CHAPTER 26

Kit system management

ILLUSTRATIONS

BOXES

COUNTRY STUDIES

SUMMARY

Pharmaceutical kits contain selected medicines and medical supplies, in predefined quantities, that are used for primary pharmaceutical supply, supplementary supply, or emergency supply. Emergency health kits are well standardized and widely used by the main international relief agencies, and they can prevent many common problems associated with pharmaceutical donations. Ration kits provide standard quantities of essential medicines for routine use in rural health care at dispensaries and health centers, and sometimes at hospitals. The relevance of pharmaceutical kits depends on a country's ability to manage its pharmaceutical supply system; using a kit system can help countries with weak capacity.

A pharmaceutical supply system based on kits has the following advantages—

- Selection of a limited range of essential medicines
- Simplified budgeting, procurement, storage, transport, and supply management
- Reduced risk of theft
- More reliable supply
- More rational prescribing
- Possible lower indirect costs

Ration kit systems have the following disadvantages—

- Less flexible contents than in an open-order system
- Difficulty adjusting the medicine list to suit seasonal or regional variations in morbidity
- Possibility of shortages and surpluses
- Special management skills and additional space and staff required for kit packing
- Discouragement of local development of distribution and inventory control skills
- Difficulty in monitoring expiry dates
- Lack of fit in a cost-sharing system
- Large payments when prepacked kits are procured
- Higher direct costs, such as additional handling and packing

Kits should be considered when—

- Pharmaceutical supply to rural areas needs to be drastically improved.
- Pharmaceutical supplies are required for an emergency or time-sensitive situation.
- Record keeping, drug ordering, and inventory control capacities are limited.
- Central medical store capacity is limited.
- Diversion and theft of medicines are common.
- Medicine needs are such that the number of different kits can be kept to a minimum.

A distribution system that is completely based on kits is usually viewed as a temporary solution to a logistics problem; however, changing from kits based on a push system to a requisition-based system can be difficult, and combining basic kit distribution with allowing limited ordering for some products may be necessary. Realistically, once a kit system is in place, its convenience paired with the challenges of a pull system often result in this temporary solution lasting much longer than originally planned. A flexible system for distributing medicines should be instituted as soon as the necessary managerial capacity and administrative structures can be created.

26.1 Pharmaceutical supply kits

Prepacked kits, also known as pharmaceutical ration kits, contain an assortment of medicines and medical supplies. The quantity, range, and purpose of kits vary according to situation. Some comprise essential medicines and supplies targeting various levels of health facilities. Others comprise special products to meet specific program needs. The medicines are packed centrally into sealed cartons and distributed unopened to the health facilities where they will be used. Typically, each kit is designed to supply a given number of patients (for example, 1,000).

The kit system is a typical example of an allocation, or "push," system. Supplies are distributed on the basis of a centrally estimated need and not on the basis of a specific request. This system is the opposite of a requisition, or "pull," system, in which health units order supplies on the basis of demand (see Chapter 22).

Different types of kits have been widely used in emergency relief efforts. Since the early 1980s, several countries have adopted kit systems like ration or supplementary kits for the routine supply of essential medicines and supplies to rural health care facilities, usually monthly or quarterly. These two major uses of kits, for emergency situations and for regular supply, are discussed separately.

26.2 Kits for emergency situations

In acute emergencies, medicines and medical supplies are often a first priority. Needs are difficult to assess on short notice; many of the large international relief agencies there-

Box 26-1
The Interagency Emergency Health Kit

This resource explains how to use standardized packages of essential medicines, supplies, and equipment after large-scale emergencies and disasters. The concept and contents of the kit were developed by the World Health Organization in collaboration with international and nongovernmental agencies. In the 1990s, the kit was called the WHO Emergency Health Kit; however, WHO was dropped from the name, recognizing that now the main contributors are organizations with greater emergency field experience. The Interagency Emergency Health Kit is geared mainly to relief agencies, but it also serves as a reference for national authorities and hospital managers interested in stockpiling medicines and supplies.

A complete emergency kit contains two separate sets of medicines and supplies for 10,000 people for approximately three months. The first set consists of ten identical packages of basic units containing medicines and supplies for 1,000 people each, intended for use by primary health workers with minimal training. The supplementary kit for 10,000 people contains medicines, renewable supplies, and equipment needed by well-trained health care workers working in referral health facilities.

All kits now provide medicines for malaria and for the prospective treatment of rape victims. In response to resistance of the malaria parasite to chloroquine and sulfadoxine-pyrimethamine in most places in the world, the kit contents were revised in 2006 to include artemether + lumefantrine fixed-dose combination tablets and artemether injections.

Source: WHO 2006.

fore rely on ready-made kits that contain a selection of the most commonly needed items.

The most popular kit is the Interagency Emergency Health Kit, which is now generally recommended for basic health care immediately after a disaster. Formerly known as the New Emergency Health Kit 98, the interagency kit was redesigned and updated through a collaborative process and finalized in 2006 (Box 26-1). Many international and nongovernmental organizations (NGOs) have agreed to use the same kit, and that agreement has made possible the maintenance of a permanent stock for immediate dispatch when an emergency arises. Thousands of kits are used every year in a variety of emergency situations (see Country Study 26-1). The kit contents and their intended use are described in a World Health Organization (WHO) information booklet (WHO 2006).

The kit measures about 4 cubic meters and weighs about 900 kilograms. It contains essential medicines, disposable supplies, and basic equipment for primary care up to the level of a health center. It can serve a population of 10,000 for three months (or about 10,000 consultation visits). The kit contains ten units for use by paramedical workers. It also contains a supplementary unit, with additional medications and supplies for minor medical and surgical care at the health center level.

This emergency health kit is adequate for the first phase of an emergency, when exact needs have not yet been established. When it is possible to define needs more precisely, some items in the standard kit may prove to be unnecessary, and other items may be insufficient or lacking. Most organizations then switch to other systems. Some of them—Médecins Sans Frontières (MSF) and the Red Cross, for example—use different kits for the second phase.

