Report

First Meeting of the WHO Technical Advisory Group on Health Technology

WHO Headquarters
Geneva, Switzerland
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This publication contains the report of the First Meeting of the WHO Technical Advisory Group on Health Technology and does not necessarily represent the decisions or policies of the World Health Organization.
## List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning</th>
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<tr>
<td>ACODESS</td>
<td>Cooperation Agency for Health Care Services Development</td>
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<td>ADB</td>
<td>Asian Development Bank</td>
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<td>AfDB</td>
<td>African Development Bank</td>
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<td>AFRO</td>
<td>WHO Regional Office for Africa</td>
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<td>AMRO</td>
<td>WHO Regional Office for the Americas</td>
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<td>ADVAMED</td>
<td>Advanced Medical Technology Association</td>
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<td>BME</td>
<td>Biomedical Engineering</td>
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<td>CC</td>
<td>Collaborating Centre</td>
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<td>CE</td>
<td>Clinical Engineering</td>
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<td>CEN</td>
<td>European Committee for Standardization</td>
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<td>CENETEC</td>
<td>National Center for Health Technology Excellence</td>
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<td>CMMS</td>
<td>Computerized Maintenance Management System</td>
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<td>DCs</td>
<td>Developing Countries</td>
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<td>EDF</td>
<td>European Development Fund</td>
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<td>EHT</td>
<td>Essential Health Technology</td>
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<td>EMRO</td>
<td>WHO Regional Office for the East-Mediterranean</td>
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<td>EUCOMED</td>
<td>European Medical Technology Industry Association</td>
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<td>EURO</td>
<td>WHO Regional Office for Europe</td>
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<td>GIHT</td>
<td>Global Initiative on Health Technology</td>
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<td>GMDN</td>
<td>Global Medical Device Nomenclature</td>
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<td>HDS</td>
<td>Health System Governance and Service Delivery</td>
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<td>HCTS</td>
<td>Health Care Technical Services</td>
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<td>HIT</td>
<td>Health Infrastructure and Technology</td>
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<td>HITEChP</td>
<td>Healthcare Infrastructure and Technology Management Package</td>
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<td>IHTSDO</td>
<td>International Health Terminology Standards Development</td>
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<td>HMIS</td>
<td>Health Management Information System</td>
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<td>HT</td>
<td>Health Technology</td>
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<td>HTA</td>
<td>Health Technology Assessment</td>
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<td>HTAi</td>
<td>Health Technology Assessment International</td>
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<td>HTM</td>
<td>Health Technology Management</td>
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<td>ICMRDA</td>
<td>International Conference on Medical Devices Regulatory Agencies</td>
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<td>ICT</td>
<td>Information and Communication Technology</td>
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<td>INHATA</td>
<td>International Network of Agencies for Health Technology Assessment</td>
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<td>IFMBE</td>
<td>International Federation for Medical and Biological Engineering</td>
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<td>IHF</td>
<td>International Hospital Federation</td>
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<td>iHTP</td>
<td>Integrated Healthcare Technology Package</td>
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<td>INAHATA</td>
<td>International Network of Agencies for Health Technology Assessment</td>
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<td>INFRATECH</td>
<td>Health Infrastructure and Technology Discussion Group</td>
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<td>ISO</td>
<td>International Organization for Standardization</td>
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<td>IT</td>
<td>Information Technology</td>
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<td>KPI</td>
<td>Key performance indicator</td>
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<td>LMIC</td>
<td>Low- and Middle-Income Countries</td>
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<td>MoH</td>
<td>Ministry of Health</td>
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<td>NPO</td>
<td>National Professional Officer</td>
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Purpose

The purpose of the meeting was to review and analyze country experiences with developing and implementing national health technology policies and programmes within the broad health systems and service delivery context, including feedback on use of existing decision-making and management tools. The meeting was expected to provide WHO with expert advice and guidance with regard to delineating further action for supporting Member States in their efforts in setting up effective national health technology policies, programmes and systems, particularly as relates to the revision and update of existing tools or the development of new ones to address identified gaps.

The recommendations of the meeting are to be followed up by a smaller group of selected experts who would work on the revision and update of existing tools and development of new ones, as required. The outcome of this work will be presented at a second meeting of the Technical Advisory Group on Health Technology (TAGHT) to be held at Rio de Janeiro in November 2009, and concluded at a third meeting at Cairo in June 2010, following pilot country implementation of selected tools. Country and regional workshops could be held in between as needed. The dissemination of the tools and training will take place at Sri Lanka in November 2010, and a launching of the priority medical devices with high level decision makers in September 2010.

The long-term objective of this work is to clearly define country needs and possible gaps in the internationally available healthcare technology management tools concerning medical devices, especially within the biomedical engineering field, and delineate required actions by WHO and other partners to respond to the identified needs in a concerted and aligned way.

Participants

The meeting brought together 11 participants from 11 countries, in addition to the 25 members of the Technical Advisory Group on Health Technology (TAGHT), 6 officers from four of the six WHO Regional Offices, and 9 officers from WHO Headquarters. The full list of participants is presented in Annex 1.

Organization

The agenda of the meeting is in Annex 2.

Opening session

Dr. Steffen Groth, Director, Essential Health Technology (EHT) Department, opened the meeting by welcoming the participants to the consultation and outlining its aim. This is primarily a review of existing health care technology tools, with a view to improving
them and making health care technology people-centred, aligned to the Primary Health Reform

Dr. Andrei Issakov, Coordinator, Technology and Facilities Planning also welcomed the participants to the meeting on behalf of the Director, Department of Health System Governance and Service Delivery (HDS).

Each participant then briefly introduced himself or herself. This was followed by the election of a Chair and Rapporteurs. Mr. Rob Parsons was elected chairman, while three Rapporteurs were elected in the persons of: Dr. Said Jorge Calil, Dr. Bastiaan Remmelzwaal and Prof. S. Yunkap Kwankam.

**Scope and format of the meeting**

Dr. Andrei Issakov and Mrs. Adriana Velazquez then outlined the scope, purpose and format of the meeting. Each, in turn, briefly described one of the two projects which are the focus of the meeting – the Global Initiative on Health Technologies (GIHT) funded by the Bill & Melinda Gates Foundation, and the project on Strengthening of Healthcare Infrastructure and Technology Management for Optimized Health Service Delivery (HIT), funded by Lux-Development. Although differently formulated, both projects aim to provide tools and guidance on assessing current technologies in countries, setting technology standards, selecting appropriate technologies, and managing and maintaining procured technology resources.

The meeting format consisted entirely of plenary sessions at which presentations were made on the main themes, followed by discussions and recommendations. Discussions were to focus on three main issues:

i. scoping and mapping of existing tools
ii. experiences with their implementation, and
iii. recommendations and next steps

A total of 13 themes were addressed during the three days of the meeting, with each of the second and third days beginning with a summary of the previous day's work.

**Session 1**

Prof. Yunkap Kwankam gave a presentation titled “Mainstreaming health infrastructure and technology: a new approach to sustainable health technology management”. He argued that health technology management issues and challenges recently identified at a WHO meeting at Talloires, France in October 2008 were no different from those highlighted at a meeting at Nicosia in 1986. He concluded that the way to resolve these perennial challenges was through integration of health technology into the mainstream of the health system.

**Three key messages**

Three key messages from the presentation were:
- HTM challenges do not seem have changed in two decades. So, we need a new approach.
- Health infrastructure and technology are not an end in themselves – HIT must serve a higher purpose. That higher purpose is the set of goals and functions of the health system
- There are some tools available for managing technology. The greater need is for tools to mainstream HTM into the health system, and one mechanism is by leveraging other programs
Discussion was deferred due to time constraints

### Session 2

Healthcare Infrastructure and Technology Policies - Framework and Formulation Process

**Roger Schmidt**

Where regulations exist, there may be no need for explicit policies on technology – such as in some industrialized countries.

