Report

FOR

Creation of a global knowledge network on healthcare technologies to promote and disseminate best practices

BY

GIC Limited

September 2001

CONTENTS

EXECUTIVE SUMMARY

DFID has funded a project which aims to improve the access to, and availability of, information related to healthcare technology (including management practices) for healthcare delivery institutions and health professionals in developing countries, through two interlinked activities: Firstly a survey of healthcare delivery institutions in selected developing countries which will aim to identify priority areas where information and training needs are not being met; and then, assembly and maintenance of an indexed "knowledge database", accessible via the KaR website and in electronic media and hardcopy, of relevant individuals, institutions, publications and web-sites.

Healthcare Institution Survey
In overall summary, the technology aspects are no longer considered the prime source of perceived problems, rather it is the policy and management environment which are now considered to be serious deficient and there should be a change of emphasis away from technology and technicians and onto wider healthcare technology policy and management developments within national healthcare systems.

Web based database
The web based database is now operational at:
http://www.ids.ac.uk/data/healthlink/kar.htm

And contains information on:

80 organisations
270 publications
6 software entries
14 training courses

additional work to include manufactures/suppliers contact points continues.

Recommendations and Conclusions
Recommendation to guide future priorities for KAR HT funding are:
- Overall - Change emphasis from technology and technologists to policy and management environment;

- Management and Policy Support further dissemination of existing WHO materials. Support research on how best to apply and influence policy environment;

- Information - Support increased information access to healthcare institution and biomedical units. Support improved dissemination of existing information and WHO materials;

- Maintenance Manuals Support projects that seek to improve access to maintenance manuals perhaps by discussion and encouragement to industry bodies and/or through provision of web space hosting for medical equipment technical materials;

- Recall product warning notices Support projects that seek to improve access to recall/product warning notices;

- Training Support inclusion of management and policy aspects in training. Support inclusion of environmental and safety aspects in technical training.

1. INTRODUCTION

As part of the KAR 'fast-track' group of projects, DFID has funded a project which aims to improve the access to, and availability of, information related to healthcare technology (including management practices) for healthcare delivery institutions and health professionals in developing countries, through two interlinked activities: Firstly a survey of healthcare delivery institutions in selected developing countries which will aim to identify priority areas where information and training needs are not being met; and then, assembly and maintenance of an indexed "knowledge database", accessible via the KaR website and in electronic media and hardcopy, of relevant individuals, institutions, publications and web-sites.

The project is being undertaken by GIC Limited with extensive coordination and cooperation with active players in the field of healthcare technology and particularly with WHO.

2. SURVEY OF HEALTHCARE INSTITUTIONS

2.1 Overall

The original project concept note envisaged a simple survey of healthcare institutions but after correspondence and discussions with Dr. A. Issakov of WHO plans it was considered necessary for a three part survey to be undertaken:

- Analysis of the PAHO funded web site discussion forum, to determine which healthcare technology subject areas raised the most problems;
- Determination of the extent of availability of WHO Country Situation Assessment instruments being undertaken by the national healthcare engineering institution;
- Data collection, using a project designed instrument, from healthcare institutions in the target countries.

2.2 PAHO discussion forum

Regrettably it has not proven possible to engage the PAHO web site moderators to undertake the dialogue analysis, within the timeframe available to this study.

2.3 WHO CSA

The WHO CSA instrument is contained in Appendix 2. The design was completed in December 1999 since which time it has been widely disseminated. It serves as a comprehensive document for overall assessment of healthcare technology in a country, and is clearly an essential first step in formulating country wide plans for healthcare technology development. For the purposes of the WHO CSA instrument, healthcare technology is defined as: the knowledge associated with devices, medical and surgical procedures in the prevention, diagnosis and treatment of disease as well as in rehabilitation, and the organisational and supportive systems within which care is provided. It includes physical infrastructure such as health buildings and associated services and utilities, logistics support and information systems, since these are important in ensuring quality in the treatment and care of patients.

Although many of the countries from which replies were received reported that they were in the process of developing the WHO instrument, only one biomedical unit was prepared to release any part of the CSA they had undertaken. Even for those countries for which it was known that a draft CSA was available, release was specifically on the approval of senior ministry staff, which could not be achieved in the timeframe available to this study.

Correspondence indicated that resource restrictions were limiting the undertaking of the CSAs and that the preliminary findings had the potential for such significant policy and financial implications that serious consideration was required before they could be released.

Whilst it is recognised that individual CSAs may, in some quarters, be regarded as a sensitive document, and that trusted international bodies such as WHO may well have greater access than could be achieved by this survey, the overriding conclusion is that, at this time, CSAs for Healthcare Technology are not widely available.

The CSA has the potential to be an exceptionally valuable document in determining the status of healthcare technology, but this can only be achieved if country CSAs become freely available.
Recommendations relating to these findings are included in Section XX

2.4 Data Collection, Project Instrument

2.4.1 Instrument Design
The project instrument was designed to cover salient points of the application of healthcare technology at healthcare delivery level and identify particular problems.
It draws on criteria identified in:
the WHO CSA;
'Practical Steps for Developing Health Care Technology Policy', by Caroline Temple-Bird; and
'Management of Healthcare Equipment in Developing Countries: Overview of Problems, requirements and Action', by Dr.A. Issakov of WHO.

The instrument is contained in Appendix 3.
The instrument was designed to be simple and quick to administer, seeking opinions and perceptions of healthcare technology operation in a variety of healthcare settings.
It contains a list of questions with 5 options for response, which can then converted to numerical scoring for subsequent analysis.
It was sent to all 15 countries contacted, and modified slightly in accordance with the comments received.

2.4.2 Survey
The original intention was to undertake surveys in three target countries. Units in the countries were to be paid a fee for undertaking the survey and providing the information.

With the assistance of Dr.A.Issakov of WHO, biomedical engineering units and prominent individuals were contacted in over 15 developing countries.

Replies were eventually obtained from 5 countries, and agreements made with four countries; but after greatly protracted correspondence and many delays, survey submissions have only been received from two countries.

It is still possible that further replies will be received and these will be incorporated if/when they are received.

It is clear that even with the incentive of a fee payment, many biomedical units felt unable to take part in a basic survey. Correspondence indicated that in some countries, high level ministry clearance for any such activity was required and that this could not be achieved in the time frame of the project, whilst in other countries workloads were just too high to permit any additional activities, even with payment.

2.4.3 Results of the surveys

The survey reports from the countries are contained in Appendix 3.

The following table provides an average score across all the establishments surveyed.

	Question	Average Score (1 - 5)	Meaning of Score in Instrument
6	What are the major problems with medical equipment in your institution at present ?		
	Equipment not present	4	Serious problem
	Not enough equipment	4	Serious problem
	Equipment not functional	4	Serious problem
	Equipment incomplete/lacking accessories	5	Very serious problem
	Maintenance repair service	4	Serious problem
	Staff don't know how to use it	4	Serious problem
	Is the equipment not appropriate	2	Some problems but does not significantly effect overall operation
	Too basic	3	Problems but equipment functions most days
	Too sophisticated for this type of unit	3	Problems but equipment functions most days
	Equipment uses expensive consumables	3	Problems but equipment functions most days

6a	Do you have any authority over health care technology decisions and the equipment which is purchased ?	5	No control, equipment just arrives
7	How is the system of providing new equipment ?	5	Serious problem, some of the new equipment is not what we want and cannot be used effectively
8	Is there any way to discuss and rectify new equipment problems	4	No real system but some chance to address problems
	Do you have:		
9	Standard equipment lists linked to health goals ?	5	None
10	Realistic equipment replacement plans ?	5	None
11	A staff training programme for new equipment ?	4	Considering drawing up plans systems
12	Procedures for use/operation and procurement of equipment ?	5	None
13	Do you have access to:		
	Product brochures/suppliers catalogues	4	Little access
	Professional journals	5	None
	Technical library/database	5	None
	Technology assessment reports	5	None
	Staff reports on the past performance of equipment	5	None
	Generic specifications for equipment	5	None
	Guidelines for negotiating with donors regarding the choice of technology	5	None
	E-mail	5	None
	Internet	4	Little access
14	How do you rate your knowledge of advances in healthcare technology	4	Little
	How well do you keep up to date	4	Little
15	Do you receive information about product recalls - hazard warning notices	5	No
	Operating manuals	4	Little
	Training, Do you receive		
16	Initial operator training for new equipment	4	Little
	Maintenance training for operatives	4	Little
	Understanding of safety issues	5	No

	Equipment cleaning	5	No
	Staff refresher training on equipment	5	No
	Monitoring state of equipment	5	No
	Safe disposal of equipment	5	No
17	Do you have Equipment which cannot be used because staff have not been trained	4	Many Items
	Does normal Health staff training include exposure to equipment	4	Little

Average Standard Deviation of scores approx: 18%, equating to around 1 point on the 1-5 scoring system.