MSF (www.msf.org) has created about forty medical kits, consisting of different modules. They include a basic dispensary module with simple treatment guidelines and modules containing dressings, surgical instruments, immunizations, intravenous infusions, and laboratory materials. The appropriate modules can be dispatched after MSF field staff have assessed local needs. Some MSF kits are specifically designed to address a particular health crisis—for example, Ebola kits, which include medications and protective gear, are used in outbreak locations.

The Red Cross organizations (www.icrc.org) use small kits to restock health facilities in emergency areas that are particularly busy. In addition to the hardware kit already available in these facilities, they may use a dispensary kit, a dressing kit, a pediatric kit, a sutures kit, an injection kit, and any others that are required.

The use of these kits prevents many of the problems with pharmaceutical donations that are discussed in Chapter 15.

26.3 Use of kits as a distribution strategy

In the early 1980s, the supply of essential medicines to rural facilities had become so unpredictable that several countries, including Kenya, Democratic Yemen, Tanzania, Uganda, and Bhutan, started to use ration kits for rural health care (see Country Study 26-2). The aim was to make a range of cost-effective essential medicines and supplies directly available to dispensaries and health centers, bypassing the district hospital. At that time, most of these programs were

Country Study 26-1
Emergency medicines after the Asian earthquake and Indian Ocean tsunami

On December 26, 2004, a powerful earthquake off the coast of Indonesia sparked a devastating tsunami in the Indian Ocean. The disaster resulted in hundreds of thousands of people dead and missing and more than a million people displaced in Asia and Africa—with the hardest-hit areas in Indonesia, Sri Lanka, and India.

An initial assessment of one of the hardest-hit areas of Indonesia, by WHO, the Indonesian government, the United Nations, and the U.S. military, showed that no master list existed that detailed the overall medical supplies and medicines being provided to interim health posts from various donations worldwide. One common complaint to the assessors was that aid groups brought in only enough supplies to treat clients and did not leave behind any supplies when they departed, rendering the community health care centers unable to treat patients. Initially, the temporary field hospitals met the acute needs of the population, but after the first few weeks, those affected most needed the restoration of primary health care and preventive services. The International Dispensary Association Foundation mobilized 350 Interagency Emergency Health Kits in two weeks for shipment and distribution to affected areas. The kits provided medicines and supplies sufficient for basic health care for 3.5 million people for three months and helped fill the gap until supply services could be reestablished.

Source: WHO 2005.

Box 26-2
Using patient kits to improve management and use of tuberculosis medicines

The Global Drug Facility (GDF) is an initiative to increase access to high-quality tuberculosis drugs for DOTS (directly observed treatment, short course) implementation. To help countries provide drugs to treat up to 10 million patients and reach TB control targets, the GDF's activities revolve around facilitating pharmaceutical management, increasing treatment adherence, and promoting rational medicine use. As part of this strategy, the GDF developed a TB patient kit, which was introduced in the Philippines in 2004. The patient kit contains enough medications, including two-drug and four-drug fixed-dose combinations (FDCs), for a full course of treatment for one patient.

The purpose of the kit is to improve the logistics of pharmaceutical supply, since fewer items will need to be ordered, distributed, and stocked in health facilities. In addition, the kit promotes rational medicine treatment because all medicines are available in the appropriate dosages and quantities when they are needed.

Two different kits conform to patient treatment guidelines for TB. The first is for newly diagnosed patients (Categories I and III) and contains all medications needed to treat one patient in the weight band (55–70 kg).

The recommended STOP TB Kit contains the following in two separate boxes—

1. Intensive phase: Six blisters of four-drug FDC tablets (FDC-4) (rifampicin/isoniazid/pyrazinamide/ethambutol 150/75/400/275 mg)
2. Continuation phase: Twelve blisters of two-drug FDC tablets (FDC-2) (rifampicin/isoniazid 150/75 mg)

Tablets are packed in blister sheets of seven rows of four tablets each.

The second kit is for patients who have relapsed or failed initial treatment (Category II), which contains all medicines needed to treat one patient in the weight band (55–70 kg).

The STOP TB Kit contains the following in three separate boxes—

1. Intensive phase: Nine blisters of four-drug FDC tablets (FDC-4) (rifampicin/isoniazid/pyrazinamide/ethambutol); fifty-six vials of streptomycin, water, syringes, and needles (S 1 g)
2. Continuation phase: fifteen blisters of three-drug FDC tablets (FDC 3) (rifampicin/isoniazid/ethambutol 150/75/275 mg)

Source: Stop TB Partnership/Global Drug Facility <http://www.stoptb.org/assets/documents/gdf/whatis/FS%20DP%20Brochure%20FINAL.pdf>

heavily supported by external donors; some of them still receive substantial external support.

The careful selection of medicines and the parallel development of treatment guidelines in the 1980s introduced the essential medicines concept to many national planners and rural health workers. The kit programs of the 1980s assisted in the dissemination of generic medicines and the promotion of the essential medicines concept in several countries.

A similar distribution strategy based on the kit concept is the use of patient packs for disease-specific treatment. A patient pack is essentially a medication kit for individual patients that includes the correct dose of the correct combination of medicines of assured quality. Box 26-2 discusses the development of patient packs for tuberculosis (TB) treatment. In Ethiopia, a kit for prevention of mother-to-child transmission of HIV/AIDS is composed of HIV test kits and antiretroviral medicines, which addresses the service and management needs of local prenatal care clinics.

The number of programs using kits for regular medicine supply has declined. The main reasons for this decrease are a reduction in long-term donor commitments, a general shift away from centralized public-sector funding for medicines, the incompatibility between kit systems and cost sharing, an increasing desire to implement more flexible requisition systems, and improved capacity in pharmaceutical supply management. However, countries with inadequate pull systems may opt to use kits as a supplement to their regular supply, especially where challenging geography or a weak transportation system makes distribution difficult or where there is a lack of skilled human resources to properly maintain a well-functioning pull system (see Country Study 26-3).

26.4 Advantages and disadvantages of kit systems

The benefits of a kit system depend greatly on the quality of the planning and on the initial kit design. Advantages and disadvantages need to be carefully weighed before a decision is made to adopt the kit approach (see Figure 26-1 and Section 26.6).