**Discussion**

The discussion included the first two presentations and is summarized below.

HTM challenges may not have changed over two decades, but the context has changed - who we are dealing with; financing schemes have dramatically changed – players, flows of financial resources and how they are spent. Stakeholders have also changed. There is now significantly more private sectors involvement in provision of health services through private foundations, faith-based organizations, and civil society organizations. Twenty years ago, the Ministry of Health (MoH) was the principal provider organization in the delivery of health services. Today, major stakeholders might be private autonomous providers. The role of the MoH therefore must change towards more of guidance and stewardship and less of provider.

Policies should be national and not sub-national policies.

Norms and standards are important. And accountability goes hand-in-hand with standards, and the stewardship function of the health system. However, often standards developed in the North, and cannot be used in the South because conditions are not the same. High tech devices and systems should not be used in environments where they cannot be sustained. Hence, there is a need for WHO recommendation/guidelines on standards which are appropriate to the context. However, it is difficult to advocate “double standards” - one for developed countries and one for developing countries, as this raises ethical issues.

**Experience in countries and regions**

In many African hospitals up to 60% of the capital budget goes to health technology and infrastructure. Although AFRO has two resolutions on HIT, no more than five countries have actually implemented them. There is a need to know what is happening at country level in terms of technology policy and its implementation. In Cameroon, for example, a policy has finally been published after nine years of work. The process itself took just four months of work but it took a nine years period from getting a mandate to the signature of the final document. Good stewardship and, especially, transparent processes are the key to smoother and shorter processes.

### Three key messages

Three key messages from the presentation were:

- Positive frameworks needed
- Stewardship of Ministry of Health
- A policy is a dynamic document, requiring review and updating
In Latin America the health technology sector is fragmented and segmented. Only 45% of total beds are under the control of the ministry of health. This fragmentation also extends to health technologist. For example, in Malaysia the two key groups – those concerned with medical devices and those dealing with health care technology – clearly need to work together.

**Tools**

As to existing tools, it is not sufficient to make them available. There need to be accompanying measures in their development, to help ensure that the tools are applied and easy to use. The WHO set of four booklets published by EMRO were used in the oil for food program in Iraq. However, they need to be made simpler. They also need to be updated, since they are now seven years old.

Tools are used in countries, but these are often not rooted in the mainstream. Where existing national policies are not implemented, it might make sense to suggest the creation of a technical working group within the health sector-wide approach (SWAP).

**Healthcare Infrastructure and Technology Policies - Implementation Challenges, Strategies and Tools to Determine Effectiveness**

*Dr. Bastiaan Remmelzwaal*

**Discussion**

There is a need for impact indicators as these are the link between technology and health. The example of the Institute of Medicine (IOM) in the US was given, where indicator areas for ICT in health are specified as: access; quality; cost; provider satisfaction and patient satisfaction. Impact indicators could be simple and easy to compute – for example, information on user satisfaction can be collected through a phone call and serve as a performance indicator of a district health unit.

The indicators proposed could also benefit from the inclusion of demographic data to the set, so the data can be normalized to make comparisons easier. It would also appear that only few countries are collecting data from adverse events due to malfunctioning of equipment, similar to adverse events in drugs. The World Alliance for Patient Safety work stream on Technology and Patient Safety, which is still in its infancy, could serve as a vehicle for addressing this issue. Key performance indicators (KPI) could be a way of retrieving information on technology and patient safety.

While the suggestions made were welcome, it was pointed out that the set of proposed indicators was only part of the package of measures being developed by WHO. A balance also needs to be found between computing indicators, a resource-intensive process, and the need/demand for them. In the same stream is the need to measure what matters and not just what is easily measurable. Technology indicators should be part of the Health Management Information System (HMIS) in countries – with links and cross references to other indicators.
What is needed from WHO are guidelines on indicators and examples on how to use them by the countries. Training should also be included as part of the provision of tools for measuring indicators.

Session 3

Health Technology Assessment

Dr. Reiner Banken

Discussion

Health technology assessment (HTA) brings together a health metric such as QUALY and financial resources. A similar model is needed in HTM. However decision makers often do not use economic data. Health economic models are very sensitive to bias and quite often there is no policy tool to translate HTA policy recommendations into reality. Tools are being developed to fill this void.

As to HTA model validation, models can leave out significant facts that are not available in a different environment. To carry out an HTA process there needs to be a scoping phase, which goes beyond the requesting institution, and that translates scoping questions into scientific questions which can be answered by HTA. The HTA process is very important – not just the knowledge. HTA reports should provide evidence on requests made by clinicians.

An HTA unit needs to be embedded in the system but still be independent, and HTA should be used primarily for difficult decisions. However, it should be remembered that HTA does not replace public policy. It informs policy and diminishes uncertainty. But evidence is only one factor in decision making.

There was some debate about whether HTA comes before health technology management (HTM) or vice versa. HTA goes into epidemiology, unlike HTM. The example of the model used in AMRO/PAHO with links between HTA and HTM was cited. There was agreement that ultimately it does not matter, which comes first – HTA and HTM should be used together.

The discussion also pointed out the difficulty to get HTA adopted in low income countries. Is there a need for HTA specifically for developing countries? Although there are many tools around, it is not clear if there are tools for low income settings.

That said, WHO experience with HTA in low resource setting, dates back to the HTAi's Special Interest Group (SIG) for Developing countries, which has continued to the recent meeting in Turkey. WHO's strength in this field is that this Organization is seen as neutral broker. One approach promoted by the Organization for Low- and middle-income countries (LMICs) is for the countries not to do evaluations themselves. Rather, they need to build capacity to access information where it is available and determine its relevance to their questions.
Healthcare Technology Needs Assessment and Planning
Mario Castaneda

Discussion

Concern was expressed in the area of needs assessment, where countries sometimes do not know how to plan what they need, and sometimes plan for what they do not need. A proposal was made for a working group to focus on development of planning tools. ECRI Institute (USA) has a model for needs assessment. Hong Kong took this model, modified it and now uses this new version. It could help jump start the development of needs assessment tools. It was also pointed out that needs assessment should include optimization of available resources.

The World Health Assembly resolution on technology represents a commitment from every country to move forward with the issue of medical devices. Lists of medical devices which are needed could be determined from analysis of clinical guidelines to determine which guidelines call for which medical devices. However, there are very few of such guidelines. WHO could support work in the area of devices that are needed and which should be made available.

The discussion also laid emphasis on the growing importance of information and communication technology (ICT) in health and the links between eHealth and health technology in general. The convergence of IT and clinical technology, underscores the need to work with eHealth groups and not constrain countries by the separate structures in WHO for these areas of technology.

Large quantities of data, made available through electronic records, are both a boon and a burden. They necessitate the development of tools to sift through the data to get to the kernels which are relevant to the problem at hand. On the other hand with masses of data comes recognition of patterns. The more information is made available the more important patterns can emerge from the data. But with increased electronic data also comes the need for security. A key concept in this regards is the CIA – confidentiality, integrity, availability – and there is now an ISO standard which specifies a person in a hospital that must be responsible for the security of systems.

There is a need to identify the most useful technology for a given context, including how to make the best use of the Internet for health. The mobile antennas (over bicycles or animal carts) used to provide asynchronous Internet access in the example from India, which was presented, empowers people by allowing them to access information.

Increasingly, today’s equipment is normally connectivity-ready. But in many instances local connectivity is not available. Governments need to invest in connectivity for equipment purchases and to provide local connectivity for use of these capabilities. In Africa, for example, most public sector hospitals are not connected to the Internet. Even where there is connectivity the bandwidth needs to be high enough to allow loading of
modern web pages that tend to be very data heavy. This, however, underscores the need for planning. Countries without plans respond to international pressure to purchase new technology, when the local environment does not support it.