Question 18. What is your biggest equipment problem

Comment	Frequency mentioned
No user Manuals, nor technical documentation	4
Spare parts needed	4
Obsolete and old equipments.	3
Guidelines for proper equipment usage needed	3
Missing accessories or consumables.	2
No standards,	2
Repair often takes months, because of delays with outside services	1
Not sufficient (no u-sonic, no ophthalmoscope)	1
Training be given for maintenance for sophisticated equipment	1
Equipment purchasing and donations suggestions to be taken from maintenance dept.	1
Management does not consider M&R enough	1
Management is still in the end a few people in the Ministry	1
Maintenance Intervention capabilities is extremely low	1
No local representative all the equipment is bought via international bids with little control by the users	1
There is no acknowledgement of maintenance role by the Medical Doctors Managers at Ministry Level	1
Not sufficient time for M&R activities	1

2.4.4 Analysis of the results
2.4.4.1 Overview

65% of the responses score 5, the worst case condition indicating that application of healthcare technology is still perceived as a major problem at healthcare delivery institutions.

2.4.4.2 Categorisation of problems
The most serious problems reported, i.e. those that averaged a score of 5 (worst condition) in all the institutions surveyed, can be grouped into six main categories:

- Consultation
- Information
- Management
- Policy
- Procurement
- Training

Whilst this categorisation is significant and will be discussed in further detail below, perhaps of greater significance are categories that are NOT present amongst the most serious problems.

Equipment not appropriate, too basic, too advanced, too expensive to operate, are not perceived as being major problems.

In general summary, the technology is not the prime source of perceived problems, it is the policy and management environment which lead the problem field in healthcare technology operations.

The problem categorisation summary is given in the table below.

	Question	Problem Categorisation
6	What are the major problems with medical equipment in your institution at present ?	
	Equipment incomplete/lacking accessories	Procurement/Consultation
6a	Do you have any authority over health care technology decisions and the equipment which is purchased ?	Procurement/Consultation
7	How is the system of providing new equipment ?	Procurement/Consultation
Do you have:		

9	Standard equipment lists linked to health goals ?		Policy/management
10	Realistic equipment replacement plans ?		Policy
12	Procedures for use/operation and procurement of equipment ?		Policy/Procurement
13	Do you have access to:		
	Professional journals		Information
	Technical library/database		Information
	Technology assessment reports		Information
	Staff reports on the past performance of equipment		Management
	Generic specifications for equipment		Information/Management/Procurement
	Guidelines for negotiating with donors regarding the choice of technology		Policy/management
	E-mail		Information
15	Do you receive information about product recalls - hazard warning notices		Information
	Training, Do you receive		
16			
	Understanding of safety issues		Training
	Equipment cleaning		Training
	Staff refresher training on equipment		Training
	Monitoring state of equipment		Training
	Safe disposal of equipment		Training
18	Biggest Equipment Problem		
	No user Manuals, nor technical documentation		Information
	Spare parts needed		Information

2.4.4.3 Consultation

Whilst the alienation, and resulting lack of ownership of healthcare technology from, missing or ineffective consultation with end users has been well recorded for many years there still appears to be little application of those procedures which would help address the problem. Extensive consultation can be a very expensive process but the development of national standardised equipment lists linked to health goals generally provides a mechanism for an adequate level of consultation without major cost; because the production of standardised lists, enables consultation without the need for continuous repetition. Such mechanisms are incorporated into the WHO CSA guides and publications, but it is clear that they are not yet widely observed.

2.4.4.4 Information

In all areas information is deficient with the main area reported as the largest problem being the lack of maintenance manuals.

Interestingly the area with commercial motivation, manufacturers catalogues/brochures, does have some presence so it is clearly not impossible to reach the units if there is a potential commercial gain.

2.4.4.5 Management

Many of the management procedures will link to the policy section below, and it is clear that despite the efforts of WHO to promote various initiatives there is still very little happening in the areas of management development.

2.4.4.6 Policy

Again despite the efforts of WHO to produce and promote policy development tools it is clear that many developing countries lack and effective policy environment for healthcare technology.

2.4.4.7 Procurement

Alienation from lack of consultation has been addressed in the consultation and management sections, although it should be recognised that alienation from the procurement process adds a further dimension to the process. In addition to the alienation however, there should also be a recognition that institutional procurement procedures are often innately restrictive and unnecessarily rigidly interpreted in their implementation, both by IFIs and the recipient countries.

2.4.4.8 Training

Previous healthcare technology training programmes have tended to concentrate on the technical aspects of biomedical engineering, and thus focus both on the technology and technologists. Whilst there undoubtedly remains a need for such programmes it is clear from the survey results that management and organisational functions represent the greatest perceived training need, and management training programmes for a much wider range of staff will be required.

3. PRODUCTION OF DATABASE

The production of the database was undertaken by three centres, the GIC team based in London, a healthcare technology consultant with extensive experience of operation in developing countries based at Bristol, and a team of healthcare technologists/biomedical engineers with developing country experience based at a health authority and university in Staffordshire.

Further inputs were provided from WHO, and biomedical teams in two developing countries.

At the outset it was recognise that the information available on healthcare technology in developing countries is in disarray. Despite extensive efforts by WHO, resource limitations and the lack of coordination between donors, often results in information dissemination being

very restricted; even to the extent that active players and senior donor funded consultants are unaware of publications and reports, until they encounter them, almost by accident, in the various countries they visit.

With this background in mind, and in order to undertake at least an approximate measure of the extent of information dissemination, the project was designed so that the three main teams would work largely independently of each other until results were pooled.

All parties expected that there would be a considerable degree of overlap in the resources located by the three teams, and there was indeed overlap, but not to the extent predicted. The overlap, i.e. duplication of resource identification, was only around 30-40% in total between the three sources.

At the outset, all of the teams acknowledged that healthcare technology resources and publications in particular were difficult to obtain and reference, but it would be fair to say that all teams were surprised by the extent of the disarray they encountered. Each of the teams were long standing operators in the field of healthcare technology in developing countries and all of the engineers involved had worked extensively in developing countries. Two team members had acted as senior consultants regularly traveling and providing consultancy advice to developing country healthcare technology operations.

Each team held their own 'databank' of resources, which had been collected over time from myriad sources. With only a 30-40% duplication between the three teams it is clear that each team did not have a comprehensive bank of the information available. If consultants and technologists based in the UK with extensive resource access do not have comprehensive information it is not surprising that engineers in developing countries have difficulty identifying information sources.

A further point of surprise is how little information is available via the internet. Of the non supplier/manufacturer entries, only 30% even have a web site address, and many of the web reference are little more than a single page with rudimentary information.

After removing duplications, a database containing the following was produced:

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80 organisations
270 publications
6 software entries

14 training courses

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The entries for supplier manufacturers were formulated after contacts from engineers in developing countries who noted that a common problem was to be able to trace manufacturers of donated equipment to be able to obtain spare parts. Although some 430 supplier/manufacturers contacts have been obtained, the Introduction of the Data Protection Act into the UK has caused seriously [problems in incorporating this information into the database. Although the exact interpretation of the practical implementation of the act remains

unclear, the web site database administrator was not willing to web publish the suppliers/manufacturers data unless we had first obtained written permission from all of the companies involved. It has therefore been necessary to embark upon a further exercise to individually contact all the companies to obtain the necessary permissions, which has naturally resulted in long delays before this information can be incorporated into the web site. It should be noted that it is intended that the supplier/manufacturers are included only as a means of enabling engineers to contact manufacturers to obtain spare parts for equipment, and there is no intention to recommend or endorse, in any way, equipment from the listed manufacturers.

It was noted by all collaborators that, with the exception of the WHO publications, many of the publications are difficult to obtain. They are either out of print or are limited circulation journals for which reprints are often impossible and a significant number are not openly published, but are rather field reports and recommendations which await funding before they can be published or at least widely disseminated.

All collaborators agreed that there is a great need for available publications to be made more widely available. It was noted that even the WHO publications, which are relatively easy to trace, still constitute a significant expense to biomedical units in developing countries and it is recommend that active consideration be given to promoting dissemination of Healthcare Technology publications. As a minimum all the WHO publications should be made available for internet access.

