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INTERREGIONAL MEETING ON THE DEVELOPMENT AND STRENGTHENING OF LOGISTIC SUPPORT TO PRIMARY HEALTH CARE INCLUDING COMMUNICATIONS AND TRANSPORT

10-14 June 1985, Ottawa, Canada

(1985, Ottawa)

Contents

ABBREVIATIONS USED

AMREF	African Medical Research Foundation
CIDA	Canadian International Development Agency
HFA	Health for All by the Year 2000
NGO	Non-governmental Organization
PHC	Primary Health Care
PVO	Private Voluntary Organization
TCDC	Technical Cooperation among Developing Countries
ECHO	Equipment for Charity Hospitals Overseas
IDA	Agency for International Development

1. INTRODUCTION

The Interregional Meeting on the Development and Strengthening of Logistic Support to Primary Health Care including Communications and Transport was held in Ottawa, Canada, 10-14 June 1985. The Meeting was organized by the World Health Organization, Division of Strengthening of Health Services, and hosted by the Government of Canada, Ministry of National Health and Welfare.

1. Opening Session

At the opening session Dr. E. Tarimo, Director, Division of Strengthening Health Services, on behalf of Dr. Mahler, Director-General, WHO, and Dr. Macedo, Regional Director, AMRO, welcomed participants and thanked the Ministry of Health and Government of Canada for hosting the meeting.

Dr. Tarimo noted that countries are facing enormous problems in providing the logistic support for health services which is critical in achieving Health for All by the Year 2000. Although logistics is accepted as an essential element in PHC, it is an area often characterized by neglect, haphazard operations and crisis intervention, rather than planned intervention. Concern was voiced about each of the major components of logistic support. Central warehouses and medical stores are often physically inadequate and inadequately managed; handling and distribution of critical supplies often face delays, spoilage and other losses; problems with maintenance and repair of equipment and vehicles result in considerable waste; and so on.

The management of health sector logistic systems is inextricably linked with the overall development of a country, but within the constraints of underdevelopment, there is much that can be done by countries. Innovative country experiences and WHO activities have achieved some successes in areas such as Essential Drugs, the Expanded Programme on Immunization, and the Control of Diarrhoeal Disease. In the area of procurement of critical supplies, for example, the WHO concept of essential drugs is proving to be of tremendous help to countries. Similar attempts have been made for critical equipment and facilities, but much more needs to be done.

Dr. Tarimo indicated that WHO was looking forward with great interest to the outcome of this interregional meeting, which was organized to draw on the extensive experience of the participating countries and organizations to achieve the following objectives: (1) to identify priority areas in which action and changes are required to strengthen logistic support for PHC; (2) to identify innovative approaches which participating and other countries have found for solving logistic problems; and (3) to define areas where WHO and other agencies can support country efforts.

In opening the meeting, Canada's Minister of Health and Welfare, the Honourable Jake Epp, extended a warm welcome to participants, and was confident that the gathering of experts at the meeting would lead to constructive discussion on important areas of health care delivery. He indicated that logistic support for the health sector is an area that has not received adequate attention in the past, either by countries or by WHO. He hoped that the meeting would begin a process of correcting the deficiency, as good logistic support was essential for the achievement of the goal of health for all by the year 2000. The meeting could serve to highlight some of the critical issues that militate against effective and efficient logistic support of the health sector.

Mr. Epp observed that the Canadian experience exemplifies some of the difficulties of providing logistic support to health services. While developed countries have solved many logistic problems, he acknowledged that Canada certainly does not have all the answers. For example, the problem of referring patients from small northern health units to larger urban service centres is made more acute by geographic and climatic factors. He pointed out that the human resource component of logistic support is often overlooked. Few resources are used to train and upgrade the skills of people providing logistic support to the health sector.

The Minister noted that another problem area is the upkeep and maintenance of equipment. In developing countries, costly capital items including buildings and equipment obtained through bilateral aid or multilateral agencies sometimes operate poorly because of shortages of spare parts and maintenance skills. What can be done? For one thing, effective logistic support depends on the standardization of equipment. In Canada standardization of X-ray machines and heating furnaces has been achieved in the North. Many developing countries often take whatever equipment they can get and hope for a few years' use before it is beyond repair. Both donor and recipient countries have a responsibility to try to ensure compatibility of new equipment with that already in hand. WHO has completed some work on standardization related to essential drugs and X-ray equipment. He asked if WHO could produce catalogues of medical equipment and supplies that are safe, reliable and cost-effective. This would be a mammoth undertaking, but one which would be well worth exploring.

In conclusion, the Minister indicated that the issues he raised barely scratch the surface of logistic support problems in the health sector. He hoped the meeting would address the more critical issues and arrive at recommendations which would lead to improved logistic support in the delivery of PHC.

2. Participation and Organization

The meeting was attended by participants from 15 countries representing all WHO regions and observers from UNICEF, CIDA and AMREF. The list of participants appears in Annex B. Dr. M. M. Law, Associate Deputy Minister, National Health and Welfare, Canada, was elected Chairman, Dr. J. M. Bob'oyono, Cameroon, Vice-Chairman, and Dr. J. D. Quick, USA, Rapporteur.

The meeting worked in plenary as well as small groups. Annex C lists the composition of the working groups, and Annex D indicates the programme of work.

II. COUNTRY EXPERIENCES

Following the opening plenary session, country reports were presented by participants from each of the fifteen countries represented at the Meeting. Each report provided an overview of health care systems within the country, then focused in detail on experiences related to logistic support for health services. Major problems as well as solutions and innovations were discussed. The presentation of individual country experiences provided the context for the rest of the week's deliberations.

The experiences presented ranged from attempts to improve overall logistics in the health sector in countries such as Sudan and Zimbabwe, to the mobilization of health and other sector logistic support for a countrywide immunization campaign in Colombia.

There was a great similarity in the type of problems identified, although emphasis varied. Communications and transport were special problems in the Bahamas, Indonesia and Sudan and parts of Canada. Shortage of funds was specifically mentioned in the case of Zambia where a budget of $17,000,000 had been allocated for the purchase of drugs while the need was estimated at $40,000,000. The health infrastructure was considered to be adequate in a number of countries such as the Bahamas, but what is now needed is improved logistics and better management. In Zimbabwe there has been extensive expansion of the health infrastructure since independence, and some 200 new rural health centres have been built in the last few years. The challenge is now to strengthen the logistic system. This should include improved communication between health centres and referral levels.

Innovative experiences outlined included: deployment of different mechanisms to coordinate action in logistics (Cameroon); use of two-way radio communications (Canada, Indonesia, Thailand); standardization of drugs (Cameroon, Canada, Malaysia, Zimbabwe); standardization of equipment (Canada, Chile, Malaysia); use of community pharmacies (Sudan); training programmes (Canada and Jamaica); and decentralization of logistics activities (Finland).

More detailed country examples are cited in the following section in relation to specific key issues. Volume II of this report contains summaries of the experiences of the participating countries.

III. KEY ISSUES IN STRENGTHENING PHC LOGISTICS

Logistics can be defined as the process of procuring, storing, transporting and maintaining supplies and equipment. It is an essential component of the health system infrastructure without which it would be difficult, if not impossible, to deliver health services. Fourteen major functional areas were identified (Table 1). These fourteen areas provided the framework for the discussion of key issues.

After the presentation of the country experiences the focus of the meeting turned to systematic discussion of the key logistics issues in plenary and working group sessions. To facilitate discussion, topics were divided into three main areas: logistics management, communications and transport.

Several themes were common throughout all of the discussions. The first theme was that of logistics as a system; it requires the coordinated efforts of many administrative and technical units both inside and outside the government. Unless these units are working together in a coordinated way as a system, logistic support will be disjointed and inadequate. But logistics should not be viewed as an independent system. Instead, it should be viewed as an integral part of the national health system, including the logistics component of EPI, malaria control, communicable disease control and other traditionally vertical programmes.

TABLE 1 *

Logistic System Activities

1. Planning and Budgeting
2. Procurement
3. Receipt and Inspection
4. Storage and Warehousing
5. Inventory Control
6. Requisition and Distribution
7. Transport
8. Maintenance and Repair
9. Communications
10. Environmental Management of Health Facilities
11. Records and Reporting
12. Training and Supervision
13. Research and Evaluation
14. Role of Computer Systems

*Adapted from WHO: How to Assess Health Services Logistics, (Draft), Geneva, April 1985.

It was recognized that, although development of vertical logistic support efforts was critical at times, the effort often appeared to be less cost-effective than a more streamlined, integrated approach. An effective logistic system requires an intersectoral approach for optimal use of available resources, including financial resources, human resources, equipment and facilities, transport and communications.

Emphasis was placed on making optimal use of the private sector, local and international private voluntary organizations (PVOs), local universities, and, of course, donor agencies. Planners and implementers should attempt to achieve the most efficient, effective balance between the use of public sector and private sector capabilities. Private sector procurement, storage, transport and servicing capacities should be used whenever they offer clear economic and other practical benefits. PVOs and other types of non-government organizations (NGOs) can provide various types of support, including, for example, assistance with training programmes. Local universities and technical schools can assist in areas such as specialized quality control testing and translation of technical manuals.