Potential advantages of a kit system are—

- Rational selection of a limited range of essential medicines and medical supplies
- Simplified budgeting, procurement, storage, transport, and supply management, with reduced risk of diversion to hospitals and theft in transit
- Decreased handling needed at the central medical store level, which saves resources
- Scheduled supply intervals leading to more secure delivery to rural health units
- Better and more equitable availability of essential medicines and medical supplies at the primary health care level, which results in improved community confidence

Country Study 26-2
Use of the kit system as a distribution strategy in Kenya

Kenya has been distributing kits containing selected medicines and medical supplies to health facilities since the early 1980s as part of its regular pharmaceutical distribution system. The kit concept has helped promote the dissemination of generic medicines and has supported the growth of the pharmaceutical industry in Kenya.

The kits are designed to serve various levels of care, including provincial general hospitals, district hospitals, subdistrict hospitals, health centers, and dispensaries. Each box is expected to last a month for 1,000 patients at a particular facility; however, because the workload varies from facility to facility, distribution supervisors at the district level have the option to increase or decrease the supply of kits. The Medical Officer of Health can order additional medicines to supplement the kits, although because the use of kits has led to poor inventory control systems, additional medicine orders may not be based on real consumption data, but rather on educated guesses as to the needs of the facilities. Another problem is that differing consumption patterns among the districts have resulted in overstock, which theoretically should be redistributed, but weak infrastructure and transportation problems have led to extra stock accumulating where it is not needed.

Consequently, the government of Kenya has begun to shift away from the kit concept. The change has occurred because of the disadvantages associated with kits and the restructuring of the distribution system to create an autonomous entity from which districts will requisition their supplies on a cash-and-carry basis. Hospitals will be expected to requisition medicines from a predefined list, but health centers and dispensaries will continue to receive kits during the transition, because the poor staffing levels in those facilities means they lack the capacity for more complicated inventory control.

- Support for the development of treatment guidelines and prescriber training programs, contributing to more rational prescribing
- Indirect savings

Disadvantages are—

- Less flexibility in the selection of essential medicines for specific health problems in different regions, climatic zones, or types of health units
- Resistance by senior prescribers because of the limited range of medicines in the kit
- Need for special management skills, space, and staff for central kit packing
- Requirement that all funds be available at once, assuming that contractors deliver kits in one installment
- Lack of flexibility in the quantities of medicines, leading to shortages or surpluses of certain items
- Need for multiple kit types to handle different usages at various levels of the health care system
- Difficulty in supplying or returning individual items, which may lead to wastage caused by expiry
- Difficulty in monitoring expiry dates
- Absence of information at the central level on the usage of individual medicines, which hurts the ability to track consumption trends at the national level
- Negative effect on development of supply management systems and skills for inventory control, quantification, ordering, and distribution planning
- Added cost of kit packing
- Difficulty in combining kits with a cost-sharing program
- Difficulty in evaluating the quality of individual products, because the national drug regulatory authority may have to depend on information provided by the kit supplier
- Difficulty in transitioning to a pull system once the simpler kit system has functioned for a long time

The inflexibility of the kit system is its greatest problem. When kits are packed overseas (and they often are), a year may pass before a change in content reaches the rural facilities. In the meantime, stockouts of certain items may occur, while there may be surpluses of other items. This problem is frequently perceived as serious, yet a WHO evaluation (Haak and Hogerzeil 1991) showed that in most long-term governmental kit programs (as opposed to emergency or incidental external kit projects), stable kit content was reached in about two years. In the short term, the problem was sometimes solved by redistributing the accumulated

Country Study 26-3
Implementing a kit system in Papua New Guinea

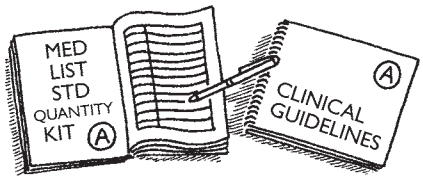
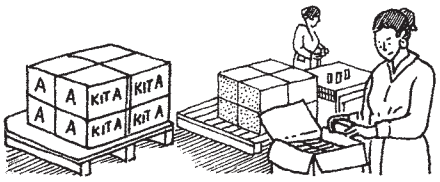
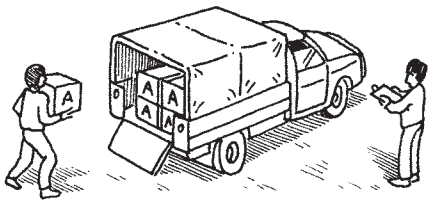
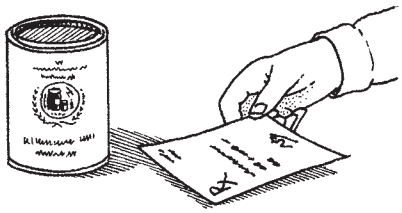
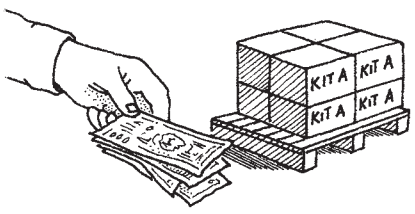
In the 1990s, Papua New Guinea was experiencing serious shortages of essential medicines and supplies in its health centers. In 2000, the National Department of Health asked the AusAID-funded Health Services Support Program to design a health center kit to supplement the regular requisition supply system for two years, while the primary system was revamped. Two types of kits were introduced in 2001, a standard kit containing sixty-five essential medicines and medical supplies, and a supplementary kit with twenty prescription-only medicines. The standard kit was supplied to all health centers and provincial hospitals, while the supplementary kit was sent to health facilities that had a medical officer. The kit quantities were based on patient morbidity data and designed to meet the average patient-visit load in a small health center. The number of kits supplied to health centers varied depending on their average patient visits during a year. The kits were designed to meet 40 percent of the national demand, while the other 60 percent would continue to be met through the primary supply system.

Since mid-2001, thirteen rounds of kit distribution have been made every four months, with the distribution from the capital of Port Moresby to the twenty provincial health offices outsourced to the private sector and distribution from the provincial capitals to health centers managed by the provincial health offices.

