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IMPROVING THE AVAILABILITY OF
PHARMACEUTICALS IN THE PUBLIC
SECTOR IN LIBERIA

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Definitions

- Revolving Drug Fund:** The sale of drugs to patients and the use of the money received to buy drugs to replace those sold. It begins with an initial stock of drugs, called a "seed" stock. A revolving fund may be operated at any or all levels from communities to the whole nation. It is commercial in nature (i.e., based on buying and selling). Its success depends upon several key factors: (1) an adequate seed stock; (2) mark-ups sufficient to cover all costs, including the probability of higher prices for subsequent orders, or further seed or subsidies to cover shortfalls; (3) acceptance by patients and their ability to secure money to buy drugs; and (4) an efficient supply management system.
- Supply Management System:** A system which ensures a continuous supply at all levels of drugs and drug-related supplies of known therapeutic efficiency at the best possible prices. Its elements include a formulary, supply and inventory service, and consumer service. A financing mechanism is implicit.
- Supply and Inventory Service:** The service embraces procurement, warehousing, redistribution, inventory control, and quality assurance procedures.
- Consumer Service:** The network of dispensing sites and the procedures needed to oversee, supervise, or otherwise assure accessibility of drugs to the consumer.
- Formulary:** The list of drugs, in generic terminology, complete with a description of dosage forms and appropriate prescribing information such as usual dose schedules, side actions and contra-indications written within therapeutic or pharmacological classifications.
- Drug List:** Simple listing of drugs (not a formulary).
- Vital Drug List:** Simple definitive listing of all drugs and drug-related items which have been identified by pre-established criteria as being applicable for use in Liberia, and which lists all items which should initially be in a formulary for Liberia. Revisions/additions/deletions are expected over time with the availability of new epidemiological information.
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Abbreviations

CCCD	Combatting Childhood Communicable Diseases
CHAL	Christian Health Association of Liberia
CMO	Chief Medical Officer
EPI	Expanded Program of Immunization
GOL	Government of Liberia
IMF	International Monetary Fund
JFK Medical Center	John F. Kennedy Medical Center
LGDS	Liberia Government Drug Service
MH & SW	Ministry of Health and Social Welfare
MOF	Ministry of Finance
NMSD	National Medical Supply Depot
NBL	National Bank of Liberia
PHC Project	Primary Health Care Project
USAID	United States Agency for International Development
VDC	Village Development Committee
VHW	Village Health Worker

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EXECUTIVE SUMMARY

A Study Team was assembled and brought to Liberia under the auspices of the Primary Health Care Project to fulfill several specific objectives including:

- Examine and describe the operation of Liberia's existing drug supply management system at all levels of the system; ascertain its weaknesses in the context of internationally accepted practices.
- Provide recommendations for strategic policy for strengthening the drug supply management system (including sections on recommendations pertaining to a revolving drug fund) nationally, but with emphasis on the PHC Project Counties.
- Identify both a strategy and the resources required for expanding a strengthened system and its revolving fund nationwide.

A. The Existing Drug Supply Management System

The Study Team describes a model of a drug supply management system. Its components include a Formulary, Supply and Inventory Services, and Consumer Services. Each is described in the context of internationally accepted practices, and the elements of each are enumerated. Using this framework, the existing Liberian Government drug supply management system is described. Weaknesses and/or problem areas are identified.

With regard to a Formulary component, the Ministry of Health and Social Welfare (MH & SW) currently does not have a Formulary, but rather a drug list. The drug list is in need of revision to bring it into closer alignment with the goals of the MH & SW, health priorities of the nation and resources available. Creation of a Formulary would foster the need for new effort by the MH & SW to update standing orders regarding chemoprophylaxis, treatment and referral at each level of the health system for all health staff. A Formulary would, then, help to standardize treatment practices of each category of staff at each level (i.e., hospital, health center, clinic, and village levels by doctors, physician assistants, nurse-midwives, etc.).

Regarding the Supply and Inventory Services (which embrace procurement, warehousing, inventory control and quality assurance, and redistribution), the Study Team has outlined system limitations in general organization, personnel issues, physical facilities, inventory and procedures related to inventorying, purchasing policy and procedures, redistribution, manufacturing/bulk compounding.

Regarding the Consumer Services which deal mainly with dispensing sites and their interaction with the patient, two major observations are made. First, drugs are either in gross undersupply or nonexistent in all of the

facilities visited by the Study Team. Second, Government health facilities (which often have a "dispenser") are located usually at some distance or at an inconvenient location for the populations they serve.

Several specific recommendations are provided with regard to strengthening the supply management system. The major recommendations are enumerated below by component of the supply management system.

1. Liberia's Drug List

- o A Central Drug Service Board (discussed below) should immediately be formed with a sub-committee to develop guidelines and establish criteria to:
 - confirm a new drug list
 - modify future versions of the drug list
 - supervise a drug needs assessment survey (in conjunction with a baseline health survey)
 - develop a priority for purchasing drugs
 - review and revise the drug list periodically in the context of epidemiological data
 - assume other tasks related to the supply management system as needed.
- o A set of drug selection criteria are recommended for consideration by the Central Drug Service Board.
- o A Vital Drug List based on the above criteria is recommended for adoption by the Central Drug Service Board.
- o It is recommended that a Formulary be published and distributed.

2. Supply and Inventory Service

- The National Medical Stores Depot (NMSD), per se, should be dissolved and simultaneously replaced by a body to be called, it is suggested, the Liberian Government Drug Service (LGDS). The new central drug service would be a separate department within the MH & SW.
- LGDS should be under the sole aegis of the MH & SW, and be responsible only to the MH & SW; be staffed by MH & SW employees responsible only to the MH & SW through the Chief Medical Officer; and maintain financial and operational accountability to the MH & SW.
- LGDS should be charged as the singular central department having sole responsibility for the continuous supply (procurement, warehousing and re-distribution) of listed drugs to the public sector (including JFK Medical Center). Hence, as such, any straight-line governmental programs which currently have their own drug supply

management systems (e.g., EPI, CCCD, Family Health Services Division, Leprosy, TB, or others which the Study Team does not know about) are recommended to be phased into LGDS as LGDS achieves certain predetermined levels of efficiency and effectiveness.

- The recommended Vital Drug List should be immediately adopted. Procurement, both purchased and donated, should be restricted to items listed on this Vital Drug List only.
- Recommended financing should immediately be arranged for December, 1984, to facilitate purchase of a basic 12 months' "seed" stock of required Vital Drug List items. In turn, LGDS shall seed each dispensing site, and provide monthly replenishment of it. As the primary health care programs expand to the village level, its VHWs should be brought into the LGDS supply management system in a fashion to be decided upon after further study of the issue.
- The Central Drug Service Board should take initial responsibility for establishing procedures to apportion drugs to health facilities and implement these procedures. As better information becomes available for a more rational, information-based allocation, this information should be utilized by the Board to develop revised allocation procedures.
- The Central Drug Service Board should perform initially as a task force to plan, schedule, and oversee the implementation of the strengthened drug supply management system. In its more permanent form, it would act as the supervisory body of LGDS.
- The Chief Medical Officer should chair the Central Drug Service Board; other membership is suggested.
- The General Manager of LGDS should be responsible to the Minister of Health and Social Welfare through the Chief Medical Officer.
- The staffing pattern of the new LGDS should encourage upward chain of authority and downward delegation of responsibility.
- Planned construction of a new warehouse should be abandoned.
- Steps should be taken to name the existing NMSD facility the permanent home of LGDS. This facility should be made organizationally distinct from JFK Medical Center.
- The existing warehouses and office should be upgraded as necessary with regard to shelving, fire fighting equipment, atmosphere control (including refrigeration), security, etc. Similar steps should be taken at county and other lower level facilities.

- Purchasing procedures should be modified. Several policy recommendations are offered.
- Warehousing and redistribution procedures require modification. Monthly rather than quarterly cycles should be observed. Pre-packaging for VHW supplies is recommended. County hospitals should act as trans-shipment and not as repacking facilities. Other policy recommendations for procedures are offered.
- Accountability and control recommendations are made.
- LGDS should not develop its own fleet of vehicles, but rather should ship to counties via private sector contractors.
- Mark-up policy for pricing drugs supplied in the public sector is recommended.

B. Financial Analysis of the Drug Supply Management System

Against a background of Liberia's general economic trends -- domestic, foreign and public finance -- the public sector expenditures on drugs and medical supplies are examined in the report. They are low (11% of annual recurrent expenditures on health) by international comparisons. General difficulties underscored include: budgetary and foreign exchange shortages and budgeting, spending, banking and foreign exchange systems that do not lend themselves to careful planning and control of drugs and supply purchases and financing. Non-public sector drug imports are about \$6 million per year, reflecting the substantial procurements by missionary, foreign company, and private medical facilities, as well as the large network of private pharmacies and medicine shops in the country.

The current financial status of drug and medical supply procurement by the public sector is examined in some detail, using the ledgers of Ministry of Finance (MOF), MH & SW, NMSD, JFK Medical Center and audits by the Auditor General's Office as data sources. The chief findings of that analysis are:

- Financial flows are erratic;
- Local purchases are excessively high;
- Financial controls and supervision, as well as reporting, are absent with respect to NMSD and JFK Medical Center activities;
- There are significant inconsistencies -- in sums of several hundreds of thousands of dollars per year -- among the accounts of NMSD, MH & SW, JFK Medical Center, and the MOF and internal inconsistencies in NMSD's books;
- The entire system is in debt but only some \$639,000 (unsubstantiated) is to foreign and local suppliers.

In the light of the above, rational planning and decision-making is not now possible. A number of financial policy and planning issues relevant to the establishment of a revolving drug fund are mentioned.

The central recommendations are:

1. The GOL should make an immediate allocation of \$1 million to restock the drugs in the public health system. An additional \$600,000 will be required in fiscal 1984-1985.
2. Continual access to foreign exchange should be provided for the purchases of required drugs from the Vital Drug List. This might be accomplished by earmarking a specific amount of foreign exchange in offshore accounts or through the commercial banking system -- ensuring priority access to exchange for drug imports similar to the priority now given to oil imports. Consultations between the MH & SW, the MOF, the National Bank of Liberia, and the Bankers' Association, at the highest levels of each, should be held immediately to determine the best approach and most efficient mechanism.
3. The effective restructuring and financial control of the supply management system should take place before a revolving drug fund is put into place.
4. The GOL should pay NMSD's creditors now, on the basis of a full audit of NMSD's books and accounts.
5. The MH & SW comptroller should be given full authority over NMSD's accounts, immediately.
6. The following payments system should be introduced as part of the restructuring of the supply management system:
 - a. A single annual allocation should be made according to the approved drug budget for all drug-using units of the MH & SW and JFK Medical Center and no longer included in separate budgets.
 - b. The MOF should be instructed to make deposits in LGDS's account at a commercial bank in amounts sufficient to meet, on a sight draft basis, the ordering schedule for drugs.
 - c. Release of these funds should be authorized by the Chairman of the Central Drug Service Board, the General Manager of the LGDS, and a senior official from the MOF as co-signers. Most payments will be extremely large.
 - d. Foreign exchange to meet payments should be guaranteed.

C. The Revolving Fund

The case for a need to examine alternative sources of additional and reliable sources of funds to pay for drugs and drug-related supplies in Liberia is summarized. The revolving fund concept, viewed as perhaps the only viable alternative in the long term for providing additional and reliable funds for drugs, is presented. Recommendations for adapting the revolving fund concept to Liberia are presented. In Liberia it is recommended that a revolving fund would work in the following manner:

- Start-up costs (drugs and management system expenses except salaries for national employees) would be provided through some form of external assistance.
- Initial seed supply of drugs would be laid-in at all levels.
- Proceeds from consumer drug sales at dispensing sites would be used by them to purchase from the central warehouse's seed supply; money collected by the central office would be used in turn to purchase from overseas or qualified local suppliers.
- The central supply facility in Liberia would process purchase orders collected by county hospitals who would also be the temporary repositories of payments being forwarded by all other levels (except villages) directly.
- Drugs would be trans-shipped in prepackaged cartons through the county hospitals.
- Drugs would be sold to dispensing sites at cost (CIF) plus a mark-up to cover costs; and sold to consumers at an additional mark-up to cover dispensing site costs.

Several specific guidelines are recommended for the operation of the drug fund. Most notably principles of: all commodities must be exchanged for cash; separation of health care providers from dispensing and money collection where possible; accountability for funds by two or more persons; use of community leaders to safeguard and transfer funds, and to participate in accounting; some pharmaceuticals or related items to remain free (i.e., EPI vaccines, contraceptives, and TB and Leprosy drugs) subject to further study; community responsibility for thefts or other causes of breakdown of the revolving fund with some mechanism for the central Ministry to share costs in cases of community hardship.

D. Supply Management System at the Village Level

At the village level, strengthening the system requires close attention to community participation in the process. Indeed, it is strongly felt that this is more important than specific recommendations for the form of a strengthened system. The Study Team recommendations in this regard relate to how to foster a successful strengthening at the village level. Recommendations are based on Liberian experience and international experience. Liberian experience here was particularly helpful in that it seems to establish that: People are willing to pay for drugs, local arrangements can be made for emergencies, Village Development Committees' participation is crucial, a major training effort emphasizing supervision and accounting is required, and a very simple accounting system is needed.

E. Strategy for Strengthening the Public Sector Drug Supply Management System

This portion of the report is an action strategy and timetable to achieve a nationwide Revolving Drug Fund. The strategy is based on the recommendations in the earlier chapters of the report, and a financial analysis of the costs of implementing those recommendations. We suggest that the restructuring of the supply management system be undertaken independently of and prior to the implementation of a nationwide revolving fund. The timetable for that restructuring requires immediate replenishing of the stock of the system, careful planning and implementation of improvements (one year), and two years for testing and adjusting the new system. The funds for restocking the system and operating it without a revolving fund are to be met by the GOL. They begin with \$1.6 million in 1984-1985, peaking at \$2.2 million in 1987-1988. They are, thus, well within the means of the Government. We stress the absolute necessity of allocating the full amount of money needed for local expenditures and the foreign exchange necessary to purchase drugs; these funds must be available on time and not reduced even in the face of general revenue and exchange problems which may occur.

The revolving fund should be tested, as planned, in the two USAID PHC Project counties, although we recommend some alterations in the timetable. There are important questions to be answered with respect to whether PHC Project counties should depend upon the central drug service or some private organization such as CHAL during the years of restructuring of LGDS and testing a revolving fund.

Should the pilot revolving fund and the restructured central supply management system prove a success by September 1987, we recommend that the following 12 months be used to plan and prepare for the implementation of a nationwide revolving fund. The capital costs are roughly estimated to be \$2.9 million and should be met through foreign aid. We recommend a loan with a performance scheme that would provide an incentive for superior performance.

GENERAL INTRODUCTION

The Government of Liberia (GOL) and the United States Agency for International Development (USAID) have jointly undertaken to develop further and expand primary health care services in Liberia. The primary health care (PHC) Project, initiated in 1983, is central to effecting this objective. The PHC Project operates in two of nine of Liberia's counties; and aims to bring full primary health care services to 5% of Liberia's approximately 2,000,000 citizens.

Revitalizing the drug supply management system (i.e., all aspects of financing, national procurement, warehousing, repackaging, inventory control, redistribution, regional storage and trans-shipment, and dispensing site control and supervision related to pharmaceuticals) is identified as crucial to ensuring the success both of the PHC Project and the eventual expansion of primary health care services while maintaining the credibility of the health services elsewhere in Liberia. This strengthening is viewed as essential at this time because the system is seen as faltering. In addition, in response to this circumstance, the GOL has adopted a policy of charging patients for drugs. Money collected from drug sales is to be placed into a revolving fund for the purchase of re-supplies of pharmaceuticals.

In this regard, the PHC Project is responsible for examining the existing drug supply management system; identifying its weaknesses; and recommending, developing, testing, and implementing changes (at central level and in two counties) to strengthen the system. This process includes placing the revolving fund concept into operation. Hence, while the PHC Project places emphasis on strengthening the system at the central level and in two counties, it is assuming the responsibility of development costs for a strengthening of the system nationally.

The objectives to be fulfilled by the Drug Study Team include:

- Examine and describe the operation of the existing pharmaceutical supply management system as this exists at all levels of the health care system.
- Ascertain the limitations and/or weaknesses of the system in the context of internationally accepted practices.
- Provide recommendations for (or guidelines for establishing) strategic policy for strengthening the drug supply management system (particularly including recommendations regarding the operation of the revolving fund, and eventual extension of the supply management system to the village health worker - VHW - level). Recommendations are to be made in the context of a strengthening of the system nationally, not only in PHC Project areas.
- Identify both a strategy and the resources required for expanding a strengthened system and the revolving fund nationwide.

To fulfill these objectives, a study team of consultants was assembled by Management Sciences for Health of Boston, Massachusetts. The report of this Study Team regarding the objectives stated above follows in the remainder of this document. National counterparts (the Working Group) to the Study Team are listed in Appendix 1.

The report is divided into five chapters. Chapter I describes the existing operations of the drug supply management system at the national, county, health center, clinic, and village levels. Weaknesses of the supply management system in the context of internationally accepted practices are identified, and recommendations for rectifying these and strengthening the supply management system are offered. Chapter II relates a description of the existing financial systems which interact with and within the Government's supply management system (i.e., particularly with regard to the National Medical Supply Depot - NMSD). Problems, weaknesses, and actions to minimize those which might be relevant to an effort to strengthen the system are described. Chapter III provides an introduction to the revolving fund concept as a logical aspect of the supply management system, recommendations for its form in Liberia, and several specific guidelines for its operation. Chapter IV explores supply management system issues (including the revolving fund) at levels below the clinic (i.e., the potential domain of VHWs); and identifies the requirements and recommendations for successfully amalgamating VHWs, a revolving fund scheme, and a strengthened supply management system. Chapter V presents a strategy for implementing a National Revolving Drug Fund, should pilot testing suggest its usefulness, and the costs associated with implementing the strategy.

Chapter I

DRUG AND DRUG-RELATED SUPPLY MANAGEMENT SYSTEM: EXISTING CIRCUMSTANCES, SYSTEM WEAKNESSES, AND RECOMMENDATIONS

I. INTRODUCTION

The specific objectives of this chapter are to:

- Describe the existing system for supply management of drugs and drug-related items at all levels (national, county hospital, health center, clinic, and village).
- Identify weaknesses of the existing drug supply management system.
- Recommend steps which might strengthen the supply management system at the central through clinic levels.

II. STUDY TEAM APPROACH

To accomplish these objectives, the Study Team has assessed the existing system in the context of an internationally accepted model of the practices of supply management of drugs and drug-related items. This accepted framework which we will refer to simply as the supply management system includes:

An Objective: The objective of supply management is to ensure a continuous supply at all distribution levels of essential drugs of known therapeutic efficiency at the best possible prices.

The Methodology: To achieve the objective requires strict adherence to definitive procedures supported by and integrated with management information which readily facilitates decision-making and necessary actions at any given time by appropriate persons within a strong management system. It requires recognition of sound business principles including fiscal fluidity guarantees.

The Elements of a Supply Management System: In broad terms, the service elements through which a smooth flow of drugs is managed are:

1. Drug formulary service. The formulary is the cornerstone of drug supply management. At the beginning, the formulary may be a simple listing of essential drugs, described by their generic names/titles and in appropriate dosage formats, within therapeutic or pharmacological classifications: a "Drug List." The Formulary/Drug List constitutes the "shopping list" for those charged with the responsibility of procurement and redistribution of drugs, centrally and at consumer levels. Proper management of a formulary provides

added assurance to the health care practitioner that its items are continuously available. A formulary, in its true format, provides information basic to rational prescription and usage of each drug listed.

2. Supply and inventory services. The supply services embrace procurement (including forecasting, tendering or otherwise determining the most appropriate supply source, contract letting, ordering), warehousing, redistribution, inventory control and appropriate quality assurance procedures. These elements are applied centrally and at consumer dispensing sites. Manual systems for information, simple but definitive, are adequate. But they should be developed with the potential for future conversion to electronic data systems. The system and its management information pieces must exhibit the status of the "supply pipeline" at any given time; that is, exhibit the adequacy of stock-on-hand of an item in relation to a pre-determined full supply and its depletion through usage. Readily available knowledge of usage rates (distribution, average or extraordinary), coupled with lead times required to obtain deliveries from sources of supply, are needed. The pipeline includes stocks in the central warehouse and at the dispensing sites.
3. Consumer services. Accessibility to required drugs (prescribed and self-medication) by the consumer is the principal target to be achieved. This requires the proper location of "dispensing sites" (i.e., the place or individual from which the consumer obtains his drugs) which are adequately stocked and equipped, staffed in a manner which meets the perceived basic needs of each level -- ranging from village worker, clinics, health centers, county hospitals, to tertiary care institutions. Government policy determines the terms under which the consumer is assisted with his financing of drugs supplied (i.e., free of charge, cost shared, no subsidy, etc.).

Given this framework and background to accepted practices of supply management of drugs and drug related items, the remaining portion of this chapter describes the supply management system in use in Liberia's MH & SW.

III. THE EXISTING SUPPLY MANAGEMENT SYSTEM

A. General

The National Medical Supply Depot (NMSD) was established in 1975 as a joint venture of the MH & SW and the John F. Kennedy (JFK) Medical Center. The latter, which opened in 1972, is not within the MH & SW. However, the Minister of Health and Social Welfare is the chairman of its board. The NMSD is responsible to the Minister through the Chief Medical Officer. It operates as a separate entity with its own administrative, accounting and banking control. Housed in two warehouses of the JFK Medical Center, it began operations with \$250,000 from the Government of Liberia, \$270,000 in JFK Medical Center's drugs and supplies and unused portions of nine Disaster Hospital Units from USAID.

An Advisory Committee, appointed in 1982 by the Minister and which includes the General Administrator of JFK Medical Center as its Chairman is responsible for the overall management of NMSD. The day-to-day operation rests with the NMSD Director who is Chief Pharmacist of the MH & SW.

The main 300 bed General Hospital of JFK Medical Center was closed in September, 1983 for renovations. Its Maternity Center (which is being replaced by a newly constructed Maternity Hospital), and its Rehabilitation Hospital remain in operation.

In addition to NMSD and JFK Medical Center, there are numerous church-sponsored missions and clinics (35 are members of the largest non-government group offering medical services, the Christian Health Association of Liberia (CHAL), which procures drugs and drug related supplies for its members independently of the MH & SW). Private and Concessionary Hospitals (i.e., Firestone Rubber Company and LAMCO Mining Company, etc.) also have their own supply management systems, as do private pharmacies which are concentrated in Monrovia, and "shops" located in suburban areas and towns operated by lesser qualified "dispensers."

B. The Formulary

In 1979, a Formulary of Drugs was proposed and distributed by the MH & SW. From this, NMSD prepared a Drug Catalogue. The NMSD Advisory Committee is responsible for the preparation of a Formulary as a guide for purchasing.

The JFK Medical Center has a Formulary for its purposes. In mimeographed format, it lists drugs by their therapeutic classifications. In effect, both are drug lists, not true formularies.

C. Supply and Inventory Services

The supply and inventory service serving the government sector is fragmented. At its apex the supply and inventory service rests largely with NMSD, but duplicate services have cropped up to service

special programs. For instance, the Expanded Program on Immunization (EPI), the Combatting Childhood Communicable Diseases (CCCD) Program, and Family Health Division of the MH & SW each have their own supply and inventory services. The remaining portion of this section describes only the supply and inventory service which has the NMSD at its apex.

Until 1973 the Liberian Government contracted with a local distributor (Evans Company) and paid it a \$20,000 fee to ensure availability of drugs. The JFK Hospital developed its own system in 1971 into which the MH & SW system merged in 1973. A Tenders Committee was named in 1974 by the MH & SW to review all bulk purchasing according to established guidelines. The details of components of the supply and inventory service of the NMSD as they have existed since 1973 are presented below.

1. Physical Facilities

NMSD is housed in two well constructed warehouses joined by a broad loading platform. Combined, these buildings provide approximately 12,400 sq. ft. of warehouse floor space plus 400 sq. ft. of office space. Each warehouse is divided into two rooms:

- Drug warehouse: general storage and shipping (4000 sq. ft.)
cool room and dangerous drugs (1600 sq. ft.)
- Medical Hospital Supplies: general and shipping (4700 sq. ft.)
hospital equipment (2000 sq. ft.).

Physical security appears good and the atmosphere control is adequate except that the air conditioners in the hospital equipment area are not currently able to be operated. Fire fighting equipment is lacking.

Storage shelving in all areas is inadequate. Most drugs and supplies remain in their opened shipping cartons on the floor.

On the loading platform are several large boxes of heavy equipment awaiting transport to a new distant, rural hospital, the opening of which has been delayed.

Bin cards for perpetual inventory recording by the warehousemen are not used. Rather, a "cardex system" maintained in the Administrative Office performs this function -- or more accurately, could or should do so but is deficient in its entries.

The Administrative Office is air conditioned, and partitioned to provide separate working areas for officers of the various sections:

Office of the Director
Procurement Section
Requisitions and Distribution Section
Accounting Section

Within the warehouse, working area is provided for:

Stock Management Section including:

Medical Supplies warehouse staff
Drug warehouse staff.

2. Personnel

Reflecting the joint venture structure of NMSD, its 38 personnel are paid by three different sources: 7 persons are paid by JFK Medical Center, 20 by the MH & SW, and 11 by NMSD as "casual employees".

3. Inventory

Stock-on-hand is sparse, unorganized, and not controlled relative to redundancies of items, obsolescence, and expiry. The physical inventory (not previously counted for several years) recorded by NMSD staff during the week of August 1, 1984 (attached as Appendix II) shows that of 318 pharmaceuticals, at least 44 are expired or otherwise not usable. (Our spot check of the inventory showed that many obscurely printed expiry dates were not observed by inventory takers.) Of the 67 drug designations in the Vital Drug List recommended by the Study Team, only 27 are in stock at NMSD. Of those in stock only a few are in significant quantities.

4. Purchasing

Procurement is severely hampered by an extremely inadequate and erratically provided flow of funds. Purchasing is done through overseas suppliers, local wholesalers, and local pharmacies. Although their prices are much higher, the local suppliers are the major sources used because they extend credit. The following can be noted:

- During the calendar year (January-December) 1983, of \$855,939 purchases approved, \$636,074 were delivered to NMSD. Of those delivered, \$403,649 worth were local purchases.

- During the first half of 1984 (January-June), \$85,416 worth of drugs were received, and all were purchased locally.

These delivered purchases, if broken down by type and recategorized by fiscal year (July-June, 1983-1984), illustrate the predominance of local purchasing in the fiscal year 1983 which occurred in several of the past years.

	<u>DRUGS</u>	<u>SURGICAL</u>	<u>SUPPORT SUPPLIES</u>
FOREIGN PURCHASE	\$ 66,160	0	0
LOCAL PURCHASE	<u>149,727</u>	<u>54,031</u>	<u>8,001</u>
TOTAL PURCHASES	\$215,887	\$54,031	\$8,001

The purchasing system includes a tendering procedure. Each year, forecasted annual requirements are listed and sent to potential suppliers for quotations (79 items were listed in an early 1984 mailing). Offers to supply are scrutinized but no orders are placed until NMSD receives a cash allocation (supposedly quarterly, but not regularly available from the Ministry of Finance). Annual requirements are determined generally from historical levels.

The purchasing procedure follows an established routine:

- a. Based on a memo from the warehouse, a request to purchase is prepared; this is reviewed and, if acceptable, a quadruplicate purchase order is prepared by the Procurement Section.
- b. Purchase order is signed by purchasing agent, the NMSD Director, and the JFK Medical Center Administrator (as Chairman of NMSD Supervisory Committee). In the extended absence of the NMSD Director, the Pharmacy Administrator of JFK Medical Center acts on his behalf.
- c. The purchase order original goes to the vendor; triplicate copy of the purchase order goes to purchasing agent's file; duplicate and quadruplicate copies of the purchase order remain in the sequential file at NMSD.
- d. Upon delivery to the loading dock, shipment is checked by the receiving agent who signs a receiving report.
- e. The shipment is moved to the appropriate warehouse and is double-checked by that warehouse supervisor who co-signs the receiving report.
- f. The original of the receiving report accompanies the vendor's invoice to the accounting section for payment, a copy of the receiving report goes to JFK Medical Center Pharmacist for information, a copy is filed with the purchase order copy.

- g. After completing the receiving report with "Selling Price" calculations, its figures are recorded on the 'cardex file' of each item. The selling price of foreign supplies is calculated as CIF plus 5% (landing and transport costs), plus 20% mark-up. Items procured locally are marked up 5% only. New inventory cost values (i.e., average of existing stock plus new stock) are not calculated; hence, calculation of the value of stock-on-hand inventory is not possible without a laborious search of old invoices.

5. Redistribution

Drug and drug-related items are distributed on the basis of requisitions received each quarter from the various dispensing sites (i.e., hospitals, health centers, and clinics). JFK Medical Center, apparently, has first demand on existing stocks. Three systems have evolved at the county level:

- a. Health centers and clinics forward their quarterly requirements to the county hospital which, in turn, forwards these with its own requisitions to NMSD.
- b. The county hospital "calculates" the needs of the health centers and clinics based on its knowledge of their patient loads and requisitions a bulk amount on their behalf.
- c. Health centers and clinics located in the Monrovia area bypass the county level and submit their requisitions directly to NMSD.

The requisition form provided to hospitals by NMSD is a six-page mimeographed listing of approximately 161 drug items and 57 medical-surgical supplies. If applicable, the catalogue number and package description is shown. Columns are provided for the requisitioner to state his existing quantities on hand, and his need. Other columns are used by NMSD when "picking" the order and "invoicing" it.

The picked order is double-checked by the warehouse supervisor and then passed to the Financial Section for pricing as well as cardex entry (selling price, mentioned above, is that of the stock being shipped -- not the average of the total composite inventory of the item). An invoice is then typed showing the price of each item and the total. The latter becomes an account receivable (fictitious, inasmuch as no money changes hands nor is it expected under the present system).

Informed by various means (radio, mail, word-of-mouth) that his order is ready, the requisitioner arranges its pick-up. NMSD's vehicle, used mainly for its own local purposes

such as port clearances, has been out of service since April, 1984. The Requisition-to-receipt process often embraces a slow four weeks. Within this period, emergency needs can be picked up at NMSD. However, the desired items are seldom available.

Several public sector health care institutions purchase locally (such as reported to the Study Team by the Bendaja Community Project), bypassing NMSD procedures and records mentioned above. Further, JFK Medical Center, and possibly others, completely bypass NMSD in obtaining drug supplies which, presumably, are not available from NMSD because these are out-of-stock or not stocked. Additionally, other departments of MH & SW and other Ministries distribute drug supplies received by them from various sources (such as from UNICEF). Too, there are the separate programs through which EPI, CCCD, etc., mentioned earlier, distribute drugs and drug-related supplies. Separate from NMSD involvement also are the private concession hospitals and the health care institutions of the several religious missions.

Indeed, no one centrally-located responsible agency or facility has knowledge of the extent of drug supply distribution, nor how the quantitative and therapeutic needs are being met (past, present, or future) at the institutional level in Liberia. Nor are the quantitative transactions of the private sector known.

6. Manufacturing/Compounding

Local manufacturing and/or bulk compounding of standard recipes is non-existent. Prior to its September 1983 closing for renovation, JFK Medical Center's pharmacy department did some extemporaneous compounding for its own needs. Several hospitals (Phebe and ELWA, Ganta, Kolahun, Curran Lutheran, and Kolba City Health Center) prepare intravenous solutions for their own purposes. Repackaging of drug items from large bulk containers received by NMSD is minimal. However, in the current warehouse, there is adequate space for repackaging.

D. Consumer Services

Within the government system, drugs and drug-related supplies are available to consumers through a variety of dispensing sites: JFK Medical Center, 13 county hospitals, 34 health centers, 271 clinics, and 4 military hospitals. Comments about the existing supply management system in the context of consumer services and pertaining to the hospital, health center, clinic, and village levels are presented below. However, first an overview statement relevant to consumer services regarding pharmacy practice and drug distribution in Liberia is presented.

An Overview of Pharmacy Practice and Drug Distribution

Pharmacy Practice. Pharmacy is governed by Chapter 67 of the Public Health Law, 1967. It is administered by the Liberian Pharmacy Board which is an agency of the MH & SW under the Division of Curative Services. It is composed of:

Chief Pharmacist, MH & SW
Pharmacy Administrator, JFK Medical Complex
An Appointee of Liberian Pharmaceutical Association
Two Pharmacists in private practice, appointed by the Minister.

Its responsibilities include licensing and supervisory monitoring of pharmacists, dispensaries, pharmacies, registered medicine stores, manufacturers and wholesalers. The legislation provides that "it shall regulate and control the sale, distribution, character and standard of drugs, medicines, poisons and therapeutic devices."

For licensing as a pharmacist "the applicant must possess a bachelor's degree in pharmacy." Dispensers "complete a course prescribed by the Pharmacy Board and must be in attendance at leased medicine stores." Hospitals have pharmacy departments; other health care institutions (health centers and clinics) have drug room dispensaries, very few of which are controlled by a pharmacist or dispenser, per se.