**Session 4**

**Medical Device Regulatory Systems**

*Antonio Hernandez and Josée Hansen*

Antonio Hernandez gave a historical background of medical regulatory efforts in PAHO beginning with the international conference on medical devices regulatory agencies (ICMDRA) in 1986, through the consultation on regulation of medical devices in 1999, and culminating in the 42nd PAHO Directing Council resolution on regulation in 2000 and the subsequent Regional plan of action – in the context of health care reforms

Josée Hansen gave a country perspective from the Netherlands. The presentation highlighted the tension arising from the fact that in Europe medical device legislation is Europe-wide while health care is governed by national legislation. Holland has one notified body and eight umbrella organizations on medical devices.

**Discussion**

Poor maintenance in the Netherlands came as a surprise, with a fire in an operating theatre. This was an eye-opening seminar event to highlight the problems. The resulting declaration on improved maintenance showed that this is not a problem of developing countries alone. This happens even in the best hospitals, but may not be an indicator of poor maintenance.

In response to the need of countries to set up regulations, EMRO relied on two PAHO documents. It would be useful to review all PAHO documents on regulation for dissemination in all parts of the world.

It is important to pay particular attention to disposal of medical devices. It is also important to include incident reports in the regulatory framework.

There was a question as to whether the absence of regulation is an obstacle to innovation. However, experience shows that the driver for innovation is potential market, not regulation.
Devices and pharmaceuticals do not have the same impact in terms of the attention they get when mishaps occur. This could be because of the longer history of professionals in the pharmaceuticals industry as compared to health technology professionals.

Registration fees can also constitute a challenge with registration of medical devices, and this could sometimes be a deterrent to registering devices.

In Latin America, regulation is driven more by engineering concerns than by tort law concerns as is the case in North America.

ISO and CEN have standards on regulation of medical devices.

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<th>Recommendations</th>
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<tr>
<td>1. WHO should revise existing regulations and develop “How to” guidelines</td>
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<td>2. WHO documentation center for medical device tools – data base of experiences should be created</td>
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<td>3. Final documents of the GHTF should be disseminated</td>
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<td>4. Tools for ensuring compliance to regulations should be developed</td>
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<th>Suggested areas for recommendation</th>
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<tr>
<td>1. WHO to develop common data base for compliance to regulatory directive for countries to consult.</td>
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<td>2. Clearinghouse – information portal should be developed</td>
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<td>3. Provide infrastructure requirements for equipment – especially high priority items</td>
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<td>4. Lack of standards specification parameter – how to harmonize framework for specification parameters</td>
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<td>6. How to guide on feedback loop in procurement</td>
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<td>7. Provide training to technicians in countries</td>
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<td>8. Revise guidelines on procurement and produce WHO document taking into account country experiences e.g. India, Mexico</td>
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<td>9. Set up guidelines for generic specification for most important equipment</td>
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<td>10. Guidelines for compatibility for ICT systems should be developed</td>
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<td>11. Tools for ECRI</td>
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<td>12. Need for tools for ensuring transparency in procurement</td>
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<th>Three key messages</th>
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<tr>
<td>• Full cycle, closed loop - starting right, enabling update, keeping feedback) – In addition this helps provide evidence to support mainstreaming of HTM</td>
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<td>• Complex centralization is not the way forward. Framework should be developed for existing materials, if they add value</td>
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<td>• Comprehensive suite of information exists – the challenge is to make this accessible</td>
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The presentation pointed out the tensions that need to be resolved in the procurement process – among various stakeholder groups: donors, suppliers, patients, doctors, etc. One key tool for improving procurement is to build in assurances at each stage of the procurement process - sets of guides for procurement which will improve assurance.
Discussion

Infrastructure needs for procured items should be taken into account, such as - electricity, physical environment, etc. These requirements need to be part of the preparation - getting the specifications right.

The experience of PAHO underscores the value of such appropriate tools. Acquisition processes within the poorest regions have improved since the widespread application of available tools in the area of procurement. It would perhaps be useful to create more WHO Collaborating Centers (CCs) in the field of technology management, who could support updating/development of procurement and other HTM tools.

Procurement specialists are experts in their field. Health technology experts need to be wary of encroaching on their turf. There is a need for mutual respect between the two professions.

Healthcare Equipment Donations
Billy Teninty

In his presentation Billy Teninty made reference to available donation guidelines – WHO, FAKT, WCC? He highlighted the fact that private donors, whose role in health service provision has grown significantly over the years, often work directly with hospitals thus by-passing government systems of verification and control. A key aspect of the donation process, as underscored in the WHO donations guidelines is communication among interested parties – recipient, donors, advisers, government – before, during and after the donation. This is important to creating mutually beneficial partnerships around the donations.

Three key messages
- Donors benefit from all donations, while the recipients do not always benefit from donations.
- There is a need for accompanying measures (speaks to the broader “purpose” of the donation) – to include supplies, manuals, user training, etc.
- A community of donor organizations is a useful instrument for peer pressure to ensure that good donation practices are followed by members of the community.

Suggestions for recommendations
1. Legislation on equipment donations and accompanying measurement
2. Document some successful case studies
3. Checklist for donors and recipients
4. Do not separate donations from procurement
5. ORBIS had a checklist that they are willing to share. They have very stringent procedures such that many proposals are not accepted for donations.
6. Disseminate existing guidelines – guidelines from DRC and Madagascar (in French) adapted from WHO guidelines
7. Include ADVAMED and EUCOMED guidelines for voluntary compliance
8. Second guidelines for donor accountability issues
9. Differentiation of guideline by level/complexity of technology or function
10. Review, update and dissemination of existing guidelines (by experts) and accompanied to include training
11. Guidelines for implantable and single-use devices

at the top levels of WHO have interest on the development of this issue. The HTM community should take advantage of this conductive environment.
It is important to distinguish between equipment and medical devices, and to recall that equipment purchase cost is usually no more than 20% of the life cycle cost of the equipment.

There might be a missing piece to the concerns expressed. Despite the tools availability, there is a need to pay attention on how to turn guidelines into policy and also how to address donors so that donations are not simply for the benefit of donors. Which tools are available to help with this transformation? Blaming and shaming could be one such tool. Wide dissemination of the donation guidelines to the donor community might also help. It might worth looking into a rating system for donating organizations to promote good practices.

The other side of the coin has to do with accompanying measures on the recipient side. More responsibility should be taken by host health systems, rather than putting the burden on partners alone. The checklist, which is part of the WHO guidelines, is a mechanism for politely turning down donations which do not meet acceptance criteria. As with other tools, the WHO guidelines on equipment donations need to be updated.

Another missing piece is how WHO should communicate with people who need to hear about the challenges and solutions in the area of HTM. How do WHO can “advertise” what it does? How should WHO do good public relation? Is there a need for communications units to help publicize this area of work?

The same considerations that are given for donation of equipment should be extended to donation of services. For example, in one country, there is strong pressure by a confessional organization, to set up a paediatric cardiac service in a setting where this is not at all appropriate.

Leasing/rental with purchase option is used in some countries. How do we handle these options? The transition from rental to purchase needs to be examined. Finally, there are two issues on the horizon. One is rental and the responsibilities associated with them. The second is purchase of refurbished equipment covering the entire spectrum from “spray and pray” refurbishing to refurbishing which adds functionality, and is almost like redesign of equipment.

Session 6

Healthcare Technology Management Systems
Adham Ismail, Iyad Malkawi and Peter Heimann

The presentations provided information on computer-based systems tools for HTM, both from WHO (HiTEMP) and from other sources. Details of the specific example of custom designed and built system in use within the public sector in Jordan were given. National inventories, if properly designed to deliver the right indicators, can go a long way to influencing national policy.