Although the initial kit supply period was two years, it was extended year by year through the end of 2008. The strategy to revamp the requisition supply system included a training program in pharmaceutical supply management for health center staff and for students of nursing and community health work. At the end of the five-year program, which began in 2003, expectations were that nationwide, skills of health center staff members in ordering, stock keeping, and stock-control practices would be adequate to return to a completely requisition-based system.

The experience in Papua New Guinea shows that improving a requisition system can be a long-term proposition that requires extensive, sustained training in pharmaceutical management at the grassroots level. The addition of a kit system can improve the availability of essential medicines by supplementing an ineffective primary pull system.

Figure 26-1 Weighing advantages and disadvantages of kit systems

ADVANTAGES		DISADVANTAGES
Rational selection of a limited range of essential medicines and medical supplies		Less flexibility in the selection of essential medicines for specific health problems in different regions, climatic zones, or types of health units; resistance by senior prescribers due to limited range of medicines in the kit
Simplified budgeting, procurement, storage, transport, and supply management, with reduced risk of diversions to hospitals and theft in transit		Need for special management skills; space and staff are needed for central kit packing; requirement that all funds be available at once
Scheduled supply intervals leading to more secure delivery to rural health units		Lack of flexibility in the quantities of medicines, leading to stockouts or surpluses of certain items
Better and more equitable availability of essential medicines and medical supplies at the PHC level		Difficulty in supplying or returning individual items, which may lead to wastage due to expiry; difficulty in monitoring expiry dates
Support for the development of treatment guidelines and prescriber training programs, contributing to more rational subscribing		Possible slow developments of supply management systems and skills for inventory control, quantification, ordering, and distribution planning
Possible indirect savings		Added cost of kit packing; difficulty in combining kits with a cost-sharing program

Country Study 26-4
Revolving drug fund and kit management in Guinea

The primary health care program in Guinea grew rapidly and included a cost-sharing system from the start. Initially, the information system for monitoring pharmaceutical use did not function, and rural staff members were not trained in pharmaceutical management. A decision was made to introduce a kit system while keeping the cost-sharing system in place.

Although the kit contents were regularly modified, major disadvantages arose in combining the two systems—

- Cost sharing reinforced the need for good-quality care and availability of medicines.
- New kits were opened as soon as one item in the previous kit had run out. This practice resulted in an accumulation of half-used kits. The facilities then had no cash to purchase more medicines. Medicines could be procured only as part of a kit. Any "unsold" medicines remained in stock.
- Some medicines became heavily overstocked. However, a low-cost, efficient redistribution system, based on credits for future pharmaceutical procurement, avoided large-scale waste of expired medicines.
- Management committees and health workers resented paying for kit medicines they did not need.

Although the content of the kits was reviewed several times, and standardized treatment was considered a priority, discrepancies between need and supply remained. After a few years, the kit system was abandoned and replaced with a requisition system using a limited medicine list.

medicines; in the long run, it was addressed by adapting the kit content. The latter is easier if the kits are packed within the country. In some countries, the problem was solved by changing to kits with a smaller number of commonly used medicines and by supplying additional items through a requisition system. In addition, many countries have different kits for different levels of health facilities, with medicines and quantities that attempt to better meet the needs of the facility rather than a "one size fits all" system.

The most serious problems of mismatch between need and supply have occurred in kit projects that were badly planned or were operated in isolation from other supply structures. Some problems were directly related to poor performance by overseas suppliers.

Redistributing the accumulated surpluses is not always easy. When the same item has accumulated in most health units, redistribution does not make sense. However, most products that accumulated in the past were simple, commonly used, and very stable medicines. If the products were supplied free of charge, any surpluses could simply be taken back to the central store. In practice, surplus medicines are often returned to the nearest operating level with a requisition system, usually the district hospital. A special problem arises when the kit has been paid for, in which case returning surplus medicines may meet resistance, and some sort of credit system will have to be established. This reason is probably why kit systems and cost sharing do not go very well together. The combination was tried in Guinea, but the kit system was finally abandoned (see Country Study 26-4). In countries that have adopted decentralized pharmaceutical management, transferring surplus stock from one place to another becomes impossible. In this case, the kit system's disadvantages outweigh its advantages.

26.5 Cost aspects of kit systems

The direct costs of a kit system are higher than those of a regular requisition system, for the following reasons. Most international suppliers add 3 to 5 percent to the price for packing the medicines in kits. If kits are packed locally, labor costs may be slightly lower, but certain investments are needed (for example, carton boxes and a strapping device). If kits are procured ready-made, the number of potential suppliers is restricted, and there is less possibility to benefit from competitive prices for individual medicines. Some waste (estimated at an average of 4 percent) is possible because of expiry of accumulating unused medicines (although this waste may not be more than with most requisition systems).

Several factors may result in reduced indirect costs. Waste is reduced because of decreased pilferage during transport and less frequent interception of medicines at the district level. A careful selection of kit contents implies that less money is wasted on items that are not cost-effective, not needed, or inappropriate. Because of the regular supply, less safety stock is needed at the facilities. The regular availability of essential medicines reduces the number of patients who refer themselves to higher levels of care, where average treatment costs are higher. Although such advantages would also be achieved by a good requisition system, the kit system has

often been instrumental in realizing these improvements, but it is probably not needed forever to maintain them.

A pure cost comparison between a kit system and a requisition system leaves out the many qualitative aspects that are not related to costs and are much more difficult to measure. The ease of supply management and the better availability of essential medicines at the primary care level may justify some extra costs. The limited time of health care providers can be used more efficiently. The quality of care may also improve, and lives may be saved. Some overstock (and potential expiry and waste) of cheap but lifesaving medicines, such as oral rehydration salts and ergometrine injection, can be justified (whereas overstock of an expensive but noncritical drug such as praziquantel cannot).

26.6 Conditions for a successful kit program

A kit system is generally most useful when—

- Emergencies or special situations cannot be handled through the existing pharmaceutical supply system.
- Record keeping and pharmaceutical ordering capabilities are limited.
- Requisitioned medicines remain at the hospital level or at intermediate distribution points and do not pass down the system.
- Infrastructural and human capacity of the central medical store is limited.
- Theft in the distribution system is common.
- Pharmaceutical needs are similar throughout the area, and only a few different kits are needed.