A final theme was the need to involve all levels of the health system in the planning and implementation of a successful logistic support system. This involvement should begin at the community level where health services are ultimately delivered and extend upward to include peripheral health facilities, intermediary health facilities and central institutions.

1. Logistics Management

The discussion on logistics management identified eight critical areas for the development and strengthening of logistics for PHC: (1) policy and planning, (2) logistics operations management, (3) training in logistics, (4) procurement strategies, (5) information support,
(6) maintenance and repair of equipment, (7) storage facilities, and (8) monitoring, evaluation, and operations research. In each of these areas basic strategies were identified, and wherever possible specific country examples were cited.

1.1. Policy, Planning and Budgeting

Many countries noted a lack of a specific policy and plan regarding logistics. In fact, logistics is often the most neglected component of PHC.

1.1.1 Policy and planning

A comprehensive logistics policy should be considered as an essential component in any overall national health development programme. Such a policy should be based on an assessment of the logistic requirements for a particular country and should build on the existing infrastructure. The logistics policy should address financing, human resources development (manpower planning), the role of non-government organizations, the question of centralization versus decentralization of individual logistics activities, mechanisms for intersectoral cooperation and the need for contingency and emergency plans. A realistic logistics policy would require the collaborative efforts of each ministry and department which has a major role in supply activities, including health, financing and planning.

It was suggested that any comprehensive logistics policy should also should consider a pricing policy for essential medical supplies, equipment, and drugs. Particularly with respect to essential drugs, unjustifiably high prices can substantially reduce a programme's purchasing power and thereby result in a seriously reduced supply of essential drugs.

Several different national experiences in logistics were cited. Cameroon, Canada and Finland described the value of community-based participation in planning and implementing logistic support activities. In Indonesia systematic health planning, which includes planning for the logistic system, is included in the HFA plan as well as the national five-year plan. In Colombia a rapid and substantial increase in EPI coverage based on a significant intersectoral effort to coordinate planning, supply, and transportation, demonstrated the benefits of an established logistic infrastructure in support of PHC as well as the benefit of high-level national support. In isolated regions of northern Canada an analysis of transportation alternatives led to a successful policy of contracting all transportation requirements to the private sector. Finally, in Malaysia, health planning, which includes logistics, is the responsibility of a Ministry of Health Planning Committee and an Interagency Planning Group on Social Services at the level of the Prime Minister's Department.

1.1.2 Finance

Finance was identified as a critical area for logistics planning. Careful budgeting and efficient management of human and material resources is necessary to obtain the greatest benefit from available financial resources. At the same time, some logistics activities may have the potential for self-financing. This is particularly true with essential drugs, where there is a demonstrated willingness of patients to pay for medicines. Examples were cited of community pharmacies in Haiti and Sudan and community drug funds in Indonesia and Thailand. In Mali, some health centres generate funds for medical supplies by charging modest fees for certain medical services.

1.1.3 Donor Role

The central role of donor agencies in planning and budgeting for logistics activities is clearly recognized. Donor agencies are particularly important in the supply of equipment, vehicles, facilities and, in many cases, essential drugs. Unfortunately, logistics operations in many countries have been severely hampered by inappropriate or multiple models of equipment and vehicles which result from bilateral aid tied to donor-country purchasing. Recently, however, some donors have demonstrated an increased willingness to relax such restrictions. Experiences to date indicate that if equipment and vehicles can be purchased on the basis of local serviceability, rather than donor restrictions, they will be better maintained and last substantially longer.

1.1.4 Incentives

Finally, logistics policy and planning needs to consider the incentives and accountability for improved logistics performance. Logistics typically involves low status and low paying jobs, and, not surprisingly, the result is a low level of performance. Several options were identified for increasing the prestige of logistics and encouraging improved performance. These included (1) creation of leadership positions in logistics; (2) creation of job titles which better reflect the importance of logistics; (3) creation of a career ladder in areas such as supply and maintenance; and, where possible, (4) increasing wages. Indonesia and Sudan both reported improvement in their logistic systems when regional or provincial supply officers were appointed and given responsibility for specific logistics activities.

1.2. Logistics Operations Management

Logistics operations management refers to organization of the logistics system, staff responsibility, assignment of work and management of the other tasks in the logistic cycle. This includes the management of procurement, receiving and inspection, storage and warehousing, inventory control, distribution and transport, records and reporting and supervision.

Some participants raised the question as to whether the basic problem with the logistics systems was one of inadequate resources or inadequate management of available resources. Although there was no universal answer to this question, it was clear that many logistics system improvements depend more on improved management of existing resources than on acquiring additional funds.

Participants noted that responsibility for different logistics functions is often divided among several governmental and sometimes non-governmental agencies. Furthermore, lines of authority are not always clear. This division of responsibility and lack of clear authority can seriously undermine efficient logistics system operation. Thus, it is important for countries to review their tables of organization as they apply to logistics activities and determine whether logistics functions are organized in the best possible way.

Establishing basic operating procedures is an essential step in logistic planning and operations management. Some countries noted that procedures for procurement, distribution, and other logistics activities are outdated and, as a result, these procedures complicate rather than expedite the supply process. In other countries, there are no formal procedures for everyday logistics activities such as determination of order quantities, inventory control and transportation scheduling. Some of the references listed in Annex A provide specific guidance for preparing or evaluating logistics operations.

Some of the most important procedures are those related to reducing waste. Beginning with port-clearing procedures and continuing through procedures for using supplies and equipment at health facilities, it is essential that logistics managers institute and observe procedures which minimize spoilage, pilferage, expiration and other losses. Given economic realities, it may be impossible to eliminate certain kinds of losses, but losses due to spoilage, expiration and neglect can and should be minimized.

Finally, an improved table of organization and appropriate operating procedures will not have their desired impact without training and regular supervision of all levels of staff concerned with logistics activities. Day-to-day staff supervision was noted by participants to be one of the most essential, but frequently deficient, components of effective logistics operations management.

1.3 Training in Logistics

Training was considered one of the most critical factors in strengthening logistics for the health services. Training needs exist at all levels of logistics personnel including planners, managers, supervisors and health workers.

Pre-service training for new staff, as well as in-service or refresher training for current staff, is needed. Training is particularly needed in logistics management, determination of drug and supply requirements, procurement, warehouse management, transportation, transportation planning, maintenance and repair of vehicles and equipment and vehicle operation.

Training resources need to be identified and developed at the local, national and international levels. Individual countries need to develop the capacity to train their own trainers in areas such as stock management and maintenance. It was noted that many useful training materials already exist, including a WHO/EPI series on Logistics and Cold Chain for PHC and the WHO/CDD series on Control of Diarrhoeal Diseases (Annex A). These materials can be expanded and modified to incorporate other elements of primary health care logistics.

The participants emphasized that training has to be approached as a continuing process and not an isolated event.

Also recognized was the importance of sharing country experiences. In recent years the South East Asia Region has acquired useful experience in regional cooperation for training in maintenance and repair of electro-medical and biomedical equipment. In Zimbabwe, EPI coverage improved after training programmes were held. Thailand has developed materials and training curricula in the maintenance of motor vehicles, refrigerators and other electrical equipment. Jamaica has developed training modules in stock control, procurement, warehousing, budgeting, accounting and general management.

1.4 Procurement Strategies

Within the overall logistics policy, one of the most critical elements is the procurement policy. As with overall logistics policy, procurement policy must be developed jointly with other Ministries involved in the procurement process, especially with the Finance Ministry.

Several issues were discussed in the procurement area: the establishment of realistic expectations of what can be supplied, standardization, centralization vs. decentralization of procurement, the role of local production, the importance of serviceability in equipment selection, the use of international procurement services and the importance of quality assurance programmes.

Special consideration was given to the issue of importation that requires hard currency, given the economic crisis confronted by most countries. There was a consensus that realistic levels of service have to be established with respect to essential drugs and vaccines, medical supplies and equipment.

1.4.1 Standardization

Standardization of essential drugs, medical supplies, equipment and vehicles was strongly advocated by many participants. Standardization generally simplifies supply management and reduces inventory costs and wastage. It is also crucial in providing maintenance and repair services for equipment and vehicles. It is very difficult to maintain

a spare parts inventory and to have trained maintenance staff for the huge variety of equipment and vehicles which can accumulate in a health care system - especially with donor-imposed restrictions on supply sources.

Standardization is not always easy. It often requires the collection of information from the user regarding the best product selection. Standardization of equipment or vehicles may require agreement from the central purchasing authority since routine open-tender procedures cannot always be followed. One disadvantage in standardization is that suppliers may raise their prices once they know their products are accepted as the standards. Nevertheless, most experience with standardization of essential drugs, medical supplies, medical equipment and vehicles, is favourable.

Cameroon, Canada, Malaysia, Zambia and Zimbabwe have all had experiences with the standardization of drug procurement with restricted essential drug lists. In Chile standardization of medical supplies and equipment has proven beneficial for the Central Procurement Agency. In isolated areas of Northern Canada where transportation and servicing is extremely difficult, standardization is considered a key element in the success of the logistic system.