The database is currently being converted into format for internet publication with integral search facilities and should be operational shortly.

CONCLUSIONS/RECOMMENDATIONS

Healthcare Institution Survey

Overall:
In overall summary, the technology aspects are no longer considered the prime source of perceived problems, rather it is the policy and management environment which are now considered to be serious deficient and there should be a change of emphasis away from technology and technicians and onto wider healthcare technology policy and management developments within national healthcare systems.

Specific areas for consideration:

Consultation
There is a clear need for further dissemination and promotion of existing WHO based guides and publications on policy and management practices which encourage and bring a rational approach to consultations and perhaps for further research into how best to influence national healthcare systems to identify and adopt such systems.

Maintenance manuals

Despite long standing recommendations that all equipment should be supplied with service manuals such conditions can still often be lost in the plethora of conditions placed on suppliers by onerous institutional procurement procedures. More commonly, manuals arrive in a language unsuited for local conditions and frequently lack of organisations within healthcare institutions and biomedical units means that manuals are often lost.

Traditionally medical equipment has been a relatively low volume market and manufacturers have been very reluctant to release any technical information on their products for fear that it would provide 'free' design advice to their competitors. Developments in the field of IT however, may offer some hope for the future. In the field of IT many manufacturers/suppliers now make technical information, software and drivers available via the internet. They recognise that the developments within the industry move so fast that information available on a product on sale today is of little benefit to competitors, since at any one time they will have at least two generations of upgraded product in the design stage in preparation for release in a year's time. 'Protection' of the current product offers little benefit compared to the goodwill that can be generated by having good technical information freely available to engineers.

Medical equipment developments rarely move as fast as the world of IT, so continued reluctance to provide technical information is to be expected, but, as a first step, it may be possible to encourage manufacturers to provide internet access to technical information on older version of their equipment. A series of initiatives could be considered: discussion and encouragement to industry bodies to lobby their members; provision of free web space hosting for medical equipment technical materials; for companies that still wish to maintain control and not provide open access – a service to provide material by e-mail response against an equipment serial number, etc.

Recall/product warning notices

Supply of medical equipment to developing countries can often follow a tortuous route, involving donor funding, procurement agents, three or more local ministries or ministry sub departments. The end result is that the manufacturer will rarely know who is the final end user, and it is therefore impossible for them, even when the will exists, to notify the necessary authorities of any recall or product warning notices.

The development of the Medical Device Directive in Europe has helped to centralise and rationalise recall/product warning notice but there remains a need for a central organisation to collate and provide a ready source of reference of recall/product warning notices to developing countries.

Management and Policy

WHO has various policy and management guidelines available and these should be more widely disseminated and assistance provided to countries to assess and then establish appropriate policies. More fundamentally, it is over 20 years since WHO recognized and began formulating a response to the severe problems of medical equipment in the developing world. There is clearly a need for a radical rethink of how the whole situation can be approached and how national level healthcare operations and funding agencies can be influenced to effect a more rational operation.

Procurement

In addition to the alienation produced by a general lack of consultation on procurement matters, there should also be a recognition that institutional procurement procedures are often innately restrictive and unnecessarily rigidly interpreted in their implementation, both by IFIs and the recipient countries. Even when extensive consultation on procurement has taken place many biomedical engineers in developing countries are firmly of the opinion that institutional procurement procedures, as currently operated by the large IFIs and developing country governments, are virtually certain to result in receiving unsatisfactory equipment. The current insistence by many IFIs and national government of the 'cheapest compliant equipment' for complex medical equipment, and the lack of funding in procurement project management, and particularly specification production, remains a major problem.

The World Bank, for example, has a series of procurement procedures, some of which would be entirely appropriate for medical equipment, yet such appropriate procedures are virtually never applied, and even granting of permission to use such 'non-standard' procedures is often refused.

It may appear an unusual requirement, but if there are to improvements in healthcare technology in developing countries there does need to be major changes in the way equipment is procured, and developments in healthcare technology policies and management to incorporate these requirements are required.
There is a need for research into how best complex equipment can be procured and how IFI and others can be influenced to adapt appropriate procurement procedures.

Training

In the technical areas, environmental and safety aspects are two areas which warrant greater attention. In the past the volume of equipment supplied to developing countries has been relatively small in relation to the land surface areas, so that equipment disposal has rarely represented a serious problem. It was generally just dumped, and the climatic conditions in many of the recipient countries were considered to provide a rapid deterioration – it would literally just rust away or be recycled by local industry. Recognition of environmental and safety problems arising from equipment disposal have however been greatly increasing particularly in relation to the use of modern materials and chemicals in medical equipment. Transformer oil from high voltage X-ray units, oil from medical vacuum/suction pumps, heavy/toxic metal batteries, refrigerant gasses from cold units, and many more are all now recognised as requiring specialist disposal, yet, as the survey shows, healthcare technologist in developing countries receive virtually no training in how to handle such materials. There are now guidelines on how donated equipment should be handled, but none yet include training for safe disposal of equipment. It is a policy areas which requires serious attention.

Database production

Need to improve access to information which is available and disseminate more widely.

RECOMMENDATION SUMMARY	
AREA	**RECOMMENDATION**
Overall	Change emphasis from technology and technologists to policy and management environment
Information, General	Support increased information access to healthcare institution and biomedical units. Support improved dissemination of existing information and WHO materials.
Information, Maintenance Manuals	Support projects that seek to improve access to maintenance manuals perhaps by: discussion and encouragement to industry bodies and/or through provision of web space hosting for medical equipment technical materials
Information, Recall product warning notices	Support projects that seek to improve access to recall/product warning notices through provision of central service
Management and Policy	Support further dissemination of existing WHO materials. Support research on how best to apply and influence policy environment.
Training	Support inclusion of management and policy aspects in training. Support inclusion of environmental and safety aspects in technical training.

APPENDIX 2
COUNTRY ANALYSIS SURVEY

WORLD HEALTH ORGANIZATION

ORIGINAL: English

COUNTRY SITUATION ANALYSIS

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December 1999

FOREWORD

Health care systems everywhere face the twin problems of increasing patient needs and expectations and rising costs. Much of rising expenditure on health is associated with increasing sophistication of the technologies used in diagnosis, treatment and care. If equity and quality of services are to be improved and costs controlled, an accurate situation analysis is needed for each country to establish the basis for prioritizing activities, improving utilization effectiveness and allocating resources (physical, financial, and human). A situation analysis can also provide essential baseline data against which policies and actions to bring about desired improvements in the performance of the health care systems can be determined. The issue is not simply that of containing costs. It is a matter of striking a reasonable balance between increased costs associated with the introduction of technology and infrastructure development and the benefits of increased capacity which should improve equity and quality of health care provided to the population.

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ANNEXES

INTRODUCTION

The term "situation analysis" is defined as those procedures, enquiries, data collection and assessments necessary to provide a reasonable summary of the current state of health technology and physical infrastructure, including its management, in a country.
The definition of health technology used by WHO includes drugs, devices, medical and surgical procedures, the knowledge associated with these in the prevention, diagnosis and treatment of disease as well as in rehabilitation, and the organisational and supportive systems within which care is provided. For the purposes of the situation analysis, this document does not include drugs and hospital supplies. However, it does include physical infrastructure such as health buildings and associated services and utilities, logistics support and information systems, since these are important in ensuring quality in the treatment and care of patients.
This guideline is part of a planned series of interrelated documents that will include policies and guidelines relating to health technology management. A situation analysis is the essential first step to understanding the current system. This understanding, in turn, will help identify areas for policy development and interventions that will lead to improved health systems.
The aim of this guideline is to facilitate a systematic approach for the reporting of country situations by survey teams. It can be adapted by survey teams to country specific situations and needs.

