Innovative Technology in Addressing Global Health Issues: the WHO Perspective

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Adriana Velazquez Berumen

WHO/HQ/HSS/EHT/DIM
Make safe and appropriate diagnostic imaging services available to all (universal coverage);

Advise, train, guide and support those working in the field, to develop and maintain safe and appropriate diagnostic imaging services (effective service delivery);

Promote the importance of safe and appropriate diagnostic imaging services starting from the planning level (sensitize policy makers).
Activities

- Hosting meeting of study groups and scientific groups
- Education and training of operators and interpreters to ensure delivery of safe and effective diagnostic imaging services
- Joint Global Initiative on Radiation Safety in Health Care Settings
- Global Steering Group for Education and Training in Diagnostic Imaging
- Publication of reports (guidelines, recommendations)
Global Steering Group for Education and Training in Diagnostic Imaging

- Established 1999
- Representatives from major global and regional societies and organizations
- 'Train the trainers'
- Local 'centres of excellence' for capacity building
Professional Societies Members of Steering Group

Permanent members
ISR, ISRRT, WFUMB, WFNMB

Regional societies
ESR, CIR, RSNA, MASU, AFSUMB, AOSR, SFR, ACR, ARRS

Temporary members
Related to activities
Other Forms of Collaboration

Expert Advisory Panel on Radiation

Collaborating Centres

1. WHO Collaborating Centre for Continuing and General Education in Diagnostic Ultrasound, Philadelphia, USA
2. WHO Collaborating Centre for Breast Diagnostic Imaging in Mammary Pathology, Buenos Aires, ARGENTINA
3. WHO Collaborating Centre for Diagnostic Ultrasound in Obstetrics and Gynaecology, Trondheim, NORWAY
4. WHO Collaborating Centre for Secondary Standard Radiation Dosimetry, Nonthaburi, THAILAND
5. WHO Collaborating Centre for Secondary Standard Radiation Dosimetry, Mumbai, INDIA
6. Centre collaborateur de l'OMS pour la Formation et la Recherche en Maintenance hospitalière, Diourbel, SENEGAL
7. WHO Collaborating Centre for Patient Safety, Risk Management and Health Care Technology, Plymouth Meeting, USA
8. WHO Collaborating Centre on Environmental and Occupational Health Impact Assessment and Surveillance, Sainte-Foy, CANADA
9. WHO Collaborating Centre for Health Technology Assessment, Barcelona, SPAIN
10. WHO Collaborating Centre for Health Technology Assessment and Management, Shanghai, CHINA
Publications (2001 - 2006)
Technical Series

- Diagnostic Imaging: What is it? When and how to use it where resources are limited? (WHO/DIL/01.1)
- Quality assurance workbook for radiographers and radiological technologists (WHO/DIL/01.3), (ISBN 9 789241 546423)
- Consumer Guide for the purchase of X-ray equipment (WHO/DIL/00.1 Rev. 1)
- Basic radiation protection. How to achieve ALARA. Working tips and guidelines (ISBN 92 4 159178 1)
- The WHO manual of diagnostic imaging. Radiographic technique and projections (ISBN 92 4 154608 5)
- X-ray equipment maintenance and repairs workbook for radiographers & radiological technologists (ISBN 92 4 159163 3)
## Publications (2001 - 2006)
### Medical Series

- Pattern recognition in diagnostic imaging (ISBN 92 4 154632 8)
- The WHO manual of diagnostic imaging. Radiographic anatomy and interpretation of the musculoskeletal system (ISBN 92 4 154555 0)
- The WHO Lecture Series on Radiology and Ultrasound (CD-Rom)
- Pediatric dosimetry
- Efficacy and Radiation Safety in Interventional Radiology
WHO Publications on Ultrasound

- Future Use of New Technologies in Developing Countries – WHO Technical Report Series
- Maintenance and Repair of Laboratory, Diagnostic Imaging, and Hospital Equipment – WHO Publication
- A Practical Guide to the Standardized Use of Ultrasonography for the Assessment of Schistosomiasis-related Morbidity – Second International Workshop
- Basic Physics of Ultrasonographic Imaging – WHO Publication
- IMAI District Clinician Manual: Hospital Care for Adolescents and Adults
Manuel of diagnostic ultrasound

During the last decades, use of ultrasonography became increasingly common in medical practice and hospitals around the world, and a large number of scientific publications reported the benefit and even the superiority of ultrasonography over commonly used x-ray techniques, resulting in significant changes in diagnostic imaging procedures.

