

Part I: Policy and economic issues	Part II: Pharmaceutical management	Part III: Management support systems
	Selection	
	16 Managing medicine selection	
	17 Treatment guidelines and formulary manuals	
	Procurement	
	Distribution	
	Use	

CHAPTER 16

Managing medicine selection

Summary 16.2

16.1 Introduction 16.2

16.2 Practical implications of the essential medicines concept 16.2

16.3 Selection criteria 16.4

16.4 Use of International Nonproprietary (generic) Names 16.5

16.5 Essential medicines lists in context 16.6
Lists of registered medicines • Formulary manuals • Treatment guidelines

16.6 Approaches to developing essential medicines lists, formularies, and treatment guidelines 16.8

16.7 Therapeutic classification systems 16.10

16.8 Sources of information 16.13

16.9 Implementing and updating essential medicines lists 16.14
Reasons for failure • Gaining acceptance of essential medicines lists • Authority of essential medicines lists

Assessment guide 16.15

References and further readings 16.15

Glossary 16.16

ILLUSTRATIONS

Figure 16-1 The essential medicines target 16.7

Figure 16-2 Common health problems guide selection, training, supply, and medicine use 16.9

Figure 16-3 Sample form for proposing revisions in essential medicines lists 16.12

Table 16-1 Advantages of a limited list of essential medicines 16.4

Table 16-2 Example of level-of-use categories, Ethiopia Essential Drugs List, fifth edition, 2007 16.6

Table 16-3 Key factors in successfully developing and implementing an essential medicines program 16.14

BOX

Box 16-1 WHO criteria for selection of essential medicines 16.5

COUNTRY STUDIES

CS 16-1 Approaches to updating essential medicines and formulary lists 16.10

CS 16-2 Updating the National Essential Medicines List of Kenya 16.11

SUMMARY

The rationale for selecting a limited number of essential medicines is that it may lead to better supply, more rational use, and lower costs. Essential medicines are those that are deemed to satisfy the health care needs of the majority of the population and that should be available in the appropriate dosage forms and strengths at all times. Because selection of medicines has a considerable impact on quality of care and cost of treatment, it is one of the most cost-effective areas for intervention.

A list of essential medicines may be selected for use in one or more health facilities or for the public sector as a whole. In the latter case, the list usually indicates the level of the health care system where each medicine may be used. It can also be considered a supply list. A formulary system is part of the medicine selection process. The system includes a formulary list, which is ideally based on an essential medicines list, and a formulary manual, which contains summary information on each medication on the formulary list. Standard treatment guidelines are systematically developed statements that assist prescribers in deciding on appropriate treatments for specific clinical problems. Whereas a formulary manual is medicine centered, treatment guidelines are disease centered, presenting treatment alternatives and recommending a treatment of first choice.

The process of selecting essential medicines begins with defining a list of common diseases for each level of health care. The treatment of first choice for each health problem is the basis for the list of essential medicines, the national formulary system, and the treatment guidelines. The supply system should then supply the medicines that have been selected, based on this series of steps.

Essential medicines should be selected on the basis of (1) relevance to the pattern of prevalent diseases, (2) proven efficacy and safety, (3) adequate scientific data and evidence of performance in a variety of settings, (4) adequate quality, (5) favorable cost-benefit ratio, (6) desirable pharmacokinetic properties, (7) possibilities for local manufacture, and (8) availability as single compounds. The drugs should be identified by the International Nonproprietary Name (INN), sometimes referred to as the generic name.

General acceptance of an essential medicines list can be promoted by wide consultation with senior specialists and experts, including professional organizations and academic institutions, on the list's development and use. An open and transparent system of regular updates is an absolute prerequisite for maintaining the authority and acceptance of an essential medicines list or formulary list. The essential medicines concept can be applied in any country, in the public and private sectors, and in rural areas as well as at referral hospitals.

16.1 Introduction

Pharmaceuticals may constitute as much as 40 percent of the health care budget in developing countries, yet large portions of the population may lack access to even the most essential medicines. The limited funds available are frequently spent on ineffective, unnecessary, or even dangerous medications.

As much as 70 percent of pharmaceuticals on the world market are duplicative or nonessential. Many are minor variations of a prototype drug product and offer no therapeutic advantage over other medicines that are already available. Some are medications that show high toxicity relative to their therapeutic benefit. In some cases, new medicines are released without sufficient information on efficacy or toxicity. Finally, new products often are for therapeutic indications not relevant to the basic needs of the population. In all of these cases, the newer medicines are nearly always more expensive than existing medicines.