1.4.2 Centralization versus decentralization

Another important issue in procurement is that of centralization versus decentralization of procurement. Centralization generally leads to the economies of scale associated with bulk purchasing and distribution. But centralized procurement can also involve a certain degree of "mis-management of scale" in the form of long lead times, unreliable delivery, and reduced user control over the products being purchased. Participants, citing the advantages and disadvantages of both centralized and decentralized approaches to procurement, concluded that there is no universally preferable procurement strategy. Programmes should draw on their own experiences and the experiences of others to establish procurement practices which best suit their own needs.

Several country experiences highlighted the advantages of centralization, while others demonstrated advantages in decentralization. In Malaysia the procurement of essential drugs and medical supplies is highly centralized, and with efficient management and a good infrastructure, the system appears to work quite well. In Chile mandatory procurement of drugs and medical supplies through the Central Procurement Agency resulted in laxity on the part of the procurement agency. Several years ago the system was changed to make procurement through the purchasing agency optional, with the result that the Agency had to compete with the open market. The Purchasing Agency was stimulated to obtain better prices and payment conditions. In Finland there is a mix of centralized and decentralized policy and budgeting, but all procurement has been decentralized to municipal health centres and hospitals. In Sudan, community pharmacies are encouraged to buy directly at the local level because of the difficulty involved in centralized procurement and distribution.

1.4.3 Local production

Procurement policies should also address the issue of local production. Local production can reduce foreign exchange requirements, lower procurement costs, and contribute to increased self-reliance -- provided that raw materials are available at a reasonable price and the production process is reasonably efficient. When these conditions are not met local production can lead to higher costs and more frequent shortages. Incentives for local production can be written into the procurement policy and other national regulations.

Experiences with local production were varied. In Malaysia the Ministry of Health runs a large pharmaceutical production facility with unit costs considerably below those which are obtainable with bulk procurement. In contrast, locally produced or packaged essential drugs and vaccines in Indonesia have often been considerably more costly than equivalent imports.

1.4.4 Serviceability

The importance of equipment and vehicle serviceability should also be reflected in the procurement policy. An inexpensive piece of equipment which cannot be serviced locally may prove considerably more expensive in the long run than a higher priced piece of equipment which has good local service support. Standard tendering procedures may need to be modified in order to reflect the critical importance of the serviceability in the selection of health care equipment. This can be done by specifying in the tender document the level of service required from the supplier.

1.4.5 International procurement services

The importance of international procurement services should be recognized. UNICEF, WHO, ECHO, IDA, and Action Medeor are among the services which provide essential drugs and medical supplies at highly competitive bulk rates. These organizations do not generally respond to open tenders, and they have certain restrictions regarding payment and eligibility. Therefore, special provisions in procurement policies may be needed to take full advantage of these services. Even if countries choose not to buy from them, knowledge of their prices can help in negotiating local purchases.

1.4.6 Quality assurance

One requirement of any procurement system is that it assures the quality of drugs, medical supplies and equipment. The WHO Certification Scheme on the Quality of Pharmaceutical Products Moving in International Commerce represents a significant but underutilized mechanism for controlling the quality of essential drugs.

1.5 Information Support

A common problem for planning and management of logistics in many countries is the lack of usable information with which to manage the system. Information requirements for logistics management should be identified and integrated into the total health information system. In addition to basic health system data on epidemiology, health facilities and health manpower, logistics management requires information on drug and vaccine utilization, equipment and vehicle inventories, spare parts requirements, maintenance requirements, vehicle life and related information.

Several countries noted the problem of estimating essential drug requirements. Data on past consumption were either absent, incomplete or misleading. Health problem data needed to make an epidemiologically based estimate of drug requirements were similarly felt to be incomplete or misleading.

Few examples were cited of health information systems which were able to provide needed information for logistics management and decision-making. Microcomputer technology offers a potentially useful tool for organizing and analysing logistics information. Presently the Bahamas, Jamaica and Malaysia are in the process of computerizing drug supply information. In recent years Chile's Purchasing Agency, which serves the Ministry of Health, has simplified planning and inventory control through computerization. Examples were also cited of microcomputer applications for district-level training in rational drug supply (Indonesia), provincial-level estimation of drug requirements (Morocco), and national-level transportation management (Haiti).

1.6 Maintenance and Repair of Equipment

The lack of adequate maintenance and repair was cited as the major cause of equipment and vehicle breakdown and one of the major causes of the short field-life of medical equipment and vehicles in many developing countries. Several strategies to improve maintenance and repair were identified including the following:

- standardize equipment and vehicles;
- establish and enforce specific preventive maintenance procedures;
- train operators of equipment and vehicles as well as maintenance staff in basic maintenance and repair;
- establish maintenance units at national, provincial and other appropriate levels in the system;
- require manuals in the native language as part of the purchasing agreement for major items or call on local technical schools to translate manuals;
- improve maintenance and repair training by the supplier as part of the purchase agreement;
- explore the possibility of maintenance contracts with suppliers, and, if feasible, include this as part of the purchase agreement;
- restrict purchasing to suppliers who have in-country service capability and who maintain basic spare parts inventories;
- include spare parts requirements in the initial purchase agreement;
- establish mobile maintenance teams for specialized types of equipment;
- consider renting rather than buying certain pieces of equipment which are hard to maintain.

Not all of the above strategies are feasible or even desirable for every country. However, where these strategies have been effectively implemented, countries have experienced improvement in the reliability and longevity of equipment.

The establishment of preventive maintenance procedures and the standardization of equipment have played a central role in maintaining medical equipment in Canada's northern areas. In Indonesia and Zambia equipment maintenance has been improved by establishing maintenance units at the national or provincial level. Chile and Indonesia have found suppliers to be initially reluctant, but ultimately willing to provide operating and service manuals in the native language as part of the purchase agreement. In the Bahamas maintenance training is included as part of the purchase agreement for certain categories of medical equipment. Finally, Thailand is experimenting, on a limited basis, with mobile maintenance units.

Participants noted that equipment and vehicle suppliers are an important and sometimes underutilized resource for service support. Suppliers can provide training in preventive maintenance and repair, and they are often willing to enter into maintenance contracts as part of the purchase contract. Suppliers who maintain an extensive inventory of spare parts can reduce the administrative and economic burden of the government having to maintain a large spare parts inventory of its own. Thus, supplier selection is an important element in a country's maintenance and repair programme.

Clearly, planning for maintenance and repair starts long before a piece of equipment or a vehicle is purchased or donated. A maintenance and repair policy should address not only spare parts requirements but all aspects of management support including equipment selection, operating procedures, training and logistics information.

1./ Storage Facilities

Most countries are experiencing or have experienced significant problems with the location, design, or maintenance of storage facilities. Warehouses are often overcrowded and disorganized; moisture control, temperature control, and pest control are inadequate; and security is frequently lacking.

Several recent efforts to improve central and regional storage facilities were described, including efforts by Malaysia and Sudan. The construction of more adequate facilities is a costly, long-term solution. But training in warehouse and stock management should lead to the more efficient use of existing storage facilities and decrease losses. Unfortunately, warehouse staff are often among the lowest paid and most poorly supervised staff. Unless performance incentives change and supervision improves, reorganization of medical stores and staff training will have a limited impact.

Where a good private infrastructure exists consideration should be given to reducing or eliminating the role of central medical stores. In Canada's Northwest Territories, for example, there is a central government procurement agent, but, to reduce expenses, there is no central store; suppliers ship directly to the user-institutions.

Participants suggested that the issue of central or decentralized stores is a critical policy issue and proper attention has to be given to it.

1.8 Monitoring, Evaluation and Operations Research

The last key area which was identified was that of monitoring, evaluation and operations research. To determine how well the logistic system is functioning it is important to establish specific performance measures such as the percentage of vaccine wasted, frequency of lack of supplies, average vehicle life, and so on. These performance measures should be established in such a way that the information system can be used to determine the level of performance which is being achieved.

Several countries observed that operations research has an important role to play in identifying areas of inefficiency and potential ways of improving logistic system performance. Malaysia and Thailand cited examples of operations research which led to streamlining and improving the efficiency of their distribution networks. Malaysia operations research identified the need for establishing a small number of regional stores which would by-pass the more numerous state medical stores. For Thailand this meant consolidating distribution channels and eliminating duplication of distribution efforts.

2. Communications

Communications refers to the ability to send and receive messages and instructions. In PHC communications can serve any of four objectives: consultation, education, administration and social interaction.

Consultation applies not only to clinical consultation about individual patient problems, but also to operational consultation about such things as vehicle maintenance and repair. The educational function can be served not only by scheduled training sessions which can be broadcast by radio and televideo systems, but also by regular supervisory telephone calls, two-way radio conferences, or telex exchanges. Many administrative announcements, directives and queries can be routinely sent via health communications networks.

