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Management and Maintenance of Health Care Equipment
WHO Global Effort

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MANAGEMENT AND MAINTENANCE OF HEALTH CARE EQUIPMENT - WHO GLOBAL EFFORT

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The widespread introduction and increasing influence of technology is a reality of the modern health care system all over the world and its effective management and efficient maintenance have deep economic consequences, an impact on all aspects of health care delivery and are vital for the smooth functioning of every health facility from the primary health care centre to the most sophisticated hospital in every country. This issue should be considered as one of the essential elements of the strategies developed with the aim of achieving the goal of Health for All by the Year 2000 set up by the World Health Organization and all WHO Member States.

Regarding the management and maintenance of health care equipment, countries fall naturally into two groups. In the first group are those with a strong industrial sector which are able to care for all types of equipment. Although a variety of approaches are used in these countries leading to different degrees of cost-effectiveness, there is generally sufficient national wealth to provide the financial resources required and the necessary qualified manpower is available. However, even in these countries which have, in the past, allowed uncoordinated and uncontrolled equipment management relyingy on manufacturers' service there is a growing trend towards the development of national policies and introduction of technical services in the public health sector.

The second group comprises nations which do not have a high level of industrialization, have relatively low gross national product and import virtually all their health care equipment. Although regional and national variations exist, identifiable factors are encountered which are globally common and contribute to the current situation in the developing countries. In general, a wide variety of equipment at various levels of sophistication exist in the majority of these countries, some chosen and purchased by the Ministry of Health and some provided as international or bilateral aid. Adequate maintenance of the most technologically-advanced equipment, if assured by the manufacturers' services, usually costs more than most countries can possibly afford. Even less-sophisticated equipment leads to high maintenance costs by local agents. The related services are usually slow and not always sufficient. Technically-qualified manpower is usually lacking and

most equipment is often operated by inexperienced users. Also a "hostile" environment with humidity, dust, inadequate ventilation, power and water supply gives rise to a high probability of malfunction and deterioration.

Available information indicates that a developing country will seldom have 50% of its equipment in usable condition at any given time. In some cases, 80% of equipment may be inoperable.

Conservative estimates indicate that inadmissibly high wastage of national health resources persists due to lack of specific policies, proper management and infrastructure for maintenance of equipment. The most common factors contributing to the wastage are:

- purchase of too sophisticated equipment which is underutilized or never used due to lack of technical expertise to support, maintain and use it.	estimated to waste 20-40%
- reduced useful lifetime of equipment due to mishandling and lack of maintenance and repair. of lifetime	estimated to affect 50-80%
- additional purchase of accessories, extra spare parts and modifications to facilities initially unforeseen due to lack of expertise in choosing appropriate equipment.	estimated to affect 10-30% of equipment value
- lack of standardization resulting in increased cost of spare parts or additional purchases and extra workload on limited competent staff.	estimated to affect costs by extra 30-50%
- excessive down time of equipment due to lack of preventive maintenance, inexperience in repair and lack of spare parts.	estimated to affect 25-30% of equipment
- shortage of foreign exchange reserves compounds the problem of unfavourable purchasing contracts.	estimated to add 10-30% extra purchasing costs for equipment and spares

The reduction in the potential output of the equipment resulting from poor technical service is illustrated by Figure 1 where the dotted lines show the profile for equipment put into use promptly and well maintained over its entire lifetime while the profile of solid lines shows how excessive storage, installation time and poor technical support significantly reduce output.

