The Brazilian experience in collecting data on medical exposures

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Objectives

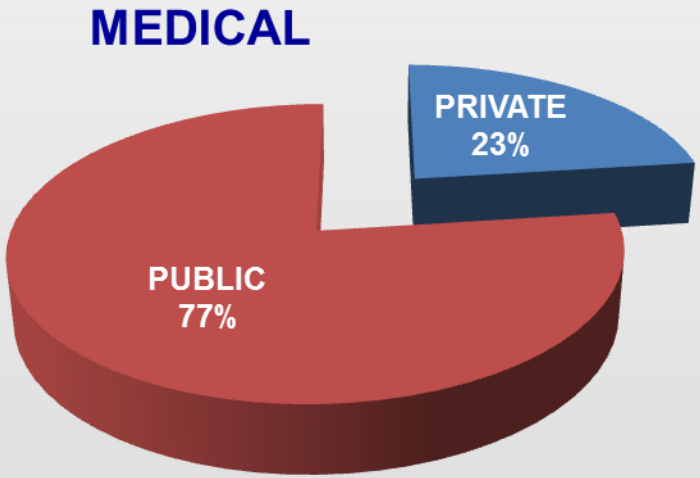
- Discuss the problems observed in collecting brazilian data on medical exposures with the UNSCEAR electronic platform.
- Discuss local problems
- Establish methodology to address the local issues

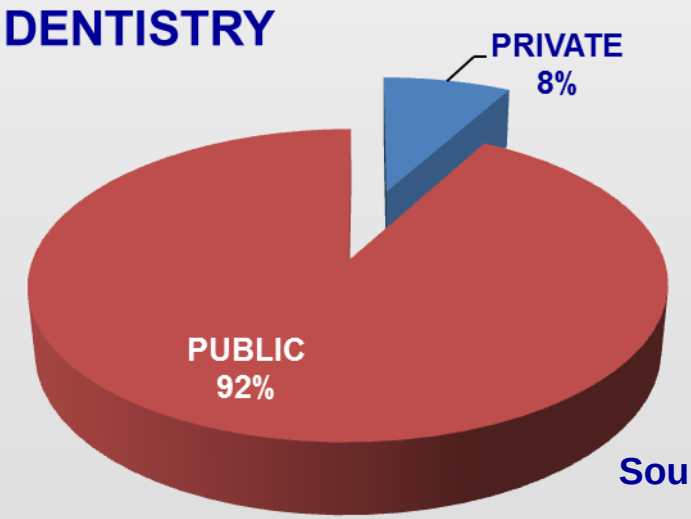
DATA

Brazilian health system

- **PUBLIC: compulsory health insurance paid directly from the salaries of every worker**

- **PRIVATE: paid health insurance (in addition to the public), very expensive**





Source: ANS

The number of procedures is not directly related

DATA
First Problem

Two Regulatory Bodies

- Ministry of Health (www.ms.gov.br)
- **ANVISA (www.anvisa.gov.br)**
- **VISA (Sanitary Vigilance) in the states**
- **SUS (Unique Health System www.sus.gov.br)**

Grant licenses addressing sanitary aspects and control radiation protection issues for Diagnostic Radiology