Before a kit can operate properly, several conditions have to be met. First, medicines have to be selected (see Chapter 16), and quantities have to be estimated (see Chapter 20). Second, funding has to be secured; this condition requires a real political and financial commitment to satisfying the health needs of the rural population. A third condition is a well-trained and dedicated management team. Finally, a program for training prescribers is essential. If the prescribers do not follow the treatment guidelines on which the kit contents are based, a mismatch will exist between pharmaceutical supply and use, and patients' health may be at risk.

When should a kit system not be chosen? A kit system does not combine well with a cost-sharing program. A kit system is not needed when health facilities are close to the warehouse and when communications and transport facilities are good. Nor is it needed when the public sector has no pharmaceutical shortages and a well-managed and reliable requisition system already exists. In situations in which management deficiencies are present but the capacity exists to overcome them, developing a sustainable requisition system may be a better option. A kit system may become very complicated if many different types of facilities exist or considerable regional or seasonal variations occur in the incidence of health problems. Generally, a kit-based supply system is successful when the overall supply system is poorly organized and pharmaceutical product availability is limited, conditions that are especially common in rural areas.

26.7 Implementing a kit program

Careful planning is required before a kit program is introduced (see Figure 26-2). After a program begins, changing it is difficult and may require a year or more. There are twelve steps to be taken in implementing a kit program.

Step 1. Assess the supply system: is a kit system appropriate?

The balance between advantages and disadvantages has been discussed. The situation should be carefully assessed (see Chapters 22 and 36) before choosing between a kit-based and a requisition-based system.

Step 2. Choose the types of health units to be supplied with kits

A kit distribution system is usually most suitable for smaller, poorly managed, poorly staffed facilities. Sometimes, a mixed distribution system may be an appropriate choice. In a district hospital, for example, kits may be used in the outpatient department, and a requisition system may be used to supply additional medicines for inpatients. There is a growing tendency to reduce the number of different kits and to supplement a limited kit system with a simple requisition system.

Step 3. Prepare a list of medicines and other items for each kit

Separate kits may be prepared for different types of health facilities; for example, one kit for dispensaries and one for health centers (see Chapter 16 and Table 26-1). Bulky products, liquid products, medicines with cold-chain requirements, and medicines with short shelf lives should be avoided whenever possible. If the kit system is being introduced following a long period of shortages, an additional starter kit may be designed that contains essential equipment to upgrade the facilities at the beginning of the program.

Step 4. Determine the quantities of medicines needed in each kit

Usually, kits are designed for a certain number of outpatient consultations (1,000 to 5,000). When this figure has been decided upon, the quantity of each item in the kit can be