In his 1981 report, the Executive Secretary of the Pharmacy Board records 13 Government hospital pharmacies, 13 private and mission hospital pharmacies, 35 private pharmacies and wholesalers, 127 medicine stores (total 191 facilities). The vast majority are in Montserrado County in which the capital city, Monrovia, is located. Only 4 of the nation's 35 private pharmacies are located in the other 11 counties where medicine stores predominate (115 of 127 total). Several pharmacies operate wholesaling businesses.

That report records 39 registered pharmacists: 10 Liberians, 12 Ghanians, 16 Indians and 1 American.

A pharmacy school is being established in the College of Science and Technology, University of Liberia. It will have substantial financial support from the private sector through the Liberian Pharmaceutical Association which has worked closely with the Pharmacy Board, the West African Pharmaceutical Federation, and the West African Health Community. It will serve Gambia, Sierra Leone and Liberia. Its coordinator was recently appointed (a senior professor from Ghana) toward start-up in March 1985 (15-20 students per year; baccalaureate after 2 pre-pharmacy years plus 4 years pharmacy).

Private pharmacies are limited to the sale of drugs and a few related health care items and accessories. Prescriptions are almost non-existent and from their shelves pharmacies sell all but the most restricted drugs (such as narcotics), many in small pre-packaged quantities, on customer demand. Most, if not all, provide an injection service. All of this is "justified" by the scarcity of prescribing medical practitioners, the existence of persons having scant education who would proliferate in drug administration if pharmacists did not do it, and the many "black-baggers" throughout the country.

Medicine shops sell in the same manner but with fewer items which, however, do include many potentially dangerous drugs such as minor psychotropics and antibiotics.

Drugs and Services. The private sector imports from many countries throughout the world without control respecting quality or efficacy of the products nor, seemingly, with foreign exchange problems. Statistics of imports in 1983-1984 indicate two-thirds of pharmaceuticals were by the private sector.

NMSD is, theoretically, the principal importer and distributor of drug items in the public sector. However, for several reasons, mainly financial, this is not so today. A high percentage of NMSD procurements are now made from local pharmacy-wholesalers (in fiscal 1983-1984, 75.5% of its total \$269,918).

In various communities there exist a variety of health-care programs sponsored by Women's Organizations, Farmers' Cooperatives, Village Councils. Drug supplies are procured from Liberian distributors and, to a small extent, via NMSD. Some sell to their patients and thus have existing drug revolving funds starting from donations of supplies and/or cash.

Concessionary hospitals are operated by several commercial firms engaged in lumbering, mining, rubber plantations, etc. They serve the employee, his spouse and immediate family without charge. Supplies are procured locally and overseas.

The foregoing are but a few of the great many different health care routes through which drugs and related items become available to Liberian citizens. To these can be added the doctors' offices and the numerous private clinics, many of which have come into existence since the closing of JFK Hospital in September, 1983. Total drug consumption statistics cannot be calculated -- only that pharmaceutical imports in 1981 totaled \$8,500,000.

Although, again, their magnitude is not discernable, donations of drugs are significant in volume (although some are of questionable therapeutic significance). When shipped to NMSD they are redistributed on request throughout the country. NMSD is bypassed by some donor agencies; these, for example, ship to MH & SW Headquarters, and this office, in turn, undertakes to distribute to various health institutions. Then there are donors who choose to sporadically give to just one or another institution -- usually with considerable publicity -- which may or may not be able to use the items. In other words, donated items in various quantities and of varying usefulness come to Liberia from many sources to untold numbers of recipients without any control or overview or centralized responsibility such as might be exerted by NMSD or by the programs discussed below: namely Planned Parenthood and Family Planning Programs; the Extended Program of Immunization (EPI); and Tuberculosis and Leprosy Programs.

- Planned Parenthood Programs are advanced by the Family Health Division of MH & SW and the Family Planning Association of Liberia, with support from FPIA (85%) and Pathfinder (15%). The Family Health Division stores its items in the NMSD warehouse and distributes them to hospitals and clinics by means of its small field force. It reports that 12,400 persons received its items without charge in 1983. Family Health of MH & SW work is assisted by the Liberian FPA to which it gives a small operative grant and which is funded by IPPF. The FPA emphasizes "child spacing." It charges nominal fees for its items: oral contraceptives at \$1.00 per cycle (17,000 in 1982), condoms at 3 for \$0.25 (7,000), jelly and foams at \$0.50, injectables at \$5.00 (3000), plus IUDs (8000) at an unstated price.

The private sector plays a significant role in the distribution of contraceptives. An estimated 40,000 cycles of 10 brands of the Pill are sold in the \$2.00 to \$3.55 range.

- EPI is receiving new emphasis in the program entitled "Combatting Childhood Communicable Diseases." The project, while emphasizing child health care, targets to provide increased immunizations for the total population (BCG, Measles, DPT, Polio, Tetanus Toxoid) as well as Oral Rehydration Salts and Chloroquine plus the necessary cold-chain equipment. Delivery to clinics is rather nondescript, at the moment, from the center in Monrovia.
- Drugs used in the Tuberculosis program are obtained from UNICEF with only a small amount procured through NMSD and the private sector. Included are Streptomycin, Isoniazid, Ethambutol, Thiacetazone.

- The Leprosy program is supported by the donation of therapeutic items from Germany in quantities requested by the six clinics through MH & SW. Upon receipt in Liberia, they are stored briefly by MH & SW while awaiting pick-up by the clinics. The following drugs are used: Dapsone, DDS, Clofazimine, Rifampicin.

1. By Way of Summary

- There is a scarcity of qualified pharmacists and pharmacies in Liberia; only 3 or 4 are in Government Service; all but 4 of 35 pharmacies are located in the Monrovia area.
- Communities are served by registered medicine stores; they and the pharmacies sell over the counter many drugs which are heavily restricted in industrialized nations.
- Drugs and related items in the public sector are procured (imported or otherwise) and distributed by a great multitude of different agencies, programs, and institutions; no central responsible agency is operative.
- No guidelines exist respecting procurements (purchases or donations) nor the rational distribution, prescription, and use of drugs.

2. County Hospitals

Hospitals at the county level serve two purposes in the supply management system. First, county hospitals serve to assemble requisitions of health centers and clinics. In some circumstances, as noted earlier, health centers and clinics do not produce a requisition, but rather the county hospitals "estimate" the drug needs of these facilities. Secondly, hospitals serve as redistribution points for drugs. In some instances shipments to health centers and clinics are transshipped through county hospitals. Alternatively, county hospitals which have requisitioned for health centers and clinics, re-assemble and repackage shipments before forwarding.

Requisitions at the county level are the responsibility of the county medical officer who prepares requisitions according to a variety of criteria which he establishes. These requisitions are prepared quarterly, although emergency orders are able to be placed.

Although a large variety of drugs and drug-related supplies are theoretically available, actual stores at the county hospitals are very meager and inadequate to meet even the needs of emergency patient care. Requisitions are rarely completed in their entirety because of shortages at NMSD. Emergency requests are filled, but not in all circumstances and generally only after weeks if at all.

Drugs are stored at the county hospital in a separate storeroom apart from the hospital pharmacy. These storage facilities are generally adequate, although they are in need of upgrading. Dangerous drugs are stored separately at this level and are accessible only by the physician in charge. Where health centers and clinics have requisitioned drugs on separate requisition forms, their prepackaged shipments are often stored separately from the hospital drugs -- although with the current shortage of drugs, hospitals admit to "borrowing" from health center and clinic supplies.

There are no unified practices established or followed for disposal of expired or otherwise unusable drugs at the hospital level and other dispensing sites.

Not much was ascertained by the Study Team regarding prescribing practices at this or lower levels. That drugs run out within a few days or weeks of their receipt at the hospital complicates an assessment of prescribing practices. Anecdotally, we found varying degrees of continuity in prescribing practices for a selection of diseases across types of facilities. That is, the same diseases are subject to widely varying prescription practices regarding individual drugs.

With regard to fees, hospitals, health centers, and clinics are supposed to be collecting certain registration fees from patients. Considerable variation exists from unit to unit in the rules concerning collection of these fees, effectiveness in collection of fees, and disposition of funds collected. The information on each of these issues obtained from the health centers and clinics (and from the outpatient departments of the hospitals) which were visited by the Study Team is summarized in Table 1.1. The most important conclusions appear to be:

- Roughly 80% of all patients are exempted from payment of fee policy.
- Many of the other patients either do not pay at all, or only pay part of the fee.
- Some units keep part of the money collected, while others do not.
- The amount of money collected through the present fee system (even if all of it were to be kept by the MH & SW) would not be sufficient to cover drug costs.*

*A study by CHAL estimated that their units were spending about \$0.75 per patient for drugs. (Total average cost per patient visit was \$1.35 of which they collect \$0.85 per patient visit.) The highest average collection per patient in Table 1.1 is \$0.44. The highest average collection (\$0.44) was in a hospital which has established much higher fees than other units.

OUTPATIENT REGISTRATION FEE POLICIES AND COLLECTIONS FROM
SELECTED HOSPITALS, HEALTH CENTERS & CLINICS
AUGUST, 1984

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Table 1.1

NAME OF INSTITUTION	REGISTRATION AND OTHER FEE POLICY	PER DAY	AMOUNT COLLECTED PER PATIENT	SOURCE	FEE COLLECTED
<u>Montserrat County</u>					
Paynesville Health Center	50¢ from any patient who receives drugs				100% to Min./Finance
Barnersville Health Center	Registration - 50¢. Follow-up - 25¢. Lost card -\$1. 7-14 half. 0-6-free.				100% to Min./Finance
Redemption Hosp., New Kru Town	Any visit - \$1.50. Soldiers, police & dependents - \$1. Students - 50¢ 0-5 free. Lab test - 50¢ 12-4:30 visit - \$2. 4:37 - mid-night visit - \$3	\$29.65	44¢	Records for 10-day period in July 84	25% to Min./Finance Remainder kept for general hospital expenses
Kakata Hospital	Registration - 50¢ Follow-ups - 25¢ Children-half. Indigents, students, TB, Leprosy, Soldiers, Police & their dependents - free. X-Ray & pregnancy test fees Emergency room fees.	\$ 5.67	13¢	Records for 9-day period in July 84	100% to Min./Finance except emergency room fees (\$10-45/week)
<u>Grand Cape Mount</u>					
Madina Clinic	25¢ for any visit. \$5 delivery fee.	14-23¢	1.84	Staff	Whatever remains after deduction of their expenses
Robertsports Hosp.	Registration for each new illness - 50¢. Follow-ups - 25¢. Soldiers, Police, Students, 0-5-free	\$2.82	11¢	Records for June 84	100% to Min./Finance
Sinje Clinic	Registration - 50¢ Follow-ups - 25¢ 6-15-half. Students, Soldiers, 5-free. Delivery - \$10				Whatever remains after deduction of their needs
Moniba Clinic	Registration for each new illness - 50¢. Follow-ups - 25¢. Children - half. Students, Soldiers, Police, 65 - free. Delivery - \$10	\$1.39	20¢	4-year summary records Records for 5 days in July 84	Whatever remains after deduction of their needs.
<u>Maryland County</u>					
Pleebo Clinic	Registration - \$1. Soldiers, Police - free.	\$10		31 July Receipts	
Sodeke Clinic	Registration - 50¢. Children - half. Babies - free	45¢	5¢	Clinic staff estimate for July 84. No records kept.	
<u>Bong County</u>					
Falala Clinic	Registration - 50¢. Follow-up - 25¢. 2-15-half. 2 yr.-				No accurate records. At end of month, they deduct their expenses. Remainder to Min./Fin.

3. Health Centers and Clinics

Health centers and clinics relate to county hospitals separately insofar as the drug supply management system is concerned. The physician assistant at each different type of facility (or the nurse midwife in some clinics) each completes his/her own requisition form -- if the system has not broken down and the county has assumed purchase ordering for the facility through estimation of need. Where requisitions are still being completed, these are done quarterly based on rough extrapolation from past usage.

The requisition is then brought to the county hospital, usually by the staff member who is entrusted to go there monthly to obtain staff salaries. He brings the requisition to the individual who is in charge of the county hospital's own drugs and who doubles as a distributor of health center and clinic drugs. If the health center and clinic staff person have access to transportation, the requisition may be filled immediately, depending upon the availability of drugs, and taken to the facility the same or a subsequent day. Otherwise, the requisition will be filled at a later date, then it is taken to the facility either by the county hospital's own vehicle or by a vehicle hired at the facility's expense.

Health centers and clinics, as noted earlier, do not receive all the drugs they requisition: only a portion of one-half of the items appears to be the norm. In some instances, as noted previously, they no longer bother to complete requisitions. Instead, whenever drugs arrive at the county hospital from NMSD, a proportional share is sent to each health center and clinic or picked up by them.

In addition to regular quarterly requisitions, clinics and health centers may also request emergency drugs and supplies from the county hospital. Presumably, this procedure was originally initiated for real emergencies which required larger quantities of one or more drugs than should normally be kept in stock. Now, however, due to the normalcy of under-availability of drugs, the emergency requisition procedure is frequently used to try to obtain non-emergency items.

An exception to the distribution chain described above exists for Montserrado County (the county which includes Monrovia). For this county, each health center and clinic deals directly with NMSD rather than a county hospital. Their requisitioning procedures (including emergency requisitions) are similar, but each unit must go directly to NMSD for its supplies.

Drugs are stored at the health center and clinic levels in separate storage areas. It is hard to assess the general adequacy of these facilities (storage areas) from the small number of facilities we visited. Theft by "rogues" was a common complaint, and upgrading of the security at these facilities would be an area for further investigation.

Comments made earlier regarding disposal and prescribing practices at the hospital level are applicable to the health center and clinic level.

4. Villager Access to Drugs

For all practical purposes, the formal government drug supply management system does not now extend into the village. In most of Liberia, villagers obtain drugs by going to larger villages, towns and cities. Drugs and drug-related supplies when obtained or purchased are generally gotten from government health facilities (hospitals, health centers, and clinics), and from private medicine stores, drug shops, and general village shops. We do not know what proportion of villagers obtain pharmaceuticals from the public or the private sector. However, we have determined that most government health facilities we visited are generally without any significant supplies, while private medicine stores, drug shops and some general village shops have some drugs. A wide degree of variation exists among private sector drug shops and the range of drugs they sell. The qualifications of private sector vendors of pharmaceuticals is highly variable, and government supervision of these shops is limited. In addition, it seems that the public often bypasses government health facilities (where variable supplies of drugs exist) to seek care and treatment from the private sector vendors. Complicating this situation and exacerbating it is the fact that the government health system, which is often out of drugs, simply gives its patients prescriptions to be filled at a private drug shop. Eventually, patients bypass the government health system and go directly to the local shops for care and treatment.

A potentially widespread source of selected pharmaceuticals to the communities of rural Liberia is the Village Health Worker (VHW). However, VHWs are not now uniform in their roles and responsibilities or activity where they exist in Liberia; and few, if any, are distributing drugs. VHWs are practicing in only limited areas of the country: Maryland County and parts of Grand Gedeh, Grand Cape Mount, and Bong Counties. Plans for initiating or rejuvenating VHWs are underway in Sinoe, Grand Gedeh, Bong, Nimba and Bomi Counties.

IV. AREAS OF THE SUPPLY MANAGEMENT SYSTEM IDENTIFIED AS REQUIRING STRENGTHENING

Following along the lines of the framework of the supply management system described for background purposes in the first part of this chapter, areas in need of strengthening in the existing system of MH & SW can be enumerated in relation to the Formulary, Supply and Inventory Services, and the Consumer Services. A short description of the major weaknesses of the supply management system is given under each of these three subheadings below.

A. Weaknesses of the Formulary

The entity which is loosely called Liberia's Drug List (i.e., NMDS's catalogue) is impaired in the following respects:

1. No true formulary, per se, actually exists to guide and promote rational prescribing practices and use of drugs in Liberia, particularly in the public sector.
2. NMSD's drug catalogue lists a wide range of almost 400 drugs and drug-related items. However, less than 140 are on NMSD's warehouse shelves. Further, there does not seem to be a relationship between the nation's health priorities and the range of drugs and drug-related supplies on the drug list.
3. No drug committee exists which might review the drug list/formulary on a regular basis, advise on special requests and orders, and adjudicate disputes regarding the use of drugs in Liberia.

B. Weaknesses of Supply and Inventory Services

1. Personnel/Organization

NMSD staff, while responsible to the Director of NMSD who is also the Chief Pharmacist, are paid by two different agencies within the MH & SW and one non-MH & SW government institution (JFK Medical Center). This arrangement is inherently disadvantageous to the management integrity of NMSD. Similarly, the supervision of the NMSD through the supervisory committee -- with its complicated relationship with the NMSD -- also undermines the management integrity of the NMSD.

The hierarchy of administrative posts in the NMSD with consequent compartmentalization of administrative functions impairs the conduct of NMSD affairs in an efficient, timely, and orderly fashion. The hierarchy also encourages centralization of decisions and fragmentation of authority and effectiveness at lower levels of NMSD.

The Chief Pharmacist is responsible to the CMO and ultimately to the Minister of Health and Social Welfare, yet the person who acts in the absence of the Director is in the employ of the JFK Medical Center, an institution which acts in effect as a separate Ministry, and which is not accountable for the budget allocations of the NMSD. This circumstance potentially can allow for preferred treatment of JFK Medical Center for available NMSD inventory, without budgetary accountability.

All NMSD purchase orders must be countersigned by the Chairman of the NMSD Supervisory Committee (who is the Administrator of the JFK Medical Center).

2. Physical Facilities

Central and regional facilities for storage and trans-shipment of drugs and drug-related items are basically adequate. However, all facilities require varying degrees of upgrading. While there may be a need for some very minor additions to some regional health facilities where storerooms do not exist, no need for additional construction of major facilities is in evidence. Because NMSD's physical facilities are not organizationally distinct from JFK Medical Center injects uncertainty into NMSD's long-term management as well as potentially contravening authority within NMSD. However, this issue should not be confused with the physical facility of NMSD which is physically distinct from other JFK Medical Center buildings -- although it is located within the JFK compound.

3. Purchasing

NMSD has been and continues to be under-financed to achieve its objectives. Erratic receipt of its quarterly allotment from the Ministry of Finance against its approved, appropriated budget, and reductions in its appropriated budget at the time of receipt of quarterly revenue allotments undermines the purchasing power of NMSD by forcing it to buy from the local market which extends credit (unlike foreign suppliers). This also disrupts the volume of drugs in the "pipeline" dramatically.

Inventory control within the warehouse and in office records is lacking (stock-on-hand, inventory values, expired and obsolete items, etc.). This causes confusion for re-purchasing in an effective and orderly fashion.

Vagaries of funding prevent the tendering system from taking advantage of the best possible suppliers or price, and from utilizing institutional agencies such as Unipak or IDA.

Dispensary sites purchase drugs from non-NMSD sources without any record by the government's central system.

NMSD is not purchasing drugs for all government uses. This is to the disadvantage of the MH & SW.

4. Redistribution

Current inventory includes large quantities of expired, obsolete, and redundant items all of which occupy valuable storage space and are or would be dangerous if redistributed and used at the consumer level.

NMSD has no operating vehicle and, primarily because of continuing recurrent funding shortages, the potential for NMSD to maintain one and keep it in full service is questionable.

NMSD does little or no repackaging or prepackaging, both of which could be done to some advantage to NMSD and the health system.

JFK Medical Center gets preferred treatment relative to supplies available and relative to requisitioning frequency.

Dispensary sites often get items from NMSD which they do not order and cannot use.

Delivery time from NMSD is often slow, usually four or more weeks from time of receipt of a requisition.

The inventory record system fails to record the cost of items and dwells only on a selling price (currently of fictitious value).

NMSD is not the sole redistribution authority of drugs and drug-related supplies of MH & SW facilities and programs. This is to the economic disadvantage of the MH & SW, and helps to make the health system less effective.

C. Weaknesses of the Consumer Services

The consumer services element of the supply management system is subject to the following inadequacies:

1. Drug inventories are virtually non-existent during most periods (i.e., quarters).
2. The scope of items available is wholly inadequate to treat even the most common causes of morbidity or mortality.
3. Health facilities are often very distant from the villages.
4. The storage facilities at the dispensing sites are adequate, but in need of upgrading. Some counties are without a proper storage room at the county hospital level for drugs. Minor additions to the existing facilities or interior alterations are feasible.

5. Drug disposal procedures are needed at all dispensing sites regarding expired and expended items.
6. Trans-shipment procedures to dispensing sites are inadequate.

V. RECOMMENDATIONS TO STRENGTHEN THE SUPPLY MANAGEMENT SYSTEM: CENTRAL LEVEL THROUGH CLINIC LEVEL

Apart from financial interactions of the system, this chapter has attempted to present an overall view of the drug supply management system, and identify its weaknesses. The financial issues will be identified and discussed in the next chapter. However, irrespective of the outcome of a financial analysis, it is possible to draw several conclusions about how to improve the existing supply management system within the existing levels of financing. These are presented below in the form of recommendations to strengthen the system. The reader can correctly infer that the Study Team feels these recommendations are unaffected by and will mesh properly with any new financing mechanisms which might be instituted in the future, including the revolving drug fund.

A. Specific Recommendations Regarding the Drug List

It is apparent that the Government of Liberia cannot afford to provide a wide range of pharmaceuticals to treat all the sick people in the country. The concept of developing a short list of drugs is not new in Liberia. In fact, various formularies and abbreviated lists have been developed by the NMSD and JFK Medical Center. Each of these lists contains about 150 items. However, it has been suggested by persons at all levels of the health services ranging from the Minister of Health to the village health worker that a streamlined, consolidated list of drugs be developed which includes those drugs that satisfy the basic and primary health care needs of the majority of the population. Such a list can provide a national basis for drug procurement and for establishing level-of-use drug requirements at the various levels within the health care system. It would also help assure that designated drugs would be available at all levels in the adequate amounts and in appropriate dosage forms. In this context, the following recommendations are made:

1. The MH & SW needs to create a Central Drug Service Board with a sub-committee to control a considerably reduced Vital Drug List. Other responsibilities of this Central Drug Service Board

are discussed later in this document; however, some immediate and specific responsibilities in the context of a Vital Drug List would include:

- a. Confirming and adopting the Vital Drug List recommended in Appendix III.

- b. Supervising the execution of a regular comprehensive national drug needs assessment, perhaps in conjunction with the PHC Project Baseline Survey. Such an assessment might attempt to establish basic incidence and/or prevalence of major diseases (or sign/symptom constellations) through a household survey; usage patterns of government health facilities by the population (KAP studies); and attempt to apply these epidemiological patterns to populations served by the MH & SW to ascertain (guided by Liberian or international formulary information) appropriate generic drug needs of health facilities. This would have to be done in the context of MH & SW goals and objectives vis-a-vis health priorities.
 - c. Establishing the criteria (adapted from recommendation 2 below and also in Appendix VI) for developing subsequent editions of the Vital Drug List.
 - d. Establishing the priority among Vital Drug List drugs for purchasing in the event of limited funds.
 - e. Reviewing the Vital Drug List for appropriateness as new epidemiological data regarding health status and usage patterns are obtained.
 - f. Reviewing and acting upon special requests from government health facilities for items not on the Vital Drug List.
 - g. Assuming responsibilities for relevant policy-making assigned to it by the Chief Medical Officer who would be the chairman of the committee.
2. It is recommended that the Central Drug Service Board consider at least the following factors/criteria in establishing a Vital Drug List:
- a. The list needs to be drastically reduced in size and should be designed to provide essential basic therapy (chemoprophylaxis as available, early and late treatment regimens) for a major portion (i.e., 75-80%) of illness situations which might be encountered in Liberia.
 - b. The List should not attempt to meet all drug needs of Liberia inasmuch as items not on the list will still be available in the private sector.

- c. The list should be limited to the drug needs relevant to the ten leading causes of morbidity and mortality plus a few other selected items such as contraceptives, emergency care items, drug-related items needed to administer the drugs on the list, or items which fit into the main health priorities of the nation.
 - d. To enhance patient compliance, long-acting and smaller dose medications should be given a higher consideration to be included on the Vital Drug List than should multi-dose therapies.
 - e. Flexibility and calculability of dose. Ease of obtaining multiple dosage amounts from a single preparation (e.g., one 125 mg. dose in stock and have patient take two or more tablets for a higher dose, or 250 mg., 500 mg., etc.; additionally, measuring 1/2 or 1/4 a tablet can be more accurate than measuring 1/2 or 1/4 a teaspoonful).
 - f. Ease of transportation and storage (oral solids are lighter and less bulky to transport and store than are liquids).
 - g. Cost-of-therapy vs. cost of single dose unit. A preparation might be more expensive than a single dose but in the long run be cost effective because it provides a cure and greater compliance.
 - h. Extent of training required by health staff to use additional drugs.
 - i. The minimum number of drugs needed to treat a specific disease should be included. The committee should not opt for multiple variant brand names of the same generic drug.
3. The Vital Drug List is recommended to specify which levels of health care system are eligible to receive the drugs and drug-related supplies, and the professional categories which are authorized to prescribe and/or administer first or subsequent prescription of the item. (See Appendix IV for recommendation in this regard.)
 4. A Formulary is recommended to be published and distributed which includes guidelines and brief information for prescribing and using each preparation on the Vital Drug List. This document should embrace indications for use, dosage range, side effects, precautions, and contra-indications. Indeed, the drug service and the MH & SW desparately need to develop an updated set of unified standing orders for health staff of all categories and all levels of the system regarding the treatment, cure, and referral of all patients.

B. Specific Recommendations Regarding the Supply and Inventory Services

The inadequacies of the existing drug supply management system described earlier in this chapter combine to jeopardize the credibility of the government health care system of Liberia. A significant problem, the Study Team has found, is the ill-defined and fragmented lines of authority, responsibility, and contact inherent in the organizational structure of NMSD. As a result, operating capability of the supply management system is compromised both centrally and at lower levels. Further compounding the inefficiencies of the supply management system's operations is that these inadequacies have given rise to multiple and parallel government-run supply management systems to service existing MH & SW programs with their specialized or regular drug and drug-related needs. At lower levels of the supply management system (i.e., county hospital, health center, and clinic levels), inadequacies of the system are primarily administrative in nature and stem from limitations in operating capability at the central level of the system.

Contrary to the existing circumstances in Liberia, a central body overseeing a drug supply management system should be expected to play a leading role in all aspects of pharmaceutical services at all levels of the public sector. It should be expected to have unambiguous lines of authority, responsibility, and control. It would be expected to fulfill a role which is characterized by much more than being a "depot" for shipping drugs. In this context, the following specific recommendations are offered:

General

1. NMSD, per se, should be dissolved and simultaneously replaced by a new body. This body might be called the Liberian Government Drug Service (LGDS), or have any name which accurately describes its function. This central drug service would be a separate department within the MH & SW. It should be recognized that this recommendation implies much more than a name change as reflected in the recommendations which follow.
2. The LGDS would be under the sole aegis of the MH & SW, and responsible only to the MH & SW. It would be staffed by MH & SW employees responsible only to the MH & SW through the CMO, and would maintain financial and operational accountability to the MH & SW.
3. LGDS would be charged as the singular central department having sole responsibility for the continuous supply (procurement, warehousing, and redistribution) of the listed drugs to the public sector (including JFK Medical Center). Hence, as such, any straight-line programs of the MH & SW which currently have their own drug supply management systems (i.e., EPI, CCCD, Family Health Division, Leprosy, TB, or others which the Study Team does not know about) are recommended to be phased into LGDS as LGDS achieves certain predetermined levels of efficiency and effectiveness. This will be discussed further in the last chapter of this report.

4. The Vital Drug List should immediately be adopted and procurements, both purchased and donated, should be restricted to its items only.
5. Recommended financing (see Chapters II and V) should immediately be arranged toward purchasing, by December 1984 a basic 12 months' "seed" stock of required Vital Drug List items. In turn, LGDS shall seed each dispensing site, and provide monthly replenishment of it. As the primary health care programs expand to the village level, its VHWs are to be brought into the LGDS supply management system in the fashion to be decided upon after further study of the issue.
6. The Central Drug Service Board should take initial responsibility for establishing procedures to apportion drugs to health facilities and implement these procedures. As better information becomes available for a more rational, information-based allocation, this information should be utilized by the Board to develop revised allocation procedures.
7. It is recommended that the Central Drug Service Board perform initially as a taskforce to plan, schedule, and oversee the implementation of a strengthened drug supply management system. In its more permanent form, it will work as a Board performing an authoritative and supervisory role in the LGDS regarding national drug supply matters through regularly scheduled meetings. This Board would have regular liaison with the PHC Program Coordinating Committee. There would be temporary standing subcommittees (possibly including non-Central Drug Committee experts) relating to:
 - a. Drug List/Formulary.
 - b. Supply and Inventory (issues regarding tendering, procurement (including donor items); inventory; distribution (including transportation)).
 - c. Finance and Accounting (issues regarding pricing; inventory records; sales records; invoicing; accounts payable and receivable; statistics; internal audits (spot check and routine); etc.).
 - d. Physical Facilities (issues regarding central and dispensing sites).
 - e. General Administration (issues regarding management procedures; staff routines; job descriptions; personnel; and equipment).

8. Membership of the Central Drug Service Board, which shall meet regularly, is recommended to reflect primarily the composition of the MH & SW of which it is a part and to include:
 - a. The Chief Medical Officer of the MH & SW as its chairman
 - b. The General Manager of LGDS.
 - c. The Chief Pharmacist of the MOH.
 - d. The Pharmacy Administrator of JFK Medical Center.
 - e. The Chief Medical Officer of the JFK Medical Center.
 - f. Two Medical Officers from the county level.
 - g. Both Deputy Chief Medical Officers of the MH & SW.
 - h. Senior Administrative Officer of the MH & SW
 - i. Chief of Nursing Services for the MH & SW.
 - j. Pharmacologist of the Medical School.
 - k. Other persons/organizations deemed appropriate by the MH & SW.
9. On another topic, the MH & SW needs to establish and distribute to potential donors a policy statement regarding gifts of drugs and drug-related items. This policy should indicate that only the items on the Vital Drug List or items which might substitute for a specific item will be accepted. In any event, the Central Drug Service Board will have sole authority to determine acceptability of all donations of drugs or drug-related supplies.

Personnel

1. The new LGDS should have its staffing pattern organized so as to provide an integrated upward chain of authority and with downward delegation of responsibility.
2. All personnel should be responsible to the General Manager of LGDS alone and should be on the MH & SW payroll allocated to LGDS (see Appendix V).
3. The staffing pattern of the newly organized LGDS should include an Assistant Manager for Supply and Inventory Services; and an Assistant Manager for Financial Services. The former would act on behalf of the General Manager in the absence of the General Manager. The Assistant Manager for Supply and Inventory Services would be responsible for procurement, warehousing, and redistribution activities and personnel. All financial transactions, procedures, statistics, and related activities (including inventory costing, price calculations, invoice pricing, etc.) and bookkeeping should be under the Assistant Manager for Financial Services.

These three senior officials (and probably all supervisory personnel) would regularly receive the flow of all management information having to do with LGDS undertakings.

Under the Assistant Manager for Supply and Inventory, there is recommended to be a Supervisor of the Drug Warehouse, and a Supervisor of Medical Supplies. Under the Assistant Manager for Financial Services, there is recommended to be a Supervisor for Pricing and Inventory; and a Supervisor for Bookkeeping.

4. Further to the above and with reference to the top three positions, it is recommended that:
 - The Management Operations Team of the Drug Service would be composed of the General Manager, the Assistant Manager for Supply and Inventory Service, and the Assistant Manager for Finance and Administration. In conjunction with the Board and its subcommittee, the Team would implement policies and procedures for the effective and efficient operation and management of the Drug Service and its components.
 - The General Manager must be a person knowledgeable and experienced in senior administration and management. Preferably, he should be a pharmacist having these skills.
 - The Assistant Manager of Supply and Inventory should, preferably, have a background in drug-related work including a working knowledge of supply routines, of inventory management needs, and of drug commerce systems.
 - The Assistant Manager of Finance and Administration should be an accountant capable of overseeing the finance-related procedures of the office including the accounting functions required of a self-responsible unit of the Ministry.
5. LGDS, subject to approval of the Central Drug Service Board, should establish clear job descriptions for all employees.

Physical Facilities

1. The study team strongly recommends the LGDS retain the present national warehouse and office facilities, and that these be designated the permanent site for LGDS. LGDS should assume the cost of utilities and upkeep of these facilities. LGDS should be freed of the possible reclamation by JFK Medical Center of these facilities by taking the necessary steps to separate the physical structure of the department, organizationally, from the JFK Medical Center.
2. At this time justification for a new central warehouse cannot be made on the basis of space needs, increased cost effectiveness/benefit, inadequate existing facilities. NMSD's current problems relate to budgetary problems and limitations of organization and management systems -- not physical facilities. It is recommended that a new warehouse should not be built. The

- existing appropriation could be better utilized for upgrading the present facility, a course which is now recommended. Upgrading might include, but not be limited to, providing extensive additional shelving, a small dangerous drugs lock-up area, firefighting equipment, improved atmosphere control (including cold chain facilities, security, etc.), all at minor cost.
3. Upgrading of country and other lower level health facility store-rooms with monies saved by not constructing a new central warehouse could provide significant additional savings by lessening damage to drugs caused by environmental factors and losses due to theft.

