When the first edition of this manual was published in 1995, it quickly established itself as a reference work. In the intervening period, the rapid developments that have occurred in both ultrasound equipment and investigative techniques, including use of ultrasonography in the therapeutic domain, have necessitated publication of a totally new edition of this manual.

Volume 2 covers paediatric examinations, gynaecology and musculoskeletal examinations, as well as therapy.

This package includes volume 1 and 2 of Manual of Diagnostic Ultrasound. These new publications, which extensively cover modern diagnostic and therapeutic ultrasonography, will be of great use to medical professionals in both developed and developing countries.

The present volume in the series of WHO manuals in diagnostic imaging, provides an exhaustive description of radiographic normal anatomy as well as the most common pathologic changes seen in the chest, focusing specifically on pulmonary and cardiac problems.

The text aims to provide an aid to the interpretation of the chest radiograph (CXR). It is not a comprehensive account of all possible chest diseases but a descriptive text to help identify the way in which chest pathology is manifest and diagnosed on CXR. Backed by high-quality reproduction of radiographs, this manual will prove essential reading to general practitioners, medical specialists, radiographers and radiologists in any medical settings, although focusing specifically on needs in small and mid-size hospitals.
Basic Physics of Ultrasonographic Imaging

This manual is one of a series of four practical and technical books and manuals prepared by the International Society of Radiographers and Radiological Technologists (ISRRT) on behalf of the Global Steering Group for Education and Training in Diagnostic Imaging, established by the World Health Organization in 1999. The aim of these books is to assist medical and technical personnel working in the area of diagnostic imaging in small and mid-size hospitals. The present volume on basic physics of ultrasonographic imaging procedures provides clear and concise information on the physics behind ultrasound examinations in diagnostic imaging.

X-ray Equipment Maintenance and Repairs Workbook for Radiographers and Radiological Technologists

The X-ray equipment maintenance and repairs workbook is intended to help and guide staff working with, and responsible for, radiographic equipment and installations in remote institutions where the necessary technical support is not available, to perform routine maintenance and minor repairs of equipment to avoid breakdowns. The book can be used for self-study and as a checklist for routine maintenance procedures.

WHO Manual of Diagnostic Imaging: Radiographic Technique and Projections

This manual provides practical assistance and guidelines for exposures, projections and positioning of a patient as needed for a majority of common radiographic examinations. Although each examination needs to be tailor-made according to clinical problems, size and age of patients, and type of equipment used, this manual offers basic generic information, which can easily be modified according to local needs. Backed by sophisticated computer graphics, this manual will prove essential assistance and help to anybody involved in producing radiographs, be it general practitioners, medical specialists, radiographers or radiologists in any medical settings, although focusing specifically on needs in small and mid-size hospitals.

WHO Manual of Diagnostic Imaging. Radiographic Anatomy and Interpretation of the Musculoskeletal System

This manual provides an exhaustive description of radiographic normal anatomy as well as pathologic changes most frequently seen in musculoskeletal system including trauma, infections in bone and joints, metabolic, endocrine, and toxic disorders, tumours, congenital and developmental disorders.

Backed by high-quality reproduction of radiographs, this manual will prove essential reading to general practitioners, medical specialists, radiographers and radiologists in any medical settings, although focusing specifically on needs in small and mid-size hospitals.
Pattern Recognition in Diagnostic Imaging

This book focuses on how to perform and interpret X-rays examinations in countries where diagnostic imaging has not yet reached the stage of molecular imaging and where many primary care physicians have had little or no training in the interpretation of images, both radiographic and sonographic. It provides images of common pathologies seen in many developing countries in a pattern format. These include chest, musculoskeletal, gastrointestinal and urinary tract patterns. The pattern recognition format has been used successfully both by national and international radiographic societies to educate and train radiographers and physicians working in regions where advice or services from radiologists are unavailable.