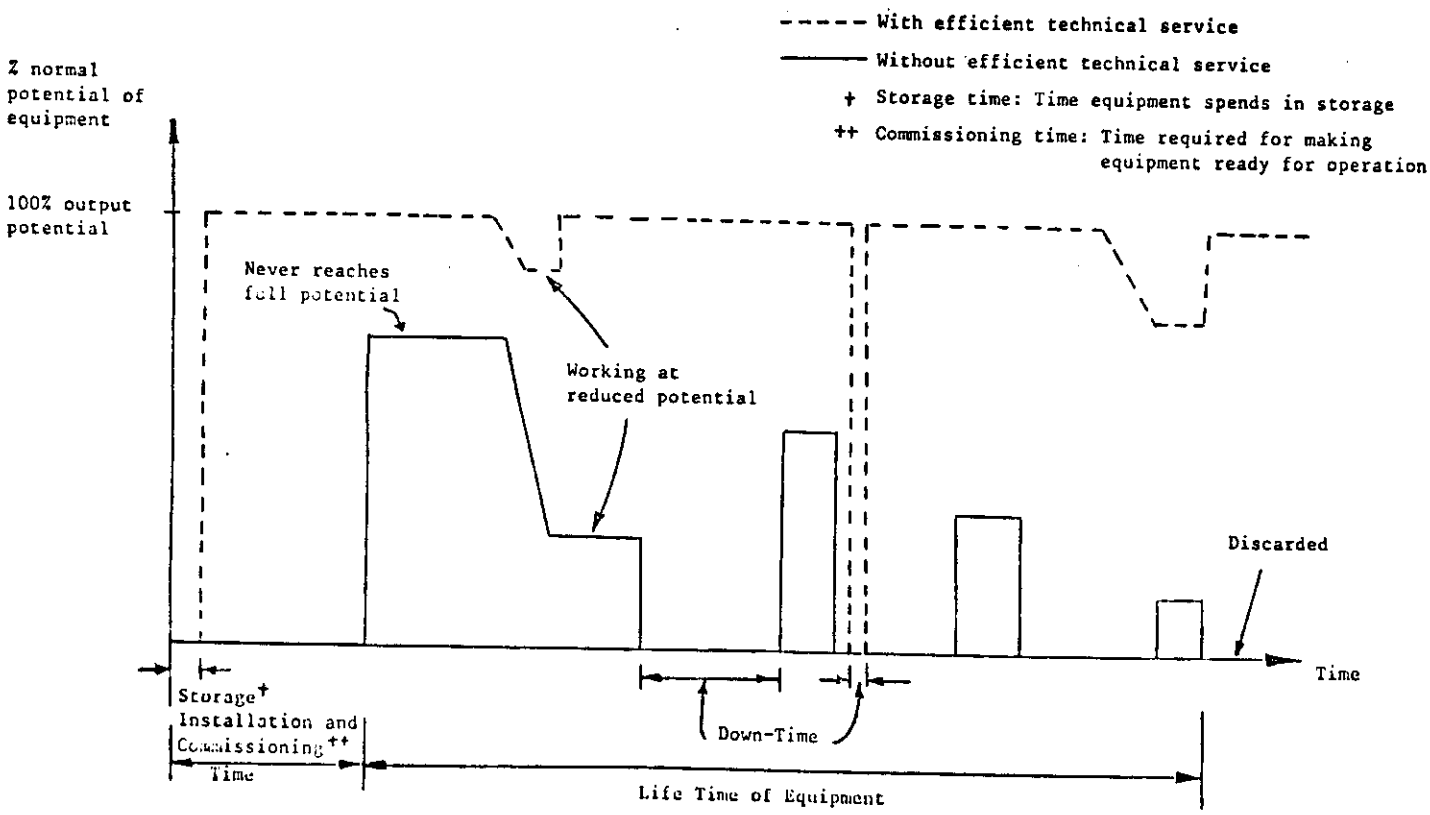


Fig. 1. Chart of Potential of Equipment versus Time

Health care technical services with their responsibility for maintenance of equipment cannot be considered in isolation from a larger health technology cycle with its complex and highly interdependent relationships not only within the health system but with a variety of other sectors such as financing, communications, transport, logistic support, national educational capabilities, mechanisms for determining wage structures and parities which

are important influencing factors for the efficient operation of health care technical services, as shown in Figure 2. The main deciding factor and final objective of the cycle are the health needs since they set the level and objectives for all other contributing parameters whose aim is to satisfy them.