Purchasing

1. General

- a. From the perspective of procedure, the NMSD procurement system is adequately designed, but is not used or is otherwise undermined. There is a need for some modification to strengthen staff's access to and ability to retrieve information which needs to flow from staff to supervisors to the director. The filing system which feeds the office cardex (i.e., the perpetual inventory of each item) is in need of modification to exhibit:

Maximum stock, average monthly issues, reorder level.

Purchase order number, date, supplier, and quantity ordered.

Date received, supplier, invoice number, quantity received, new balance on hand, CIF cost per unit, new average inventory, new selling price.

Date issued, requisition number, recipient, quantity issued, balance on hand.

A suggested format is attached (Appendix VI) along with calculation of new average inventory values and, in turn, new selling prices.

- b. Local purchases should be limited to emergency quantities only. However, local qualified wholesalers may participate in tendering of regular drug orders as discussed below.
- ### 2. Supplies

Supplies of drugs and drug-related items in the public sector shall be those described in the Vital Drug List only. Existing

stocks of other items shall remain available for distribution until inventory is depleted. The only exceptions shall be an item specially applied for and specifically authorized (by the Chairman and one other medical member of the Central Drug Service Board) and then only in an amount required to meet the circumstances of the request.

3. Suppliers/Vendors

Suppliers/Vendors to the national drug service shall result from a competitive international tendering system among manufacturers, not-for-profit institutional suppliers, and distributors both overseas and local.

Suppliers obtained outside the tendering system (e.g., from a local pharmacy) should be limited to emergency quantities only.

4. Procurement

Procurement by LGDS needs to take into account the delivery lead-time required by the vendor plus administrative and local handling times: on average, three months plus one month, plus a safety factor. To provide continuity of fresh stock and economical investment in tangibles, stock turnover shall be at least two times per year. Hence, six months' supply is ordered when the central inventory reaches the average five months' level (theoretically, when delivered and on the shelves four months later, central will be down to one month and the dispensing sites at two months).

This is the "Supply Pipeline": full at nine months' supply (seven months centrally plus two months in dispensing sites); at maximum supply with twelve months' supply (of which three months is in dispensing sites); at reorder level when only five months' supply exists centrally; at minimum low supply when central is at one month and dispensing sites at one month supply.

Warehousing and Redistribution

1. General

- a. LGDS should re-establish procedures for warehousing. The warehouse needs to be neat and orderly and stocks need to be on open shelving to ensure full inventory control, and to facilitate rapid and accurate filling of requisitions. Obviously, the nature of items (size of package, frequency of requisitioning, shelf-life, abuse potential, etc.) may cause exceptions to the rule of shelving according to generic name in sequence.

- b. Existing stocks need to follow FIFO recycling (First in, First out).
- c. Legislatively-restricted Dangerous Drugs need to be separated and secured, and be under the personal control (stocking and picking) of the supervisor.
- d. Newly received items and outgoing orders need to be checked by the supervisor.
- e. Given the confirmation of the new Vital Drug List, a new pre-printed Requisition Form needs to be provided to each facility.
- f. Rather than the present quarterly routine, each facility will prepare requisitions monthly for quantities sufficient to bring the stock back to a three-month maximum level (keeping in mind package sizes and limited storage space).

2. Repacking

Repacking from large bulk quantities into smaller size dispensary bulk packages is worthy of consideration (e.g., a drum of 100,000 capsules repacked into 500's). However, economies of scale may produce the same savings and in better containers when clinic-size quantities are specified in the tendering process.

3. Prepackaging

Prepackaging in course of therapy quantities is recommended, particularly for items being distributed by VHW's. Their labels will include simple pictorial instructions (pictograms).

Consideration should also be given to similar prepackaging of all drugs and related items (which lend themselves to such procedures) for dispensing to outpatients at all health care institutions. Equipment for this is inexpensive and readily available. Training in its use is minimal. Materials cost would be part of the operating cost of the Drug Service. Space requirements are not great but must be in an area separate from the general warehousing activity. Procedures must be monitored in a cross-verification manner to obviate errors. (See Appendix VII.)

4. Redistribution

Rather than the present routine of acquiring their supplies each quarter, hospitals and the health center and clinics of a county are recommended to requisition monthly during a pre-designated week for amounts sufficient to replenish their stocks to a three-month level.

The completed orders, individually identified in securely sealed shipping packages (cartons, bags, etc.), shall be collectively transported to the county hospital from which they will be trans-shipped to the health centers and clinics.

Supplies for VHWs will be included in the requisitions of the health centers and clinics.

True emergencies occurring outside the designated requisitioning week would be affirmatively handled.

JFK Memorial Hospital, when it reopens, would be provided with requisitioning privileges on a designated day each week. Other facilities of JFK Medical Center will purchase drugs and drug-related supplies from LGDS on a schedule determined by the Medical Center administration in consultation with LGDS.

5. Transportation

Transportation of supplies is recommended to be via private carrier(s) established through a public tendering system.

Bulk Compounding/Small Manufacturing

1. It has been suggested by NMSD or on behalf of NMSD to the Study Team that NMSD undertake bulk compounding/manufacturing. Indeed, intravenous solutions are prepared by Phebe Hospital and ELWA Hospital and others for their own use, but they don't have excess capacity. Additionally, there is a manufacturer of small plastic containers in Monrovia and the possibility of expanding production to economically produce drug containers might be investigated. However, immediate plans for manufacturing should be placed on hold until the basic supply management system is operating effectively.
2. A cursory view of the Pharmacy of JFK Memorial Hospital indicates that it, when reopened, should consider an expanded program of producing quantities of standard drug recipes (Whitfields' Ointment, Cough Syrups, and many others) for nationwide distribution via LGDS. Equipment costing less than \$20,000 would be very adequate. This work would also enhance the learning experience of Pharmacy students of the proposed School of Pharmacy.
3. Repacking from bulk containers and prepackaging in consumer size or course of therapy quantities are forms of "manufacturing." This is recommended for LGDS (Appendix VII). Beyond those activities, the Study Team does not recommend manufacturing activities for LGDS.

Consumer Services

Specific recommendations regarding the consumer services are directed mainly at the village level. These are discussed in Chapter IV.

Chapter II

FINANCE AND DRUGS IN THE PUBLIC SECTOR IN LIBERIA

I. INTRODUCTION

Improving the performance of the procurement and delivery of drugs in developing countries is not simply a question of designing and costing a new system. Corporate structures, management systems, purchasing arrangements, deliveries, prices, and financial flows exist within the realities of the society. An important set of these relates to the economy in general, the practices of the governmental and financial institutions, and the financial specifics of the present drug procurement and delivery system.

Each of these factors will be examined in this chapter. The first section covers the relevant trends in the Liberian economy, especially those linked to recurrent expenditures in health and pharmaceuticals. Foreign exchange and drug imports are examined. The second section describes various institutional practices important to providing drugs for the government's health delivery system -- budgeting, spending, banking, and foreign exchange. The third section focuses on the financial aspects of drug procurement and payments by NMSD and JFK Medical Center. Total drug purchases by the MH & SW and JFK Medical Center over the past six years are examined. The current financial position of NMSD is noted, and the financial, accounting, and supervisory problems of NMSD, MH & SW, and JFK Medical Center (in its drug purchases and payments) are discussed.

II. TRENDS IN THE LIBERIAN ECONOMY

In a developing economy such as Liberia's (\$540 per capita income in 1982), with about 45% of the monetary GNP stemming from the export sector, no domestic capacity to produce pharmaceuticals, and all public medical facility drugs resting on annual budgetary allocations, the state of the economy is critical to the fate of the supply of medicines.

Liberia's monetary economy was nearly stagnant from 1973-1977. After a two-year surge of over 4% per annum growth rates, growth has been negative from 1980 onward, with annual declines averaging over 6% over the four years. Exports were hit by world recession. The domestic economy suffered from uncertainty following the change in government in 1980, domestic inflation, government deficits of an average of \$106 million per year between 1979 and the end of fiscal 1982-1983, and private capital exports of nearly \$100 million from 1979 through June 1983.

A recovery is expected during the current fiscal year, resulting in a positive growth in GDP (1.2%) for the first time since 1979. Improvements are forecast in all major sectors. Austerity measures were insisted upon by the IMF and accepted by the GOL. These, coupled with improvements in the world economy, appear to provide a basis for optimism in the export and investment sectors, at least for the near future.

Liberia's external activities show a somewhat unusual pattern for a Third World country. First, it has continual trade surpluses. Second, workers' payments to abroad are very high, more than wiping out trade surpluses. These stem mainly from foreigners sending money out of the country and are officially nearly \$40 million each year.

Third, because of a lack of exchange control, bank and other private capital transfers can move freely -- both are sensitive to political phenomena and general movements in the economy. As a consequence, Liberia's overall balance of payments deficit has been \$46-74 million per year over the past four years.

Nevertheless, the IMF recently (March 1984) concluded that Liberia's balance of payments may be expected to improve over the next several years, providing the government continues to implement restrictive expenditure policies, particularly with respect to public employment and wages.

At the same time, it should be stressed that Liberia's external debt has increased steadily from \$359 million in 1978-1979 to \$941 million by the end of fiscal 1983-1984. The IMF's program of fiscal austerity includes no further debt rescheduling for the country and a reduction of total external debt to \$817 million over the next four years. Foreign aid, exports, and foreign investment are all projected to increase, but there will be little flexibility on the part of the government in its use of foreign exchange. Furthermore, excess reserves of the banking system (deposits of banks with the National Bank of Liberia (NBL) over and above what they are required to hold) have been high since 1981 (\$15.8 million in September 1983). This reflects (to what extent is not known) the desire of the banks to shift deposits to foreign accounts (on their own behalf and that of their depositors) in excess of the government's ability to provide the foreign exchange to finance such shifts. (See foreign exchange system in the next section.)

The relevance of all this discussion about foreign trade and payments lies in the fact that the steady importation of drugs and medical supplies required for the smooth operation of the revolving drug fund necessitates continual access to foreign exchange. Such guaranteed access may not be possible over the next several years.

With respect to GOL revenues and current expenditures, both continued to increase until 1982-1983 when they declined. Normally, over a third of government tax revenues comes from foreign trade taxes. These have shrunk to just over 25% of the total in the past fiscal year. Recurrent expenditures increased by 29% in 1980-1981 over the previous year, partly reflecting a 1980 100% increase in the minimum wage.

TABLE 2.1 LIBERIA: RECURRENT EXPENDITURES FOR GOVERNMENT OF LIBERIA AND HEALTH SECTOR (\$'000)

	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84 to (3/84)	1983/84 Annual Rate
EXPENDITURE							
Total Recurrent							
GOL ¹	152900	179700	232800	300600	265300	129038	172051
MH & SW	10580	12560	15093	17499	15187	13136	17515
JFK Hospital	7092	7085	7203	8289	6980	2237	-
JFK Medical School	58	61	57	55	33	26	-
Maternity Center	1109	1126	1224	1346	1332	899	1199
TNIMA	493	546	586	614	515	335	487
Total Health (3-7)	19332	21358	24163	27803	24047	16633	19201
Total JFKMC (4-7)	8752	8798	9070	10307	8860	3497	-
Salaries							
GOL		92837	141437	157320	136915	91302	121736
MH & SW	5929	6408	9200	10155	9878	8096	10795
JFK Hospital	3948	4192	4680	5035	4768	2220	2960
JFK Medical School	31	32	31	28	20	15	20
Maternity Center	662	712	830	872	983	655	873
TNIMA	307	353	409	443	391	256	341
Total Health (13-17)	10877	11697	15150	16533	16040	11242	14989
Total JFKMC (14-17)	4948	5289	5950	6378	6162	3146	4195
Drugs & Medical Supplies							
Rabies Control (Drugs Only)	0	0	-	-	-	-	-
Curative Service	693	923	833	1099	729	661	-
JFK Hospital	1026	1051	1292	1518	995	592	-
Maternity Center	192	192	217	269	187	119	-
Rehab. Hospital	53	52	63	62	26	18	-
T.B. Center	53	-	-	-	-	-	-
Malaria Control	-	-	5	-	-	-	-
Rivercess	-	-	-	-	-	5	-
Total	2017	2218	2410	2948	1937	1395	-
Source: Government of Liberia, Expenditure Report, 1978/79 - March, 1984. Ministry of Finance							
June, 1979 - 1983 and March, 1984							
¹ From IMF Report, March 1984							

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Table 2.2: LIBERIA: HEALTH EXPEDITURE ANALYSIS

<u>Salaries as % Recurrent Expenditures</u>	<u>1978/79</u>	<u>1979/80</u>	<u>1980/81</u>	<u>1981/82</u>	<u>1982/83</u>	<u>1983/84</u>
1. Government of Liberia	n.a.	52	61	52	52	70
2. Ministry of Health & Social Welfare	56	51	61	58	65	62
3. J.F. Kennedy Medical Center	56	60	66	62	70	-
<u>Drugs & Medical Supplies as % Recurrent Expenditures</u>						
1. Ministry of Health & Social Welfare	5	5	4	4	2	-
2. J.F. Kennedy Maternity Center	7	8	6	8	6	-
3. MH & SW and J.F.K. Medical Center	12	13	10	12	8	-
<hr/>						
<u>Drugs as % of Recurrent Expenditures</u>						
1. Ministry of Health Social Welfare	3	4	3	3	2	-
2. J.F. K. Maternity Center	4	4	4	5	3	-
3. MH & SW & J.F.K. Medical Center	7	8	7	8	5	-

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Source: Tables 2.1 and 2.4.

Table 2.3: LIBERIA: IMPORTS OF PHARMACEUTICALS (\$'000 CIF)

S.I.T.C. No.	ITEMS	1978	1979	1980	1981	1982	Main Suppliers	Footnotes Source:
541	Medicinal and Pharmaceutical Products	8014	9550	7721	8509	4291		The following items are samples of those included under the SITC number listed.
541.100	Vitamins	59	38	27	12	57	US	
541.300	Antibiotics	550	522	500	59	157	W. Germany	1. Caffein, cocaine, codeine, morphine, opium derivatives, quinine, strychnine.
541.400	Vegetable Alkaloids, their salts and derivatives	11	87	204	-	-	US	
541.500	Hormones	2	8	8	1	-	Congo	2. Blood derivatives, endothyrin, bone marrow, thymus, urine concentrates, venom.
541.610	Glycosides and derivatives	3	-	6	15	-	Sweden	
541.620	Organic therapeutic glands or other organs Extracts	4	9	-	-	13	US	3. Including ferments but not yeasts.
541.640	Antisera and microbial vaccines ³	29	125	98	96	41	UK	
541.650	Toxins, microbial cultures ⁴	21	20	17	36	42	US	4. Including ferments but not yeasts.
541.701	Internal analgesics & antipyretics ⁵	842	1,718	503	327	1,260	India	5. Aspirin, cortical tablets, phenacetin, seldlitz powder.
541.702	Sedatives & other Psychotherapeutic agents	135	1,339	1,022	388	752	W. Germany	
541.703	Pharmaceutical preparations working primarily on the respiratory system	361	757	800	259	363	Netherlands	6. Antacids, kapectate, laxatives, kidney pills, vitamin tablets.
541.704	Pharmaceutical preparations working primarily on the genito-urinary system ⁶	472	415	345	617	943	India/W. Germany	
541.705	Pharmaceutical preparations working primarily on the skin	1,131	525	859	274	277	Hongkong/China ⁷	Anaesthetics (mixed), anti-asthmatics, colloidal & solutions, counter-irritants, enzymes, eye drops, glycerol, medicinal injections (not
541.706	Vitamins and fish liver oils	87	68	257	369	75	US	antibiotic, hormonal, alkalides, or microbial products, iodine, liniments, magnesia
541.708	Pharmaceuticals for humans, n.e.c. ⁷	3,607	3,657	2,809	5,775	226	-	cannphor oil.
541.910	Bandages, surgical dressing, gauze, wadding	704	262	266	281	85	China	

hp

Hard times and IMF pressure resulted in the GOL reducing public sector wages and salaries by $16 \frac{2}{3}$ to 25 percent as of January, 1983. Recurrent expenditures fell by 12% in fiscal 1982-1983, and the government wage bill is expected to fall an additional 10% in 1983-1984. Government employees on the payroll rose from about 39,000 in 1978-1979 to a peak of just over 64,000 by the end of 1981-1982. By June 1984 they had fallen to about 45,500.

Again, the IMF expects the GOL's fiscal position to improve over the next two years "but serious financing problems will remain unless additional measures are taken."¹

The health sector has not been a priority of the Liberian government in terms of development expenditures relative to other developing countries. During any of the last six fiscal years the GOL has committed less than one per cent of overall development expenditures to health and considerably less than 10% of social and community service development expenditures. This share has drastically dropped during the past three fiscal years. Health fares much better on the recurrent expenditure side, taking about 9% of the total (down to 6-7 percent in the last two years). This is high for Third World countries, where health typically accounts for under 5% of total recurrent expenditures. Until recently, health represented one third of total recurrent expenditures for the social and community services sector; now it has fallen off to a quarter of that sector's total. Again, this is extremely high for Third World countries.

These expenditures reflect two elements of the health sector in Liberia: the first is a rather extensive network of hospitals and clinics throughout the country; the second is the large annual expenses associated with the JFK Medical Center. Table 2.1 provides an aggregate profile of health expenditures in relation to total GOL recurrent expenditures, MH & SW annual outlays, and the recurrent costs of the JFK Medical Center.

A number of things can be seen from Table.2.1. First, with respect to total expenditures, the increases that occurred from 1980 through fiscal 1982-1983 were not spread evenly. GOL expanded 18, 29 and 29 percent in those three years, respectively, while MH & SW expenses advanced 19, 20, and 16 percent, and JFK Medical Center outlays only increased 1, 3, and 13 percent in the same years. One may conclude that health, although apparently fairly well entrenched, is not regarded as a priority sector. On the other hand, when austerity arrived in 1982-1983, the cuts were nearly exactly the same for GOL, MH & SW, and JFK Medical Center, at about 13 percent. Second, salaries represent over half of total recurrent expenditures for GOL, MH & SW, and JFK Medical Center, although the latter spent over 60% on salaries. Another important point is that, when the economic crisis of 1982-1983 and 1983-1984 came, salaries actually increased as a share of recurrent expenses for all three. This is significant in light of the fact that outlays on drugs and medical supplies were cut over 25% by both MH & SW and JFK Medical Center in 1982-1983.

¹IMF, Liberia-Staff Report of the 1983 Article IV Consultation and Review Under Stand-By Arrangement. (Washington: IMF, 1984), p. 25.

Turning to pharmaceuticals, there are a number of points about trends in expenditures, and imports that are significant to the question of a revolving drug fund. Looking at Table 2.1 and Table 2.2 again, it is clear that Liberia's expenditures on drugs and medical supplies are an extraordinarily low proportion of total health recurrent expenditures. Third World countries typically spend between 20 and 50 percent of their health budgets on drugs and even countries that have introduced such policy measures as national formularies, tender purchasing, generic buying, and guidelines to standardize courses of therapy, have only managed to reduce drug outlays to about 15% of health expenditures. In addition, drug and medical supplies outlays took a healthy cut in fiscal 1982-1983, while salaries increased their share of health spending. The GOL priorities in health clearly do not lie with extending the availability of drugs and medical supplies.

Partial explanation for the relatively low expenditure on pharmaceuticals by government may relate to the substantial outlays by the private sector. As can be seen from Table 2.3, total pharmaceutical imports range between \$8 and \$10 million -- falling drastically with the fiscal crisis of 1982. If we calculate these imports as a percentage of total government outlays on health, the share of drugs jumps to between one third and one half before 1982. While this does not measure government efforts in the drug area, it does give a somewhat more realistic picture of the importance of drugs to health care in the country. In addition to government, these imports include those made by the mission hospitals, the foreign company health units (e.g., Firestone and LAMCO), other private health facilities, and wholesale imports which end up in private pharmacies and drug shops throughout the country. Since the recurrent expenditures of these health facilities are not included in our total health outlays, we have overstated the importance of drugs, but, clearly, they play a larger role in the entire country's health system than is indicated by the purchases of the GOL.

Two further points need to be made about non-governmental drug imports. First, private pharmacy mark-ups are based on the following: 1.5% consular fee; 7-1/2-12% landing cost 33-1/3% wholesale mark-up; 50-75% retail mark-up -- the higher being for upcountry sales. Thus, the total private retail prices range from 118-165% over the CIF import price. Second, total imports by NMSD and JFK Medical Center are about \$2.9 million (before budget cuts). When CHAL imports of about \$1.3 million per year and UNICEF and WHO imports of some \$500,000 per year are added to the government total, only some \$4.3 million of the total \$8-10 million worth of drugs imported are explained. This tells us that other voluntary and private medical facilities account for 50-60% of drug imports and, thus, their delivery to the Liberian population.

Imports of drugs are spread over a fairly wide group of countries, although only about 10% come from countries other than the US and EEC members. Internal analgesics (aspirin) and sedatives and other psychotherapeutic agents make up a large part of the drug imports -- 26% in 1980 and 47% in 1982. That is, antibiotics (4% in 1980, 6% in 1982) and respiratory drugs (10% in 1980, 8% in 1982) are relatively less important than aspirins and sedatives. Most Third World countries devote large percentages of their drug budgets to such items as antibiotics and antiparasitics.

III. LIBERIAN BUDGETING, SPENDING, AND FINANCIAL SYSTEMS RELEVANT TO DRUGS

A. Budgeting

Recurrent budgeting is from the Ministries upward. That is, each year the MH & SW prepares a needs budget sometime in February or March. In the past, the Ministry worked with a figure of \$1 million per year for its drug budget. But with the financial cutbacks in the past two years, it has worked within a total budget estimate given it by the Bureau of the Budget. Even in good years, there was no budgetary planning input from the health units within the Ministry. NMSD provided the drug estimate on historical data. The Bureau of the Budget sums the needs budgets from all the Ministries and confers with MOF on projected revenues. Hearings are then held with each Ministry, after which annual budget ceilings are given to each by the Bureau of the Budget. The Ministries then recalculate their budgets by the end of May and resubmit them to the Bureau, who finalizes them and sends them on to the President and Cabinet. For health, the MH & SW and JFK Medical Center were regarded as falling within the total budget ceilings for the whole sector; the percentages allotted to each were based on previous shares. Other NMSD costs are included in MH & SW global estimates (e.g., for fuel, telephone, etc.).

B. Spending

After the budget is finally approved and the fiscal year opens, the MOF makes the first quarter's allocations. In good years this meant merely dividing each spending unit's annual budget by four and allocating that amount to each. With the crisis, a projection of the first quarter's revenues is made and allocations are based on each unit's share of the budget. An allocation is merely a notification to the spending units that funds may be applied for. Salaries are charged to ministerial accounts, but are paid directly by the MOF paymasters. Funds are actually secured by submitting either purchase orders or vouchers (both are requests to pay sellers of goods and services) to the MOF. These are for funds to purchase the various items within the Ministries' budgets. The requests specify which unit within the Ministry is spending and against which budget line item. Since actual revenues to the MOF may be less than projected, vouchers may be turned down at any given point of time.

NMSD and JFK Medical Center work under a different system. JFK Medical Center received its allocations directly, by submitting vouchers to the MOF, who then transferred funds to JFK Medical Center's account. For NMSD, the original idea was that it would operate as a revolving fund. It was given a seed stock valued at \$250,000 by the Government and JFK Medical Center's stock (the value of which varies according to who is asked). MH & SW and JFK Medical Center were to secure their drug funds through annual allocations and each drug-using unit would buy drugs from NMSD -- JFK Medical Center paying from its own account and MH & SW units paying through the MOF with vouchers -- treating NMSD as a vendor. Eventually both JFK Medical Center and MH & SW fell sharply behind on their payments. NMSD had secured credit from its suppliers, expecting a smooth flow of funds from its two main customers (ultimately from the MOF). The buyers collected their drugs and supplies but had to be extended credit by NMSD. Thus, in the case of MH & SW, vouchers submitted to MOF in favor of

NMSD were (and still are) for goods already received. Only once in the eight years reviewed by the Study Team did MH & SW have a credit balance with NMSD at the end of a fiscal year (\$67,000 in June, 1980). NMSD also extends credit to a variety of other health facilities purchasing small amounts of drugs from it; they owed \$190,000 in September 1980.

Two final points on spending: first, JFK Medical Center purchases drugs from vendors other than NMSD (about \$700,000 per year). Second, MOF expenditure records are based on vouchers it has approved. In the case of NMSD the credit extended to MH & SW and JFK Medical Center, although it represents drugs shipped to each, has not entered the expenditure accounts.

C. Banking and Foreign Exchange

Liberia's banking and foreign exchange systems are important to the current procurement and disbursement of pharmaceuticals and to the proposed solutions in this report. Although the National Bank of Liberia (NBL) acts as the government's bank, it is not a central bank in the sense that other countries have such institutions. Since Liberia uses the United States dollar as its currency, it does not print bills and is limited in its ability to mint coins. Thus, although the money supply may expand through loans extended by the commercial banking system, balance of payments surpluses, and government deficit financing (now severely limited), the government cannot consciously create money. This means that, in the rural areas where there is considerable economic activity outside of the monetary economy, the process of "monetizing" these activities must come through other channels; cash will be scarce, even though production and trading are going on. Peoples' cash will, thus, be less than in the urban areas, as well as in other countries with similar rural characteristics.

Nevertheless, the NBL had the power to extend overdrafts (as of June 1984 all government agencies have to keep their accounts in commercial banks), and did so (at the President's direction) to NMSD; \$750,000 to pay off some creditors and extricate shipments from the port. Interest is charged on these loans and NMSD pays out of its receipts, directly to the NBL.

Liberia's foreign exchange system also affects the drug situation in the country. Liberia has no foreign exchange control or budgeting. Before the economic crisis, and in years when foreign exchange was not scarce, foreign payments were made through the foreign commercial banks located here (with branches in other countries) and through the NBL which managed the government's foreign accounts. These accounts are called "off-shore" accounts, are held in other countries and, thus, represent foreign exchange accounts. The government used these funds for its direct exchange needs (debt service, etc.) and to credit banks who wished to transfer funds abroad. Thus, a purchaser of an import, such as NMSD, simply arranged payment through its bank, who paid the overseas supplier from its own foreign accounts.

The economic crisis brought with it a foreign exchange crisis. As a result of severe balance of payments problems, the government's foreign exchange holdings dropped significantly. Banks, consequently, have had to hold reserves in the country which they wish to transfer abroad. And available foreign exchange is now rationed: debt servicing receives the highest priority; and imports are prioritized with oil and food having first claims. The remaining exchange is, essentially, rationed through the private foreign banks who grant, or do not grant, various requests for funds for imports.

D. Problems

There are a number of problems following from the preceding paragraphs that need to be highlighted.

1. The GOL's commitment to health and drugs for the public health sector is too low.
2. NMSD has lost its foreign and local credit and must now pay cash for purchases; this reduces the country's effective exchange reserves.
3. Foreign exchange is in short supply and will remain so for many years.
4. The lack of foreign exchange planning produces an erratic flow of essential drugs into the country and within the health system.
5. The lack of drug planning (items and quantities for each unit) leads to financial wastage.
6. The lack of budgetary planning results in a failure to raise the policy and resource questions relevant to expenditures on drugs.
7. JFK Medical Center's 60% of the GOL drug expenditures is excessively high in the context of the numbers of people served and its impact on the overall health status of the nation.
8. The competition between JFK Medical Center and NMSD creates financial problems for the latter and purchases at less than optimum prices.
9. The GOL's expenditure system:
 - a. makes it difficult to secure smooth drug supplies, has resulted in higher than necessary prices being paid for drugs, and almost certainly has led to health care problems;
 - b. introduces several steps that result in delays and uncertainties in drug procurement;
 - c. makes accountability and data flows difficult.

E. Specific Recommendations Regarding Budgeting, Spending, and Financial Systems

1. The GOL should make an immediate allocation of \$1 million to restock the drugs in the public health system. An additional \$600,000 will be required in fiscal 1984-1985. (See Chapter V for requirements and cash flow details.) Adjustments to other parts of the health budgets should be made, if necessary, to set aside this finance.
2. Continual access to foreign exchange should be provided for the purchases of required vital drugs. This might be accomplished by earmarking a specific amount of foreign exchange in offshore accounts or through the commercial banking system -- ensuring priority access to foreign exchange for drug imports similar to the priority now given to exchanges for oil imports. Consultations between the MH & SW, the MOF, the NBL, and the Bankers' Association, at the highest levels of each should be held immediately to determine the best approach and most efficient mechanism.
3. Drug planning should be introduced, consistent with the recommendations in other parts of this report, and the required funds should be allocated and protected against both budget cuts and revenue shortfalls.

IV. FINANCIAL ANALYSIS OF THE SUPPLY MANAGEMENT SYSTEM AT THE CENTRAL LEVEL

A. Description and Analysis

Purchases of drugs and medical supplies for public sector health delivery takes place through NMSD and JFK Medical Center. Table 2.4 shows that these commodities totaled about \$3.4 million at their peak in 1981-1982 before national budgetary constraints. Drug purchases account for about 60% of the total on a regular basis -- \$2.1 million in the peak year. Since there are no adequate inventory or use records, these figures only represent the commodities that arrived at the MH & SW and JFK Medical Center health facilities. From 1978/79 - 1981/82 the total value of these shipments was regularly about \$500,000 less than checks written by MOF for outlays by MH & SW and JFK Medical Center for these goods, so the totals in Table 2.4 should not be regarded as expenditures but, rather, an approximation of use (assuming inventories were not built up at JFK Medical Center or MH & SW health facilities).

It can also be seen from Table 2.4 that JFK Medical Center accounted for around 60% of the drugs and about 80% of the medical supplies used each year. Its share in the total continued to rise over the years to a peak of 72% in 1982-1983. JFK Medical Center purchased about one half of its drugs and medical supplies on its own; that is, through channels other than NMSD.

Although NMSD accounting data (control sheets) only have foreign and local purchases for four of the six years covered by this study, over half of its purchases were made locally (except in 1983-1984). This appears to us to be too high, especially in light of NMSD's report that the cost of local procurement averages about 13% higher than foreign purchases, even with a 15% discount to NMSD from local suppliers (see Table 2.5). Since JFK Medical Center did not keep a ledger of the foreign and local sources of its purchases, we cannot comment on the total amount of expenditures spent locally. Whatever that total, in general it is important that more could have been bought had low cost foreign suppliers been used.

The financial picture of NMSD presented in Table 2.5 is poor but not disastrous. Since no balance sheet or financial summaries, including costs of sales and inventory values, are produced by NMSD, only a crude financial generality can be made. In the past three fiscal years NMSD has averaged about \$1.5 million in accounts payable to commodity suppliers. About two thirds of these have been to foreign companies. Considering that half of its supplies come from these firms and that their understanding of Liberia's budget and foreign exchange problems is likely to be much less sympathetic than local firms, it might have been expected that the bulk of the debt would have been placed on local firms by NMSD. By contrast, JFK Medical Center's accounts payable (6/30/83) totaled \$1.4 million, \$1.3 million of which was owed to NMSD and the remainder to local suppliers.

NMSD's receivables appear to be its big problem, ranging over \$2 million continuously since 1980-1981. The vast majority of these were from JFK Medical Center (70%). Indeed, according to the picture in Table 2.5, NMSD would have been able to purchase, and pay for, over \$600,000 worth of drugs and supplies in 1983-1984, if its accounts receivable and payable were zero. Put another way, it could have bought a total of \$3 million worth of drugs and supplies in fiscal 1983-1984, if its debtors had paid their outstanding debt to NMSD in that year. This does not seem out of the question, since both MH & SW and JFK Medical Center purchases of drugs and supplies from NMSD are based on annual budgetary allotments by the MOF.

Table 2.6 gives a limited picture of JFK Medical Center's financial activities in the drug and medical supplies area. Drug appropriations and purchases are fairly close in all the five years examined, purchases exceeding appropriations by a total of about \$800,000 taking the five years together. Purchases of medical supplies, on the other hand, exceeded appropriations by several hundred thousand dollars each year. In both categories purchases regularly exceeded payments, by a growing amount annually. The total implied increase to JFK Medical Center debt from the excess of drug and supply purchases over payments for the five years is \$2.7 million. Perhaps the most interesting part of JFK Medical Center's financial picture is revealed by the last two lines of

Table 2.4

LIBERIA: PURCHASE OF DRUGS & MEDICAL SUPPLIES
BY MH & SW AND JFK MEDICAL CENTER (\$'000)

ITEM	1978/79	1979/70	1980/81	1981/82	1982/83	1983/84
<u>DRUGS</u>						
MHSW ¹	580	837	747	859	411	560
JFKMC (NMSD) ¹	808	824	621	668	368	71
JFKMC (NON-NMSD) ²	-- 3	-- 3	335	599	313	
Total JFKMC	808	824	956	1267	681	
Total Drugs	1388	1661	1703	2126	1092	
Percent JFKMC	58	50	56	60	62	-
<u>Medical Supplies</u>						
MHSW ¹	289	241	186	242	103	178
JFKMC (NMSD) ¹	345	420	288	186	170	38
JFKMC (NON-NMSD) ²	328	383	329	791	471	
Total JFKMC	673	803	617	977	641	
Total Medical Supplies	962	1044	803	1291	744	
Percent JFKMC	70	77	77	76	86	-
Grand Total	2350	2705	2506	3417	1836	
Percent JFKMC	63	60	63	66	74	
Source: NMSD Sales Ledger and JFKMC Receipts and Expenditure Ledger.						
1. Shipments from NMSD						
2. Total JFK Medical Center Purchases minus shipments from NMSD.						
3. JFK Medical Center Ledgers show total purchases for the year less than NMSD Ledgers show total shipments to JFK Medical Center for the year.						