Three key messages
- Networked computerized maintenance management system (CMMS) are a comprehensive system with major advantages
- Tools deployed in the Directorate of Biomedical Engineering, Jordan include: Incentive system for HCTS staff; quality control program; tender process; fully paperless CMMS.
- Guidelines for locally developed CMMS could possibly lead to a WHO CMMS for use in countries.
**Recommendations**

1. Jordan's experience is a good starting point. WHO should extend this to other countries.
2. Provide consulting support to other countries that are interested.
3. Need a modular system where you can turn on and off modules.
4. List of other existing CMMS. Need to harmonize these systems to provide for safety. Common device code – linked to nomenclature harmonization.
5. WHO should provide technical assistance to countries for HCTSs.
6. Clear overview of what is currently available with key features of each system.
7. Insist on technical inventory – expectation is to establish link between HTM system and physical assets management.
8. Need more publicity on HiTEMP and support system – need to outsource this to system that can provide support.
9. Need for only one system for all countries?
10. In coming generations of this software special attention should be paid to computer-related issues: configuration; interconnection with other systems; revision levels. Cross system compatibility.
11. Do not forget private sector in developing systems in countries.

Guidelines should be made available on the minimum information to be included in technical inventory systems. In this vein there is a need for a unified questionnaire for collecting information on technology, so that information can be aggregated across countries. Such inventory systems need to take into account national and international standards, for example from ISO, and others.

Users in different services, e.g. surgery, laboratory, EPI, etc. can be used for collecting information for technology inventory in their areas of health services. As users, they know the problems and benefits of the technology that the use.

**Discussion**

HCTS staffing issues in government hospitals in Jordan are not a problem, as all staff are employees of the Directorate of Biomedical Engineering of the MoH.

Coding of spare parts in a custom-designed system, with the huge potential for multiple codes for the same parts, is a challenge. The Jordanian system uses its own codes, but these are mapped to the manufacturers' codes.

Is there a need for guidelines for evaluating computerized HTM systems? Robust clinical information systems and entire Health Information systems are being introduced in countries. Technology inventory systems need to be incorporated into these robust systems, as stand alone inventory systems run the risk of disappearing in the future. This speaks to compatibility with, and interoperability between, technology inventory systems and other HIS components. In addition, it would be worth while to promote a distributed architecture where there is local management of data that are used locally, but access is available for other authorized users.
Session 7

Nomenclature issues

Didier Vallens and Peter Illig

Didier Vallens and Peter Illig discussed the tensions that exist between the two major competing nomenclature systems used around the world, ECRI's Universal Medical Device Nomenclature System (UMDNS), and the Global Medical Device Nomenclature (GMDN) sponsored by the European Commission. GMDN and UMDNS have two very different business profiles. While UMDNS is a free subscription service, with other revenue streams from tools for technology management which use the nomenclature, and delivers a full file of terms, the GMDN Agency has a single funding stream from paying clients who use the nomenclature by accessing their proprietary base nomenclature terms. The European Commission has decided in 2007 to fund translations from English into the 20 other EU languages, within 4 years. UMDNS had been translated into Spanish by ECRI Institute (which is one of the WHO Collaborative Centres).

There are two related issues: what will happen to the continuous update of the English base nomenclature terms, and what to do in the mean time? There are also issues associated with the periodic maintenance of both systems – “daily” in one and or “continuous” in the other. It appears this will mean that the GMDN and the UMDNS translated versions will not be up to date most of the time. Furthermore this requires users to manage frequent updates.

Discussion

There is extensive experience in PAHO with UMDNS. And it is unlikely that GMDN would fulfil the same mission as UMDNS.

The job of resolving this tension is a big task, very political and will require a lot of diplomacy to broker the negotiations between the two competing nomenclature systems. And the divergence between the two will continue to grow as other areas of work grow - areas such as tissue biology, etc. However, the question arises whether it even matters which is used, as long as it works. It does matter. A lot of work has been done on

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Three key messages

- Can the world afford the waste of energy and bad PR? Is there room for active harmonization and could WHO help with this? WHO needs to define its objectives in more detail
- None of the legal issues are insurmountable with the existence of both systems
- There is an immediate need to establish WHO policy on the subject. Such a decision will have consequences.

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Recommendations

1. Link this WHO debate of IHT SDO on SNOMED (Systematic Nomenclature of Medicine – clinical terminology)
2. If nomenclature does not link to health outcomes, there are serious questions of value.
3. Tie it to health outcomes
4. Do not invent new tools when functional tools exist which can be improved
5. WHO should organize a task force on this
6. Choice is for UMDNS – to be updated as it is more inclusive
7. Matching of codes should be done
8. WHO to provide a matching table
9. WHO to be involved in a single nomenclature
harmonization and still no agreement has been reached. A deadline needs to be set for resolution in some form. A task force could be set up for this. Otherwise the challenge will only get more difficult.

**Country experiences**

**Mexico**

**Key messages**
- Health technology policy is embedded in the National Health Plan, has action plan, indicators and budget
- Health system in Mexico is segmented – Social Security, government and private providers
- CENETEC, national (MoH) agency covering Equipment, HTA and eHealth and Telemedicine.

Discussion – manufacturers need to be registered in Mexico in order to market their equipment there.

**Cameroon**

Experience in formulating national health technology policy.

**Key messages**
- Health system has three main levels – district, provincial and national
- Technology situation shows that technology needs to be better managed
- Process took a long time

Cost $260,000 US and took 9 years.

**Nicaragua**

**Key messages**
- Key donors: Venezuela, Luxemburg, Japan, WHO, Cuba, etc. Equipment donations play an important part in health services
- Governments priority is health services for rural areas
- Problems with some donations – sometimes a lot of junk.

**Other specific experiences**

**Priority medical devices**

**Key messages**
- What research on medical devices is needed to make them more useful for the management of high burden diseases
- Project is defining gaps and defining research agenda to close the gap
- Dynamics of interface – medical device market push vs. public health needs

**Specifications for steam sterilizers**

**Key messages**
- Challenge of infrastructure requirements in a district hospital in a developing country for sterilizer designed for the industrialized world to international standards
- Challenges linked to limited capacity, both human and financial, and low market importance of the country
- Work to be done to develop appropriate specifications to cover this situation.
Session 8

Healthcare Equipment Maintenance
Dr. Jim Wear

The presentation outlined the maintenance system in the US Veterans Administration (VA) health care system, where there is a programme in every hospital. Hospital maintenance staff is also responsible for clinics in the area, and even home healthcare systems. The range of competences needed in health care equipment maintenance includes artisans, technicians, engineers, clerical staff, and managers. These skill sets can be developed through various education programs—academic, on the job, and continuing education. Training of trainers is a useful strategy for developing human resources for maintenance.

Maintenance management is crucial, and as the saying goes, “If you can’t measure it you cannot manage it.” There are different types of tools available. They range from forms and manuals (publications from various sources including the VA equipment management guidebook) and other types of low technology tools, to Communities of Practice (CoPs) on the Internet.

Suggestions for Recommendations

1. Make VA software available to countries
2. Coordinate with the academic sector for training and use distance learning techniques
3. WHO should recommend tax reduction on medical equipment spare parts
4. Develop a forum for uploading and sharing tools and information
5. Manufacturers should provide maintenance information with each device or equipment
6. Provide training to countries
7. WHO should identify counterparts in institutions such as WB, IAB, ADB, AfDB, EDF, USAID, and other financial institutions, cooperation agencies, other donors and charities for better sharing of maintenance resources and programmes.
8. WHO should advocate support of maintenance and better availability of spare parts
9. Better sharing of technical maintenance manuals
10. The problem of lack of human resources for maintenance and HTM in general needs to be addressed.
11. WHO should prepare generic and special checklists for basic and preventive maintenance
12. Work should be done to develop an international list of performance indicators

Key messages

- Skills required for maintenance include professional ethics
- The VA serves 25 million people, and is thus very much like a country. Hence its experience could be readily useful to countries. The history of Biomedical engineering in the VA is also similar to the experience of some countries.
- Equipment is getting better and better, so HCTS can do more with fewer people.