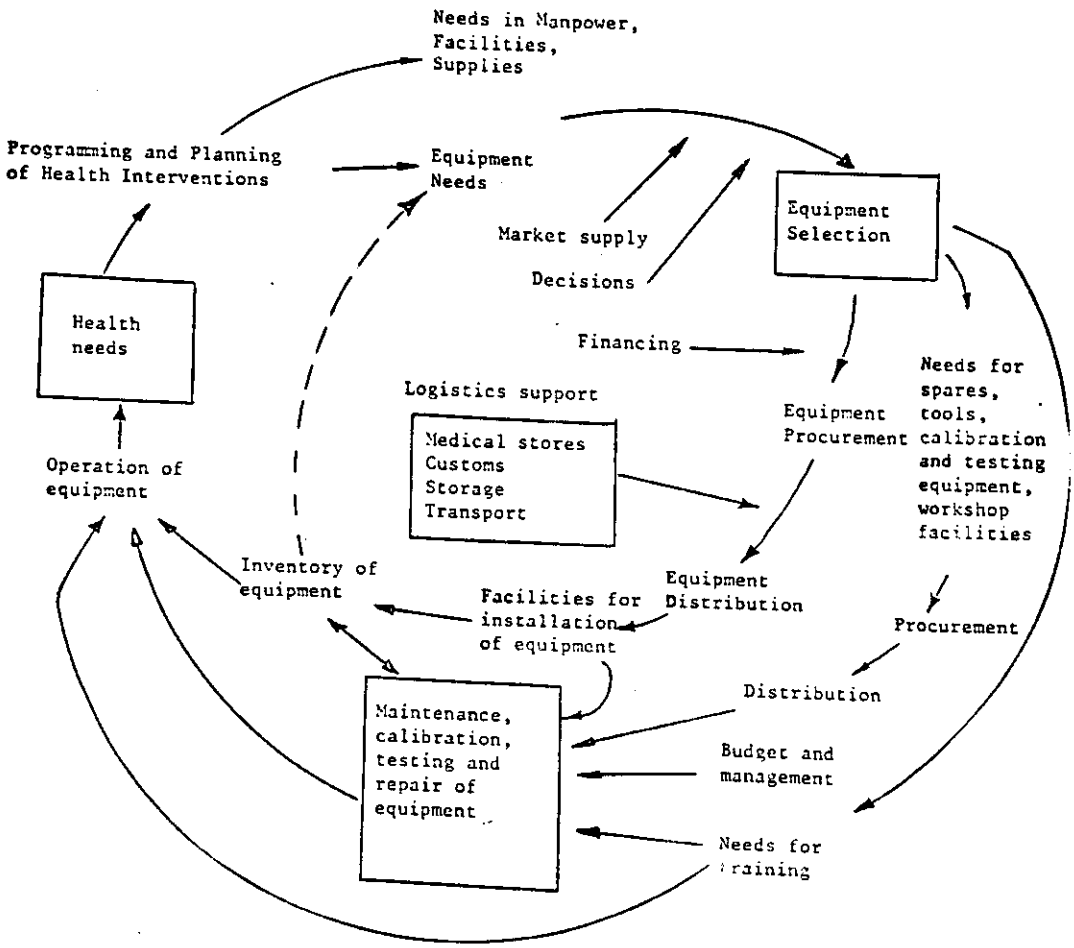
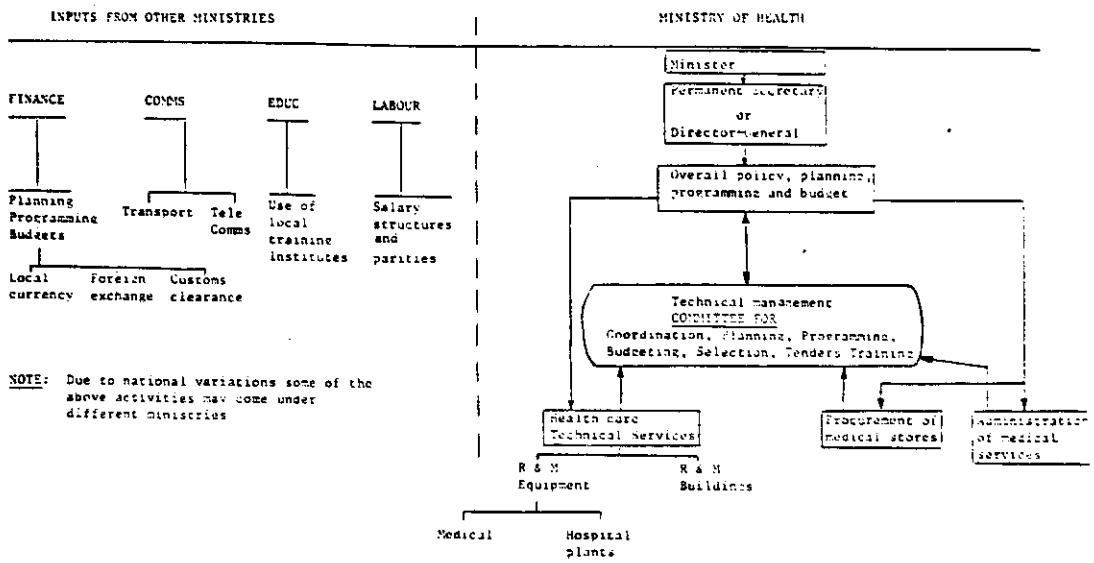