TABLE 2.3: NATIONAL MEDICAL SUPPLY DEPOT: PURCHASES, SALES, RECEIVABLES, PAYABLES - DRUGS AND MEDICAL SUPPLIES (\$'000)

ITEMS	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84
Purchases								
Foreign			1681	Na ³	Na ³	1145	479	469 ⁴
Local			960	Na ³	Na ³	602	366	170 ⁵
Total			2641			1747	845	639
Sales¹								
JFK Hospital			819 ⁶	843 ⁶	707 ⁶	688	422	70
Maternity Center			334	401	202	166	58	39
MHSW			869	1078	933	1101	514	735
Total			1894	2322	1842	2043	1029	880
Accounts Receivable²								
JFK Hospital	314	344	223	789	1228	948	1053	1127
Maternity Center	137	140	315	567	763	562	611	611
Rehab. Hospital	2	6	10	10	22	44	44	44
MHSW	241	588	527	(67)	955	404	747	613
Total	694	1078	1075	1299	2968	1958	2455	2395
Accounts Payable²								
Foreign	14	17	60	Na ³	516	839	601	674 ⁷
Local	348	287	387	Na ³	221	331	218	267 ⁸
NBL	0	466	475	0	0	344	706	807
Total	362	770	922	Na	-737	1514	1525	1748

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Source: NMSD Books.

1. Totals are larger than sales by the amount of sales to mission, private and other health units.
2. As of June 30 for each year.
3. 1980 Control pages are mission form the books.
4. Through 12/31/83, date of last purchase.
5. Through 3/31/84, date of last purchase.
6. Includes drugs for the Rehabilitation Center.
7. As of 12/31/83.
8. As of 10/31/83.

Table 2.6. Here we see that the checks issued to JFK Medical Center by the MOF for the purchase of drugs and medical supplies (i.e., payment vouchers submitted to MOF by JFK Medical Center specifically for funds to pay for drugs and medical supplies, and the checks issued on the basis of these approved vouchers) exceeded the payments made by JFK Medical Center for these items in all but two of the five years examined. A total of \$1.3 million more was received than was paid to suppliers. Had these funds been used to pay for items purchased, JFK Medical Center's implied outstanding debt for these items would be \$1.4 million instead of \$2.7 million.

Unfortunately, neither a complete nor accurate financial or economic analysis of public sector purchases of drugs and medical supplies over the past six years was possible. Control sheets are missing for various parts of 1980-1981 in NMSD's ledgers for purchases, sales, and accounts payable. There is no summary sheet for receipts and payments in NMSD's books. JFK Medical Center does not keep an accounts payable ledger and can only secure these by adding up the totals on outstanding vouchers, some of which date back to, at least, 1978-1979. Their accounts department does not keep a record of the value of shipments received from various vendors, including NMSD. A number of different accounting practices have been employed by NMSD accountants over the years, making the ledgers inconsistent and difficult to understand. Perhaps most importantly, there is no regular reporting system of key financial and physical flow data to the MH & SW or MOF by either NMSD or JFK Medical Center. This means that financial, economic, and health planning decisions related to the procurement, payment, total outlays, and disbursement of drugs and medical supplies has not been and is not now possible. Furthermore, without such data, efficient management decisions cannot be made within NMSD and JFK Medical Center.

These problems are illustrated in Table 2.7. The first group of numbers shows some inconsistencies in the records of NMSD, MH & SW, and MOF with respect to the payments made to NMSD by MOF on behalf of MH & SW for the purchase of drugs and medical supplies. In 1978/79 - 1980/81 NMSD books show that it received more than either MH & SW or MOF books show was paid. In each of the three subsequent years NMSD shows lower receipts than the other two ministries claim were made. In all six years, MH & SW books show payments lower than those recorded in MOF's ledgers. (MOF records are for checks issued against vouchers.) By the close of 1983-1984, NMSD claims to have received during the six years a total of nearly \$1 million in excess of what the others claim was paid.

The second group of data in Table 2.7 show the inconsistencies regarding payments to NMSD by JFK Medical Center. Again, NMSD says it received more than JFK Medical Center records it paid. In this case the differences are consistent throughout the six years and the total excess amounts to \$633,000.

In an attempt to solve the mysteries with some deduction (in the absence of complete records), NMSD receivables were analyzed. The notion that sales to a customer minus receipts from that customer should be equal to the change in accounts receivable from that customer during the year was applied. It is

Table 2.6: JFK MEDICAL CENTER DRUGS AND MEDICAL SUPPLIES:
 APPROPRIATIONS, PURCHASES AND PAYMENTS (\$'000)

ITEM	1978/79	1979/80	1980/81	1981/82	1982/83
DRUGS					
Adjusted Appropriation	727	774	700	804	639
Purchases	616	764	956	1267	681
Payments	570	748	505	392	186
Balance (3-4)	46	16	451	875	495
Medical Supplies					
Adjusted Appropriation	409	383	303	607	451
Purchases	673	803	617	977	641
Payments	627	721	431	652	484
Balance (13-14)	46	82	186	325	157
Totals					
Appropriations	1136	1157	1003	1411	1090
Purchases	1289	1567	1573	2244	1322
Payments	1197	1469	936	1042	670
Balance (19-20)	92	98	637	1200	652
Checks Issued to JFK Medical Center by MOF Against Drug & Supply Purchase Vouchers 25-20	1271 92	1295 174	1572 1	1849 807	1208 538
Source: JFK Medical Center's Accounts Summary Ledgers.					

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Table 2.7

LIBERIA: DRUGS AND MEDICAL SUPPLIES
ANALYSIS OF ACCOUNTS: (\$'000) MOF,
MH & SW, NMSD, JFKMC*

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	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	10	11	12
NMSD & MHSW									
NMSD Receipts From MHSW	1018	1716	1002	997	694	196			
MHSW Payments to NMSD	465	920	830	1093	697	842			
MOF Payments to NMSD	693	923	833	1099	729	661			
3-2	-553	-796	-172	96	3	446			
3-2 Cumulative	-553	-1349	-1521	-1425	-1422	-979			
4-2	-325	-793	-189	102	35	250			
4-2 Cumulative	-325	-1118	-1287	-1185	-1150	-900			
NMSD & JFKMC									
NMSD Receipts from JFKMC	693	272	444	501	278	30			
JFKMC Payments To NMSD	490	415	441	67	142	30			
13-22	-203	143	-3	-434	-136	0			
13-12 Cumulative	-203	-60	-63	-497	-633	-633			
NMSD Receivables									
Sales To MHSW	869	1078	933	1101	514	736			
Receipts From MHSW	1018	1716	1002	997	694	196			
21-22	-149	-638	-69	+104	-180	+540			
Change In Receivables/MHSW	-61	-594	+1022	-551	+343	-134			
Sales To JFKMC	1153	1244	909	854	340	109			
Receipts From JFKMC	693	272	444	501	278	30			
26-27	+460	+972	+465	+353	+202	+79			
Change/Receivables/JFKMC	+60	+818	+647	-459	+154	+74			
Source: Tables 2.1 & 2.5; MH & SW Payments Vouchers Ledger; NMSD Finance Department; and JFKMC (J.F. Kennedy Medical Center) Accounts Department.									
* JFKMC = J.F. Kennedy Medical Center.									

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important that, in the case of both MH & SW and JFK Medical Center, NMSD records sales as the value of goods shipped and not goods ordered on behalf of the customer but not yet received by NMSD. The third group of data in Table 2.7 show the results of this exercise. Lines 23 and 28 show the change in accounts receivable implied by subtracting receipts from sales. Lines 24 and 29 show the actual change in accounts receivable from the end of the previous fiscal year. There is neither a match nor a consistency with respect to the direction (+ or -) of the implied change in receivables compared to the actual change in receivables. The importance may be seen in the case of MH & SW. Line 23 implies that their debt to NMSD between 1978-1979 and the close of fiscal 1983-1984 should have fallen by \$392,000. Assuming that NMSD's 6/30/78 records of receivables from MH & SW are correct (\$588,000, Table 2.5), MH & SW's payables as of 6/30/84 should be \$196,000 and not the \$613,000 shown on NMSD's books. For JFK Medical Center, the exercise shows an implied increase in receivables of \$2.5 million over the six years, compared with an increase of \$1.3 million shown on NMSD's books. Overall NMSD should show \$870,000 more in accounts receivable from these two customers than is shown on its books.

Over the fiscal years 1981/82 - 1983/84, total NMSD purchases (value of goods received) was \$3.2 million. Total payments (including to suppliers and for services, but not for its overdraft at NBL) for the three years was \$4 million. Total increases in its accounts payable was \$1 million. This implies that \$2.2 million was paid to suppliers for purchases and the remaining \$1.8 million spent on other payments. However, the implied payment for other (non-drug and supply purchases) services and commodities is \$600,000 per year, compared with a reported "Expense Accounts Balances" for 1983-1984 of \$138,000. (See Appendix VIII.)

There are inconsistencies with JFK Medical Center data also. For example, the Auditor General's Office sent a team of three auditors to help with the Study Team's financial analysis of JFK Medical Center's data. They calculated (from outstanding invoices) that JFK Medical Center has accounts payable of \$1.4 million for drugs and medical supplies. (See Appendix IX.) Yet, NMSD shows a JFK Medical Center debt to it of \$1.9 million (Table 2.5). Another example comes from comparing expenditures on personnel (reported by the JFK Medical Center's Comptroller's Office)¹ with checks issued to JFK Medical Center by MOF for salaries (Table 2.1) from 1978/79 - 1982/83. The actual payments were higher than the checks issued in each of those years. JFK Medical Center paid a total of \$3.5 million more in salaries than the MOF released funds over the five years. Thus, JFK Medical Center does not appear to be spending money for the purposes for which it was released by the MOF.

An inescapable conclusion from this analysis is that appropriate decisions are not being made on behalf of the patients of Liberia's Government health institutions with the present financial structure and financial management of the country's supply management system for drugs.

¹Snow Public Health Group, "Study of J.F.K. Medical Center," Feb., 1984, Appendix L.

B. Problems

There are a significant number of financial problems with the current national drug procurement system that continually undermine its solvency, its ability to procure and disburse, and the confidence of suppliers and recipients of drugs and supplies.

1. The failure of the MOF and JFK Medical Center to pay for goods shipped from NMSD has severely undermined the latter's financial solvency.
2. NMSD's local purchases result in payments costing 13% more than imported goods. This cost some \$150,000 over the past three fiscal years. It is also not clear why these purchases were made in such large amounts, especially in 1981-1982 (\$602,000).
3. There is virtually no financial supervision or control of NMSD outside the organization itself. The MH & SW comptroller was recently told that he had no authority over NMSD accounts and MH & SW failed to take steps to establish that control. There is confusion in the upper ranks of the MOF, the MH & SW, and the Bureau of the Budget as to just who is controlling and supervising NMSD.
4. NMSD does not make regular financial reports of any kind; nor are regular inventories undertaken.
5. There are significant inconsistencies -- in sums of several hundreds of thousands of dollars -- among the accounts of NMSD, MH & SW, JFK Medical Center, and the expenditure records of the MOF.
6. NMSD books are missing control sheets for purchases, and accounts payable sales for all of calendar 1980 and the first half of calendar 1981.
7. There are internal inconsistencies in NMSD's books, as noted.
8. JFK Medical Center has continuously ordered drugs and supplies in excess of its allocations.
9. JFK Medical Center has invoices that have been outstanding at least since 1978-1979.
10. JFK Medical Center does not keep a ledger totalling its accounts payable and, thus, can only determine its outstanding debt at any given time by summing unpaid invoices.
11. NMSD's stock and accounting irregularities stem, at least, back to December 1978 when the General Auditing Office completed its audit (Report No. L-65/78/79).
12. MH & SW does not keep records of its payables to NMSD believing this debt to be MOF's debt to NMSD.

13. MH & SW does not have records on the drugs and supplies drawn by its various hospitals, clinics, and health centers.
14. NMSD does not keep cost of sales records.

C. Specific Recommendations Regarding Financial Management Within Liberia's Central Drug Service

The Study Team does not understand the sources of the problems (both NMSD and JFK Medical Center were initiated with basically sound systems). Moreover, budgetary shortages experienced during the past two fiscal years alone, if at all, cannot explain the problems enumerated above. In this context, and among our major recommendations, the Study Team strongly suggests that:

1. The managerial, accounting, spending, payments, records, policy and control problems should be corrected before a revolving fund is put into place.

At the same time, the central objective of this study is:

- ..to provide the necessary guidance to the GOL, for changes in the policy and operation of the national drug supply system so as to strengthen the system's operation and management...especially with regard to operating costs....

Therefore, we make the following recommendations to the GOL as immediate financial measures that should be instituted.

2. A complete audit of NMSD's records should be made
3. GOL should pay NMSD's suppliers what is owed them (on the basis of the audit). Foreign firms should be given a priority for payment to allow the GOL to take advantage of their better prices on future orders -- something which cannot be done without repayment of past debts. The stated total of \$639,000 is .06% of the June 1984 outstanding external public debt and 2% of one year's external debt payment proposed by the IMF.
4. MH & SW and JFK Medical Center should keep up-to-date accounts of their transactions with LGDS.
5. The MH & SW comptroller should be given full authority over LGDS's accounts.
6. The interest charges being assessed NMSD by NBL should be ceased and back charges dropped. NMSD is not a public corporation and one branch of the government paying another does not make economic sense. The debt belongs to MOF.

7. The following payments system should be introduced as part of the restructuring of the drug supply management:
 - a. a single annual allocation should be made according to the approved drug budget for all drug-using units of the MH & SW and JFK Medical Center and no longer included in separate budgets;
 - b. the MOF should be instructed to make deposits in LGDS's account at a commercial bank in amounts sufficient to meet (on a sight draft basis) the ordering schedule for drugs;
 - c. release of these funds should be authorized by the Chairman of the Central Drug Service Board, the General Manager of the LGDS, and a senior official from the MOF as payments will be extremely large. (See Chapter V);
 - d. foreign exchange to meet payments should either be guaranteed through LGDS's commercial bank or placed in a GOL off-shore account.
8. MOF should use its influence to assist NMSD in collecting all its accounts receivable from non-government debtors.
9. LGDS should adopt and adhere to a "Vital Drug List" (as suggested elsewhere in the report) and arrange its purchases from a non-profit drug supplier, such as IDA or others.

Chapter III

FUELING THE SUPPLY MANAGEMENT SYSTEM: THE REVOLVING FUND CONCEPT AND USE

I. INTRODUCTION

The inherent weaknesses of the supply management system were described in the previous chapters. Apart from these, an inadequate budget and erratic disbursement of funds to NMSD further impair the efficiency and effectiveness of the system. Both additional funds and reliable sources of financing for pharmaceuticals are required to keep the supply management system running, and are required to save the health system's credibility from total collapse.

As elaborated in Chapter II, the GOL is extremely unlikely, at least in the next few years, to be able to afford to provide additional funding for pharmaceuticals. Even the reliability of timing of the funds which the GOL can provide is very questionable and, in any case, is beyond the direct control of the MH & SW. Thus, if additional and reliable sources of financing are to be available, they must come from somewhere other than the Government. One possibility might be donor agencies but their reliability derives from political factors beyond the influence of the MH & SW, and besides, donor agencies are extremely reluctant to fund recurrent costs.

If both the Government and donor agencies are eliminated, the only logical alternative is to seek financing for pharmaceuticals from the people of Liberia, the users of the health care system. The Study Team was informed that the GOL has already agreed to the policy change required to institute such a system, but that the Ministry has not as yet clarified the strategies to be used. Our most basic recommendation is that a revolving fund be established to accomplish this purpose.

The objectives of this chapter are to introduce the revolving fund -- the mechanism for financing the future pharmaceutical supply management system -- to offer recommendations for policy guidelines for the operation of this mechanism, and to discuss several issues concerning its functioning.

II. THE REVOLVING FUND CONCEPT*

Basically, a revolving fund works as follows: start-up money is provided to purchase an initial supply of drugs which is then sold. The proceeds from the sale are used to purchase replacement stocks which are in turn sold. The cycle can be repeated indefinitely without further government allocations as long as the funds recovered from sales are sufficient to purchase replacement stocks.

*Adapted, in part, from Chapter III.E., "Who Will Pay: Financing Drug Supplies," appearing in MANAGING DRUG SUPPLY, a reference manual prepared by Management Sciences for Health, Boston, Mass., 1981.

In theory, a revolving drug fund is relatively simple, as portrayed in the top portion of Figure III.1. In essence, the expenses incurred in the operation of the system must equal the costs of running the system. Unfortunately, the reality is more complex than this basic structure implies. There are a number of other costs which must be considered in establishing the prices to be charged to ensure that receipts are equal to expenses. A few of these are suggested in the bottom portion of Figure III.1.

III. A REVOLVING DRUG FUND FOR LIBERIA

A. General

How might such a revolving fund work in Liberia? First, a seed stock is required which would be delivered without cost to the central supply depot and throughout the health system to the various facilities. At a Hospital, Health Center, or Clinic, drugs would be sold to each patient. The health facility would collect the funds received from, say, one month's sales before ordering a next supply. The quantity of this next requisition would be limited by the funds previously collected, since the health facility would have to pay cash when the order arrives from the supply depot. A Clinic or Health Center would pay cash to the County Hospital which in turn would forward these receipts, plus its own, to LGDS. It would thus have sufficient funds for its next purchase of drugs from international suppliers. Several points relevant to this scheme are discussed below.

B. Mark-ups

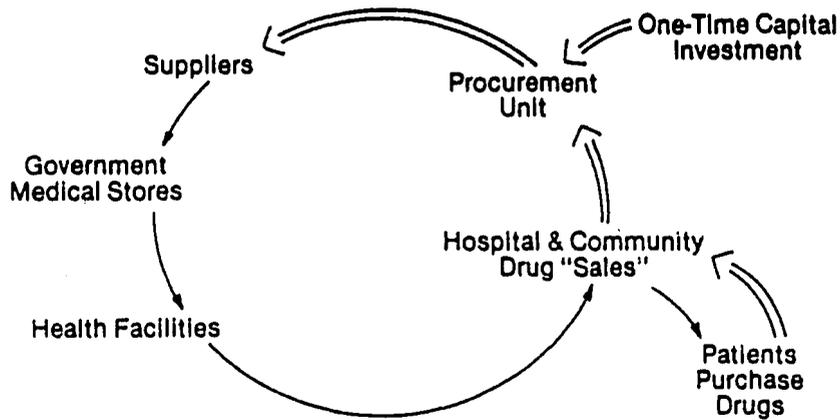
Inherent in the concept of a revolving drug fund is the need to add a mark-up to the prices charged in order to ensure that all costs are covered. The levels in the system at which additional mark-ups are added should basically reflect additional costs, although other factors -- such as the desirability of ensuring equity throughout the system -- may also be considered. The mark-ups may be summarized as follows:

1. LGDS sells to dispensing sites at its CIF cost plus a mark-up sufficient to cover:
 - a. an inflation factor related to future procurement (probably 10%);
 - b. shrinkage, breakage, spoilage, and waste;
 - c. landing costs (port charges; transport to warehouses);
 - d. internal supportive materials (stationery; forms; etc.);
 - e. repackaging/prepackaging materials;
 - f. redistribution transportation.

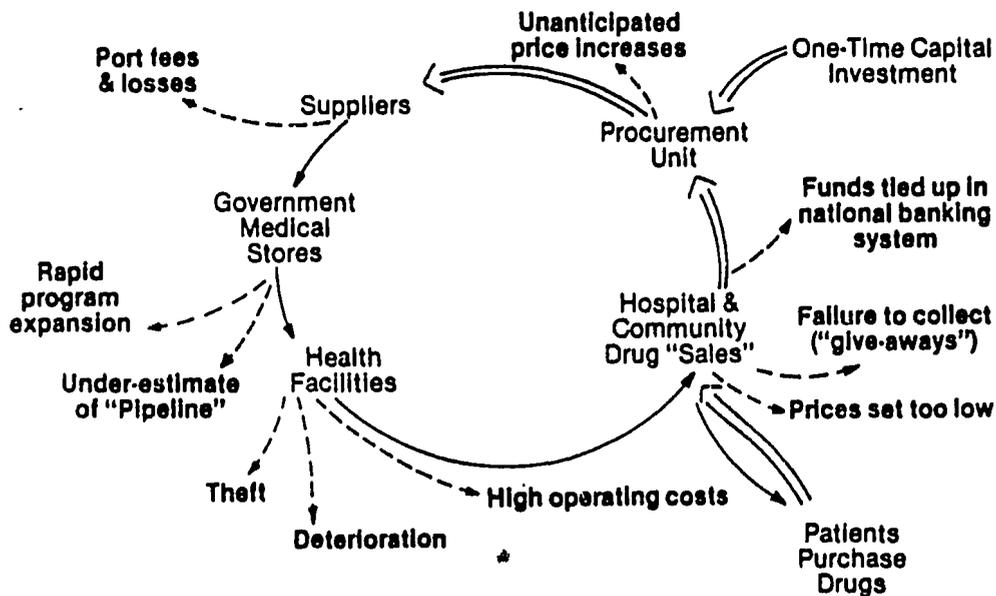
Figure III.1

Revolving Drug Funds in Theory and in Practice

IN THEORY—EXPENSES FOR EACH CYCLE EQUAL RECEIPTS:



IN PRACTICE—EXPENSES FOR EACH CYCLE, INCLUDING LOSSES, EXCEED RECEIPTS:



Key:
 —————> Flow of drug supplies
 ==> Flow of funds
 - - - - -> Loss of available funds or drugs

Source: Chapter III E. "Who Will Pay: Financing Drug Supplies" appearing in Managing Drug Supply, a reference manual prepared by Management Sciences for Health, Boston, Mass.

2. The dispensing site (hospital, health center, clinic, VHW) sells to the consumer at LGDS invoiced price plus a mark-up which embraces:
 - a. inflation factor re its next acquisitions;
 - b. shrinkage (petty theft; diversions);
 - c. expiring of dated items;
 - d. spoilage and waste (due to physical aspects of item);
 - e. cost of unchargeable items (iodine used; small bandaging; etc.);
 - f. bad debts (patient will pay "tomorrow");
 - g. transportation costs (if applicable).

C. Cash Flow

Cash flow within the system begins with the consumer at the site of dispensing (the initial stock having been seeded at no charge). Preliminary estimates indicate that LGDS would mark-up 35-40% and the dispensing site 30% (depending upon transportation method). Thus, the consumer price is:

- CIF plus 35% plus 30% = CIF plus 75.5%

This compares very favorably with the private sector where retail price (on higher cost brands) is:

- CIF plus 1.5% consular fee plus 7-1/2% - 12% handling cost plus 33-1/3% wholesaler mark-up plus 50% retailer mark-up = CIF + 118%.

The cash flow is as follows:

- Consumer pays dispensing site upon receiving the item.
- Dispensing site pays LGDS for what it has received (the LGDS invoice) when it transmits its next requisition; in essence, LGDS extends credit for approximately one month.
- LGDS pays its Supplier by sight ^{*}draft or cheque for new stock.

The cash flow produces the following accumulations:

- At start-up, the dispensing site accumulates 2 months' cash which drops to one month when it pays its first invoice.

- LGDS extends credit for one month and, thus, accumulates three months' cash by the time its inventory reaches the reorder level of five months' stock (from its nine months' start-up stock). Thereafter, it accumulates cash from six months' sales achieved between each reorder.

D. Opening Inventory and Initial Financing

Opening investment and initial financing is recommended to be a twelve months' supply plus cash equal to a further four months' requirement.

The opening order would be delivered to LGDS in two equal shipments spaced three months apart. During the interval, LGDS would deliver seed stock equal to three months' needs to each dispensing site while at the same time organizing its own shelving of items.

Within four months, it reorders its six months' replenishment needs which may be determined as greater than first calculated and which, in any event, require cash additional to that accumulated from its start-up sales as described above (i.e., a cash amount equal to four months' supply ensures a one month cash cushion).

E. Transportation

Transportation of supplies under a revolving fund financing mechanism is recommended to be via private carrier(s) established through a public tendering system.

Two options are presented by the Study Team.

1. In Option A, LGDS would bear the financial responsibility for transporting supplies from its central warehouses to the consumer/dispensing sites. It would directly pay the contractor for delivery to county hospitals. Then, the cost of trans-shipments throughout the county would be accepted by LGDS as a deduction from its invoice for items shipped to the dispensary from LGDS. This method provides that each dispensing site would receive its supplies at the same cost and with transportation costs being built into the LGDS mark-up.
2. In Option B, LGDS would assume only the cost of delivery to the county level. From there, each dispensing site would arrange the pick-up of its own shipment from the County Hospital and pay for same. These costs will vary from site to site and must be built into the mark-up costing of each with the end result of a variety of consumer prices particularly disadvantageous to the health facilities and consumers in more remote areas of each county.

The option actually chosen for use will depend on the GOL's policy decisions regarding the extent to which the MH & SW should subsidize supply management system costs, and the extent to which government should attempt to equalize inequities of cost caused by geographical location of the population being served.

IV. SUGGESTED GUIDELINES FOR REVOLVING DRUG FUND OPERATION

The guidelines suggested below are relevant to all levels touched by the supply management system: LGDS, hospitals, health centers, clinics, and to a limited extent, the villages. More detailed recommendations regarding the village level are presented in Chapter IV.

1. A revolving fund supported by charges for drugs and drug-related items used by patients should be operated on the following principle: all drugs dispensed must be exchanged for cash. A revolving fund cannot be operated on any other basis than commodities being exchanged for cash at every level of the system. The last sub-section of this chapter explores the issues and implications of this principle for planning the establishment of a revolving fund in Liberia.
2. Charges for drugs at hospitals, health centers, and clinics should be collected by persons other than those rendering health services. Existing non-medical staff should be used.
3. At all levels there should be some system of accountability which involves two or more persons.
4. Members of the community should be brought into the process of accounting and safeguarding daily receipts.
5. Selected pharmaceuticals should be free, and advertised as being free to the community (e.g., for leprosy, tuberculosis, vaccines or immunization of EPI targeted childhood diseases, and planned parenthood items).
6. Clinics, health centers, county hospitals, and the JFK Medical Center institutions should receive pharmaceuticals according to the same principle which applies to patients: all drugs "dispensed" to a health facility by LGDS must be exchanged for cash. THERE CAN BE NO EXCEPTION TO THIS RULE.
7. Where breaks occur in the revolving drug fund cycle, either through loss of funds, or loss of drugs, the basic principle should be that the health facility (and its community) still remains responsible to obtain funds to make up the loss. A central MH & SW body (perhaps the Central Drug Service Board) may be given access to other funds which it can award in situations where the loss was truly not the fault of the facility, such as a natural disaster or a fire. In most instances, theft should remain the responsibility of the health facility and its community, although the central ministry body adjudicating such matters should be able to share some of the costs where hardship would be severe.

V. ISSUES RELATED TO THE REVOLVING DRUG FUND

There are some basic issues regarding the concept of a revolving drug fund which are appropriately noted at this point. Those issues which potentially impinge upon the long term viability of a revolving drug fund are listed below.

A. Issues Regarding Policy of the GOL

1. Foreign Exchange. The lack of foreign exchange planning resulting in an erratic flow of vital drugs into the country and within the health system was noted in Chapter II. While the Study Team has recommended specific steps to address this situation, the GOL needs to establish for the MH & SW and its short/long term planning the priority of foreign exchange allocations for drugs and a method ensuring continual access to foreign exchange for drug purchasing.
2. Government Subsidy. There are a range of policy issues regarding the extent to which the GOL wishes to subsidize the drug supply management system, and how to execute that subsidy. The model of the revolving fund and the guideline recommendations presented earlier in this chapter assumed certain answers to these policy questions (e.g., that selected pharmaceuticals be free) which may or may not be valid. Within the drug supply management system several areas where subsidy by the GOL might be exerted can be named. A few of these include:
 - Exemptions of selected sub-groups.
 - Differential fees for urban areas.
 - Surcharges on curative drugs.
 - Flat fee covering average cost of all prescriptions (as perhaps for in-patients).
 - Transportation subsidy for redistribution operations.

The implications of selected choices within each of these areas have broad and disparate ramifications for the successful operation of a revolving fund. The cost of these implications needs to be considered in the context of the basic operating principle of the revolving fund: all drugs dispensed at all levels must be exchanged for cash. If subsidies are to assume parts of the costs of the drug supply management system, a regular and reliable flow of funds for any level of subsidy from the government will be as essential as the contributions from all other sources.

B. Planning Issues

1. Citizens' Ability to Pay. The central operating principle of a revolving fund is that all drugs dispensed at all levels of the system must be exchanged for cash. While, at a national level, it appears that the nation has a substantial ability to pay for drugs; at the individual level, as in all countries, there will be some portion of individuals who will not have sufficient cash to pay for drugs. There will need to be careful study, before the implementation of a revolving fund, to identify and engage the most promising mechanism(s) for ensuring that whatever drugs are dispensed for individuals will be paid for by some pre-identified source of funds. These sources might range from the obvious "extended family" to more formal mechanisms which the Village Development Committees or other appropriate local and national authorities might decide (e.g., conversion of hut taxes for drug use, special once-per-year assessments, use of registration fees, or others which are discussed in Chapter IV).
1. Data Collection. There is a need for careful planning when revolving funds are introduced. Ongoing data collection on drug use is required, and projections need to be made (and regularly recalculated) of cash flows, levels of demand, delivery costs, purchase prices, and foreign exchange availability. A long- and short-term planning combination can be useful.
3. Adequate Funding. The operation of the revolving fund needs to be continually assessed and adjusted -- problems are inevitable. Sufficient capital must be placed in the system to allow for unforeseen problems; funding it too close to initial cost estimates may be a prescription for failure.
4. Drug Charges Effect on Primary Health Care Financing and Acceptance. Drawing funds from patients to pay for drugs may have major economic implications for PHC financing. There are other PHC costs which might be appropriate for community funding, e.g., VHW salaries, health post construction, and various money costs of PHC preventive activities. The ability of communities (differentiated with respect to location, wealth, etc.) to pay needs to be fully assessed and joined with long-term planning for PHC. Having identified the various potential claims on communities' income for PHC activities, a rational economic and policy decision can then be made as to which activity or combination of activities should be targeted for such funding.

Another important concern is whether charges for drugs, particularly in primary health care programs, will discourage those most in need of health care from seeking out that care. The dilemma, however, is that those groups most in need of basic health services will also consume the largest quantities of drugs. Experience in other countries bears out the validity of the fears that charging for PHC drugs can have a negative effect on PHC service usage.

The issue then is how to minimize the effect of drug charges on the use of primary health care services. The answer appears to rest in making a distinction between prophylaxes and curative treatments, the former generally but not always should be free of charges, the latter generally subject to charges. However, exceptions can be anticipated.

C. Consumer Service Issue

An important way of making the revolving system more cost-effective is to reduce over-prescribing. In Ghana the savings were found to be as high as 900% per prescription for certain drugs. The MH & SW needs to explore ways to systematize prescribing practices and patient usage. Development of a Formulary is a first step.

Chapter IV

DRUG DISTRIBUTION AT THE VILLAGE LEVEL

I. INTRODUCTION

There are two specific objectives for this chapter. First, the chapter relates some important findings by the Study Team regarding special projects where alternative drug schemes are at issue; and identifies the requirements for a successful drug sale scheme under the jurisdiction of VDCs and involving VHWs. The second section of this chapter provides the Study Team's specific recommendations for expansion of a strengthened supply management system to the village level.

II. LESSONS LEARNED FROM EXISTING LIBERIAN PROJECTS FOR INCREASING VILLAGERS' ACCESS TO DRUGS

The supply management system, including a revolving drug fund, potentially could be extended to the village level on a national basis. Community-based health promotion projects have been tested with some success and implemented on a moderate scale in Liberia. Although these projects are not identical to one another, there are some commonalities among them; and between them and the PHC Project counties of Sinoe and Grand Gedeh.

The VHW concept is an important potential component in this effort and has been accepted in Liberia. Gradual development of the VHW cadre in all areas of the country is either underway or planned. VHWs are viewed as eventually assuming the frontline position: health workers with whom the villagers will interact first for basic health services and preventive services. Although VHWs are currently small in numbers, and active mainly in pilot projects, strengthening the supply management system (including operation of a revolving drug fund) needs to take account of community-based health promotion programs. This would include those involving the VHW movement in Liberia. Consideration needs to be given as to how the supply management system will mesh with the VHW concept and, more broadly, with community-based health promotion programs.