Figure 26-2 Flow chart for kit program planning

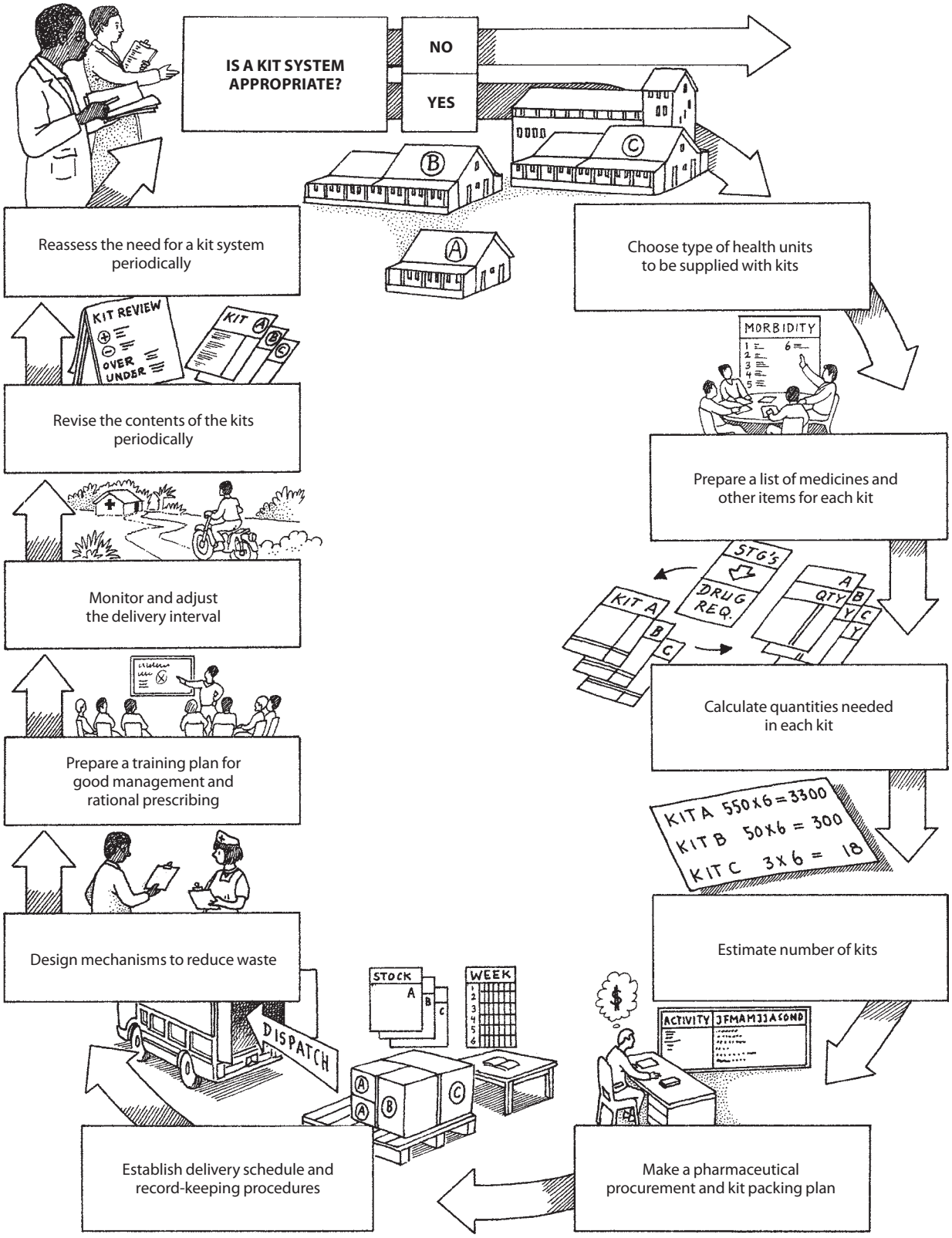


Table 26-1 Health center kit contents, Essential Medicines Program, Kenya

Item	Description	Unit of pack
1	Lignocaine hydrochloride injection BP 2%	Vial (30 mL)
2	Adrenaline acid tartrate injection BP 0.1% (requires cool storage)	Ampoule (1 mL)
3	Chlorpheniramine maleate injection BP 10 mg/mL	Ampoule (1 mL)
4	Chlorpheniramine maleate tablets BP 4 mg	1,000
5	Hydrocortisone sodium succinate injection BP (IV use) 100 mg base, with diluent	Vial
6	Phenobarbitone tablets BP 30 mg	1,000
7	Diazepam injection BP 10 mg/2 mL (IV & IM)	Ampoule (2 mL)
8	Albendazole tablets USP 400 mg	1,000
9	Aminophylline injection BP 250 mg/10 mL	Ampoule (10 mL)
10	Clotrimazole cream BP 1%	Tube (20 g)
11	Gentian violet crystals	Pack (5 g)
12	Hydrocortisone ointment BP 1% w/w	Tube (20 g)
13	Sodium hypochlorite solution BP 4% available chlorine	Bottle (5 L)
14	Compound magnesium trisilicate BP tablets chewable	100
15	Oral rehydration salts (WHO formula – 14 g to make 500 mL)	100 sachets
16	Tetracycline hydrochloride ophthalmic ointment USP 1%	Tube (5 g)
17	Ergometrine maleate injection BP – 500 mcg/mL (requires cool storage)	Ampoule (1 mL)
18	Chlorpromazine hydrochloride injection BP 25 mg/mL, 2 mL	Ampoule (2 mL)
19	Chlorpromazine hydrochloride tablets BP 25 mg, sugar coated	100
20	Salbutamol tablets BP 4 mg, scored	1,000
21	Griseofulvin tablets BP 500 mg	100
22	Griseofulvin tablets BP 125 mg	100
23	Metronidazole suspension 200 mg/5 mL	Bottle (60 mL)
24	Multivitamins/minerals supplement capsules	1,000
25	Multivitamins/minerals supplement syrup	Bottle (5 L)
26	Compound magnesium trisilicate + simethicone	100
27	Chloramphenicol ear drops	Bottle (10 mL)
28	Cough syrup (chlorpheniramine 1 mg, promethazine 2.5 mg, sodium citrate 4.5 mg, diphenhydramine 5 mg, ammonium chloride 90 mg, and ephedrine 5 mg)	Bottle (5 L)
29	Calamine lotion	Bottle (100 mL)
30	Povidone-iodine 10% standardized	Bottle (1 L)
31	Hydrogen peroxide 100 vol.	Bottle (1 L)
32	Lysol 12%	Bottle (5 L)
33	Chlorhexidine gluconate 4%	Bottle (5 L)
34	Methylated spirit	Bottle (5 L)

defined. Kit contents are normally intended to treat only the most commonly seen health problems, and all health facilities are assumed to see the same mix of problems per 1,000 attenders.

When a new kit program is to be started, the morbidity method is the best way to estimate requirements. This method helps determine both the types of medicines and their quantities, based on the expected number of attendances at a health facility (see Chapter 20). This first estimate can then be compared with the quantities used in other kit systems.

In the first years a kit system is operating, the consumption method can be used to adapt quantities to match actual consumption. Experienced kit suppliers can supply various kinds of kits and change kit contents with each order.

Step 5. Estimate the number of kits needed

The quantity of each type of kit is determined by the number of health units served and the estimated number of attendances at each health unit. If a kit distribution system starts after a period when pharmaceutical supplies have been

reduced or are absent, increased patient attendance should be anticipated and allowed for. Taking into account long delivery times, most orders cover a period of nine to eighteen months.

Step 6. Make a pharmaceutical procurement and kit-packing plan

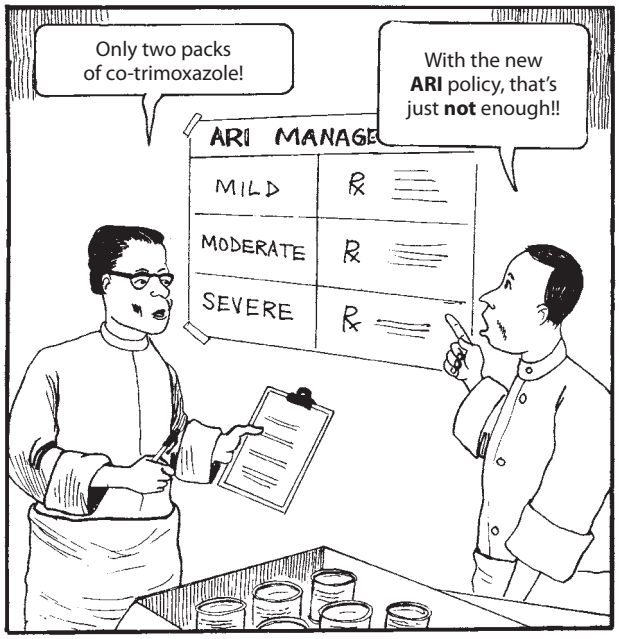
There are at least four ways to manage procurement and kit packing—

- Purchase prepacked kits from overseas
- Purchase prepacked kits on open tender, from local and/or overseas suppliers
- Contract a local company to pack all kits, using medicines purchased separately through local or international tender
- Set up kit packing at national or regional medical stores

The choice depends on cost, availability of staff, and availability of space at the medical stores. Kit suppliers should be prequalified as part of standard procurement procedures to avoid potential problems such as late shipments, incomplete kits, and poor-quality products. Prepacked kits are available through the United Nations Children's Fund (UNICEF), through international low-cost suppliers such as the International Dispensary Association (IDA), or from private companies. In some countries, such as Kenya, local suppliers compete in tenders for prepacked kits. Some programs begin by purchasing prepacked kits and concentrate on distribution and monitoring of consumption patterns. After the system is operating well at the periphery, the feasibility of establishing packing operations at central or regional medical stores can be considered.