Discussion

To underscore the value of documentation, the VA does not buy any equipment without manuals, and 60% of the value of technology in the system is medical equipment. The updated set of G29 manuals is available. Over the years, PAHO has benefited from its relation with the VA—by receiving manuals, books, and finding partners for its maintenance programmes in countries.

There were some concerns expressed about models implied by the suggestions made. These suggestions point to very centralized models, which may not last. Getting funding for a central repository is a difficult task. In addition, there is a need for staff to manage the repository. There are other web tools for collaboration, including networks and communities of practice. Some even use networks and cell phones. The key is not to limit
a country's options to one model, but use whatever model is appropriate. Training and building capacity are a much needed complement to manuals and documentation. The staffing ratio in the VA is 1 engineer to 10 technicians. To build capacity, technologists should use available technology. Distance learning is the way to go for capacity building. There are virtual rooms at PAHO, and INFRATECH and its subnetworks can serve as tools. In the same path, it would be worthwhile exploring building intelligence into equipment by working with manufacturers. WHO should use its brand more strategically by working with manufacturers towards such strategic goals. The cardiovascular disease programme, for example, worked with manufacturers to develop a Blood Pressure monitor which sells for less than US$20. This collaboration with industry should extend to guidance on how to provide information, working with manufacturers. In the US states require that technical manuals come with each equipment.

How do we make maintenance successful? In many African countries, tender documents include a comprehensive list of components with minimum stocks of supplies. However, a budget for maintenance is not always obvious. There is a need to collect data and figures to make sure countries take a holistic approach to equipment maintenance.

Clearinghouse and survey
Adriana Velazquez

A lot of information is produced by WHO and its partners, but it is not easily accessible. Even on the WHO web site there is very little information on health care technology. The information needs to be further disseminated including to non technologists. Resolution WHA60.29 calls for the establishment of a web based health technology data base. And in WHO, there is a call to support appropriate health technology for primary health care (PHC). This is captured in the work plans for the period 2008-2010.

Discussion

Links with professional social networking sites. The site should be part of a web presence, which includes other aspects beyond the site.
Human Resource Development issues

Frank Painter

The presentation pointed out gaps in a number of health technologies, for example, the gap in knowledge between what is needed to function, which has changed over time due to technology progress, and what staff actually know.

### Suggestions for recommendations

1. Disseminate information that exists on Clinical Engineering (CE) training programs
2. Develop strategic alliances with universities and technical schools
3. Inventory to identify training institutions
4. WHO to advocate for implementation of CE international certification to IFMBE
5. WHO to define and recognize the types of professionals involved in HT
6. WHO should promote availability of eLearning materials especially in the context of LMICs
7. Curriculum should be comprehensive, and include all relevant competences
8. WHO should connect with international CE program among European countries
9. Develop easily transferable training materials
10. Identify existing programs in developing countries
11. An inventory of existing human resources should be made in HCTSs
12. WHO should invest more in fellowships and other mechanisms for training, especially training of trainers
13. The relevance of the level of training to the challenges faced in health services, should always be kept in mind
14. Health technologists need to be more visible in WHO classification of health workers

### Three key messages

- Content of training should be based on the body of knowledge needed to function
- Professional organizations with appropriate activity programs are key to successful bridging of the gaps.
- Recommendations in the HTM area should align more with IT and other groups with more recognition in hospitals and health services.

In training staff there are significant benefits if the curriculum is accepted by various categories of stakeholders

### Discussion

Work is needed on the demand side with health systems to complement the supply side work to produce clinical engineers, technicians, and other HCTS staff.

### Session 9

Major issues arising from meeting

Addressing issues emerged at the meeting
   - identified gaps and further needs

*Discussion moderated by Chair or Rapporteur*

Most crucial thing to be dealt with and how – to break the cycle of the same situation for 25 years

1. Training of BME
2. Global summit on technology in health
3. Improve work ethic
4. WHO should do marketing of tools available (and examples of their use)
5. Comprehensive review of existing tools and guidelines
6. Invite and interact with other health workers
7. WHO advocacy with member states to emphasize need of technology as a cross-cutting area in disease programs
8. Do not just document what we have in WHO but also in other sources
9. Serve as convener on tools and promote their use in countries
10. Need a strategy with a big picture. Then discipline to implement what has been agreed on and accountability.
11. Document and classify information collected to date and follow up
12. Make tools available, help implement them and evaluate them
13. Commitment, continuity and more recently, connectivity – use connectivity
14. Prove the impact of technology on health and what the profession and tools contribute to health, to be used in marketing strategy.
15. WHO help create international CE association
16. Emphasis on HR - Recommend leadership development for HTM
17. Learn from other professions that have succeeded for marketable solutions
18. Effective information sharing – covers marketing, evidence base.
19. Invest heavily on Education and training
20. WHO has many CCs. Find hospitals that can be used for internships for HCTS
21. WHO should promote sharing of experiences in health technology
22. Closer follow up to meeting by requesting participants to report on progress in countries
23. HR is key – WHO and partners to hire NPOs to look after HT in WHO country offices
24. Data clearinghouse
25. Technology is still not clearly understood in DCs. WHO to help understand and integrate technology into HS and make resources available
26. Use of the SMART criteria used when setting the objective stages for project management.
27. Advocacy is still the biggest challenge to convince governments, donors of the importance of HT
28. Promote approaches to increase pressure for transparent governance
29. WHO to force IHTSDO to consider socio-economic conditions related to HT in DCs.
30. WHO has to cooperate internally with other departments in the organization
31. What is not written down is not done – data for clearinghouse
32. Uneven penetration of HT. Advocacy in countries with low penetration
33. More formal efforts to institutionalize HT in legal frameworks
34. Key role of basic peer reviewed research in convincing – make a list of research topics
35. Look at countries that have been successful in breaking this cycle and learn from them.
36. More HTM focus in PHC. Available tools to focus on PHC
37. Digest everything that has been said and use this in a workable strategy. Task force to review decades of experience.
38. Policy makers and health manager need to be involved, as they play a major role.
39. WHO to look at availability of safety management for medical devices and provide guidelines to these countries.
40. Dissemination is crucial – use of a range of methods including web tools.
Dr Groth informed that a global summit on health technology is planned for September 2010, organized by WHO in collaboration with INHATA and HTAi. An announcement will be made some time in the near future. Two additional points, worth following up are the ideas of professional associations and research.

**Areas not adequately covered:**
1. Disposal of equipment needs further deliberations
2. Financing mechanisms for HT. In most DCs this is a major issue.
3. We need to develop some success stories about financial management. Good HT pays for itself. Evidence of this should be developed and used for marketing.
5. How to manage series does not cover how to organize
6. Small group of countries – scalability of this effort to other countries?
7. Meeting intended to discus tools – but not discussed. Specific items on deliverables which are due next November are not covered.
8. How to link HT people
9. Leveraging the work of other services in health systems in countries and other Units/departments in WHO. Take advantage of PHC program to show the added value of HT
10. Need to show evidence of the added value. To convince other discipline

**Missing points**
1. Waste management to be considered
2. Financing of maintenance – highlight success stories
3. Impact indicators and examples of health technology
4. Guidelines needs country adaptation
5. Meeting not addressed the project specific outputs
6. Organization of staff at ministry level
7. Leverage HT via dialogue with other sectors that are necessary for HT implementation, mainstreaming HT into WHO work
8. Roles of hospitals in countries
9. Strategy for scalability of the activities to reach countries
10. Challenge the evidence we have for usefulness of HT management
11. Ask countries directly about their needs
12. Use examples of what happens when HT management is lacking compared to when it does exist

**Way forward for WHO, partners and countries**
- Tasks, responsibilities, time frames
  
  *Discussion moderated by Chair or Rapporteur*

**Free comments session**

*What is the plan now that WHO has received all this information?*
One activity is to identify leads and members for the task forces. This information will be communicated back to all participants. Work needs to start soon, as results need to be presented at the Rio meeting in November 2009. Further activities are shown in the calendar in one of the slides shown at the beginning.
Perhaps a web conference tool such as Elluminate will be used for holding virtual meetings and working collaboratively.