Laboratory Quality Management System Handbook

This handbook is intended to provide a comprehensive reference on Laboratory Quality Management System for all stakeholders in health laboratory processes, from management, to administration, to bench-work laboratorians. This handbook covers topics that are essential for quality management of a public health or clinical laboratory. They are based on both ISO 15189 and CLSI GP26-A3 documents. Each topic is discussed in a separate chapter. The chapters follow the framework developed by CLSI and are organized as the “12 Quality System Essentials”. This handbook was developed through collaboration between the WHO Lyon Office for National Epidemic Preparedness and Response, the United States of America Centers for Disease Control and Prevention (CDC) Division of Laboratory Systems, and the Clinical and Laboratory Standards Institute (CLSI).

Laboratory Quality Standards and their Implementation

Establishing and maintaining laboratory quality standards are essential to generate reliable results to support clinical and public health actions. The Laboratory Quality Standards present a minimum set of standards that can be readily adapted by countries and applied to laboratories at every level of the health-care system. This document also outlines mechanism to implement them. This document will be of help to national policy-makers as well as regulators in developing national laboratory quality standards. It provides a simple approach to meet the minimum requirements set with the ultimate objective to comply with ISO 15189 in a logical and step-by-step manner.

Laboratory Biosafety Manual

For more than 20 years, since it was first published in 1983, the Laboratory biosafety manual has provided practical guidance on biosafety techniques for use in laboratories at all levels. Good microbiological technique and appropriate use of biosafety equipment by well trained staff remain the fundamental elements of laboratory biosafety.

For this new edition, therefore, the manual has been extensively revised and expanded. The manual now covers risk assessment and the safe use of recombinant DNA technology, and provides guidelines for the commissioning and certification of laboratories. Biosecurity concepts are introduced, and the latest international regulations for the transport of infectious substances are reflected. Material on safety in health-care laboratories, previously published elsewhere by WHO, has also been incorporated.
### Manual of Basic Techniques for a Health Laboratory

This book is a new edition of a very popular laboratory manual published by WHO in the 1980s. The new edition is necessary because of new procedures and technologies developed since the previous edition that have proved useful to small laboratories in developing countries. These new procedures and technologies have been included in the relevant sections of the manual, and some obsolete procedures have been replaced by more up-to-date techniques. The manual provides a practical guide to the safe and accurate performance of basic laboratory techniques. Intended for use by laboratory technicians working in peripheral-level laboratories in developing countries, the book emphasizes simple, economical procedures that can yield accurate results where resources, including equipment, are scarce and the climate is hot and humid.

2003, 394 pages  
ISBN 978 92 4 154530 3  
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Also available in French

### Basic Laboratory Procedures in Clinical Bacteriology

The present publication brings together and updates the various guidelines produced by WHO over the years on sampling of specimens for laboratory investigation, identification of bacteria, and testing of antimicrobial resistance. It concentrates on the procedures to be followed, rather than the basic techniques of microscopy and staining, which have been described in detail in other WHO publications.

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### Compendium of Innovative Health Technologies for Low-resource Settings

The objective of the compendium series of innovative medical devices, assistive devices and eHealth solutions is to provide a neutral platform for technologies which are likely to be suitable for use in less resourced settings. It presents a snapshot of several health technologies which might have the potential to improve health outcomes and the quality of life, or to offer a solution to an unmet medical/health technology need. It is released to acknowledge some success stories and at the same time, to raise awareness of the pressing need for appropriate and affordable design solutions and to encourage more innovative efforts in the field.

2014, 124 pages  
ISBN 978 92 4 156473 1  
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### Medical Devices and eHealth Solutions

The compendium series of innovative medical devices and eHealth solutions has been created as a neutral platform for technologies which are likely to be suitable for use in low-resource settings. It presents a snapshot of several health technologies which might have the potential to improve health outcomes or to offer a solution to an unmet medical need in low-resource settings. The compendium specifically focuses on showcasing innovative technologies that are not yet widely available in developing countries. It is released to encourage the dialogue between ministries of health, procurement officers, donors, technology developers, manufacturers, clinicians, academics and the general public.

