

HEALTH
INFORMATION
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-STRATEGY FOR ESSENTIAL DRUGS

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Development and Support

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A. CURRENT STATUS OF ESSENTIAL DRUGS IN THE REGION

Pharmaceuticals have assumed an increasingly important role in the management of many diseases. Rational use of medications provides an efficacious and cost-effective means of treating illness. In many cases, rational ambulatory use of medications can obviate the need for costly hospitalization. Formerly devastating diseases, such as pneumonia, tuberculosis and diarrheal disease can now be treated with medications thus avoiding the necessity of costly hospitalization. Many diseases (such as polio or measles) can be prevented altogether by use of vaccines.

Although up to 40 percent of health care budgets in developing countries are being spent on drugs, the majority of the population does not have access to many of the essential drugs needed to treat prevalent diseases. Frequently, the limited funds available are ill-spent on ineffective, duplicative, unacceptably dangerous drugs or wasted on nonessential drugs which are used inappropriately. Additionally, numerous studies have demonstrated that drugs have the capacity to not only cure, but to harm as well. This paradox of drugs is acutely experienced in developing countries because such a significant proportion of the health care budget is spent on drugs and access to drugs is a symbol of health care to the patient. When drugs are not available, the patient does not get well, is often given an inappropriate substitute, and he/she becomes disgruntled with the entire health care delivery system. On the other hand, if the drugs that are available are

irrationally used, therapeutic failures and drug induced illness add significant burdens to the already overburdened health system. There are numerous examples of irrational drug use/management in developing countries. Some examples particularly serve to underscore the importance of developing mechanisms to improve the delivery of essential drugs. For example, in one country, a patient was given chloroquine to treat a fever and cough when penicillin was not available. In other countries, expensive and potentially dangerous tricyclic antidepressant drops are used for the treatment of school phobia in children while in the same country insulin or mebendazole is unavailable. Thousands of vials of antibiotics reach their expiration date while sitting in customs awaiting port-clearing, because payment is not made to the supplier. Suppliers default on their contractual commitments and essential drugs must be obtained locally at private sector prices. Limited funds are also wasted due to inadequate inventory control, inadequate storage, stock mismanagement, and inappropriate prescribing and use of drugs at all health care levels.

Developing countries have begun to demonstrate an awareness of the need to rationalize drug use in their health care programs and have begun to implement measures aimed at increasing efficiency and effectiveness of therapy.

These measures include: .

- 1) Development of essential drug formularies based on prevalent morbidities, utilizing criteria of efficacy, safety, and cost.
- 2) Development of therapeutic prescribing information and standards of care.
- 3) Improvement of inventory control systems
- 4) Establishment of management information systems
- 5) Improvement of procurement systems
- 6) Implementation of "Level of Use" standards
- 7) Development of quality control procedures

These efforts have been undertaken with the assistance of the World Health Organization, UNIDO, development banks, FDA, international manufacturing associations and AID. These groups have provided or funded technical assistance, equipment acquisition, training, production and procurement of drugs, warehouse construction, etc. Although each organization has different objectives and orientation, there are always overlapping spheres of impact. Unfortunately, there is frequently a lack of coordination and a resultant duplication or contradictory goals of programs.

B. PAHO ACTIVITIES IN ESSENTIAL DRUGS

The Pan American Health Organization (PAHO) has been involved, limitedly, in providing technical assistance to Member Countries in essential drugs since 1978. PAHO has worked with many countries in developing national formularies of essential drugs, improving the pharmaceutical supply systems, developing national drug policy, defining drug registration and inspection policies, assisting in developing standards for good manufacturing practices and quality control and sponsoring workshops on essential drugs. These efforts have been restricted in the past by funding limitations, lack of Member Country interest, and paucity of quality consultants in this area.

The Pan American Health Organization has recently designated essential drugs as a priority area in health for the Central American Region. Each country in the Region has formulated a plan regarding its specific needs and national realities (economic, political, etc.). There has been a movement, as evidenced by the Central American Bank of Economic Integration's projects of pooled procurement and production of essential drugs, to promote intercountry cooperation in the health sector. Therefore, PAHO has developed a Regional Program on Essential Drugs for 1984-1989.

