ANNEX 2: REFERENCE MATERIAL AND CONTACTS

This Annex is in two parts, and provides information about:

Part i. Books, guidelines, databases, and websites

Part ii. Organizations, sources of publications in part i, resource and information centres.

i. Books, Guidelines, Databases, and Websites

The following books, guidelines, databases, and websites are listed in subject categories according to the topics found in Sections of this Guide. For each publication, a brief description of the content and the main source(s) are included. Contact details for the source organizations are included in *Part ii*. Readers should note that many of the publications are available at low cost. In some countries it may also be possible to obtain these publications from local bookstores, as publishers and distributors increase efforts to ensure wider availability. Published prices may be flexible depending on the order size, discounts available and distribution method.

Tip

- Many books and documents cover a variety of topics that appear in several Sections of this Guide. The first time they appear in this list they are described in full. For each subsequent entry only the basic details are provided.

Healthcare Technology Management Framework Issues

This material covers issues in *Sections 1 and 2*, such as healthcare technology management definitions, policy, regulations, guidance, and services, and in *Section 4.4* on developing purchasing, donations, replacement, and disposal policies. It is listed alphabetically by title.

Developing healthcare technology policy

Examples of Policies

A number of health service providers have already developed their own healthcare technology policies, as well as implementation guidelines to go with them. For example, more information can be obtained from:

- Dr P Asman, Biomedical Engineering Unit, Ministry of Health (Room 33, MOH Building), PO Box M-44, Accra, Ghana. Email: nchtm@africaonline.com.gh
- Ministry of Health, PO Box 7272, Kampala, Uganda. Email: info@health.go.ug, website: www.health.go.ug/support_system.htm
- Dr N Forster, Under Secretary: Health and Social Welfare Policy, Ministry of Health and Social Services, Private Bag 13198, Windhoek, Namibia. Email: nforster@mhss.gov.na
- Director of Health, Lusaka Urban District Health Board, PO Box 50827, Makishi Road, Lusaka, Zambia. Email: msinkala@lycos.com
- Department of Hospital Services, Ministry of Health, 151-153 Kampuchea Krom Boulevard, Phnom Penh, Kingdom of Cambodia. Email: procure.pcu@bigpond.com.kh, website: www.moh.gov.kh

Health care technology management No.1: Health care technology policy framework
Kwankam Y, Heimann P, El-Nageh M, and M Belhocine (2001). WHO Regional Publications, Eastern Mediterranean Series 24. ISBN: 92 9021 280 2
This booklet is the first in a series of four titles. It introduces the ideas of and behind health care technology management, defines terms relating to and sets objectives for health care technology management policy. It examines what should go in to such a policy, and the national policy framework and organization. Capacity-building and human resources issues are considered, as well as economic and financial implications. Attention is also given to legislation, safety issues, cooperation nationally and between countries, implementation, monitoring, and evaluation. See *Guide 1* for information on the three further titles in this Series:
No.2: Eastern mediterranean regional strategy for appropriate health care technology
No.3: Health care technology policy formulation and implementation
No.4: Country situation analysis.
Available from: WHO

Interregional meeting on the maintenance and repair of health care equipment: Nicosia, Cyprus, 24-28 November 1986
WHO (1987). WHO document WHO/SHS/NHP/87.5
This document provides a comprehensive discussion of the problem of non-functioning equipment and of proposed solutions. The major policies, recommendations, and strategies proposed by the conference on the issue of maintenance and repair of health care equipment are presented. It includes four Working Papers which cover in detail: maintenance and management of equipment, the proposed health care technical service, manpower development, and training.
Available from: WHO

Management of equipment
DHSS, UK (1982). Health Equipment Information No. 98
The aim of this booklet is to recommend a system of equipment management that, if fully implemented, would ensure that all equipment used in the British National Health Service was suitable for its purpose, was maintained in a safe and reliable condition, and was understood by its users. Its recommendations and procedures are structured into sections on equipment selection, acceptance procedures, training, servicing (maintenance, repair, and modification), and replacement policy. It also covers the management of inventories, equipment on loan, servicing, long-term commercial contracts, infection hazards.
Available from: Her Majesty's Stationery Office (HMSO).

Medical equipment in sub-saharan Africa: A framework for policy formulation
Bloom, G and C Temple-Bird. (1988). IDS Research Report Rr19, and WHO publication WHO/SHS/NHP/90.7. ISBN: 0 903354 79 9
This book provides a good overview of the situation of medical equipment in Africa. Its approach to the analysis is to unpackage medical equipment technology into its component activities, such as planning, allocating resources, procurement, commissioning, operation, maintenance, training, etc. It provides good general policy formulation strategies to address the problems discussed.
Available from: WHO

Practical steps for developing health care technology policy: A manual for policy-makers and health service managers in developing countries
Temple-Bird, C (2000). Institute of Development Studies, University of Sussex, UK. ISBN: 1 85864 291 4
This book is a practical step-by-step guide for developing health care technology policy. It can be used by health service providers, regional and district health authorities, health facility managers, and external support agencies. It describes a process for developing health care technology policy which is collaborative, participatory, iterative, and involves community stakeholders. Guidance is provided on underlying management concepts, undertaking a situation analysis, running a ideas workshop, formulating policy, developing an implementation plan and procedures manual, as well as the resources required to complete these tasks.
Available from: Ziken International Consultants Ltd

Strategic medical technology planning and policy development
Raab M (1999). Swiss Centre for International Health. August 1999.
This paper discusses the challenge of the fast expansion in technologies, and the choices that have to be made to manage them. It looks at healthcare technology assessment, the elements and formulation of a healthcare technology policy, and the strategic planning process required.
Available from: SCIH

See *Guide 4* for resources that discuss policies for disposing of healthcare waste and the development of a waste management plan.

Regulating relationships with external support agencies that provide equipment

Guidelines for health care equipment donations
WHO (1997). WHO document WHO/ARA/97.3
This document presents guidelines that aim to improve the quality of equipment donations, not to hinder them. They are not an international regulation, but intended to serve as a basis for national or institutional guidelines, to be reviewed, adapted and implemented by governments and organizations dealing with health care equipment donations. They provide detailed guidance and checklists for both the potential donor and recipient. The guidelines are based on extensive field experience and consultations with many experts internationally. They also merge together several earlier documents, including the one listed below.
Available from: WHO

Guidelines on medical equipment donations
Churches' Action for Health (1994). World Council of Churches' publication
This paper is a guide for those accepting and making donations, and is also useful for those planning to buy equipment. It clearly lays out in point form the responsibilities of the recipient and the responsibilities of the donor.
Available from: WCC

Understanding healthcare technology management

International seminar for hospital technicians/engineers: February 1998, Moshi, Tanzania
Clauss J (ed) (1998). FAKT
This document reports the results of intensive work by 38 national and international experts brought together from faith, public, and private agencies to strengthen equipment management measures in the health sector. It includes papers, with country examples, on healthcare technology management, using cost-sharing to finance maintenance, networking, structures of health care technical services, cash control for workshops, training, communication technologies, modification of medical and hospital equipment, energy supply and photovoltaics. There are also lists of standardized equipment for the Evangelical Lutheran Church of Tanzania and the Joint Medical Stores of Uganda, and a description of how they were developed.
Available from: FAKT

International workshop on healthcare technology management: 2-6 October 2000, Catholic Pastoral Centre, Bamenda, Cameroon
Clauss, J (compiler) (2000). FAKT
This document reports the results of intensive work by 35 national and international experts involved in setting up and operating systems for the sustainable management of healthcare technology. It includes papers, with country examples, on healthcare technology management, the role of stakeholders, public/private partnerships for providing HTM, financial management of maintenance organizations, and donations of healthcare technology.
Available from: FAKT

Medical equipment in Botswana: A framework for management development
Temple-Bird C L, Mhiti R, and G H Bloom (1995), WHO publication WHO/SHS/NHP/95.1
This book reports on the results of a study of the healthcare technology sector in Botswana, and the lessons learnt are of relevance to many other countries. The study was undertaken by unpackaging the sector into its component activities, such as planning, allocating resources, procurement, commissioning, operation, maintenance, training, etc. In this way the book provides good general healthcare technology management strategies to address the problems discussed. This book also describes how technical staff obtain their basic technical qualifications either as artisans at local Trade Testing Centres, or as technicians at the local Polytechnic, and provides an understanding of how such systems and qualifications work.
Available from: WHO

Medical technology management
David Y, and T Judd. (1993) BioPhysical Measurement Series, SpaceLabs Medical Inc.
ISBN: 0 9627449 6 4
This book looks at the appropriate management tools needed to make technology's role more clinically effective and cost–effective (based on the healthcare delivery system in the USA). It focuses on strategic technology planning principles, and how they contribute to improved patient outcomes. It also looks at a process for technology assessment and life-cycle cost analysis. It defines many common terms, and the role of useful committees, procedures, and forms.
Available from: SpaceLabs Medical Inc.

Physical assets management and maintenance in district health management
Halbwachs H (2000). GTZ document
This paper provides practical guidance to health workers involved in district health systems concerning health technology - one of the critical areas in managing health service delivery at district level. It presents the physical assets management approach, and elaborates on key strategies for maintenance, financing, quality control, monitoring indicators, cost-benefit analysis calculations, and a basic paper-based maintenance information system.
Available from: GTZ

The effective management of medical equipment in developing countries: A series of five papers
Remmelzwaal B (1997). FAKT, Project Number 390
This document is aimed at the health workers, administrators, maintainers, and overseas aid workers who are involved in medical equipment management in developing countries. It examines the variation in performance with management of medical equipment in different countries, with the objective of identifying successful approaches. It addresses some of the managerial issues related to the conservation of equipment; allocation of human, financial and material resources; and acquisition and use. It looks at the structure for the HTM Service, and the HTM cycle. It includes an example spreadsheet layout to use as an inventory form, with various data collection codes.
Available from: FAKT

See *Guide 1* for more information on further relevant issues, such as health service definitions, the place of HTM in health systems, regulations, and standards.

Equipment Inventories and Price Information

This material covers issues in *Section 3.1* on establishing and keeping an equipment inventory, and an inventory code numbering system, and equipment price data needed for the stock value estimates in *Section 3.2* and the cost calculations in *Sections 5 and 6*. It is listed alphabetically by title.