With so many different pharmaceutical products avail-

able, prescribers often find it impossible to keep their knowledge up-to-date and to compare alternatives. In addition, the variety of available products may contribute to inconsistent prescribing within the same health care system or even in the health facility. With regard to procurement, purchasing power is significantly lessened by the large number of duplicative and nonessential pharmaceutical products on the market.

In short, pharmaceuticals can provide great benefits, but their cost is substantial. The selection of medicines has a considerable impact on the quality of care and the cost of treatment, and it is therefore one of the areas where intervention is most cost-effective.

16.2 Practical implications of the essential medicines concept

The World Health Organization (WHO) has defined essential medicines as those that satisfy the needs of the

majority of the population and therefore should be available at all times. The rationale for the selection and use of a limited number of essential medicines is that it leads to an improved supply of medicines, more rational prescribing, and lower costs; in fact, the appropriate use of essential medicines is one of the most cost-effective strategies a country can enact.

The essential medicines concept is a global concept that can be applied in any country, in the private and public sectors, in referral hospitals as well as primary health care units, and in both urban and rural areas. However, the decision about exactly which medicines should be considered as essential should be a national-level responsibility. By 2007, 86 percent of countries had national essential medicines lists, of which at least 69 percent had been updated in the previous five years. Some have state or provincial lists as well (Kathleen Holloway, personal communication, March 2010).

Under optimal circumstances, the registration of medicines for the private and public sectors should be based on an evaluation of efficacy, safety, and quality. In some countries, cost and need are also criteria for medicine registration. In such cases, the selection of essential medicines takes place during medicine evaluation, approval, and registration and is therefore applicable to both the public and private sectors.

More commonly, the selection and use of essential medicines are limited to public-sector health facilities. However, many private-sector facilities and health insurance systems have limited formulary lists, which can serve the same function. For each level of health care in the public sector, a limited list of essential medicines is prepared as the basis for supplying pharmaceuticals, for prescribing in the public sector, and for training of health workers—which is why such lists should be closely related to standard treatment guidelines for clinical health care practice. This correlation is especially relevant for medical and paramedical training institutions and teaching hospitals, because they have an important influence on the prescribers of the future.

There are many reasons to support the use of a limited essential medicines list. First, fairness dictates that basic health services be accessible to everyone before more expensive services are made available to a small, usually urban proportion of the population.

Second, no public-sector or health insurance system can afford to supply or reimburse all medicines that are available on the market. Therefore, essential medicines lists guide not only the procurement and supply of medicines in the public sector, but also schemes that reimburse medicine costs as well as what medicines it makes sense for local manufacturers to produce. Because the availability of pharmaceuticals in the public sector is erratic in many countries, a regular supply of most products on the essential medicines list would result in a real improvement in public health and would increase the public's confidence in the health care

system. Many international organizations, including the United Nations Children's Fund (UNICEF) and international nonprofit supply agencies, have adopted the essential medicines concept for their supply systems.

Third, when the limited list of essential medicines represents prescribers' consensus on pharmaceutical treatments of first choice, its use may improve the quality of care by ensuring that patients receive the treatment of choice as well as similar treatment from different providers. It also allows prescribers to become more familiar with a smaller number of medicines. This restricted number of possibilities contributes to improved recognition of actual benefits and limitations of specific medicine therapy, as well as to the detection and prevention of adverse drug reactions.

Fourth, improved effectiveness and efficiency in patient treatment reduce health care costs. Therefore, lack of funds in developing countries is not the only reason to limit treatment selection to essential medicines, nor does such a policy necessarily compromise quality of care. In fact, the essential medicines concept is increasingly being accepted as a universal tool to promote both quality of care and cost control.

Fifth, for public-sector supply programs, advantages exist in concentrating procurement and logistics efforts on a limited number of medicines, including reduction in the number of different products that must be stocked, distributed, and monitored. Essential medicines are usually available from multiple suppliers. With increased competition, more favorable prices can be negotiated. In addition, limiting the number of different medicines used to treat a particular clinical problem means larger quantities of the selected medicine will be needed, creating potential opportunities to achieve economies of scale. Ensuring the quality of a small number of pharmaceutical products is easier, which is another reason why many national pharmaceutical programs base their medicine donation policies on the national essential medicines list.

Finally, the selection of a limited number of essential medicines facilitates efforts to provide drug information and education, both of which advance rational prescribing and use. Objective drug information and training materials are so scarce in most developing countries that their provision is considered very beneficial by physicians and other health care workers. Thus, although the number of pharmaceutical products for public health use may be limited by an essential medicines list, the practical availability of medicines and corresponding drug information and training materials may be increased. Patient education and efforts to promote proper use of medicines by patients can also be enhanced by focusing on these medicines.