Finally, the value of communications for social interaction should be clearly recognized. In circumstances where health workers are widely scattered and often physically isolated from other health workers, communications systems can play an unequalled role in supporting better interpersonal relationships and in fostering the collaborative spirit which is crucial for a cohesive and smoothly running health care team.

Thus, to maximize the value of communications systems, planners and users of these systems should keep in mind each of the four applications.

Discussion of communications issues fell into three main areas: policy and planning, operation and management and training and manpower management.

2.1 Policy and Planning

Participants noted that policy-making and planning for communications should take into consideration environmental factors, intersectoral coordination, standardization of equipment, contingency and emergency situations and confidentiality issues.

2.1.1 Appropriate communications systems

Selection of appropriate communications systems was considered to be crucial. The selection should reflect cultural, economic and environmental factors. Some countries have modern communications systems, ranging from radio communication to satellite communication and some countries have more traditional ways of communication by messengers, drums and mirrors, thus illustrating the wide range of possibilities.

In formulating communications plans, effective traditional methods should not be excluded simply because they are not state-of-the-art, nor should the latest equipment be rejected because it would require a period of training and adjustment. Instead, an effort should be made to identify the full range of available systems and to evaluate these systems on the basis of cost, feasibility, acceptability and appropriateness for the local environment.

2.1.2 Intersectoral coordination

The development of mechanisms for intersectoral coordination and mobilization of the private sector was considered a very important element. In particular, the need to coordinate with the International Telecommunications Union (ITU), with the Local Associations of Amateur Radio Operators and with other government units was emphasized. Mobilization of private sector or individual facilities was discussed and considered as an important component of any communications system.

Sharing communications equipment is another form of intersectoral coordination. Equipment which may be too expensive to justify its purchase exclusively for the health services may be economically feasible when the costs are shared with other government or non-government services. Collaborative planning should aim at assuring each of the user groups that its communications needs will be met.

2.1.3 Standardization of equipment

This was considered important not only for economic and operational reasons, but also for maintenance purposes. The following aspects were considered: the selection of the appropriate communications system, the planning for conventional and emergency situations, the critical role that communication plays in emergency situations and the need to differentiate between normal communications requirements and emergencies. Importance was given to the different sources of power for the system as a factor in the selection and use of communications networks.

2.1.4 Contingency plans for emergency situations

It was noted that communications has a critical role to play in emergency situations. Yet without prior planning, this role may be negated by the circumstances of the emergency. In disaster situations, for example, the public telephone system is frequently useless; if it has not been rendered inoperable by the disaster, the lines are jammed by people calling hospitals, government agencies or family members. Thus, alternatives to telephone communication must be identified in advance. Similarly, other types of communications equipment which rely on electricity may be useless unless emergency power is available. In sum, contingency plans for emergency situations should be developed as a specific element in communications policy and planning.

2.1.5 Confidentiality

Finally, if communications will involve information about individual patients, policies and procedures must be developed to protect the confidentiality of this information according to medical ethics. Coding systems are one approach to maintaining confidentiality. Any such system must be developed within the context of local laws, which in some countries prohibit encoding of telephone, radio and other forms of communication.

2.2 Operation and Management of Communications Systems

The operation and management of communications systems requires the development of operating procedures, budgeting and accounting systems and maintenance procedures. Operating procedures should include guidelines covering authorization of usage, use of communications logbooks, confidentiality, and specific responsibilities for system users. When multiple communication channels are available - as in Chile, for example, where health facilities may have access to telephone, telex and the postal system - guidelines may be needed to help users determine the most cost-effective use of different channels under various circumstances. Such guidelines might specify long-distance use of the telephone only for patient care emergencies, use of telex for supply and equipment emergencies and so on.

Two very important considerations in the operation of communications systems are the selection of specific equipment and maintenance.

2.2.1 Selection of specific equipment

As noted above, the communications policy should support the concept that the selection of equipment should reflect cultural, economic and environmental factors. The seminar noted the following advantages and disadvantages of common communications possibilities.

Radio has the advantage of being independent from other public systems, of having immediate and direct access between stations, and of covering a long range. Potential disadvantages include difficulty in maintenance, staff training requirements, possible high cost and lack of detailed written records of use. In some circumstances proper use and maintenance of a radio will require a full-time operator. Rapid developments in radio communication, particularly the advent of cheaper, more robust transmitters and satellite connections, suggest an even greater future role for radio.

The advantages of telephone are also immediate access and its long range. It may be cheaper than radio, depending on existing telephone networks. Potential disadvantages of telephone are that it is a public utility, it is often unreliable, it is usually not available at the periphery, and there is no visible record of communication. As more countries begin to use satellites for their domestic telephone services, use of the telephone, at least between major cities, should become more reliable.

Postal service has the advantage that it is generally cheaper than radio and telephone, it provides a written record, it is more likely to be available at the periphery, and it can be used to send goods (eg., drug samples, blood smears, etc.). Disadvantages are that it is slower, often unreliable, prone to breakdown and has some of the problems associated with being a public utility.

Finally, a messenger service represents one of the oldest forms of communication. It has the advantage of being independent of public utilities, it can be used to send goods, visible records exist, and it can be used at the periphery. Disadvantages are that distances may be limited, the cost may be greater than other methods, additional staff are needed and access is limited to the availability of the messenger.

Several examples were given of effective use of radio and telephone communication for logistics management. In the Bahamas, Indonesia and Zimbabwe telephones and radio are used to communicate information about health care delivery schedules. AMREF has twenty-five years of experience with two-way radio networks in Kenya, Sudan, Tanzania and Uganda for day-to-day management of health programmes and services, including logistics operations. In Zambia, the Flying Doctor Service has provided 35 two-way radios in remote rural clinics and mission hospitals in five provinces. Although this radio network has proven quite useful, there is hesitation to extend it to all health centres because of high maintenance costs.

In Canada and Thailand, two-way radios are used for communication between health centres and district health officers, and health centres and hospitals. In areas without regular electricity, radios can be powered by car batteries or solar panels (which are

available for about US$200). The Bahamas and Zimbabwe use two-way radios, but for emergencies and disasters only.

2.2.2 Maintenance

Lack of regular preventive maintenance, inability to provide a repair service and the lack of spare parts are major causes of communication breakdowns in many programmes. As with any type of equipment, guidelines for maintenance and repair of communications equipment, including provisions for spare parts availability, are vital for the system to function successfully.

Funds for maintenance should be considered and budgeted for at the same time that equipment is purchased or donated. Maintenance responsibilities should be clearly identified in the table of organization and individual work assignments. For newer or more complex equipment maintenance contracts should be considered whenever they are available at a reasonable price.

2.3 Training and Manpower Management

The training of communications operators was considered essential because, as experience has clearly demonstrated, communications without trained personnel will not be as efficient as planned. The training of maintenance personnel and proper incentives are necessary.

When new modes of communication are introduced, it is important to teach the users not only the mechanical skills necessary to operate the equipment, but also the communications skills necessary to use the equipment effectively. In Canada, for example, communications experts have found that teleconferences (meetings held by connecting people at multiple locations in one telephone conversation) are efficient and acceptable ways of conducting government business; but to make teleconferences work, it proved even more important to teach communications skills for running a teleconference than to teach the basics of using the teleconference equipment.

3. Transport

Transportation is an integral and essential component of logistic support to PHC and one that is often taken for granted. Without this component PHC services will be compromised. The degree of compromise is related to the effectiveness of the transportation system.

Transport support functions may be characterized as follows:

(1) delivery of supplies required by the PHC centres;
(2) transportation of health care personnel, including mobile health care units;
(3) evacuation of patients from PHC units to more sophisticated health care facilities; and
(4) transmission of information from and to PHC facilities.

The scattered nature of health facilities, poor roads, bad weather conditions making roads impassable at times, and inadequate transport equipment are some of the crucial aspects which must be considered.

Strengthening of transportation support involves (1) policy and planning, (2) transport operation and control, and (3) training and manpower management.

3.1 Policy and Planning

Transport requirements and available resources must be realistically assessed prior to making decisions on investments for vehicles, equipment and personnel. Departmental transport policies should not be developed in isolation from the overall national transport system. Environmental, economic, government administrative and personnel policy and ecological factors should be taken into consideration.

Intersectoral cooperation with other government departments is necessary to avoid duplication. Existing transport facilities from the private sector should not be ignored. Whenever feasible private transportation may be an effective and, when a full cost analysis is done, more economical alternative to increasing the public health transport fleet.

Fleet standardization was recognized as an important prerequisite for effective vehicle maintenance and economical spare parts stocking. Standardization should conform to government guidelines and have commercial dealer back-up. Coordination between government purchases and donations of bilateral and international assistance are necessary for achieving the desired results.

The selection of appropriate transport equipment decisively influences budgeting and efficient operation. Several factors have to be taken into account when selecting a vehicle: standardization, suitability in terms of capacity and existing road conditions and special conditions under which bilateral aid is given.

Keeping the above in mind, the most economical vehicle should be selected. Four-wheel drive vehicles, necessary as they may be in certain circumstances, should be avoided whenever possible because of their higher cost. The lighter, less costly two-wheel drive vehicle as well as motorcycles and bicycles should be considered instead. Diesel-powered vehicles can reduce transport operation costs significantly if they can be adequately maintained in the transport system.

