

## **World of work for graduates of professional education in radiology: Distribution of bone densitometry equipment in the state of Rio de Janeiro**

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### **ABSTRACT**

Bone densitometry (BD) is essential in medicine for assessing bone mineral density (BMD) and diagnosing osteoporosis. It is non-invasive and crucial in preventing osteoporotic fractures. Osteoporosis, characterized by reduced BMD, significantly increases the risk of fractures. Early detection through DO is essential in order to start appropriate treatments and monitor their effectiveness, preventing the disease from progressing. DATASUS uses the National Register of Health Establishments (CNES) to operationalize data, including OD equipment, facilitating the management and monitoring of these resources.

**Keywords:** Bone densitometry, Osteoporosis, DATASUS.

### **INTRODUCTION**

Bone Densitometry (DO) is a fundamental technique in the field of medicine, especially in the assessment of bone mineral density (BMD) and in the diagnosis of osteoporosis. According to Silva et al. (2020), "bone densitometry is an imaging test that measures the mineral density of bones, being a non-invasive and widely used method to assess the risk of osteoporotic fractures". According to Barbosa et al. (2021), "osteoporosis is a condition characterized by decreased bone mineral density and deterioration of the microarchitecture of bone tissue, resulting in a significant increase in the risk of fractures."

Early detection through bone densitometry is essential to initiate appropriate therapeutic interventions and reduce complications associated with osteoporosis. Therefore, bone densitometry not only plays a crucial role in the early diagnosis of bone conditions, but is also critical for monitoring the effectiveness of treatment and preventing disease progression (OLIVEIRA; PEREIRA, 2018).

The Unified Health System has a dedicated platform of its Department of Informatics (DATASUS), which has the function of promoting, operating and controlling national data and implementing systems to assist public health (DATASUS, 2024). The method, called National Registry of Health Establishments (CNES), aims to make DATASUS data operational, making it possible to track biomedical equipment, including Bone Densitometry (DC) equipment.

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## OBJECTIVE

The objective of this study was to identify the distribution of DC equipment in operation in the state of Rio de Janeiro, with a view to evidencing the current clinical and workability scenario in the field of radiological techniques, characterizing collaboration for professional education in radiology.

## METHODOLOGY

The method used in the study was descriptive research, which involved the collection of information at a quantitative level.

At first, a survey was carried out on the CNES website until mid-June 2024, regarding the diagnostic imaging equipment of Bone Densitometry in the state of Rio de Janeiro, as shown in figures 1 and 2:

Figure 1: CNES page with the DC equipment in Rio de Janeiro.

Indicadores - Equipamentos					
Estado - RJ					
Tipo Equipamento - Equipamentos de Diagnostico por Imagem - Raio X para Densitometria Ossea					
CNES	Estabelecimento	Município	Existentes	em Uso	SUS
0909319	ALENA BARRA	RIO DE JANEIRO	1	1	N
9531580	ALPORGES COMERCIO E SERVICOS LTDA	BELFORD ROXO	1	1	S
7973306	ALTA BARRA SHOPPING	RIO DE JANEIRO	1	1	N
7367856	ALTA BOTAFOGO	RIO DE JANEIRO	1	1	N
3071650	ALTA IPANEMA	RIO DE JANEIRO	1	1	N
9333347	ANTONIO JOSE CASIMIRO DE CARVALHO MONTEIRO	ANGRA DOS REIS	1	1	N
3151700	APICE HOSPITAL LTDA	SAO JOAO DE MERITI	1	1	N
3058050	ASSIM MEDICAL TIJUCA	RIO DE JANEIRO	1	1	N
6403859	ASSOCIACAO AMOR E VIDA	ITAGUAI	1	1	N
3030415	BENEFICENCIA PORTUGUESA DE PETROPOLIS	PETROPOLIS	1	1	N
6786537	BIENCLIN	CAMPOS DOS GOYTACAZES	1	1	N
3382133	BRONSTEIN MED DIAG MEIER II	RIO DE JANEIRO	1	1	N
3383083	BRONSTEIN MEGA MADUREIRA	RIO DE JANEIRO	1	1	N
7011547	CADI DIAGNOSTICOS	ARMACAO DOS BUZIOS	1	1	S
7442548	CADI DIAGNOSTIDO	CASIMIRO DE ABREU	1	1	S
9280944	CAMIM CLINICA MEDICA	RIO DE JANEIRO	1	1	N
0288187	CAMIM DEL CASTILHO	RIO DE JANEIRO	1	1	N
3958035	CARDIO CENTER RESENDE	RESENDE	1	1	N
3113205	CASA DE PORTUGAL	RIO DE JANEIRO	1	1	N
3130339	CASA DE SAUDE E MATERNIDADE TEREZINHA DE JESUS LTDA	SAO JOAO DE MERITI	1	1	N
3046281	CASA DE SAUDE NOSSA SENHORA DO CARMO	RIO DE JANEIRO	1	0	N
2275244	CASA DE SAUDE PIO XII	SANTO ANTONIO DE PADUA	1	1	N
2271443	CASA DE SAUDE SAO JOSE	RIO DE JANEIRO	1	1	N
2281244	CDOAR	ANGRA DOS REIS	1	1	S

Source: CNES, 2024.