Fig. 2. The Place of Maintenance and Repair of Equipment in the Health Technology Cycle

Figure 3 gives the sample of the required infrastructure for efficient organization of health care technical services which interacts between various inputs of the health system and other sectors and delivers specific specialized outputs for which it is responsible as shown in Figure 4.

Fig. 3



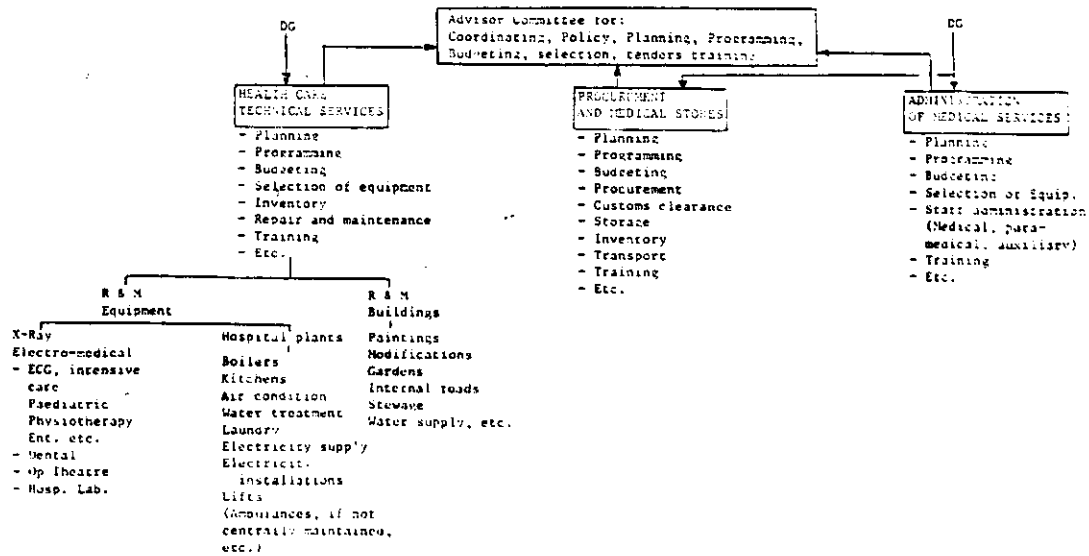
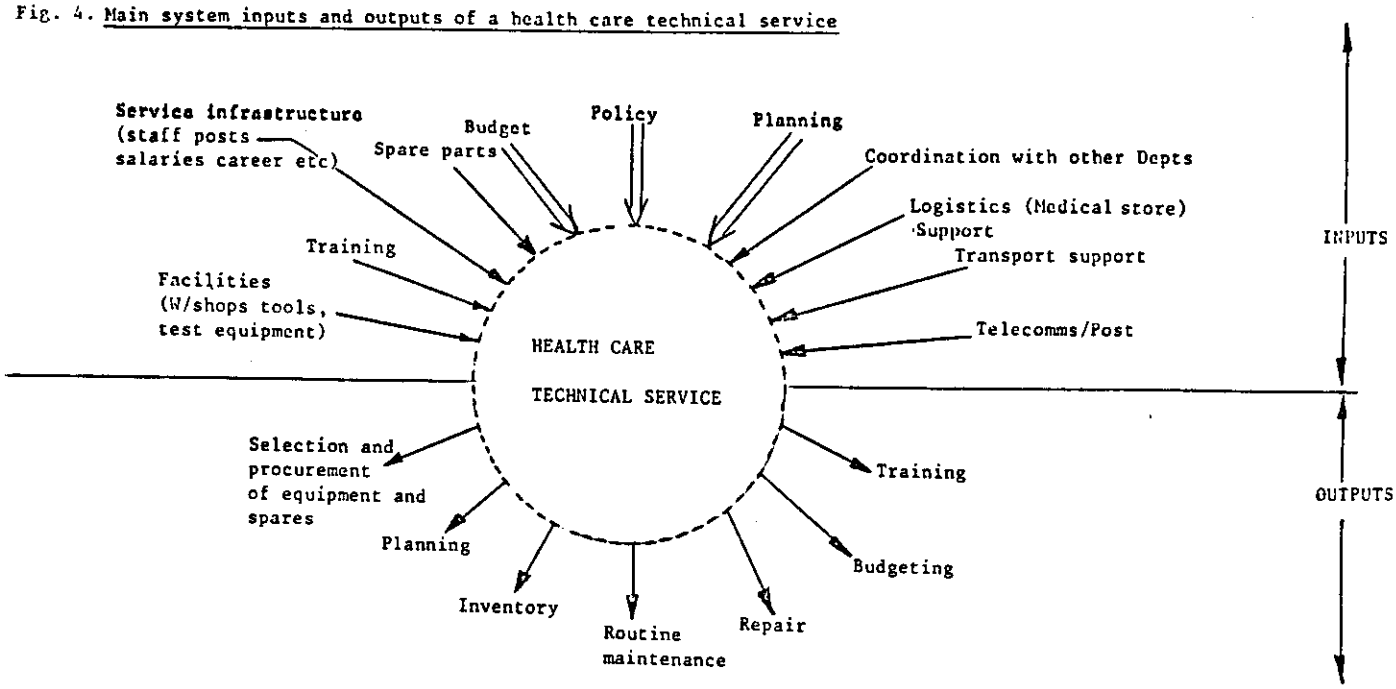