Note on inventory software: Keeping an equipment inventory is an area where simple computer software programs can be of assistance once you have mastered a manual paper system, have a large enough stock (several hundred items of major equipment), and can obtain sufficient training of staff. For example:

- at a district hospital, any common computer database software could be used such as a commercially available product like Access (part of Microsoft Office) or a shareware program available on the internet free or at competitive rates
- for larger stocks of equipment (for example at a teaching hospital, or a centralized inventory), where analysis of the data is required with the possibility of sorting the data according to several selection criteria in parallel, more sophisticated software programs can be used, such as the ECRI and PLAMAHS products listed below
- more information on deciding when and how to computerize your records, see the GTZ book by Halbwachs and Miethe listed below.

Clinical engineering service departments: Establishment, scope of work and organization
Raab M (1999). Swiss Centre for International Health, Basle, Switzerland
This paper discusses the issues that prompted the evolution of clinical equipment support services, the resources and staff required when establishing clinical engineering service departments, and their scope of work, including details of necessary documentation and reporting using inventories and other recorded data.
Available from: SCIH

Computerizing maintenance for health care facilities in developing countries
Halbwachs H, and B Miethe (1994). GTZ, Eschborn, Germany
This book describes the documentation and analysis required if healthcare technology management is to be undertaken effectively (such as inventory management, planned preventive maintenance timetabling, costs analysis). It illustrates that for large stocks of equipment such work is made easier with the aid of computers. The book goes on to describe when and how to computerize equipment and maintenance records, including details of hardware and software requirements and products available. It includes details of the sort of data to be collected for effective healthcare technology management.
Available from: GTZ

District laboratory practice in tropical countries (part 1)
Cheesbrough M (1998). Tropical Health Technology. ISBN:0 9507434 4 5
A valuable resource aimed at those responsible for the organization and management of district laboratory services but can also be adapted for use by health centres. It covers selection and procurement of laboratory equipment and supplies, including lists of requirements with brief specifications and indicative (1997) prices. It covers parasitological tests, clinical tests and training of personnel, as well as all types of safety issues for laboratories.
Available from: TALC, THT

District laboratory practice in tropical countries (part 2)
Cheesbrough M (2000) Tropical Health Technology. ISBN:0 9507434 5 3
Covers microbiological, haematological and blood transfusion techniques required at district level.
Available from: TALC, THT

Emergency Care Research Institute (ECRI, USA) products
This organization produces a variety of products on healthcare technology. They are available as hard copy and as software regularly renewed by subscription, with special rates for developing countries. The data is comprehensive and primarily written for the US audience, and the software is sophisticated. The products cover various issues, such as:

- **HECS 4 for Windows** (includes inventory management software)
- **Health devices source book** (a directory of manufacturers and distributors for the US market, their contact details, products, and typical price ranges)
- **Healthcare product comparison system** (a reference guide for selecting equipment)
- **ECRI spec** (a database of specifications, instructions to bidders, and terms and conditions, etc)
- **Inspection and preventive maintenance system**
- **Health devices alerts database**
- **Health technology trends newsletter**

Available from: ECRI

Healthcare equipment management
Halbwachs H. (1994). pp 14-20 in *Health Estate Journal*, December 1994, Portsmouth UK
This paper first discusses elements of an equipment management system including selection, inventories, user training, and maintenance services, as well as issues concerning energy, waste, and hygiene. It discusses establishing an HTM system including the organizational structure, personnel requirements, and costs. It also covers typical maintenance running costs for various categories of equipment, discusses budget implications of the backlog of repairs, and the financial balance between preventive and repair activities.
Available from: GTZ

Hospital engineering in developing countries
Dammann V, and H Pfeiff (eds) (1986). GTZ, Eschborn, Germany. ISBN: 3 88085 293 6
This is a report of a symposium held in 1983 in Giessen. It covers the constraints in developing countries, and requirements for establishing healthcare technical services. This includes discussions on tasks, establishing an inventory, data collection, and training of maintenance and user staff.
Available from: GTZ

Management of equipment
DHSS, UK (1982). Health Equipment Information No. 98

Medical supplies and equipment for primary health care: A practical resource for procurement and management.
Kaur M, and S Hall (2001). ECHO International Health Services Ltd. ISBN: 0 9541799 0 0
This book is intended for health workers and those responsible for the procurement and management of medical supplies and equipment at primary healthcare level. It covers guiding principles for selecting supplies and equipment, provides guidelines for ordering and procurement, storage and stock control (with brief guidance on keeping an inventory), care and maintenance, and considers decontamination and safe disposal of medical waste. The manual also discusses the use of standard lists as a tool for encouraging good procurement practice and includes model lists and specifications for medical supplies and equipment required for primary health care activities in both health facilities in the community, and basic laboratory facilities.
Available from: TALC

Physical asset planning and management software (PLAMAHS)
HEART Consultancy
This software package holds information, and supports analysis, on: the equipment inventory, equipment models and standards, existing and planned facilities, procurement support, and maintenance support. The software holds various digital images, model equipment lists, specifications, price and other financial data, and templates for forms, etc., and has a security system. It has been designed especially with developing countries in mind and is available at special rates for developing countries. It is being used in a number of countries, and HEART can assist with the set up and initial training requirements.
Available from: HEART Consultancy

Practical laboratory manual for health centres in East Africa,
Carter J and Olema O (1998). AMREF.
Practical laboratory manual providing information necessary to establish, select and use laboratory tests for patient management. Also includes material on implementation of safe working practices, reporting and recording test results, keeping an inventory of supplies and equipment, ordering supplies and maintaining equipment.
Available from: AMREF

Spare parts and working materials for the maintenance and repair of health care equipment: Report of workshop held in Lübeck, August 1991
Halbwachs H, and C Temple-Bird (eds) (1991). GTZ, Eschborn, Germany
This book, mainly aimed at maintenance technicians, covers the maintenance requirements for common items used at district level (anaesthesia equipment, infant incubators, X-ray equipment, suction pumps, autoclaves and laundry equipment) including some advice on safety testing and test instruments. It also includes information on workshops, stock control of parts, and an equipment inventory code numbering system.
Available from: GTZ

The effective management of medical equipment in developing countries: A series of five papers
Remmelzwaal B (1997). FAKT, Project Number 390

Health Trends and a Vision for the Future

This material covers issues in *Section 1.2* on trends in planning and expenditure for health and healthcare technology, *Section 2.2* on issues affecting service delivery in the future, and *Section 4.2* on developing a vision of service delivery. The material also covers areas that may be new to some health service providers, such as healthcare technology assessment, telemedicine, and energy management. (For more information, refer to the section below on equipment needs). It is listed alphabetically by title.

Addressing the future of healthcare technology management
Halbwachs H (2001). GTZ, Eschborn, Germany
This paper reminds healthcare technology management practitioners how HTM evolved, and warns that it will not be successful unless it is integrated into the way health services are managed and delivered on a daily basis. It lists the requirements for measuring and improving performance, and undertaking a quality management approach. It suggests actions for all the different players involved (countries, international organizations, donors).
Available from: GTZ

Better health in Africa: Experience and lessons learned
World Bank (1994). Development in Practice Series, World Bank, Washington, USA,
ISBN: 0 8213 2817 4
This book is aimed at policy-makers and sets forth a vision of health improvement that challenges African countries and their external partners to rethink current health strategies. The report stresses positive experiences in Sub-Saharan Africa and concludes that far greater progress in improving health is possible than has been achieved in the past – even within existing resource constraints. It proposes that a basic set of health services can be provided in low-income Africa at an annual cost of around US$ 13 per person, presents the key reforms for achieving this, and illustrates the costs and benefits involved.
Available from: World Bank, major internet bookshops

Cost-effective aid for developing economies
Halbwachs H (1999). GTZ, Eschborn, Germany
This paper explains that as funds for aid are dwindling, there needs to be a more effective utilization of resources. It presents strategies and criteria which would help aid used to supply equipment to be more cost effective.
Available from: GTZ

Developing health technology assessment in Latin America and the Caribbean
PAHO (1998). PAHO. ISBN: 92 75 073777
This publication is aimed at policy-makers and health care professionals. The first part provides an introduction to health technology assessment: why it is important, who does the evaluations, when and how the evaluations are done. The second part looks at health technology in Latin America and the Caribbean, and PAHO's recommendations for promoting health technology assessment.
Available from: PAHO

District health care: Challenges for planning, organization and evaluation in developing countries (2nd edition)
Amonoo-Larston R, Ebrahim G, Lovel H, and J Rankeen (1996). MacMillan. ISBN: 0 333 57349 8
This book contains practical support and advice intended for those in the planning, management and evaluation of health services at district level. It covers a wide range of topics based on country experience, including: district health needs, plans, organization and management; staff motivation, teamwork, developing management skills, managing change, managing conflicts, and staff development; managing finances; as well as monitoring and evaluation.
Available from: TALC

Draft final report of the informal consultation on physical infrastructure, technology and sustainable health systems
WHO Health Systems Department (1998). WHO, Geneva, Switzerland
This paper looks at the issues surrounding physical infrastructure in health – it does not pretend to provide the answers but prompts discussion. Using accumulated experience from different countries, the paper defines the role of physical infrastructure in the development of sustainable health systems, discusses the opportunities and challenges facing health systems in developing countries due to the rapid developments in technology, identifies the constraints to progress with effective healthcare technology management at national and international level, and identifies the current gaps in knowledge which need to be filled.
Available from: WHO

Health and disease in developing countries
Lankinen, K et al (eds) (1994). MacMillan Press. ISBN: 0 333 58900 9
This comprehensive book covers health and disease from the wider perspective of development in general. It is of particular interest to medical and other professionals working in developing countries or for international cooperation agencies. It is a valuable resource for district medical officers, and students taking courses in public health and tropical medicine. Besides sections on: society, economy and health; infectious diseases; and challenges for health care, there is a section on health services to meet the challenges. This section contains chapters relating to equipment and/or management such as health systems management and financing, immunization services, essential laboratory services, blood transfusion services, and medical equipment management.
Available from: major internet bookshops

Health in the commonwealth: Challenges and solutions 1998/1999
Commonwealth Secretariat (1999). Kensington Publications Ltd, London
This digest of articles covers a wide range of health issues, such as: resources and planning; equity of access; medical technology and equipment; health promotion; mother and child health; community health; communicable and non-communicable diseases, etc. The content is aimed at policy-makers and planners. There is a range of technology articles on equipment management, telemedicine, radiology, cardiac care, hospital design, sanitation, vector control, water and air supplies.
Available from: Commonwealth Secretariat