The Study Team devoted considerable effort to become familiar with the activities and plans of existing community-based health projects. Among the counties we visited, Maryland and Bong Counties, in particular, have projects with VHWs who have been working for several years. We also visited a general community development project in Grand Cape Mount County in which drugs are sold to the public by a community group. Finally, we received some limited information concerning a community-based drug sale scheme in Lofa County, although time was insufficient to visit this site.

There seems to be a rough consensus among these projects' beneficiaries, their implementors, and other knowledgeable MH & SW personnel concerning the directions the projects should take in the future (including with regard to sale and distribution of pharmaceuticals). Following a few selected observations concerning the individual projects, this consensus will be summarized.

A. Maryland County VHW Project

1. General

VHWs in Maryland County were selected and trained six years ago, following an extensive period of preparing their communities for this project. In each community, Village Development Committees (VDCs) were established, with responsibilities beyond the health sector. Until recently, this project was supported by an external donor as well as the Liberian government. This support, which has been terminated, included a free monthly drug supply as well as a stipend of \$25.00 per month for the VHWs, and an extensive supervision system. A revolving fund for drugs was never initiated so drugs were provided for free.

2. Drug Distribution

The drugs provided to VHWs in Maryland County's program came as a standardized monthly supply, either delivered to the village by the clinic staff (whenever the motorcycle was working) or picked up from the clinic by the VHW when he went there for a meeting. Distribution at this level did not seem to be a major problem.

3. Drug Use

The quality of VHWs' diagnosing, prescribing, and dispensing practices was difficult to assess during our field visits. The few VHWs we spoke with tended not to give any drugs for patients to take home, but rather insisted that the patients consume the medicine in their presence. We are not certain if this is standard practice.

4. Supply Adequacy

The VHWs we met maintained that their monthly supply was inadequate. For example, two of them felt that they needed about 500 tablets of chloroquine and aspirin, compared with the 300 they were receiving, to treat adequately the majority of patients. Again, we are uncertain of the representativeness of this sample, as well as the validity of their claim.

5. Current Status of the Project

Neither drugs, nor stipend, nor extensive supervision of VHWs continue to exist. Nevertheless, in three of the four villages we visited, the VDC continued to function and had, in fact, met during the past few weeks. The VHWs we met all claim that they continue to perform health education and referral responsibilities, even though they no longer have drugs to dispense and no longer receive a stipend.

During the past six months, the County Community Health Department has visited each village to prepare both the VHW and the VDC for the loss of external support; only five of the 130 VHWs indicated that they would quit if they did not receive a stipend. Most of the VDCs said they would try to find ways of compensating the VHW, such as helping him with his farm (although this does not appear to have occurred yet). Given the severe reduction of external assistance, we found the continuing positive attitudes of health staff, VHWs, and villagers alike to be extremely encouraging, suggesting that this project (i.e., a VHW supported by a VDC, with a lot of training and supervision from the health sector) is a very workable concept.

6. The Future of the Maryland County Project

Maryland County personnel admit that two major mistakes were made in their earlier project:

- o the VHWs should never have been paid from outside;
- o drugs should never have been given for free.

They are currently attempting to revitalize the project, correcting these two errors.

In the revised version of their project, VHWs will not receive any payment, unless this payment comes from the village itself; the county will not play an active role in either promoting or rejecting this concept, but rather will encourage the VDCs to make their own decision. Drugs will be sold to the villages, and a revolving fund established to pay for periodic resupply. Drugs will be sold by the VHW to village patients at a mark-up sufficient to pay for any costs and to provide a small 'profit'; sale prices have not as yet been finalized, and it has not as yet been determined if some or all of this profit may be used as a stipend for the VHW. The initial drug supply for each VHW will be described to the villagers as a 'loan' which will need to be repaid whenever the fund ceases to revolve.

Money collected by the VHW from sale of drugs will not be kept by him, but rather by the VDC. An accounting system will be devised in which at least two individuals are aware of the amount of money which should be extant at any time. Assistance will be provided by the project to train selected VDC members in establishing and maintaining this accounting system.

In this revised project, Maryland County's intention is to obtain drugs for VHWs from CHAL rather than NMSD, reflecting their low opinion of the latter's efficiency.

B. Bendaja Women in Development Project

In Bendaja, Grand Cape County, a community-based project supplements the drugs which the government provides for free. A community organization runs a drug shop, selling drugs from a room provided by the clinic. The organization's purpose is much broader than drug sales, including other aspects of village development.

In 1981, an initial supply of drugs was donated to the community organization by WHO; its value at that time was over \$4,000. A five-week training program was provided for a number of individuals, six of whom are directly involved with drug sales. These six are five women, each of whom works in the drug shop one day per week on a voluntary basis; and one man, who works five days per week for a salary of \$25.00 per month. He maintains all records as the women are not literate.

The drugs available through this drug shop are restricted by NMSD. No injectables, antibiotics, or other items normally prescribed are included.

Drugs are obtained by the drug shop directly from NMSD. Orders are prepared by the drug shop manager, with the assistance of the clinic staff. They are hand-carried to Monrovia, and have all been filled by NMSD (through purchase from the private sector) within 24 hours. A vehicle is hired to transport the drugs back to Bendaja.

Since 1981, there have been only four reorders of drugs primarily because the initial supply was substantial and lasted for over two years. The cost of drugs obtained since August 1983 has averaged only \$66.00 per month. However, since a) some of the original WHO-provided drugs still remain and b) the clinic continues to receive and disseminate free government drugs (albeit in inadequate quantities), this cannot be used to estimate the total cost of drugs required. The quality of the drug shop's accounting system is poor, especially during its first year when many sales were handled by people who were not literate; it does not permit an analysis to determine whether income from the sale of drugs is sufficient to cover the cost of the next supply.

The mark-up on drugs developed by the community organization is surprisingly high, averaging slightly more than 100% above their cost. There appears to be real 'profit,' although this is difficult to assess with any certainty. Some of the income from sales is used for the two drug-related expenditures noted above: the manager's salary and the transportation of drugs from Monrovia. But most of this apparent 'profit' is used for other development activities, unrelated to the drug situation.

The organization claims that everyone in the community, without exception, is able to pay for drugs in some way. Payment in kind is accepted, as long as it is a saleable item. People who really have no money are able to obtain cash from relatives or friends. An occasional emergency credit is always repaid.

C. Bong County VHW Project

In Bong County, a VHW project has been in existence for six years. Of the 150 VHWs who began, about 90 continue to function.

No drugs were ever provided to these VHWs. Their work was strictly preventive and promotive.

Within the past few months, steps have been taken to revitalize this project. A major effort at 'sensitization' of the communities has recently begun. The overall plan developed by the county is very similar to the Maryland, Sinoe, and Grand Gedeh plans: much greater emphasis on Village Development Committees, extensive supervision, and a revolving drug fund. New VHWs will be trained, and old ones retrained, to bring the total back to 150.

No detailed plans (types of drugs, mark-up policy, accounting procedures, etc.) have yet been developed for the revolving drug fund, except that drugs will be obtained through CHAL rather than NMSD.

D. Kolahun Community Drug Project

A project which the Study Team was unable to visit, but only know of from a written report, exists in Kolahun District of Lofa County. A local farmer's cooperative provided \$10,000 to seed a revolving drug fund. Drugs were obtained through CHAL and are sold at a 25% mark-up. Other aspects of this project's implementation are not clearly explained in the document provided.

E. Conclusions

The provision of drugs and other supplies for these community-based projects is not an end in itself. The objectives of the above projects are either the local provision of general primary health care services or, in the case of Bendaja, an even broader multi-sectoral development effort for the community. Even in Maryland County, the VDCs' objectives are broader than health care. Availability of drugs improves the quality of the curative care that can be provided. Drug distribution simultaneously enhances the projects' credibility and their resulting effectiveness at implementing other activities. Both of these effects are extremely important to the project, but should still be kept in perspective: these projects view drug supply as a means rather than the end.

With this caveat in mind, we draw the following major conclusions concerning supply management from the above observations:

1. People, and the communities in which they live, are willing and able to pay for drugs, including a reasonable mark-up.
2. Local arrangements could be made for emergencies and for people unable to pay.

3. The combination of a VHW and a VDC is necessary for a project's success. A VHW project cannot succeed without a major focus on a local support group to provide it legitimacy and practical assistance.
4. Major emphasis is required to be directed at training and supervision for any supply management system to be effective.
5. A simple accounting system is needed, both to help villagers track funds and drugs, and to provide a basis for their safekeeping.

III. OBSERVATIONS REGARDING COMMUNITY-BASED HEALTH PROJECT: IMPLICATIONS OR EXTENDING THE SUPPLY MANAGEMENT SYSTEM TO THE VILLAGE

A. General

Based upon both Liberian and broader international experience, we have concluded that community or village health worker programs tend to be more effective if they are supported by a community organization which:

1. Has members who are well motivated and knowledgeable about health matters.
2. Meets frequently.
3. Makes real decisions about policies, plans, and implementation strategies (not simply ratifying decisions made by others).
4. Implements direct health-related activities (such as immunization campaigns, village cleanup, etc.) in addition to the more common indirect health-related activities (such as selecting a worker, constructing a building, or raising money).
5. Has some financial responsibilities (for collecting and/or disbursing funds).
6. Has women who play a major role, preferably comprising a majority of the organization's membership.

The Primary Health Care Project developed by the MH & SW for Sinoe and Grand Gedeh Counties, plus the revised plan for Maryland and Bong Counties, already include most of these elements. With major emphasis on training and supervision of Village Development Committees, plus a philosophy of transferring real power to these committees, we believe that this project has an excellent chance to succeed.

Any drug distribution system implemented through a project such as the FDC Project is far more likely to succeed than a system without this supporting infrastructure. Thus, the observations and implied recommendations in the remainder of this section are all of secondary importance compared with the basic strategy already planned for the village-level activities.

The major elements of the supply management system (including a revolving drug fund) recommended for the village level are similar to the system at higher levels:

1. All drugs dispensed must be exchanged for cash.
2. The VHW should pay cash for his monthly resupply.
3. A small profit from the sale of drugs might be used for transportation of drugs from the clinic.

The strictness of the payment procedures should also apply at this level: all drugs must be paid for, and exceptions are not made for stolen or mismanaged funds or drugs.

Previous Liberian and international experience impinges upon several specific topics related to the supply management system and its revolving drug fund. Specific descriptions are enumerated below.

B. Accounting

Prior to beginning the flow of drugs to the village level, a village-level accounting system should be developed, tried out, and improved. Presumably, this can be done first in Maryland County or in one of the other existing VHW projects. The accounting procedures should be complete but simple, reflecting the fact that at least some of the VHWs will be at best barely literate. Forms for the accounting system should be printed and distributed in adequate quantities.

The accounting system should include a 'checks and balances' approach. The VHW will physically receive payments, but will then pass them on to a VDC member. Both of them, and perhaps a third person, should be able to know at any time the amount of cash supposedly and actually available; each should be expected to check regularly on each other. Supervisors from the clinic or county should also be expected to routinely double-check them both.

County health staff should first be taught these accounting procedures, then sent around the county to teach them to clinic staff, then to VHWs and VDCs. At least two members of each VDC, in addition to the VHW, should learn the details of this system, including how to complete all forms.

C. Initial Drug Supply

The training of VHWs and VDC members in drug accounting should coincide with the distribution of the first monthly supply of drugs. The initial supply might represent two months' expected use in order to reduce the possibility of a break in the supply. The village as a whole should be clearly told that the supply is a loan -- not a grant -- which must be repaid if ever the village decides not to continue in the system. Labelling it a loan might provide a useful 'threat' to a village which, at a later date, experiences a break in its cash flow (e.g., from a theft). Such a village would be told that it has to repay the loan anyway, but if it is able to raise enough funds to pay back the loan, it would have the option to continue to receive drugs for the same money. This loan status might be formalized through a contractual agreement between the VDC and the health system.

D. Drug Distribution

It might be considered (depending upon policy decisions) to be the village's responsibility (using the mark-up to pay for transportation costs) to bring cash to the clinic and drugs from the clinic. This might be modified somewhat if clinic personnel have access to a motorbike and are expected to visit each village regularly for supervision purposes. It might, for example, be possible in such instances for the village to share the cost of gasoline with the clinic staff. But these and similar local arrangements should not be developed as higher-level policies; rather, the policy should be that the village has the responsibility because the village can make a 'profit' on the sale of drugs.

E. Drug Sale Price and Use of Mark-up

The VHW will sell drugs at the same price as the drugs are sold to any patient elsewhere in the country (if LGDS ensures all transportation costs). This represents a mark-up of approximately 75% over the CIF cost. Basically, the mark-up is intended to cover transportation costs, plus theft, breakage, expiration, inflation, etc., as described earlier for dispensing sites. If money still remains after payment of these costs, it should be used for drug-related purposes (e.g., a secure cabinet for the VHW to store the drugs, pencils for the accounting system, a subsidy for villagers who cannot afford to pay). If anything still remains after these expenses, the VDC can decide on its use.

It was suggested to the Study Team that the VDC might be given the authority to raise drug prices higher than the official national patient price list, then use any additional profit for other community development purposes.

After careful consideration of the pros and cons of this suggestion, we recommend that it be discouraged, and that drug sale profits be used only for drug-related purposes, primarily because:

1. It is desirable to keep drug prices as low as possible to enable more people to afford to purchase them.
2. Many general community development expenditures tend to benefit the leadership more than the poorer people (e.g., a new well is more likely to be located near a VDC member's home if he makes the decision on its location).

Another suggestion concerning village drug prices is that they should be lower than the prices charged to patients at other levels in the system. Such an approach would be more equitable, since villagers have less access to the other health facilities, with their highly subsidized services. Implementation of this suggestion would require an additional subsidy for the drugs distributed by VHWs: the subsidy might come from the general government budget, if some or all of the funds which are currently allocated for drugs can be continued. Implementation of this subsidy would require some system to separate the VHW's drugs from the clinic's own drug supply, presumably through prepackaged bulk volumes earmarked only for VHW use.

F. Drug Supply and Resupply

Several suggestions for initial and subsequent resupply were made to the Study Team. For initial seed supply, an initial kit with some predetermined quantity of a selected range of items is deemed appropriate. Resupply has been given two options: a standard resupply kit, versus minimum unit bulk supply of individual drugs. The former option is not satisfactory for the following reasons:

1. Actual relative morbidity and mortality patterns are not really known. A more sophisticated drug-needs assessment, suggested earlier in this report, is required.
2. The portion of communities who will actually use VHWs is unknown. Continuity of size of populations served by VHWs is unknown.
3. Experience in other countries with kits often shows that workers invariably end up after a short time with an oversupply of one drug and shortages of others. This could pose a real problem where VHWs must pay for kits and accept drugs of which they feel they do not need large quantities.
4. Variable drug use might cause some VHWs hardship in purchasing resupply -- even if a two-month seed start is provided initially.

The alternative option which appears acceptable, at least initially, is for resupply in the following manner. Clinics would receive a seed supply of drugs from which only the VHWs of the area could draw. These and subsequent

supplies to the clinic would be in the form of prepackaged bulk (similar to those used and ordered by the clinic itself), but each bulk master package of, say, chloroquine would be made up of, say, ten unit bundles of ten treatment package courses to a unit bundle. VHWs would be allowed to purchase unit bundles rather than master bundles from the clinic. Preplanning needs to be undertaken to ensure that bulk master bundling and the numbers of unit bundles to a bulk master bundle are useful to all levels of the system when disaggregated. A final system of resupply to VHWs in a national program, however, will have to await PHC Project experience.

It needs to be emphasized here that the price the VHW pays for the individual drugs at the clinic should be identical to the 'wholesale' price which the clinic itself paid. The supply should be priced exactly the same as its contents would cost at the county hospital or clinic or at a lower level, reflecting a national subsidy to the VHW program. However, actual costs/pricing will have to be weighed against the different methods presented earlier for dealing with transportation costs.

G. Other Financing Possibilities and Issues

For structural simplicity of the system, we have been assuming that VHWs will sell drugs to patients in the same manner and for the same mark-up as drugs sold to patients at any health facility. Initially, this is probably the best way to structure the system. However, at the village level, it is not necessary that only this method of obtaining funds be used. As long as a village is able to obtain enough funds to pay for the next month's supply, virtually any method could be considered acceptable. Other methods might, for example, include: a standard service fee, variable semi-required 'donations' at time of service, a standard village-wide per person or per household levy, a periodic donation campaign, a lottery, an admission charge for a sports or social event, profit from a communally-worked farm or other community-owned income generating item. All of these methods, and various combinations of them, have been reported as working successfully in one or more VHW programs in other countries. Some of these methods are more equitable in the sense that they share some of the inequity of illness: healthy people pay at least some of the costs -- if not the pain -- of sickness; other methods are more equitable in the sense that they reduce some of the inequity of wealth: the rich pay more than the poor. The cultural acceptability of these methods, the assessment of which approach is most fair (or least unfair), can best be done by the villagers themselves. At least some of these methods of raising funds (plus their pros and cons) could be explained to villagers, then the VDC encouraged to decide whether to adopt one or a combination of them or to retain the standard drug sale method. The health staff should emphasize their own neutrality on this issue, that they are only concerned with the objective rather than the means.

The issue of payment of a stipend for VHWs will inevitably arise in conjunction with the collection of money for drug resupply. We recommend that the PHC Project begin by assuming that all VHWs will receive no payment, that they are to work strictly as volunteers. Such an approach would eliminate, through self-selection, any individuals who view this role primarily as a source of income. Only in the unlikely event that this approach appears to be unworkable should the village be encouraged to consider a payment mechanism. We recommended earlier that any profit from funds collected from patients for drugs be earmarked solely for drug-related purposes. If it proves necessary to pay the VHWs a stipend, the VDC could decide if it considers this to be a 'drug-related purpose' and, if so, include a higher price mark-up. Alternatively, perhaps one of these other methods might be used by the VDC for a VHW stipend, with drugs continuing to be sold at the nationally-established prices.

H. Supervision

No system, especially one as complex as this, can be perfect. Considerable and continual 'fine tuning' will be required at all levels. Regular supervisory visits to the village should focus on helping the VHW and VDC members to understand and correctly implement their varying roles. Another major focus of supervision should be an assessment of whether requiring payment for drugs is inhibiting their distribution and use. If some people are not going to the VHW or the clinic because they cannot afford to pay, the VDC should be strongly encouraged to recognize this as a problem and to take action. Finally, field supervisors are often in the best position to recognize larger system flaws, and should be expected to report these and recommend county-wide or nation-wide improvements.

I. Other Comments

It should be noted that the system outlined above is one which will take the central supply service considerable time to prepare for and link into, given the restructuring and strengthening needed at all levels of the system above the village. In addition, few VHWs are actually in place. It is suggested that for the next several years, VDCs consider all options for purchase of drugs for VHWs. (One option is to purchase through CHAL, if this is possible, until NMSD can reorganize itself and gear up to the special needs of VDCs as these and VHWs become more numerous.) In this regard various options and their relative merits are discussed in Chapter V.

J. Summary

In conclusion, we return to the emphasis of the first paragraphs. The most important aspects of the village-level drug distribution system are not the details of drug selection, pricing, prescribing, distribution, etc., but rather the basic infrastructure upon which it rests. Considerable preparation of the community, even greater emphasis on the VDC than on the VHW, periodic brief training of VDC members as well as VHWs, and supportive supervision at least monthly from the health staff are essential for a village-level drug

system to be effective on a long-term basis. Low prices, no credit, a complete yet simple accounting system, distribution of drugs in both initial supply kit and individual bulk drug form, and VDC decision-making on the payment method are the other most important of our recommendations.

IV. SUMMARY OF SPECIFIC RECOMMENDATIONS FOR STRENGTHENING SUPPLY MANAGEMENT SYSTEM AT THE VILLAGE LEVEL (INCLUDING OPERATION OF REVOLVING DRUG FUND)

A village-level supply management system will only be successful if it is within an effective community-based health program. The key elements of this program in Liberia -- already in advanced planning stages for Maryland, Bong, Sinoe, and Grand Gedeh Counties -- should comprise:

- Representative VDCs, who receive periodic training and supervision from the health sector, are expected to make local policy decisions, and to spearhead the implementation of health and other development projects.
- Part-time VHWs, selected from and by their communities, working on a largely voluntary basis, receiving periodic training and supervision from the health sector.
- No payment of VHWs from the health sector.
- A substantial training and supervision system based in the nearest clinic, with visits to each village at least monthly.

More specific recommendations for an effective supply management system, in rough chronological order, are as follows:

1. A simple accounting system, for both money and drugs, should be developed. This system should be usable by people who are barely literate. It should incorporate extensive requirements for the VHW, at least one VDC member, and health system supervisors to check regularly on the quantities which should be and are remaining. In general, the VDC, not the VHW, should have overall responsibility for funds.
2. The health staff should provide an orientation to the supply management system for all VHWs, VDC members, and any other villagers who wish to attend. A more detailed training for the accounting system should also be provided for VHWs and selected VDC members.
3. The health sector should suggest a variety of alternative financing schemes to the VDC, and encourage them to decide whether to adopt one or a combination of these, or to use the national drug sale prices. They should retain the option to alter this decision at any time.

4. A first supply of drugs, representing two months' expected use, should be presented as a loan (not a grant) to each VDC (not the VHW). A contract should be signed, committing them to repay the loan or to continue to purchase a resupply of drugs.
5. If the revolving fund method of financing is used, nationally established prices should apply.
6. All drugs must be exchanged for cash. The VDC should enforce payment or make alternative arrangements for payment.
7. Drug sale prices should include a small mark-up to cover costs of transportation and other drug-related expenditures. Broader health or community development costs should not be included in the mark-up.
8. A fixed stipend for the VHW should not be built into the mark-up. However, VDCs should have the option to increase prices to pay a stipend.
9. The VHW should only be allowed to obtain resupplies of drugs and other items from the clinic for cash. If LGDS assumes all transport costs for distribution, the prices the VHW pays should be equal to the prices paid by hospitals, health centers, and clinics. Alternatively, if funds are available for a special subsidy for the VHW program, this subsidy can be implemented through lower prices for VHW drug supplies.
10. Various approaches to drug supply (kits or bulk) will have to be explored further and be based on experimentation in the PHC Project counties.
11. Initially, consideration could be given to supplying VHWs through CHAL, rather than through the government system, if this can be arranged. (See Chapter V, page 88, Implementing the Pilot Revolving Fund Drug Scheme.)

Chapter V

STRENGTHENING LIBERIA'S DRUG SUPPLY MANAGEMENT SYSTEM TOWARDS THE INTRODUCTION OF A NATIONWIDE REVOLVING FUND SCHEME: PHASING AND RESOURCES

I. INTRODUCTION

The objectives of this chapter are:

- To pull together the main themes of the preceding chapters as they apply to the action now required for moving Liberia toward an efficient supply management system.
- To specify what we see as the necessary sequence of steps required to revamp the system at the central level.
- To indicate the prerequisites and implementation sequence for designing and implementing a nationwide revolving fund.
- To quantify the capital and recurrent costs of these two programs and suggest possible lines for funding them.

In general, we see the need for approaching the problems and objectives through a series of stages, each depending upon the success of the preceding stage. A main point is that the drug supply management system must and can be restructured before a nationwide revolving drug fund is put in place. This process is one in which the GOL, USAID, and the PHC Project technical assistants cooperate closely in providing the policies, labor, and funding needed for accomplishing the required tasks.

II. PREPARING FOR PILOT-TESTING THE REVOLVING FUND

A program to strengthen the supply management system and introduce a nationwide revolving drug fund will require four stages. Stage I should concentrate on the restructuring of the drug supply management system: design and preparation for implementation; and preparing for the pilot-testing of a revolving fund scheme in the two PHC Project counties. Stage II should be a period in which the restructuring is tested and adjusted, and in which the county-level pilot scheme is implemented. Stage III should involve detailed planning and preparation for introducing the revolving drug scheme on a national level. Stage IV is the time for implementing the national revolving drug scheme.

A. Stage I: One Year

Restructuring the Central Supply Management System

As we have stressed throughout this report, the central supply management system is in need of restructuring, regardless of whether a revolving drug fund is adopted. The need to restructure is an immediate one to ensure at least a minimal flow of drugs to segments of the population depending upon the government's health system. The needs for restructuring are primarily related to restocking and the management and operations of the LGDS. The following sequence should be followed, the details of which may be found in the previous chapters of the report.

On the premise that a Central Drug Service Board will be named expeditiously and that it will immediately confirm the recommended Vital Drug List (pending a more definitive study which might lead to minor amendments), the following actions are recommended:

1. Limit new procurements (both purchases and donations) to items listed on the Vital Drugs List only.
 - a. Assess those most needed, governing the selection by the money available, the existing stock on hand (if any) of the specific item, and/or the potential of using up other items of similar therapeutic use (e.g., use co-trimoxazole in stock to meet requests for triple-sulpha tablets which are customarily used in Liberia).
 - b. Categorize usable substitutes.
 - c. Publicize availability of items to dispensing sites.
2. Form the Central Drug Service Board (CDSB) and disband the present NMSD Advisory Committee.
 - a. Confirm Vital Drug List: form Sub-Committee to:
 - i. study and recommend criteria for Vital Drug List;
 - ii. maintain scrutiny and recommend amendments as deemed essential;
 - iii. recommend on and supervise production of a public sector Formulary.
 - b. Confirm organizational and personnel recommendations: form Sub-Committee on Organizational Methods to:
 - i. establish job descriptions;
 - ii. oversee transition to new Liberia Government Drug Service (LGDS) to replace NMSD.

- c. Confirm recommendations concerning physical facilities: form Sub-Committee on Organization Matters to:
 - i. adjudicate plans and supervise construction/installation of shelving, build storage areas, bench spaces, refrigeration, security (fire, theft, etc.), etc., as well as the administration office and its equipment;
 - ii. arrange and supervise the required formalities with JFK Medical Center to take over the present warehouse buildings in the name of LGDS.
- d. Confirm supply routines: form Sub-Committee on Supply to establish and supervise:
 - i. tendering procedures including forecasting and adjudication of offers to supply;
 - ii. letting of contracts;
 - iii. principles of purchasing;
 - iv. redistribution policies and routines.

3. Inventory

- a. Definitively establish values (CIF) of inventory counted during week of August 1, 1984.
- b. On existing Cardex records, record August 1, 1984, and the current CIF value per unit; confirm and obtain supply of new perpetual Inventory Record cards and transfer information from present cards beginning, at least, from most recent inventory count.
- c. Physically set aside all expired and otherwise obsolete items; list (to obtain authorization to write-off; to record the actions in Cardex/new Inventory Record cards); remove and destroy under supervision.; maintain an area for such future purposes.
- d. Physically set aside in an orderly fashion (pending availability of new shelving and other storage spaces) all usable items categorized as:
 - i. Vital Drug List items;
 - ii. items substitutable for Vital Drugs;
 - iii. other non-Vital Drug items.

Ensure that the principal of F.I.F.O. (First in, first out) is facilitated.

4. Supply

- a. Prepare 12-month forecast of quantity required of each item on Vital Drug List (keeping in mind paragraphs above) toward placing an order in December, 1984.
- b. Publish forecast to potential Suppliers, overseas and local.
- c. On deadline for Tenders, tabulate the Offers to Supply (for current and future reference) and select most appropriate Supplier; first, set forth criteria for selection (price, quality, delivery time, reliability, etc.).
- d. Based on financing arranged, transmit Purchase Orders to Supplier(s); intention is to obtain a basic start-up stock of Vital Drug List items equal to 12 months' requirements (the maximum capacity of the "Pipeline").
 - anticipate four months' delivery time;
 - future replenishments will be for six months' stock;
 - anticipate reordering in September, 1985, and each six months thereafter.

5. Redistribution

- a. Pending new stock of Vital Drugs, concentrate on using up the available stock of usable items.
- b. Establish and publish to the institutions the schedule of monthly requisitioning; request estimate of three-month stock needed by each; adjudicate each to apportion the anticipated supply.
- c. Establish through a public tender contractual arrangements for transporting to County Hospitals (and throughout Counties if that policy is approved); contractors should be bonded and insured.
- d. Prepare and print new Requisitioning Forms; design for convenient use and to serve as 'invoice' as well.
- e. Within the month after receiving Supplier's shipment and in the scheduled weeks, deliver appropriate apportioned stock to each dispensing site (i.e., their 'seed stock' of estimated three months' duration); thereafter, accept and complete according to schedule these monthly requisitions for quantities required to replenish to three months' level (based on established monthly average).

Allocation of drugs to health facilities is recommended to be eventually based on appropriate information, the substance of which is to be established by the Central Drug Service Board. Such information would appropriately include, but not be limited to, epidemiological information gathered by central level, historical use records of health facilities, and supervisory based information.

6. Finance

- a. Establish sound financing and refinancing required to ensure continuous supply of Vital Drug List items.
 - i. arrange early payment to creditors;
 - ii. establish financing of start-up Purchase Order (for December 1984; approximately \$1,120,000);
 - iii. establish financing of future six-months' replenishments (beginning September 1985).
- b. Establish accounting system (including costs of sales or inventory values, accounts payable, invoicing; accounts receivable, monthly statements, annual financial reports) on basic, but sound, principals of accountability.

7. Personnel

- a. Confirm staffing pattern of management and operations personnel; prepare job descriptions.
- b. Appoint qualified persons to the respective positions.
- c. Institute training programs:
 - i. externally, as available (management, administration, accountancy, etc.);
 - ii. on-the-job: initial and continuing.
- d. Consider and, as soon as practical, appoint staff to assist and supervise the various dispensing sites relative to stock control, storage facilities, rational use of drugs, etc.

8. General

The above and related matters of detail should be charted for priority and sequential (although overlapping) activation -- planning, programming, training, testing, full implementation -- while evolving a comprehensive drug management system throughout the first year of new operations followed by refinements suited to the perceived needs of drug-related programs being brought into place.

Some of these steps should be taken immediately, such as the formation of the Central Drug Service Board and the introduction of the Vital Drug list. The majority, however, will require design and preparation. Technical assistance will be required. The Logistics and Supply Officer is already in place and is expected to be the primary external assistance labor, working closely with relevant Liberians in designing the new central drug service and its system. Technical assistance will also be required for various aspects of the design of systems for the LGDS. Funds for these are provided in the PHC Project budget.

Preparing for Pilot-Testing the Revolving Fund

Stage I will also require the PHC Project team to plan and prepare for the implementation of a pilot revolving drug scheme in the two project counties. In the report we have raised many questions, presented some findings, and suggested some thinking regarding alternative solutions. All of these need more in-depth investigation and should be part of the PHC Project preparation in Phase One. These questions include:

1. What is the capacity of rural people (individually and in various communities) to pay for drugs?
2. What are the most suitable methods for ensuring that all people who require drugs have the cash to pay for them, whether receiving them from VHWs, clinics, health centers, or county hospitals? We expect that the answers will vary and that more than one solution will have to be introduced into the system.
3. What are the bookkeeping needs for the system, especially at the clinic, health center, and VHW levels, and what are the capacities to meet these needs?
4. What is the best way to meet the costs of transporting drugs below the county level?
5. How can monies collected at all levels be handled most efficiently and safely?
6. To what extent are over-prescribing and incorrect prescribing problems at the various levels, and how can they best be solved?
7. What are the actual, realistic, times required for delivering and ordering to each level?
8. What are the specific roles played by the non-Governmental importers of drugs, and how are they relevant to meeting the drug needs of the country and the setting-up of a revolving drug fund?

It is expected that the technical assistance team will work closely with the Central Drug Service Board, providing it with the ongoing results of its findings and its proposals for solutions, and raising policy questions that need to be answered.

B. Stage II: Two Years

Implementing the Central Supply Management System

It is important to stress that we believe that the GOL should fund the seed stock and working capital requirements of implementing the central supply management system in its initial years. We think an emergency seed stock of \$1 million should be sufficient with annual GOL financed replacement funds for the initial three years of LGDS's operation, providing that the vital drug list is strictly adhered to and purchases are made from non-profit or similarly low-price suppliers. This will require foreign exchange each year that is made available without delays. We envision these first years as ones in which the new system is tested and adjusted. Keeping the flow of drugs low during these years seems advisable so as neither to overload the LGDS nor overburden the Government before the system is proven.

We expect that an additional full-time expatriate will be needed to assist in the first three to four years of LGDS's operation. This person would most likely be at the level of an Assistant General Manager, with special strengths in accounting. More consultancies will probably be required to meet unforeseen needs during the first two implementation years and should be anticipated. An evaluation should be scheduled at the end of Phase Two to determine whether or not LGDS is prepared for the design and implementation of a nationwide revolving drug fund.