The potential advantages of using a limited list of essential medicines are summarized in Table 16-1. These advantages do not, however, follow automatically. The essential medicines list is only a starting point, not an end in itself. For

Table 16-1 Advantages of a limited list of essential medicines

Major objective	Challenge
Supply	<ul style="list-style-type: none"> • Easier procurement, storage, and distribution • Lower stocks • Better quality assurance • Easier dispensing
Prescribing	<ul style="list-style-type: none"> • Training more focused and therefore simpler • More experience with fewer medicines • Nonavailability of irrational treatment alternatives • Reduction of antimicrobial resistance • Focused drug information • Better recognition of adverse drug reactions
Cost	<ul style="list-style-type: none"> • Lower prices, more competition
Patient use	<ul style="list-style-type: none"> • Focused education efforts • Reduced confusion and increased adherence to treatment • Improved medicine availability

countries to realize its advantages, the selection of essential medicines must be followed by other actions outlined in this book, including the promotion of the essential medicines list by use of a formulary manual and standard treatment guidelines, improvements in procurement and distribution, and efforts to promote rational medicine use.

With the continuing impact of infectious diseases such as malaria, tuberculosis, and HIV/AIDS, as well as widespread increases in antimicrobial resistance, the application of the essential medicines concept is more appropriate than ever. In developing countries, antimicrobial resistance has resulted in the use of new and far more expensive treatments for malaria and tuberculosis, while the scale-up of treatment for HIV/AIDS is straining limited health care resources. Developed countries, too, have experienced large increases in pharmaceutical expenditures. The use of the essential medicines concept in both developed and developing countries can promote the most efficient use of resources as well as help combat the spread of antimicrobial resistance.

16.3 Selection criteria

Although there are many different settings in which a national list of essential medicines can be used, the criteria for selection are basically the same in each. For a national essential medicines list to be credible and widely accepted, the criteria must be defined and published. The final selection criteria should be based on thorough discussions and acceptance by a multidisciplinary committee of experts. Specialists within the selection committee can interpret data and evaluate the safety of medicines in their areas of expertise.

Box 16-1 summarizes the criteria used by the WHO Expert Committee on the Selection and Use of Essential Medicines, which were the result of extensive deliberation. The WHO criteria are frequently adopted and modified to fit local requirements.

Determining the safety and efficacy of specific pharmaceutical products requires access to relevant, up-to-date, and unbiased information, such as summaries of relevant clinical guidelines, systematic literature reviews, important references, and quality assurance standards. Personal observations should not be used as justification for selecting a medication, nor should selection be based on sales figures or a medicine's popularity in the market. Sources of objective information can include a national drug information center; many useful references are available in the WHO Essential Medicines Library (<http://www.who.int/medicines/publications/en>). See also Section 16.8 and Chapter 34.

The choice of medicines depends on the capacity of health care staff to use them effectively. Consequently, it is important to have thorough knowledge of the extent of staff training and the availability of support facilities for each level of the health care system before deciding where individual medicines will be made available. For example, cancer medicines are expensive, have serious side effects, and require frequent laboratory monitoring. Therefore, such medicines might be limited to a few designated cancer treatment centers. In addition, selection should take into account potential staff confusion and medication errors that could be caused by including sound-alike or look-alike products and various concentrations of liquid preparations for the same drug.

In choosing among medicines of similar safety and efficacy, the total cost of treatment should be considered. Care must be taken, however, in making the comparison. For example, ampicillin may be cheaper than amoxicillin in a tablet-to-tablet comparison but more expensive in a course-of-therapy comparison, because ampicillin must be taken more often. Because pharmaceutical costs vary from country to country, cost comparisons should be country-specific.

Decision making becomes more complicated when more expensive medicines are also more effective, as in the case of certain antibacterial, antitubercular, or antimalarial medicines for resistant organisms. In such cases, the cost of cure may actually be lower for medicines that are more expensive, based on a tablet-to-tablet (dose-to-dose) comparison. Chapters 10 and 17 discuss how cost-effectiveness analysis can guide such decisions.

Thus, although all selection criteria may appear reasonable and almost self-evident, considerable room exists for discussion about the relative merits of individual medicines. Before such a discussion occurs, members of the selection committee should review, discuss, and come to a common understanding of the selection criteria and the quality of the evidence to support the choices.

16.4 Use of International Nonproprietary (generic) Names

Each drug product on the market has a chemical name (for example, 6-{D(-)-, a-amino-a-phenylacetamido}-penicillanic acid) and an International Nonproprietary Name, or generic name (ampicillin). The INN is the medicine's official name, regardless of what company or organization manufactures or markets it. A proprietary, commercial, trade, or brand name is chosen by the manufacturer to facilitate recognition and association of the product with a particular firm for marketing purposes. For most common medicines, there are several branded products that all contain the same active ingredient and therefore share the same INN.