Two charts relevant to this discussion, Tables 2 and 3, were distributed to the participants.

Other important criteria identified for the selection of transport equipment (vehicles, motorcycles, out-board motors, bicycles) were an efficient service back-up and availability of spare parts in a country. Transport and equipment maintenance guidelines for health equipment and vehicles should be established. Depending on local circumstances, a Ministry of Health may elect to use other governmental repair facilities or the services of commercial dealerships. The latter are usually considered good, but expensive. A Ministry of Health may decide to establish its own transport maintenance and repair organization. It may even extend this service to include health equipment maintenance. Several countries present at the meeting have done so, notably Cameroon, Mali, Sudan and Zambia. A department may decide to establish a facility for preventive maintenance and minor repairs only and have the more extensive repairs carried out in a commercial dealer workshop.

Participants noted that appropriate advisory services are available from international and bilateral organizations to help developing countries in planning for the most rational maintenance system.

Plans should be developed for emergencies, major accidents, natural calamities (the present drought situation in parts of Africa, for example). Major emergencies may make it necessary to significantly increase a Ministry's vehicle fleet. However, this should only be done with a view to integrating additional vehicles into the general transportation system.

Finally, a policy for financing a department's transport operation and for the replacement of vehicles should be developed based on available resources.

Several examples of effective transport policy and planning were described. Indonesia, for example, used to have 36 different makes of vehicles. As a result of a policy of standardization, there are now only four makes of vehicles, all of which are assembled in-country. The importation of other makes for the public sector is banned. Zimbabwe has a department which carries out centralized procurement and maintenance of vehicles. Standardization of donated vehicles has improved the ability of this department to maintain all vehicles. To determine vehicle requirements, the Central Mechanical, Transport, and Equipment Department receives requests which are communicated from the districts to the provinces, and from the provinces to the Central Ministry of Health. In the Sudan there have

Table 2

COMPARISON OF VEHICLE PRICES AND OPERATING COSTS

	Average C&F Price U.S.$	Fuel Consumption Litre/100km	Fuel Cost U.S.$[1]	Annual Maint. Oil, Parts, Labour cost U.S.$[1]	Operating Cost per year U.S.$[2]	Percent Operating Cost per Vehicle
1) Four-wheeled vehicles	$	LTR.	$	$	$	%
a) Light passenger vehicle	5,400	8	816	810	1,626	30.1
b) Station wagon/full size car	7,920	12	1,224	996	2,220	28.0
c) Van, pick-up, small bus (4x2)	10,000	12	1,224	1,008	2,232	21.8
d) Ambulances (fully equipped (4x2))	14,000	12	1,224	1,008	2,232	15.5
e) 4-wheel drive vehicle (4x4) petrol engine (Land Rover, Toyota, Jeep)	12,000	22	2,244	1,350	3,594	29.9
f) 4-wheel drive vehicle (4x4) diesel engine (Land Rover, Toyota, Jeep)	13,000	18	1,296	1,400	2,696	20.7
g) Mid-size truck (petrol 4x2)	19,200	22	2,244	1,320	3,564	18.6
h) Mid-size truck (diesel 4x2)	20,000	18	1,296	1,400	2,696	13.5
i) Large truck (diesel 4x2)	42,000	30	2,160	2,160	4,320	10.3
2) Motorcycles						
j) Mobylette (50 cc)	500	2	82	192	274	54.8
k) Motorcycle (125 cc)	960	3.25	133	300	433	45.1

[1] Based on a performance of 15,000 km per year for 4-wheeled vehicles and 6,000 km per year for 2-wheeled vehicles.
Average fuel prices: Petrol $0.68 per litre
Diesel $0.48 per litre

[2] Does not include drivers and insurance.

Source: UNICEF, 1985.

Table 3

AVERAGE UNICEF PROGRAMME VEHICLE OPERATION COST
(petrol, maintenance, repairs, tyres, etc.)

a) Based on vehicle performance of 15,000 km. per year.
b) Petrol average price of $0.68 per litre; diesel fuel $0.48 per litre.
c) Oil (grease) average price $2.10 per litre.
d) Labour average cost in government workshops $8.50 per hour.
e) Replacement tyres required per 15,000 kms, 3 tyres per car and 4 tyres per truck average.
f) Batteries required, 1 battery for each vehicle in 18 months. The amount included here represents 2/3 the price of a new battery.
g) Prices for spare parts, tyres, and batteries are factory prices for overseas procurement. If replacement parts are to be purchased locally, the respective amounts should at least be doubled.

		Passenger Car Petrol	Pick-up Petrol	Light Truck Diesel	Toyota Land Rover 4x4 Petrol	Toyota Land Rover 4x4 Diesel	Truck Diesel 10 Tons
1) Petrol consumption, litres per 100 km.	Litres	8	12	18	22	18 (Diesel)	30 (Diesel)
2) Petrol requirements per year or every 15,000 km.	Litres	1200	1800	2700	3300	2700	4500
3) Petrol cost per year, or every 15,000 km.	US$	816	1224	1296	2244	1296	2160
4) Oil requirements per year, or every 15,000 km.	Litres	24	30	40	42	42	60
5) Oil cost per year, or every 15,000 km.	US$	50	63	84	88	88	126
6) Annual required labour hours	Hours	40	50	60	65	70	70
7) Annual labour cost	US$	340	425	510	553	595	595
8) Cost for replacement parts per year, or every 15,000 km.	US$	255	295	418	361	369	603
9) Cost for replacement tyres per year, or every 15,000 km.	US$	140	200	360	320	320	780
10) Cost for batteries per year	US$	25	25	28	28	28	56
11) Operation cost per year, or every 15,000 km. with labour	US$	1626	2232	2696	3594	2696	4320
12) Operation cost per year, or every 15,000 km. without labour cost	US$	1286	1807	2186	3041	2101	3725
13) Operation cost per kilometre without labour cost & disregarding fixed cost for driver salaries, insurance, & vehicle depreciation	US$	0.085	0.120	0.146	0.203	0.140	0.248

NOTE: Costs listed under 7 and 8 above are average costs for the first 2-3 years under normal operating conditions, (trained driver, not too bad roads, regular service) and do not include accident repairs. After 30,000 to 40,000 km maintenance costs increase impressively as vehicle requires major repairs and overhauls.

Source: UNICEF, 1985.

been several recent actions to improve health service logistics including procurement of several trucks for distribution to areas accessible by vehicles and agreement by Sudan Rail to give a higher priority to loading and transporting drugs to the regions. Finally, the Bahamas represents a system which mixes public and private transportation. For one group of islands, for example, drugs and medical supplies are usually shipped by mailboat while vaccines are generally sent by the commercial domestic airline.

3.2 Transport Operation and Control

Proper procedures for the utilization of transport, the supervision of drivers, the control of fuel, and the control of other operational costs must be established to ensure that transport systems operate within available resources.

Regular maintenance is the first and indispensable level of technical intervention to ensure proper functioning of motor vehicles, boats, and other transport equipment and to avoid costly breakdowns. No sophisticated tools are necessary for this level. However, facilities for carrying out preventive maintenance must provide coverage for the whole country. A mobile maintenance service has also been mentioned as a possibility.

The repair of vehicles requires more sophisticated workshop equipment in terms of facilities and workshop tools. Generally one central repair facility is adequate for a country which has field workshops in outlying areas for preventive maintenance service.

Careful financial planning and planning to assure the availability of technically qualified personnel must precede the establishment of repair facilities. An adequate supply of spare parts for health transport systems is a problem in many developing countries. Identified as weak points were foreign currency shortage, spare parts managers with insufficient managerial and technical know-how, frequently changing vehicle models and parts specifications and many different makes and types of vehicles in a health transport fleet. Cooperation and suitable business arrangements with commercial vehicle distributors may be very helpful in ensuring the supply of parts.

International agencies, bilateral donors and international voluntary agencies may be sources for spare parts' supply to health services in developing countries. These agencies are more willing to assist if parts management, accounting and secure storage can be ensured.

Finally, proper budgeting and accounting procedures must be applied in health transport systems to avoid shortage of supplies and ensure servicing for all vehicles throughout the government's budget cycle.

Improved transport operation and control has been achieved in several countries. In the Bahamas preventive maintenance programmes have been initiated in an effort to lengthen vehicle life and improve vehicle performance. The Southern Rural Health Support Project in Sudan employs a maintenance engineer for equipment and transport servicing; he plans and supervises maintenance activities and conducts training programmes to expand the maintenance capabilities of local staff. Zimbabwe has established positions for transport officers, who have overall responsibility for transport operation, maintenance and control.

3.3 Training and Manpower Management

Training for each category of transport personnel was repeatedly emphasized by all discussion groups. This is vital for managers, technicians, and drivers alike, considering the high cost of the vehicles for which they are responsible. Training must be appropriate and on-going to ensure a high standard of efficient workmanship and awareness of technical developments.