Kits are usually procured by tender (see Chapter 21). Tender specifications for each medicine in the kit should be just as detailed as for individual medicine tenders. The specifications should describe how the kit is to be packed and stipulate the quality of the outer carton, the method of strapping, kit labeling, and any other relevant features. In addition, the buying agency should request sample checklists of kit contents along with expiry dates (for example, a sample checklist for every ten or twenty kits), and a buyer's representative should randomly sample kit contents by opening one in every twenty-five to fifty packed, sealed boxes. This type of quality control will help ensure that the contents and expiry dates meet the tender requirements.

Significant problems can arise in setting up a local packing operation. A kit cannot be packed until all items needed for the kit are available. If the supply of any item is delayed, the entire packing operation is held up, which may lead to stockouts at facilities. Because of this possibility, the period before expiry of the products must be as long as possible.



KIT CONTENTS MUST KEEP UP WITH STANDARD TREATMENTS

Most programs pack or purchase kits in sturdy cardboard boxes sealed with tamper-proof tape or some other form of seal that will clearly reveal any attempt to open the box in transit. Lockable, reusable plastic containers are also available for locally packed kits. However, because kit distribution systems are used mainly where distribution conditions are difficult, the containers are unlikely to be returned to the central medical store.

One person from the supplier packing the kits should be assigned to check the contents of every kit to reduce the risk of theft during the packing process and to assure it has what it is supposed to have. A list of the contents should be made, signed, and dated, and a copy should be sealed into the kit. This list should also show the expiry date of whatever product is due to expire first, and that date should be marked on the outside of the carton as well.

Step 7. Establish delivery schedules and record-keeping procedures

The delivery schedule depends on the average number of patient visits to the facility. For example, when kits for 1,000 visits are used, a facility with 200 to 300 visits per month needs only one kit every three months.

A kit system simplifies record keeping but does not eliminate the need for it. At each level of the distribution chain, stock records should show the type, number, source, condition, and value of each kit received and issued. A periodic stock count must be done. In short, a kit should be treated in the same way as any other item as far as stock keeping is

concerned. At a rural facility, a tally card or ledger should be used to keep a record of the number of kits received, opened, and in stock. As soon as a kit is opened, the contents should be entered into the item-by-item stock records at the facility. Where a kit system supplements a requisition-based system, a single record-keeping method should be used that bases demand figures on supplies made through both systems.

Step 8. Design mechanisms to minimize waste and stockouts

Actual medicine consumption should be analyzed regularly, particularly in the early stages of a kit program. Supervisors should use a simple checklist. Rural facilities need to supply the following information—

- Number of patient attendances per month
- Recent kit delivery dates
- The three medicines that are most often out of stock
- The three medicines that accumulate most often
- Proposals for changes in kit contents

Information on actual deliveries and receipts should be collected and given to planners to help monitor the program and to modify distribution plans as required. Details of stockouts, surpluses, and any proposals for change are particularly useful for adjusting the kit content.

Other mechanisms to prevent waste and stockouts are to—

- Allow individual requisitions for a few products whose consumption is variable (for example, antimalarials or medicines for schistosomiasis)
- Assure that inventory control accounts for supplies in both the kit and requisition systems, if a mixed system is in use
- Create a simple system for returning unused stock
- Avoid containers with more than 1,000 tablets
- Specify maximum possible periods before expiry for medicines received from suppliers
- Instruct kit packers to mark the earliest expiry date on the outside of the kit carton
- Keep supply intervals as short as possible

Step 9. Prepare a training plan for good management and rational prescribing and dispensing

Staff members should be trained to use the standard treatment schedules on which the kit contents are based. A regular training schedule is important to ensure that new employees are aware of the supply system, its standard operating procedures, standard treatment schedules, and the kit composition, especially in areas where turnover in health care personnel is high, such as sub-Saharan Africa. As pharmaceutical supply improves, training and retraining in rational prescribing and dispensing are essential to prevent misuse of the medicines. Not only is in-service training necessary, but so are revisions to curricula in nursing and medical schools and for community health workers.

Step 10. Monitor and adjust delivery intervals

Any push system needs feedback, monitoring, and supervision if it is to operate effectively. Difficulties arise when

Country Study 26-5
Transition from primary health kits to a direct requisition system in Tanzania

The Tanzanian Ministry of Health and Social Welfare (MOHSW) is instituting a policy of replacing essential medicines kits with an indent (direct requisition) system in order to tailor medicine orders to fit the needs of each particular health facility and to reduce waste. The MOH introduced a pilot project in the Morogoro region in 1999, where health facilities placed their orders with the Medical Stores Department (MSD) through the District Medical Officer. It was then rolled out to five of the country's twenty-one regions.

The scaling up of the indent system put MSD operations under some strain, contributing to a slower rollout than planned. Inventory management, warehousing, and picking and packing operations all had to be reengineered. The primary health care kits comprise four prepacked stock items that require only simple block stacking in the warehouse. Replacing the kits with the indent system means that instead of distributing more than 3,000 prepacked kits every month, MSD has to pick, pack, and deliver items according to customized orders, which is having a significant effect on the size and nature of MSD's inventory, storage, and distribution operations.

A 2007 assessment of the Tanzanian pharmaceutical distribution sector revealed that the MSD still shipped kits to some lower-level health facilities, and the rise in the number of vertical programs introduced additional program-specific kits. Staff in health facilities in only two of the six regions that had a direct requisition system had been trained in that system.

Sources: SEAM Program 2003; MOHSW 2008.

Country Study 26-6
Transition from a kit system to a modified optional replenishment system in Cambodia

An international organization committed itself to organizing the central medical store in Cambodia in 1992. NGOs had been supporting a large number of facilities throughout the country and had delivered continuous training in pharmaceutical management and rational prescribing. It was decided to introduce a three-phase pharmaceutical distribution system—

1. *Basic kit:* This kit contained fourteen different medicines in quantities considered minimal for functioning.
2. *Complete kit:* This kit contained forty-three different medicines in much larger quantities than the basic kit. The quantities were not, however, adapted to each particular facility, so surplus accumulations and shortages often occurred.
3. *Modified optional replenishment system:* The initial maximum consumption for three months was set to be equal to the standard consumption multiplied by the expected number of attendances at each facility. These maximum levels were to be revised once a year.