The general objective of PAHO's Regional Program on Essential Drugs is to support member governments in the formulation of policy and development of programs that have as their goals the marketing of drugs with known efficacy and safety and the availability of high quality essential drugs at a reasonable cost, for all sectors of the population with particular emphasis on primary care.

The specific objectives in priority order as described in the PAHO document "Programa Regional de Medicamentos Esenciales: Plan a Mediano Plazo 1984-1989" are:

1. Formulate National Policies: Promote an integrated analysis of the availability and use of drugs at the national level in order to define policies, strategies and intersectorial programs. Then based on those analyses and policies, identify common elements among countries in order to foster technical and economic cooperation and the integration of regional and subregional programs.
2. Supply Systems: Strengthen all components of the supply system—selection (national formulary), procurement (product specifications, providers, procurement mechanisms), quality control, distribution (transportation, warehousing, inventory control), prescription and dispensing (standards and practices), use (national, institutional, and community level) and financing.
3. Quality: Improve the national systems of control and surveillance of drugs (legislation, registration, inspection, analysis, and adverse effects monitoring) to assure the quality, safety and efficacy of marketed pharmaceutical products.
4. Information: Prepare and distribute information on drugs and strengthen the national drug information systems. Integrate national information systems into regional and subregional networks.

5. Research: Promote and support research in basic and applied pharmacology, biopharmaceutics, quality control, use, cost and financing, drug monitoring, medicinal plants, and supply systems operations.
6. Production: Support national programs for production of essential drugs for the private sector, with emphasis on large volume parenteral solutions and drugs needed for primary care. Promote the complementary regional integration of drugs and basic chemicals production.
7. Training and Use of Human Resources: Promote the on-going training for personnel as a permanent component of all the projects mentioned above. Additionally, promote the inclusion of training on essential drugs in the curricula of all academic programs related to the health sector and support the better use of the available human resources.

In order to carry out the specific objectives described above, PAHO has elaborated six complementary strategies designed to provide sustained support to the Member Countries to achieve concrete, evaluable, and longlasting impact. These are: 1) expansion of technical cooperation to address the seven priority objectives, 2) development of mechanisms for pooled procurement of drugs and chemicals, 3) improve coordination among the international, regional and subregional institutions involved with technical and financial cooperation, 4) promote private sector participation, 5) mobilize financial and human resources for technical cooperation, and 6) promote research.

PAHO has begun to act on the objectives and strategies delineated above as evidenced by recent conferences in the region on essential drugs with particular attention to pooled procurement of drugs, manufacturing, and intercountry cooperation.

C. MAJOR CONSTRAINTS TO IMPROVING ESSENTIAL DRUG SUPPLY

The major constraints to improving essential drug supply exclusive of funding are traditionally addressed by seven categories.

1. SELECTION

PROBLEM OVERVIEW

Many countries purchase a wide variety of pharmaceutical products for their public health programs without regard to prevalent morbidities, drug efficacy and safety, or cost. Hence, the limited economic resources are diluted by the purchase of drugs of secondary need leading to a diminished capacity to purchase essential drugs. Typically this situation exists because of the absence of a formalized drug selection committee, with objective criteria and procedures for the evaluation of drugs proposed for inclusion on an essential drug formulary.

Compounding the constraint to rational drug selection is the paucity of unbiased drug prescribing/use information available to practitioners. Rational decisions for drug selection must be predicated on complete information regarding drug safety, appropriate indications, and administration.

And finally many products are prescribed by practitioners who are not sufficiently trained to responsibly select and monitor their use. As pharmaceuticals differ widely in their relative complexity, toxicity and capacity for misuse, many developing countries fail to assign designation of "level of use" indicators for each product.

SOLUTIONS

1. Develop an essential drug formulary which contains drugs of choice for the treatment of prevalent morbidities, avoiding therapeutic duplication, unacceptably dangerous drugs, or drugs of unproven efficacy.
2. Create an Essential Drug Formulary Committee with broad representation of medical specialties, health care program administration, and pharmacy.
3. Establish criteria and procedures for periodic objective evaluation of drugs proposed for addition to the essential drug formulary.
4. Development of therapeutic information to accompany each drug included on the essential drug formulary to provide a basis for appropriate prescribing of the drugs.
5. Development of "level of use" standards for each drug on the essential drug formulary so that drugs requiring sophisticated monitoring techniques are restricted to use in health care installations staffed by appropriately trained personnel.