INNs are intended for use in pharmacopoeias, labeling, product information, advertising and other promotional material, pharmaceutical regulation, and as a basis for generic product names. INNs are assigned through WHO, following a well-established procedure. Official INN listings are in Latin, English, French, Spanish, and Russian. Their use is normally required by national or, as in the case of the European Union, international legislation. As a result of ongoing collaboration, national names such as British

Approved Names (BAN), Japanese Adopted Names (JAN), and U.S.-Accepted Names (USAN) are usually the same as the INN. WHO offers guidance on the use of INNs (see <http://www.who.int/medicines/services/inn/en>).

The use of generic names for pharmaceutical purchasing as well as prescribing carries considerations of clarity, price, and quality. Proponents of generic drug purchasing and prescribing point out that—

- Generic names are more informative than brand names and facilitate the purchase of products from multiple suppliers, whether as brand-name or generic products.
- Generic drug products are often cheaper than products sold by brand name.
- Generic prescribing facilitates product substitution, whenever appropriate.

With regard to clarity, the generic name helps identify the class of medication. The common stem of the INN usually indicates a “family” of drugs. For example, the names of all benzodiazepines end with -zepam (diazepam, temazepam, nitrazepam), and beta-blockers share the stem -olol

Box 16-1 WHO criteria for selection of essential medicines

Essential medicines are those that satisfy the health care needs of the majority of the population; they should therefore be available at all times in adequate amounts and in the appropriate dosage forms.

The choice of such medicines depends on many factors, such as the pattern of prevalent diseases; treatment facilities; the training and experience of available personnel; financial resources; and genetic, demographic, and environmental factors.

Only medicines for which sound, adequate data on efficacy and safety are available from clinical studies, and for which evidence of performance in general use in a variety of medical settings has been obtained, should be selected.

Each selected medicine must be available in a form in which adequate quality, including bioavailability, can be ensured; its stability under the anticipated conditions of storage and use must be established.

When two or more medicines appear to be similar in the above respects, the choice between them should be made on the basis of a careful evaluation of their relative efficacy, safety, quality, price, and availability.

In cost comparisons between medicines, the cost of the total treatment, not only the unit cost of the medicine, must be considered. The cost-benefit ratio is a major consideration in the choice of some medicines for the list. In some cases, the choice may also be influenced by other factors, such as pharmacokinetic properties, or by local considerations, such as the availability of facilities for manufacture or storage. In 2002, WHO began to view and evaluate affordability as a consequence of a selection rather than as a precondition for selection; for example, antiretroviral medicines for HIV/AIDS are now included in the WHO Model List, although they are expensive. Including these medicines on the list implies that they should become affordable enough for any patient to have them.

Most essential medicines should be formulated as single compounds. Fixed-ratio combination products are acceptable only when the dosage of each ingredient meets the requirements of a defined population group and when the combination has a proven advantage over single compounds administered separately in terms of therapeutic effect, safety, or patient adherence to treatment.

Source: WHO 2007.

Table 16-2 Example of level-of-use categories, Ethiopia Essential Drugs List, fifth edition, 2007

Therapeutic class and item description in national list		Sublists by level of care					
		Zonal hospital	District hospital	Health station	Community pharmacy	Drug shop	Rural drug vendor
OP.300 Anti-infectives, ophthalmic <i>OP.301 Antibacterials</i>							
Chloramphenicol	Ointment, 1%, 5% Solution, 0.4%, 0.5%, 1%, 5%	x	x	x	x	x	x
Erythromycin	Ointment, 0.5%	x			x	x	
Gentamicin	Solution, 0.3%	x			x	x	
Neomycin sulfate	Ointment, 0.5%, 2%	x			x	x	
Oxytetracycline hydrochloride	Ointment, 0.5%	x	x	x	x	x	
Polymixin B+ bacitracin	Ointment, 100,000 units + 500,000 units	x			x		
Rifamycin	Solution, 1%	x			x		
Silver nitrate	Solution, 1%	x	x	x	x	x	
Tetracycline	Ointment, 1% Solution, 1%	x	x	x	x	x	x
Tobramycin	Solution, 0.3%	x			x		

Source: Drug Administration and Control Authority of Ethiopia, 2007.

(propranolol, atenolol, metoprolol). In addition, students and prescribers should find learning one generic name rather than a host of different brand names much easier. Nevertheless, many students initially may find memorizing a brand name easier, because such names are usually designed to sound attractive. The confusion comes later, when the students are confronted with many different names for the same medicine.