Healthcare technology management and health sector reform
Halbwachs H (2001). GTZ, Eschborn, Germany
This paper presents data and arguments for the need for healthcare technology management to be a part of health sector reform. It explains how HTM can contribute to health sector reform, and what needs to be done by the different players involved (countries, international organizations, donors).
Available from: GTZ

Health technology assessment: Methodologies for developing countries
PAHO (1989). PAHO. ISBN: 92 75 12023 4
This publication reviews the main concepts and methodologies involved in assessing the effectiveness, safety, cost, and social impact of health technologies, and discusses the potential contributions of such assessments to improving health care delivery in developing countries. It discusses how the methodologies must be adapted for developing countries, using results from actual examples.
Available from: PAHO

Information technology in the health sector of Latin America and the Caribbean: Challenges and opportunities for the international technical cooperation
PAHO (2001). Essential Drugs and Technology Program, Division of Health Systems and Services Development, PAHO. ISBN: 92 75 12381 0.
This publication is aimed at policy-makers and reviews the challenges and opportunities for technical cooperation in the area of information technology (IT) globally, with a status report from Latin America and the Caribbean. The diffusion and impact of information technology in healthcare services and organizations is reviewed. The publication also aims to start the process of defining measurement indicators for the infrastructure, process, and impact of IT in the health sector.
Available from: PAHO, WHO

Medical technology management
David Y, and T Judd. (1993) BioPhysical Measurement Series, SpaceLabs Medical Inc.
ISBN: 0 9627449 6 4

Myths and realities about the decentralization of health systems
Kolehmainen-Aitken, R-L. (ed) (1999). Management Sciences for Health, Boston, USA, ISBN: 0 913723 52 5
This book is aimed at managers and policy-makers, and provides a comprehensive look at the impact of decentralization on health systems around he world. Decentralization can profoundly influence both the content and quality of health services and the technical support areas necessary to deliver the services equitably and efficiently, but there is little information on the challenges of introducing new policies and services in a decentralized environment. So, this book presents lessons learned to provide an understanding of the positive and negative consequences of decentralization, and offers advice on anticipating and dealing with these issues based on experiences in numerous countries.
Available from: Management Sciences for Health

Strategic medical technology planning and policy development
Raab M (1999). Swiss Centre for International Health. August 1999.

Successful energy management of health facilities
Riha J (1994). In Halbwachs H, and R Schmitt (eds) *La maintenance dans les systemes de santé/ Maintenance for health systems: 4th GTZ Workshop, Dakar, Senegal, September 1993*. GTZ
This paper covers the principles of energy management and its importance for health facilities. It discusses energy costs, strategies, and obstacles to overcome by the health team.
Available from: GTZ

Technology assessment in healthcare
Raab M (2000). Swiss Centre for International Health
This paper discusses and calls for the need to undertake health care technology assessment in developing countries, in order to make the best use of new technologies. It presents some strategies for starting this process.
Available from: SCIH

The world health report 2000: Health systems – Improving performance
WHO (2000). ISBN: 92 4 156198 X
This book is aimed at policy-makers. Drawing from a range of experiences and analytical tools, this book traces the evolution of health systems, explores their diverse characteristics, and uncovers a unifying framework of shared goals and functions. The book presents three fundamental goals for health services, and shows that the achievement of these goals depends on the ability of each health system to carry out four main functions. It aims to stimulate debate about better ways of measuring health system performance and thus finding a successful new direction for health systems to follow.
Available from: WHO

World development report 1993: Investing in health
World Bank (1993). Oxford University Press, New York, USA. ISBN: 0 19 520889 7
This report examines the controversial questions surrounding health care and health policy, and advocates a threefold approach for governments in developing countries and those in transition. First, to foster an economic environment that will enable households to improve their own health. Second, to redirect spending away from specialized care and toward low-cost and highly effective activities, by adopting packages of public health measures and essential clinical care described in the report. Third, to encourage greater diversity and competition in the provision of health services.
Available from: World Bank

Equipment Needs and Equipment Lists

This material covers issues in *Section 4.3* on establishing model equipment lists and includes resources that discuss equipment needs, provide lists of equipment, advise on design and layout implications relating to the use of equipment, and standardization. It is listed alphabetically by title.

Anaesthesia at the district hospital (2nd edition)
Dobson MB (1988). Nuffield Department of Anaesthetics, John Radcliffe Hospital, Oxford, UK.
ISBN: 92 4 154527 5
A practical manual designed to help medical officers in small hospitals acquire competence in the use of essential techniques for inducing anaesthesia for both elective surgery and emergency care of the critically ill. Addressed to doctors having at least one year of postgraduate clinical experience, the book concentrates on a selection of basic techniques, procedures, and equipment capable of producing good anaesthesia despite the limited resources usually found in small hospitals. The manual was prepared in collaboration with the World Federation of Societies of Anaesthesiologists.
Available from: WHO

Anaesthetic equipment: Physical principles and maintenance (2nd edition)
Ward C (1985). Baillière Tindall. ISBN: 0 7020 1008 1
This book provides a comprehensive and practical coverage of the wide range of equipment used in anaesthetic practice. It allows the reader to understand the mode of operation and maintenance of equipment, and how to cope with common causes of mechanical failure. Suitable for trainee and established anaesthetists, intensive care specialists, anaesthetic nurses, and theatre and maintenance technicians.
Available from: book suppliers

A pocket book for safer IV therapy (drugs, giving sets and infusion pumps)
M Pickstone (ed.) (1999). ISBN: 094 867232 3
This pocket book has been written to help clinical staff deliver safe IV therapy. It covers the calculation of drug dose, the make-up of drug solutions and the selection of infusion devices and associated equipment.
Available from: major internet bookshops

Approaches to planning and design of health care facilities in developing areas: Vol 3
Kleczkowski B, and R Pibouleau (eds) (1979). WHO Offset Publication No 45. ISBN: 92 4 170045 9
This volume addresses the issue of hospital design in terms of the building structure itself. It discusses inpatient areas, outpatient department, surgery, radiology department, and mobile facilities. Equipment issues are specifically covered in the sections discussing layout and flow, alternative ways of undertaking procedures, the equipping process, and choosing a complete X-ray system for a rural medical facility.
Available from: WHO

Approaches to planning and design of health care facilities in developing areas: Vol 4
Kleczkowski B, and R Pibouleau (eds) (1983). WHO Offset Publication No 72. ISBN: 924 170072 6
This volume addresses the issue of hospital design in terms of the building structure itself. The design of a hospital is discussed in the context of geographic and demographic data, utilisation, costs and available resources. It is a useful resource for planners, architects and administrators. This volume covers small health care facilities, laboratory facilities, transport systems, local construction materials, health service management, training, commissioning, and engineering and maintenance services. Equipment issues are specifically covered in the sections discussing layout and flow, laboratory design, commissioning, and engineering and maintenance services.
Available from: WHO

Design for medical buildings (4th edition)
Mein P, and T Jorgnesen (1988). University of Nairobi, Housing Research and Development Unit; African Medical and Research Foundation
Construction guidelines for medical buildings with special reference to appropriate designs for developing and tropical countries. Relationship diagrams, flow of patients, linkages between different units and services.
Available from: WHO, AMREF

District health facilities: Guidelines for development and operation
WHO Regional Publications: Western Pacific Series No 22 (1998). ISBN: 92 9061 121 9
This revised and expanded book presents detailed, richly illustrated guidelines for the planning and design of district hospitals including the efficient utilization of space and easy movement of people, equipment, and supplies. It also provides extensive information on the selection and maintenance of medical and laboratory equipment, including specifications for a basic radiological system and a general–purpose ultrasound scanner. Additional material covers sanitation and waste management, emergencies and disasters, the procurement of essential drugs, and test instruments.
Available from: WHO

District laboratory practice in tropical countries (part 1)
Cheesbrough M (1998). Tropical Health Technology. ISBN:0 9507434 4 5

District laboratory practice in tropical countries (part 2)
Cheesbrough M (2000) Tropical Health Technology. ISBN:0 9507434 5 3

Essential equipment for district health facilities in developing countries
Halbwachs H, and A Issakov (eds.) (1994). GTZ, Eschborn, Germany
This book describes the types of equipment required at different levels within the district health services – at health post level (sub-health centre without beds), at health centre or small district hospital level (with 1-75 beds), and at district or provincial hospital level (with 76-250 beds). It also provides guidance on the maintenance skill levels required for each equipment type.
Available from: GTZ, WHO

Essential healthcare technology package (EHTP)
WHO Collaborating Centre for Essential Health Technologies, Medical Research Council, South Africa
The WHO and MRC-SA have developed a tool (concept, methodology, and software) which systematically relates planning to essential health interventions, rather than relying on static equipment lists. The software links all internationally classified diseases (ICD codes) to their respective procedures (CPT codes), then to the technologies (medical devices, drugs, human resources, facilities) required for their execution. The EHTP templates are modified through country specific consultations and consensus. An in-built query and simulation capability ensures that planners can see the implications and costs of their choices. The EHTP is being field tested and modified in 20 – 25 countries. Various papers are available describing the software and the results of pilot application studies, contact: heimannp@who.int, or issakova@who.int.
Available from: http://www.ehtp.info

Examples of model equipment lists

A number of health service providers have already developed their own model equipment lists. For example, more information can be obtained from:

- Dr P Asman, Biomedical Engineering Unit, Ministry of Health (Room 33, MOH Building), PO Box M-44, Accra, Ghana. Email: nchtm@africaonline.com.gh
- Ministry of Health, PO Box 7272, Kampala, Uganda. Email: info@health.go.ug, website: www.health.go.ug/support_system.htm
- Dr N Forster, Under Secretary: Health and Social Welfare Policy, Ministry of Health and Social Services, Private Bag 13198, Windhoek, Namibia. Email: nforster@mhss.gov.na
- Ministry of Public Health, Conakry, Guinea. In French. Contact: mboule.andre@hotmail.com
- Ministry of Health, Gaborone, Botswana. For district hospitals and primary hospitals. Contact: Ziken International on info@ziken.co.uk

Furniture and equipment in relation to activities, personnel and architecture – Primary and secondary health care in developing countries
Knebel P (1984). Club du Sahel, OECD
This book, based on experience in the Sahel region, contains lists of the minimum requirements for furniture and equipment for health facilities. There are also sections on UNICEF ordering procedures, inventory control, catchment areas, basic demographic assumptions and calculation of manpower needs. Two additional sections cover, in more detail, i) advice on staffing levels by facility and activity and, ii) proposed architectural layouts for facilities.
Available from: OECD, WHO