2. PROCUREMENT

PROBLEM OVERVIEW

Pharmaceutical procurement in LDCs is frequently based on estimates of drug movement that are not true reflections of actual drug consumption. Therefore, quantities procured are either over or under-estimates with resultant overspending of funds or shortages of pharmaceuticals. Moreover, criteria for selection of vendors are not well-defined resulting in repeated sales to vendors with poor product quality, unreasonably high cost, or undependable delivery characteristics. This is further compounded by the absence of detailed specifications of products to be procured (in terms of strength, dosage, form, color, etc.) which are not adequately defined, and thus results in product deliveries which do not meet actual needs.

The procurement process is similarly impeded by the absence of order tracking procedures and follow-up system. Characteristically, this process, when it exists in LDCs is unsystematic and as such fails to identify situations leading to stock outages.

The scheduling of call for bids for pharmaceuticals is oftentimes erratic. This is directly related to the deficiencies in quantity estimating and planning. Repeated smaller procurements are more costly than semi-annual or annual larger procurements. Delivery schedules which result in a spreading out of receipt of pharmaceuticals are not negotiated at the time of contracting when specific delivery dating is desirable to the country. And finally, procurement personnel do not avail themselves of "return goods" policies offered by many drug manufacturers which allows for return of damaged or expired products for exchange or credit.

SOLUTIONS

1. Development of a method for measuring actual drug consumption to be used for procurement estimates.
2. Identify and implement vendor performance incentives, which both encourage the vendor to meet contract terms while providing meaningful disincentives for nonperformance.
3. Development procurement criteria for vendor selection which provides for a quantitative assessment of each vendor's bid so that more objective selection of vendors is accomplished.
4. Development of order tracking procedures which create a path of accountability for each pharmaceutical order from the point of contract issue to its receipt by the central warehouse.
5. Develop and adopt a consistent and detailed set of pharmaceutical product specifications to be used for all calls for bids emanating from the public sector. The establishment and ongoing maintenance of these specifications should be included within the responsibilities of the Essential Drug Formulary Committee previously described.
6. Development of a periodicity schedule for monthly, quarterly, semi-annual and annual purchasing.
7. Improvement of training of procurement specialists (see training component of this document).
8. Development of information network on regional drug prices and vendors (see drug price/vendor information component of this document).

3. INVENTORY CONTROL

PROBLEM OVERVIEW

Inadequate control of pharmaceutical inventory remains a common and serious problem throughout all of the developing countries in the region. This problem has led to stockpiling of drugs at some locations within a country (due to fears that an essential drug will become unavailable) while there are drastic shortages at other locations; drugs being lost through reaching their expiration dates, and inappropriate minimum quantity standards for reordering. Management information is not routinely updated so that reports describing availability of drugs are erroneous and misleading.

These problems are characterized by both the regional and subregional inventory process. Local practitioners responsible for inventory control at clinics and outposts lack sufficient guidelines and training to be able to properly control their pharmaceutical stocks.

SOLUTIONS

1. Develop and implement a "simplified" inventory management system utilizing a manual approach initially with transferability to a computerized process.
2. Develop a critical drug locator system for locating and transferring supplies from one pharmacy or warehouse to another.

3. Develop minimum quantity standards for reordering for each health facility level.

4. Improve training of personnel responsible for inventory control.

5. Create a utilization driven inventory distribution program.

4. QUALITY CONTROL

PROBLEM OVERVIEW

Although there has been an increased focus on procuring pharmaceuticals generically, there has not been a corresponding increase in quality control support. Products reaching the central warehouse are not systematically tested to determine whether they meet the product specifications. Consequently, governments are often paying for drugs of inferior quality which results in practitioner reluctance to use generic products.

IDCs have justifiably felt that performing routine quality control analyses on all products is an impossible task and thus have required very few, if any, routine analyses on products reaching the central warehouse. There has not been any systematic identification of a limited list of products whose efficacy or toxicity characteristics require strict quality control analyses. Sampling procedures to select samples for testing are not adhered to, if employed, in many government central warehouses.

Frequently, product defects are identified at the primary health care level and are not communicated back to the central warehouse for reaction.