With regard to price, the patents on many common medicines have expired, allowing various manufacturers to produce and market equivalent products by the medicines' generic names. These generic products are usually sold at a lower price than that of branded equivalents. Therefore, the use of the generic name introduces elements of price competition. If a prescription is written using the generic name of the medicine, the pharmacist may dispense an equivalent product with a price that is more attractive to the consumer but that also meets quality standards. The concept of generic substitution is accepted in an increasing number of countries: even if the prescription is made under a brand name, the pharmacist may substitute a generic equivalent unless the prescriber specifically indicates that this should not be done, by writing "do not substitute" on the prescription. This measure may lead to large savings in pharmaceutical costs.

Opponents to generic prescribing argue that the quality of generic medicines is inferior to that of brand-name products. Quality control and naming of medicines are completely separate issues. Generic medicines from reliable suppliers are as safe, effective, and high quality as medicines

with well-known brand names. At the same time, brand-name medicines from a manufacturer with inadequate procedures for quality control can be of poor quality, despite the brand name. Also, although any medicine can be counterfeited, there are more incentives for counterfeiting brand-name medicines. In countries with strong drug regulatory systems, drug products sold by generic name have the same low rate of recall as brand-name products. Some pharmaceutical companies also sell their branded products under the generic name, for a much lower price.

Bioequivalence is often misused as an argument against the use of generic equivalents. For many medicines, the variation in bioavailability among individual patients is much larger than the variation among products of different manufacturers. In fact, bioavailability is clinically relevant for only a relatively small number of medicines. (Medicine quality and bioequivalence are discussed in Chapter 19.)

16.5 Essential medicines lists in context

An essential medicines list names the medicines considered optimal treatment choices to satisfy the health care needs of a given population. In its simplest form, it is used for one health facility (for example, a hospital) or for a group of health facilities to indicate which medicines should be procured and prescribed. For practical purposes, the lists can be considered supply lists, defining the range of medicines for the different levels of care and indicating dosage form and, sometimes, pack size and other specifications. A sample

page of a list, organized by levels of use, is reproduced in Table 16-2.

Lists of registered medicines

Adoption of a national list of essential medicines, usually limited to the public sector, does not necessarily mean that no other medicines are available in the private sector. In many countries, the marketing of pharmaceutical products requires prior evaluation, approval, and licensing by the national drug regulatory authority. The criteria for approval and licensing include efficacy, safety, and quality, but some countries also consider cost and need. Registration of medicines is discussed in greater detail in Chapter 6. The list of registered medicines includes all drug products that have been licensed.

The number of drug products that are licensed may be many times greater than the number of drug products on the essential medicines list, for two reasons. First, equivalent drug products produced by different manufacturers are registered separately (the product is registered, not the active substance). Second, medicines may not be considered essential for use in the public sector, yet their efficacy, safety, and quality are such that they can be available in the private market. For example, in the United Kingdom, the list of medicines available free of charge through the National Health Service contains several laxatives; if a particular patient wants another brand, it is available for sale but without reimbursement. Figure 16-1 illustrates the relationship between the list of essential medicines and the list of registered medicines.

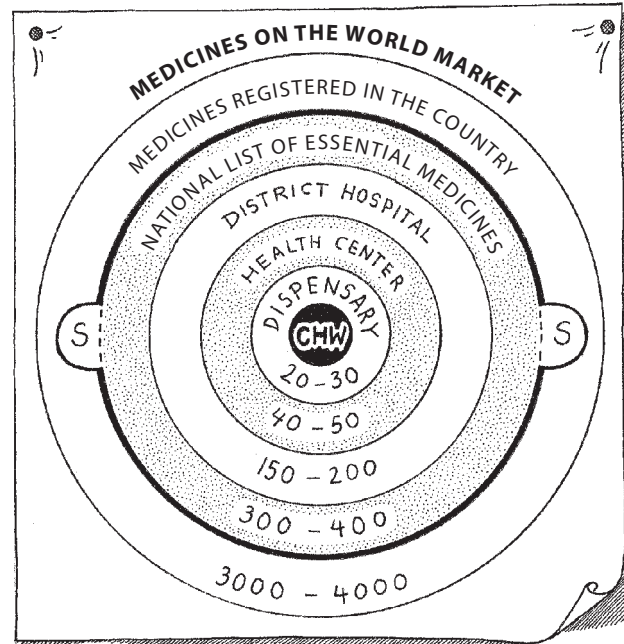
Formulary manuals

The term *formulary* can be confusing. It is useful to distinguish between the formulary list as a selection tool, the formulary manual as a source of medicine information, and the formulary system as a pharmaceutical management process.

A *formulary list* is a list of pharmaceutical products approved for use in a specific health care setting. It may be a national formulary list, a provincial list, a hospital list, or a list indicating products reimbursed by a health insurance program. In the public sector of most developing countries, the formulary list is synonymous with essential medicines list.