With increasing use of ultrasonography in medical settings, the need for education and training became essential. WHO took up this challenge and in 1995 published its first training manual in ultrasonography. Soon, however, rapid developments and improvements in equipment and indications for the extension of medical ultrasonography into therapy indicated the need for a totally new ultrasonography manual.

The manual (consisting of two volumes) has been written by an international group of experts of the World Federation for Ultrasound in Medicine and Biology (WFUMB), well-known for their publications regarding the clinical use of ultrasound and with substantial experience in the teaching of ultrasonography in both developed and developing countries. The contributors (more than 50 for the two volumes) belong to five different continents, to guarantee that manual content represents all clinical, cultural and epidemiological contexts.

This new publication, which covers modern diagnostic and therapeutic ultrasonography extensively, will certainly benefit and inspire medical professionals in improving "health for all" in both developed and emerging countries.
Use Health Technology to Strengthen Health Systems
Recognizing that health technologies equip health-care providers with tools that are indispensable for effective and efficient prevention, diagnosis, treatment and rehabilitation.
URGES Member States:

1. To collect, verify, update and exchange information on health technologies in particular medical devices as an aid to their prioritization of needs and allocation of resources;

2. To formulate as appropriate national strategies and plans for the establishment of systems for the assessment, planning, procurement and management of health technologies in particular medical devices, in collaboration with personnel involved in health-technology assessment and biomedical engineering;
Primary health care should be “based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development.”

International Conference on Primary Health Care, Alma Ata Declaration, 1978
Primary Health Care
Primary Health Care – Level I

Basic Radiological System (BRS)

Serving a small rural (or suburban) hospital or health centre

BRS - 1980 WHO
X-RAY UNIT - SPECIFICATIONS FOR EQUIPMENT

Battery powered generators
Manual for radiographers and darkroom techniques
Radiographic interpretations

ULTRASOUND UNIT

General Purpose Ultrasound Unit
Manual of Ultrasound

Effective choices for diagnostic imaging in clinical practice
Report of a WHO Scientific Group
World Health Organization
Technical Report Series 795

Future Use of new imaging technologies in developing countries
Report of a WHO Scientific Group
Technical Report Series, 723
Diagnostic Ultrasound

Equipment is smaller
Less expensive
Easier to use
Safe
Effective
Highly flexible

Rapidly developing technique

Specialized Techniques
Endovaginal
Endorectal
Transoesophageal
Echocardiographic
Intraoperative
Pulsed
Colour Doppler ultrasound
Others

Primary imaging modality
Gynecology
Hepatology
Imaging of Biliary System
Pancreatic diseases
Splenic diseases
Renal diseases
Scrotum
Bladder
Prostate
### Ultrasound Training Needs
According to Equipment

<table>
<thead>
<tr>
<th>Level of health care</th>
<th>Level of training required</th>
<th>Professional Category General</th>
<th>Professional Category Specialized</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Sufficient to perform common examinations safety and accurately</td>
<td>Family physician, trauma physician, sonographer</td>
<td>Midwife, paediatrician</td>
</tr>
<tr>
<td>II</td>
<td>Sufficient to accept and manage referrals</td>
<td>Radiologist Sonologist</td>
<td>Obstetrician/gynaecologist, cardiologist, other specialists</td>
</tr>
<tr>
<td>III</td>
<td>Advanced, for teaching and research</td>
<td>Radiologist Organ – oriented sub-specialist sonologist</td>
<td>Advanced specialists (perinatologists and sub-specialized internists and surgeons)</td>
</tr>
</tbody>
</table>