In some countries, separate quality control facilities exist to serve the Ministry of Health, the Social Security, and other agencies, resulting in duplication of expensive equipment and little or no coordination or collaboration.

SOLUTIONS

1. Develop procedures for selecting samples and testing products arriving at the central warehouse.
2. Develop a list of select drugs requiring strict quality control analysis and implement a mandatory QC program for these products. For less critical products, industry standard sampling procedures must be adopted and these products similarly tested.
3. Improve quality control facilities to support the pharmaceutical testing requirements identified above. The emphasis in this improvement should not be ultra-modern technical equipment, but rather improvement in capacity to perform standard quality assurance testing on large numbers of product samples by technicians with minimum technical training.
4. Improve quality control personnel capabilities through training (see training component of this document).
5. Organize quality control scheduling for routine testing.
6. Support regional quality control facilities which are capable of performing those QA requirements which do not require technical training or equipment (eg. visual inspection, dissolution testing, etc.).
7. Develop subregional product defect inspection program.
8. Coordinate resources for quality control testing to minimize duplication.

5. WAREHOUSING

PROBLEM OVERVIEW

Pharmaceutical warehouses in developing countries reflect poor structural organization which are beyond the scope of this initiative. However, in addition to their physical limitations, there are significant space planning and security inadequacies that can be addressed independently of the ability to remodel or construct new warehouses. Given the lack of country funding for larger warehouses, emphasis on the organization of the structure, planning for the utilization of space, movement, and accessibility is not commensurate with the need currently being experienced by the IDCs.

SOLUTIONS

1. Develop model "space planned" warehouse for efficient and secure storage and retrieval of medical supplies (pharmaceuticals).
2. Improve training for warehouse personnel (see training component of this document).
3. Develop procedures that provide information for product tracking so that products can be tracked during their residence in the warehouse.
4. Implement procedures to improve efficiency of order filling and handling of backorders.
5. Develop security programs/systems to minimize warehouse related theft and pilferage.

6. DISTRIBUTION

PROBLEM OVERVIEW

Distribution of drugs, including transportation and dispensing, is hampered by problems of theft and pilferage, inefficient distribution of products, and deficient dispensing procedures. Drugs are a desirable commodity for personal use as well as for sale and hence require strict security measures. Inefficient distribution and deficient dispensing procedures negate the value of appropriate drug selection, adequate procurement and warehousing. The 'end point distribution' must be successful for drug therapy to be effective.

SOLUTIONS

1. Develop procedures for establishing delivery routes and scheduling.
2. Develop a plan for securing the transport of drugs.
3. Improve training of distribution personnel (see training component of this document).
4. Improve procedures for dispensing drugs including training on appropriate drug containers, heat, light and moisture considerations, and patient counseling.
5. Develop security programs/systems to minimize distribution related theft and pilferage.
6. Evaluate feasibility of transfer of transportation tasks to private transport companies.
7. Evaluate feasibility of transfer of dispensing functions to the private sector pharmacies.

7. USE

PROBLEM OVERVIEW

Drugs have the capacity to harm as well as cure. When drugs are not available (as often occurs in the rural health setting) the patient does not get well, as may be given an inappropriate substitute, and becomes disgruntled with the health care delivery system. On the other hand, in urban areas, there is frequently a wide variety of products available (in many cases they are ineffective, duplicative, unacceptably dangerous, or non-essential) which are used inappropriately. The inappropriate use/management of drugs leads to therapeutic failures and drug induced illness. These problems of inappropriate drug use can be in part attributed to the lack of availability of appropriate drugs and unbiased drug information for prescribers. Of equal importance, however, is the patient's lack of knowledge regarding how to take his medications. Drugs are often prescribed in the absence of a correct diagnosis, adequate information on the drug, a complete patient medical history and appropriate procedures for monitoring therapy.

The system for collecting morbidity/mortality and therapeutic statistics in most developing countries is deficient. The information collected on morbidities is limited to gross descriptions of disease. Statistics on drug consumption is based on movement of products from the central warehouse to other storage facilities. Therefore, it is difficult to accurately assess the status of drugs and diseases in the health system.