A *formulary manual* contains summary drug information. It is not a full textbook, nor does it usually cover all medicines on the market. Instead, it is a handy reference that contains selected information that is relevant to the prescriber, dispenser, nurse, or other health worker. It commonly includes the generic name of a medicine, indications for use, dosage schedules, contraindications, side effects, and important information that should be given to the patient. A formulary manual is drug centered—it is based

Figure 16-1 The essential medicines target



Notes: S = specialist medicines available to special hospitals and departments in the public sector; CHW = community health worker, who typically has an essential medicines list of 12 to 18 items.

on monographs for individual drugs or therapeutic groups. Formularies may or may not contain evaluative statements or comparisons of medicines. Some national formularies include options for therapeutic substitution; for example, in Panama the official medicines list includes three interchangeable drugs—astemizol, cetirizine hydrochloride, and loratadine—under the category of “nonsedating antihistamines.” Some formularies include comparative price information, which can help guide prescribing decisions.

A *national formulary manual* is based on the national list of essential medicines. The *British National Formulary* includes most of the medicines registered for use in the United Kingdom, and even though medicine selection is not as limited there as in developing countries, the beginning of each section in the manual contains general evaluative statements, and the formulary indicates the medicines whose costs are not reimbursed through the National Health Service. The development of a formulary manual is discussed in Chapter 17.

Finally, the term *formulary system* is used in some settings to encompass the whole system for developing, updating, and promoting the formulary (essential medicines) list. A fully developed formulary system usually includes, in addition to the formulary list and formulary manual, regular newsletters or bulletins, guidelines for the use of non-formulary medicines, and methods for evaluating the need for changes in the formulary list or manual. The formulary system in the hospital setting is discussed in Chapter 45.

Treatment guidelines

Treatment guidelines (standard treatment guidelines [STGs], treatment protocols, clinical guidelines) are systematically developed statements that assist prescribers in deciding on appropriate treatments for specific clinical problems. These guidelines usually reflect the consensus on the optimal treatment options within a health facility or health system. The information is disease centered, emphasizing the common diseases and complaints and the various treatment alternatives. Information on medicines is usually limited to strength, dosage, and duration. Most guidelines indicate a treatment of first choice. Some include diagnostic criteria for starting the treatment or for choosing among treatment alternatives. The development of treatment guidelines is discussed in Chapter 17.

The key difference between a formulary manual and treatment guidelines is that the former is drug centered, concentrating on drug information and usually not providing comparisons of different medicines, whereas the latter are disease centered, listing treatment alternatives and indicating treatments of choice.

16.6 Approaches to developing essential medicines lists, formularies, and treatment guidelines

Essential medicines lists, formularies, and treatment guidelines are interdependent and should be developed in a systematic way (see Figure 16-2). The most logical approach is based on the needs of patients and on the job descriptions of health workers. The first step is to prepare a list of common health problems. A first-choice treatment for each health problem on the list may be limited to one or more medicines or to various forms of nondrug treatment. This choice of treatment can be the basis for two important documents: the list of essential medicines for the specific level of care, which is a direct result of the selection; and a set of treatment guidelines for that level of care, which requires additional clinical information (diagnostic signs and symptoms and treatment algorithms).

This approach works best for the primary health care level. The number of diseases and conditions may be too many or too complex to be practical for a hospital, although the approach could be applied at the departmental level and is commonly used at the specialist level. An example of the latter is cancer treatment, in which following an STG provides a way of evaluating outcomes and improving treatment.

In practice, some sort of medicines list is already available in most settings and can serve as a starting point. This list is critically reviewed by therapeutic group, and, as in the WHO Model List of Essential Medicines, first-choice medi-

cines and alternative or complementary medicines may be indicated.

The lists of essential medicines for each level of care should be combined into one national list of essential medicines. This list is the basis for developing the national formulary system. This approach ensures that the supply of medicines, which is based on the national list of essential medicines, is consistent with the treatment guidelines in public-sector facilities and training institutions and that summary drug information is available for all medicines supplied in the public sector.