Implementing the Pilot Revolving Drug Fund Scheme

The pilot revolving drug fund scheme potentially could be implemented in two different ways. In the first option, PHC Project counties (and other VHW programs) would place drug orders through LGDS. It is presumed that by the time these counties are prepared to start a revolving fund, LGDS would be prepared to take on the special responsibilities of ordering for these counties. Early integration of the PHC Project county drug supply management with LGDS would presumably avoid "integration pains" or resistance to integration which might occur if separate systems were allowed to develop and then be expected to be merged at a later stage. The major disadvantage of this approach is that if LGDS cannot develop efficiently and perform effectively early on, then the piloting of the revolving fund will be exposed to a factor which potentially could undermine the success of an otherwise sound concept.

In the second option, all drugs for the two project counties including those for use in piloting the revolving fund could be purchased by the counties directly or through CHAL (providing CHAL agrees). This option would insulate a test of the revolving fund from LGDS (which might not be capable of handling drug ordering efficiently for the counties at the time of the test), thus allowing an unimpaired test of a revolving fund in the PHC Project counties. However, this option would also expose the pilot test to another obstacle: developing a capability within counties -- which are totally unfamiliar with bulk procurement procedures -- to procure internationally. Perhaps more importantly for the long term is that this option could pose important strains at a later date when the county will have to yield to LGDS the procurement for the county in order to maintain national economies of scale.

Fortunately, a decision as to whether PHC Project counties should purchase drugs independently of LGDS or through it is not needed immediately. A decision in this regard should be deferred at least for one year to see how far the process of restructuring and reorganizing the supply management system at the national level has proceeded.

A related issue is whether PHC Project counties should continue to receive any drugs from LGDS, and, if so, at which levels within the county during a test of the revolving drug fund. There are again options. One option would be to test the revolving fund at all levels (i.e., county, health center, clinic, and VHW levels), using no LGDS "free drugs." A second option would be to allow LGDS "free drugs" to flow into the system to certain levels. The first option would be methodologically "cleaner", but perhaps objectionable to county authorities who might feel "cheated" by having regular government allocations to their counties absorbed by other counties. The issue of having two different drug systems (one free to all, one having an out-of-pocket expense) operating simultaneously could cause problems. This issue will have to be studied in greater depth and cannot be explored fully by the Study Team as part of a strategic study. The issue is only outlined here. Whichever option is eventually selected, a massive public information campaign will be needed to avoid misunderstanding which could easily arise out of dual systems of drug financing being in place within or among counties.

C. Stage III: One Year

Planning a Nationwide Revolving Drug Fund

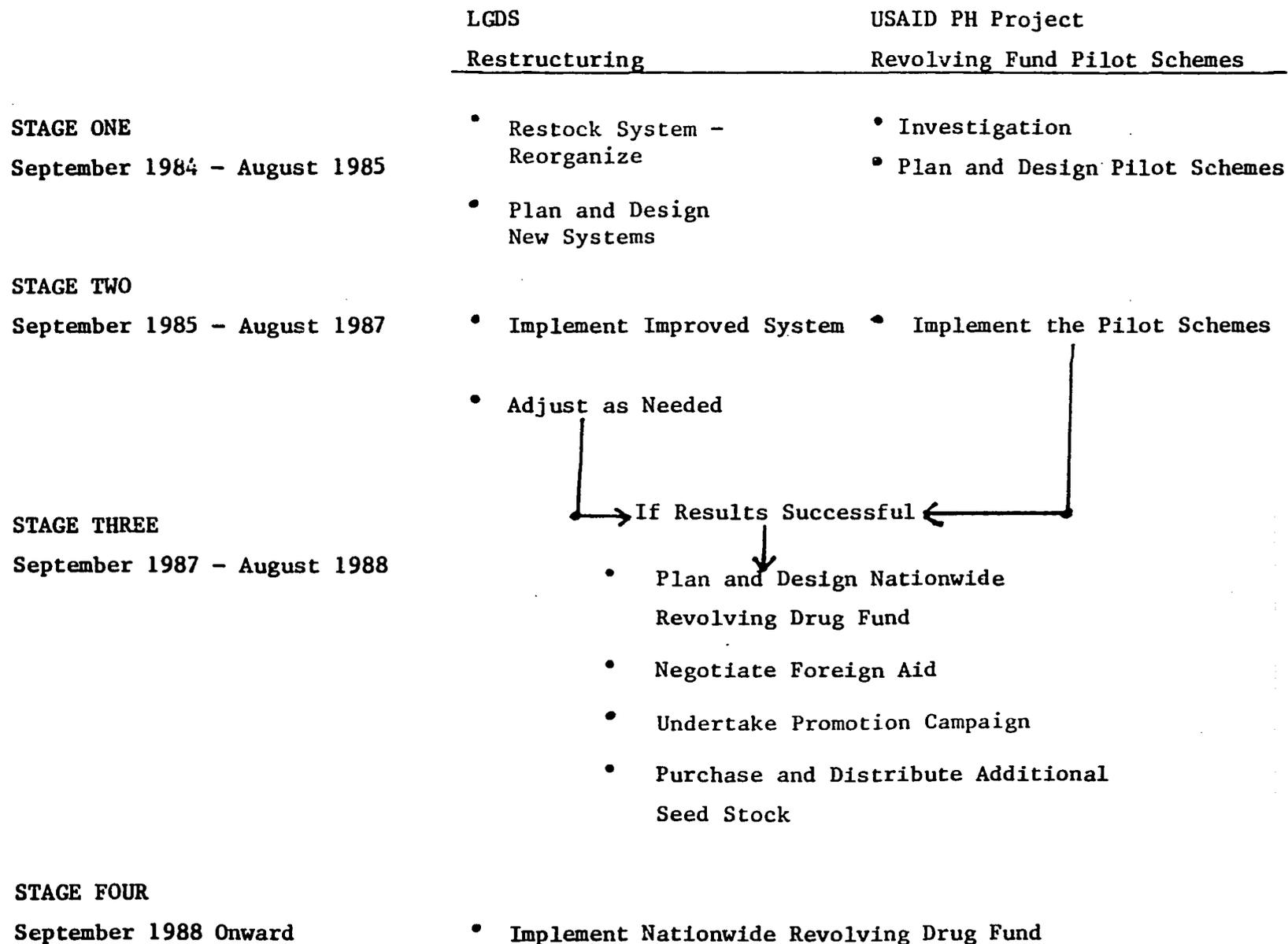
If the evaluations of the activities in Stage II provide clear evidence that: 1) a revolving drug fund works effectively and equitably at the county and village levels; and 2) LGDS is prepared and capable of operating a national revolving drug fund, Stage III should be used to draw up detailed plans for introducing the system. In addition to consultants who might be needed, we advise that the non-Governmental importers of drugs (missions, companies, private health facilities, and wholesalers and private pharmacies) be invited to assist the Central Drug Service Board in planning the national scheme. Donor agencies should also be included in this work.

D. Stage IV: Year Four onward

Stage IV will begin the implementation of the national revolving drug fund. Appropriate points and forms of evaluation should be introduced. In this stage, donor support in the form of financial resources will be required.

Each of these stages is depicted in Figure V.1.

Figure V.1: PROPOSED SCHEDULE OF IMPLEMENTATION



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III. FINANCIAL ANALYSIS

Because we have divided the proposed solutions to the problems of Liberia's supply management system into two distinct phases -- the restructuring of the central supply management system, and the introduction of the revolving drug fund on a nationwide basis -- we have separated the financial analysis accordingly.

A. Financial Analysis of the Restructuring of the Supply Management System

We have viewed the restructuring of the central system in terms of a number of assumptions which are reflected in the financial picture presented below.

1. We have assumed that GOL can and must finance this process, including the cost of drugs during a transition period. (See below for a discussion of GOL's ability to pay.)
2. We have assumed that, owing to the present financial status of the GOL, the drugs injected into the restructured system, both as seed stock and for the annual consumption levels, must be bought out of an austerity budget. For this reason we have assumed that the system will only serve the patients of 500,000 people in the country. This is 25% of the total population, compared with 20% served by the public health system in developing countries with a high coverage. Furthermore, CHAL claims that it currently serves some 30% of the population. When the concession and other private hospitals and clinics are added, the coverage will not be insufficient, considering the general state of the economy.
3. We have assumed that drug purchases will be limited strictly to the Vital Drug List through non-profit suppliers.
4. We have included only a small amount of medical supplies. Some funds may have to be added for these, consistent with the austerity outlook in the drug area.
5. We have included the Maternity Center and the Rehabilitation Hospital, but not the JFK Memorial Hospital in our calculations. JFK Memorial Hospital is left out because: 1) their drug list might include items not now on the Vital Drug List but not known to the Study Team; and 2) the volume of their patients is not now possible to estimate.
6. We have assumed that immediate steps will be taken to secure funds to restock the system at the levels recommended and that one year's stock will arrive on April 1, 1985.
7. We have assumed that the procurement and delivery of the drugs for the system will continue during the process of restructuring, which will also begin immediately.

One of the first steps that the Central Drug Service Board will have to take will be to apportion the drug stock among the hospitals, health centers, and health posts. This will have to be done carefully and with a fair degree of precision so that the LGDS will have specific directives on which to make up and ship packages. Two policies will be critical to the operation of the system. First, representatives from the various health units must have no access to the drugs in the LGDS, except what is allocated to them by the Board and what they may need for real emergencies. Emergency allocations should be made by the Board and consequent adjustments to other shipment orders. Second, influential people in Liberia must not be able to direct that allocations be altered. Authorization for this regulation should be sought from the Head of State.

Table 5.1 presents a rough estimate of the capital and recurrent (for the first year) costs of the proposed system. Seed stock of \$1,120,000 is ordered in December, 1984. Along with certain improvements to the central warehouse and equipment and stock for prepackaging and shipping, these are the only capital costs, totalling just over \$1.2 million. For reasons spelled out in other sections of the report, it is necessary to start out with a full year's supply, part of which is distributed to the dispensing sites. An ordering, receiving, packaging, and shipment system to dispensing sites can then be operated on an orderly basis, eliminating the delays of the past.

Recurrent costs are, primarily, the replacement of the stock. \$1.7 million will be required in the first year for recurrent expenses.

Table 5.2 is a cash and stock flow for the system during the period from December, 1984, through August, 1988, after which, it is expected, the nationwide revolving fund will be put in place. For fiscal 1984-1985 the GOL will have to spend \$1.6 million in capital and recurrent costs, \$1.3 million of which will be in foreign exchange. The fiscal outlays peak in 1987-1988 at \$2.2 million, with \$1.9 million foreign exchange expenditures needed. An important conclusion of this table is that the GOL will have to budget the foreign exchange requirements of the system each year and make these sums available when orders are placed. It has already been stressed elsewhere in the report that the GOL will also have to allocate the budgeted amounts for local expenditures and protect them against revisions resulting from revenues less than expected. Without both of these measures, no amount of restructuring or improved management systems will convert the present system into one that delivers drugs to the people of Liberia.

For illustrative purposes, Table 5.2 shows the ordering, receipt, and changes in the stock levels in the central warehouse over the period.

B. Financial Analysis of the National Revolving Fund

As argued earlier in this chapter, the implementation of a national revolving fund should depend upon: 1) the successful restructuring of the central supply management system; and 2) the success of the pilot revolving fund schemes in the PHC Project. Assuming both successes, we further assumed that the national scheme would be operational by September 1, 1988. This means that the order for the seed stock will have to be placed at the beginning of April, 1988. We assumed that the revolving fund would expand the coverage of the system to 1 million people, thus requiring a doubling of the total seed stock in the country.

Table 5.1 : STRENGTHENING THE CENTRAL SUPPLY SYSTEM: COST

	(\$'000)
I. <u>Capital</u>	
A. Seed Stock	1,120
B. LGDS	
1. Shelving and other improvements	20
2. Machines for pre-packaging 2 @ \$1,000 each	2
3. Bags for pre-packaging	40
4. Other packaging materials	50
C. Technical Assistance ²	
1. Logistics Officer (USAID PHC Project)	
2. Administrator/Accountant	
3. Short-term (USAID PHC Project)	
D. Total Capital Cost	\$1,232
II. Recurrent Costs (per year)	
A. Drug purchases (CIF) ³	1,300
B. Handling, packaging, transport to health units (18% of CIF)	202
C. Labor (See staff list in Appendix V)	120
D. Other Operating Costs of LDGS ⁴	
E. Total Recurrent Costs	1,654

1. Assumes 500,000 people are served through the existing government health care system, including the Maternity Center and Rehabilitation Hospital but not JFK Hospital.
2. Assumes all technical assistance will be financed through the USAID PHC Project.
3. Basic Cost calculations for Vital Drugs flow (Appendix X).
4. Bank charges, repairs, telephone and cable, etc.

Table 5.2
LIBERIA : SUPPLY MANAGEMENT SYSTEM CASH AND STOCK FLOW FOR THE RESTRUCTURING PERIOD 1/84 - 8/88

ITEM	1984 QUARTER		1985 QUARTER				1986 QUARTER				1987 QUARTER				1988 QUARTER			
	3rd.	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Expenditures																		
Capital																		
Seed Stock		1120																
LGDS Repair		112																
Recurrent																		
Drug Purchases					640		680		750		825		910		1000			
Handling/Transport.				202			114		122		135		149				188	
LGDS Labor	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Other Operating	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Total	38	1270	38	240	656	38	830	38	910	38	898	38	1097	38	1039	38	228	38
Fiscal Yr. Totl.	1044	851	566	188	766	1584	1946	877	1984	1687	885	2211	1030	688	59	264	264	264
Outlays: (00L)																		
Local	38	150	38	38	38	38	150	38	160	38	173	38	187	38	38	38	146	38
Foreign		1120		202	620		680		750		828		910		1000			
Stock Flow																		
Order & Mos. Supply		1120			640		680		750		825		910		1000			
Receive Order				1120			718		780		860		950		1030		1150	
Stock on Hand (Months) Dec. (0)				April (12)	Sept. (5)		Jan. (1)	March (3)		July (7)	Sept. (5)		Jan. (1)	March (5)	July (7)	Sept. (5)	Jan. (1)	March (3)

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Table 5.3: REVOLVING FUND COSTS¹ STARTING SEPTEMBER 1988 (\$'000)

I. <u>Capital</u>	
A. Seed Stock	1,625
B. Working Capital ²	1,083
C. LGDS	
1. Additional Prepackaging Bags	40
2. Additional Packing Materials	50
D. Training Costs ³	
1. County Medical Supervisors	2
2. Training 100 Trainers	12
3. Training Clinic, Health Center and Hospital Staff	60
4. Materials ⁴	<u>12</u>
E. Total Capital Costs	2,884

-
1. For a scheme covering patients within a population of 1 million people. Includes Maternity Center and Rehabilitation Hospital.
 2. Four months' worth of purchases to cover lag between orders by the LGDS and receipt of funds from health units in the system. Based on total value of seed stock in 1988 of \$3,250,000.
 3. These are very rough estimates. They should be used for illustrative purposes only and not for budgeting.
 4. Posters, etc.;, for national publicity campaign, training booklets, ledgers, charts, etc.

Table 5.3 shows the capital costs of putting the revolving fund into place. In addition to seed stock, four months' working capital (based on the entire stock in the country, not just the new seed stock ordered) will be required because of lags between ordering and receipt of funds. A national campaign will have to be launched to explain the changeover from free drugs to a payment system, emphasizing that the volume of drugs the public sector will be making available will immediately double by virtue of the fact that people will now be paying for them. The \$2.9 million required to launch the fund will be secured through foreign aid that allows the seed stock to be purchased at generic names from lowest-cost non-profit suppliers.

Table 5.4 shows the recurrent costs of operating the central supply management system with a revolving fund. These annual costs to the GOL drop from \$1.7 million to \$152 thousand. This is because the cost of replacing drugs, of handling them, of wastage, transport, and inflation are included in, and therefore recovered by, the cost to the consumer. In the first year of operation it is estimated that final sales to the patients will be just over \$5.8 million. This will be about \$6 per capita for the million people the system is expected to serve. This does not mean that every one of the one million people will be patients of the system. The actual cost per patient will vary according to the illness and the drug required.

Table 5.4

IMPROVED SUPPLY MANAGEMENT SYSTEM WITH REVOLVING FUND NATIONWIDE

LGDS Recurrent Costs ¹		(\$'000)
A.	Labor	120
B.	Other Operating Costs	<u>32</u>
C.	Total	152

C. Meeting the Costs of Restructuring the Central Supply Management System

The need to refurbish the stock of drugs in the public health system in Liberia is of national importance. The costs are well within the means of the Liberian Government. Even the \$1.6 million required in fiscal 1984-1985 is well within the means of the Government; it represents less than one percent of estimated GOL total recurrent expenditures for 1983-1984 and about .3% of 1983 total exports. It would represent only 8% of the overall 1983-1984 health recurrent expenditures and be only a \$200 thousand increase over that year's drug and medical supply outlays. Indeed, over the entire period in which we recommend that the central system be restructured and tested, the recurrent costs are well within the budgetary and foreign exchange capabilities of the GOL.

¹Extrapolations from 1984 Salary Schedules and NMSD Expenses (NMSD Director's memo, January 1981, and Appendix VIII).

D. Meeting the Costs to Initiate a National Revolving Fund System.

We recommend that the GOL seek the estimated \$2.9 million required to meet the capital costs of the revolving fund.

If foreign aid is used to capitalize the system (for the drug seed and working capital), the following approach should be considered as a way of inducing efficiency and reducing the risk of wasting scarce aid resources.

1. The aid should be in the form of a loan.
2. The loan should carry an interest rate at some level between concessionary rates and commercial rates.
3. Measurable performance standards should be included as part of the loan agreement with yearly evaluations. Ratings of Excellent, Good, Average, and Poor should be attached to the evaluations.
4. On the basis of the performance rating, the following adjustments should be made to the loan:
 - a. Excellent: yearly interest and principal converted to grant;
 - b. Good: yearly interest waived;
 - c. Average; yearly interest converted to concessionary rate;
 - d. Poor: yearly interest remains as negotiated.

E. Benefits from a National Revolving Fund and Restructured Supply Management System

Considering the present state of the procurement and supplying of drugs in the public health sector in Liberia, a smooth stock flow and efficiently operated central system will bring marked improvements that will be felt directly by patients. Cost savings can be expected from:

1. Restricting ordering from the Vital Drug list.
2. Bulk buying.
3. Purchasing from non-profit suppliers.
4. Utilization of private transport on a contract basis for deliveries.

Further savings will be experienced if over-prescribing is reduced as part of the health practitioner education program.

Appendices

Appendix I	The Working Group - National Counterparts to the Study Team
Appendix II	Physical Inventory of NMSD Recorded During the Week of August 1, 1984
Appendix III	A Recommended Vital Drug List for Liberians
Appendix IV	Availability of Proposed Vital Drugs by Health Facility (Including Allowed Use by Health Worker)
Appendix V	Proposed Staffing of Liberia Government Drug Service
Appendix VI	Supply and Information System
Appendix VII	Course-of-Therapy Prepackaging
Appendix VIII	National Medical Supply Depot: Expense Accounts Balances from the Period July 1983 - June 1984
Appendix IX	JFK Medical Center Drugs and Medical Supplies: Accounts Payable as of 8/17/84
Appendix X	Estimated Quantity and Cost of Proposed Vital Drugs for Liberia

APPENDIX I

NATIONAL COUNTERPARTS (WORKING GROUP) TO THE STUDY TEAM

1. Dr. Ivan Camanor, Chief Medical Officer, MH & SW.
2. Mr. Jacob N. Cisco, Chief Pharmacist and Manager, National Medical Supply Depot (NMSD).
3. Dr. Fred K. H. Gordon, Pharmacy Administrator, JFK Medical Center.
4. Mr. Eric Johnson, Financial Management Officer, Bureau of Planning, Research and Development, MH & SW.
5. Dr. Abdul R. Massaquoi, Deputy Chief Medical Officer for Curative Services, MH & SW.
6. Ms. Phyllis Nguma, Administrative Coordinator, Bureau of Coordination, MH & SW.

APPENDIX II

PHYSICAL INVENTORY OF NMSD RECORDED DURING WEEK OF AUGUST 1, 1984

	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
1. ACIDO-NALIDIXCO PRODES TABS 56's	31 BT				
2. ASMAR TABS. 20's	300 BT		1.85		INN/GENERIC?
3. AMINOPHYLLINE INJ. 10 ml 25mg 50's	12 Bx				
4. AMINOPHYLLINE INJ. 100's 250mg	1 Bx	4/80		Ø	EXPIRED
5. ACETYLSALICYCLIC ACID (ASPIRIN) TABS. 100's	11,434 BT		1.92		
6. AMINOPHYLLINE TABS. 10mg 1000's	10 BT				
7. AMITRIPTYLLINE TABS. 25mg 100's	41 Bt	8/85	5.90		
8. ASCRIPTIN A/D TABS. 24's	2,412 BT				INN?
9. ASCRIPTIN TABS. 12's	1,239 BT				INN?
10. ARTOSIN TABS. 30's x 1	80 Bx				INN?
11. APRESOLINE TABS. 25mg 250's	265 BT				
12. AMOBARBITAL SODIUM TABS 200mg 100's	36 BT				
13. AMPICILLIN SUSPENSION 125 mg 100ml	3,905 BT				
14. AMPICILLIN INJ. 500mg 100's	528 Bx	4/88			
15. ALBUDID EYE DROPS (SULFACETAMIDE 30%)	94 BT				INN?
16. ASPO (ASPIRIN) TABS. 208's	97 BT		GIFT		INN?
17. ADREMYCINE SOLN. 3ml	7 BT		2.55		INN?
18. ALOE 1ml 10's	820 Bx		GIFT	Ø	

	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
19. AKTIVANDAD SYRUP 100 ml	65 BT				INN?
20. ARTERENOL INJ. 1 ml	53 Bx				?
21. ANANASE TABS. 4's (BROMELAINS)	97 BT		GIFT		?
22. ANTISEPTIC CREAM	450 TU		GIFT		?
23. AVISANE TABS. 0.5 gm 50's	56 Bx	6/83	GIFT	Ø	EXPIRED
24. ARTISTAMID GEL 20 mg	62 TU		GIFT		INN?
25. BELLADONNA (MASIGEL) TABS. 0.5 gm 20's	222 Pks				
26. BISACODYL SUPP. 10 mg	22 Pk				
27. BEKUNIS TABS. 45's	170 BT				FORMULA?
28. BETADINE OINT.	72 TU	3/84		Ø	EXPIRED
29. BETNESOL EYE DROPS 5 ml	17 BT	1979		Ø	EXPIRED
30. BRINERDIN TABS. 500's	48				EXPIRED
31. BELLADONNA 12.5 mg TABS. 1000's	6 BT		3.10		EXPIRED
32. BUTADILAT CREAM 30 gm	131 TU		GIFT		INN?
33. CORDIAMINE SOLN 15 ml 25's	53 Bx		GIFT		INN?
34. CHLORPHENIRAMINE INJ. 1 ml 100's	856 Bx		4.35		
35. CHLOROPROMAZINE SYRUP 25 mg 1000 ml	50 BT				
36. CHLOROPROMAZINE TABS. 100 mg 1000's	73 BT		5.40		
37. CHLOROPROMAZINE TABS. 50 gm 1000's	340 BT		7.20		

	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
38. CHLOROPROMAZINE TABS. 25mg 1000's	105 BT	6/85	3.90		
39. CHLOROPROPAMIDE TABS. 250 mg 250's	386 BT				
40. CHLOROPROPAMIDE TABS 250 mg 1000's	108 BT				
41. CORAMINE SOLN 1.5 ml 5's	12 Bx				
42. CHLOROQUINE INJ. 5 ml 100's	502 Bx		11.00		
43. CALCIUM LACTATE TABS. 300mg 1000's	912 BT				
44. CHLOROQUINE TABS. 250mg 1000's	116 BT		15.70		
45. CHIBRO ATROPINE 1%	330 Pk	4/81		Ø	EXPIRED
46. CHIBRO PILOCARPINE 2%	101 BT	6/81		Ø	EXPIRED
47. COLCHICINE TABS. 0.5mg 100's	101 BT		1.94		EXPIRED
48. CHLORATETS (CHLORAMPHENICOL SODIUM) INJ. 250 mg 100's	33 Bx	5/85			EXPIRED
49. CHLORAMPHENICOL EYE OINTMENT	160 TU		1.60		EXPIRED
50. CHLORAMPHENICOL EYE OINTMENT	150 TU	1979	1.10	Ø	EXPIRED
51. CARDIAZOL INJ. 1.1ml 50's	32 Bx				?
52. CIMETRIN CAPS. 250mg 12's	64 BT		2.76		?
53. CO-TRIMOXAZOLE TABS. 100/20mg 1000's	10 BT	3/83		Ø	EXPIRED
54. CIRAMIN SYRUP 1000ml	371 BT	12/84			FORMULA?
55. CALAMINE LOTION, IL	115 BT		5.09		
56. CAMPHORAE AMPS 20% 100's	40 Bx				

	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
57. CAPSOVIT FORTE 25's	5 Bx				FORMULA?
58. COLLIRIO ALFA DROPS	920 BT		GIFT		FORMULA?
59. CHLOHYORUE 1 ml 10's	307 Bx		GIFT		INN?
60. CARYDOL CAPS. 300 mg 500's	1 BT				INN?
61. CHLORHEXIDINE GLUCONATE 20% SOLN	12 BT		GIFT		
62. DEHYDROEMETINE AMPS 50's 60mg/2ml	71 Bx		GIFT		
63. DEHYOROEMETINE TABS. 10mg 150's	5 BT		GIFT		
64. DOLAGIN TABS. 50 STRIPS 6's	6 Bx		GIFT		FORMULA?
65. DIPHENYORAMINE INJ. 1 ml	5 Bx				
66. DOLOBID TABS. 250mg 20's	30 BT				INN?
67. DEXTROSE 5% & SODIUM CHLORIDE 0.9% 500ml	15 BT		2.20		
68. DEXTROSE 5% & SODIUM CHLORIDE 0.9% 1000ml	10 BT	7/82	2.80	Ø	EXPIRED
69. DAVITAMON TROPICAL 60's	108 CAN		GIFT		FORMULA?
70. DAVITAMON TROPICAL TABS. 1000's	144 CAN		39.60		VATIMINS
71. DURENOT AMPS 5ml 5's	180 Bx				FORMULA?
72. DICYNONE AMPS 2 ml 50's	148 Bx				FORMULA?
73. DEXASYLYL CREAM 20gm	141 TU		GIFT		FORMULA?
74. DOLO-NEUROTRAT TABS. 20's	7 BT				FORMULA?
75. D-CYCLOSERINE TABS. 250's	1 Bx				
76. DIGOXIN TABS. 250 mg 1000's	107 BT				

	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
77. DIGOXIN INJ. 0.5mg/ml 10's	123 Bx				
78. ERYTHROMYCIN TABS. 250mg 500's	19 BT	6/85	20.40		
79. ETHAMIVAN TABS. 20's	208 BT				FORMULA?
80. ETHER ANAESTHETIC 100ml	811 CAN				
81. ENDOXAN-ASTA TABS. 500's	58 BT				FORMULA?
82. EROGOMETRINE TABS. 0.5mg 1000's	163	10/85	6.26		?
83. EYE OINT (POMMADE OPTH) 5gm 100's	15 Bx				FORMULA?
84. EUDYNA CREAM 2 gm 10's	12 TU		GIFT		FORMULA?
85. EPHEDRINE THEO-PHENOBARITONE TABS 500's	275 BT	11/86	6.14		
86. EPHANUTIN (PHENYTOIN) INJ. 250 gm	332 BT				
87. FERROUS SULPHATE SYRUP, 2l	3 BT				
88. FERROUS SULPHATE & FOLIC ACID TABS. 1000's	778 BT		GIFT		
89. FIBS INJ. 1 ml 10's	742 Bx				FORMULA?
90. FLEBOCORTID 100mg 10's	2 Bx				INN?
91. FURAMIDE TABS. 500 mg 250mg	6 BT				
92. FERROUS SULPHATE TABS. 1000's	10 BT		7.48		
93. FLUPHENAZINE TABS. 1.0gm 500's	86 BT				
94. FANASIL INJ. 500 mg 2ml 60's	310 Bx				INN?

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	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
95. FRUSEMIDE TABS. 40mg 250's	149 BT				
96. GANTRINIL TABS. 1000's	13 BT				FORMULA?
97. GLUCOSIL INJ. 5% 500ml I.M.	412 BT	SPOILED		Ø	OBSOLETE
98. GLUCOSI INJ. 40% 10's	20 Bx	1979		Ø	EXPIRED
99. CRYSTAL GENTIAN VIOLET 25 gm	3 BT	11/85			
100. GROTANTA TABS. 900 gm	12 BT	1982		Ø	EXPIRED
101. GRISEOFUCUIN TABS. 125mg 1000's	27 BT	8/86	18.94		EXPIRED
102. GENTAMICIN INJ. 2 ml 100's	5 Bx	1/85	0.48/Vial		
103. GESTINON TABS. 5 mg 1000's	198 BT		174.81		INN?
104. HEMORSOL HEMMORRHOIDAL SUPP 12's	357 Pk				
105. HALOTHANE SOLN, 250ml (FLUOTHANE)	271 BT		14.52		
106. HYDROCHLOROTHIAZIDE TABS. 25 mg 1000's	1,264 BT	7/85	2.70		
107. HYDROCORTISONE SODIUM INJ. 100mg	6,850 VIAL				
108. HYPERTENSION (CIBA) 2.5mg 5's	985 Bx				FORMULA?
109. HEPT-A-MYL INJ. 5ml 100's	58 Bx				FORMULA?
110. IMIPRAMINE TABS. 25mg 1000's	30 BT				

	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
111. ISONIAZID TABS. 100mg 1000's	382 BT				
112. I.V. SETS DISP 12's	36 Bx				
113. ISONIZID TABS. 0.1gm 5000's	357 BT				
114. INDOMETHACIN CAPS. 25mg 1000's	274 BT		17.55		
115. INDOMETHACIN CAPS. 5 mg 1000's	29 BT				
116. INDOMETHACIN TABS. 25 mg 1000's	13 BT	7/88			
117. IBUPROFEN TABS. 200mg 1000's	27 BT				
118. ISO-PURAMIN SOLN. 5%	40 BT				FORMULA?
119. KIXBYCHLOR EFFERVESCENT DISINFECTANT TAB	17 BT				
120. LIBRIUM-10 CAP 100's	7 Bx				
121. LIVER EXTRACT INJ. 20mg 100's	10	?	GIFT		
122. LOBELIN AMP. 0.1gm 6's	63				
123. LOBELLIN AMP. 0.1gm 100's	5 Bx				
124. LOPRESSOR I.V. 5 mg./5ml 5's	516 Bx				
125. LARGACTIL SYRUP 25 mg/5ml 2 l	1 Bt				
126. LARGACTIL TABS 100mg 500's	14 BT				
127. LIDOCACINE CHLOHIDRAT 0.5%	335 VJAL				
128. LEVOPHED AMPS. 4 ml 6's	23 Bx	8/81		0	EXPIRED

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		STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
129.	LEVASCAN SYRUP 500cc	461 BT				FORMULA?
130.	LEUCOVORIN CALCIOCO INJ. 1cc 6's	1 Bx				FORMULA?
131.	LEVAMISOL HCL TABS 40mg 500's	132 BT		6.20		
132.	LANOXIN PED/GER ELIXIR 60 ml	96 BT				
133.	LEUKERAN (CHLORAMBUCIL 2mg 25's	14 Bx	?			
134.	LASTIPEN INJ. 1.2mega I.V. 2ml	77 BT				INN?
135.	LERGOBAN TABS. 5 mg 50's	310 BT				INN?
136.	LANCEPHYLLINE SYRUP 100mg 5 ml	139 BT				INN?
137.	LIDOCAINE 2% INJ. 1.8 ml	108 BT				
173a.	LYRAMYCIN (GENTAMICIN) INJ. 2 ml	381 VIAL		1.40		
138.	METHYLTESTERONE TABS. 5mg 1000's	187 BT		10.70		
139.	METHYLDOPA TABS. 500mg 1000's	130 BT		16.90		
140.	METHYLDOPA TABS. 250mg 500's	57 BT	6/85	7.90		
141.	METHYLDOPA CAPS. 250mg 1000's	47 BT		GIFT		
142.	MEVLIN-L MEASLES VACCINE 0.5ml	34 Doses	11/78		Ø	EXPIRED
143.	METRONIDAZOLE 250mg 1000's	402 BT		9.45		

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	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
144. METRONIDAZEOLE 250mg 500's	30 BT		GIFT		
145. MULTIVITAMIN CAPS. 1000's	987 BT		GIFT		
146. MULTIVITAMIN TABS. 1000's	57 BT		GIFT		
147. MAGNESIUM TRISILICATE TABS. 1000's	1,154 BT		3.10		
148. MAGNESIUM SULPHATE 25% INJ. 10ml 100's	73 Bx				
149. MAGNESIUM HYDROXIDE LIQUID 2l	2 BT				
150. MULTIVITAMIN TABS. 1000's	604 CAN		3.00		
151. MULTIVITAMIN TABS. 500's	10 CAN				
152. METHEVANAMINE MANDELATE TABS. 0.5gm 1000's	71 BT	11/79		0	EXPIRED
153. MYCIFRADIN SULPHATE 0.5mg 100's NEOMYCIN	89 BT				
154. METHYLDOPA TABS. 250mg 1000's	392 BT	7/86			
155. MERSALYL B.P. INJ. 50mg/ 2ml 100's	74 Bx				
156. MELDIAN TABS. 1000's	40 BT				FORMULA?
157. MYLERAN (BUSULPHAN) TABS. 2mg 100's	178 Bx				
158. MYCITRACIN OINTMENT 0.5 oz.	281 TU				
159. MENSTROGEN INJ. 1ml 25's	387 Bx				INN?
160. MENSTROGEN TABS. 500's	122 BT		57.94		INN?
161. METAXAMINA (WELLCOME) INJ. 20mg	25 Bx				

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		STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
162.	MAALOX SUSPENSION 103 ml	3,720	BT	GIFT		
163.	MAALOX PLUS TABS.	3,529	BT	GIFT		
164.	METAPECTOLIN 2.61t.	2	BT			FORMULA?
165.	MADRIBON TABS. 0.5 mg	1	BT	GIFT		INN?
166.	MESTINON 1ml 5's	75	Bx			
167.	NOVAMINO SULPHONE INJ. 500mg/ml 100's	112	Bx	19.15		?
168.	NITROGLYCERIN CAPS 25 mg 100's	248	BT	8/81		
169.	NASAL SPRAY (MENTHOLCATED) -4WAY	268	BT	1.05		
170.	NEOSTIGMINE BROMIDE 15mg TABS. 20's	8	Bx			
171.	NIAMYCETINE SYRUP 1000ml	94	BT			FORMULA?
172.	NIKETHAMIDE INJ. 2ml 10's	606	BT			
173.	NICETHAMIDUM INJ. 1ml 100's	315	Bx			
174.	NEO-CORTEF OINTMENT 1% 20gm	26	TU			
175.	NIVAQUINE SYRUP 60ml 10's	50	BT			
176.	NEO-CODION TABS. 100's	34	Bx			FORMULA?
177.	NATRIUM CHLORATUM 0.9% 500ml	2	BT	GIFT		
178.	NEO-PACTOMYCIN SUSP. 60cc	40	BT			FORMULA?
179.	NICOSAMIDE TABS. 500mg 100's	1	Bx	7/84	GIFT	Ø EXPIRED
180.	NYSTATETS MIXTURE 30ml 25's	275	Bx	1.36		
181.	NUVAPEN INJ. 250 mg 2 ml	210?				