Figure 2: Data of the establishment that has DC devices in RJ.

Estabelecimento de Saúde					
Identificação					
CADASTRADO NO CNES EM: 11/10/2021 ULTIMA ATUALIZAÇÃO EM: 31/5/2024 DATA DE ATUALIZAÇÃO LOCAL: 26/4/2024					
Veja onde se localiza:		Exibir Ficha Reduzida por Competência		Exibir Ficha Reduzida Atual	
Nome:			CNES:	CNPJ:	
ALENA BARRA			0909319	38299625000179	
Nome Empresarial:			CPF:	Personalidade:	
ALENA SERVICOS MEDICOS E MEDICINA DIAGNOSTICA LTDA			--	JURÍDICA	
Logradouro:			Número:	Telefone:	
AV DAS AMERICAS			13685	2198798265	
Complemento:		Bairro:	CEP:	Município:	UF:
LOJA B1 B2		BARRA DA TIJUCA	22790701	RIO DE JANEIRO - IBGE - 330455	RJ
Tipo Estabelecimento:		Sub Tipo Estabelecimento:		Gestão:	Dependência:
CLINICA/CENTRO DE ESPECIALIDADE		OUTROS		MUNICIPAL	INDIVIDUAL
Número Alvará:		Órgão Expedidor:		Data Expedição:	
09/97/051168/2023		SMS		01/05/2023	
Horário de Funcionamento:					
Sempre aberto					
Módulos:					
Básico	Conjunto	Ambulatorial	Hospitalar	Mantenedora	Profissionais
Habilitações	Regras Contratuais	Contrato de Gestão	Incentivos	Equipes	Residência Terapeutica
Telessaúde	Org. Parceiras	Ger/Adm (Terceiro)			

Source: CNES, 2024.

Secondly, a spreadsheet was prepared with the following guidelines: establishment, municipality, state, existing and used equipment, and whether they are operating in the SUS, as illustrated in figure 3:

Figure 3: Illustration of the spreadsheet with all the DO equipment installed in RJ.

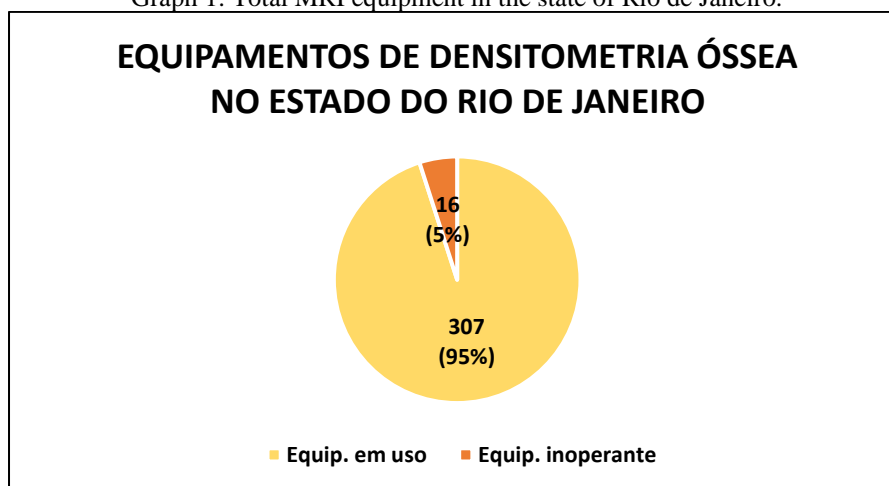
CADASTRO NACIONAL DE ESTABELECIMENTOS DE SAÚDE (CNES)				
EQUIPAMENTO DE DENSITOMETRIA ÓSSEA				
Estabelecimento	Município	Equipamentos Existentes	Equipamentos em Uso	Atuação no SUS
ALENA BARRA	RIO DE JANEIRO	1	1	N
ALPORGES COMERCIO E SERVICOS LTDA	BELFORD ROXO	1	1	S
ALTA BARRA SHOPPING	RIO DE JANEIRO	1	1	N
ALTA BOTAFOGO	RIO DE JANEIRO	1	1	N
ALTA IPANEMA	RIO DE JANEIRO	1	1	N
ANTONIO JOSE CASIMIRO DE CARVALHO MONTEIRO	ANGRA DOS REIS	1	1	N
APICE HOSPITAL LTDA	SAO JOAO DE MERITI	1	1	N
ASSIM MEDICAL TIJUCA	RIO DE JANEIRO	1	1	N
ASSOCIACAO AMOR E VIDA	ITAGUAI	1	1	N
BENEFICENCIA PORTUGUESA DE PETROPOLIS	PETROPOLIS	1	1	N
BIENCLIN	CAMPOS DOS GOYTACAZES	1	1	N
BRONSTEIN MED DIAG MEIER II	RIO DE JANEIRO	1	1	N
BRONSTEIN MEGA MADUREIRA	RIO DE JANEIRO	1	1	N
CADI DIAGNOSTICOS	ARMACAO DOS BUZIOS	1	1	S
CADI DIAGNOSTIDO	CASIMIRO DE ABREU	1	1	S
CAMIM CLINICA MEDICA	RIO DE JANEIRO	1	1	N
CAMIM DEL CASTILHO	RIO DE JANEIRO	1	1	N
CARDIO CENTER RESENDE	RESENDE	1	1	N
CASA DE PORTUGAL	RIO DE JANEIRO	1	1	N
CASA DE SAUDE E MATERNIDADE TEREZINHA DE JESUS LTDA	SAO JOAO DE MERITI	1	1	N
CASA DE SAUDE NOSSA SENHORA DO CARMO	RIO DE JANEIRO	1	0	N
CASA DE SAUDE PIO XII	SANTO ANTONIO DE PADUA	1	1	N
CASA DE SAUDE SAO JOSE	RIO DE JANEIRO	1	1	N
CDOAR	ANGRA DOS REIS	1	1	S
CDT SCAN	TERESOPOLIS	1	1	S
CDT SCAN	TERESOPOLIS	1	1	S
CEDI CENTRO DE DIAGNOSTICOS	RIO DAS OSTRAS	1	1	N
CEDI DIAGNOSTICOS	MACAE	1	1	N
CEDOR	RESENDE	1	1	N

