STRATEGY AND PROPOSED ACTION CONCERNING MAINTENANCE AND REPAIR
OF HOSPITAL AND MEDICAL EQUIPMENT

by

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This report has been prepared in response to the feedback received from field workers and governments concerning the lack of equipment repair and maintenance policies and action, resulting in inadmissible wastage of resources.

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1. INTRODUCTION

1.1 The problem

The widespread use and influence of technology in health care is a reality that can not be ignored nor isolated from the strategies developed with the aim of achieving the goal of Health for All.

In an essentially interacting and interdependent health care system, this situation has generated and has resulted in an inadmissible wastage of resources, mainly due to the lack of expertise in formulating and implementing an appropriate policy of support and repair and maintenance of equipment.

1.2 Current situation regarding maintenance and repair of equipment in health care

Although regional and national variations exist, identifiable factors are encountered which are globally common and contribute to the above situation. The main components of the problem are the lack of clear national commitments, policy and action in vital areas such as forecasting, planning and execution of policies. The situation is further aggravated by inadequate financing of facilities, infrastructure and expertise. Lack of foreign exchange availability, compounded with the lack of standardization of equipment, results in inadequate supplies of spare parts. Another parameter is the inadequacy of manpower expertise, training and career prospects both at managerial and technical level resulting in inefficient implementation of policies. Due to the unavoidable intersectoral nature of the system, problems in other sectors such as transport, communications and logistics support contribute to the inefficiency of the health care system.

Policy and action aimed at improving the situation of health equipment utilization and maintenance cannot be narrowly conceived but must take into account all the contributory factors.

1.3 Economic consequences

The ineffective policy and infrastructure concerning repair and maintenance of hospital and medical equipment results in the wastage of limited national resources in local as well as foreign currency reserves. Detailed national data on the overall magnitude of this loss are unavailable, however, estimates for the main areas of waste, from some country sources and the experiences of workers in the field, may be summarized as follows:

<table>
<thead>
<tr>
<th>Cause of waste</th>
<th>Estimate of waste</th>
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<tbody>
<tr>
<td>Purchase of technologically sophisticated equipment for the countries needs, which remains unused or partly used due to lack of skills of operating and technical staff</td>
<td>20-40% of equipment</td>
</tr>
<tr>
<td>Shorter life time of equipment due to maltreatment by operating and maintenance staff,</td>
<td>30-80% of life time</td>
</tr>
<tr>
<td>Extra modifications or additions to equipment and buildings unforeseen at the initial tender stage due to lack of staff expertise</td>
<td>10-30% of equipment</td>
</tr>
<tr>
<td>Lack of standardization resulting in increased spare parts costs and load on limited staff expertise.</td>
<td>30-50% extra spare parts costs</td>
</tr>
<tr>
<td>Down time (time of inoperation) of equipment due to inability to use or repair, no spare parts or accessories.</td>
<td>25-35% of equipment</td>
</tr>
</tbody>
</table>
- Extra purchase costs, usually in foreign exchange, due to inability to correctly specify and foresee total needs when tendering and procuring equipment. 10-30% extra cost of purchase

From the above analysis it is evident that policy and action in the field of repair and maintenance will save valuable and badly needed resources, which should be adopted as a pressing priority.

2. PROPOSED ACTION

National plans of action to deal with the equipment repair and maintenance situation in the health sector, will unavoidably have different starting points and courses of action due to inter-country variations.

However, any suggested programme will undoubtedly need two essential ingredients in order to have a chance of success:

1. At national level: a declared government policy.

2. At international level: a committed programme of cooperation and action.

2.1 Action at national level

It is essential to review present policy and introduce the necessary changes in order to provide the essential basis for any policy action adopted.

When formulating such policy, countries may note the experiences of other countries which have been encouraged and supported by WHO to act in relation to equipment repair and maintenance. In these cases WHO has supported regional training programmes, specifically designed to cover repair and maintenance of various types of medical equipment. In parallel with this effort, collaboration has been provided at country level through resident technical officers who have initiated training and have specifically helped in setting up and equipping workshops located at central or district level. The latter also cover the needs of the sub-centres and posts in their districts.

In countries where this effort has been seriously undertaken and policy and funds have been committed the situation has shown an encouraging improvement.

However, many countries around the globe have not as yet actively engaged in programmes designed to tackle the problems already described.

Emphasis should be given to certain areas concerned with repair and maintenance, particularly in the identification of the essential mechanisms required in order to establish health care technical needs and provide for adequate advanced planning and financial inputs. A starting point may be the evaluation and recording of the present situation concerning the repair and maintenance service (see Annex I).

The required calibre and expertise of staff at managerial and technical levels must be ascertained and suitable staff appointed to key posts and be given specialized training. Advantage of already available specialist training courses on repair and maintenance of medical equipment should be made (see Annex II).

The needs and infrastructure of a health care technical service,* of supporting services, such as procurement and medical stores, and areas where specialist assistance is required must be identified.