SOLUTIONS

1. Develop a system for collecting patient specific information or morbidities treated and drugs dispensed.
2. Develop a program for monitoring patients for rationality of pharmaceutical care and notifying prescribers of patients exhibiting a high risk potential for drug induced illness.
3. Develop patient drug education posters and brochures.
4. Develop pharmacist based pharmaceutical use counseling programs.
5. Develop training programs in drug epidemiology and drug monitoring.

C. LAC BUREAU STRATEGY WITH REGARD TO ESSENTIAL DRUGS

LAC Bureau has identified essential drugs as a priority component of its health program. The objective of LAC's strategy on essential drugs is to promote the availability and rational use of essential drugs in the Region. Essential drugs are defined as those drugs necessary for the treatment of the prevalent conditions/morbidities affecting the population. The rational use of essential drugs promotes the basic objective of AID's health programs as stated in the Health Policy, that is "to help developing countries become self-sufficient in providing broad access to cost-effective preventive and curative health services directed at the primary causes of morbidity and mortality". LAC Bureau recognizes the cost benefit of being able to successfully treat a patient with drugs on an ambulatory basis.

In order to promote the availability and rational use of essential drugs, LAC sees the increase of both bilateral and regional support for technical assistance and training for each of the seven areas affecting essential drug supply (selection, procurement, inventory control, quality control, warehousing, distribution and use).

These areas require specific in country technical assistance and regional training. The technical assistance must be action oriented rather than diagnostic or theoretical. Reports generated must be brief, and easily read and identify step by step tasks to be implemented with short to medium term impact. The technical assistance should be performed by professionals experienced in pharmaceutical logistics and sensitive to the particular constraints facing Latin American developing countries.

The training component of this initiative will utilize a two phase format incorporating a follow-up training experience for each trainee. The programs must be designed with practical exercises rather than extensive didactic presentations. Professional graphic and audiovisual techniques should be employed to maximize effectiveness of training. Regional centers, with demonstrated exemplary practices relevant to the training course subject should ideally serve as the training site, thereby maximizing the non-classroom opportunities for interactive education and hands-on experience. And finally, these training programs should be restricted in size, providing maximum trainee/faculty contact. The faculty for the training programs should be professionals from the region with support as needed from international experts.

D. REGIONAL ACTIVITIES TO BE FUNDED IN ESSENTIAL DRUGS

In order to effect short and medium term improvements in the supply of essential drugs in the region AID/LAC will fund in-country technical assistance activities for, at a minimum, the following tasks:

- Analysis of existing essential drug formularies
- Development of objective criteria and procedures for the selection of drugs for the formulary
- Establishment of "level of use" standards for each drug
- Development of unbiased drug information for the essential drug formulary

- Design of methodology to calculate actual drug consumption statistics
- Development of drug supplier performance incentives
- Development of procurement criteria and detailed product specifications
- Development of an order tracking system
- Identification of reasonable procurement scheduling
- Design of manual or computerized inventory management system
- Design of system for locating and transferring critical supplies
- Development of minimum quantity standards for reordering drugs
- Development of sampling procedures for quality control to be carried out at the central warehouse down to the primary health care level
- Identify list of drugs that require strict quality control
- Facilitate arrangements between quality control laboratory and MOH, SS for routine quality control

- Coordinate resources for quality control among all health sectors to minimize duplication
- Organize warehouse
- Design a product tracking system for the warehouse
- Improve accuracy and efficiency of order filling
- Establish efficient delivery routes and scheduling
- Improve security of drugs during transport
- Develop dispensing procedures and standards for packaging
- Develop system for collecting patient specific information on drugs and morbidities
- Develop patient drug monitoring program and prescriber notification/education
- Design patient drug information posters and brochures
- Design a pharmacist drug counseling program

SELECTION

2 weeks

PROCUREMENT

Projecting Requirements	1 week
Procurement Process	1 week
Order Tracking	1 week
Vendor Management (Negotiations with Pharmaceutical Suppliers)	1 week

INVENTORY CONTROL/WAREHOUSING

Central Facility Management Principles	2 weeks
Local Facility Management Principles	2 weeks
Utilization-driven System Design	1 week

QUALITY CONTROL

Laboratory Planning	1 week
Basis Drug Testing Principles	2 weeks
Advanced Drug Assaying Principles	2 weeks