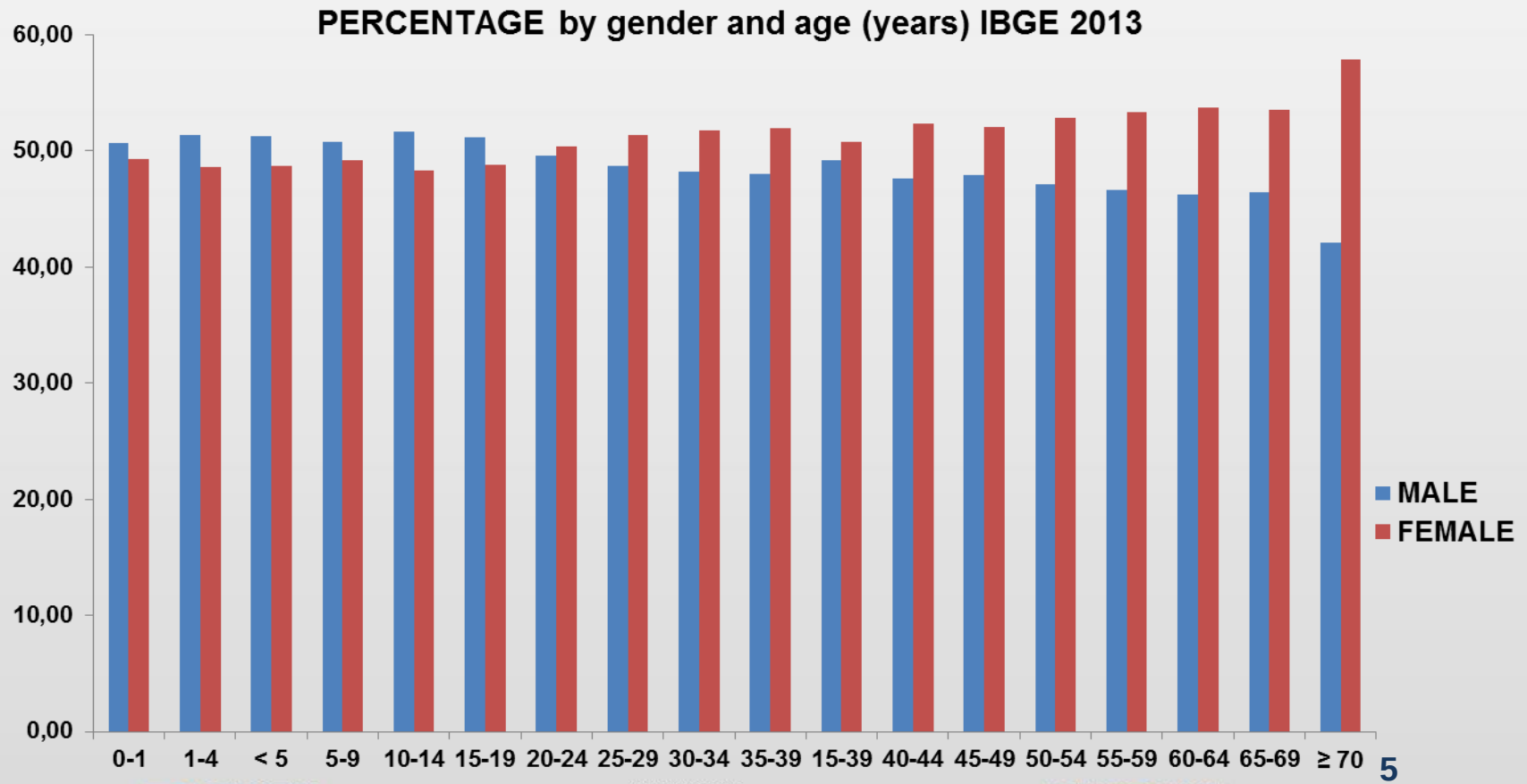
- Ministry of Science, Technology and Innovation (MCTI)
- **Brazilian Nuclear Energy Commission (www.cnen.gov.br)**

Licensing and control Radiotherapy and Nuclear Medicine facilities

- ANS (National Health Agency www.ans.gov.br) – private insurance

DATA

- General information about brazilian population is available consulting government institutions (www.ibge.gov.br)



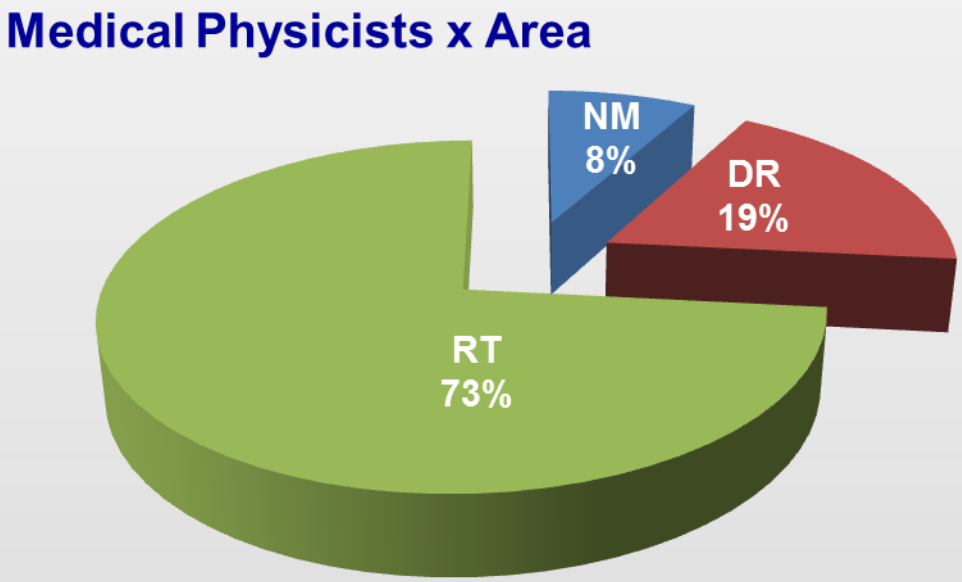
DATA

- Number of physicians (total and specialists) was obtained by the professional records in Federal Council of Medicine (www.cfm.org.br) and respective associations. But there are different classifications
- There is no Interventional Radiologist as a specialty
- Number of dentists (Federal Council of Dentistry www.cfo.org.br/)
- Number of technologists: it is a new profession in Brazil and we do not have records about number of professionals or work areas
- Nurses: total number but not specialities or work areas