BACKGROUND

In many countries, the effective management of health care technology is limited by lack of: appropriate policies; suitable organizational structures; manpower with relevant skills; education and training programmes; and information systems and resources. The result is that rational planning of technology for health care has been impossible to achieve, and resource utilization has been less than optimal.
In the 1970s and 1980s, WHO and other organizations promoted the creation of health care technical services to dealing primarily with maintenance and repair of medical equipment. While there was some success, it became apparent that a broad focus on health technology management in all its aspects would be more effective.
Advances in health care technologies (HCT) are determined mainly by manufacturers, and their marketing interests lead to pressure on consumers to acquire new technologies. In addition, there is frequently political and professional lobbying to acquire these technologies. Some donors and aid agencies contribute to this process. As a consequence, the introduction of technology into developing countries is driven by "wants" as much as by "needs".
Besides the lack of policies for rational acquisition of technology, there is often inadequate management (including equipment management), inefficient and inequitable distribution and utilisation of available health technology resources, absence of norms and standardisation, and budget limitations.
Equipment fails prematurely, in part because maintenance activities and budgets are inadequate. Often only 1 percent or less of the asset value is allocated annually for maintenance in contrast to an optimal allocation of 4-8%. In most cases, improving maintenance performance will increase operating life and reduce downtime, and is more efficient than acquiring new equipment.
In many countries, major investments are often made in expensive equipment, which is then not used to its full potential, or not used at all, because appropriate trained personnel are not available, necessary consumables have not been provided, or replacement parts cannot be obtained. Equipment is often introduced without careful assessment and evaluation including an analysis of the total costs of ownership. It should be noted that the acquisition cost of

technology (especially equipment) is usually only a small portion of its life cycle cost. Lack technology assessment mechanisms of can cause delays before appropriate technologies can be made available to potential beneficiaries.

One of the major issues facing developing is the transfer of technology from the highly developed to the less developed countries. The great variation between the manufacturing countries and the recipient countries in political, social, economic and cultural characteristics raises challenges of appropriateness which need to be considered.

Many countries lack access to information sources. This is a major impediment to the formulation of sound policies, and the establishment of functional mechanisms for the rational needs assessment, acquisition and utilization, and general management, of technology at all levels of health care. Little healthcare technology related information is integrated into Health Management Information Systems (HMISs). Furthermore, access to databases and other sources of up-to-date technical information is limited. Articles and documents on technology assessment are difficult to obtain, and lack of continuing education and awareness programmes contributes to limiting access to what up-to-date information might otherwise be available.

The lack of reliable communication links results in the isolation of healthcare technical services personnel within a country, especially those working at the intermediate and peripheral levels.

Some countries waste precious resources by purchasing sub-standard, obsolete, or improperly re-conditioned medical devices, or devices with reduced life expectancies. The lack of technology assessment has also led to the introduction of new healthcare technologies, sometimes based on unjustified preferences or fashions, even before proper evaluation to establish safety or effectiveness. Technology assessment should be concerned with justification of purpose, quality, cost effectiveness and health outcomes, in accordance with priority needs, effectiveness, transferability and impact.

Furthermore, the choice of public health and clinical interventions, and associated technology modalities, should be governed by the healthcare needs of the population (based on local disease patterns), available healthcare services, cost, affordability, cost–effectiveness and equity considerations.

The importance of healthcare technology management, as a component of health systems organization and management, is underestimated or neglected in most countries. The lack of an HCT management policy leads to a lack of uniformity of operation and a diversity of types of technology used for similar purposes.

Standardization of healthcare technology, in the interest of improving asset management, utilization and maintenance, is difficult to achieve due to free market conditions, lobbying by special interest groups, the individual preferences of end users and donations of equipment.

At present, human resource development programmes pertinent to HCT management generally do not take into account the wide range of staff and skills required. Current training usually involves ad-hoc interventions, rather than well planned skill enhancement and professional development activities. As a result, there is a general lack of managerial expertise and technical skills resulting in poor technology assessment and equipment management capability among decision-makers and health workers at large, and poor practical know-how on proper equipment operation and care among users.

Even with well planned skill enhancement and professional development activities, unattractive career schemes and lack of incentives can lead to a "brain drain" of technical staff to the private sector and other countries.

OBJECTIVES

An accurate situation analysis is needed for each country to establish the basis for prioritizing activities, improving utilization effectiveness and allocating physical, financial, and human resources. A situation analysis can also provide essential baseline data against which policies and actions to bring about desired improvements in the performance of the health care systems can be determined.

The situation analysis is required by policy makers and senior management responsible for health care technology as the first step in formulating comprehensive policies for the introduction, management, use and maintenance of appropriate health technologies and planning for the implementation of those policies.

The main benefits of a situation analysis are that subsequent planning will be based upon up-to-date and reliable information on all aspects of the HCT management process. In many countries, documentation of the condition of health care technology is sparse and there is seldom any systematic evaluation of the entire managerial processes which include needs assessments, technology innovation, equipment selection, procurement, training, operation and obsolescence.

Policies that are rooted in a rational and comprehensive analysis of the country's health technology environment will greatly assist decision makers in ensuring that areas requiring further development are clearly identified, and that the distorting effects of lobbying and professional pressure groups are minimized. The situation analysis will also provide a baseline against which the impact of the changes brought about by future development activities can be measured.

CONTENT OF A SITUATION ANALYSIS FOR HCT MANAGEMENT

A situation analysis consists of a survey of an entire country to determine the existing state of Health Technology Management in the Country. It necessarily involves sampling, the surveying of representative elements of the health care system. This allows a useful survey to be completed in a reasonable time, for a reasonable cost but yet provide sufficient reliable information. Health care technology impacts all levels of a health care system, from the top to the bottom. A situation analysis survey must be broad but detailed, ranging from the highest level of government to a village clinic.

The Political Environment. This will include the organisation and structure of the government as it relates to health care. What are the interactions between government Ministries and between divisions and departments? What are the lines of administration and authority? How is health care financed? How are resources distributed? What policies exist that impact Health Technology? How are changes made? What are the operating mechanisms? How is Health Technology currently managed? How is health information distributed throughout the country?

Any situation analysis must include information on the political environment that encompasses the Health Care System. The organization and structure of the government has a significant impact upon the Health Care System. The interactions between departments and Ministries, both formal and informal, must be known. Knowledge of the lines and sources of authority is necessary to implement effective change. A clear understanding of how changes in policies, priorities and programmes are brought about is crucial for future planning and progress.

Sources of funding must be known as well as the process of allocating funds. Similar information for human, physical and other resources is required. The existence, content and degree of implementation of policies must be determined and the relevance to a comprehensive HCT management system assessed. The current awareness of HCT, its position in the system and means of management must be determined. The means and lines

of communication within the government for the dissemination of information must be assessed and evaluated for effectiveness.

The Public Health Environment. What are the relevant public health statistics? Life expectancy? Infant and maternal mortality? Endemic infectious diseases? Chronic diseases? Burden of key diseases? Morbidity and mortality patterns at health institutions. Comparisons between urban and rural areas of the country? How is the population distributed? What is the distribution of diseases? What are the education and literacy levels? What public health programs are planned, in place and on going? What is the distribution and training of physicians? How are physicians educated and trained? What specialities exist and which are in need? What is the level of spending per citizen by the government? What percentage of the population is covered by public hospitals of all types? What equity issues exist?

An awareness of the major public health issues in a country is important background to any situation analysis in the health sector. Vital statistics on life expectancy, disease burden, infant and maternal mortality and the distribution of diseases form the basis for health planning. Facility planning requires information on morbidity and mortality patterns at different types of health institutions. The distribution of populations by age and location, the comparison of health statistics between urban and rural populations provides a means of identifying areas requiring special attention. Information on literacy rate, education and training opportunities and systems for both the general population and professionals is useful for planning, as is the number, specialities and distribution of physicians, nurses, paramedical and technical support staff. An understanding of insurance systems, their financing and accessibility provides further information on coverage and equity issues.

The Delivery Environment. Issues related to the delivery of health care. What are the different organisations or groups that have their own hospitals (such as the Ministry of Health, the Ministry of Education, Social Security, Municipal, County, the Railroad, Private, etc.)? What proportion of the population is served by each? How are the different hospital groups organised? How are they financed? What level of co-operation and co-ordination of services exists between the different hospital organisations? What are the types, numbers and sizes of hospitals? What is the hierarchy of the hospitals? For each level of public hospital; Specialist, Central Referral, Regional, Provincial, District and Village, the quality and condition of buildings, facilities, utilities, equipment, communications, information systems, and transport must be determined.

Hospitals and clinics are focal points for delivering technology dependent health care. In many countries, there is a variety of public, NGO and private health care providers, each with its own delivery system and facilities. Examples are hospitals owned by the Ministry of Health, the Ministry of Education, Provinces, Counties and Municipalities. Employers such as railroad organizations, the Police and the military and also the social security system and insurance companies, often have their own hospitals and clinics. Along with the services provided by private hospitals, that are frequently significant, all of these have to be considered in the situation analysis.

For each hospital group, the numbers, organization, methods of financing, management structure, populations served and services provided should be determined. Within each group the same information needs to be obtained for each level of the organization. Identification of existing technologies associated with each layer is necessary. The type and quality of facilities, utilities, equipment, communications, information systems and transport should be assessed.