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Training in Diagnostic Ultrasound: Essentials, Principles and Standards
Report of a WHO Study Group
World Health Organization
### Core Conditions Utilizing X-Ray in Resource-Poor Settings

<table>
<thead>
<tr>
<th>Type</th>
<th>Condition</th>
<th>Intervention</th>
<th>Skill Level</th>
<th>Necessity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest</td>
<td>Pneumonia</td>
<td>Medical management</td>
<td>Basic</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Tuberculosis</td>
<td>Medical management</td>
<td>Basic</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Pneumothorax</td>
<td>Chest tube placement</td>
<td>Advanced</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Pleural effusion</td>
<td>Thoracentesis</td>
<td>Advanced</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Cardiac failure</td>
<td>Medical management</td>
<td>Advanced</td>
<td>Moderate</td>
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<tr>
<td></td>
<td>Hemothorax</td>
<td>Thoracentesis</td>
<td>Advanced</td>
<td>High</td>
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<tr>
<td></td>
<td>Chronic obstructive pulmonary disease</td>
<td>Medical management</td>
<td>Basic</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Asthma</td>
<td>Medical management</td>
<td>Basic</td>
<td>Moderate</td>
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<tr>
<td></td>
<td>Lung abscess</td>
<td>Medical management</td>
<td>Advanced</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Occupational lung diseases</td>
<td>Medical management</td>
<td>Basic</td>
<td>Moderate</td>
</tr>
<tr>
<td>Limb</td>
<td>Long bone fracture</td>
<td>Reduction and fixation</td>
<td>Advanced</td>
<td>High</td>
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<tr>
<td></td>
<td>Small bone fracture</td>
<td>Reduction and fixation</td>
<td>Advanced</td>
<td>High</td>
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<tr>
<td></td>
<td>Osteomyelitis</td>
<td>Medical and surgical management</td>
<td>Basic</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Dietary deficiency diseases (scurvy, rickets)</td>
<td>Nutrient supplementation</td>
<td>Basic</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