By end of next week (beginning of May), a document outlining the process and expected results, for each topic, and outcomes should be ready for sharing with participants.

More detailed information is available and could be posted. Two timelines, tied to the projects funded by the Bill & Melinda Gates Foundation and Lux-Development.

Information and a demo on software tools such Planning and Management of Assets in Health Services (PLAMAHS) are available can be arranged at the hotel for those interested and who are still here.

Conclusions and recommendations

In the last session, the meeting:
- Agreed on key recommendations in each of the thematic areas, for further work by the working groups.
- Suggested what each participant, as well as others known to him/her, could offer.
- Proposed next steps for the work
- Individualized evaluations of the meeting.

Priority areas of work and key recommendations

The list of priorities is given below:

**Clearinghouse**

1. A plan should be developed for WHO to inform about the clearing house in order to increase awareness
2. Do a survey of all existing tools developed and evaluate them in pilot countries
3. Sustainability of the clearing house through long-term funding is a priority.

**Computerized Maintenance Management System (Management software)**

1. Provide technical assistance for HTM systems in countries
2. Involve other stakeholders?
3. Link to needs assessment

**Human resources**

1. WHO should promote the availability of e-learning material focusing developing countries
2. Disseminate information on existing biomedical training programmes
3. Identify easily transferable training material
4. Training of trainers systems

**Procurement**

1. Procurement guidelines to be in Clearinghouse
2. Transparency guidelines
3. Update of guidelines
4. Provide training to technicians in countries

**Maintenance**
1. Develop performance indicators for maintenance
2. Increase awareness about the importance of budgets for maintenance
3. Identify key persons in international institutions WB, USAID…..for health technology issues

**Policy Development**
1. Guidelines for policy formulation
2. Creation of technical working group on health technology within the health sector-wide approach (SWAP)
3. Make the guidelines appropriate to the country context
4. Embed health technology policy in national health policy

**Policy implementation**
1. Guidelines for an implementation plan
2. Develop impact and performance indicators as part of the HMIS
3. Training tools for measuring technology indicators
4. WHO should establish a team to assist countries in HT policy development and implementation processes

**Needs assessment**
1. Develop needs assessment and planning tools/models
2. WHO should provide assistance for implementation of needs assessment mechanisms
3. Link needs for assessment to recognized policy/health frameworks, such as Medical Development Groups and clinical needs
4. Develop a web-based database for HT planning for different types of health facilities (cf. Jordan and Mexico)

**Donations**
1. Set up legislation and regulations on equipment donations
2. Provide guidelines for measuring efficacy and sustainability of donations including successful case studies
3. Establish donations guidelines for specific medical devices, such as implantable and single-use devices
4. Setting up committees for donations management at facility and country levels

**Nomenclature**
1. Task Force for the choice of a universal/global nomenclature
Interrelated database

1. Locate existing databases on health technology
2. Provide solutions for database interrelations
3. Establish a protocol and procedure system for submission of information
4. Create adequate networking

Country survey

1. Conduct a two-phase baseline country survey on health technology
2. Provide the respective requirements of Member States for tools and guidelines

Health technology assessment

1. Embed HTA in the health system
2. Develop HTA tools for low income settings
3. Provide models that link HTA and HTM

Closing session

Dr. Andrew Gammie gave a vote of thanks to WHO and the organizing departments on behalf of the participants (the results from an evaluation by the participants is given in Annex 6). In closing the meeting, Dr. Steffen Groth thanked the participants for their contribution to the achievement of the goals of the meeting. He also thanked the chair for a job well done, the Vice Chairman for his support role, and the Rapporteurs for their good work. He expressed his appreciation for the collaboration with the HDS department in preparing and running this meeting. Finally, he gave special thanks to Adriana Velazquez-Berumen for her excellent work on the meeting, and to the support staff.

Antonio Hernandez thanked the organizers and participants on behalf of his group at PAHO. He pledged to support the two projects in any way possible, and offered facilities available in his Unit for use in their implementing.

Dr. Andrei Issakov, in his turn, thanked the participants on behalf of the HDS Department. He indicated that this was the start of the process, and so further contributions would be needed from one and all. He informed the meeting that the two WHO Regional Offices that were not present (EURO and SEARO) would receive all the documentation. Finally, he wished everyone safe travels back to their stations.

Adriana thanked the country representatives and Advisory Group members. She indicated that it was good to have IFMBE members and reminded the audience that all of this is done for the patients and those served by the health services. She lauded the collaboration with professional associations such as the International Hospital Federation (IHF), which was represented by its Director General, Dr. Eric Roodenbecke, and expressed the need to get health technology management into their agenda as well as into those of other international federations.
Friday April 24 – Planning meeting

Present:

Purpose of meeting (Adriana) – to review the key recommendations made at the meeting and plan the creation and functioning of the working groups (WG), covering the various areas:

WG1: Policy Development
WG2: Policy Implementation
WG3: Needs Assessment
WG4: Procurement
WG5: Donations
WG6: Management software
WG7: Nomenclature
WG8: Documentation Centre
WG9: Interrelated database
WG10: Human resources
WG11: Maintenance
WG12: Country Survey
WG13: Health Technology Assessment

NB: Below are other groups:
- Consultants for WHO Regional Offices
- Consultants for WHO Headquarters

Self introductions in relation to the two projects:

1. The Global Initiative on Health Technology (GIHT) funded by the Bill and Melinda Gates Foundation.
2. The Project on Strengthening of Healthcare Infrastructure and Technology Management for Optimized Health Service Delivery funded by Lux-Development.

GIHT is in two parts: Tools and innovative technologies

- Part 1: Identify/develop tools, guidelines, and the methodology needed for the establishment of Health Technology Programmes.
- Part 2: Challenge the international business and science communities to identify new and/or adapt existing technologies for use in health

The following information is provided for future work
1. The GIHT Mind Map (Annex 3) worked by planning group on April 24th.
2. The lists of GIHT Working Groups and their respective members (Annex 4)
3. The timeline chart for GIHT (Annex 5).
ANNEXES
Annex 1: List of participants

**AFRO**

**CAMEROON**

Mr Vincent NGALEU TOKO  
Biomedical Engineer  
Ministry of Public Health  
Department of HealthCare Organization and Health Technology  
P.O.Box 7784  
Yaoundé  
Telephone No.: +237 77 769144,  
Mob: +237 33 031810 / +237 96 074882  
Fax No. +237 22 314637 or 22233259  
Email: vngaleutoko@yahoo.fr

Ms Tania O’CONNOR  
Biomedical Engineer  
Ministry of Health  
Addis Ababa  
Telephone No.: +251 911 95 98 85  
Email: taniabme@gmail.com

**ETHIOPIA**

Mr Martin OWINO  
Head Biomedical Engineering and Maintenance Services Division  
Ministry of Medical Services  
AFYA House, Cathedral Road  
P.O. Box 30016-00100  
Nairobi  
Telephone No.: 00 254 20 2717077  
Mobile: +254 722 75 06 03  
Fax: 00 254 20 2713594  
Email: martin.owino@yahoo.com

**KENYA**

Ms Paulina NGHIPANDWLWA  
Deputy Director, Clinical Support Services  
Ministry of Health and Social Services  
Private Bag 13198  
Windhoek  
Telephone No.: +264 61 2032320  
Cell No.: +264 81 127 0288  
Fax No.: +264 61 226 351  
Email: pnghipandulwa@mhss.gov.na

**NAMIBIA**

Mrs Maimouna DIOP FALL  
Biomedical Engineer Chef de Division  
Direction des Equipements Médicaux  
Telephone No.: +221 33 8321718  
Email: ingmounas@yahoo.fr