The level of co-operation between groups and hospitals is important. If there are specialized or referral hospitals, requirements for admission or referral need to be understood.

Resources, Their Availability, Distribution, Quantity and Quality. How are budgets determined? How are operational budgets determined? How are capital and construction budgets determined? How are analogous budgets determined for each level of hospital? Are resources, both material and human distributed appropriately and equitably? How are staffing levels determined? What provisions are made for educating and training of professional and non-professional staff? Is adequate, trained manpower available? Does the country have access to sufficient educational and training facilities of appropriate quality?
The quantity, quality, availability and distribution of resources form an essential part of any HCT situation analysis. "Resources" include financial, physical, human, technological and organizational resources.
Budget and personnel policies and procedures need to be understood. Education, training and professional development resources and their availability should be identified and assessed. Staffing patterns can significantly affect the equity and quality of health services available, as can the distribution of technologies, information and communications. The it is important to establish the purpose, condition and location of building and other physical assets.
The information gathered by the survey is intended to provide answers the above questions. The results of the survey will provide a situation report on Health Technology Management for the country. This report will provide a rational basis for identifying areas in need of attention and in prioritising resulting activities.

SURVEY INSTRUMENTS

Checklists to assist those undertaking country situation analyses for HCT management are included in Annexes 1-? (to be drafted).
Annex 1 is in the form of a matrix of questions on issues about the current situation, grouped within broad topic areas. The questions are posed in a manner intended to elicit a response of "Yes" , "No" or "Part". Space is provided for fuller details and comments and also for the survey team and others involved in the analysis to make appropriate recommendations concerning actions on future development.

SURVEY RESOURCES
(to be drafted)

RECOMMENDATIONS

It is important that the outputs from the country situation analysis are a accessible to policy makers and planners. For this reason it is recommended that a joint working group, comprising senior management and the survey team, is established before the surveys are initiated to reconfirm the terms of reference and give necessary authority to the team undertaking the field work. It is equally important that the joint working group shares the responsibility for recommending actions based on the data and preliminary analysis undertaken by the survey team.

SURVEY FOR NEPAL

Biomedical KAR Survey

Country Situation Analysis - Nepal

Background

Currently the Nepal health system is burdened with a high mortality rate for infants and women and the epidemiology data in general is unsatisfactory. The availability of health services is not well developed especially in remote areas and the substantial lack of qualified staff further contributes to an already stressed and over burdened situation. Nepal has one of the highest Maternal Mortality rates (57 / 10000) and the infant mortality rate is at 48 / 1000[1]. Hospitals at all levels are faced with huge demands in terms of curative care however they lack the necessary resources to comply with the increasing number of trauma cases and other diseases from industrialised countries i.e. cancer, cardiovascular disease etc. In this situation efficient use of all available resources is crucial in order that a more effective response is available within the healthcare system.

Situation Analysis:

The Ministry of Health and its Department of Health Services is responsible for the delivery of health services in the public sector. The DHS/ LMD is responsible for Planning, Procurement, Commissioning and Maintenance and Repair of its assets in all the health facilities at primary and partly at secondary level. National hospitals procure their equipment through internal procedures i.e. the identified needs are presented to the hospital board and decisions are often made without the input from a technically qualified person being involved. Co-ordination between public and private hospitals is non-existent resulting in expensive sophisticated equipment being scattered throughout the country, and rarely used in a cost-effective manner.

Moreover, the private sector is also procuring equipment independently without obtaining official certification for its medical devices. The DHS/ HIMDD is responsible for all matters concerning infrastructures (new construction, rehabilitation, cost estimates, supervision, etc) and human resource development. None of the divisions are clearly implicated in Healthcare Technology and related issues such as life cycle costing, guidelines/regulations, standardisation and human resource management is not addressed appropriately.

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[1] Annual Report, Department of Health Services, November 1999

The actual situation can be described as unsatisfactory due to the inefficient use of equipment and facilities leading to rising costs in an already burdened budget situation. Needs assessment is not structured thus no proper planning is established i.e. procurement or human resource development. No appropriate inventory system is existing at any level thus hindering proper planning and procurement activities. Lack of maintenance information system and missing records contribute to a grim picture. During a survey in 1999 in selected districts, zonal and national hospitals it was found that only some 39% of equipment are in functional order while some 16% of equipment needed urgent repair[2]. The division lacks expertise to adequately plan, procure and commission equipment. Substantial delays (frequently involving months) occur from the time requests are submitted for new equipment or maintenance and repair activities by regional and district facilities. Many of the faults can be attributed to the improper storage and manipulation of sensitive equipment due to (i) high rotation of qualified staff between facilities, (ii) lack of competent personnel to operate devices, (iii) in-adaptable equipment delivered for the purpose originally planned and (iv) a heavy centralised administration.

The quality of equipment is frequently not in compliance with international safety standards or the quality is so poor that the equipment is often out of order[3]. Furthermore, hazardous dangers (especially in rural and remote areas) are apparent however statistics in this area are not yet available. Additionally, M&R facilities wherever available at national and regional level, are not utilised as needed. The lack of management, unclear job descriptions and lack of properly qualified staff is to be found at all levels.
At the District Health Office and hospital management levels, there has been little awareness or understanding developed about M&R. The current attitude both within and outside of the hospital environment depicts a trend of preference for procuring new equipment through the various channels instead of increasing capacities of current equipment with M&R services. Additionally, at national level also, the management of in-house workshops is not really existing and the lack of guidance has led to a form of anarchical behaviour amongst the staff. Economical issues are not at all considered and the number of obsolete equipment and utilities is on the rise due to not only the age of equipment itself but also misuse and poor or in existent preventative and curative maintenance. At this stage no hospital has an appropriate maintenance management system available and no records can be found to evaluate the cost/benefit of in-house services.

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[2] P.Vogt et al, Status of equipment in selected hospitals in Nepal public sector, Feb/March 1999
[3] DHS / PAMP Report, D.Porter, R.Schmitt, June 2000

Frequently, outside services are solicited to repair equipment due to the lack of in-house competence. The dependence on such services even for minor interventions mean that hospitals or facilities can be greatly over charged. There is a lack of sensitisation on the high costs involved in purchasing equipment that is then left unused, and these actions further highlight the poor level of equipment management that exists.

Furthermore, the overlapping of the various different divisions involved in issues healthcare technology life cycle management hinders the improvement of the current situation. This has consequences at both national and decentralised level. Furthermore, risk management issues involved in the utilisation of equipment must be discussed and the lack of supportive systems i.e. power, waste disposal, working materials etc. which are essential but not yet established at this time.

Moreover, the lack of user competence cannot be ignored. It is estimated that 60-70% of equipment and utility breakdown is due to operator misuse[4]. A key factor to improve this situation is the implementation of the strategy to program continuous training of human resources in conjunction with improved managerial and administrative systems development.

Existing Structures

As outlined before the ministry of health has no appropriate organisation to focus on healthcare technology issues and several divisions at central level are partly involved but no clear assignments are established. However in 2000 MOH forwarded a proposition to adjust the organogram of DHS and there is planed to create a new division in charge for equipment, infrastructures in charge for planning, procurement and maintenance issues. The need of additional specially qualified engineers / technicians is recognised and in February 20001 a first polyvalent training course for maintenance technicians in hospitals has been established. A first lot of 15 candidates within public services has been identified and started the course which takes 2 years. Successful candidates will be posted in workshops at regional and wherever justified at zonal level.

HCT Policy

Since March 2000 the Ministry of Health and its Department of Health Services is engaged in a process to develop a Policy in order to structure the Life cycle of HCT and its medical devices. In several meeting, in which PAMP was involved as an facilitator a policy was developed based on the guidelines established under WHO / EMRO in December 1999. A special steering committee had been established to guide the process with the objective to submit a final draft for sanction at cabinet level. It is expected that

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[4] P.Vogt, M&R evaluation in Public Health Services of Nepal, March 1999

the final document will be submitted for final approval by May 2001.

However the implementation of the policy and the development of guidelines, regulations and procedures will take a minimum of 2 years before first effects will be expected. This counts in particular for needed improvement in technology assessments, planning and procurement of equipment and facilities. Urgently needed human resources fat management and operational level need to be further developed and assigned in order to achieve the goal of a sound policy and improved equipment and facility management.