## Core Conditions Utilizing Ultrasound in Resource-Poor Settings

<table>
<thead>
<tr>
<th>Type</th>
<th>Condition</th>
<th>Intervention</th>
<th>Skill Level</th>
<th>Necessity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal</td>
<td>Cephalopelvic disproportion</td>
<td>Cesarean section</td>
<td>Advanced</td>
<td>Moderate</td>
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<tr>
<td></td>
<td>Ectopic pregnancy</td>
<td>Surgical management</td>
<td>Advanced</td>
<td>Moderate</td>
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<tr>
<td></td>
<td>Retained products of conception</td>
<td>Dilatation and Curettage</td>
<td>Advanced</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Abruptio placenta</td>
<td>Medical and surgical management</td>
<td>Advanced</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Peripartum hemorrhage</td>
<td>Medical management</td>
<td>Basic</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Cholecystitis</td>
<td>Medical and surgical management</td>
<td>Advanced</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Tuberculosis (intra-abdominal)</td>
<td>Medical management</td>
<td>Basic</td>
<td>High</td>
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<tr>
<td></td>
<td>Hydronephrosis</td>
<td>Medical and surgical management</td>
<td>Basic</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Abdominal trauma</td>
<td>Medical and surgical management</td>
<td>Advanced</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Abdominal masses</td>
<td>Medical and surgical management</td>
<td>Basic</td>
<td>High</td>
</tr>
<tr>
<td>Chest</td>
<td>Pleural effusion</td>
<td>Thoracentesis</td>
<td>Advanced</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Pneumothorax</td>
<td>Chest tube</td>
<td>Advanced</td>
<td>Moderate</td>
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<tr>
<td></td>
<td>Hemothorax</td>
<td>Thoracentesis</td>
<td>Advanced</td>
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<tr>
<td>Cardiovascular</td>
<td>Deep vein thrombosis</td>
<td>Anticoagulation</td>
<td>Basic</td>
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<tr>
<td></td>
<td>Cardiac failure</td>
<td>Medical management</td>
<td>Basic</td>
<td>Moderate</td>
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<tr>
<td></td>
<td>Cardiac valve disease</td>
<td>Medical and surgical management</td>
<td>Advanced</td>
<td>High</td>
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<td>Pericardial effusion</td>
<td>Medical management and pericardiocentesis</td>
<td>Advanced</td>
<td>High</td>
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<tr>
<td>Orthopedic</td>
<td>Spine, skull trauma</td>
<td>Surgical management</td>
<td>Advanced</td>
<td>Moderate</td>
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<tr>
<td></td>
<td>Pediatric Osteomyelitis</td>
<td>Medical management</td>
<td>Basic</td>
<td>Moderate</td>
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<tr>
<td></td>
<td>Rib, pelvis trauma</td>
<td>Surgical management</td>
<td>Advanced</td>
<td>Moderate</td>
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<tr>
<td>Neurological</td>
<td>Neonatal hemorrhage</td>
<td>Medical management</td>
<td>Advanced</td>
<td>High</td>
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<tr>
<td></td>
<td>Neonatal infection</td>
<td>Medical management</td>
<td>Advanced</td>
<td>Moderate</td>
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<tr>
<td>Procedural</td>
<td>Intravenous Access</td>
<td>Procedural guidance</td>
<td>Basic</td>
<td>Moderate</td>
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<td></td>
<td>Abscess</td>
<td>Procedural guidance</td>
<td>Basic</td>
<td>Moderate</td>
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<td>Arthrocentesis</td>
<td>Procedural guidance</td>
<td>Basic</td>
<td>Moderate</td>
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<td>Paracentesis</td>
<td>Procedural guidance</td>
<td>Advanced</td>
<td>High</td>
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<td>Thoracentesis</td>
<td>Procedural guidance</td>
<td>Advanced</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Pericardiocentesis</td>
<td>Procedural guidance</td>
<td>Advanced</td>
<td>High</td>
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<td></td>
<td>Foreign Body</td>
<td>Procedural guidance</td>
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<td>Moderate</td>
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<tr>
<td></td>
<td>Lumbar Puncture</td>
<td>Procedural guidance</td>
<td>Basic</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
Health Care Levels
Secondary Health Care – Level II

Equipment

ALL LEVEL I TECHNIQUE AND:

- Sophisticated radiography
- Sophisticated ultrasonography including Doppler
- Mammography
- Angiography
- Digital subtraction angiography (DSA) and macro-radiography
- Computed tomography (CT)
- Radionuclide scintigraphy, including single photon emission computerized tomography (SPECT)
- Thermography (of limited use)

General Purpose Radiological System

In secondary care hospital with 100 – 500 beds and a number of medical specialists (surgery, medicine, obstetrics, gynaecology, paediatrics)

Effective choices for diagnostic imaging in clinical practice
Report of a WHO Scientific Group
World Health Organization
Technical Report Series 795

Future use of new imaging technologies in developing countries
Report of a WHO Scientific Group
Technical Report Series, 723
Health Care Levels
Tertiary Health Care – Level III

Equipment

ALL LEVEL II AND III TECHNIQUES AND:

- Magnetic resonance imaging (MRI)
- Positron emission tomography (PET)
- Advanced radionuclide scanning: labelling by means of monoclonal antibodies (immunoscintigraphy)

Specialized Radiological System

Tertiary care hospital - usually the top-level referral hospital, often a university hospital

Effective choices for diagnostic imaging in clinical practice
Report of a WHO Scientific Group
World Health Organization
Technical Report Series 795

Future Use of new imaging technologies in developing countries
Report of a WHO Scientific Group
Technical Report Series, 723
What Do We Expect From Medical Devices?

- Available
- Accessible
- Appropriate
- Affordable
Worldwide, much of the ultrasonography is currently performed by individuals with little or no formal training.