Collaboration with international agencies through bilateral agreements involving repair and maintenance projects should be sought to cover areas where specialist input is considered necessary.
2.2 Action at international level

In order to provide maximum impact in the shortest possible time it is necessary that WHO adopts a plan of action which strengthens and complements national efforts. Such international level action may be implemented through the establishment of a Global Advisory Group which would regularly review repair and maintenance policies and achievements. At Headquarters and regional level the strengthening or creation of focal points concerned with repair and maintenance would enhance and facilitate action. Initial action may concentrate on the presentation of the various aspects of repair and maintenance through information seminars and encouraging the participation in available training courses. Also collaboration in carrying out detailed situation analyses at country level on repair and maintenance will enable the collection of useful information and data on which follow-up collaborative action may be based. The last area of action can be in the promotion and encouragement of collaboration among countries in training on appropriate technology and exchange of experiences under the umbrella of Technical Cooperation among Developing Countries (TCDC) and with other UN agencies, initially using as nuclei the existing training establishments.

Having initiated action and following the assessment of results in the longer term, programmes may be initiated, as appropriate, in areas concerned with legislation, safety, calibration and testing of medical equipment.

3. ACKNOWLEDGEMENTS

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* Health care technical service: department set up to deal with all aspects of repair and maintenance of hospital and medical equipment.
ANNEX I

Questionnaire concerning the situation of repair and maintenance of hospital and medical equipment

The following questionnaire must be filled in as accurately as possible and returned to WHO the earliest possible so that an initial assessment of the situation concerning repair and maintenance in the country may be made.

Country: .................

Submitted by: .................. Date: ..................

1. Is there a health care technical service dealing with repair and maintenance of medical and hospital equipment available.

   NO: ____ YES: ____

   If YES, please give following details:

   - Under whom does it operate?
   - How many staff employed?
     - Engineers:
     - Technicians:
     - Craftsmen:
     - Others:

2. Annual budget allocated to:

   Repair and maintenance:
   Spare parts:
   Purchases of equipment:

3. Type of training, if any, received by staff of health care technical service. Please specify:

   Type:
   Duration:
   Place:
   Speciality:

4. List number of workshops available in your country in order to carry out repair and maintenance. Please specify:

   In capital city:
   In district capitals:
   In rural areas:
   Other:

5. Is there an inventory of equipment?

   NO: ____ YES: ____

   If YES, could you please specify number of:

   - X-Ray equipment:
   - ECG and intensive care:
- Operating theatres:
- Dental units:
- Hospital laboratory equipment:
- Other:

6. Specify type of maintenance and repair approach:

- Routine maintenance (give examples if possible):
- Emergency repair only:
ANNEX II

Availability of Training Centres

1. At present training centres operating on a regional or national basis exist in:

- Cyprus
- Iraq
- Syria
- Bahrain
- Egypt
- Pakistan
- Sierra Leone
- India
- Manila
- Lyon
- Several countries in AMRO

The centre with the longest and continuous record of work is the Regional Training Centre in Cyprus and its courses cover many aspects of standard medical equipment found at primary health care level but also at main hospitals.

The courses given below are based on the Cyprus experience in which emphasis is placed on training in the following areas:

- General (polyvalent) technicians (10 months): First line technician carrying out supervised routine and simple repair and maintenance work.

- Specialised technician courses (5 months) in:
  Diagnostic X-Ray
  Dental equipment
  Operating Theatre Equipment
  Electro-medical equipment
  Standard hospital laboratory equipment

The above training is for higher level technicians able to carry out unsupervised routine work and under professional supervision and technically more complicated work.

Address of Cyprus centre: Regional Training Centre
Higher Technical Institute
P.O. Box 2423
Nicosia
Cyprus

Telex: 4070 RTCENTER CY
Cables: HTINICOSIA

The addresses of the other centres may be obtained from their respective regional offices.
Policy makers and other high level managers in ministries of health should participate in these seminars in which the following would be explained:

Explaining the advantages of bilateral projects between WHO and governments on repair and maintenance in order to promote the setting up of repair and maintenance infrastructure and save resources.

Particular emphasis should be given to the following areas:

- Need for R & M and ultimate savings
- Training fellowships for suitable staff
- Setting-up of pilot workshops
- Equipping workshops with tools and test equipment

However in order to implement such a project governments should assist in the completion of the questionnaire given in Annex I.

Follow-up agreements will ensure the strengthening of the R & M effort and special assistance will be offered to countries who manage to fulfil satisfactorily the provisions of the original project agreement.

The main role of technical managers post at ministries of health are to:

i. Liaise between health care technical service and high-level ministry management.

ii. Coordinate national or district action in selection and procurement, training, logistics, etc., and act as focal reference point for the various agencies involved (i.e., engineering, medical stores, building services).

iii. Estimate and submit budgets for approval.

iv. Formulate policy for planning, training, spare parts and logistics support.

v. Determine medium and long-term needs and programming, etc.

Suitable courses may be run at selected collaborative centres for engineers requiring management experience or for managers requiring technical background. The former may be a more suitable candidate.

The level of the post should be that of a middle management grade, i.e., equivalent to assistant director of services.