Future use of new imaging technologies in developing countries.
Report of WHO Scientific Group (1985). WHO Technical Report Series No.723. WHO, Geneva, Switzerland
This document discusses the use of ultrasound and computed tomography and the specifications for the required equipment.
Available from: WHO

General surgery at the district hospital
Cook J, Sabkaran B, and A Wasunna (eds) (1998). Dept. of Surgery, Eastern General Hospital, Edinburgh, Scotland. ISBN: 92 4 154235 7
A richly illustrated guide to general surgical procedures suitable for use in small hospitals that are subject to constraints on personnel, equipment, and drugs. The book presents an overview of basic principles, and detailed information on simple but standard surgical techniques for the face and neck, chest, abdomen, gastrointestinal tract, urogenital system, and paediatric surgery. Lists of essential surgical instruments, equipment and supplies are included.
Available from: WHO

If not in use – switch off!: Guidelines and key recommendations for a sustainable and cost-effective energy supply for health facilities in remote locations
Röttjes M (1995) FAKT, Stuttgart, Germany
This practical document aims to provide a variety of courses of action that medical and administrative staff can pursue when health facilities are hit by energy problems. It covers sustainable and cost-effective energy supplies, the different energy requirements, possible energy sources, and suggestions for a hospital energy supply. It includes PPM schedules for air-cooled diesel power plants.
Available from: FAKT

Infusion systems
Medicines and Healthcare Regulatory Authority (1995). MDA Device Bulletin, No. DB 9503 (May 1995)
This publication addresses many aspects of the use and selection of infusion systems. Its purpose is to raise awareness of the nature of infusion systems, their advantages and their potential risks, with a view to reducing the number of adverse incidents that arise from their use. It describes the different types of infusion devices, risks and applications, training programmes, safety recommendations, purchasing, and management responsibilities.
Available from: MHRA

Instrumentation for the operating room: A photographic manual (5th edition)
Brooks Tighe S (1999). ISBN 0323003508
Colour photographic reference manual illustrating in detail a range of instruments for major surgical procedures: endoscopic, neurosurgery, ophthalmic, orthopaedic, and oral, maxilla and facial surgery. Also includes a section describing the care and handling of instruments from cleaning to sterilization, inspection and testing.
Available from: major internet bookshops

International Centre for Eye Health (ICEH) standard lists of equipment
ICEH produces annual standard lists of equipment, instruments and optical supplies for eye care in developing countries.
Available from: online at http://www.ucl.ac.uk/ioo

International seminar for hospital technicians/engineers: February 1998, Moshi, Tanzania
Clauss J (ed) (1998). FAKT

Medical administration for frontline doctors: A practical guide to the management of district-level hospitals in the public service or in the private sector (2nd edition)
Pearson C (1990). FSG Communications Ltd, Cambridge, UK. ISBN: 1 871188 03 2
This book provides information for doctors who combine wide clinical responsibilities with administration and support for primary health care services. It covers a wide range of topics, with country examples, including: management structures; infrastructure and maintenance; buildings, support services, and equipment; hospital supplies; training; outreach programmes; and wider responsibilities in the district and above.
Available from: TALC

Medical supplies and equipment for primary health care: A practical resource for procurement and management.
Kaur M, and S Hall (2001). ECHO International Health Services Ltd. ISBN: 0 9541799 0 0

Medicines and Healthcare Regulatory Agency (MHRA, UK) products
This agency of the UK government (formerly the Medical Device Agency) ensures medical devices and equipment meet appropriate standards of safety, quality, performance, and effectiveness, are used safely, and that they comply with relevant Directives of the European Union. The MHRA provides a variety of publications, such as:

- **Device evaluations** (replacing former evaluation reports) which evaluate and compare different makes and models of equipment
- **Device bulletins** (one of many types of safety warnings produced about specific types, makes and models of equipment)
- **Medical device alerts** (replacing former hazard notices, safety notices, device alerts, advice notices, etc.)
- **Advice on a wide variety of safety topics** (visit the website, click on contacts, then medical devices, then search under a subject area such as decontamination, or laundry for example).

Available from: MHRA

Physical asset planning and management software (PLAMAHS)
HEART Consultancy

Provisional reference lists of equipment and supplies for peripheral health services
Torfs ME (1975). WHO, Geneva, Switzerland, WHO/SHS/75.2
The document begins with a discussion of the methodology used in drawing up the lists. Recommended lists of furniture, equipment, supplies, disposables, and pharmaceuticals are provided for: i) static facilities, ii) mobile facilities, and iii) kits and sets.
Available from: WHO

Selection of basic laboratory equipment for laboratories with limited resources
Johns ML and ME El-Nageh (2000). ISBN: 9290212454
This book provides a framework to help laboratory workers, supply officers and decision makers to choose and buy laboratory equipment and consumables. Includes information on maintenance and energy requirements for laboratory equipment, quick reference buyer's guides and equipment data specification sheets provide easy reference for equipment buyers. The framework can be adapted to guide general equipment purchasing.
Available from: WHO

Surgery at the district hospital: Obstetrics, gynaecology, orthopaedics and traumatology
Cook J, Sabkaran B, and A Wasunna (eds) (1991). Dept. of Surgery, Eastern General Hospital, Edinburgh, Scotland. ISBN: 92 4 154413 9
An illustrated guide to essential surgical procedures in small hospitals for treating the major complications of pregnancy and childbirth, common gynaecological procedures, and managing traumatic injuries, including fractures and burns. Emphasis is placed on standard surgical protocols that represent the safest line of action in hospital settings where equipment may be primitive, drugs limited, and specialist services sparse – these requirements are discussed.
Available from: WHO

Surgical instruments: A pocket guide (2nd edition)
Papanier Wells M, and M Bradley (1998). ISBN: 00721678017
A pocket guide listing and describing surgical instruments: sharps/dissectors, forceps, clamps, retractors, suction tips, dilators, endoscopic instruments, internal stapling devices, and most commonly used instrument sets for a variety of surgical procedures. Includes a picture of the instrument with a brief description explaining the uses, varieties, and alternative names.
Available from: major internet bookshops

See *Guide 4* for more literature that discusses equipment needs for particular disciplines but does not contain lists of equipment, and for training videos.

Equipment Specifications and Appropriate Models

This material covers issues in *Section 4.5* on developing generic equipment specifications and technical data, as well as material that discusses appropriate design of equipment. It is listed alphabetically by title.

Appropriate medical technology for developing countries: Report of IEE 1st seminar in February 2000
IEE Medical Focus Group. Report 00/014
This document contains papers on appropriate products that have been designed for use in developing countries, such as an anaesthetic machine, diagnostic instruments for primary health care, laboratory equipment, and an incinerator. It also contains discussions on issues such as solar power, repair and maintenance of equipment, selection and procurement options, and sustainability.
Available from: IEE

Appropriate medical technology for developing countries: Report of IEE 2nd seminar in February 2002
IEE Healthcare Technologies Professional Network. Report 02/057
This document contains papers on appropriate products that have been designed for use in developing countries, such as a healthcare technology management information system, laboratory equipment, a growth monitor, observation of respiratory dysfunction, a virtual doctor system, solar energy, ophthalmic examination and surgical equipment. It also contains discussions on issues such as a global medical devices nomenclature, management systems, the use of Cobalt 60 teletherapy for cancer, a call for a biomedical instrument development centre, and an update of the anaesthetic machine, diagnostic tools for medical surveillance, and an incinerator
Available from: IEE

Appropriate medical technology for developing countries: Report of IEE 3rd seminar in February 2004
IEE Healthcare Technologies Professional Network. UK ISSN: 0963 3308, reference no.: 03/10408
This document contains mainly scientific papers on research and design work being undertaken on appropriate products and techniques for developing countries.
Available from: IEE

District health facilities: Guidelines for development and operation
WHO Regional Publications: Western Pacific Series No 22 (1998). ISBN: 92 9061 121 9

District laboratory practice in tropical countries (part 1)
Cheesbrough M (1998). Tropical Health Technology. ISBN:0 9507434 4 5

District laboratory practice in tropical countries (part 2)
Cheesbrough M (2000) Tropical Health Technology. ISBN:0 9507434 5 3

Emergency Care Research Institute (ECRI, USA) products
ECRI

Examples of equipment specifications and technical data

A number of health service providers have developed their own equipment specifications, package of inputs to purchase, national technical data, and supply contracts. For example, more information can be obtained from:

- Dr P Asman, Biomedical Engineering Unit, Ministry of Health (Room 33, MOH Building), PO Box M-44, Accra, Ghana. Email: nchtm@africaonline.com.gh
- Ministry of Health, PO Box 7272, Kampala, Uganda. Email: info@health.go.ug, website: www.health.go.ug/support_system.htm
- Dr N Forster, Under Secretary: Health and Social Welfare Policy, Ministry of Health and Social Services, Private Bag 13198, Windhoek, Namibia. Email: nforster@mhss.gov.na
- Ziken International, contact: info@ziken.co.uk

Future use of new imaging technologies in developing countries.
Report of WHO Scientific Group (1985). WHO Technical Report Series No.723. WHO, Geneva, Switzerland

Medical supplies and equipment for primary health care: A practical resource for procurement and management.
Kaur M, and S Hall (2001). ECHO International Health Services Ltd. ISBN: 0 9541799 0 0

Physical asset planning and management software (PLAMAHS)
HEART Consultancy

UNICEF supply catalogue (formerly the UNIPAC catalogue)
UNICEF
This catalogue lists products with their specifications under categories such as: immunization and cold chain; medical devices and kits; water, environment, sanitation and engineering; education, communication; etc. View it online at www.supply.unicef.dk/Catalogue.
Available from: UNICEF Denmark

Cost and Budgeting Information

This material covers issues in *Sections 5 and 6* such as resources that discuss the various costs incurred when owning equipment and how to calculate them, how to make budget estimates, how to make savings, how to undertake cost-benefit analysis. It is listed alphabetically by title.

