SOME ASPECTS OF DIAGNOSTIC RADIOLOGY IN BRAZIL

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Country Information

Area: 8,514,877 km$^2$

Population: 188,098,127 hab

Number of physician/1000h

- TOTAL: 1.71
- North Region: 0.84
- Northeast Region: 1.02
- Southeast Region: 2.31
- South Region: 1.79
- Midwestern Region: 1.71
Distribution of radiology equipment in health facilities

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>REGION OF THE COUNTRY</th>
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<tbody>
<tr>
<td></td>
<td>North</td>
</tr>
<tr>
<td>Mammography</td>
<td>105</td>
</tr>
<tr>
<td>X-Ray Units</td>
<td>858</td>
</tr>
<tr>
<td>Fluoroscopy equipment</td>
<td>30</td>
</tr>
<tr>
<td>Hemodynamic equipment</td>
<td>14</td>
</tr>
<tr>
<td>Computed Tomography</td>
<td>71</td>
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</tbody>
</table>

High concentration of the medical units in the South and Southeast regions

New diagnostic imaging technologies are found besides old technologies.

IBGE – Brazilian Institute of Geography and statistics - 2006
Regulatory Aspects

• The National Sanitary Vigilance Agency (ANVISA) of the Health Ministry is the regulatory authority in the diagnostic field.

• ANVISA delegates the authority to carry out inspections and to issue operation licences to the State Sanitary Vigilances of the State Health Secretaries.

• Requirements for the medical use of radiation are in agreement with the BSS with respect to infrastructure, staff and quality assurance and are established in Resolution 453/1998 (MS) of the National Health Ministry.

• The Program of Quality Assurance and the radiometric survey are obligatory since 1989.
Actual situation in Brazil Radiology Services

• There is an unequal distribution of facilities and radiology services in the country

• There is a great contrast in the technology of the equipments available. In some services there is equipment of the most recent technology and in others there is very old equipments

• Surveys of patient dose and image quality have been undertaken in some states of the country. As a result of these studies, some clinics have implemented a quality assurance program
Actual situation in Brazil Radiology Services

- Although there is no justification, many hospitals adopt, as a protocol for patient's hospitalization, an X-ray examination of the chest.

- Some public institutions also require a chest X-ray for hiring the employee.

- Some hospitals require a chest X-ray per day for inpatients.
Due to financial interests, a number of examinations, higher than the necessary, are required for the patient without justification, in special, in hospitals and private clinics.

The new technologies are highly expensive for our country, resulting in high cost for the patients.

Another important aspect is related to the physical infrastructure of the services and personnel training.

Investments in the acquisition of new technologies are not accompanied by investment in staff training.
Pediatric Radiology

- There are no dedicated x-ray equipments for pediatric radiology.
- Some studies have demonstrated the large variation of the exposure parameters used in hospitals in Brazil, many of which are outside the recommend values of the EC.
- It is common the use of anti-scattering grids for pediatric x-ray examinations.
- It is no common the use of patient protectors and of immobilizers.
- High values of the Entrance Surface Air Kerma are observed, indicating that the procedures are not optimized.
Computed Tomography

- In many cases the volume irradiated is greater than the necessary: torax, abdomen, pelvis is a normal practice.

- Utilization of pitch < 1.

- Same protocols for adults and children.

- There is no special devices for shielding of superficial organs such as thyroid, breast, eye lens and gonads particularly in children and young adults.

- The modulation system (automatic exposure control) are not often utilized.

- The protocols are not optimized in the clinics.

- There is not a certification program implemented in the country to evaluate the image quality and patient dose.

- There is a tendency to carry on the procedure in 3 or 4 phases – (contrast).
CONCLUSIONS

1. In Brazil, the territorial dimension and the expressive differences in distribution of income in the country leads to a contrast in the technology installed, in the qualification of the radiology service staff and consequently in the quality of the service offered to the population.

2. The specific legislation published in 1998 contributed to improve the quality in the radiology centers.

3. Quality Programs in Mammography, magnetic resonance, ultrasound imaging and Nuclear Medicine (CBR) has contributed to the quality of the services.

4. Governmental Bodies should be created to regulate and enforce radiological services.

5. Radiological equipments and raw materials should only be sold to Radiological Technical Supervisors.