Fig. 4. Main system inputs and outputs of a health care technical service



Background document for reference and use by personnel dealing with WHO Programme for Support to Countries in the Field of Maintenance and Repair of Hospital and Medical Equipment

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The present experience shows that there are four major problems confronting developing countries:

(a) lack of organizational policy: at present inadequate awareness of the magnitude of the problem and limited expertise prevent the necessary policy, planning, funding and identification of all the necessary components that constitute the essential inputs of the problem;

(b) lack of information support: insufficient technical information exchange within the health sector and from external inputs concerning particularly equipment specifications, tenders, spare parts, manufacturers, technical manuals and data sheets, hinder the updating of technical know-how and implementation of appropriate action;

(c) ineffective health care technical services: its infrastructure, organizational capability, expertise, incentives, training, funding and collaboration with other health services, as well as with other sectors, are lacking to such a degree as to render it ineffective and inefficient.

(d) lack of manpower development and training: lack of career structures, staff development and appropriate manpower training within ministries of health inhibit human resources from fulfilling their mission, and solving of the entire problem depends, in the first place, on a comprehensive approach.

At present, many efforts and activities exist in most countries addressing one or several aspects of management, maintenance and repair of health care equipment.

During the last years WHO has been deeply concerned about this subject. In WHO headquarters and regional offices, specific activities were undertaken within the context of several programmes. A variety of approaches have been used and a number of collaborative activities with countries have been developed.