Training may be provided by local technical and managerial development institutions, and it may also be provided by vehicle manufacturers through a local representative or, for senior transport personnel, in manufacturing facilities abroad. International organizations

which provide many vehicles to developing countries and are, therefore, important customers to certain manufacturers, can help to facilitate arrangements for such training. In the Bahamas some success has been obtained in including training in maintenance as a part of the purchase contract.

Suitable manuals, wall charts, and audiovisual materials are important training media. Often such material is available from vehicle suppliers at little or no cost. Wherever possible, manuals should be provided in the national language. Indonesia routinely requests manuals and other publications from their suppliers in the Indonesian language and feels that this material is thus much more useful.

Career development possibilities, effective personnel management, and adequate salaries were recognized as incentives for retention and motivation of well trained and qualified transport personnel in health services. Nevertheless, it was recognized that government salaries are usually part of a wider intersectoral system and cannot easily be changed. However, in most governments, possibilities of additional benefits exist. If fairly applied, these incentives can increase motivation for serving in a national health system.

It was also pointed out in the group discussion that the senior transport personnel should be included in the decision-making process of the health services - particularly when transport, logistics and other operational aspects are involved.

IV. DETAILED RECOMMENDATIONS IN KEY AREAS

Logistics has been important for health programme management. Its development, however, has not kept pace with the expansion of health facilities. There has been a great increase in types of health services provided following the adoption of the PHC approach by countries as the main strategy for their national health development.

During the past two decades, national and global health campaigns in specific programmes have included the development of logistic systems for the particular campaign. Notable examples are smallpox and malaria eradication campaigns and, more recently, the Expanded Programme of Immunization (EPI) and the Programme for Control of Diarrhoeal Diseases (CDD). All these programmes contained major components of logistic support for the provision of supplies, equipment and transport.

In addition, over the last two decades, WHO has provided strong support for programmes of administrative reform or institutional development. These programmes have focused on Ministries of Health, Social Security Institutions, and National Water Authorities and have aimed at strengthening the operational capacity of these institutions. A major component of these programmes has been the development of logistic services in relation to supply management, transport management and communications. These logistic services continue to receive considerable attention and there is increasing demand for technical cooperation to strengthen them.

The emphasis on PHC, as the major strategy for achieving the goal of Health for All, is based on efficiency and effectiveness in the delivery of health services and on the extension of coverage.

Some of the areas for technical cooperation by WHO and other international organizations/agencies in support of national endeavours to strengthen logistic were the following:

1. Promotion of logistic support to PHC in policy, planning, programme formulation and budgeting process of national health development;

2. Promotion of greater collaboration between the health and other relevant sectors to strengthen logistic support to PHC;

3. Support to orientation, training and skill development among health managers at all appropriate levels as an integral part of management development;

4. Technical support to the integration of a logistics component into health programme management;

5. Dissemination of valid information on country experience in logistics development and innovations;

6. Expansion of practical and intensive collaboration among countries (TCDC) in sharing of information, expertise and joint endeavours in procurement, production and distribution;

7. Research and development of appropriate logistic support including transport, communications support and collaborating mechanism with other sectors;

8. Development of standard manuals in logistics for PHC, including a manual used for self assessment;

9. Grants and financial support from international and bilateral agencies to strengthen logistic services.

In its deliberations the group developed the following detailed recommendations for action based on the priority logistics issues identified in the preceding section.

V. PROPOSALS FOR ACTION

The preceding sections of this report have summarized the key issues in strengthening logistic support for PHC and identified a number of recommended actions which governments and international organizations can take to address these issues. During the final sessions of the meeting, participants worked to select the highest priority areas for action by governments and international organizations.

The following nine activities were established as the highest priority for immediate action by governments and international organizations: (1) policy formulation; (2) advocacy; 3) training; (4) exchange of experiences; (5) technical collaboration between developing countries; (6) standardization; (7) direct support; (8) research and development; and (9) coordination among international organizations.

1. Policy Formulation

Any efforts to strengthen logistic support for health services should proceed from policies developed by governments and international organizations. These policies should highlight the critical role of logistics in the delivery of all health services and, as appropriate to the government or organization involved, they should specifically address questions of financing, human resources development, the role of the private sector and private voluntary organizations, centralization versus decentralization of logistics activities, mechanisms for intersectoral cooperation, contingency and emergency planning, incentives for improved staff performance, standardization of supplies and equipment and maintenance of equipment and vehicles.

In many instances, logistics policy will already exist as part of separate vertical health programmes. In these instances efforts should be made to harmonize policies from the different programmes, to coordinate logistic support in these programmes and to revise existing policy where it is incomplete or ineffective.

2. Advocacy

A major cause for the inadequacy of logistic support in many programmes appeared to be the low priority given to logistics. Logistics appears to have neither the prestige nor the inherent appeal that characterize some other health care activities. As a result, logistic support is often one of the most neglected aspects of national health development.

Participants felt that an essential step in any programme to strengthen logistic support is in raising the general level of consciousness within governments and international organizations about the vital role of logistics. Participants urged each other to begin this advocacy process within their own countries by sharing the results of this meeting and through meetings at the national and local level. International groups such as WHO and UNICEF are urged to conduct regional and subregional meetings directed toward priority logistics problems identified by the countries in each region or subregion.

The awareness of logistics issues which would result from these meetings, and the mutual support which would be generated by the meetings should provide the foundation for subsequent specific activities.

3. Exchange of Experiences

Despite existing weaknesses in logistic systems, there appears to be a rich body of experience - both positive and negative - which governments can draw upon to strengthen their own logistic support systems. Participants urged governments to document such experiences and urged WHO, UNICEF, other United Nations agencies and other international groups to help publicize these experiences. As a beginning, selected country studies from this meeting will be revised and published. In addition, a wide range of published examples of logistic system interventions already exists. A list of these examples should be collected and distributed.

Regional and subregional meetings can be a valuable forum for the direct exchange of experiences with specific logistics activities such as procurement, inventory management, transport management and radio communication. WHO and UNICEF, in coordination with other UN agencies, can play an important role in convening such meetings.

4. Technical Cooperation among Developing Countries

In addition to exchanging experiences through meetings and publications, countries can take a more active role in assisting each other through the process of TCDC. Countries can collaborate in establishing regional training centres for specialized training in areas such as maintenance and repair of vehicles and management of central medical stores. Countries should also consider collaboration in the production of selected medical supplies and equipment.

Finally, governments should work with international organizations to identify experienced logistics managers from developing countries who can provide specific technical support and consultation to neighboring countries.

5. Training

Lack of adequate training was felt to be a critical weakness at almost every level and for almost every major activity in the logistic system. Governments need to determine their specific training needs and establish intermediary level and national level training programmes to meet these needs. When asked by host governments, international organizations should be prepared to provide assistance in defining training needs and establishing training programmes. An important aspect of this is strengthening the capacity of existing national training institutions to provide training in specific areas of logistics.

When called upon by governments, international organizations should be prepared to provide examples of training materials and practical manuals for logistics operations. Finally, international organizations can assist by facilitating regional courses to train senior level logistics managers and to train logistics trainers.

6. Standardization

Throughout the meeting standardization was repeatedly mentioned as one of the cornerstones of efficient logistics management. Standardization of drugs, supplies, equipment and vehicles reduces procurement costs and inventory costs, considerably improves the likelihood that equipment and vehicles can be maintained and facilitates logistics management at every level. International organizations can support standardization by coordinating efforts to develop guidelines for medical supplies, medical equipment, vehicles and communications equipment. The WHO list of essential drugs is an excellent example of standardization. Yet standards must be appropriate to the economic circumstances, supply channels, geography, climate of individual country and cultural preferences. Therefore, it is incumbent upon each government to develop its own standardization policy and its own standard supply lists, using available international lists only as guidelines.

The role of donors in this process should be emphasized. Donor policies on tied procurement can have a significant impact on inhibiting or facilitating a country's efforts toward standardization. Donors are beginning to adopt policies which are more flexible and, therefore, more consistent with long-term objectives of national development and increased self-sufficiency.

7. Direct Support

Direct contribution of drugs, vaccines, medical supplies, medical and communications equipment and vehicles continues to be essential to health service development in many countries. Within the context of expressed country needs and a general move towards standardization of equipment and vehicles, these contributions will continue to be greatly needed and appreciated by recipient countries.

With regard to technical assistance, it is critical that donor agencies recognize the importance of balancing their tendency to support new and expanding programmes with the undeniable need to strengthen logistic support for existing health programmes. Logistics is an essential ingredient in the cement which keeps health development projects from falling into rubble after donor assistance is completed. Therefore, donors need to work closely with host governments and international agencies to establish technical assistance priorities which reflect the long-term logistics requirements for continuing health service operations.

8. Research and Development

Governments and international organizations should continue to identify, test, and adapt appropriate technology, including storage methods, transport methods, medical equipment, communications equipment and related maintenance procedures. Governments should identify and support institutions and individuals involved in research and development in PHC logistics and, where necessary, seek outside assistance to strengthen these institutions and individuals. Governments and international organizations should also support operations research in specialized logistics areas.