2013, 70 pages  
ISBN 978 92 4 150591 8  
CHF 30.00/US$ 36.00  
Print-on-demand  
Order no. 19300282
Needs assessment is a complex process, incorporating a number of variables, that provides decision-makers with the information necessary to prioritize and select appropriate medical devices at a national, regional or hospital level. This document describes and illustrates the objective, the general approach and the process of such a needs assessment.

The number of countries with existing health technology policies and with units to implement those policies, data available from WHO’s baseline country survey on medical devices, shows that there is forward movement in the development and implementation of health technology policies. However, because medical devices are complex to select, manage and use, it is important to ensure that new policies are developed appropriately and existing ones are modified as necessary to make them as effective as possible.

This document integrates health technology assessment into the WHO framework for evidence-informed policy-making. Health systems are strengthened when HTA is integrated into the human and material resources, data, transparent decision- and policy-making, and linked to the overall vision of equity and accountability. Good governance can rely on health technology assessment to provide a policy approach that is accountable for its decisions to the population.

Poor practices in the arena of procurement lead to substandard provision or performance of health technology. This document summarizes currently available resources on how to achieve good practice in procurement. The focus is on medical devices; however, the principles and processes outlined can also be applied to the procurement of infrastructure facilities and other supplies.

This document provides an overview of the issues and challenges surrounding medical device donations, and offers considerations and best practices that may be useful for making and soliciting donations. The document highlights the importance of an active participatory role for the intended recipients of medical equipment donations and emphasizes the importance of treating donations with the same rigour typically applied when purchasing medical equipment.
An effective medical equipment maintenance programme consists of adequate planning, management and implementation. Planning considers the financial, physical and human resources required to adequately implement the maintenance activities. Once the programme has been defined, financial, personnel and operational aspects are continually examined and managed to ensure the programme continues uninterrupted and improves as necessary. Ultimately, proper implementation of the programme is key to ensuring optimal equipment functionality.

Medical Equipment Maintenance Programme Overview

An effective medical equipment maintenance programme consists of adequate planning, management and implementation. Planning considers the financial, physical and human resources required to adequately implement the maintenance activities. Once the programme has been defined, financial, personnel and operational aspects are continually examined and managed to ensure the programme continues uninterrupted and improves as necessary. Ultimately, proper implementation of the programme is key to ensuring optimal equipment functionality.

Computerized Maintenance Management System

For organizations with the appropriate resources to implement this tool, CMMS can be very beneficial. It is a highly flexible tool that when properly implemented has the ability to transform the management of medical equipment while also improving the availability and functionality of the technology required to prevent, diagnose and treat illness.

Package WHO medical device technical series (8 documents)

These documents are intended for use by biomedical engineers, health managers, donors, nongovernmental organizations and academic institutions involved in health technology at the district, national, regional or global levels.

Interagency List of Medical Devices for Essential Interventions for Reproductive, Maternal, Newborn and Child Health

The objective of this project was to list the medical devices required to provide the essential reproductive, maternal, newborn and child health interventions defined by existing WHO guidelines and publications, in order to improve access to these devices in low- and middle-income countries, support quality of care, and strengthen health-care system. The medical devices are allocated across the reproductive, maternal, newborn and child health continuum of care according to the level of health-care delivery.
Baseline Country Survey on Medical Devices
The main objectives of the survey were to determine the key areas which require support for the development or improvement of health technology programmes in countries and regions; and to share knowledge and resources among the participating countries facilitating decision making on a national, regional and global level.

First WHO Global Forum on Medical Devices: context, outcomes and future actions
This report briefly describes the intense activity in the medical device arena leading up to the Global Forum. It outlines and discusses the main outcomes of the Global Forum, and then consolidates the information to focus on future actions for achieving global access to appropriate medical devices, through better regulation, assessment and management processes.

Local Production and Technology Transfer to Increase Access to Medical Devices
This report analyses local production of medical devices in five countries: Brazil, China, Ethiopia, India and Jordan, and provides examples of successful local enterprises in each of these countries as well as government efforts to promote an enabling environment. Ten specific medical devices are also assessed to offer insights into the opportunities and challenges that local producers face.