The main focus was on increasing awareness in Member States on the issues involved, including the need for dedicated specific policies and improved managerial and technical capacities; supporting the development and strengthening of national and intercountry training capabilities through establishing training institutions and organizing various courses; providing technical advice and consultancy services on organization of maintenance and repair facilities, on the selection, procurement and use of equipment.

Also, a number of collaborative activities with countries or intercountry programmes were developed by other international agencies such as IAEA, UNICEF, UNIDO, ILO, UNESCO, UNDP, the World Bank, the Commonwealth Secretariat, and by nongovernmental organizations such as IFHE, IFMBE, IHF and by bilateral development agencies.

However, assistance provided to countries by WHO, other international organizations, through multilateral development agencies or bilaterally has not been as effective as anticipated because it has not taken into account its multifaceted aspects and addressed only one or some factors of the problem with hardly any interaction, coordination or collaboration existing between the various parties involved.

In view of the growing importance given to the subject and responding to the concerns of the Member States over the lack of coordinated action, duplication of efforts in some areas with others being neglected and wasting resources in this field, the WHO Headquarters Programme Committee, in February 1986, decided to place heightened emphasis on the management, maintenance and repair of health care equipment.

A wide dialogue has been initiated both within WHO and with other agencies and institutions concerned, with the ultimate aim of making activities undertaken more systematic and coordinated.

The first WHO Interregional Meeting on the Maintenance and Repair of Health Care Equipment held in Cyprus in November 1986 highlighted existing problems and made precise recommendations in identified key areas regarding promotion of awareness, policy formulation, information exchange, strengthening of infrastructure and manpower training and thus set the scene for future action.

In May 1987, the subject received attention, inter alia, at the Technical Discussions on Economic Support for National Health For All Strategies held during the Fortieth World Health Assembly. The Assembly adopted a resolution in which it urged Member States to establish a programme for better management and maintenance of equipment.

Most recently, the importance of effective maintenance services was again stressed, inter alia, in the "Statement on Renewed and Strengthened Commitment for Health for All by the Year 2000 and Beyond" adopted at the Interregional Meeting "From Alma-Ata to the Year 2000 - A Midpoint Perspective", held in Riga, USSR, in March 1988.

As a result of these recent efforts, WHO has launched the Global Action Plan on Management, Maintenance and Repair of Health Care Equipment, based on the recommendations of the Interregional Meeting in Cyprus, as well as other generated information, which outlines the plan of action directed towards strengthening of national capabilities for the establishment and development of comprehensive systems for effective management of health care equipment as an essential part of the overall strengthening of health systems based on primary health care.

The main objectives of the Plan may be summarized as:

- formulation and adoption of policies, strategies and approaches specifically related to health care equipment, as part of the overall national health policy;

- establishment of information systems capable of receiving, assimulating and disseminating technical information to the health sector;

- strengthening of national health care technical services infrastructure;

- training of national staff, including technical managers, engineers, technicians, operators and users;

- strengthening national training capabilities, including establishment of national and intercountry training centres;

- strengthening mechanisms for exchange of information, sharing of experiences, expertise and training facilities at intercountry, subregional, regional and interregional levels.

The Global Action Plan addresses four major problem areas confronting developing countries and aims to meet its objectives by building-up common collaborative action at all levels with inputs from and benefits to all parties concerned, by facilitating WHO's liaison with other organizations and agencies involved in this area and by mobilizing resources for comprehensive, integral and coherent action.

The Global Action Plan forms an initial and essential part of a broader and longer-term action. Its implementation is foreseen as a simultaneous and complementary set of activities with other efforts in the field of health care technology undertaken and planned by various WHO programmes and other intergovernmental and nongovernmental organizations, with WHO ensuring close liaison and promotion of coordination of such activities.

Recommendation No. 13 of the Alma-Ata International Conference on Primary Health Care reads "that governments ensure that efficient administrative, delivery and maintenance services be established and that suitable and sufficient supplies and equipment be always available at all levels in the health system". In view of the importance of the contribution of effective management of health care equipment to the effectiveness and efficiency of the overall health system and finally to the national strategies for health for all, joint collaborative international action is essential for strengthening national capabilities and achieving countries' self- sufficiency in this complex area.