DATA

Medical physicists: only mandatory in radiotherapy, not for nuclear medicine and diagnostic radiology (by regulation)

Certification process is not well stablished (www.abfm.org.br)



Total number of certified MP: 372
2015

DATA

Ministry of Health System – Public Health System
DATASUS: www2.datasus.gov.br/
Information about diseases, mortality, etc.

National Health Facilities Registration www.cnes.datasus.gov.br

- **Number of devices**
- **Number of diagnostic procedures**
- **Number of treatment procedures**

The data is not updated frequently and the information is from the health facilities to receive the insurance (confidence?)

There is no information about the used techniques or diagnostic and treatment conditions

DATA
DIAGNOSTIC RADIOLOGY

Number of devices: in public and private systems

Total number of procedures, only for public health system but not separated for technical conditions and individual or group patient characteristics

No information about image-guided interventional procedures

No information about computed tomographs technology installed (multi or single slice, dual source)

No information about CT in Dentistry, despite this technique is used around the country

No information about nuclear resonance equipment

Profession	Number of persons
Physicians	362835,0
General practitioners (GP)	81709,0
Dentists	252162,0
Radiologists	9072,0
Other physicians conducting radiological exams	8143,0
Interventional radiologists	
Interventional cardiologists	313,0
Other physicians conducting interventional procedures	
Medical physicists in radiology/imaging	56,0
Radiation technologist in radiology/imaging	23164,0
Nurses in radiology/imaging	890,0

Diagnostic radiological systems	Number of devices		
	Analogue	Digital	Total
Radiography systems			19779
Fluoroscopy systems			1399
Mammography systems			3939
Dental X-ray systems			35091
Angiography systems			640
Bone densitometry systems			1516

Computed tomography scanners	Number of devices
Single slice CT	
Multi slice CT	2651

MRI scanners	Number of devices
1.5 Tesla	1044
> 1.5 Tesla	

Modality category	Examination category	Number of examinations
Projectional radiography (without contrast media)	Head (skull & facial bones)	5025701
	Head (soft tissue)	539203
	Neck (cervical spine)	1872246
	Neck (soft tissue)	32011
	Chest/Thorax (lungs PA & LAT)	15283489
	Chest (thoracic spine)	1586189
	Chest (shoulder girdle & ribs)	2144757
	Mammography	1179874
	Mammography (screening)	2910544
	Lumbar spine	2391413
	Lumbo-sacral joint only	123833
	Abdomen	1771216
	Pelvis & hips (bone)	1439419
	Pelvis (soft tissue)	
	Limbs and joints	17910839
	Whole spine (trunk)	25711
	Skeletal survey (head & trunk)	
	Dental intraoral	2735650
	Dental panoramic	149908
	Other (please specify) Bone linear tomography	3218
	Other (please specify)	
	Other (please specify)	
	Other (please specify)	

DATA
DIAGNOSTIC RADIOLOGY

Dose calculation methodologies are well understood in scientific community but not always for the professional team

There are no register in the clinic about technical factors used for each exam or patient group characteristics

The problems can be addressed from the equipment acceptance tests that are not stablished in national standards or controlled by the regulatory body

A Quality Assurance program is not so common among the users

The presence of Medical Physicists, in a mandatory way, could help to address these problems

DATA
NUCLEAR MEDICINE

Number of devices: in public and private systems for SPECT, but not for PET or hybrid techniques

Total number of diagnostic procedures for SPECT, only for public health system

No information about administered activity and individual patient characteristics for diagnostic and treatment applications

Dose calculation methodologies are well understood in scientific community but not always for the professionals

The problem can be addressed from the equipment acceptance tests that are stablished in national standards, but not well controlled by the regulatory body

A QA program is not so common among the users

The presence of Medical Physicists, in a mandatory way, could help to address these problems

