



WORLD HEALTH ORGANIZATION

Diagnostic imaging

AIDE-MEMOIRE

for Diagnostic Imaging Services

Diagnostic imaging is a prerequisite for the correct and successful treatment of at least a quarter of all patients worldwide.

Diagnostic imaging services (DIS) should be:

- Developed as an integral part of national health care systems, according to the needs and social and economic structure of the country, region and area
- Regulated by governments in accordance with international standards
- Appropriate to the level of the health care system at which they are provided
- Appropriate to the therapeutic capabilities that are available.

Approximately two-thirds of patients needing diagnostic imaging can be diagnosed by the use of simple X-ray examinations and ultrasound examinations, either singly or in combination. Every hospital, from district level to university hospital level, should have the capacity to perform these techniques.

Referral hospitals and larger medical institutions should be able to provide more sophisticated techniques and procedures, in accordance with local needs.

Regardless of the type of equipment and procedures used, the following infrastructure is required.

- 1 Trained medical, technical and engineering staff.
- 2 Radiation protection.
- 3 Reliable supplies of clean water, electric power, X-ray films, chemicals and spare parts.
- 4 Adequate air quality control.

Words of advice

- **Secure government commitment and support for the national diagnostic imaging programme**
- **Establish a National Radiation Protection Control Authority to develop and enforce national regulations in accordance with international standards**
- **Plan diagnostic imaging services in accordance with national and local needs and the available therapeutic capabilities**
- **Ensure that every hospital has the capacity to perform X-ray examinations and ultrasound examinations**
- **Establish the necessary infrastructure for safe and effective diagnostic imaging services**
- **Establish a national quality system for diagnostic imaging services**
- **Train all medical, technical and engineering staff involved in diagnostic imaging**



Checklist

National level

- ☐ Government commitment and support
- ☐ National plan for diagnostic imaging services
- ☐ National Radiation Protection Control Authority
- ☐ National regulations on radiation protection
- ☐ Specialist DIS advisory groups
- ☐ Inventory and needs assessment
- ☐ Upgrading, repair and maintenance of existing facilities and establishment of new services, as appropriate
- ☐ National quality system

Local level

- ☐ Equipment and procedures relevant to each hospital's needs and the therapeutic capabilities available
- ☐ Training of all medical, technical and engineering staff involved in diagnostic imaging
- ☐ Suitable infrastructure, including radiation protection, clean water, stable power supply and air quality control
- ☐ Adequate and reliable supply of films, chemicals and spare parts
- ☐ Correct, safe functioning of equipment
- ☐ Regular maintenance of equipment by trained technical maintenance staff
- ☐ Radiation protection measurements, in accordance with national regulations
- ☐ Correct image handling, development of films and interpretation of examinations
- ☐ Quality assurance and quality control programme, including standard operating procedures

Key elements

Develop and maintain diagnostic imaging services

It is the responsibility of governments to ensure safe and adequate diagnostic imaging services (DIS) as part of national health systems. The operational responsibility may be divided between governmental and private institutions, but the overall responsibility remains with governments.

Important activities include:

- The formalization of government commitment and support
- The development of a national plan for diagnostic imaging services

- The establishment of a National Radiation Protection Control Authority to develop and enforce national regulations in accordance with international standards
- The appointment, when necessary, of specialist DIS advisory groups
- An inventory of current availability and assessment of future needs:
 - buildings and facilities
 - medical and technical equipment
 - staff
 - education and training

- The upgrading, repair and maintenance of existing facilities and the planning of new services, according to national and local needs
- The appointment and training of staff, as appropriate
- The procurement, supply, storage and distribution of films, chemicals and spare parts to ensure continuity of services
- The establishment of a national quality system, including guidelines, standard operating procedures (SOPs), accurate records, monitoring and evaluation.

Develop national guidelines and regulations

A national strategy should be developed which ensures that diagnostic imaging services at all levels adhere to national and international regulations and standards.

- National and international regulations and guidelines for radiation protection should be followed at all times
- An adequate number of trained staff should be available, in accordance with the needs of the hospital
- The technical and medical quality of examinations should conform with generally accepted international practice and recommendations
- Examinations should be performed in accordance with medical considerations.

Plan appropriate services for each level of the health care system

Diagnostic imaging services should be established as an integral part of each hospital and adapted to local needs. These will be determined by:

- The type and size of the hospital
- The number and type of patients: disease burden, inpatients and outpatients
- Therapeutic capabilities.

The structure and capacity of each diagnostic imaging facility or department should be based on existing or planned therapeutic capabilities

within a hospital, region or country, in accordance with an overall, national health plan.

They should also be developed in close collaboration between national health authorities and relevant hospital clinical and technical staff.

Every hospital, from district level to tertiary level, should have the capacity to perform:

- Simple X-ray examinations
- Ultrasound examinations.

Referral hospitals and larger medical institutions should be able to provide more sophisticated techniques and procedures, including:

- Specialized X-ray based techniques, such as:
 - Contrast media enhanced examinations (gastrointestinal tract, angiography, urography)
 - Computed tomography (CT)
 - Mammography
 - Combined diagnostic and therapeutic procedures (interventional radiology)
- Doppler Technique ('Colour-Doppler')
- Magnetic Resonance Imaging (MRI)
- Nuclear medicine examinations, including Single Photon Emission (Computed) Tomography (SPECT)
- Positron Emission Tomography (PET).

Establish an infrastructure for DIS

A minimum of infrastructure should be in place for all DIS, as follows.

Department/facility

- Adequate medical and technical knowledge and skills for:
 - correct image handling
 - development of X-ray films
 - interpretation and reporting of examinations
- Adequate engineering knowledge and skills for:
 - equipment installation and maintenance
 - radiation protection, including construction requirements and regulations
- Accessible supply of spare parts
- Reliable supply of clean water
- Reliable, stable power supply
- Adequate air quality control: pollution, temperature, humidity
- Suitable location:
 - accessible to operating rooms and relevant departments
 - convenient for transportation of beds and stretchers
- Adequate facilities for patients, accompanying persons and staff
- Quality control system.

Examination room and equipment

- Radiation protection in accordance with national regulations
- Correct, safe and efficient use of equipment in accordance with operation manuals and SOPs
- Regular maintenance of equipment in accordance with operation manuals and SOPs
- SOPs for:
 - patient identification
 - documentation
 - archiving
- Quality control system.

