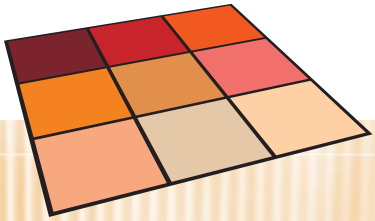


ESSENTIAL DIAGNOSTIC IMAGING

THE DIAGNOSTIC WORK-UP

A systematic and organized approach to a patient leading to a conclusion is what in medical terms is called a *diagnostic work-up*, and is a prerequisite before any medical treatment or intervention can be prescribed.

An incorrect diagnosis, or treatment in the absence of any diagnosis, can have serious, even fatal consequences for the patient. It is therefore in the interests of the patient, the medical profession and the general public that diagnostic conclusions are as correct as possible and that the final diagnosis is based on adequate and reliable medical and scientific procedures.

In the majority of cases, a diagnosis is based on a combination of "patient history" and a medical examination without the need for additional diagnostic procedures. The accuracy of this diagnosis, however, depends on the knowledge, skills and experience of the person making the judgement, i.e. the health staff establishing the diagnosis.

CAUSES OF INADEQUATE DIAGNOSIS

Although no reliable documentation exists, it is generally assumed that in some 20%-30% of cases worldwide, clinical considerations alone are not sufficient to make a correct diagnosis. A child with severe cough and fever, for example, is often diagnosed to have pneumonia, although an X-ray examination may uncover information to indicate a different condition and avoid the expensive and potentially dangerous antibiotics that would otherwise be prescribed.

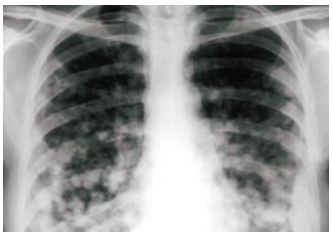
Similarly, sometimes a correct diagnosis is insufficient to prescribe appropriate treatment. For example, it is normally easy to diagnose a limb fracture when combining patient history and clinical signs, but it may be difficult to give proper treatment without an X-ray examination revealing anatomical details such as the position of fragments, distortion etc.

Why is a medical diagnosis necessary?

Medical treatment – and global disease surveillance – depends on a correct diagnosis. This is nothing more than a summary of the patient's complaint, objective clinical signs such as fever or pallor, and physical, social or environmental conditions which may have an influence on the patient's condition.

WHAT IS DIAGNOSTIC IMAGING?

Diagnostic imaging is a means to take pictures of the structure and processes in the body and make them visible or "accessible" to the human eye.



It encompasses the use of so-called ionizing radiation (i.e. X-ray based examinations including CAT scan (computed tomography), or nuclear medicine procedures or "scintigraphy"), ultra-sound, magnetic resonance and a few other highly sophisticated procedures. Practically, however, some 80%-90% of diagnostic problems can easily be solved using "basic" X-ray examinations and/or ultrasound examinations, regardless of the type of hospital or medical setting.

Unfortunately, two-thirds of the world's population has no access to this type of service. When it is available, both the quality and safety of the procedures may be questionable or even dangerous, both to the patient, the health care worker and the public.

In general, such conditions are most prominent in low-income countries with insufficient infrastructure, an unstable political environment and a considerable burden of disease. This is compounded by the need of these countries to allocate scarce resources to basic life-saving issues such as the supply of safe, clean water and nutrition.

Appropriate policies for diagnostic imaging services are therefore rarely seen as a global health priority, or integrated into the national health plan. National health authorities are often simply unaware of the problem. On the other hand, basic diagnostic imaging services are invariably taken for granted in the modern world, leading to insufficient aid and support being channelled to diagnostic capacity in the developing world.

WHO'S IMMEDIATE RESPONSE

Increased political and financial awareness from all sides will have a tremendous impact on the health of all, particularly those in greatest need. Much could be achieved rapidly and effectively by working with countries to improve the skills and capacities of those working in difficult conditions, often using inadequate, old and unreliable equipment in a questionable way. The key to success is *education adapted to local needs*.