**SENEGAL**

**AMRO**

**MEXICO**

Mr Luis MARTINEZ LIEVANO  
Clinical Engineering  
National Center for Health Technology Excellence CENETEC  
Secretaria de Salud  
Mexico, D.F.  
Telephone No.: + 52 55 52 07 39 88  
Email: luis.martinez@salud.gob.mx  
Email: ingmlievano@gmail.com  
URL: www.cenetec.salud.gob.mx
NICARAGUA

Ms Tatiana María VALDEZ GARCÍA
Directora (a.i) de Desarrollo Tecnológico
Ministerio de Salud de Nicaragua
Managua

Telephone No.: + 505 8652 6505
Email: tvaldez@minsa.gob.ni
www.minsa.gob.ni

EL SALVADOR

Dr Carlos Enrique HERNANDEZ AVILA
Investigador y docente
Centro de Investigación
Facultad de medicina
Universidad de El Salvador

Telephone No.: +503 2100 9235
Mobile No.: +503 7768 3649
Email: dreavila@gmail.com
Email: carlos.hernandez3@ves.edu.sv

EMRO

SUDAN

Dr Iqbal A. B. ABUKARAIG
Director
Health System Strengthening
Federal Ministry of Health

Mobile No.: +249 9123 45970
Email: drighal@gmail.com

EURO

NETHERLANDS

Mrs JOSEE HANSEN
Chief Inspector
Wilhelmina van Pruisenweg 52
2595 AN Den haag
Postbus 90460
2509 LL Den Haag

Telephone No.: + 070 304 16 17
Mobile: + 06 1503 55 52
Email: jm.hansen@igz.nl
URL: www.igz.nl

MEMBERS OF THE TECHNICAL ADVISORY GROUP

Mr Ronald M. BAUER
Managing Director, SANIPLAN
Deutsche Beratungsgesellschaft für Hygiene und Medicines mbH
Homburger Landstrasse 838
60437 Frankfurt / Main
GERMANY

Telephone No. + 49 69 95 08210
Email: r.m.bauer@saniplan.de
www.saniplan.de
Mr Reiner BANKEN
Deputy CEO, external relations
Agence d’évaluation des technologies
et des modes d’intervention en santé
(AÉTMIS)
2021, avenue Union, bureau 10.083
Montréal (Québec)
CANADA

Mr Saide Jorge CALIL
MSc, Ph.D
Departamento de Engenharia Biomédica
Universidade Estadual de Campinas
Cidade Universitaria Zeferino Vaz
CP 6040, Campinas,
São Paulo 13083-970
BRASIL

Mr Mario CASTAÑEDA
National Director, Clinical Technology
Kaiser Permanente
1795 Second St.
Berkeley, CA 94710
USA

Mr Ismael CORDERO
Senior Clinical Engineer
ORBIS
520 8th Avenue, 11th floor
New York, NY 10018
USA

Mr Trond FAGERLI
Haraldsplass Deaconal Hospital
Ulriksdal 8
5009 Bergen
NORWAY

Mr Andrew GAMMIE
Fishtail Consulting
3 Green Lane, Marshfield
Wiltshire SN14 8JW,
UNITED KINGDOM

Mr Azman HAMID
Head, Training and Calibration Services
HEALTHTRONICS (M) SDN BHD
Suite (P3-03) Building Information Centre
Lot 2, Jalan 51A/243
47650 Petaling Jaya, Selangor,
MALAYSIA
Mr Jan HUIJS
HEART Consultancy
Quadenoord 2
6871 NG Renkum
THE NETHERLANDS

Mr Peter ILLIG
268 Rue de Lausanne, #731
01220, Divonne-les-Bains
FRANCE

Professor Yunkap KWANKAM
CEO, Global eHealth Consultants
(GeHCs)Ch. des Champs-Blancs 94
CH-1279 Chavannes-de-bogis
SWITZERLAND

Ms Sev LUCAS
International Hospital Federation
13, Chemin du Levant, immeuble JB SAY
01210 Ferney Voltaire
FRANCE

Prof. Robert MALKIN
Practice of Biomedical Engineering
Director, Duke-Engineering World Health
Duke University
Hudson 136, #90281
Durham, NC 27708-0281
USA

Mr Andre MBOULE
Independent Consultant
P.O Box 25096
Yaounde
CAMEROON

Mr Cyril NOGIER
Swiss Centre for International Health
-Swiss Tropical Institute
Health Technology and Telemedicine Unit
Socinstr. 57 - CH 4002 Basel
SWITZERLAND

Mr Rob PARSONS
Waterside Centre
North Street
Lewes
East Sussex, BN7 2PE
UNITED KINGDOM

Telephone No.: +31 317 450 469
Mobile No.: +31 6 179 18 924
Email: jh@heartware.nl
www.heartware.nl

Telephone No.: +33 45 020 9398
Mob: +33 61 805 8908
E-mail: pililig1@msn.com

Telephone No.: +1 919-660-8266
Fax: +1 919-684-4488
Email: ramalkin@duke.edu

Telephone No.: +237 7509 2009
Telephone No.: +237 9986 8271
Email: mboulea@yahoo.fr
Email: mboule_andre@hotmail.com
URL: http://mboule-consulting.biz

Telephone No.: +41 (0) 61 284 81 94
Fax: +41 (0) 61 271 86 54

Telephone No.: rparsons@healthpartners-int.co.uk
Mr Frank R. Painter
MS, CCE, Professor
Clinical Engineering Program Director
University of Connecticut
School of Engineering & Computer Science
35 Grandview Drive
Trumbull, CT 06611
USA

Telephone No.: 12032618340
Email: frank.painter@unconn.edu

Mr Albert Poon
Flat 1603, Block B, 16F Villa Loto
18 Broadwood Road, Happy Valley
HONG KONG

Telephone No.: + (852) 3155 4004
Mob: + (852) 9138 9535
Email: akpoon2004@yahoo.com

Mr Bastiaan Remmelzwaal
House no.10
Windsor View Gardens
Kigwa Ridge
Ridgeways, Off Kiambu Road
Nairobi,
KENYA

Telephone No.: +254 727 329512
Email: bastiaan@remm.net

Mr Josef Riha
GTZ / EPOS Health Consultants,
Ministry of Health
BP 7814, Yaounde
CAMEROON

Telephone No.: +237 77 78 99 93
Email: rihai@icnnet.cm
Email: Josef.riha@epos.de

Mr Roger Schmitt
Freier Platz, 26
35423 Lich
GERMANY
or King Hamad General Hospital
C/o Commissioning Office, P.O. Box 15503 Manama
BAHRAIN

Telephone No.: + 49 172 655 2682
Email: roger-olive@gmx.net
Telephone No.: +973 3655 8094

Elliot B. Sloane
PhD, CCE
Villanova University School of Business
800 Lancaster Avenue
Villanova, PA 19085
USA

Telephone No.: 1 215 646 0687
Mobile No.: 1 616 402 6405
Email: eb sloane@gmail.com

Mr Billy Teninty
MET Director
International Aid.
17011 Hickory St.
Spring Lake, MI 49456
USA

Telephone No.: 1 800 968 7490
Email: tenintyb@internationalaid.org

Mr Didier Vallens
156 rue Robespierre
93170 Bagnolet
FRANCE

Telephone No.: +33 662 584443
Email: didier.vallens@invivo.edu
Dr James Otto WEAR
5104 Randolph Road
North Little Rock,
Arkansas 72116
USA

Telephone No.:
Email: wearjam@cswnet.com

WHO REGIONAL OFFICE FOR AFRICA

Dr Jean-Bosco NDIHOKUBWAYO
Programme Manager
Health Technology and Laboratory

Telephone No.: + 47 241 39269
Email: ndihokubwayoh@afro.who.int

Dr Nicholas ADJABU
Technical Officer
Health Technology
Kenya Country office

Telephone No.: +233 262602220
Telephone No.: +254 20 271 7902
Email: adjabun@ke.afro.who.int