Kar survey

TOPIC / Issue	Questions	Yes/ No / Part	**Details*** *(if Yes or Part)* **/ Comment***	Recommended Action
NEEDS ASSESSMENT	Has a country health situation analysis been done?	yes	*In January 2000, Bob Morris* *In June 2000, David Porter* *In February / March 99 by P. Vogt* *(all under PAMP)*	To trained polyvalent hospital technicians To develop and implement HCT Policy To reorganise DHS and create a division in charge for Equipment and material To ensure functional in-house workshops at national and regional / zonal level
	Are healthcare issues prioritized?	Part	*Give main headlines* *Safe motherhood and child health as well i.e. Infectious diseases are major programmes. The health budget however hardly exceeds the 5% mark of the national budget, which leaves still a lot of room for improvements*	It is recommended to improve share of healthy budget vs. national budget. Also is suggested that budget for M&R should be improved from the recent below one % level.
	Have an essential services package been developed?		*Obtain details and annex to CSA report* *The MOH together with some external donors is in the process to define an essential healthcare package. Also are we in the process to adapt and implement the newly developed Healthcare Technology Package (EHTP)*	PAM is supporting the implementation and will ensure participation at training sessions for the use of this tool.
	Does an HCT management infrastructure exist?		*Explain / illustrate key relationships* *At this stage no such division / unit exists. However in March 2000 the DHS forwarded a proposal to integrate such a unit within its structure. It is expected that an amendment will be reached not before end of 2002*	PAM Project is facilitating this process and has elaborated a proposal together with DHS in December 1999
	Do healthcare technology policies exist?	No	*Obtain details and annex to CSA report* *We are in the process of developing such a policy and the final draft (5th version) for Ministerial Approval will be submitted by end of April 2001*	WHO & PAM together are facilitating this process and the MOH created a special steering committee in March 2000 to supervise the process.
	Has the need for macro technology assessment been defined at national level?	Yes	*Describe process and recommendations* *The need has been identified but due to lack of qualified human resources and heavy centralised administration this is still in a planning stage.*	Within the policy document the subject of technical assessment is addressed.

TOPIC / Issue	Questions	Yes/ No / Part	**Details*** *(if Yes or Part)* / **Comment***	Recommended Action
	Is there access to micro/macro technology assessment reports, systematic reviews and other technical documentation?	No	*Describe resources and summarize available documentation* *Not at this stage. However the LMD (Logistic Management Division) is supplied with updated documentation's and comparison tools in order to improve the assessments.*	
	Have technology needs assessments been conducted?	No	*List participants, summarize topics and methods* *Not at this stage. There are verbal discussions within national hospitals but outcomes and decisions are not transparent at the moment. Involvement of technical expertise is not yet reached due to various reasons (caste system, acceptance etc.) t*	
	Has an "Essential Technology Package" (or equivalent standard lists of equipment) been developed?	Yes	*Obtain details and annex to CSA report* *Please see previous comments*	
ORGANIZATIONAL				
Policy Objectives	Have HCT policy objectives been identified?	yes	*Give main headlines* *They are integrated in the policy document.*	
	Has a directive been granted by the relevant Ministry to develop an HCT policy?	yes	*Give main headlines* *Health secretary instructed DHS by Ministerial letter to develop such a policy in February 2000. Also has been created a steering committee in charge for the development. PAM Project received mandate to facilitate the process.*	
	Are HCT policies and procedures available in written format?	Not yet	*Obtain details and annex to CSA report* *See above*	
	Have all the HCT organizational issues been identified, such as reporting structures, budget implications and levels of authority?	yes	*Give main headlines* *Within the new document this issues are addressed.*	
Management & Authority	Is there any other legislation relevant to the development of HCT management policy?	yes	*Give main headlines* *The Health act and Long term health plan are the frame documents in which HCT Policy document will be integrated*	
	Are professional development and training programmes (public and private sector) subject to	yes	*Explain requirements* *A newly created 2-year training course for Hospital technicians*	

TOPIC / Issue	Questions	Yes/ No / Part	**Details*** *(if Yes or Part)* **/ Comment***	Recommended Action
	regulation by the Government?		*has set criteria's for admittance.* *However no such regulations do exist yet for other technical professional groups.*	
	Has the policy framework and authority been defined?	Yes	*Summarize and annex official documentation.* *It is part of the document and it is based on the WHO Guidelines developed in December 1999 in Alexandria (Issakov et al)*	
	Are personnel available for the policy development process?	Yes	*Name individuals, parent organizations and job responsibilities* *Director General, Dr. Chataut, DHS* *Dr Chhattra Armatya, Director Planning and foreign aid division, Directors from HIMDD, LMD. National Lab and National Hospitals are members of the steering committee. Additional the Regional Medical Directors and Representatives of the private sector in Health are additional stakeholders involved in the formulation process.*	
	Does management at facility level have healthcare technology management skills?	No	*Describe skill development process* *PAM is in the process of supporting the process of increasing management skill and capacities*	
	Have operational procedures for HCT management been established?	NO	*Summarize and annex official documentation* *Guidelines have been elaborated and discussed at decentralised level. It is planned to have such guidelines established before end of 2001*	
Information Systems	Are existing information systems relevant to and adequate for HCT management?	Part	*Summarize type of information available & records kept* *A reference workshop at regional level has been identified and is currently implementing and exploring such a system*	
	Are technical databases available to assist HCT management decision making?	Part	*Summarize type of information available as databases* *No adequate inventory is yet in place. Consequently no such database is available at this stage.*	
	Is information available at all levels (national /regional or hospital information systems)?	Yes	*Summarize type of information available & records kept* *Various donors had introduced systems / INGO's but have failed being successful implemented.*	
	Are information systems easily accessible?	No	*Describe access situation & problems*	
Public-Private mix	Is there co-operation / dialogue between public / NGO / private health care providers on HCT management matters?	No	*Describe extent of co-operation*	PAM is organising on a six months base the Physical Asset Management "Round Table" for all stakeholders

TOPIC / Issue	Questions	Yes/ No / Part	**Details*** *(if Yes or Part)* **/ Comment***	Recommended Action
				under the Chairmanship of DHS (regularly ignored by DFID funded Projects)
	Do the responsibilities / requirements of the public and non-public sectors with respect to HCT management differ significantly?	No	*Explain roles of public and private sector and differences in needs and practices.* *Private sector is cibling clients who can pay while government tries to ensure equal access.*	
	Are there processes for co-operation?	Yes	*Explain mechanisms and list any examples of co-operation* *Government regulates appropriation of private clinics. I.e. Imposed is a sound self sustained waste disposal system* *Also is imposed to ensure care for up to 10% of patients (poor) to have access free of charge*	
TECHNOLOGY INNOVATION				
Technology Tracking	Does a mechanism exist to identify new and emerging technologies?	No	*Explain mechanism and list any 'case histories'*	
	Have the main stakeholders in the HCT management processes been identified?	Yes	*Name oganizations, individuals and responsibilities etc and describe their participation* *Public and private sector, National and International organsiation involved in delivery of healthcare.* *They contribute to the discussion of the HCT Policy and ensure their inputs.*	
	Is there access to technology assessment expertise and/or information?	Part	*List resources / organizations / individuals involved and summarize type of information available* *Private clinics share their expertise and lessons learned. However the whole exchange is not structured*	PAM Round Table offers regularly also to national stakeholders to present their findings
Standards	Are international and/or local standards utilised?	No	*Give details of standards adopted /employed*	Will be part of HCT Policy and related guidelines
	Do standards exist for local products?	No	*Give details of standards adopted /employed*	"
	Are there relevant Quality Assurance programmes?	No	*Summarize details of programmes & methodologies*	"
Research & Development	Is technology innovation actively promoted?	No	*Describe processes and mechanisms Describe processes and*	"

TOPIC / Issue	Questions	Yes/ No / Part	**Details*** *(if Yes or Part)* **/ Comment***	Recommended Action
			mechanisms giving examples of any activities	
	Are research priorities identified?	No	*Describe process and give examples of topics addressed*	"
	Are partnerships with industry encouraged?	No	*Explain mechanisms giving examples of any activities*	"
Local Production	Are there mechanisms / procedures to assure product quality?	No	*Describe mechanisms and summarize quality standards used.*	"
	Do existing policies / practices encourage local production?	No	*Summarize policies & practices and give examples of resultant local production*	
	Are there regulations or legislation, which promote local production?	No (but in other sectors they exist)	*Give main headlines and references*	
	Do product certification procedures exist?	No	*Explain procedures and give examples of products certified*	Will be part of HCT policy recommendations
	Is there local capacity to undertake product certification?	No	*Describe resources and summarize local activities*	
Technical Co-operation	Is there co-operation / dialogue with donors?	Part	*Lists donors involved, HCT topics addressed and development partnerships* *At this stage no donor / international organisation is willing to be involved (except GTZ and WHO)*	See also possibility of round table
	Are procedures for co-operation documented?	No	*Summarize content of documentation*	PAMP has an agreement with MOH and WHO to promote HCT policy development and implementation
Ethics	Are legal and ethical issues formally addressed?	Unsure	*Describe procedures, forums and participants*	