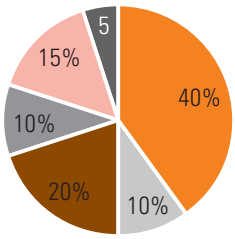
The WHO Team of Diagnostic Imaging, in collaboration with the Global Steering Group for Education and Training in Diagnostic Imaging, is responding to immediate needs for improving quality, safety, quantity and equity of diagnostic imaging services for small and mid-size hospitals in remote areas by:

- assessing short- and long-term needs
- improving medical and technical capacity through centres of excellence to train trainers according to local needs
- supporting local and regional experts to develop and implement train trainers programmes adapted to local needs.
- supporting research into the availability of modern technology for resource-poor settings, such as digital imaging facilities

THE WHO BASIC OPERATIONAL FRAMEWORK

The WHO Department of Essential Health Technologies assists countries to achieve a safe and reliable level of health services in a variety of health technologies through its Basic Operational Frameworks.[1]

Estimated needs for diagnostic imaging



Chest problems	40%
Musculoskelatal problems	10%
Accidents and injuries	20%
Abdominal problems	10%
Pregnency-related problems	15%
Other	5%

Below is a summary of the requirements for countries to attain this level of health service for Essential Diagnostic Imaging, and the products and services that WHO can make available to support this goal.

Diagnostic imaging – the most common and most needed procedures of which are X-ray and ultrasound examinations – plays a critical role in surveillance, prevention and diagnosis of disease as well as in monitoring treatment.

Scaling-up health services in a country implies that essential diagnostic imaging services are available nationwide. However, countries face major challenges in achieving this goal. These include weak national systems, rudimentary procurement and supplies procedures, great disparity between urban and rural areas, a lack of infrastructure and human resources, variable quality of laboratory performance and equipment that is either inappropriate or ill-maintained.

Policy

TO BE IN PLACE IN COUNTRIES

National policies and guidelines related to diagnostics services need to be based on an assessment of the current situation. Such assessments, or benchmarking, are largely missing in developing countries. Road maps for planning, implementation and evaluation of national systems also need to be developed. Key elements include:

- Formalization of government commitment to diagnostic imaging services.
- Development of a national plan to include and implement accreditation.
- National regulations on radiation protection
- National staff training programme
- Commitment of capital and resources to set up, maintain and further develop nationwide diagnostic imaging services according to local needs.

WHO PRODUCTS AND SERVICES TO SUPPORT POLICY REQUIREMENTS

- Aide Mémoire on Diagnostic Imaging
- Essential requirements for imaging technology
- Policy guidelines for diagnostic support for surveillance and treatment
- Tools for assessing diagnostic imaging services

Quality and safety

TO BE IN PLACE IN COUNTRIES

National systems need to monitor the quality, safety and performance of diagnostic imaging technologies appropriate for their country.
Key elements include:

- National regulatory authority on radiation protection.
- Curricula for radiologists and radiological technologists
- Harmonized procurement of equipment and consumables, such as films and chemicals.

[1] *The Basic Operational Framework for Essential Diagnostic Imaging can be found on the Internet at www.who.int/eht*

- Regular measurement of laboratory performance against international standards
- Establishment, implementation and monitoring of quality control programmes adapted to local needs and conditions

WHO PRODUCTS AND SERVICES TO SUPPORT QUALITY AND SAFETY REQUIREMENTS

- Assessment of the quality of diagnostic technologies
- Guidelines on establishing a national quality system
- Training of health care staff in quality and safety standards

Access

TO BE IN PLACE IN COUNTRIES

Access to high quality diagnostic imaging products should be based on an essential list of services and equipment. Key elements include:

- National policy including support to the management of injuries and disease according to needs and medical capacity.
- Nationally negotiated prices through WHO and partner institutions
- Reliable and timely distribution of equipment and consumables
- Lightened tax levies on imports of equipment

WHO PRODUCTS AND SERVICES TO SUPPORT ACCESS REQUIREMENTS

- Guidelines for procurement and supply management systems for equipment and supplies
- Essential equipment list for hospitals at various levels
- Training in equipment maintenance and basic repair
- Negotiations with industry and guidelines on donations
- Facilitated technology transfer
- Training of medical and technical staff according to national guidelines
- Training in handling equipment safely and appropriately
- Upgrading medical and diagnostic knowledge of users

Use

TO BE IN PLACE IN COUNTRIES

Insufficient and high turnover of skilled staff is a reality in many countries. In addition, national curricula for a degree related to diagnostic imaging services may not be up to date with the rapidly evolving diagnostic technologies. Continuous training is therefore essential, especially for those actually carrying out diagnostic imaging activities. Key elements include:

- National and regional Centres of Excellence for Education and Training in Diagnostic Imaging
- Train-the-Trainers programmes adapted to national and local needs
- Train the users of the equipment and services to increase their medical and technical knowledge