DISTRIBUTION

Developing Delivery Routing/Schedules	1 week
Pharmaceutical Security Procedures in the Distribution Cycle	1 week
Dispensing Principles and Practices	1 week

USE

Developing Morbidity Data Collection Schemes	1 week
Developing Drug Use Data Collection Schemes	1 week
Designing Drug Monitoring Programs	1 week
Developing National Adverse Drug Reaction Reporting Programs	1 week
Principals in Drug Epidemiology (physician only-option)	1 week

Several studies have demonstrated that significant price and product availability variation can occur among neighboring countries within a region. Although pharmaceutical manufacturers and suppliers assume a "what the market will bear" attitude with respect to product availability and pricing, armed with current procurement data from recently awarded contracts within the region, negotiators can secure lower prices and better terms for their pharmaceutical procurements. Thus, establishing, a regional pharmaceutical vendor/pricing information network which would provide current data on procurements and suppliers within the region creates a stronger and more informed procurement process. Participating procurement offices would provide copies of successfully negotiated vendor contracts to a central coding and data entry facility. Quarterly, this information would be added to the network data base, copied onto diskettes and forwarded back to each participating procurement office. Pre-programmed micro-computers on-site would permit the data base to be interrogated on the basis on a number of variables (product name, therapeutic class, vendor, price, return goods policy, dating, etc)

A key requirement of a successful pharmaceutical logistics program is the rational selection, and ultimate use of the pharmaceutical products. Moreover, as many pharmaceuticals share the capacity to induce illness (adverse effects), the recognition of these risks must be attendant to the prescribing/dispensing process. To assist in the development and on-going awareness of the requirements for rational drug use, and to maintain an adequate consciousness relative to adverse effects AID/LAC will provide funding for the purchase of unbiased drug therapy/dispensing information resources for several sites within each

participating country. This support would be in three major categories: reference textbooks, journals and newsletters and microfiche libraries. Although the reference textbooks provide a useful theoretical foundation, monthly journals, newsletters and microfiche libraries represent current therapeutic awareness, and relevancy to the clinical issues confronting the health practitioner.

A number of important political constraints often exist in LDCs which impede the full optimization of the pharmaceutical logistics program. Often these constraints reflect historical infrastructure requirements, employment issues, and special interest considerations. However, notwithstanding these obstacles, AID should begin to fund certain activities which address alternatives which maybe available to LDCs to further improve the pharmaceutical component of the health care systems of their countries.

Among the most difficult of these areas is the possible transference of certain historically government managed functions to the private sector. Although in some LDCs, this concept is neither practical nor feasible, in others, the cost benefits and managerial efficiencies of a limited transfer of certain functions should be thoroughly explored. Thus AID may fund two feasibility studies which examine the short and long term impacts (both government and private sector) of transferring two functional areas, transportation and dispensing, to the private sector. These two areas, in particular, present the greatest potential of yielding desirable public/private sector outcomes due to the significant involvement of private industry in transport/shipping technology and the poliferation of community pharmacies throughout LDCs.

Developed countries have begun to recognize significant economies due to the shifting from trade name to generic pharmaceuticals. However, this shifting has not been without its political/medical concerns regarding the "quality" of the generic product. Governmental regulators and the medical profession have increasingly turned to sophisticated pharmaceutical testing procedures to assure the consumer (the patient) that the economies realizable from generic drugs are not at the expense of the quality of their care. Not surprisingly, the early negative experience of the developed countries regarding the quality of generic products, and the antigeneric marketing efforts of the major multinational pharmaceutical manufacturers have resulted in skepticism and fear among health care practitioners in LDCs. These fears and misgivings can only be adequately resolved by strengthening the pharmaceutical quality control programs within the region. Thus, AID may fund the modernization and increased technical capacity of existing quality assurance laboratories in selected countries. Armed with the ability to monitor for strict adherence to product specification standards, generic prescribing and an overall increase in the therapeutic effectiveness of pharmaceuticals will significantly improve the pharmaceutical component of the health care system in LDCs.