9. Coordination Among International Organizations

Participants felt that coordination among international organizations should begin first at the country level. Recipient countries themselves should take the leading role in evaluating their logistics requirements and in coordinating the contributions of the various international, bilateral, and voluntary agencies to meet these requirements. When drawing on external agencies for assistance in making logistic system assessments, governments should encourage the formation of joint assessment teams from these agencies.

While coordination of logistics interventions should start at the country level, it should continue at the subregional, regional and local level, both within organizations and among the international organizations.

In conclusion, participants felt that this interregional meeting was neither a beginning, nor an end. Rather, it was an important opportunity in an on-going, but slowly moving process to strengthen logistic support for PHC. If major health initiatives such as immunization, control of diarrhoeal diseases, improved nutrition and sanitation are to succeed, progress toward effective logistic support systems must be accelerated. The proposals for action developed at the meeting are intended to provide governments and international organizations with guidance for redirecting and expanding their efforts in PHC logistics.

ANNEXES

Annex A

USEFUL REFERENCES FOR PRIMARY HEALTH CARE LOGISTICS

General References

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WHO Training Modules Related to Logistics

Expanded Programme on Immunization Course in Logistics and Cold Chain for Primary Health Care includes the following 24 booklets:

1. How to estimate requirements for an existing store
2. How to store supplies
3. How to distribute supplies
4. How to keep records and calculate wastage
5. How to control quality of stocks
6. How to estimate requirements for the first time
7. How to estimate chloroquine requirements for the first time
8. How to estimate ORS packet requirements for the first time
9. How to estimate vaccine requirements for the first time
10. How to estimate contraceptive requirements for the first time
11. How to estimate essential drug requirements for the first time
12. The cold chain game
13. How to improve communication

14. How to look after a compression refrigerator
15. User's handbook for compression refrigerators
16. How to look after a kerosene refrigerator
17. User's handbook for kerosene refrigerators
18. How to look after a gas refrigerator
19. User's handbook for gas refrigerators
20. How to keep stocks of spare parts
21. How to look after a cold store
22. User's handbook for cold stores
23. Instructors guide
24. Evaluation questionnaire

Programme for Control of Diarrhoeal Diseases, Training Course for National CDD Programme Managers includes the following eight booklets:

Introduction
National Priorities
Objectives and Targets
Delivery Systems
Sub-Targets
Logistics
Evaluation
Problem-Solving

Programme for Control of Diarrhoeal Diseases, Training Course for Health Area Supervisors includes the following seven booklets:

Introduction
Community Involvement
Treatment of Diarrhoea
Targets
Monitoring Performance
Training
Monitoring and Evaluating Usage and Course Summary

Annex B

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Annex C

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Mr M. Segovia - Regional Adviser in Administration, PAHO, Washington DC, USA
Dr Boyd Suttie - Assistant Deputy Minister of Health, Ontario, Canada
Dr E. Tarimo - Director, Division of Strengthening of Health Services, WHO Geneva, Switzerland
Dr M. Traoré - Médecin-chef, Centre de Santé Kolondiéba, Mali
Mr B.C. Yeap - Director of Pharmaceutical Services, Ministry of Health, Kuala Lumpur, Malaysia

Group B

Mr K.O. Asante - Health Planner/Project Leader, African Medical and Research Foundation, Nairobi, Kenya
Dr A. Bekele - Economic Consultant, USA
Dr G. Bergonzoli - Secretary of Public Health, Colombia
Mrs V. Brown - Deputy Permanent Secretary, Ministry of Health, Nassau, Bahamas
Mr S. Coutalianos - Administrative Officer, Chalkis General Hospital, Greece
Mr I. Linnakko - Chief of Office, National Board of Health, Finland
Dr D. Makuto - Deputy Secretary for Health, Rural Health Services Division, Ministry of Health Zimbabwe
Dr M. Pontus - Department of Health, Northwest Territories, Canada
Dr J.D. Quick - Director, Drug Management Programme, Management Sciences for Health, USA
Dr I. Thavichachart - Chief of Health for Security Section, Division of Rural Health, Office of the Permanent Secretary, Ministry of Public Health, Thailand
Dr M.A.M. El-Zawahry - Programme Coordinator, WHO, Indonesia

Group C

Dr R. Caram - Jefe de Cabinete, Ministerio de Salud
Mr P. Carr - Regional Advisor in Administration, PAHO, Washington DC, USA
Dr M. Zakir Husain - SEARO, India
Dr R.H. Lennox - Health and Welfare, Canada
Mrs G. Maghina-Angelothanassi - Registered Nurse, Greece
Dr H. Abdul Radjak - Chief, Sub-Directorate of Emergency and Evacuation, Indonesia
Mrs M. Ramsey - Supply Management Officer, Ministry of Health, Kingston, Jamaica
Lt. Col. P. Robinson - Surgeon General Branch, Department of National Defence, Canada
Dr N. Romanov - Medical Officer, Logistics of Health Services, Division of Strengthening of Health Services, WHO, Geneva
Dr A.H. el Sayed Osman - Director General, Public Health Care and Rural Health, Sudan
Mr S. Siatwinda - Senior Health Education Officer, Zambia

Annex D

PROGRAMME

Sunday 9 June 1985

15.00 - 19.00	Registration of participants Informal selection of chairpersons, deputy and rapporteur

Monday, 10 June 1985

08.00 - 09.00	Registration of participants
09.00 - 09.50	Plenary session 1. Introduction of participants 2. Objectives of the meeting and method of work 3. Election of chairperson, deputy, rapporteurs and steering group 4. Approval of agenda
09.50 - 10.30	Opening session 1. Statement by Dr E. Tarimo, Director, Division of Strengthening of Health Services, WHO 2. Opening address by Hon. Jake Epp, Minister of National Health and Welfare, Canada
10.30 - 10.45	Coffee break
10.45 - 11.30	Plenary session Presentation of country reports (Summary only, reflecting critical points - 10-15 minutes each)
11.30 - 12.30	Plenary session Presentation of country reports (continued)
12.30 - 14.00	Lunch
14.00 - 15.30	Plenary session Presentation of country reports
15.30 - 15.45	Coffee break
15.45 - 17.30	Plenary session Continuation of country presentations Panel discussion: discuss country reports and methodology to be suggested on how to look into logistics problems and solve them

Tuesday, 11 June 1985

09.00 - 10.30	Plenary session Introduction to Topic A: "Logistics System" Mr M. Segovia, Dr J. Quick

	Questions arising from the introduction of the topic
	Composition of working groups
10.30 - 10.45	Coffee break
10.45 - 12.30	Working groups Group discussions
12.30 - 14.00	Lunch
14.00 - 15.30	Working groups Group discussions continued
15.30 - 15.45	Coffee break
15.45 - 16.30	Working groups Group discussions continued
16.30 - 17.30	Plenary session Reports from groups on Topic A, and discussion
Evening	Editing and distribution of group conclusions - Group rapporteurs and secretariat

Wednesday, 12 June 1985

09.00 - 10.30	Plenary session Introduction to Topic B: "Communications" Canadian participant Introduction to Topic C: "Transport" Canadian participant Questions arising from introduction of topics
10.30 - 10.45	Coffee break
10.45 - 12.30	Working groups Group discussions on Topics B and C
12.30 - 14.00	Lunch
14.00 - 15.30	Working groups Group discussions continued
15.30 - 15.45	Coffee break
15.45 - 16.30	Plenary session Reports from groups on Topics B and C
16.30 - 17.30	Meeting of Steering Group - Editing and distribution of group conclusions

Thursday, 13 June 1985

09.00 - 10.30	Plenary session Development of recommendations/guidelines for governments on logistics: system, structure and functioning
10.30 - 10.45	Coffee break

10.45 - 12.30	Plenary session Recommendations/guidelines for WHO for the development of strategies and proposed follow-up actions appropriate to each level of WHO to help countries in establishing a countrywide logistic system
12.30 - 14.00	Lunch
14.00 - 17.00	Demonstration of telehealth Preparation of draft report by rapporteurs and steering group

Friday, 14 June 1985

09.00 - 10.30	Plenary session Presentation and discussion of draft report Elaboration of the most appropriate intercountry, regional and global logistical support activities needed to facilitate country action - (promote international collaboration: WHO; other agencies)
10.30 - 10.45	Coffee break
10.45 - 12.00	Plenary session Continuation of discussion
12.00 - 13.30	Adoption of draft report Closure of the meeting

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS*
1. Logistics System 1.1. Policy Planning and Budgeting	Convene working groups to review and assess current logistics activities, to formulate a specific and comprehensive PHC logistics policy, and to assist in the implementation of that policy. Guidelines should be included for incorporating the logistics component into the national health planning and development process. The policy should also address the key policy issues identified earlier in this report, drawing on the best available logistics resources. Consider carefully private as well as public sector resources for logistics policy and planning. Potential cost-savings and efficiencies through private sector collaboration should be explored.	In light of the critical role of logistics in supporting all PHC activities, WHO is strongly urged to place the topic of PHC logistics on the next possible WHA Technical Discussions agenda. Regional and country offices are urged to place increased emphasis on coordination of all logistics-related activities. Regional meetings on PHC logistics can play an important role in the exchange of experiences relevant to improving countries' logistics systems. International organizations should identify successful national and regional programmes which can serve as demonstration centres and promote bilateral TCDC based on successful experiences. International organizations should prepare guidelines for planning and budgeting in PHC logistics.