	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
182. NEOMYCIN SULFATE TABS 0.35gm 12's	1 Bx	11/82		Ø	EXPIRED
183. NEUROTRAT TABS. 50's	6 BT				FORMULA?
184. NEO-SULPHA TABS. 12's	174 BT				FORMULA?
185. NOVALGIN INJ. 5ml 5's	41 Bx				FORMULA?
186. NOVALGIN TABS. 0.5gm 200's	14 Bx				INN?
187. NEO-CORTEF OINTMENT 1% 3.5mg	762 TU				
188. OESTRADIOL BENZOATE INJ. 5mg/ml 100's	15 aBx				
189. ORBITS -GEL (ANTACIO-GEL) 200ml	176 BT				
190. OMNIVAL LIQUID 100ml	3 BT				
191. OLETETRIN TABS. 25's	48 Bx				
192. OTIC-DOME (OECORJAZINE) 200 mg 12's	6	5/81	163.30	Ø	EXPIRED
193. PROCHLORPERAZINE MALEATE TABS 25 mg 1000's	335 BT				
194. PROCAINE INJ. 2% 2 ml 100's	1 Bx				
195. POTASSIUM IODIDE TABS. 500 mg	46 Bx				
196. PREDSON RETENTION ENEMA 100 ml 7's	9 Bx	3/77		Ø	EXPIRED
197. PROMETHAZINE INJ. 50mg 100's	50 Bx				
198. PUREPAC TABS. 1000's	83 BT	3/83		Ø	EXPIRED
199. PYRAZINAMIDE TABS. 500mg 500's	60 BT	11/77		Ø	EXPIRED

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	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
200. PIPERAZINE ADIPATE TABS 300 mg 1000's	26		BT		
201. PIPERAZINE ADIPATE TABS. 500 mg 500's	88		BT		
202. PRIMOGYIN DEPOT INJ. 1 ml 3's	169		Bx		
203. PRIMOLVT DEPOT INJ. 1ml 3's	69		Bx		
204. PROPYL-THIDUL TABS. 50mg 1000's	44		BT		
205. PRIMOSISTON INJ. 1 ml	1,310		VIAL		FORMULA?
206. PHENYTOIN SODIUM TABS 1000's	61		BT	4.90	
207. PHENOBARBITAL SOD INJ. 2 ml 100's	22		Bx	5.50	
208. PROPRADOLOL TABS. 10 mg. 1000's	2		CAN		
209. PROPRANOLOL TABS. 10 gm 1000's	47		BT	4.14	
210. PITON-S-INJ. 1 ml 100's	71		BT	17.60	FORMULA?
211. PHENYLBUTAZONE TABS. 200mg 1000's	50		BT	19.00	
212. PRIMAQUINE TABS. 15 mg. 15's	374		Bx		
213. PROMETHAZINE HCL TABS. 25mg 1000's	30		BT	10.60	
214. PYRIMETHAMINE TABS. 25 mg 1000's	306		BT		
215. PRONESTYL TABS. 250mg 1000's	26		BT		
216. PRIMIDONUM TABS 250 mg 1000's	34		BT		

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	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
217. PAYULON INJ. 2ml 10's	30 Bx	1/79		0	EXPIRED
218. PARALDEHYDE INJ. 5 ml 100's	148 VIAL				
219. PENTAMIDINE ISOTHIONATE 200mg	39 VIAL				DISCONTINUED
220. PROBENECIO-NORDEX TABS 500mg 100's	22 Bx				
221. PHENOBARBITAL ELIXIR 50mg 21	152 BT		6.52		
222. PROMETHAZINE SYRUP 5mg/ 5ml 21	355 BT	5/85	7.10		
223. POLYGLUCIN INJ.	50 Bx				FORMULA?
224. PLASMA PROTEIN SOLN 5% 250 ml	24 BT				
225. PETHIDINE INJ. 2.15ml 100's	3 Bx		16.75		
226. PARAFIN LIQUID 11t	312 BT				
227. PROMETHAZINE ELIXIR 2.21t	10 BT				
228. PROCAINE HCL 0.5% 5ml 10's	684 Bx	4/83	GIFT	0	EXPIRED
229. POLYGLUCIN 400ml	3 BT	4/84	GIFT	0	EXPIRED
230. PARALDEHYDE 30 ml 12's	1 Bx				
231. POLYMYCIN M-SULPHATE TABS 50's 1MEGA	1,680 Bx				
232. PERITRATE TABS. 500's	1 BT		36.00		
233. PROHEPARUM TABS. 50's	18 BT				
234. PARACETAMOL TABS. 1000's	338 BT	2/89			
235. PROMETHAZINE HCL SYRUP	96 BT				

	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
236. PENICILLIN G SODIUM INJ. 50's	11 Bx				
237. POTASSIUM CHLORIDE 5ml 100's	100 Bx				
237a. PENICILLIN EYE OINTMENT	208 TU				
238. PREDNISOLINE TABS. 5mg 1000's	467 BT		8.48		
239. PLACENTA EXTRACT 1ml 10's	1,083 Bx	11/82		Ø	EXPIRED
240. QUINO FORME LACRDIX 0.5gm 100's	52 Bx	11/83	GIFT	Ø	EXPIRED
241. QUINIMAX INJ. 2ml 50's	6 Bx		GIFT		INN?
242. RIVO (ASPIRIN) TABS. 30's	1,507 Pk		GIFT		
243. RHEOPOLYGLUKIN INJ. 400ml	94 Bx	11/82		Ø	EXPIRED
244. RESERPINE TABS. 0.25mg 100's	108 Bx	2/79		Ø	EXPIRED
245. ROPHABIATIC (AMPICILLIN) 500 mg 10ml	60 Bx	2/85	75.97		
246. RIFAMPIN CAPS 300 mg 1000's	76 BT		GIFT		
247. RESERPINE INJ. 5mg/ml 100's	37 Bx				
248. REDUCDYN TABS 50's	48 Bx		GIFT		FORMULA?
249. REDUCDYN INJ. 10ml 10's	155 Bx				FORMULA?
250. RABIES VACCINE 7 DOSES	7 Pk	?	32.85		
251. RANSOM DISINFECTANT	145 BT		14.26		FORMULA
252. SULFISOXASOLE TABS. 500mg 1000's	590 BT		19.50		
253. SULTRIM 50 ml	27 BT				
254. SODIUM BICARBONATE (SODAMINT) TABS. 1000's	56 BT				

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	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
255. SOMBREVIN INJ. 10 ml 2's	30 Bx				FORMULA?
256. STREPTOMYCIN SULFATE INJ. 1.1gm 10's	49 Bx	11/79		Ø	EXPIRED
257. STREPTOMYCIN INJ. 5gm 50's	33 Bx				
258. SERENACE TABS. 10mg 1000's	25 BT		186.50		
259. SERENACE INJ. 5mg 25's	19 Bx	10/80		Ø	EXPIRED
260. SERENACE INJ. 5 mg 6's	1 Bx	12/80	7.55	Ø	EXPIRED
261. SCLAYOSULFA TABS. 12's	250 BT	12/70		Ø	EXPIRED
262. SOLU-MEDROL 20mg INJ.	1				
263. STANDACILLIN (AMPICILLIN) TABS. 250 mg 1000's	105 BT				
264. STREPTOPENECID INJ. 100's	10				FORMULA?
265. SERENACE INJ. 5mg/ml 25's	96 Bx	12/83		Ø	EXPIRED
266. SODIUM NITRITE 1gm TABS 100's	113 BT	3/82		Ø	
267. SURAL (ETHAMBUTOL-CHINOIN) 400 mg 500's	59 BT				
268. SLO-PHYLLIN-THEOPHYLLINE 60mg 50's	158 BT				
269. SODIUM CHLORIDE 0.9% 500 ml	10 BT	?			
270. SURMONTIL TABS. 25 mg 500's	46 BT				
271. START B-12 VIALS	69 Bx				
272. SODIUM CHLORIDE INJ. 1000ml 0.9%	4 BT	12/86	2.80		
273. SULPHACETAMIDE EYE OINT 5gm 100's	2 Bx	2/85			
274. SUPRISTOL SYRUP 60 ml	9 BT				

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	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
275. SULTRIM PED SYRUP 50ml	1 BT		GIFT		
276. SORBITOL SOL. 10 Lbs.	13 BT				
277. SULPHAMETHOXYPYRIDAZINE TABS. 250mg 1000's	29 CAN				
278. SULFALEN TABS. 0.2gm 100's	1,200 Bx				FORMULA?
279. STANDACILLIN (AMPCILLIN) SUSP. 125	79 BT	5/86	GIFT		
280. STILBOESTKOL INJ. 5mg/ml 50's	42 Bx				
281. SAVLON SOLN, 51	465 BT		1995		
282. SODIUM BICARBONATE INJ. 5ml	2,285 VIAL	10/82		Ø	EXPIRED
283. STIMOVUL (EPIMESTROLVUM) TABS. 5mg 10's	976 Bx		6.00		?
284. SULPHADIMIDINE MIXTURE (PED) 250 ml	55 BT				
285. SUCCINYLCHOLINE CHLORIDE INJ. 50mg/mg 100's	41 Bx	4/84		Ø	EXPIRED
286. THIORIDAZINE TABS. 1000's 10 mg	866 BT		11.60		
287. TERRAMYCIN INJ. 250mg/ 3ml 100's	14 Bx				
288. THIOFENTONE SODIUM INJ. 0.5gm 100's	30 Bx		52.00		
289. TERRAMYCIN OINTMENT 14.2gm	16 TU				
290. TERRAMYCIN INJ. 100mg/2ml 25's	13 Bx				
291. THIOFENTOL (INTRAVAL SOD.) 10's	153 Bx		16.54		
292. TRISULPHONAMIDE 500mg 1000's	168 BT	6/85	9.50		FORMULA?

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	STOCK ON HAND	EXP. DATE	UNIT CIF	TOTAL VALUE	COMMENT
293. TETANUS TOXOID 75 ml 1,500 UNIT	348 VIAL		19.05		
294. THIACETAZONE TABS 150 mg 1000's	159 BT	1/83		Ø	EXPIRED
295. TALC PURIFIED 500 gm	318 BT				
296. TALC PURIFIED 500 gm (EVANS)	119 Pk				
297. TETRACYCLINE OINT OPTH 5gm	1,000 TU				
298. TERACYCLINE HCL 0.05gm 20's	56 Bx	6/81	GIFT	Ø	
299. TABULETTAE VALIDOLI 0.06	2,720 TINS	1981	GIFT	Ø	
300. TUBESCULINE PURIFICODA 200 DOSES	85 Pk	SPOILED		Ø	
301. TITRALAC TABS. 180gm 100's	60 Bx				
302. TRIPLE SULPHA TABS. 0.5mg 1000's	5 BT		GIFT		
303. TETRACYCLINE OINTMENT	620 TU		GIFT		
303a. TAVEGYL TABS. 1mg 100's	80 BT		8.11		
304. URBASON SOL. 20mg 3's	72 Bx				INN?
305. URBASON RETARO 8mg 10's	130 BT				INN?
306. VITAMIN B-COMPLEX INJ. 10 ml 100's	16 Bx		24.00		
307. VITAMIN B-6 INJ. 50mg/2ml 100's	158 Bx		JFK		
308. VIBRAMYCIN INJ. 100mg 5's	104 Bx				
309. VISTARIL CAPS 50mg 500's	54 BT	6/84	JFK	Ø	
310. VISTARIL CAPS 25mg 500's	237 Bx	7/84		Ø	
311. VIRBRAMYCIN I.V. INJ. 200mg	94 VIAL	9/82		Ø	

	STOCK ON HAND	EXP DATE	UNIT CIF	TOTAL VALUE	COMMENT
312. VICKS NASAL SPRAY	44 BT		GIFT		
313. WHITE SOFT PARAFFIN /LB	126 BT		3.90		
314. WATER FOR INJ. 10ml 100's	6,231 Bx		7.00		
315. WATER FOR INJ. 2ml 100's	215 Bx		GIFT		

In the "Comments" column "INN" or "FORMULA?" indicates that generic content is to be determined (INN = WHO International Non-proprietary Name).

APPENDIX III

THE VITAL DRUG LIST

VITAL DRUG SELECTION CRITERIA

1. MORBIDITY AND MORTALITY DATA

The basic philosophy behind the vital drug list is to provide the fewest number of drugs to treat the largest number of people so that given limited government funds, treatment can still be made available. Each drug on the vital drug list is directly linked to one or more of the top 10 causes of morbidity and mortality in Liberia. As reported by the Ministry of Health, currently these are: malaria, respiratory tract infections, worms/amebiasis, urinary tract infections, diarrheal disease, anemia/malnutrition, neonatal tetanus, eye and skin infections, trauma/accidents and cardiovascular/hypertension. These conditions are not listed in prevalence priority. Just because a disease state is listed does not mean that every medicinal product indicated for the disease is included. Again, the goal is to treat the majority of patients, not every patient. Keep in mind that drugs not included on the list will still be available from the private sector, and the physician will be able to prescribe any product he feels is indicated for his patient. Table 1 outlines the vital drugs justified by the top 10 current causes of morbidity and mortality. A major reference in its compilation was the publication "WHO Emergency Health Kit: Standard Drugs and Clinic Equipment for 10,000 Persons for 3 Months".

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2. DOSAGE REQUIREMENTS

We were consistently told by medical personnel that the main problem is patient compliance (i.e., not taking repeated doses). Often patients must travel long distances to reach a health facility and the probability is low that they will come back for follow-up treatment, or that they will continue to take the prescribed therapy especially if there is a recurrent cost. Because of these factors, long-acting, single-dose preparations were given a higher priority over multiple-dose products, even if the multiple-dose drug was less expensive.

3. DOSAGE FORMS

Pharmaceutical forms (tablets, capsules, liquids, etc.) were selected on the basis of their utility, ease of handling and cost. As a general rule, tablets are less expensive and better suited to tropical climates than are capsules. Solid oral dosage forms are usually less expensive and easier to transport and store than are liquids. The use of scored tablets is recommended as a simple method of making a dosage more flexible or to provide a pediatric dose. Some health workers also felt that when calculating a dose, a portion of a tablet provides a much more accurate dose than does prescribing a portion of a teaspoonful, which liquid medicines usually require. For example, $1/2$ or $1/4$ of a tablet is easier to estimate than is $1/2$ or $1/4$ of a teaspoonful. Another consideration is that teaspoons come in different sizes and can be confused with a soup spoon.

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4. COST

In cost comparisons, the cost of a total course-of-therapy treatment was considered more than just the unit cost (price per tablet). Consideration was also given to the cost of transportation (weight), storage requirements, and shelf-life. Table 3 gives an estimate of the cost per drug item.

5. SPECTRUM OF INDICATIONS

A priority was given to broad-spectrum drugs. Combination preparations were listed if necessary. For example, mebendazole is effective for round, hook, whip, and thread worms, whereas bephenium is only effective against round and hook worms. An example of a combination product would be iron combined with folic acid in a single tablet. Both iron and folic acid are usually prescribed during pregnancy. By combining these two drugs together in a single product the patient has the advantage of taking one, rather than two tablets, and there is one, rather than two items to purchase, store, transport, prescribe and dispense.

6. EASE OF TRANSPORTATION AND STORAGE

Oral solid forms are lighter and less bulky to transport and store than are liquids. This is especially a consideration for rural health facilities.

7. LEVEL OF TRAINING AND FAMILIARITY WITH DRUG PRODUCTS

Certain drugs were included on the vital list because they are widely used in Liberia and the health personnel have been trained to use them. Reserpine and gentian violet are two examples of widely used products in Liberia. Table 2 outlines which drugs on the vital list should be considered for use at each level and by which health personnel. Along with this level-of-use drug hierarchy, simplified drug information and standardized treatment procedures should be developed for each level within the primary health care system. Such information should include standard treatment, drug dosing regimes, and referral criteria, besides drug information for medical practitioners and patients.

tract infections,

APPENDIX III

1.

PROPOSED VITAL DRUG LIST
 ACCORDING TO TOP 10 CAUSES OF MORBIDITY AND MORTALITY
 IN LIBERIA

DRUGS & DISEASE	STRENGTH	USUAL DOSE	AVERAGE COURSE OF THERAPY	JUSTIFICATION & COMMENTS
MALARIA				
Chloroquine tabs	150mg	varies	A: 10 tab	P. vivax, malaria, ovale falciparum, benign/malignant tert. malaria, amoebiasis.
Chloroquine syrup	50mg/5ml	C: 10mg/kg	C: 15ml	
Chloroquine inj	300mg/ml	varies	4ml	
Quinine inj	300mg/ml	varies	4ml	Malignant tertian malaria.
Sulfadoxine +pyrimethamine	500mg tab	varies	3 tab	Chemoprophylaxis.
RESPIRATORY TRACT INFECTIONS				
Ampicillin cap	250mg	A: 1 qds 5/7	20 cap	Also good for UTI, dysentery/fever, soft tissue infections
Ampicillin susp	125/5ml	C: 1 qds 5/7	100ml	
Penicillin V tab	250mg	A: 1 qds 5/7	28 tab	Wide spectrum. Also for VD, Post Part infect. long acting. Single dose.
Benzylpen. inj	0.6gm	1 od 5/7	5 amp	
Procaine Pen	3gm	1 stat	1 amp	
Erythromycin tab	250mg	1 qds 5/7	20 tab	Alt. to penicillin. expen.
Chloramphenicol cap	250mg	2 qds 5/7	40 cap	Severe influenza /typhoid, toxic, broad-spectrum.
Tetracycline tab	250mg	1 qds 7/7	28 tab	Chronic bronchitis, UTI.
Aminophylline inj	25mg/ml	varies	2ml	Bronchodilator, cardiac stim., anti-spasmodic.
Hydrocortisone inj	50mg/2ml	varies	2ml	Asthma, shock, arthritis, anaphylaxis, skin problems.
	10 ml amp			
Glyceryl Guaiacolate	100mg/5ml	A: 1-2 q4h C: 1/2-1 q4h	120ml 60ml	Expectorant
Codeine tab	30mg	A: 1 qds 2/7 C: 1/3 qds 2/7	8 tab 4 tab	Cough suppressant, also pain, diarrhea. Analgesic, antipyretic.
Aspirin tab	300mg	A: 2 tds 2/7 C: 1/2 tds 2/7	12 tab 6 tab	
Paracetamol	500mg	A: 2 tds 2/7 C: 1/2 tds 2/7	12 tab 6 tab	Analgesic, antipyretic.
WORMS, ABEBTASIS				
Mebendazole tab	100mg	2 stat	2 tab	Ascaris, pin, hook, whip, strongyloides, mixed inf., few SE, single dose.
Piperazine syrup	500mg/5ml	20ml stat	20ml	Ascaris, thread, pin, single dose, cheap.
Metronidazole tab	250mg	1 tds 5/7	30 tab	Amebic dysentery, giardia, anaerobic bact., trichomonas.
URINARY TRACT INFECTIONS				
Ampicillin cap	250mg	1 qds 5/7	20 cap	See also RTI
Ampicillin susp	125mg/5ml	1 qds 5/7	100 ml	
Penicillin V	250mg	1 qds 5/7	20 tab	Long acting also for VD post partum infect. Single dose.
Benzylpenicillin	0.6gm	od 5/7	5 vial	
Procaine benz pen	3.0gm	1 stat	1 vial	
Erythromycin tab	250mg	1 qds 5/7	20 tab	Alt. to penicillin.
Tetracycline	250mg	qds 7/7	28 tab	Prostatitis, typhus, bact. gastroenteritis, UTI, some bact. resist. in Liberia.

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FLUID REPLACEMENT

ORS sachets 27.5gm/l 1 in water 3 sach Fluid replacement.
See also IV solutions.

ANEMIA/NUTRITION

Multivit syrup	varies	5ml qd 30d	150 ml	Nutritional supplement.
Multivitamin tab	varies	1 qd 30d	30 tab	Nutritional supplement.
Iron & Folic Acid	60/.02mg	1 bd 30d	60 tab	Supplement preg women.
Ferrous Sulfate	60mg	1 od 30d	30 tab	Iron supplement

TETANUS

Antitoxin 50,000	50K	varies	2 vial	Neo-natal tetanus.
Phenobarbital tab	30mg	varies	10 tab	Convulsions, sedative/hyp. long acting, cheap.
Diazepam inj 2ml	5mg/ml	varies	2ml	Convulsions, psychotherapy, tranquilizer.

SKIN & EYE INFECTIONS

Griseofulvin tab	500mg	1 qd 30d	30 tab	Severe fungal inf. costly.
Nystatin cr 30gm	30gm tube	varies	30 gm	Topical fungal inf.
Benzyl benzoate lot	25%	varies	100 ml	Scabies, lice.
Gentian violet	25gm	varies	25gm	Monilia (mouth, skin, vulva), cheap.
Whitfield's oint	30gm	varies	30gm	Ringworm/tinea, fung. inf.
Calamine lotion	30ml	varies	30ml	Astringent
Hydrocortisone cr	1%	varies	30gm	Anti-inflammatory.
Necmycin/bactracin	30gm	varies	30gm	Antiseptic.
Chlorpheniramine	4mg	1 qds 2/7	8 tab	Antihistamine.
Sulfacetamide oph oint. 10 %	5gm	varies	1 tube	Eye infections.
Chloramphenicol oph. oint 1%	5gm	varies	1 tube	Eye infections.

CARDIOVASCULAR/HYPERTENSION

Nitroglycerine	0.5mg	varies	1 bot	Congestive heart failure, angina.
Propranolol tab	40mg	varies	20 tab	Hypertension, angina, other uses.
Digoxin tab	0.25mg	varies	30 tab	Heart failure,
Digoxin inj 2ml	25mg/ml	varies	1 vial	arrhythmias.
Reserpine tab	25mg	varies	20 tab	Hypertension.
Methyldopa	250mg	1 bd 30d	30 tab	Mild to severe hyperten.
Furosemide tab	40mg	varies	10 tab	Strong diuretic.
Furosemide inj 2ml	10mg/ml	varies	1 amp	oedema.
Hydrochlorothiazide	50mg	1qd 30d	30 tab	Diuretic, hypertension.

See also ^{tra}na section for other cardiac drugs.

TRAVA

Pethidine inj	50mg/ml	varies	2 ml	Severe pain.
Codeine tab	30mg	varies	8 tab	Severe pain, cough.
Aspirin tab	300mg	2 tds 2/7	12 tab	Pain & fever.
Paracetamol	500mg	2 tds 2/7	12 tab	Pain & fever.
Phenobarbital tab	30mg	varies.	10 tab	Sedative/hypnotic, tetanus spasm, long acting, cheap.

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Epinephrine inj. 1:10,000 (ug/ml) (adrenaline)	1ug	varies	1 amp	Shock, anaphylaxis. bronchospasm, cardiac stim., vasoconstrictor.
Promethazine tab	25mg	varies	4. tab	Nausea, vomiting, vertigo. allergic rxn. sedation.
Lidocaine inj	50mg/ml	varies	1 vial	Local anesthetic.
Ketamine	50mg/ml	varies	1 vial	General anesthetic.
Dextrose 5%/NS	1000ml	varies	1 bot	Fluid replacement.
Ringers Lactate	1000ml	varies	1 bot	Fluid & electrolytes.
Dextrose 50% 10ml	10ml	varies	1 vial	Fluid replactment. energy.
Water for inj.	10ml	varies	1 vial	Reconstitution.
Water for inj.	2ml	varies	4 vial	Reconstitution.

NOTE: PREGNANCY IS NOT CONSIDERED A DISEASE STATE THEREFORE CHILDBIRTH RELATED PHARMACEUTICALS ARE NOT INCLUDED ON THIS LIST, BUT ARE INCLUDED ON THE PROPOSED VITAL DRUG LIST. ALSO NOT INCLUDED ON THIS LIST ARE MEDICINES FOR LEOROSY, TUBERCULOSIS, AND FAMILY PLANNING BECAUSE THESE DRUGS ARE PROVIDED BY SPECIAL PROGRAMS SEPARATE FROM THE PRIMARY HEALTH CARE SYSTEM.

APPENDIX IV

1.

AVAILABILITY OF PROPOSED VITAL DRUGS BY HEALTH FACILITY
(INCLUDING ALLOWED USE BY HEALTH WORKERS)

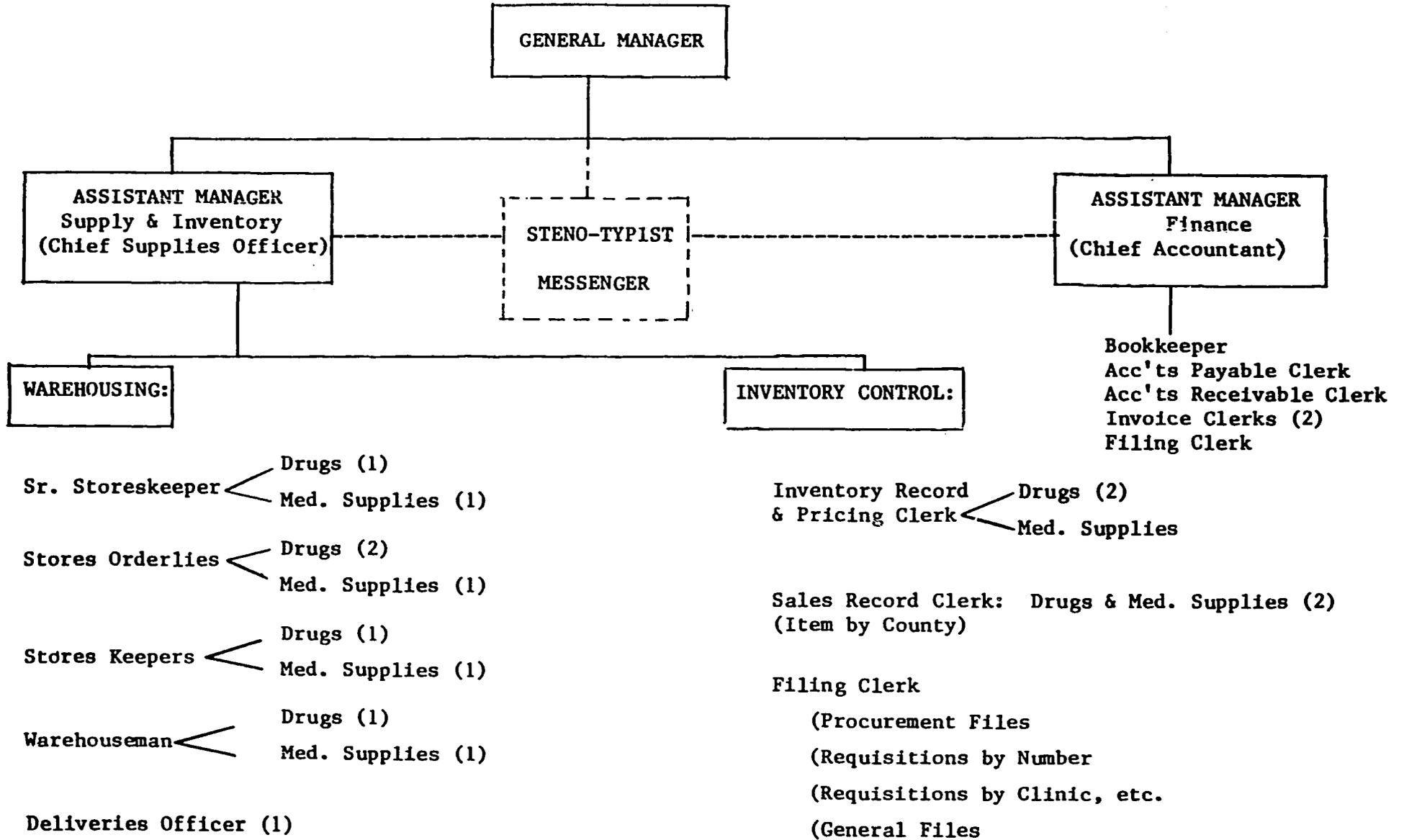
LEVEL OF USE FOR RECOMMENDED VITAL DRUGS FOR LIBERIA

DRUG & STRENGTH	HOSP	H. CTR (MD)	CLINIC/ H. POST (PA/RN)	VILLAGE LEVEL (H. WORKER)
<u>ANALGESICS</u>				
Aspirin 300mg	X	X	X	X
Paracetamol 500mg	X	X	X	x
Codeine tab 30mg	X	X		
Pethidine 50mg/ml 1ml	X			
<u>ANTHELMINTICS</u>				
Yebendazole 100mg	X	X	X	
Yetronidazole 250mg	X	X	x	
Piperazine syp 500mg/5ml	X	X	X	x
<u>ANTIINFECTIVES</u>				
*Ampicillin 250mg	X	X		
*Ampicillin susp i25/5ml	X	X	x	
*Penicillin V 250mg	X	X	X	
Benzylpen inj 0.6gm	X	X	x	
*Procaine Benzylpen 3gm inj	X	X		
Chloramphenicol 250mg	X			
Erythromycin 250mg	X	X		
Griseofulvin 500mg	X	X		
Yetronidazole 250mg	X	X	X	
Triple sulfa	x	x	x	x
Tetracycline 250mg	X	X		
<u>ANTI-MALARIALS</u>				
Chloroquine 150mg	X	X	X	X
Chloroquine syrup 50/5ml	X	X	X	x
Quinine inj 300mg/ml	X			
Sulfasoxine + pyrimethamine 500/25mg	X			
<u>ANTI-ANEMIA/NUTRITIONAL</u>				
Multivitamin tab	X	X	X	X
Multivitamin syrup	X	X	X	X
iron/Folic A. 60/.2	X	X	X	X
Ferrous Sulfate 60mg	X	X	X	X
<u>DERMATOLOGICALS</u>				
Nystatin cr 30gm	X	X	X	
Hydrocortisone 1% 30gm	X	X		
Whitfield's oint 30 gm	X	X	X	X
Neomycin/bacitracin 25gm	X	X	X	X
Calamine lotion	X	X	X	X
Benzyl Benzoate 25%	X	X	X	X
Gentian violet	X	X	X	X
<u>ANTACIDS</u>				
Aluminum Hydrox 500mg	X	X	X	X
<u>ANTI-DIARRHOEALS</u>				
ORS sachets 27.5gm/l	X	X	X	X
<u>OPHTHALMOLOGICALS</u>				
Sulfacetamide 10% oph	X	X	X	
Chloramphenicol 1% oph	X	X	X	x
<u>SOLUTIONS</u>				
Lactated Ringers 1000ml	X	X		
Dextrose 50% 10ml	X	X		
Dextrose 5% in NS 1000ml	X	X		
Dextran 70 6%/500ml	x	X		
<u>CARDIOVASCULAR/ANTI-HYPERTENSIVE</u>				
Nitroglycerin tab 0.5mg	X			
Propranolol 40mg	X			
Digoxin 0.25mg	X			
Digoxin .25mg/ml 2ml	X			
Adrenalin 1mg/ml	X	X		
Reserpine 0.25mg	X	x	X	
Methyldopa 250mg	X			

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APPENDIX V

PROPOSED STAFFING OF LGDS



APPENDIX VI

SUPPLY AND MANAGEMENT INFORMATION SYSTEM

REQUISITIONING SCHEDULE

To provide a smooth flow of processing and filling requisitions and to expedite delivery times, orders will no longer be submitted by all Dispensary Sites at only one time of each quarter. Rather, they will come to the Drug Service from a designated number of Dispensaries during designated weeks. These can be roughly divided geographically or by method of delivery and spaced into each of the four weeks of a month. Orders received by Tuesday will be ready for delivery on or before Tuesday of the following week:

- Week in which 1st of month occurs,
- Week in which 8th of month occurs,
- Week in which 15th of month occurs,
- Week in which 22nd of month occurs.