Source: Author's collection, 2024.

## RESULTS

After fragmenting the data collected, providing the quantity of the OD equipment, it was found that there are 323 devices in the entire state of RJ, among these, 307 (95%) are operational and 16 (5%) are not in operation, shown in graph 1:

Graph 1: Total MRI equipment in the state of Rio de Janeiro.



As shown below in table 1, the distribution of OD equipment in operation in the municipalities of the state of RJ was as follows: 128 for the municipality of RJ, 16 for Belford Roxo, 14 for São Gonçalo, 11 for São João de Meriti, 10 for Duque de Caxias, Nova Iguaçu and Campos dos Goytacazes, 9 for Niterói, 7 for Nova Friburgo, Petrópolis, Macaé and Resende, 6 for Araruama, 5 for Angra dos Reis, Cabo Frio and Três Rios, 4 for Magé and Teresópolis, 3 for Nilópolis and Itaboraí, 2 for Volta Redonda, Itaocara, Rio Bonito, Guapimirim, Maricá, Itaguaí, Itaperuna, Rio das Ostras and Santo Antônio de Pádua, 1 for Cachoeira de Macacu, Cordeiro, Queimados, Armação de Búzios, Arraial do Cabo, Cambuci, Cantagalo, Casimiro de Abreu, Miguel Pereira, Miracema, Natividade, Paracambi, São Pedro da Aldeia, Vassouras, Barra Mansa, Barra do Piraí, Engenheiro Paulo de Frontin, São José do Vale do Rio Preto, Saquarema and Valença.

Table 1 - Distribution of OD equipment by municipalities in the state of Rio de Janeiro.

Municipalities	Equip. In use
Rio de Janeiro	124
Belford Roxo	18
São Gonçalo	14
São João de Meriti	11
Duque de Caxias	10
Nova Iguaçu	10
Campos dos Goytacazes	10
Niterói	9
Nova Friburgo	7
Petrópolis	7



Macaé	7
Resende	7
Araruama	6
Angra dos Reis	5
Cabo Frio	5
Três Rios	5
Magé	4
Teresópolis	4
Nilópolis	3
Itaboraí	3
Volta Redonda	2
Itaocara	2
Rio Bonito	2
Guapimirim	2
Maricá	2
Itaguaí	2
Itaperuna	2
Rio das Ostras	2
Santo Antônio de Pádua	2
Cachoeira de Macacu	1
Cordeiro	1
Queimados	1
Armação do Búzios	1
Arraial do Cabo	1
Cambuci	1
Cantagalo	1
Casimiro de Abreu	1
Miguel Pereira	1
Miracema	1
Natividade	1
Paracambi	1
São Pedro da Aldeia	1
Vassouras	1
Barra Mansa	1
Barra do Piraí	1
Engenheiro Paulo de Frontin	1
São José do Vale do Rio Preto	1
Saquarema	1
Valença	1
<b>Total</b>	<b>307</b>

## FINAL CONSIDERATIONS

According to the results obtained in this research, it was found that of the 323 DC equipment existing in the state of Rio de Janeiro, 16 of them are not in operation. This means that 307 are operative.

Of the 67% of DC devices that are operating in the state's municipalities, they are concentrated in: **Rio de Janeiro, Belford Roxo, São Gonçalo, São João de Meriti, Duque de Caxias, Nova Iguaçu, Campos dos Goytacazes and Niterói.**

It is considered that municipalities with large numbers of OD equipment advance in better serving the population, while inevitably creating an expansion of the field of work for professionals in the segment. In short, there is a tendency for a greater number of OD equipment to advance of the years, with



a view to better serving the local populations, which offers employment opportunities in the radiological area.



## REFERENCES

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