A study into the costs of running X-ray equipment in a SCIH project in Egypt
Raab M, and G Hutton (2001). Swiss Centre for International Health, Basle, Switzerland
This paper investigates the cost and financing for a project in Egypt to provide X-ray machines. It shows how the costs incurred during the life cycle of the equipment can be calculated, estimated and summarized. The evaluation study classified costs as investment costs (money required at the start of the project), recurrent costs (money required to make the project sustainable), and incremental costs (additional costs to those covered by the Ministry of Health). The information on investment and recurrent costs gave the decision makers a picture of (potential) impact on budgets, and how much budgets should be adjusted to accommodate the project.
Available from: SCIH

Better health in Africa: Experience and lessons learned
World Bank (1994). Development in Practice Series, World Bank, Washington, USA,
ISBN: 0 8213 2817 4

Cost-benefit calculation models for optimizing technology management in healthcare facilities
Raab M (1999). Swiss Centre for International Health
This paper presents a set of tools for evaluating the costs related to clinical engineering services (whether in-house, externally contracted, or a mixture of both). These costs are balanced against the benefits reaped by the health service provider. The method of analysis used has been tested in a number of countries (mainly those in transition).
Available from: SCIH

Engineering and maintenance services in developing countries
Mehta, J.C. (1983) in *Approaches to planning and design of health care facilities in developing areas: Vol 4,* B.M. Kleczkowski, R. Pibouleau. (eds), WHO Offset publication No 72
This document is based on over 8 years of experience of the maintenance system in a government hospital in India. The document discusses maintenance for the hospital as a whole including buildings, plant, and equipment. There are sections on maintenance management, activities of the hospital engineering and maintenance department, planning the maintenance program, personnel, services to offer, and tables of estimated costs of maintenance for different types of equipment as a percentage of capital cost.
Available from: WHO

Estimated useful lives of depreciable hospital assets (revised 2004 edition)
American Society for Hospital Engineering (2004). American Hospital Association.
ISBN: 1 55648 319 8
One of the organizations which have tried to estimate typical equipment lifetimes for healthcare technology. The AHA's extensive list reflects how equipment lasts within the United States' health care system whether it was manufactured in the US or abroad. It covers buildings, estate, fixed equipment, and individual items of movable equipment. The list was compiled after discussions with manufacturers of healthcare equipment, discussions with various hospital department managers, and analysis of actual retirement practices for actual hospital assets.
Available from: AHA

Healthcare equipment management
Halbwachs H. (1994). pp 14-20 in *Health Estate Journal*, December 1994, Portsmouth UK

Health economics for developing countries: A practical guide
Witter S et al (2000). Macmillan, UK, ISBN: 0 333 75205 8
This book is an introduction to health economics and finance for low-income countries, which is easy to read and does not assume previous training in economics. It explains health economics in an accessible lively way using material from, and relevant to, developing countries. The focus is on practical use with worked examples and practice exercises. There are sections covering many topics, including health and development, financing health care, the value of cost information for allocating resources, organizational issues such as decentralization, public/private provision, and improving efficiency.
Available from: major internet bookshops

International seminar for hospital technicians/engineers: February 1998, Moshi, Tanzania
Clauss J (ed) (1998). FAKT

Maintenance and the life expectancy of healthcare equipment in developing economies
Hans Halbwachs, GTZ. In *Health Estate Journal* (March 2000) pp 26-31
This article comes from one of the organizations that have tried to estimate typical equipment lifetimes for healthcare technology. The GTZ estimates are for 16 types of medical equipment and plant, and tries to more closely reflect the realities in developing countries. The article describes the Delphi survey used to obtain feedback from 23 experts from 16 different country backgrounds. Rather than providing exact lifetimes, this approach provides a range for the lifetime that depends on the quality of the initial equipment and how well it has been maintained.
Available from: GTZ

Medical equipment in developing countries: Two neglected issues – planning and financing
Berg H (1992). WHO Document WHO/SHS/CC/92.2
This document is aimed primarily at health planners. It describes planning problems, and outlines the procedures that should occur before equipment is purchased in order to ensure that the implications of ownership are known. It looks at the recurrent cost implications of equipment, and presents a method for unit costing and shows the consequences through examples.
Available from: WHO

Medical technology management
David Y, and T Judd. (1993) BioPhysical Measurement Series, SpaceLabs Medical Inc.
ISBN: 0 9627449 6 4

Physical assets management and maintenance in district health management
Halbwachs H (2000). GTZ document

Reflections on the economy of maintenance: Presentation at the summit conference of the African Federation for Technology in Healthcare, Harare, Zimbabwe, 1998
Riha J, Mangenot L, Halbwachs H, and G Attemené. (1998). GTZ
This paper aims to provide convenient quantitative guidelines for engineers, administrators and decision makers on the cost implications of maintenance approaches. It explores how to define an annual maintenance cost ceiling by relating maintenance cost to the expected increase in equipment lifetime. This is achieved though the use of various equations with worked examples.
Available from: GTZ

The right equipment... in working order
Bloom GH et al (1989). Reprinted from *World Health Forum*, Vol 10, No. 1, pp 3 – 27. WHO, Geneva, Switzerland
This document contains a series of papers that discuss planning and budgeting issues for healthcare technology in developing countries. They contain cost estimates (as a percentage of the capital stock value), financial planning implications, constraints and strategies.
Available from: WHO

The technical and financial impact of systematic maintenance and repair services within health systems of developing economies or 'How good is my maintenance service?'
Halbwachs H (1998).pp57-60 in *Proceedings of the IFHE 15th International Congress, Edinburgh, June 1998*, International Federation of Hospital Engineering
This paper describes, with country examples, the consequences of a lack of maintenance and repair, and how the introduction of planned preventive maintenance and repair services can benefit the health service by providing a positive economic impact. It covers how to measure the quality of maintenance services using process, impact, and cost indicators, including savings calculations. It reports on the results of studies in three countries on the cost-effectiveness of maintenance services. It also describes a suitable national body through which donors could provide financial contributions to maintenance services.
Available from: GTZ, IFHE

World development report 1993: Investing in health
World Bank (1993). Oxford University Press, New York, USA. ISBN: 0 19 520889 7

See *Guide 6* for more information and resources covering financial management, running Healthcare Technology Management Services as businesses that can generate profits, and preparing budgets for HTM Services.

Developing Skills and an Equipment Training Plan, and Managing Change

This material covers issues in *Section 2.1* on managing change, and *Section 7.2* on developing an equipment training plan. It is listed alphabetically by title.

A book for midwives
Klein, S (1996). Hesperian Foundation. ISBN: 0 942364 23 6
This book provides practical information on antenatal care, labour, birth and post-partum care. It also includes a section on making teaching materials and low-cost equipment.
Available from: TALC

District health care: Challenges for planning, organization and evaluation in developing countries (2nd edition)
Amonoo-Larston R, Ebrahim G, Lovel H, and J Rankeen (1996). MacMillan. ISBN: 0 333 57349 8

Healthcare technology: Training skills for hospital technicians and engineers
FAKT (1999). FAKT Technical Library Data Sheet
This paper discusses the major objectives of training both on- and off-the-job. It then provides practical guidance on how to undertake on-the-job training effectively by using the PESOS procedures (prepare, explain, show, observe, supervise). It explains each step in detail. Although written for maintenance staff, its advice is just as useful for any other types of staff.
Available from: FAKT

Hospital engineering in developing countries
Dammann V, and H Pfeiff (eds) (1986). GTZ, Eschborn, Germany. ISBN: 3 88085 293 6

Hospital technology: Communication – a vital skill for successful healthcare technical service management
FAKT (1999). FAKT Technical Library Data Sheet
This paper discusses the importance of communication for both working in a team and working in an organization/network. It provides advice on how to communicate effectively, its importance, the barriers that exist, how to promote effective communication, the role of the head of department, methods to use, and related reading. Although written for maintenance staff, its advice is just as useful for any other types of staff.
Available from: FAKT

How to make and use visual aids
Harford, N and N Baird (1997). VSO. ISBN: 043592317X
This booklet describes a number of useful and practical methods for making visual aids quickly and easily, using low cost materials.
Available from: TALC, VSO

Maintenance strategies for public health facilities in developing countries: Report of a workshop held in March 1989 in Nairobi by GTZ
Halbwachs H, and R Korte (1990). WHO/SHS/NHP/90.2
This report presents the results of a workshop attended by 60 participants from 18 countries including project staff and counterparts from GTZ projects in various countries, representatives of various donor agencies, and resource persons. The papers included address the different types of personnel required in maintenance services, the training they require, experiences of establishing national training courses in hospital maintenance, and ways to monitor progress with maintenance and training.
Available from: GTZ, WHO

Management support for primary health care: A practical guide to management for health centres and local projects
Johnstone, P, and J Ranken, (1994). FSG Communications Ltd, Cambridge, UK. ISBN: 1 87118 02 4
This practical user-friendly book gives support and guidance to leaders in health centres and other local projects to help stimulate and maintain primary health care (PHC) in their surrounding communities. Aid workers, and others unfamiliar with PHC and basic management techniques may also benefit. Includes sections which will assist with staff motivation, such as teamwork and team effectiveness; managing oneself, others and tasks; and managing change, as well as sections on planning and monitoring progress.
Available from: TALC

Medical administration for frontline doctors: A practical guide to the management of district-level hospitals in the public service or in the private sector (2nd edition)
Pearson C (1990). FSG Communications Ltd, Cambridge, UK. ISBN: 1 871188 03 2

Medical equipment in Botswana: A framework for management development
Temple-Bird C L, Mhiti R, and G H Bloom (1995), WHO publication WHO/SHS/NHP/95.1

On being in charge: A guide to management in primary health care (2nd edition)
McMahon R, Barton E, and M Piot (1992). ISBN: 9241544260
This practical guide aims to improve the managerial skills of middle level health workers. The text is reinforced with practical examples, questionnaires and illustrations that help relate the information to health workers' own experiences. Topics include identifying health problems, assigning priorities to their solution, planning and implementing programmes, and evaluating results. Also serves both as a training and reference guide, covering all aspects of primary health care management including equipment and drugs.
Available from: WHO

Setting up community health programmes: A practical manual for use in developing countries (2nd edition)
Lankester, T. (2000). ISBN: 0333679334
A practical 'how-to' manual designed for a wide range of health workers working with community health programmes. With revised and updated material on planning, management and evaluation of health programmes ranging from choosing and training a team through the setting up of clinics and advising village health workers. Includes new information on community-based approaches to safe motherhood, immunisation, malaria and TB based on WHO guidelines.
Available from: TALC

Training health personnel to operate health-care equipment: How to plan, prepare and conduct user training – A guide for planners and implementors
Halbwachs H, and R Werlein, (1993). GTZ, Eschborn
The aim of this book is to ensure that users are in a position to operate equipment and plant without causing failure or malfunction. Part one addresses the planner/administrator developing user courses and gives information about methods, course organization, finances, etc. Part two discusses interesting issues for the implementers i.e. how to design a course, teaching methods and teaching aids, conducting a course, etc. This practical guide provides sample checklists, questionnaires, worksheets, tests, certificates, etc.
Available from: GTZ

Transfer of learning: A guide for strengthening the performance of health care workers
Intrah/PRIME II/JHPIEGO (March 2002)
This book is for health care workers involved in training and learning interventions and enables them to transfer their newly acquired knowledge and skills to their jobs, resulting in a higher level of performance and sustained improvement in the quality of services at their facilities.
Available from: free online at http://www.prime2.org/prime2/section/70.html

WHO Interregional meeting on manpower development and training for health care equipment management, maintenance and repair: Campinas, Brazil, November 1989
WHO (1989). WHO document WHO/SHS/NHP/90.4
This document provides a comprehensive discussion of the complexities of manpower development and training for healthcare technology maintenance and management, as well as proposed strategies. It uses reports from countries, participating institutions and organizations regarding skill development for healthcare technical services. It discusses the needs, professional development, use of an equipment survey to determine manpower requirements, certification, and job descriptions.
Available from: WHO

See all other Guides in the Series for information on the training requirements specific to the topics covered by each Guide.