Compendium of New and Emerging Health Technologies
This compendium has been created as a neutral platform for technologies which are likely to be suitable for use in low-resource settings. It is released to encourage the dialogue between ministries of health, procurement officers, donors, technology developers, manufacturers, clinicians, academics and the general public.

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This document provides a list of core medical equipment fact sheets which have been issued by the ECRI Institute and the GMDN Agency, with a view to raising stakeholders' awareness about their existence and their functionality. These technologies are commonly considered as important or necessary for specific preventive, diagnostic, treatment or rehabilitation procedures carried out in most health care facilities.

Aide-Memoire for National Medical Device Administrations

Devices intended for global use should follow international standards (ISO, IEC). A standard can be recognized fully or partially, provided this is clearly specified. Several standards can also be recognized to satisfy the requirements of a particular device. Conformity of a device can be assessed by accredited third party agencies, such as a notified body.

Aide-Memoire on Strengthening National Regulatory Authorities

The overall objective of a National Regulatory Authority (NRA) for medical products is to ensure that all medicines (drugs, vaccines, blood products and other biologicals) and medical devices are of assured quality, safety and efficacy and are accompanied by appropriate information to promote their rational use.
A Guide for the Development of Medical Device Regulations

This guide has been prepared to guide the regulatory authorities to ensure the safety, efficacy and quality of medical devices.

2002, 66 pages
web link: http://apps.who.int/medicinedocs/documents/s16574e/s16574e.pdf

A Model Regulatory Program For Medical Devices: An International Guide

For government institutions endeavoring to establish medical devices programmes, this guide is intended to provide the “basic tools” to complete the task. It also outlines various issues and options countries should weigh carefully in fashioning programmes to insure safe and high quality medical devices.

2001, 77 pages
web link: http://apps.who.int/medicinedocs/documents/s16577e/s16577e.pdf

Basics of Radiation Protection: How to Achieve ALARA. Working Tips and Guidelines

This document provides an overview of the issues and challenges surrounding medical device donations, and offers considerations and best practices that may be useful for making and soliciting donations.

2004, xxx pages
web link: http://apps.who.int/medicinedocs/documents/s15961e/s15961e.pdf

Diagnostic Imaging: What is it? When and how to use it where resources are limited?

This book reviews important clinical problems in which diagnostic imaging can assist and how to use limited imaging resources effectively in daily clinical practice.

2005, 32 pages
web link: http://apps.who.int/iris/bitstream/10665/66703/1/WHO_DIL_01.1.pdf
Also available in French, Cambodian, Vietnamese, Mandarin, Lao

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Wheelchair Service Training Package for Stakeholders
This package provides an overview of the stakeholder’s role, informing them about the need for and benefit of appropriate wheelchair provision and getting their support to develop an appropriate wheelchair provision programme.

Wheelchair Service Training Package for Managers
This Wheelchair Service Training Package for Managers (WSTPm) provides an overview of the rehabilitation/wheelchair service manager’s role in engaging people and leading the implementation of the eight steps of wheelchair service delivery and issues related to it.

Wheelchair Service Training Package: Intermediate Level
The Intermediate Level Training Package is designed to support the training of personnel or volunteers to provide an appropriate manual wheelchair and cushion for girls, boys, women and men who need additional postural support to sit upright.

Wheelchair Service Training Package: Basic Level
The Basic Level training package is designed to support the training of personnel or volunteers to provide an appropriate manual wheelchair and cushion for girls, boys, women and men who have mobility impairments but can sit upright without additional postural support.
Assistive Technology for Children with Disabilities: Creating Opportunities for Education, Inclusion and Participation

Recognising the long-term collaboration between WHO and UNICEF, this discussion paper highlights the importance of assistive technology and how it can make a critical impact on the lives of children with disabilities and enable them to enjoy opportunities like any other children.

Joint Position Paper on the Provision of Mobility Devices in Less Resourced Settings

This joint position paper was developed in response to a meeting about personal mobility and mobility devices, held on 28–29 October 2009 at World Health Organization headquarters, Geneva, Switzerland. This paper aims to guide and support countries, especially those with limited resources, in the implementation of relevant articles of the CRPD associated with the provision of mobility devices.