*In this table "international organizations" refers collectively to WHO, UNICEF, other UN agencies, international private voluntary organizations and bilateral donors.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
1.1. Policy Planning and Budgeting (continued)	Cooperate bilaterally in the spirit of TCDC and exchange information on the process of policy formulation, programming and budgeting for logistics development. Document country experiences with logistics system interventions and share these experiences with other countries through meetings and publications by international organizations such as WHO and UNICEF. Resist internal pressures from technical staff and external pressures from suppliers to divert resources to types of equipment, vehicles and other specific advanced technology which are too costly and are difficult to service.	All international and bilateral aid programmes are urged to reassess their own policies as they relate to logistics, with specific emphasis on standardization, service support and the logistics implications of all forms of health care donations.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
1.2. Logistics Operations Management	Recognize the existence of logistics as a specialized field, inform themselves about developments in this field, and adapt these developments to their own settings.	Contributions to logistics operation management should come primarily in the form of assistance in establishing training programmes and direct technical support (consultation). International agencies should support TCDC by identifying outstanding national and local logistics specialists in developing countries and assist them in serving as consultants to other developing countries
1.3. Training in Logistics	Draw on existing national and local training institutions and develop their capacity to provide appropriate training for logistics system planners, managers and supervisors. Cooperate at the regional and global level to share training resources for mutual benefit. Where necessary, seek technical support from international and bilateral organizations to strengthen national abilities to provide effective training logistics. Recognize logistics as the professional discipline it has become and make efforts to recruit, train and retain logistics experts. Countries can utilize existing international fellowship programmes for advanced training of senior logistics managers.	International organizations should collaborate to strengthen and promote existing national, regional and international training institutions with PHC logistics training experience. International organizations should support the development of training modules in the specific aspects of PHC logistics not covered by available EPI, CDD and other training materials.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
1.4. Procurement Strategies	As part of the overall policy review, attention should be paid to the issue of centralization versus decentralization of procurement. Special attention should also be given to reviewing outdated regulations and to developing regulations which expedite, rather than constrain efficient procurement. In formulating procurement strategies countries should draw on the best available procurement skills, including experts found in local private procurement positions.	WHO/UNICEF should continue and expand efforts to distribute information on the reliability of individual suppliers of pharmaceuticals, medical supplies, equipment and vehicles. They should also provide information on basic quality control methods for these items. WHO/UNICEF should collect and distribute comparative price information for essential drugs, essential supplies and equipment and vehicles. International organizations should assist in developing guideline standards for medical supplies and equipment.
1.5. Information Support	Assess logistics information requirements and review their national health information systems to assure that the necessary information is being collected and properly used. Develop specific inventory control and logistics monitoring procedures.	International organizations should support the preparation of guidelines indicating basic information requirements for logistics management, practical means of data generation and the primary uses of the information in decision-making and operations management.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
1.6. Maintenance and Repair of Equipment	Whenever purchasing or accepting donation of equipment, countries should make themselves aware of equipment service requirements, available local service support and options for service contracts. Where feasible, make operating and maintenance manuals available in the local working language. This may require collaboration with local technical schools, who may find translation of manuals to be a useful student activity and with international organizations. Standardize equipment and vehicles to the maximum extent feasible in order to facilitate maintenance and repairs.	When requested, international agencies and bilateral donors should assist countries and suppliers to produce operating and maintenance manuals in local languages. International agencies and bilateral donors should assist in promoting standardization, including review of their own policies which may promote or inhibit the procurement of standard, serviceable equipment.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
1.7 Storage Facilities	Maximum use should be made of available information and manuals on the efficient management and use of storage facilities. The need for publicly operated storage facilities should be carefully reviewed in the light of cost and availability of storage and distribution alternatives. Consideration should be given to eliminating large, often inefficient central medical stores where more efficient and more economical alternatives exist Users should be trained in proper storage methods.	WHO has prepared standards for health facilities which should be publicized and distributed. International organizations should consider developing prototype storage facilities to serve as demonstration centres. The international community should continue to support PHC logistics through the provision of vehicles, cold chain equipment, medical supplies and essential drugs.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
1.8. Monitoring, Evaluation, Operations Research	As part of their on-going activity, Ministry of Health planning and evaluation units should include routine monitoring and evaluation of the logistics system. Appropriate logistics system performance indicators should be established by logistics managers to assess how well the logistics system is functioning. Deficiencies in current management structures and technology should be identified for local and international operations research efforts. Countries should actively participate in testing and adapting appropriate technologies.	International organizations should assist in developing logistics system performance indicators which can readily be used by logistics managers and consultants to assess how well the logistics system is working. International organizations should identify appropriate technology in the area of PHC logistics and support testing and adaptation of this technology. International organizations should provide funds for developing operations research skills and for conducting research.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
2. Communications 2.1. Policy and Planning	Study available communication resources at the country level and establish mechanisms for selecting appropriate communications systems. Establish national mechanisms for intersectoral coordination in the development and use of national communication systems. Identify specific equipment needs and, where necessary, seek assistance from international organizations to obtain the equipment. Develop appropriate policies for maintenance of communications equipment (radios telex, etc.). Develop or review guidelines for cooperation with other sectors in the maintenance of communication equipment. Establish a communication network to mobilize the health sector in emergency situations and link the sector to other sectors.	WHO to collaborate with UN and other international organizations such as ITU in the standardization of communication equipment. WHO to provide documentation on policy guidelines for intersectoral coordination and possible mechanisms of collaboration with private individuals and organizations. TCDC or WHO collaboration in establishing appropriate maintenance policies.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
2.2. Operation and Management of Communications	Develop procedures and regulations for the utilization of communications systems.	International organizations should gather valid information on operating procedures.
	Obtain manuals of operation for use of equipment selected.	International organizations can provide financial support for communications systems.
	Develop procedures to protect the confidentiality of patients according to medical ethics and within the context of local laws.	International organizations can provide technical support in the development of maintenance systems for selected communications systems.
	Prepare realistic budgets for the acquisition and operation of communication equipment and services.	
	Develop appropriate organizational units and management systems for maintenance of communication equipment.	
	Develop contract agreements for maintenance of selected equipment.	

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
2.3. Training and Manpower Management	Develop and implement appropriate training and continuing in-service education programmes for communication operations. Develop and implement personnel mechanisms for recruitment, retention and instruction of communication personnel. Develop career ladders, where appropriate, for communication personnel.	Provide technical support to countries in developing and implementing training within and outside countries. Support in the organization and implementation of national and regional training programmes including the establishment of training centres and development of training materials.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
3. Transport 3.1. Policy and Planning	Evaluate transportation needs in the context of the entire national transportation system, with special reference to the potential role of the private sector. Transport policy should support the selection of appropriate equipment with a view towards standardization. Include guidelines for maintenance, including the procurement and management of spare parts in policies and plans. Before transport requests are made to international agencies there should be a joint meeting among the relevant national agencies, local representatives of international agencies, and interested NGOs. Total available transport and issues of serviceability and standardization should be considered in reviewing proposed requests.	Relevant country experiences in transportation management should be documented and used to stimulate TCDC. International agencies and bilateral donors should support operations research aimed at improving the efficiency and dependability of transport services. Results of these studies should be widely publicized. International agencies and bilateral donors should continue to provide vehicles and other forms of transport appropriate to the needs of individual countries.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
3.2. Transport Operations and Controls	Develop and implement management procedures for accounting and control of transportation resources. Give priority to recruiting or training staff who are capable of performing routine preventive maintenance and repair. Give continuing attention to the problem of spare parts; maximum use should be made of private sector spare parts supply systems where they exist.	International agencies and bilateral donors can provide advice and technical assistance in procurement of transport, maintenance, preparation of manuals, and establishment of effective operation and control procedures. The experience and expertize of international volunteer services should be drawn upon.
3.3. Training and Manpower Management	Direct attention to recruiting and retaining qualified vehicle operators, mechanics, and transportation managers. Career development, motivation of staff and creation of leadership positions. Provide training for transport managers, technicians and vehicle operators; this training should be adapted to the local transportation environment.	Country experiences in training and managing transportation staff should be documented, distributed and used to stimulate TCDC. International organizations can assist in the preparation of training materials and in the organization of national and regional transport management courses. International voluntary services also contribute to these activities. Due consideration should be given to the expertise and assistance which can be provided by bilateral voluntary services.

RECOMMENDATIONS FOR ACTION IN KEY AREAS

KEY AREAS	INDIVIDUAL COUNTRY ACTION	ASSISTANCE THROUGH TCDC AND FROM INTERNATIONAL ORGANIZATIONS
3.3 Training and Manpower Management (continued)	Investigate and use as appropriate, in-country and out-of-country training provided by manufacturers.	