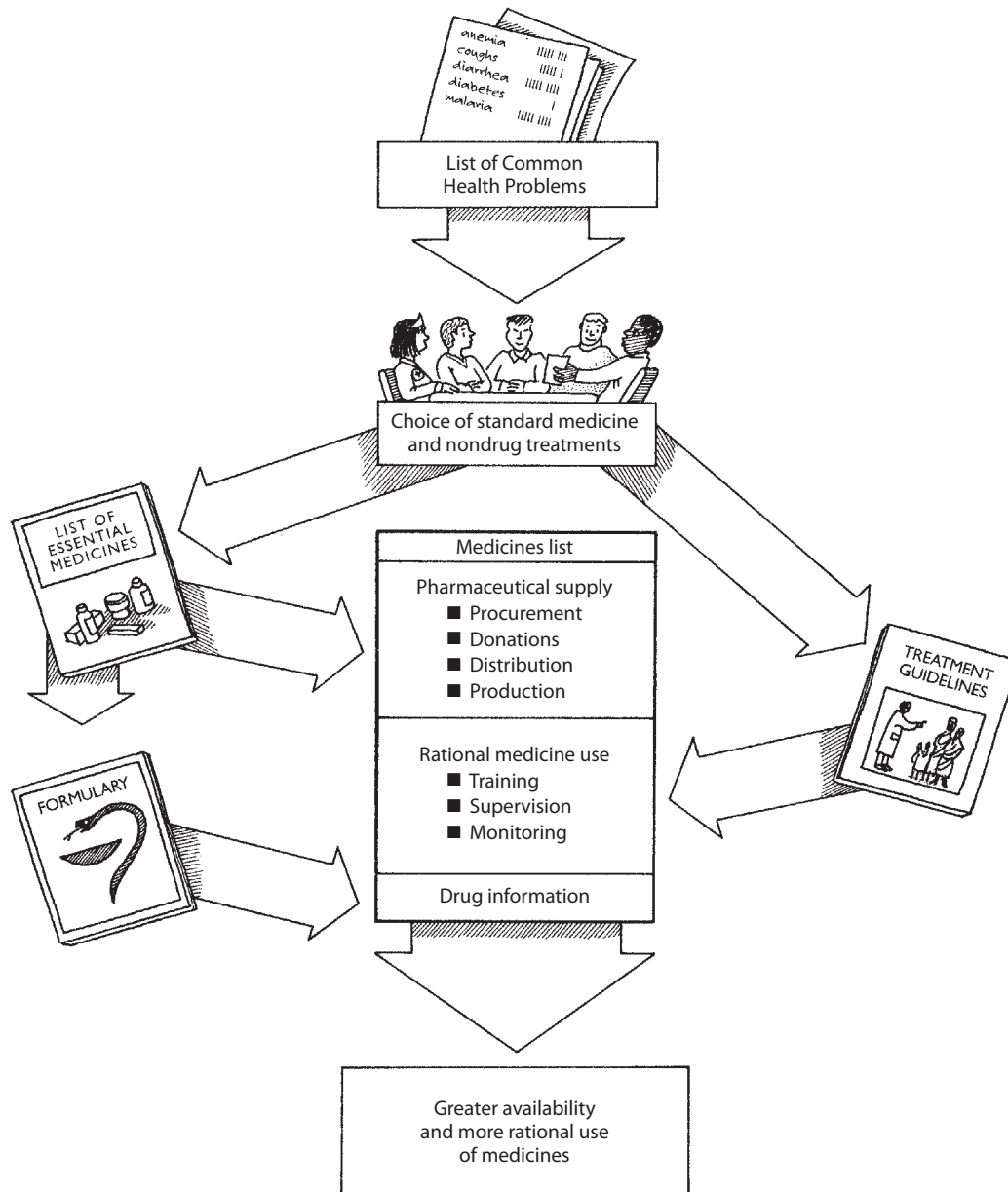
Using another approach, the list of registered medicines can be critically reviewed for selection of a much shorter national list of essential medicines. Using this shortened list, drug and therapeutics committees in individual health facilities can choose a treatment of first choice for that facility or district. Medicine selection at the facility level is especially valuable when the national list of essential medicines is too extensive to be practical for individual facilities. In addition, facility-level medicine selection ensures the maximal involvement, acceptance, and compliance of the prescribers concerned (see Country Study 16-1).

For most countries, medicine selection by committee is the preferred approach because it minimizes the opportunity for private interests to influence the decision-making process. Furthermore, the judicious selection of committee members with relevant backgrounds, previous experience, and no conflicts of interest can ensure the transparency of the decision-making process and thereby facilitate the rational selection of medicines (see Country Study 16-2).

At the national level, an officially appointed committee or regional or local officials can select essential medicines for the public sector. One advantage of national-level selection is the potential for improved efficiency and economy of central procurement; regional or local staff members should be included in the committee. In large countries, regional selection and procurement may be more appropriate.