TOPIC / Issue	Questions	Yes/ No / Part	Details* *(if Yes or Part)* / Comment*	Recommended Action
ACQUISITION				
Planning & Financing	Are all stakeholders (such as users, maintenance organization, Ministry of Health, Ministry of Finance, industry, donor agencies etc) identified and involved in the procurement process?	Part	*List stakeholders explaining their roles and relationships in stages of procurement process* *It is internal decisions. No outside (international) is involved!! Some time's external donors insist on their participation in order to control final decisions, but this is not general practise.*	New division will help to bring in moor competence and transparency
	Is a formal planning process used which includes appropriate technical and financial expertise?	No	*Describe process and involvement of participants*	
	Are the on-going costs of operation and maintenance fully considered in the planning process?	No	*Explain basis for estimating costs and how these are incorporated into procurement plan and operational budgets.*	
Selection	Is there a defined mechanism to determine and evaluate needs?	No	*Describe methods used and illustrate with 'case histories'*	
	Are the results subject to independent review?	No	*Give details of process*	
	Are relevant clinical and technical experts involved in the selection process?	Part	*Describe current practice giving examples expertise involved for specific technologies*	
	Is technical information available?	Yes	*Summarize information / databases available* *Through local dealers and Internet*	
	Does the acquisition process include the development of technical specifications?	No	*Explain process and list involvement of experts*	
	Have technical specifications been developed through a process of consultation including all the stakeholders?	No	*List technical specifications drafted / adopted through this process (Annex details if available)*	
	Has a process of equipment vendor identification been established?	No	*Explain process and list major vendors identified*	

TOPIC / Issue	Questions	Yes/ No / Part	**Details*** *(if Yes or Part)* **/ Comment***	Recommended Action
	Are infrastructure, human resources and training needs addressed?	Part	*Explain processes and participants* *Mainly through assistance of outside resources. User and Technician (also Peons) training is done on an irregular base depending mostly on outside financing.*	
Safety	Are safety issues considered for patients and personnel?	No (only on paper but never enforced)	*Describe local safety legislation or mandatory requirements and processes for instituting these in respect of health technology. Also list current safety codes, standards or guidelines.*	
	Are safety issues considered for the environment (including waste management) and infrastructure?	Part	*Describe local environmental safety legislation or mandatory requirements and processes for instituting these in respect of health technology. Also list current standards or guidelines.* *At this stage MOH together with Nepal Associations (environmental & Public Health Organisation, Metropolitan City etc.) is in the process to develop a policy and guidelines on safe waste management. This is due to an increased awareness of populations for the need of more safety)*	PAMP is currently mandated by MOH to support the process and facilitate future activities.
Standardization	Has an "Essential Health Care Package" (or equivalent) been articulated?	Yes	*Summarize content and annex official documentation.* *Its in the process to be finalised and implemented*	
	Is there an associated "Essential Technology Package" (derived from the above)?	No	*Summarize content and annex official documentation* *A WHO developed Package (see previous remarks) will be implemented and adjusted to the local EHP where needed.*	
	Are any other standard equipment lists utilized?	No	*Summarize content and annex equipment lists* *Standard list had been established on the occasion of implementation of various programms (WB, UNFPA etc.) but are not yet endorsed.*	
Costing & Finance	Is there a distinct budget allocation process for new acquisitions?	Yes	*Describe budgeting procedures and rules governing use.* *Sorry this is internal and we are not authorised for dissemination of the procedures.*	
	Do procurement decisions take in account life cycle costs (total costs of ownership)?	No	*Explain mechanisms in place to ensure adequacy of required capital investment and on-going operational funding. Give examples to illustrate.*	
	Are there legal and tax implications for imported equipment?	Part	*Describe these and any indicate circumstances under which exemptions or other concessions may be granted. Explain rules regarding future import of spares and special consumables if different.*	

TOPIC / Issue	Questions	Yes/ No / Part	**Details*** *(if Yes or Part)* **/ Comment***	Recommended Action
Procurement	Do procurement guidelines exist?	Yes	*Summarize main features of Government system and list any other guidelines in regular use such as World Bank procedures* *They are very simple and are based on the principle of cheapest price. However expertise is not available to discuss quality issues*	
	Are there adequate checks and balances in the procurement process?	No	*Describe review and verification processes*	
	Are working relationships with other involved parties (e.g. Ministry of Finance, local banks) smooth?	No	*Indicate roles, strengths and weaknesses of involved parties* *MOH is autonomy with its LMD to plan and to choose.*	
	Are model Tender Procedures and Guidelines used?	No	*Summarize main features of Government system and list any other guidelines in regular use such as World Bank procedures*	
	Are adequate criteria for evaluating tender bids developed and are these disseminated and effectively applied?	Not to my knowledge	*Describe criteria and processes, indicating responsibilities of involved parties*	
	Is there an organizational infrastructure capable of managing procurement?	Part	**Describe the place of the 'Procurement** *Department' in the organizational hierarchy and its routine responsibilities. Summarize the human and material resources available.* *DHS/ LMD is in charge but lacks technical competence. It is done through LMD for all districts. No engineering know how available at this stage.*	Complete restructuration is required.
	Are financial control mechanisms in place?	Probably	*Explain mechanisms and comment on their effectiveness.* *Of course there is regulations but enforcement is not there*	
	Are there effective mechanisms to monitor the procurement process?	No	*Describe mechanisms and comment on any particular features requiring further strengthening.*	

TOPIC / Issue	Questions	Yes/ No / Part	Details* *(if Yes or Part)* / Comment*	Recommended Action
Vendors & Supply	Have model purchase/supply contracts and agreements been developed?	No	*of Government system and list any other guidelines in regular use such as World Bank procedures*	
	Are supply guidelines and standards incorporated into contracts?	No	*Summarize main features*	
	Are items supplied monitored to ensure quality and conformity with contract?	No	*Describe mechanisms, parties involved and their responsibilities. Comment on any particular features requiring further strengthening.*	
	Is there a supplier registration scheme?	yes	*Summarize main features and indicate how to access register information*	
	Are there guidelines for donated items?	Not yet	*Summarize main features*	In process to be adopted
Importation	Are there import controls, regulations and directives that hinder the acquisition process?		*Describe these and any indicate circumstances under which exemptions or other concessions may be granted. Explain rules regarding future import of spares and special consumables if different*	
Distribution	Are there problems with distribution of procured goods?	Yes	*Describe typical practice and problem areas*	
	Are there procedures for managing and monitoring distribution?	Part	*Describe mechanisms and comment on any particular features requiring further strengthening.*	
Storage	Are storage arrangements satisfactory?	No	*Describe facilities and resources, and comment on any particular features requiring further strengthening.*	
	Are stock management procedures adequate to ensure continuity of supply without excessive outdated stock?	No	*Describe procedures and comment on any particular features requiring further strengthening.*	
	Is the availability of spare parts satisfactory?	No	*Describe system for acquisition. Comment on features requiring further strengthening.*	
Installation & Commissioning	Are operating and technical service manuals routinely ordered and supplied with the product?	No	*Outline any problems of access to technical information required by technology users or maintenance personnel.*	
	Is non-vendor acceptance testing performed?	No	*Describe mechanisms, parties involved and their responsibilities. Comment on any particular features requiring further strengthening.*	