WHO REGIONAL OFFICE FOR THE AMERICAS

Mr Antonio HERNANDEZ
Regional Advisor
Health Services
Physical Infrastructure and Technology

Telephone No.: + 202 974 3276
Email: lhernana@paho.org

WHO REGIONAL OFFICE FOR THE EASTERN MEDITERRANEAN

Dr Adham ISMAIL
Regional Adviser
Health & Biomedical Devices (HMD)
Division of Health Systems and Services
Development (DHSSD)

Telephone No.: +20 2 227 65378
Mobile No.: +2 010 54 24 304
Email: ismaila@emro.who.int

Dr Iyad MOBARAK
National Programme Officer
Jordan Country Office

Telephone No.: +962 777 49 7999
Email: mobareki@jor.emro.who.int

WHO REGIONAL OFFICE FOR THE WESTERN PACIFIC

Dr Gayatri GHADIOK
Regional Adviser
Essential Health Technologies

Telephone No.: +632 528 8001/9848
Email: ghadiokg@wpro.who.int

DEPARTMENT OF ESSENTIAL HEALTH TECHNOLOGIES

Dr Steffen GROTH
Director

Telephone No.: +41 22 791 4387
Email: groths@who.int

Mr Björn FAHLGREN
Diagnostic Imaging and Medical Devices

Telephone No.: +41 22 791 1510
Email: fahlgrenb@who.int

Ms Adriana VELAZQUEZ-BERUMEN
Diagnostic Imaging and Medical Devices

Telephone No.: +41 22 791 1239
Email: velazquezberumen@who.int

Ms Kittie RASMUSSEN
Diagnostic Imaging and Medical Devices

Telephone No.: +41 22 791 4546
Email: rasmussenk@who.int
Ms Jeanette TWELL
Diagnostics Laboratory Equipment
Email: twellj@who.int

Mr John MAURICE
Editor
Telephone No.: + 033 6 20 83 6363
Email: mauricej@who.int

DEPARTMENT FOR HEALTH SYSTEM GOVERNANCE
AND SERVICE DELIVERY

Dr Andrei ISSAKOV
Technology and Facilities Planning
Telephone No.: +41 22 791 2659
Email: issakova@who.int

Mr Peter A. HEIMANN
Technology and Facilities Planning
Telephone No.: +41 22 791 1226
Email: heimannp@who.int

DEPARTMENT FOR THE PROTECTION OF THE HUMAN ENVIRONMENT

Mr Ferid SHANNOUN
Scientist
Telephone No.: +41 22 79 11668
Email: shannounf@who.int
Annex 2: Agenda

Tuesday 21 April 2009

09.00  Opening session  
*Directors EHT and HDS*

09.15  Participants self-introduction  
Election of Chair and Rapporteur/s

09.30  Scope, purpose and format of the meeting  
*Adriana Velazquez and Andrei Issakov*

09.45  Optimizing Healthcare Infrastructure and Technology Management in Countries - What Tools are Needed?  
*Yunkap Kwankam*

10.15  Discussion

10.45  **Coffee break**

11.00  Healthcare Infrastructure and Technology Policies - Framework and Formulation Process  
*Roger Schmitt*

11.30  Country experience

12.00  Discussion

12.30  **Lunch**

13.30  Healthcare Infrastructure and Technology Policies - Implementation Challenges, Strategies and Tools to Determine Effectiveness  
*Bastiaan Remmelzwaal*

14.00  Country experience

14.30  Discussion

15.00  Health Technology Assessment  
*Reiner Banken*

15.30  Discussion

16.00  **Coffee break**

16.15  Healthcare Technology Needs Assessment and Planning  
*Mario Castaneda*

16.45  Country experience  
*Using iHTP (DRC, South Africa, Ukraine) - Peter Heimann  
Mexico (web based system)*
17.15  Discussion

17.45  Adjourn

18.00  Reception

**Wednesday 22 April 2009**

08.30  Summary of Day 1  
*Chair or Rapporteur*

09.00  Medical Device Regulatory Systems  
*Bjorn Fahlgren and Antonio Hernandez*

09.30  Discussion

10.00  Health Technology Procurement Strategies  
*Andrew Gammie*

10.30  Coffee break

10.45  Country experience

11.15  Discussion

11.45  Healthcare Equipment Donations  
*Billy Teninty*

12.15  Country experience

12.45  Discussion

13.15  Lunch

14.00  Healthcare Technology Management Systems  
*Adham Ismail, Iyad Malkawi and Peter Heimann*

14.30  Country experience

15.00  Discussion

15.30  Coffee break

16.15  Nomenclature issues  
*Didier Vallens and Peter Illig*

16.45  Discussion

17.00  Adjourn
Thursday 23 April 2009

08.30  Summary of Day 2
       Chair or Rapporteur

09.00  Healthcare Equipment Maintenance
       Jim Wear

09.30  Country experience

10.00  Discussion

10.30  Coffee break

10.45  Documentation Centre / "Clearinghouse" / Data base
       Adriana Velazquez

11.00  Discussion

11.15  Human Resource Development issues
       Frank Painter

11.45  Discussion

12.15  Lunch

13.30  Addressing issues emerged at the meeting - identified gaps and further needs
       Discussion moderated by Chair or Rapporteur

14.45  Coffee break

15.30  Way forward for WHO, partners and countries - tasks, responsibilities, timeframes
       Discussion moderated by Chair or Rapporteur

16.00  Conclusions and recommendations
       Rapporteur

17.00  Closure of the meeting
Annex 3: GIHT Mind Map (First draft)
### Annex 4: Lists of Working Group Members

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**Notes:**
- These experts are under APW with HDS/TFP.
- These experts will be under APW with EHT/DAH.
- These experts are under consideration for ROs and HQ Policies.

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Annex 5: Timeline

**Goal:** 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

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<td>1-10 September 2010</td>
<td>Shanghai, China</td>
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<td>From Medical Devices to Health Care</td>
<td>To present PMD and all tools developed and selection of technologies, to high level policy makers</td>
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Annex 6: Meeting Evaluation

EVALUATION FROM PARTICIPANTS

a) Graphs

**Communication**

- Very good: 36%
- Good: 32%
- Regular: 28%
- Poor: 4%
- Very bad: 0%

Fig. 1. Communication.

**Transportation**

- Very good: 33%
- Good: 30%
- Regular: 28%
- Poor: 17%
- Very bad: 0%

Fig. 2. Transportation.

**Hotel**

- Very good: 20%
- Good: 20%
- Regular: 27%
- Poor: 17%
- Very bad: 10%

Fig. 3. Hotel

**Meeting Room / Food**

- Very good: 30%
- Good: 30%
- Regular: 0%
- Poor: 0%
- Very bad: 0%

Fig. 4. Meeting room/ Food
b) Comments.

1. Very good presentations
2. Recommendations, which are very pertinent, will be implemented in the near future

Points that need to be improved:

3. Better planning and initial communication. Invitations should be sent to MoH's, copied to participants for follow-up. 2 to 8 weeks in advance for smooth preparations of visa and flight bookings

4. Need to see the agenda at least 1 week before the meeting. Make available meeting documents and presentations in advance, to ensure they support the directions and outcomes of the meeting

5. Better meeting facilities. Most of the people found the meeting room very small for the number of participants and also, they found the lighting too bright, therefore it was very difficult to see the presentations' slides.


7. Better welcoming and hotel arrangements. For example, arrange a "welcome package" at hotel that includes a "things to do" list such as "Cash operations"
8. Greater clarity of meeting goals. Assurance that the outcomes will be valuable and used

9. Agenda not inventive enough

10. Too many topics on the agenda, not enough time for country presentations and talk amongst participants

11. Presentation on clearinghouse should have been the first one

12. Work organization in teams (international, regional, country). Small round tables to generate ideas - it is difficult in a big group

13. Obtaining results and accountability from participants

14. Ensure adequate resources available for implementation of policy decisions

15. Identify methods of operating and voting in advance