Equipment Development Plans, Budgets, and Monitoring Progress

This material covers issues in *Sections 7 and 8* on equipment development plans, income and expenditure plans (budgets), and *Section 8* on target-setting and monitoring progress. It is listed alphabetically by title.

District health care: Challenges for planning, organization and evaluation in developing countries (2nd edition)
Amonoo-Larston R, Ebrahim G, Lovel H, and J Rankeen (1996). MacMillan. ISBN: 0 333 57349 8

Maintenance strategies for public health facilities in developing countries: Report of a workshop held in March 1989 in Nairobi by GTZ
Halbwachs H, and R Korte (1990). WHO/SHS/NHP/90.2

Management support for primary health care: A practical guide to management for health centres and local projects
Johnstone, P, and J Ranken, (1994). FSG Communications Ltd, Cambridge, UK. ISBN: 1 87118 02 4

Medical technology management
David Y, and T Judd. (1993) BioPhysical Measurement Series, SpaceLabs Medical Inc.
ISBN: 0 9627449 6 4

On being in charge: A guide to management in primary health care (2nd edition)
McMahon R, Barton E, and M Piot (1992). ISBN: 9241544260

Planning and budgeting software
Preparation of equipment development plans, expenditure plans, and budgets is an area where simple computer software programs can be of assistance once you have mastered a manual paper system, have a large enough stock (several hundred items of major equipment), and can obtain sufficient training of staff. The software should be a spreadsheet application, in which you can enter formulae to manipulate the data in each column. There are a variety of products available with different advantages, for example:

- OpenOffice software is free to download and use. It includes typical desktop applications: word processor, spreadsheet, presentation manager, and drawing program. It works with a variety of file formats and platforms, and various languages. It is run by a community of developers and end-users. Website: www.openoffice.org, and look for the latest stable release to download.
- Any commercially available spreadsheet software can be purchased. Excel (the spreadsheet application part of Microsoft Office) is readily available from any computer distributor, is commonly available on health service provider's computer systems, but is a more expensive option. Website: www.microsoft.com/office/excel for information, viewing, and download possibilities. Although many other products are available.
- Tailor-made budgeting software products have many features, however they are often more complex and expensive than required, and than a straightforward spreadsheet. These products can be found by searching for budgeting software on the internet.

- The 'Health Manager's Toolkit' is a product produced by Management Sciences for Health that includes spreadsheet templates, forms for gathering and analyzing data, checklists, guidelines for improving organizational performance, and self-assessment tools that allow managers to evaluate their organizations. Tools cover areas such as strategic planning, developing information systems, cost and revenue analysis, and sustainability. Website: http://erc.msh.org/toolkit.

Setting up community health programmes: A practical manual for use in developing countries (2nd edition)
Lankester, T. (2000). ISBN: 0333679334

Strategic medical technology planning and policy development
Raab M (1999). Swiss Centre for International Health. August 1999

The division for the supply of medical spare parts in the health system of Kenya
Paton J, Green B, and J Nyamu (1996). Ministry of Health, Nairobi/GTZ, Eschborn, Germany
This paper describes how a Division for the Supply of Medical Spare Parts was set up and is run in the health system of Kenya, financed through the use of a revolving fund.
Available from: GTZ

The technical and financial impact of systematic maintenance and repair services within health systems of developing economies or 'How good is my maintenance service?'
Halbwachs H (1998). pp 57-60 in *Proceedings of the IFHE 15th International Congress, Edinburgh, June 1998*, International Federation of Hospital Engineering

Accessing Information

These websites are sources of information concerning many aspects of health service delivery. They are locations where there is, or may be, information about healthcare technology management and the planning and budgeting requirements for equipment.

Africa online: Health website: http://bamako.africaonline.com/afol/index.php
Provides links to health information sites related to Africa. The links are organized into the following categories: health information, health news, events, African organizations, international organizations, schools and hospitals in Africa, projects, publications and health services

AFRO-NETS (African networks for health research and development)
website: www.afronets.org
Forum for exchanging health research information in and between East and Southern Africa.

AJOL (African journals online) website: www.inasp.org.uk/ajol
Offers free online access to tables of contents and abstracts of over 70 journals published in Africa.

British medical journal website: http://bmj.bmjjournals.com/
Free worldwide access to BMJ and the student BMJ and a wide range of specialist journals to users in low-income countries.

Eurasia health knowledge network (EHKN) website: www.eurasiahealth.org
Specialises in the health information needs of the Former Soviet Union (FSU) and Central and Eastern Europe (CEE). Site links to clinical practical guidelines, medical textbooks, and other educational materials, many in Russian and other regional languages

FIN: Free international newsletters: www.healthlink.org.uk
Healthlink produces this publication that lists over 130 print and electronic health-related newsletters and magazines which are available free to readers in developing countries.

Free medical journals website: www.freemedicaljournals.com
This site is a comprehensive, up to date list of medical journals available free on the internet.

GATE (German Appropriate Technology Exchange): www5.gtz.de/gate/
The GATE Information Service seeks to improve the technological knowledge of organizations and individuals involved in poverty alleviation projects and to develop information and knowledge management systems of organizations.

Global Medical Devices Nomenclature (GMDN) website: www.gmdn.org/index.xalter
The GMDN is a collection of internationally recognized terms used to accurately describe and catalogue medical devices. It is a classification system developed to allow for the classification of all medical devices put onto the market as defined by the European Standards body (CEN). It is intended to replace the older national device nomenclatures such as UMDNS (USA), CNMD (Canada), NKKN (Norway), JFMDA (Japan), in order to promote consistency in terminology around the world. The system has been accepted by the International Organization for Standardization (ISO).

Health exchange website: www.healthcomms.org
Explores issues, ideas and practical approaches to health improvement in developing countries and provides a forum for health workers and others to share viewpoints and experiences in this area.

HealthNet news website: www.healthnet.org/medpub
Weekly newsletter distributed to health professionals in Africa, Asia and Latin America. Features current, practical, clinical and public health information.

HIF-net at WHO discussion group
Discussion list dedicated to issues of improving access to reliable health information in resource-poor settings. To join, email your name, affiliation and professional interests to: health@inasp.info

HINARI (Health inter-network access to research initiative) website:
www.healthinternetwork.net
WHO initiative offering free/discounted access to journals from six leading publishers.

HNP flash website: www.worldbank.org/hnpflash
A free monthly electronic newsletter dedicated to sharing knowledge regarding the latest technical developments in the fields of health, nutrition, population, and reproductive health.

ID21 health website: www.id21.org/health
An internet based development research reporting service for health policy makers and development practitioners on global health issues. Latest research summaries are provided on a searchable website, by email and in a quarterly publication.

IEC website: www.iec.ch
International Electrotechnical Committee, which sets standards for the safe manufacture of electrical healthcare technology. There is a wide range of specific standards for medical electrical equipment falling under the standard numbers IEC 60101–1,2, and 3.

IEE healthcare technologies professional network website: www.iee.org/pn/healthtech
The Institution of Electrical Engineers of the UK provides internet sites for a wide variety of engineering professions, with the aim of enabling people to communicate with their peers around the world and access the latest global industry news and key information sources. One of their professional networks focuses on healthcare technologies. It has also hosted a series of seminars on **Appropriate medical technology for developing countries**, and their reports can be obtained from the IEE.

INFRATECH discussion group
WHO forum for global exchange of information on infrastructure and health care technology issues
To subscribe send an email to LISTSERV@LISTSERV.PAHO.ORG enter in text: subscribe infratech 'your full name'.

International health exchange website: www.ihe.org.uk
Provides training, information and advice to health workers in emergency aid and development situations. This site also provides information about jobs and health development issues.

International journal of technology assessment in health care website:
www.cambridge.org/uk/journals/journal_catalogue.asp?historylinks=ALPHA&mnemonic=THC
This journal serves as a forum for professionals interested in the assessment of medical technology, its consequences for patients, and its impact on society. It covers the generation, evaluation, diffusion, and use of health care technology through essays, research notes, regular columns on technology assessment reports, and sections devoted to particular topics. Sometimes there are articles with particular relevance to developing countries. In 1994, the Cambridge University Press produced a book of reprints called **Technology assessment in health care for developing countries**.
Email: journals-subscription@cambridge.org.

KAR (Knowledge and research programme on disability and healthcare technology) website:
www.kar-dht.org, and for the latest projects being funded use website: www.disabilitykar.net/
This is the Knowledge and Research Programme on disability and healthcare technology of the UK governments's Department for International Development (DFID). It supports a range of projects on development and use of appropriate disability and healthcare technologies in developing countries. The website also provides links to:

- **Disability and healthcare technology newsletter** produced every six months describing the progress and findings of the projects funded;
- **KaR global database** on healthcare technology publications, organizations, manufacturers, training institutions, etc.

NICE (National Institute of Clinical Excellence) website: www.nice.org.uk
Provides guidance to the UK National Health Service (NHS) on current best practice covering both health technologies (from medicines to diagnostic techniques) and the clinical management of specific conditions.

Programme for appropriate technology in health (PATH) website: www.path.org
PATH identifies, develops and applies appropriate technologies to public health problems in developing countries.