### Need for Training

**Developed countries**

- Need for entry level training and continuing education

**Developing countries**

- Need for training differs among countries
- Maintain and increase level of competence

- Educational opportunities are often limited
- Uniform standards for training physicians do not generally exist
- Many ultrasonography practitioners do not have adequate experience
Priority Medical Devices Project

Objectives

- Identify the gaps in the availability of medical devices from a public health perspective
- Identify cross cutting themes
- Propose a research agenda

Results

- Background papers published on web
- Book launched in September 2010
- First Global Forum on Medical Devices
Evaluate SAFE USE EFFECTIVENESS QUALITY

DECOMMISSION or disinvestment or Removal from list not cost effective or no safe

REGULATION To place in national market: Safe and effectiveness

NEEDS: ASSESSMENT

H.T.A.

1

2

3

HT policies planning

Technical and economic EVALUATION

PROCUREMENT or incorporation lists of devices authorized for reimbursement (donations)

USER TRAINING

USE AND MAINTENANCE

PMS

Good Health Technology: Assessment, Regulation and Management
Provide Right Information for Decision Making at all Levels of Care

- Macro
- Meso
- Micro

**MACRO**
- MOH

**MESO**
- Hospitals and regions

**MICRO**
- Doctors and health professionals
- End user: patient and their families
Baseline Country Survey on Medical Devices

2010 WHO Survey

- Mammography equipment
- CT scan units
- MRI scanners
- Nuclear medicine equipment
- Linear accelerators
- Telecobalt units
- PET equipments

145 Countries Members of WHO

Ministry of Health appointed a focal person for data collection

- Number in public sector
- Number in private sector
- Total number of equipment
- Density per population
Guidelines and Background Material

- Landscape analysis on medical devices innovation
- Priority medical devices background papers
- Consultation documents on:
  - Medical device regulations
  - Medical device donations
  - Resources for procurement
  - Health technology assessment
  - Medical devices per health facility
    - Health post/health center/district hospital
    - Provincial Hospital/specialized 3rd level care
  - Medical devices per 100 clinical procedures
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization
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Mammography Equipment: Geographical Distribution
# Background: Health Gaps

<table>
<thead>
<tr>
<th>Year</th>
<th>Life expectancy at birth</th>
<th>Maternal mortality rate / 100000 live births</th>
<th>Under 5 mortality rate / 1000 live births</th>
<th>Per capita total expenditure on health (^a)</th>
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<tbody>
<tr>
<td>1990</td>
<td>53</td>
<td>650</td>
<td>162</td>
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<td>1990</td>
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\(^a\) Purchasing Power Parity, international dollars

### Decentralization of Care Delivery

<table>
<thead>
<tr>
<th>Implications for medical devices</th>
<th>Implications for public health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater reliance on portable devices.</td>
<td>More patient care can be delivered outside the traditional hospital setting.</td>
</tr>
<tr>
<td>Increased reliance on developments in nonmedical technology (e.g. communication networks for telemedicine, long-life batteries, and alternate power sources).</td>
<td>Quality of care can be improved. It may allow clinicians to monitor patients more closely and deliver more timely care, potentially improving outcomes.</td>
</tr>
<tr>
<td>Remote-use technology could accommodate needs of end-users (e.g. patients, family caregivers, and other non-clinicians) with safeguards to protect against inadequate user training.</td>
<td>Increase ability of rural health-care professionals to perform highly specialized procedures through remote supervision.</td>
</tr>
<tr>
<td>Remote devices may vary in complexity depending on which patient data are required.</td>
<td></td>
</tr>
<tr>
<td>Portable devices are likely to require greater durability than stationary (i.e. hospital-based) devices.</td>
<td></td>
</tr>
</tbody>
</table>

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**Medical Devices: Managing the Mismatch**  
An outcome of the Priority Medical Devices project  
Trends in medical technology and expected impact on public health  
Background Paper 7  
WHO/HSS/EHT/DIM/10.7, August 2010
Decentralization of Care Delivery

1. Remote Clinical Monitoring of Patients Heading
   - Improve follow up
   - Improve disease management
   - Electronic medical record

2. Portable Technology
   - More patient care to be delivered outside the traditional hospital setting

3. Telemedicine
   - Homebound patients
   - Local clinicians
   - Specialist at other location

Medical Devices: Managing the Mismatch
An outcome of the Priority Medical Devices project
Trends in medical technology and expected impact on public health
Background Paper 7
WHO/HSS/EHT/DIM/10.7, August 2010
Diffusion of New Technology