Except for real emergencies, there will be no deviation from this schedule. Note that the institutions of the JFK Medical Center are permitted routine orders weekly.

QUANTITIES

It is an objective to have a continuous supply available within the nation so that when the pipeline is "full" it contains 10 months supply and at its lowest point, 3 months supply. This is achieved by maintaining the dispensaries at 2-3 months while the central supply tapers from 7 down to 1 month in its delivery and re-acquisition process.

Therefore, when requisitioning, Dispensaries shall rebuild their inventory back to the 3 months level. Each Dispensary Site is thus required to assess and suitably notate its average monthly consumption of each inventory item to enable it to requisition knowledgeably.

A "Supply Pipeline" is depicted

CENTRAL PURCHASING AND REDISTRIBUTION

Central purchasing redistribution is programmed to maintain an adequate nationwide supply in the Supply Pipeline at all times. A full Pipeline is ten month global inventory (central plus dispensary). Its lowest ebb is at three to four months inventory including between one to three months stock in Dispensaries throughout the country. Refilling the Pipeline must take into account the lead time required for a shipment to be received from a Supplier — three months time on average. Thus, a purchase order must be initiated when normal utilization (redistribtuion) has brought central stores inventory to minimum five-month level. It will vary according to Supplier-action experience and the upward or downward trends in the requisitions received from the health care units. These factors demonstrate the vital need for effective Management Information Systems.

a) "Flagging" of the Inventory Record Card (See next page) to the Chief Supplies Officer (CSO) as the stock balance approaches the pre-deteremined five-months balance-on-hand re-order quantity, initiates the re-purchasing procedure. The CSO investigates the Inventory Card to determine if 'utilization' is approximately that of the normal average or has

substantially change upward or downward -- if upward, CSO calculates an increased six months's requirement; if downward, he calculates a lesser requirement.

INVENTORY RECORD L.G.D.S. STORES		ITEM: Code # _____ (Generic Name/Title) _____ (Description) _____ (Package)		Notes (-pencil-)			
Warehouse Location PARTONS: _____ SHELF: _____							
UNIT OF ISSUE: _____	MAX. STOCK: (= 7 months) _____	RE-ORDER LEVEL: (= 5 mos. stock) _____	Average Issues per Month _____				
Date	Particulars	REFERENCE Purchase # Invoice # Sales #	QUANTITY Ordered Received Issued	BALANCE IN STOCK	UNIT VALUE (CIF) New Supply Inventory Average	Selling Price (Package)	Audit Date and Remarks

b) In consultation with the General Manager, after selecting the Supplier for the flagged item, all Inventory Cards of items which that Supplier normally supplies are reviewed. The quantities of each of these items are calculated toward re-purchasing them in quantities, on the same Purchase Order, to bring their stock levels up to their individual "Pipeline" maximum requirements to the end of the same six months supply date of the flagged item.

(Theoretically, all these items will require re-ordering on the same date and subsequently reach their minimum five-month level at that

time. However, at start-up and with changes in utilization, items will be at stock levels differing from that of the flagged item. Still the criterion is to attain efficiency in ordering, to achieve economies of scale while not over-investing Government money, to achieve a good turnover of inventory particularly for dated items, and to reduce the number of Purchase Orders per period. Hence, for example, if a six-month supply of the flagged item is to be re-ordered to take it through to December, another item of the same Supplier might require ordering only four months quantity to bring it to the same December date, or another three months, or another five months, etc. This holds true be it the same or a new Supplier of the flagged item or is a changed Supplier from whom other items can logically be ordered. Files should conveniently exhibit the best sources from which the various drug preparations can be advantageously procured -- by advance tendering, selective cataloguing, or otherwise).

c) The CSO expeditiously prepares the quadruplicate Purchase Order (P.O) for the items and their estimated total cost after first checking with the Accountant that sufficient funds are available. The P.O., bearing the signatures of the Assistant Manager: Supplies (The CSO) and the General Manager is submitted to the CMO (as Chairman of the Central Drug Service Board) for approval and signature. The Assistant Manager: Finance (The Accountant) commits the necessary funds and the P.O. Original Copy is sent to the Vendor.

-- P.O. Duplicate is filed by Supplier/Vendor in the Supplier's File (after entries on Perpetual Inventory Record Cards)

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- P.O. Triplicate is filed by Supplier/Vendor in the Finance Department
- P.O. Quadruplicate remains in P.O. Book by sequential number.

d) The Inventory Card records information from P.O. Duplicate on the Inventory Card of each item without altering its balance-on-hand figure (in a different ink colour suggested: green ink for P.O., red for shipment receipt, blue for re-distribution). The P.O. Duplicate is then filed in the Supplier's file.

e) As may occur, any correspondence and other relevant material respecting that P.O. is attached to it in that Supplier's file.

f) Upon receipt of shipment, its invoice is checked and certified to the Accountant; an Invoice Duplicate is retained in the Supplier's file of the Supply Section attached to 'P.O.' therein after entering the information the Inventory Cards of the respective items (in red ink) showing the new balance-on-hand of each and the new average value per unit (Unit Cost) of that balance calculated as follows:

- i) "Unit Cost" is generally figured for the smallest unit in which the item is issued by CMS and/or will be prescribed or dispensed, e.g. Tablet; Capsule; Ampul; Tube; Inhalor; etc. This should not be confused with the usual "Package of Issue" which may be a bottle of 100 tablets, a box of 12 suppositories, etc.

- ii) Unit cost is expressed to 4 decimal points CIF.
- iii) If the item is acquired for the first time, divide the CIF invoiced price (or FOB plus Insurance plus Freight total) the number of units received, e.g. 10 packages of 25 tablets each cost US \$98.80. Thus, each tablet cost
- $$\frac{98.80 \times 2.68}{10 \times 25} = \$1.0591$$
- iv) When an item is acquired to add to existing stock-on-hand, a new average Unit Cost must be calculated to relate to the new total (i.e., the new balance-on-hand):

e.g.: Current Inventory:

Quantity of		Current		\$ Value of
Units in	X	Average	=	Current
Stock		Unit Cost		Inventory

plus New Purchase:

Quantity of				
Units in shipment			=	\$ Value (CIF)

Equals New Inventory in Stock:

Total Units in			=	Total \$ Value
New balance-on-hand				of New Inventory

Thus, in New Inventory:

<u>Total \$ Value</u>			=	New Average
Total Units				'Unit Cost'

- v) This new Average 'Unit Cost' is entered on the Inventory Card. Cross-out (but still visible for reference) the old Average 'Unit Cost'.
- vi) Similarly, calculate and enter the new Selling Price on the Card and immediately begin pricing invoices at that new price.
- vii) "Free Goods" sometimes provided by a Supplier may be in the form of an extra quantity of one or two of the several items in the invoice. Their value usually, but not always, relates to the items invoiced (quantity and value) but cannot logically be spread among them. Therefore, add their quantity to the quantity of units of the item actually priced on the invoice (on the Inventory Card, place note stating the free quantity for future reference).
- viii) "Replacement Stock" might alter the balance-on-hand but will not change the Average 'Unit Cost'.
- ix) "Write-offs" of expired, deteriorated or obsolete items are valued at their original cost by reference to that shipment on the Inventory Card. Failing that, value them at the Average Unit Cost previous to the current Average Unit Cost. Failing that information, value them at the Current Unit Cost. The quantitative balance-on-hand is adjusted downward.
- x) "Gift Items" are appropriately designated as such on the Inventory Card and new balances recorded. For purpose of the Inventory, they have a zero cost, but for the purposes of Inventory Card (and the pricing of sales) they have a 'Unit Cost'. Determine this from sources such as the latest price list catalogue of the relevant manufacturer or, lacking other sources, the lowest generic preparation of the item.

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- xi) Note: At the beginning, to initiate the current "unit Cost" of balance-on-hand on the Inventory Card, refer to the most recently received shipment's CIF invoice (it is not practical to search-back further for this purpose).

EXPIRED and otherwise obsolete items must not be allowed to accumulate. They occupy valuable space and are potentially hazardous.

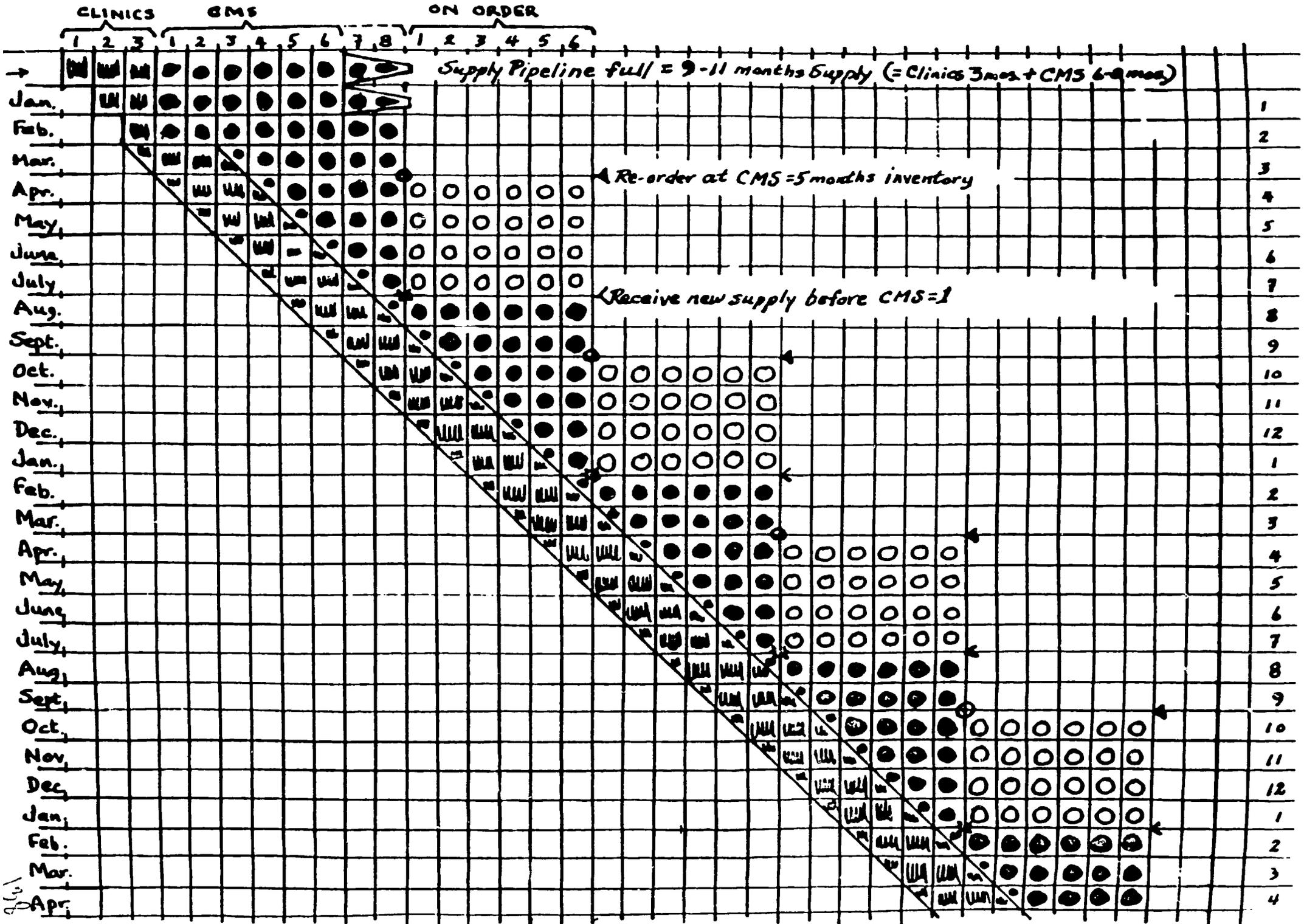
- a) In the warehouse, locate an area into which obsolete items are placed. Each half-year (or more frequently, if necessary) provide a list of these items, co-signed by the General Manager and the Chief Pharmacist of JFK (as an outside reviewer) to the CMO who, in turn will provide written permission to LGDS Finance to write-off. Transport to the dump and supervise their destruction. Certify the destruction; record the write-off of each item on its Inventory Record Card and adjust it accordingly.
- b) Hospitals, clinics, etc. should place any obsolete drug items in a convenient box which, from time to time, can be inspected by County Medical Officer who shall supervise their destruction after placing a certified list (quantities and values) on the institution's records.

OVER-STOCK ITEMS particularly at the clinic level, must be put into circulation in another location as quickly as practical - essential to regularize the "Supply Pipeline" and to protect the nation's investment in expensive, perishable items;

- a) After obtaining permission from LDGS, the items should be returned to central stores accompanied by a signed listing (use the Requisition Form "in reverse" to ensure proper file records). LGDS will credit the items through the complete flow of its Ledgers and Inventory Records (including amendment of the distribution-utilization averages).

- b) At the central level when an over-stock situation becomes apparent, a note should be distributed to all prescribers (possibly conveniently enclosed with a delivery of requisition items) -- the items are quite usable and can be prescribed to effectively treat illnesses currently being treated by drug having a name with which the physician may be more familiar (such as an acceptable substitutable brand received in a gift).

A SUPPLY PIPELINE



COURSE-OF-THERAPY PREPACKAGING

An alternative to dispensing from bulk containers is to have medicines prepackaged in sealed plastic bags, each of which contains a complete course-of-treatment for that drug, as established by Standard Norms

For example, if the norm for treating streptococcal pharyngitis is Penicillin G, 400,000 units three times a day for ten days, then each prepackaged course of therapy will contain thirty tablets.

The plastic package will have two other important parts -- a label giving the drug's name, its indications, and directions; and a receipt that has the name of the drug printed on it and space for filling out the patient's name and date. The label greatly facilitates patient understanding of the directions and gives him a written reminder. Experience has shown that even patients who cannot read almost always have access to someone who can within their own village. In areas of high illiteracy, it is also possible to use symbolic labeling for instructions (see Chapter V.C.). The receipt for the medication is detached during dispensing and kept for inventory control purposes. The number of receipts plus the number of undispensed plastic bags should equal the number of bags given to a dispenser. This simplifies drug accounting and reduces drug losses.

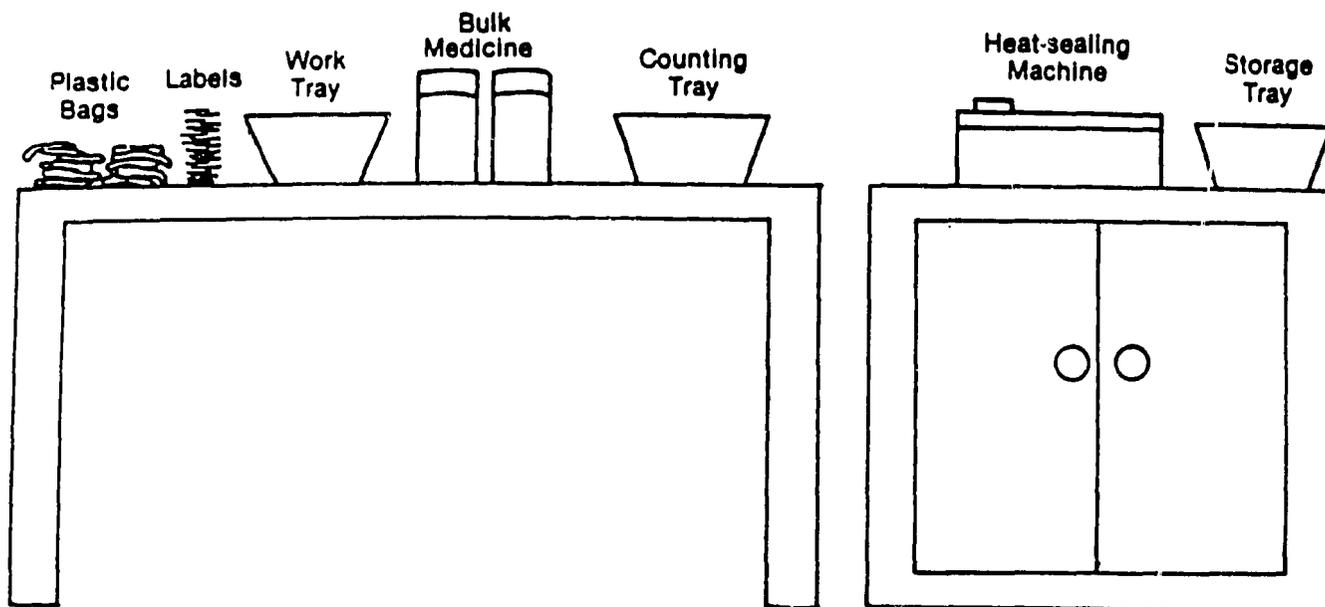
Benefits

There are many advantages to course-of-therapy prepackaging, including the following:

- (1) Safer, easier, and faster distribution of drugs with less room for error. This frees the dispenser from routine counting chores to have more communication with the patient.
- (2) Less deterioration of drugs due to adverse environmental conditions. Prepackaged drugs may remain unchanged for up to two years while bulk drugs are likely to deteriorate much earlier due to high heat and humidity.
- (3) Easier and more accurate recording of inventory with better control over drug supplies and more accurate consumption data.
- (4) Improved credibility among users, due to the attractiveness and cleanliness of the package, which can approach that of commercial drugs.
- (5) Increased likelihood that patients will take the drugs as prescribed for the proper period of time, and decreased tendency to prescribe only partial therapeutic doses.
- (6) Greatly facilitated storage and distribution, by minimizing the amount of bulk stock tied up in peripheral health centers.
- (7) More accurate and efficient prescribing by all health workers, as they have available the exact amount of drugs needed for course-of-therapy; less writing required from lower level health workers.

The disadvantages of this system are small compared to the benefits. Equipment must be made or purchased, staff need to be trained, and space must be located. These are discussed in detail in the next section. There has been some physician resistance to this system, and some feelings of loss of independence. This usually disappears after some experience is gained with the system and the actual benefits are observed.

Drug Prepackaging Operation



independence. This usually disappears after some experience is gained with the system and the actual benefits are observed.

Equipment and Methodology

Figure depicts the basic layout for a simple prepackaging operation. The following supplies and equipment are needed:

- (1) Plastic bags -- These often come in long plastic sleeves in various widths, sold either in standard lengths or by weight. They can be purchased locally in many countries.
- (2) Heat sealing machine mounted on a table -- This can be purchased commercially* or made locally, as has been done by some programs. The principle involves a heated device 1/8" wide that produces a seal on the plastic sleeve to make a bag. The bag is then filled, and the open end is likewise sealed to complete the package.
- (3) Labels -- Preprinted with name of drug, dosage, and instructions for use (both written and symbolic). In more sophisticated systems these can be imprinted directly on the plastic bags using colored ink, including a logo or some identifier for the health program.
- (4) Receipts -- Preprinted with name of drug and dose, and blank space for writing in patient's name and date.

* The Vertrud Thermal Impulse Heat Sealing Machine with foot pedal, available from Vertrud, Inc. 2037 Utica Avenue, Brooklyn, New York 11224

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- (5) Staple machine and staples -- to attach receipt.
- (6) Work table
- (7) Work trays -- for bulk drugs.
- (8) Storage trays -- for finished packets.
- (9) Tablet/capsule counting boards -- These can be made locally from wood where the exact number of holes needed for each drug is drilled into the top, in the correct size and shape.
- (10) Counting trays
- (11) Funnel
- (12) Cleaning equipment

In the prepackage operation the technician performs six basic steps:

- (1) He sets aside the correct number of plastic bags. If purchased in sleeves, they must be made up in advance.
- (2) He inserts the labels and places the bags with labels into a tray.
- (3) He empties the tablets or capsules into the counting tray.
- (4) He counts out the correct number by scooping the counting board tray for that drug into the tray and wipes off the excess, pours these drugs through a large funnel into the bag, and places the filled bags in a storage tray.
- (5) He seals the bags and places them in a storage tray.
- (6) He then attaches a receipt to the bags and prepares them for storage or shipment.

This is the simplest manual operation available, and can be done at any level -- central, district, or local. This operation can provide drugs for a small project or for a whole national program. Where more resources are available, the operation can be automated and the output increased. However, this increases capital investment costs, and maintenance can be a problem; the trade-offs need to be calculated for each country. Country Study III.F.1. describes in detail the costs determined in a feasibility study by one large government program starting on a prepackaging system.

In countries where this operation is done manually, the costs amount to U.S.\$0.005/bag, including machinery and personnel (excluding the cost of the drug). Considering the benefits, countries who have investigated this system feel the cost-benefit ratio can also be applied to liquids and creams as long as the appropriately sized containers are available.

It is important to stress that course-of-therapy is different from commercial unit-dose packaging. In unit dose systems, individual tablets or capsules are prepackaged at the factory in plastic sleeves or in blister-foil

packages. These have the advantages of protection from environmental deterioration and ease of dispensing, but unless these unit-dose packages are themselves packaged in a box with complete instructions, the advantage of improving patient compliance is lost. The combined costs of foil packages and boxes increases the costs of unit-dose packaging to 20 times that of course-of-therapy, and requires more complicated machinery that is difficult to maintain.

Care must be taken to ensure that course-of-therapy bags are properly sealed. Incorrect use of the sealer, poor maintenance of the equipment, or the wrong type of plastic can all result in an inadequate seal and early drug deterioration or contamination. Moisture-sensitive test materials are available which can be sealed into the bags; if the test material changes color within a specified period of time, it indicates that the seal has been inadequate.

Results

Prepackaged course-of-therapy operations have been successfully implemented in situations as diverse as a national rural health program in Afghanistan and a regional project in Bolivia. In Afghanistan, after this operation had been implemented, a sample of patients and service providers were interviewed to obtain their responses to the system. Generally, acceptability of the packages was high among both patients and providers. Providers especially liked the time saved in dispensing and freed up for patient care. Of interest for patient compliance is the fact that only 25% of patients understood how to take their medicine correctly when they left the health center, but 100% were able to find someone in the village who could explain the label to them. With the results of this survey, the Ministry of Health concluded that the costs were reasonable and the benefits substantial, and made the commitment to implement this on a national scale.

APPENDIX VIII
MINISTRY OF HEALTH AND SOCIAL WELFARE
NATIONAL MEDICAL SUPPLY DEPOT
P. O. BOX 79 - MONROVIA, LIBERIA

REF: NO.

EXPENSE ACCOUNTS BALANCES
FROM THE PERIOD JULY 1983 - JUNE 30, 1984

Bank Charges.....	\$ 7,159.89
Casual Labor.....	14,763.60
Custom & Survey.....	9,090.30
Gas & Oil.....	4,245.00
Interest Expense.....	82,116.34
Miscellaneous Expense.....	6,665.80
Repair Expense.....	1,603.85
Stationeries & Office Supplies Expense....	5,483.65
Storage & Handling Charges.....	466.04
Sundries Expense.....	2,000.00
Telephone & Cables Expense.....	246.70
Transportation.....	<u>1,712.00</u>
TOTAL	<u><u>132,274.67</u></u>

APPENDIX IX

J. F. KENNEDY MEDICAL CENTER, MONROVIA, LIBERIA

DRUGS AND MEDICAL SUPPLIES: ACCOUNTS PAYABLE AS OF 8/17/1984

OUTSTANDING FROM:

<u>CREDITORS</u>	1978/79	1979/80	1980/81	1981/82	1982/83	<u>TOTAL</u>
N.M.S.D.	-0-	-0-	471	636,312	674,301	1,311,084
LOCAL	34,119	-0-	9,729	17,182	17,759	78,788
FOREIGN	-0-	-0-	-0-	-0-	-0-	-0-
TOTAL	34,119	-0-	10,200	653,493	692,059	1,389,872

Source: Prepared and Signed by: James B. Williams, Sr.
 Principal Auditor,
 General Auditing Office
 17th August, 1984

1/2/84

APPENDIX X

ESTIMATED QUANTITY AND COST OF PROPOSED VITAL DRUGS FOR LIBERIA

DRUG & STRENGTH	COURSE OF THERAPY	NO. UNIT /10,000POP	TOTAL DOSES/3MO 1MILL POP	CIF BULK PRICE	MILLION CIF COST/YR U.S.\$
ANALGESICS					
Aspirin 300mg	12 tab	17.000	6.8mill	* 1.38/m	* 9.384
Paracetamol 500mg	12 tab	4.500	1.8mill	4.56/m	7.752
Codeine tab 30mg	8 tab	2.000	800.000	3.50/m	2.800
Pethidine 50mg/ml imi amp	2ml	10	4,000	17 ea	680
ANTHELMINTICS					
Yebendazole 100mg	2 tab	2.100	840.000	3.85/m	3.274
Yebendazole 250mg	30 tab	1,500	600.000	7.80/m	4.680
Piperazine syp 500mg/5ml	20ml	5 L	2.000L	72/100ml	14.400
ANTIINFECTIVES					
Ampicillin 250mg	20 cap	2.000	800.000	31.00/m	24.800
Ampicillin susp 125/5ml	100ml	420 bt	168.000	80/100ml	134.400
Penicillin V 250mg	20 tab	9.500	3.8mill	16.70/m	63.460
Benzylophen inj 0.6gm	5 vial	375 vial	150.000	53/vial	79.500
Procaine Benzylpen 3gm	1 vial	100 vial	40.000	26.57/c	10.628
Chloramphenicol 250mg	40 cap	400	160.000	13.96/m	2.234
Erythromycin 250mg	20 tab	1.500	600.000	28.07/5c	33.684
Griseofulvin 500mg	30 tab	750 tab	300.000	65.20/m	19.560
Triple sulfa	20 tab	7.500tab	3 mill	19.34/m	58.020
Tetracycline 250mg	28 tab	8.400tab	3.6mill	10.40/m	37.728
ANTIMALARIALS					
Chloroquine 150mg	10 tab	8.000tab	3.3mill	9.12/m	30.096
Chloroquine syrap 50/5ml	C:15ml	3 litres	2.000L	8.40/5L	3.360
Quinine inj 300mg/ml	4ml	20amp	8.000	16.00/c	1.280
Sulfasoxine + pyrimethamine 500/25mg					
	3 tab	150 tab	60.000	18.38/5c	11.028
ANTI-ANEMIA/NUTRITIONAL					
Multivitamin tab	30 tab	700 tab	280.000	6.00/5m	336
Yulcivitamin syrap	150ml	3.5 L	1.400L	5.50/5L	1.540
Iron/Folic A. 60/.2	30 tab	15.000T	6 mill	13.20/m	79.680
Ferrous Sulfate 30mg	30 tab	30.000T	12 mill	4.52/5m	10.848
DERMATOLOGICALS					
Vystatin cr 30gm	1 tube	10 tubes	4.000	1.20 ea	4.800
Hydrocortisone 1% 30gm	1 tube	10 tubes	4.000	.60 ea	2.400
Whitfield's oint 30 gm	1 tube	100 tube	40.000	5.80/Kg	6.960
Neomycin/bacitracin 25gm	1 tube	50 tubes	20.000	1.20 ea	24.000
Calamine lotion	30ml	5 litres	2.000L	5.00/L	10,000
Benzy Benzoate 25%	100ml	35 L	14,000L	2.90/L	41,440
Gentian violet (0.5%)	10gm	90gm	32Kg	2.40/25g	3.072
ANTACIDS					
Aluminum Hydrox 500mg	5 tab	5.000tab	2 mill	3.60/m	7.200
ANTIDIARRHOEALS					
ORS sachets 27.5gm/l	3 sach	6.000sac	2.4mill	73/10	175.200
OPHTHALMOLOGICALS					
Sulfacetamide 10% opth	5g tube	250 tube	100.000	73/tube	73.000
Chloramphenicol 1% opth	5g tube	750 tube	300.000	20.74/c	62.220
SOLUTIONS					
Lactated Ringers 1000ml	varies	10 litre	4.000L	23.10/20	4.620
Dextrose 50% 10ml	varies	10 amps	4.000	1.08 each	4.320
Dextrose 5% in NS 1000ml	varies	5 litres	3.000L	18.60/20	2.790
Dextran 70 6%/500ml	1 unit	5 litres	2.000L	49.60/20	4.960
CARDIOVASCULAR/ANTIHYPERTENSIVE					
Nitroglycerin tab 0.5mg	1 bot	100 bot	40.000	60/bottle	24.000
Propranolol 40mg	20 tab	100 tab	40.000	4.00/m	160
Digoxin 0.25mg	30 tab	100 tab	40.000	3.19/m	128
Digoxin .25mg/ml 2ml	1 vial	10 amp	400	12.00/10	480
Adrenalin 1mg/ml	1 vial	10 amp	400	3.40/c	14
Reserpine 0.25mg	30 tab	100 tab	40.000	2.35/m	94
Methyldopa 250mg	30 tab	100 tab	40.000	26.83/m	1.073
DIURETICS					
Furosemide 40mg	3 tab	100 tab	40.000	4.84/m	194
Furosemide 10mg/ml 2ml	1 vial	10 amp	4.000	3.55/c	142
Hydrochlorothiazide 50mg	20 tab	100 tab	40.000	3.40/m	136

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GASTROINTESTINALS

Promethazine 25mg	20 tab	100 tab	40.000	* 3.70/m	\$ 148
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HORMONES

Hydrocortisone 50mg/2ml	1 vial	10 vials	4.000	2.11/50	169
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OXYTOCICS

Ergometrine 0.5mg	2 tab	100 tab	4.000	6.58/m	26
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Ergometrine 0.5mg/ml	1 amp	10 amp	4.000	3.58/c	143
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Oxytocin 10IU/ml 1ml	1 amp	10 amp	4.000	5.64/c	226
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ANTICONSULSANT

Diazepam 5mg/ml 2ml	1 vial	10 amp	4.000	3.96/c	158
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Phenobarbital 30mg	10 tab	3.000tab	1.2mill	1.60/m	1.920
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RESPIRATORY

Glyceryl Guaiacolate syr	60ml	75L	10.000L	13.00/4L	32.500
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Aminophylline 25mg/ml	10ml	10amp	4.000	6.12/c	225
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ANAESTHETICS

Ethocaine inj 1% 50ml	varies	10 vial	4.000	7.88/25	12.720
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Ketamine 50mg/ml 10ml	varies	10 vial	4.000	144.25/25	23.080
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ANTIALLERGICS

Chlorpheniramine 4mg	8 tab	100 tab	40.000	1.36/m	54
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ANTITOXINS

Tetanus 50.000IU	varies	2 vial	400		
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Antisnake bite serum 20ml	varies	3 vial	1.200		
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SPECIAL PROGRAM PHARMACEUTICALS**LEPROSY**

Dapsone

DDS

Clofazimine

Rifampicin

TUBERCULOSIS

Streptomycin inj 500mg/ml

Isoniazid tab 50mg & 100mg

Thiacetazone 50. 75 & 100mg

Ethambutol

FAMILY PLANNING

Vorinyl 1/50

IUDs, condoms, diaphragms

EPI

DRUG RELATED MEDICAL SUPPLIES

Cetrimide 40%	varies	5 litre	6.000	18.36/5L	1.200
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I.V. administration sets

Water for injection 2ml	varies	500amp	200.000	14.56/c	29.120
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Water for injection 10ml		100amp	40.000	17.59/c	7.036
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Disposable syringes Luer 2ml		4.000	1.6mill	2.26/c	36.160
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Disposable syringes Luer 10ml		1.000	400.000	3.98/c	15.920
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Disposable needles 0.8x40mg/G21		2.500	1mill	2.05/c	20.500
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Disposable needles 0.5x16/G25		2.500	1mill	2.05/c	20.500
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Interchang Glass syringe Luer 2ml		5	2.000	.82 each	1.640
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Interchang Glass syringe Luer 10ml		5	2.000	1.12 each	2.240
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Interchang needles. #144 asst		2 packs	800pks	15.84/144	12.672
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Sterile swabs 5000		5.000	2mill		
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Suture sets with needles 12/pk		15 packs	6.000	2.82 each	16.920
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Gauze bandages 25mgx9m					
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60mmx4m					
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100mgx4m					
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Plastic envelopes for drugs		10.000			
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Rapid reagent strips					
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*Reference: WHO Emergency Health Kit: Standard Drugs and Equipment for 10,000 Persons for 3 months.

**Reference: IDA Price Indicator 1983 + 20% for insurance, freight and inflation.

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