The kit systems allowed the health facilities to operate, although the delivered quantities did not completely match the prescribers' needs. When the modified optional replenishment scheme began to function properly, it did a better job of meeting prescribers' needs. A reasonable level of procurement security existed at the central medical store.

Basic kits were supplied to health facilities, which had unqualified staff and no information on attendances and medicine consumption. Complete kits were supplied only after a qualified person had been appointed and the facility's information system had improved. Finally, the modified optional replenishment system was introduced when certain minimum standards of infrastructure, management, and staffing had been achieved. The supply system was downgraded if a health facility showed signs of irrational medicine prescribing or serious mismanagement of pharmaceuticals.

In 1996, the public sector reorganized the health system, including pharmaceutical distribution, resulting in the establishment of a centralized procurement and distribution system. In this system, orders flow up from public health centers to the operational district medical stores; are approved by the provincial health departments; are sent to the Essential Drugs Bureau, where they are consolidated and reviewed; and are then forwarded to the central medical stores. The medicines are procured by a private broker and distributed through central medical stores to the operational district medical stores, then directly to facilities. Kits are still used in rural communes.

a centrally planned delivery schedule is not regularly adjusted to conditions in the field, or when planned distribution schedules are incorrectly assumed to be followed. Receipt of the kits should always be confirmed. Stock levels at rural facilities should be reported regularly to spot any persistent stockouts or surpluses. Responsibility for monitoring and evaluation needs to be identified and assigned at the provincial or district level to provide feedback to the central authority responsible for kit design and distribution.

Step 11. Revise kit contents periodically

The items and quantities in each kit should be reviewed regularly. In stable, long-term kit programs, about two years are needed to get a reasonable balance between supply and demand for the individual items in a kit. Even then, changing disease patterns and changing prescription patterns make revising the kit contents periodically necessary. The system can also be refined by adding other kits or by changing to a mixed system.

Step 12. Reassess the need for a kit system periodically

At a certain stage, the program can change to other distribution methods, as described below.

26.8 Transition to other distribution systems

After a kit system has been functioning regularly for some time, pharmaceutical supply conditions will likely improve. More information on patient morbidity and medicine consumption will be available to planners and to rural health staff. Policy makers will get used to a limited range of essential medicines. Training of staff members should have improved their management capacities. At this point, moving to a more flexible distribution system may be possible, but only if the managerial and financial capacities exist to maintain sufficient product levels to fill the individual orders. In any case, a phased approach to transition will be essential.

In addition to the administrative issues previously men-

tioned, the transition to a requisition option demands that the facilities that have been handling the kit management and distribution (for example, central medical stores) reconfigure their physical capacity completely to accommodate a pick-and-pack operation. Planners should also consider the financial ramifications of the transition, including the possible costs related to renovations, new staff, additional training, and transportation. As seen in Country Study 26-5, in Tanzania, converting a kit-based pharmaceutical distribution system is fraught with challenges. Country Study 26-6 illustrates how Cambodia's supply program evolved.

Preparation for transition at the health facility level is mainly a matter of training followed by supportive supervision. A reliable and complete information system is also necessary, which is a challenge for all levels of the pharmaceutical system. At a minimum, the information system should monitor the number of patients treated, medicine consumption, and morbidity patterns. These data may also help determine whether sufficient management capacity exists to change to a requisition system based on real demand—a pull system—or to a more sophisticated push system. Notice regarding the change should be given to affected health facilities, and if the supply system is mixed, the quantities in the kit contents should be progressively reduced, so that the regular pull system can absorb the reduced quantities in the kits. Three possible stages to an open-order system are outlined below.

Fixed medicine allowance system

The first step may be to change from kits to a fixed medicine allowance system. This system also defines the selection and quantity of medicines in advance. However, the goods are not physically packed in a kit and are not necessarily dispatched at the same time. Provided that feedback is available from the health facilities, this system promotes a rapid and flexible response to changing needs.

Ordering within defined limits

The second step in the transition gives health workers some responsibility for ordering. Average medicine consumption is calculated for each facility, and these data are used to define maximum and minimum stock levels for each item. Health workers are then taught to order their medications within these limits.

Open requisitioning from a predefined list

The final stage in the transition makes health workers or pharmacy staff responsible for ordering the items and quantities they need from a predefined list, as described in Chapter 46. ■

References and further readings

★ = Key readings.

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ASSESSMENT GUIDE

Use of ration kits

- Which levels of health care and what percentage of facilities receive ration kits on a regular basis?
- How does actual distribution compare with the annual distribution plan?

Description of kits

- What are the kit contents, quantities, and intended number of patient contacts per kit?
- Are regional or seasonal kits in use? If so, what do they contain?
- What is the cost of each kit?
- What is the incremental cost for kit packaging versus open item procurement?

Financing, procurement, and distribution management

- Who pays for the kits (government or external donor)?
- Are kits prepared and packed locally or internationally?
- Is kit distribution integrated with the regular pharmaceutical supply system?
- On what basis are kits distributed (time interval, number of patient visits)?
- Does a procedure exist to order additional medicines or additional quantities?
- Which medicines are commonly out of stock before the next delivery of kits?
- What items are accumulating?
- Does a mechanism exist for transfer or exchange of products between facilities?
- What procedures are in place to deal with shortages? Are these procedures working?
- What procedures are in place to redistribute overstock? Are these procedures working?

Monitoring and evaluation

- Is a procedure established to update the contents of the kit? When was this update last done?
- Is supervision of the kit program integrated with general supervisory activities?
- What is the effect of the kit system on availability of medicines and supplies?
- What is the effect of the kit system on prescription patterns?
- Are mechanisms in place to check actual distribution of kits to rural facilities against the planned distribution schedule?
- Is reporting on consumption done regularly?
- Are stock cards/bin cards maintained for each medicine?