Profession	Number of persons
Physicians	362835,0
General practitioners (GP)	81709
Nuclear medicine physicians	493
Other physicians conducting NM procedures	
Medical physicists in nuclear medicine	26
Radiation technologist in nuclear medicine	23164
Nurses in nuclear medicine	890
Other (please specify) Biomedical	814

Nuclear medicine devices	Number of devices
Gamma Cameras (Planar)	
SPECT	817
SPECT-CT	4
PET Scanners	2
PET-CT Scanners	54
PET-MRI Scanners	0

Modality category	Procedure category	Radionuclide	Number of procedures
Diagnostic procedures using gamma cameras and SPECT or SPECT-CT	Nervous system	Tc-99m	69
	Nervous system	I-123	
	Skeletal	Tc-99m	89467
	Cardiovascular	Tl-201	4920
	Cardiovascular	Tc-99m	174856
	Pulmonary	Tc-99m	3959
	Endocrine	Tc-99m	2784
	Endocrine	I-123	
	Gastrointestinal	Tc-99m	3980
	Genitourinary	Tc-99m	35143
	Oncology		15928
	Infection/inflammation	Ga-67	515
	Other (Endocrine)	I-131	11182
	Other (Pulmonary)	Ga-67	87
	Other (Cardiac)	Ga-67	425
	Other (Kidney)	Ga-67	36
Diagnostic procedures using PET and PET-CT	Oncology	F-18	2160
	Oncology (other than F-18)		
	Nervous system		
	Skeletal	F-18	220
	Cardiovascular	F-18	432
	Cardiovascular (other than F-18)		
	Infection/inflammation		
	Other (please specify)		
	Other (please specify)		
	Other (please specify)		
	Other (please specify)		
Therapeutic procedures	^{131}I for malignant thyroid disease	I-131	
	^{131}I for benign thyroid disease	I-131	4451
	Therapy with ^{131}I MIBG	I-131	
	Peptide Receptor Radionuclide Therapy (PRRT)		
	Selective internal radiation therapy (SIRT)	Y-90	
	Polycythaemia vera	P-32	
	Bone metastases (palliation)		121
	Radiosynovectomy		
	Radioguided surgery		
	Other (please specify)		
	Other (please specify)		
	Other (please specify)		
	Other (please specify)		

DATA
RADIOTHERAPY

Number of devices: in public and private systems, but not directly

Total number of treatment procedures are available only for public health system and not for all treatments

No information about individual doses or number of fields used for each treatment; the data represents the maximum recommended and paid by the public health system

There is no dosimetrists in Brazil, the MP is responsible for the treatment planning

Dose calculation methodologies are well understood in scientific and professional community (MP)

The equipment acceptance tests are stablished in national standards and are controlled by the regulatory body

The presence of Medical Physicists, that is mandatory, can help to improve the data

Profession	Number of persons
Physicians	362835,0
General practitioners (GP)	81709
Radiation oncologist	309
Other doctors using radiotherapy	
Radiation technologist in radiotherapy	
Medical physicists in radiotherapy	219
Dosimetrist	0
Nurses in radiotherapy	
Other (oncologisty)	4158

External beam therapy systems	Number of devices
Low-Energy x-ray (<250 keV)	98
Cobalt-60	84
Stereotactic (with gamma source)	3
Linear accelerators	221
Robotic radiosurgery	0
Helical radiotherapy (tomotherapy)	0
HDR/LDR	110

Imaging systems	Number of devices
CT	
MRI	0
CBCT	95

What are we doing to address the problems?

To guarantee the equipment's CQ, IEC standards are being introduced by Brazilian Association of Technical Standards (ABNT) in a OPAS/MS project

The CNEN for RT and NM standards are being reviewed to update requirements

For CT there is an specific project to obtain a more accurate data, starting with paediatric exams

IRD has a Project with others CNEN institutes to develop and disseminate a software for colleting the data in DR and NM

For RT, the partner will be National Cancer Institute (INCa), that is the main technical reference in this area controlling information about cancer incidence and treatment information for all country

What are we doing to address the problems?

For NM, there is a pilot project in some hospitals to test a software to register and calculate the doses for each procedure considering patient characteristics

Training programs are in place to disseminate the concepts

We are promoting cooperation between stakeholders (Professional associations, regulatory bodies)

A political lobby has been carried out to recognise the MP as an essential professional to deal with patient protection

The members of the regulatory body (MS) have been trained to do inspections

Conclusions

We can conclude that we have only few information to address medical exposures in Brazil

So, there is a *lot of work to do!*

We can not refuse any help

But, I like to think (and talk) that this is an opportunity to improve our system

Thank you

Muchas Gracias

Obrigada

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