Medical Devices: Managing the Mismatch
An outcome of the Priority Medical Devices project
Background Paper 6
WHO/HSS/EHT/DIM/10.7, August 2010
Stakeholders Involved in the Innovative Process

Medical professionals
- General practitioners
- Specialists (e.g., surgeons, anaesthetists)
- Allied health professionals (e.g., nurses)
- Professional societies

Patients
- Individual patients
- Patient organizations

Users

Other stakeholders
- Manufacturers
- Vendors/distributors
- International regulators
- National/domestic regulators
- Health ministry

Medical Devices: Managing the Mismatch
An outcome of the Priority Medical Devices project
Background Paper 6
WHO/HSS/EHT/DIM/10.7, August 2010
WHO Call for Innovative Technologies

- Selection Criteria
- Health Problems
- Eligibility

Call for INNOVATIVE TECHNOLOGIES THAT ADDRESS GLOBAL HEALTH CONCERNS

1. Background and Aim of the Call

Medical devices are indispensable in health care delivery as tools for prevention, diagnosis, treatment and rehabilitation. However, despite the exponential growth of scientific and technological development, availability of and access to appropriate and affordable health technologies in low- and middle-income countries are still insufficient.

One of the WHO Department of Essential Health Technologies’ goals is to help make available the benefits of new health technologies with a view to addressing global health concerns by developing a framework for health technology programmes and by challenging the scientific and business community to identify and develop innovative technologies.

This call for innovative technologies aims at identifying and evaluating innovative medical devices, including diagnostic tools, either existing or under development, which address global health concerns and which are likely to be available, appropriate and affordable for use in low- and middle-income countries.

Selected innovative technologies will be highlighted on the WHO Essential Health Technologies website. They will be shared with governments, donors and other stakeholders, with a view to generally fostering the development, availability of and access to innovative health technologies, particularly in low- and middle-income countries.

2. Key Dates

11 September 2009: Launch of the call for innovative technologies at the World Congress on Medical Physics and Biomedical Engineering, Munich.
31 January 2010: Deadline for submission of applications.
30 June 2010: Posting of the list of selected innovative technologies on the WHO website.

3. Eligibility

3.1 Who can apply

The call for innovative technologies targets manufacturers, institutions, universities, governments, individuals and non-profit organizations which design, manufacture and/or supply any type of medical device that addresses the global health concerns mentioned in section 5. One submission per applicant will be accepted.

4. The Scope of Innovative Technologies

4.1 Medical Devices

Eligible health technologies are limited to medical devices as defined by the Global Harmonization Task Force (GHTF). They include instruments, medical equipment, implants, disposables, assistive devices and software used mainly for the purpose of prevention, diagnosis, monitoring of patients, rehabilitation, control of conception and/or changing, restoring, correcting physiological functions.

The call for innovative technologies does not cover clinical procedures, medicinal products, vaccines, biological therapeutic products or tissue engineered medical products.

4.2 Innovative Technologies

To qualify for consideration, a technology must be deemed “innovative” by providing evidence that the solution:

- has not previously existed;
- has not previously been made available in low- and middle-income countries;
- is safer and simpler to use than existing solutions; and/or
- is more cost effective than previous technologies.

4.3 Two Categories

Category 1: Commercialized/sale products
- New products
- Products which have been commercialized for less than five years in high-income countries and which are not yet widely used in low- and middle-income countries
- Recent adaptation of existing non-health products for a health purpose
- Recent adaptation of an existing medical device for low- and middle-income country settings

Category 2: Products in a non-commercialized/sale stage
- Products which are under development or otherwise available

1 http://www.who.int/medicines/health_economics/en/
2 http://www.who.int/medicines/health_economics/en/
3 http://www.who.int/medicines/health_economics/en/
e-Documentation Centre

- Searchable database of WHO documentation
- Available on www.who.int/medical Devices
- More than 300 documents currently available in 15 languages

www.who.int/medical_devices

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