Pharmaceutical losses due to spoilage, theft and expiration remain significant problems confronting the pharmaceutical systems of LDCs. Effective warehouse design and management procedures address directly these problems, and provide non-political remedial opportunities which can be implemented readily. Because the design and space planning

component of pharmaceutical warehousing is so important, and involves architectural skills apart from the traditional pharmaceutical expertise, AID/LAC may fund the design of a "model" pharmaceutical warehouse which incorporates the latest structural technologies available to LDCs and the space planning skills required to efficiently handle the constant inflow and outflow of perishable and expensive pharmaceuticals. This activity will involve an existing warehouse structure, to which exterior and interior structural modifications will be made. Pharmaceutical logistics managers, warehousing personnel and architectural consultants will be able to use the model warehouse to develop strategies for transferring the relevant technologies to other countries in the region.

The issues of irrational pharmaceutical use, and subsequent therapeutic failure and/or drug-induced illness remain increasing liabilities to the overburdened health care systems of developing countries. Given that one can optimize the selection, procurement, warehousing and distribution components of the pharmaceutical supply systems, prescribing the wrong pharmaceutical, or taking a pharmaceutical incorrectly often result in outcomes which are antithetical to the expressed objectives of the health care systems in which the pharmaceuticals are being provided. Thus AID/LAC must begin to focus attention on the "end-point distribution" (patient) issues which share an importance equal to if not greater than the sum total of the other components of the pharmaceutical supply system. Through the acquisition of mini-computers and existing drug monitoring software packages, AID could begin to support the collection of patient-specific pharmaceutical use and morbidity experience data to

provide the foundation upon which the focus on irrational therapeutic selection/utilization and iatrogenic complications can evolve: The iterative process of recognition and feedback through drug monitoring systems will ultimately yield a rationality of pharmaceutical care resulting in an improved quality of life within a responsible allocation of resources.

ESSENTIAL DRUGS COMPONENT
 TECHNICAL ASSISTANCE BUDGET
 (Budget Period 4 years)
 In-Country

DIRECT LABOR

Professional Consultants	80 wks x 4 countries x \$1,000 wk	
Secretarial Support	4 wks x 4 countries x \$400 wk	<u>\$326,400</u>

TRAVEL/PER DIEM

Airfare	160 trips x \$700 trip	\$112,000
Ground Transportation	320 wks x \$50 day	\$ 16,000
Food/Lodging	320 wks x \$500 wk	\$160,000
		<u>\$288,000</u>

OTHER DIRECT COSTS

Phones	320 wks x \$50 wk	\$ 16,000
Postage/Freight	320 wks x \$20 wk	\$ 6,400
		<u>\$ 22,400</u>

TOTAL TA Budget \$636,800

(\$39,800 per country year)

Assumptions

- 20 weeks TA per year per country
- Average stay per TA assignment: 2 weeks
- Four (4) countries requesting TA

ESSENTIAL DRUGS COMPONENT
 TRAINING BUDGET
 (Budget Period: 4 years)
 Regional Centers

DIRECT LABOR

Professional Consultants	148 wks x \$1000/wk x 2 Faculty	\$280,000	
Graphic Support	38 programs x \$2000/program	\$ 76,000	
Audio/Visual Support	38 programs x \$1000/program	\$ 38,000	
Secretarial Support	28 wks x \$400/wk	\$ 11,200	<u>\$405,200</u>

TRAVEL/PER DIEM

Faculty

Travel	114 trips x 2 Faculty x \$700	\$159,600	
Per Diem	144 wks x 2 Faculty x \$500	\$ 72,000	
Ground Transportation	144 wks x 2 Faculty x \$50	\$ 14,400	

Trainees

Travel	114 trips x 5 Trainee/class x \$500	\$285,000	
Per Diem	144 wks x 5 Trainee/class x \$500	\$360,000	<u>\$891,000</u>

OTHER DIRECT COSTS

Materials/Printing	114 courses x \$200 course	\$22,800	
Postage/Freight	114 courses x \$100 course	\$14,400	
Audio/Visual Rental	114 courses x \$100 course	\$14,400	<u>\$ 51,600</u>

TOTAL TRAINING Budget \$1,347,800

Assumptions

- 19 basic courses and 19 follow-up advanced courses
 (Total 38 training programs)
- 72 weeks of actual training
- 76 weeks (38 courses x 2 week/course) faculty preparation

ESSENTIAL DRUGS COMPONENT
OPTIONAL PHARMACEUTICAL LOGISTICS PROGRAM ENHANCEMENTS
(Budget Period: 4 years)