On the occasion of the 21st World Congress of Rehabilitation International, WHO, the US Agency for International Development, the International Society for Prosthetics and Orthotics and Disabled Peoples’ International have launched an important new document: Guidelines on the provision of manual wheelchairs in less resourced setting.

Consensus Conference on Wheelchairs for Developing Countries

This publication reports on the work of the conference and contains the background papers and their discussions, detailed reports of the syndicate discussions on selected topics, the resulting plenary discussions, and the final conclusions and recommendations.
Guidelines for Training Personnel in Developing Countries for Prosthetics and Orthotics Services

This document presents the tasks for various types of personnel in the area of prosthetics and orthotics services, and provides guidelines for their training.

Post-market Surveillance of in Vitro Diagnostics

WHO has developed guidance on post-market surveillance for in vitro diagnostics, with specific emphasis on applicability in resource-limited settings. The target audience for this document is: National regulatory authorities and national reference laboratories; end-users, procurers, implementing partners; and Manufacturers of IVDs.

HIV Assays: Laboratory Performance and Other Operational Characteristics

Reports on the WHO evaluation of 8 HIV rapid diagnostic tests. The evaluations focus on operational characteristics including sensitivity, specificity on a WHO serum/plasma evaluation panel, ease of use and suitability for use in small laboratories with limited facilities. The information is intended for use by those responsible for deciding which tests to use, e.g. programme managers and potential users of tests.

Manual for Procurement of Diagnostics and Related Laboratory Items and Equipment

The purpose of this manual is to provide information on procurement processes specific to HIV and related diagnostics, laboratory items and equipment. The intended audience includes procurement officers, HIV programme managers and end-users of diagnostics, staff in United Nations (UN) agencies and non-governmental organizations (NGOs).
Maintenance Manual for Laboratory Equipment

This manual has been developed to support personnel employed in health laboratories. Its purpose is to give a better understanding of the technical requirements regarding installation, use and maintenance of various types of equipment which play an important role in performing diagnostic testing. The manual also aims to provide support to personnel responsible for technical management, implementation of quality management and maintenance.

Selection and Use of Ebola in vitro Diagnostics (IVD) Assays

The objective of this document is to provide interim guidance to Ministries of Health and other organizations on factors to consider in the selection and use of available in vitro diagnostic (IVD) assays for the diagnosis of Ebola virus disease (EVD).

Interim Guidance on the Use of Rapid Ebola Antigen Detection Tests

The objective of the document is to provide interim guidance to Ministries of Health and other organizations on the potential use of available rapid Ebola antigen-detection tests.

Rapid Guidance on the Decommissioning of Ebola Care Facilities

This rapid guidance pertains to protecting the safety and repurposing of infrastructures and resources previously used for the Ebola outbreak to care for Ebola patients.
Innovative Technologies that Address Global Health Concerns

The initiative’s goal is to make available the benefits of core health technologies at an affordable price particularly to communities in resource limited settings in order to effectively control important health problems. This initiative includes the development of guidelines and tools for health technology management and a call for innovative technologies.

Consumer Guide for the Purchase of X-ray Equipment

This guide provides an overview of the purchasing of X-ray equipment, informing them about the need for and benefit of appropriate imaging services in the frontline of medical care.

Consolidated Guidelines on HIV Testing Services

The Consolidated guidelines on HIV testing services bring together existing guidance relevant to the provision of HIV testing services (HTS) and addresses issues and elements for effective delivery of HTS that are common in a variety of settings, contexts and diverse populations.
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Additional information and updates are available at the following web sites:

Medical devices
http://www.who.int/medical_devices/en/

Assistive Devices
http://www.who.int/disabilities/technology/en/

Diagnostic Imaging
http://www.who.int/diagnostic_imaging/en/

In Vitro Diagnostics
http://www.who.int/diagnostics_laboratory/en/

Personal Protective equipment

Health technologies
http://www.who.int/topics/technology_medical/en/

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