TOPIC / Issue	Questions	Yes/ No / Part	**Details*** *(if Yes or Part)* **/ Comment***	Recommended Action
	Is warranty and liability issues understood and appropriate follow up action taken when necessary?	No	*Describe parties responsible for follow up action. Comment on any particular features requiring further strengthening.*	
UTILIZATION				
Use	Are managers responsible for ensuring the competence of equipment users?	No	*Describe how user competence is assured and responsibilities of parties involved.*	
	Are there regulations restricting the use of specific technologies (e.g. anaesthesia machines, X-ray sets) to formally qualified staff?	No	*List any specific technologies and explain rules governing their use.*	
	Do operational guidelines exist for different technologies including routine performance verification and calibration?	No	*Summarize guidelines and list routine testing requirements and frequency for illustrative range of technology.*	
	Are records kept that allow measurement of utilization rates and downtime?	No	*Summarize record keeping practices and illustrate with sample analyses of typical experience to date.*	
	Is utilization compromised by lack of consumable supplies, accessories, unreliable utilities, or lack of trained staff?	Yes	*Describe main problems and contributing factors* *Lack of proper provision is hindering effective use. Weaknesses on user sides are frequent.*	Structured user training programme needed
Quality Assurance	Is medical equipment subject to regular inspection to ensure proper performance?	No	*Summarize procedures and frequency for range of technology, parties involved and their responsibilities. Comment on any particular features requiring further strengthening*	
	Is there an equipment quality assurance programme in place based upon documented procedures?	No	*Summarize main features*	
	Are the results of the QA activities used to improve practice?	No	*Describe process and give illustrative examples*	
Training	Is initial training given to users in operation, safety and care of equipment?	Part	*Give details of training institutions* *PAMP is doing training programms. There is however no regular activities through MOH.*	
	Are there on going training programmes to maintain	Part	*Give details of training institutions*	

TOPIC / Issue	Questions	Yes/ No / Part	Details* *(if Yes or Part)* / Comment*	Recommended Action
	and improve user competence?			
	Are vendors routinely involved in staff training?	No	*Give details of firms and products.*	
	Are training programmes evaluated in terms of their impact on trainees' knowledge, skills and practice?	Part	*Describe process and give illustrative examples* *MOH does not follow up this. PAMP is doing this in co-operation with HIMDD, but only for its own activities*	No capacities at MOH for Monitoring available.
Safety	Are necessary technical and managerial measures taken to minimize potential hazards to patients and staff?	No	*Describe measures and who is responsible for implementation.*	
	Are there any workforce or workplace general safety regulations that apply?	No	*Outline issues and main features of regulations*	
	Are formal risk assessments conducted to minimize liability exposure?	No	*Explain process and illustrate with examples of asseesments conducted*	
	Are formal procedures to deal with emergencies in place?	Part	*Describe general features* *At this stage MOH has developed a crisis plan for earthquakes only.*	
Maintenance & Repair	Does a maintenance management programme exist?	Part	*Summarize programme(s) and indicate responsible parties* *Only at Nepalganj reference workshop*	Training of polyvalent maintenance technicians
	Is there capacity building within the maintenance programme ?	Yes	*Give details on resources and programmes* *New created 2-year training course for maintenance technicians*	
	Does an adequate maintenance and repair infrastructure exist competent to deal with the majority of needs and problems arising?	Part	*Describe capabilities for maintenance within the public and private sectors.* *National and regional hospitals have in-house services. However they lack competence, skill, budgets and managerial skill.*	
	Is preventive maintenance performed within the healthcare system?	No	*Summarize nature and extent*	

TOPIC / Issue	Questions	Yes/ No / Part	**Details*** *(if Yes or Part)* / **Comment***	Recommended Action
	Do public health sector maintenance arrangements include the use of non-government providers?	No	*Summarize exiting activities of this type and annex list of non-Governmental service providers involved.*	
	Are competent technical personnel available?	No	*Categorise numbers of staff in maintenance jobs by knowledge, skills, experience and*	
	Are adequate workshop facilities, tools and test equipment etc. available?	Part	*Summarize available resources and* *There are in-house workshops available in national hospitals. Also the only regional hospital inPokhara has a workshop. It is also decided that each Region should receive a workshop in charge for Zonal and District hospital*	It is planned by MOH to have workshops at regional level too.
	Are procedures in place to efficiently obtain spare parts?	No	*Describe procedures and comment on any particular features requiring further strengthening.*	
	Are procedures manuals for preventive and corrective maintenance available?	Part	*Summarize availability, and outline any problems of access by technology users or maintenance personnel* *PAMP created Handouts for Health workers and Peons and is involved in on going training for their use at decentralised level.*	
	Are adequate records being kept on maintenance and repair activities and costs?	No	*Describe records systems in use and illustrate with examples of actual records and summary reports on services delivered.*	Exemption Regional Workshop Nepalganj with support of PAMP
	Are their guidelines for contracted maintenance & repair services?	No	*Summary main features* *It is solely ad hoc. Sometimes also personnel relations will decide on such contracts*	
	Are there basic education and training programmes for technical personnel?	Yes	*Give details of training institutions* *See polyvalent technician training*	
	Is appropriate vendor training available?	No	*Give details of firms and products* *Some of the agents received such training abroad (Siemens)*	
	Are their opportunities for continuing professional development for technical personnel?	Part	*Give details of methods/ institutions* *MOH is working on career opportunities for technicians and future engineers*	HRD issues are part of HCT Policy
	Are training programmes evaluated in terms of their impact on trainees' knowledge, skills and practice?	No	*Describe process and illustrate with examples of analyses*	

TOPIC / Issue	Questions	Yes/ No / Part	Details* *(if Yes or Part)* / Comment*	Recommended Action
	Do financial and human resources adequately support the maintenance process?	No	*Summarize resources available and comment on any remaining significant gaps*	
	Is there a separate budget for maintenance & repair activities?	Yes	*Give details of budget allocations in recent years and spending rules The national health budget has a line for M&R amounting to 0,89% of budget*	To initiate and support basket funding at decentralised level involving local organisation and INGO/ NGO's
	Is the maintenance budget under the control of the manager in charge of maintenance?	No	*Give details of budget holder(s), service beneficiaries and relationships*	
	Does a revolving maintenance fund exist?	Part	*Give details of operation and mechanism for replenishment* *Together with Hospital Helping Committees and District Development Committees basket funds for M&R have been created and guidelines have been adopted for their appropriate use. PAMP is facilitating this and contributes to the funds*	INGO's and NGO's acting in the selected districts are invited to join the system
Monitoring	Are any regular assessments made of the availability (inventory analysis) and functionality of health care technology?	No	*Describe process and responsible parties. Summarize results of most recent assessments*	PAMP did several surveys and promotes implementation of an adequate inventory system.
	Are any indicators used to monitor utilization and maintenance of equipment?	No	*Describe indicators and give examples of analyses that illustrate their recent use.*	In the reference workshop of Nepalganj this issue is addressed and documented.
	Are performance reviews of staff conducted on a regular basis?	No	*Describe process and responsible parties.*	
	Are technologies regularly assessed for clinical effectiveness and cost efficiency compared with alternatives?	No	*Describe process and parties involved. Illustrate with recent examples of assessments conducted.* *Not at this stage. Same reason - no competent staff available*	
Decommissioning	Is there an official decommissioning procedure?	No	*Summarize main features* *Obsolete equipment is generally stored in a corner since no clear policy/guidelines exist. Eventually old furniture's can be*	New Healthcare Technology Policy emphasis Life cycling cost including de-

TOPIC / Issue	Questions	Yes/ No / Part	**Details*** *(if Yes or Part)* **/ Comment***	Recommended Action
			auctioned. *Generally old equipment can be auctioned*	commissioning.
	Does the decommissioning procedure include technical and financial evaluation?	No	*Describe criteria used.*	
	Is the decommissioning procedure effective?	No	*Indicate any aspects that require further strengthening.*	
Costing & Finance	Are budget issues addressed?	Yes	*Describe process* *Budgets are always transferred every year. New Budget lines or increased budget lines are difficult to achieve since absolute health budget decreases every year*	It is up to Ministry to improve procedures.
	Has Management Costing been addressed?	No	*Explain mechanism and basis of estimates*	
HCT MANAGEMENT CAPACITY DEVELOPMENT				
	Are prospects for developing HCT management professionals hindered by poor working conditions and lack of appropriate career opportunities, professional incentives and salaries competitive with the marketplace?	Yes	*Describe main barriers* *First of all Government pay is low and most competent health professional try to leave the country or prefer to work in private sector. Lack of Funds , weak leadership and not transparent personal management lead to frustration and demotivation of staff*	Needs assessment for additional qualified staff to be done. Recommendations will be presented to MOH.
	Is the management of HCT dependent significantly on external assistance and experts?	Yes	*Give details of significant current or planned capital aid or technical assistance from external sources.* *PAMP at this stage is the only outside expertise available. However in private or informal sector good-trained engineers are available but have not the needed experiences for management tasks. Private agents can still easily dictate prices and quality of M&R interventions without those Public Facilities can assess their performances. This is due to bad management, abnormal decisions in procurement and lack of competent in-house staff.*	Support MOH in the development of own engineering / technicians skills