OPTION A - Feasibility Study for the Transfer of Public Pharmaceutical Transportation to the Private Sector	\$ <u>80,000</u>
OPTION B - Feasibility Study for the Transfer of Public Pharmaceutical Dispensing Functions to the Private Sector	\$ <u>100,000</u>
OPTION C - Enhance the Equipment and Reagent Stocks of the Existing Food/Drug Quality Control Laboratories	\$ <u>1,000,000</u>
OPTION D - Design and Structural Modifications to Existing Pharmaceutical Warehousing Facilities	\$ <u>200,000</u>
OPTION E - Equipment Acquisition (Mini-computer) and Software Development to Support a Computerized Pharmaceutical Logistics and Monitoring System	\$ <u>800,000</u>
TOTAL OPTIONAL PROGRAM ENHANCEMENTS	\$ <u>2,180,000</u>

ESSENTIAL DRUGS COMPONENT
 REGIONAL PHARMACEUTICAL VENDOR/PRICING INFORMATION NETWORK
 Budget Period: 4 years
 (Five Countries)

DIRECT LABOR (burdened by contractor overhead/fringe)

Systems Analyst	200 hrs x \$50/hr	\$10,000	
Programmer	100 hrs x \$50/hr	\$ 4,000	
Data Entry	100 hrs x \$20/hr	\$ 8,000	
Computer Operator	50 hrs x \$20/hr	\$ 4,000	\$ <u>26,000</u>

COMPUTER COSTS

Host Computer Processing	100 hrs @ \$100 x 4 yrs	\$40,000	
Micro-Computer (1 per country)	\$10,000 x 5 countries	\$50,000	
Maintenance	\$1,000 yr x 5 countries x 4	\$20,000	\$ <u>110,000</u>

OTHER DIRECT COSTS

Diskettes	\$4 diskette x 40 disk/yr x 5 countries x 4 yrs	\$800	
Postage/Freight	\$25 shipping x 4 shippings/yr x 4 yr	\$400	\$ <u>1,200</u>

TOTAL, Pharmaceutical Vendor/Drug Information Network \$137,200

\$6,860 per country per year

ESSENTIAL DRUGS COMPONENT
 PHARMACEUTICAL INFORMATION SUPPORT BUDGET
 (Budget Period: 4 year)
 Four Sites in Each of Five Countries

REFERENCE MATERIALS - TEXT

Martindales Extrapharmacopia	\$80 x 20 sites	\$1,600	
AMA Drug Evaluations	\$60 x 20	\$1,200	
United States Pharmacopia	\$50 x 20	\$1,000	
Pharmacologic Basis of Therapeutics	\$50 x 20	\$1,000	
USP Drug Information	\$50 x 20	\$1,000	\$ <u>5,800</u>

REFERENCE MATERIALS - JOURNALS

American Hospital Formulary Service	\$123 x 20 x 4 yr	\$9,600	
Medical Letter	\$70 x 20 x 4	\$5,600	
Clinalert	\$70 x 20 x 4	\$5,600	
Hospital Formulary	\$50 x 20 x 4	\$4,000	
Facts & Comparisons	\$70 x 20 x 4	\$5,600	\$ <u>30,400</u>

REFERENCE MATERIALS - MICROFICHE

Adverse Drug Reaction Index	\$100 x 20 x 4 yr	\$8,000	
Microfiche Reader	\$500 x 20	\$1,000	\$ <u>9,000</u>

TOTAL Reference Material Budget \$2,260 per site

ILLUSTRATIVE BUDGET FOR ESSENTIAL DRUGS PROGRAM

	<u>YEAR 1</u>	<u>YEAR 2</u>		<u>YEAR 3</u>	<u>YEAR 4</u>
<u>TOTAL</u>					
Technical Assistance	100,000	218,400	218,400	100,000	\$636,800
Training	225,000	472,800	425,000	225,000	\$1,347,800
Pharmaceutical Information	13,400	10,600	10,600	10,600	45,200
Vendor/Pricing Information Network	<u>82,450</u>	<u>18,250</u>	<u>18,250</u>	<u>18,250</u>	<u>137,200</u>
TOTAL	420,850	720,050	672,250	353,850	\$2,167,000