Public health care laboratory website: www.phclab.com
Global forum of information exchange and resource centre for laboratory personnel and those concerned with PHC laboratory services in developing countries.

TechNet (Technical network for strengthening immunisation services) website:
www.technet21.org
Forum focusing on improving management and operational logistics for health service delivery in developing countries, in particular, immunisation services.

The manager's electronic resource center website: http://erc.msh.org
The ERC website is an electronic information resource and communication service for health managers, containing more than 150 ready-to-use management tools in various languages. A key feature is **The health manager's toolkit** – see the discussion on planning and budgeting software in the section above.

WHO: Health technology and pharmaceuticals website: www. who.int/technology
This WHO site provides information on pharmaceutical and health technology developments with a particular focus on developing countries. It includes links to blood transfusion safety and clinical technology, essential drugs, medicines, vaccines and biologicals.

WHO: Management of health services (MAKER) website: www. who.int/management
This WHO site provides information, publications, and country experiences on all types of management issues for health services, such as facility management, resource management, and district management.

World Bank website: www.worldbank.org
This site should provide access to World Bank guidelines for equipping health facilities.

ii. Organizations, Sources of Publications in Part i, Resource and Information Centres

For the following institutions we have included the name, address, contact details, a brief description of the various services they offer, and additional contact details for further relevant activities.

AfriAfya
AMREF Building, PO Box 30125, Nairobi, Kenya
Tel: 254 2 609520, fax: 254 2 609518, email: info@afriafya.org, website: www.afriafya.org
Established by Kenya-based health agencies, AfriAfya provides community access to relevant and appropriate health knowledge and information in an interactive manner. As well as a section on HIV/AIDS there is a news centre, message board and discussion forum on their website.

Amazon Bookshop
PO Box 81226, Seattle, Washington 98108-1226, USA
Website: www.amazon.com or www.amazon.co.uk
Internet bookshop

American Hospital Association
Clinical Engineering Section, 840 North Lake Shore Drive, Chicago, Illinois 60611, USA
Website: http://aharc.library.net/
They produce a wide range of documents which are published by HealthForum, use website:www.ahaonlinestore.com

AMREF International (African Medical and Research Foundation)
Resource Centre, AMREF Headquarters, Langata Road, PO Box 00506 – 27691, Nairobi, Kenya
Tel: 254 2 501301/2/3, fax: 254 2 609518, e-mail: amref.info@amref.org, website: www.amref.org
Publishes practical books, journals and other literature for health workers, and provides advice on primary health care. Runs training courses and seminars.

BOND (British Overseas NGO's for Development)
Website: www.bond.org.uk
A network of more than 260 UK based voluntary organisations working in international development and development education. BOND works to promote the exchange of experience, ideas and information by acting as a broker for a variety of relationships and by collating and distributing information.

Commonwealth Secretariat
Marlborough House, Pall Mall, London, SW1Y 5HX, UK
Tel: 44 207 747 6500, fax: 44 207 930 0827, website:
www.thecommonwealth.org/publications/html/contactus.asp
This website provides access to the publications produced by the Commonwealth Sectretariat.

De Montfort medical waste incinerators
Website: www.mw-incinerator.info/en/101_welcome.html
This website provides information on De Montfort University incinerators designed by Prof. DJ Picken. It contains copies of drawings and instructions for the building, operation and maintenance of various incinerator models. The range of DMU incinerators has been developed for use by rural PHC facilities, and designed to be constructed on site using local materials. There may be a small charge to cover the cost of printing and postage of the plans.

DFID (Department for international development)
Website: www.dfid.gov.uk
UK government's department for international development assistance.

ECHO International Health Services Ltd
ECHO International Health Services is no longer trading as it used to. Its services can be accessed as follows:

i. the charitable foundation can be contacted at:
ECHO, Ullswater Crescent, Coulsdon, Surrey, CR5 2HR, UK
Tel: 44 208 6602220, fax: 44 208 6680751, website: www.echohealth.org.uk/intro2.html
ii. the trading branch of the business (wholesale providers of medical supplies and equipment) is now:
Durbin PLC, 180 Northholt Road, South Harrow, Middlesex, HA2 0LT, UK
Tel: 44 208 8696500, fax: 44 208 8696565, email: cataloguesales@durbin.co.uk, website: www.durbin.co.uk
iii. ECHO publications are still available from TALC (see below).

ECRI (Emergency Care Research Institute)
5200 Butler Pike, Plymouth Meeting, Pennslyvania 19462-1298, USA
Tel: 1 610 825 6000 ext 5368, fax: 1 610 834 1275, website: www.ecri.org
Offers guidance and advice on health care technology, planning, procurement and management; and health technology assessment and assistance.

Elsevier Health Science
Elsevier Books Customer Services, Linacre House, Jordan Hill, Oxford, OX2 8DP, UK
Tel: 44 1865 474110, fax: 44 1865 474111, email: eurobkinfo@elsevier.com,
website: www.us.elsevierhealth.com
Books published by WB Saunders, Mosby, Churchill Livingstone, and Butterworth-Heinemann are now all members of the Elsevier Science, Health Sciences Division.

European Union (EU)
http://europa.eu.int/comm/development/index_en.htm
EU site for international development and aid.

FAKT (Consultancy for Management, Training, and Technologies)
Gansheidestrasse 43, D-70184 Stuttgart, Germany
Tel: 49 711 21095/0, fax: 49 711 21095/55, email: fakt@fakt-consult.de, website: www.fakt-consult.de
Non-profit consultancy firm, that provides information on appropriate hospital and medical equipment and training in healthcare technologies. FAKT is not a supply organisation.

Global Directory of Health Information Resource Centres.
Health Information for Development (HID) Project, PO Box 40, Petersfield, Hants, GU32 2YH, UK
Tel: 44 1730 301297, fax: 44 1730 265398, email: iwsp@payson.tulane.edu,
website: www.iwsp.org/directory.htm
This is a directory of health information resource centres that is arranged alphabetically by country. Between January 2000 and May 2001, Health Information for Development (HID) compiled a Global Directory of Health Information Resource Centres (HIRCs). This is available from their website. The Directory is updated on an ongoing basis.

GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit – German government technical aid agency)
Division of Health and Education, PO Box 5180, D-6236, Eschborn, Germany
Tel: 49 6196 791265, fax: 49 6196 797104, email: Friedeger.Stierle@gtz.de
Website: http://www.gtz.de/de/4030.htm
Friedeger Stierle is the contact for the GTZ's healthcare technology management programme, and any articles or documents on HTM.

Healthlink Worldwide
Cityside, 40 Adler Street, London, E1 1EE, UK
Tel: 44 20 7539 1570, fax: 44 20 7539 1580, email: info@healthlink.org.uk, website: www.healthlink.org.uk
Publishes a range of free and low-cost newsletters, resource lists, briefing papers and manuals about health and disability. Publications include **HIV testing: a practical approach** which is a briefing paper on HIV counselling and laboratory testing.

HEART Consultancy
Quadenoord 2, 6871 NG Renkum, The Netherlands
Tel: 31 317 450468, fax: 31 317 450469, email: jh@heartware.nl, website: http://www.heartware.nl
Consultancy firm working in all aspects of healthcare technology management in developing countries. It also produces and supplies the PLAMAHS software package for managing the inventory, model lists, maintenance, and procurement needs for your healthcare technology stock. HEART also undertakes research and training, and produces publications on many aspects of sterilization for developing countries. It has developed a basic testkit for performance testing of sterilizers, and can identify suppliers that still manufacture basic sterilizers (manually operated/fuel heated).

HMSO (Her Majesty's Stationery Office)
Website: www.hmso.gov.uk
Publishers of material produced by departments of the UK government.

Humanitarian Information for All
c/o Human Info NGO vzw and Humanity CD Ltd, Oosterveldlaan 196, B-2610 Antwerp, Belgium
Fax: 32 3 449 75 74, email: humanity@humaninfo.org, website:
http://media.payson.tulane.edu:8086/cgi-bin/gw?e=t1c11copyrigh-mhl-1-T.1.B.21.1-500-50-00e&q=&a=p&p=home
The goal of this organization is to disseminate health care information free-of-charge in developing countries. Thus, their Medical and Health Library makes publications available on the internet. Refer to their homepage to find the large list of publications available.

Institution of Electrical Engineers (IEE)
Savoy Place, London, WC2R 0BL, UK
Tel: 44 207 240 1871, Fax: 44 207 240 7735, email: postmaster@iee.org, website: www.iee.org.uk
Largest professional engineering society in Europe with worldwide membership for those working in electronics, electrical, manufacturing and IT professions. Produces a wide range of publications, is a source of a wide range of information, and has a Healthcare Technologies Professional Network. Copies of their publications are available from IEE Publication Sales Department, Michael Faraday House, Six Mills Way, Stevenage, Herts, SG1 2AY, UK
Tel: 44 1438 767 328, fax: 44 1438 742 792, email: sales@iee.org.uk

Intermediate Technology Development Group (ITDG) and **ITDG Publishing**
The Schumacher Centre for Technology and Development, Bourton Hall, Bourton-on-Dunsmore, Rugby, CV23 9QZ, UK
Tel: 44 1926 634400, fax: 44 1926 634401, email: enquiries@itdg.org.uk, website: www.itdg.org
The Development Group is a charity concerned with the research and development of 'appropriate' technologies for application in developing countries. It has worked on topics such as alternative electrical supplies, access to water, disability aids, medical supplies. It also undertakes consultancies. The Publication Division produces and disseminates books and journals covering aspects of health, development, and appropriate technology. It can be contacted at:
Tel: 44 1926 634501, fax: 44 1926 634502, email: itpubs@itpubs.org.uk,
website: www.itdgpublishing.org.uk.

International Centre for Eye Health (ICEH)
International Resource Centre, Institute of Opthalmology, University College London, 11-43 Bath Street, London, EC1V 9EL, UK
Tel: 44 20 7608 69 23/10/06, fax: 44 20 7250 3207, email: eyeresource@ucl.ac.uk, website:
www.ucl.ac.uk/ioo
Advises and publishes information on all aspects of eye care including prevention of blindness. Produces the **Community eye health journal** distributed free to developing countries, an annual standard list of medicines, equipment, instruments and optical supplies for eye care for developing countries, and teaching slides/text sets and videos.

International Federation of Hospital Engineering (IFHE)
Website: http://home.enter.vg/ifhe/main.html
This body enables national engineering professional organizations to join in a world-wide federation. It encourages and facilitates exchange of information and experience in the broad field of hospital and healthcare facility design, construction, engineering, commissioning, maintenance, and estate management. It arranges an International Congress every two years at different locations, in conjunction with a healthcare trade exhibition. The reports of the papers presented at these congresses are sources of information on the changing requirements for many topics, such as sterilization, air flow control, waste management, equipment safety, etc. It publishes a newsletter.

International Society for Technology Assessment in Health Care (ISTAHC)
c/o Institute of Health Economics, 1200, 10405 Jasper Avenue, Edmonton, Alberta, Canada T5J 3N4
Tel: 780 448 4881, fax: 780 448 0018, email: info@HTAi.org, website: http://www.htai.org/
International non-profit body with regional branches, it researches and disseminates information concerning health technology assessment. It produces the International Journal of Technology Assessment in Health Care, and has a Special Interest Group on developing countries' issues:
International Society for Technology Assessment in Health Care – Special Interest Group (ISTAHC-SPIG), Health Technology Research Group, Medical Research Council (MRC), PO Box 19070, Tygerberg 7505, Cape Town, South Africa. Tel: 27 21 938 04 13, fax: 27 21 938 03 85.

Management Sciences for Health (MSH)
Development Office, and/or Publications Office, 165 Allandale Road, Boston MA 02130-3400, USA
Tel: 1 617 524 7799, fax: 1 617 524 2825, email: development@msh.org, website: www.msh.org
MSH undertakes consultancies with health care policy-makers, managers, providers, and clients to seek to increase the effectiveness, efficiency, and sustainability of health services by improving their management. MSH also publishes and distributes practical, experience-based books and tools in multiple languages for health and development professionals, managers and policy makers. Email: bookstore@msh.org, website: www.msh.org/publications

Medical Research Council South Africa (MRC-SA)
PO Box 19070, 7505 Tygerberg, South Africa
Tel: 27 21 9380911, fax: 27 21 9380200, email:info@mrc.ac.za, website: www.mrc.ac.za
The MRC-SA's mission is to improve the nation's health status and quality of life through relevant and excellent health research aimed at promoting equity and development. They have a WHO Collaborating Centre for Essential Technologies in Health, at website:
www.mrc.ac.za/innovation/whocollaborating.htm

Medicines and Healthcare Regulatory Agency (MHRA)
Hannibal House, Elephant and Castle, London, SE1 6TQ, UK
Tel: 44 0207 972 8000, email: devices@mhra.gsi.gov.uk, website: www.mhra.gov.uk
Offers guidance, advice, and regulations on medical device quality, safety, performance, use, and standards.

MSc Envirohealth Products
25 Reedbuck Crescent, Corporate Park, PO Box 506, 15 Randjesfontein, Midrand 683, South Africa
Tel: 27 11 314 7540, fax: 27 11 314 7535, email: scaine@mweb.co.za
Contact for further information about the Medcin 400 Gas Incinerator, a pre-assembled incinerator designed for rural and small-scale health care waste management.

PAHO (Pan American Health Organization)
Pan American Sanitary Bureau, Regional Office of the World Health Organization, 525 Twenty-third Street, N.W. Washington, D.C. 20037, USA
Tel: 1 202 974-3000, fax: 1 202 974-3663, website: www.paho.org/
The Pan American Health Organization (PAHO) is an international public health agency working to improve health and living standards of the countries of the Americas. It also serves as the Regional Office for the Americas of the World Health Organization.Antonio Hernandez is the contact for healthcare technology issues, email: 1hernana@paho.org

Quality Assurance Research and Policy Development Group (QARPDG)
Philippine Health Insurance Corporation (PhilHealth), CityState Center, 709 Shaw Blvd., Brgy. Oranbo, 1600 Pasig City, Philippines
Fax: 632 637 9693, emailmadz_valera@yahoo.com, contact: Dr. Madeleine Valera (Vice President)
PhilHealth is a government owned and controlled corporation that was the main organizer of the 3rd Asian Regional Health Technology Assessment Conference in 2004, and is the source for the conference proceedings.

RS Components Ltd.
Birchington Road, Corby, Northants, NN17 9RS, UK
Tel: 44 1536 201234, fax: 44 1536 405678, email: general@rs-components.com, website: rswww.com
Supplier of equipment, supplies, parts, and components for a wide range of engineering professions such as electrical, electronic, mechanical, heating, ventilation, air-conditioning, plumbing, welding, pneumatics, computing, automotive. Also a source of textbooks, technical data books, technical literature, and training videos for all these engineering fields.

Source (International Information Support Centre)
The Wellcome Trust Building, Institute of Child Health, 30 Guildford Street, London, WC1N 1EH, UK
Tel: 44 20 7242 9789 ext 8698, fax: 44 20 7404 2062, email: source@ich.ucl.ac.uk,
website: www.asksource.info
The Source Centre has a unique collection of over 20,000 health and disability related information resources. These include books, manuals, reports, posters, videos, and CD-Roms. Many materials are from developing countries and include both published and unpublished literature.

SpaceLabs Medical Inc
15220 N.E. 40th Street, Redmond, WA 98052, USA
Tel: 1 206 882 3700, website: www.spacelabs.com/
Spacelabs Medical is a leading global provider of patient monitoring and clinical information systems. Their educational service produces a Biophysical Measurement Book Series for biomedical and clinical professionals

Swiss Centre for Development Cooperation in Technology and Management (SKAT).
Website: www.skat.ch/dc/publ/publ.htm
SKAT works internationally in the areas of water and sanitation, architecture and building, transport infrastructure, and urban development. They also publish the **SKAT newsletter**

Swiss Centre for International Health (SCIH)
Swiss Tropical Institute, Socinstrasse 57, PO Box, CH-4002 Basle, Switzerland
Tel: 41 61 284 82 79, fax: 41 61 271 86 54, email: martin.raab@unibas.ch,
website: www.sti.ch/francais/scih/scih.htm
Undertakes consultancies in healthcare technology management in developing countries and countries in transition.

TALC (Teaching Aids at Low Cost)
PO Box 49, St. Albans, Herts, AL1 5TX, UK
Tel: 44 1727 853869, fax: 44 1727 846852, email: talc@talcuk.org website: www.talcuk.org/
UK registered non-profit charity specialising in supplying affordable books, slides and teaching aids on health and community issues in developing countries, with a particular focus on materials for PHC and district levels.

Third World Network
email: twnet@po.jaring.my, website: www.twnside.org.sg
The Third World Network is an independent non-profit international network of organizations and individuals involved in development issues. Its website offers articles and position papers on a variety of subjects related to developing countries, including trade, health, biotechnology and bio-safety.

Transaid (Transport for Life)
137 Euston Road, London, NW1 2AA, UK
Tel: 44 20 7387 8136, fax: 44 20 7287 2669, email: info@transaid.org website: www.transaid.org
A charity working in the field of international transport management. Thus unique organization works with many sectors, including health, to ensure that transport resources are efficiently and effectively used. Their aim is to develop local capacity in transport and logistics management. They produce a newsletter **Hub and spoke**, and have developed the **Transaid transport management handbook**.

Tropical Health Technology (THT)
14 Bevills Close, Doddington, March, Cambridgeshire PE15 OTT, UK
Tel: 44 1354 740825, fax: 44 1354 740013, email: thtbooks@tht.ndirect.co.uk, website: www.tht.ndirect.co.uk
Charity concerned with supporting and improving laboratory services in the developing world. Primary focus is laboratory services, information and technology. Specializes in supply of laboratory equipment, books, bench aids, slide sets and microscopes.

UNICEF (United Nations Children's Fund)
UNICEF House, 3 UN Plaza, New York 10017, USA
Tel: 1 212 326 7000, fax: 1 212 887 7454, email: jando@unicef.org, website: www.unicef.org
It provides a wide range or resource materials, journals, books and videos, games and posters for children's programmes. Your regional or field office will offer advice on all aspects of child health care and UNICEF materials – contact details are on the website. The goods contained in UNICEF's **Supply catalogue** are supplied by the UNICEF Supply Division, UNICEF Plads, Freeport, 2100 Copenhagen OE, Denmark. Tel: 45 3527 3527, fax: 45 3526 9421, email: supply@unicef.org.

World Bank (WB)
www.worldbank.org
One of the world's largest sources of development assistance including health, nutrition and population projects

World Council of Churches (WCC)
PO Box 2100, 1211 Geneva, Switzerland
Tel: 41 22 791 6111, fax: 41 22 791 0361, email: info@wcc-coe.org, website: www.wcc-coe.org
International fellowship of churches that produces publications and newsletters. Recent publications include **Guidelines on medical equipment donations**.

World Health Organization (WHO)
20 Avenue Appia, CH-1211 Geneva 27, Switzerland
Tel: 41 22 791 2476 or 2477, fax: 41 22 791 4857, website: www.who.int/en/
WHO offers advice, and undertakes programmes, on all aspects of health care. Contact your regional or field office for advice on all aspects of health care and WHO materials - the addresses of the regional offices worldwide are available on the website.

i. WHO has programmes and literature on many aspects of healthcare technology management. Andrei Issakov, Coordinator of Health Technology and Facilities Planning and Management, is the contact, and source of WHO literature on healthcare technology management that is not available as published documents, email: issakova@who.int.
ii. WHO produces and distributes books, manuals, journals, practical guidelines and technical documents, several include aspects of healthcare technology management. The Distribution and Sales Office is the contact point for information on WHO publications, email: publications@who.ch, website: www.who.int/publications/en/. To order WHO publications use email: bookorders@who.int.
iii. WHO has a comprehensive library and information service on international public health literature. Contact email: library@who.int. The WHO library catalogue has electronic access to more than 4000 technical documents, use website: www.who.int/library.
iv. WHO produces many newsletters, for a list contact website: www.who.int/library/reference/information/newsletters/index.en.shtml

Ziken International Consultants Ltd
Causeway House, 46 Malling Street, Lewes, E.Sussex, BN7 2RH, UK
Tel: 44 1273 477474, fax: 44 1273 478466, email: info@ziken.co.uk, website: www.ziken.co.uk
A consultancy organization working worldwide in many aspects of health care development, including healthcare technology management.

See *Guide 1 or 5* for information on training institutes and international professional bodies for different aspects of clinical and hospital engineering. Also see all other Guides in the Series for journals and training resources specific to the topics covered by each Guide.