The greatest efficiency is possible when medicine selection is coordinated with other activities in the supply process. This coordination can be achieved, in part, by including representatives from the ministry of health, the purchasing department, and regional and local health facilities, including medical and paramedical prescribers. Technical experts should include one or more clinical pharmacologists, an internist, an infectious diseases specialist, a pediatrician, a surgeon, one or more hospital and district pharmacists, a hospital director, and other specialists as needed. Representatives of disease control programs (such as malaria, tuberculosis, and HIV/AIDS programs) can be co-opted to attend certain meetings. Committee members should serve for several years with staggered terms, so that the committee retains some experienced members each year. Committee members should be known for their integrity, honesty, and dedication; ide-

Figure 16-2 Common health problems guide selection, training, supply, and medicine use



ally, they should not have relationships with any pharmaceutical manufacturer or distributor, or be closely related to any person who does.

The most practical approach to drawing up an essential medicines list for the first time is to have it prepared by one or two experts, preferably using the WHO Model List of Essential Medicines and the WHO criteria for selection (see Box 16-1). The full committee can then review the draft and finalize the list. After first publication of the national list, the committee should meet at least every two years to update it. The committee's decisions should again follow the established criteria. Using a revision form may facilitate rational

additions and deletions (Figure 16-3). It provides a mechanism for prescribers to participate constructively in the selection process, and because the form requires a certain amount of effort on the part of the petitioner, it may reduce requests for items that are not really needed.

The same basic principles apply at the hospital level. The selection of medicines should be made on the basis of the national list of essential medicines, using similar criteria. The list should be made by a hospital drug and therapeutics committee that, ideally, is convened by a clinical pharmacologist, with senior clinicians and the hospital pharmacist as members. This committee may also advise on

prescribing policies and should, from time to time, review the prescribing patterns in the facility through simple prescription surveys (see Chapter 28). Such committees are now mandatory in several countries. In countries where the numbers of qualified staff members are limited, the first priority is establishing such committees in the teaching hospitals to serve as models for the rest of the country and for future generations of prescribers. Chapter 45 describes in detail medicine management in a hospital setting.

Lists of essential medicines and treatment guidelines should also be drawn up for the lower levels of health care, such as health centers and dispensaries. Paramedical workers and teaching staff such as nurse tutors should be involved in the process, which is usually coordinated at the national level.

16.7 Therapeutic classification systems

Essential medicines lists and national formularies are best organized according to therapeutic category. In addition, analyses of medicine requirements, medicine consumption, or medicine prices are often facilitated by listing medicines according to their therapeutic class. Countless therapeutic classification systems are in use throughout the world. Some, such as the British National Formulary system, are organized by target organ or disease condition (for example, eye infections). Others, such as the American Hospital Formulary Service Drug Information system, are organized by pharmacologic-therapeutic action. The Nordic ATC system combines anatomic, therapeutic, and chemical criteria to classify medicines.

Country Study 16-1

Approaches to updating essential medicines and formulary lists

Ethiopia. The first edition of Ethiopia's national essential drugs list was published in 1980, and with the establishment of the first national drug policy in 1993, the government confirmed its commitment to the essential medicines concept. The fourth edition of the list, which was revised in 2002, includes sublists appropriate for different levels of health care: health centers, which include community health stations; district hospitals; and zonal hospitals (see Table 16-2). The revised edition was initially prepared by two committees assigned by the oversight agency, Ethiopia's Drug Administration and Control Authority (DACA). The committees presented the original list at a three-day workshop that included stakeholders from many disciplines, such as representatives from academia, professional associations, research institutions, the Ministry of Health, and consumer organizations. The revised version of the list was drawn up by a technical committee designated at the workshop. DACA sees the national medicines list as the product of an ongoing process, subject to continual deletion and addition as new medicines with better risk/benefit ratios replace less effective products.

Organisation of Eastern Caribbean States.

The Organisation of Eastern Caribbean States Pharmaceutical Procurement Service (OECS/PPS) is a group purchasing service for nine small Caribbean countries. Procurement is limited primarily to the OECS/PPS Regional Formulary. Medicines are selected by the OECS/PPS Technical Advisory Subcommittee (TAC), which consists of one member appointed by each participating country (generally, the chief medi-

cal officer or a comparable ministry appointee) and the central stores managers from each country. The OECS/PPS managing director is a nonvoting member of the TAC. The formulary list is subject to continual review; in the sixth edition (2002–05), twenty-nine pharmaceutical products were removed from the list and eighty-nine were added. The sixth edition also includes a new section on managing HIV/AIDS, including the addition of antiretroviral medicines. Changes are based on the evaluation and approval of written requests (see Figure 16-3).

World Health Organization. Since publication of the first Model List of Essential Drugs in 1977, the list has been updated every two to four years. The list is updated using a systematic approach, similar to that recommended for developing STGs. An expert advisory committee consisting primarily of clinical pharmacologists and physicians evaluates the latest clinical evidence, and decisions are made through a transparent process involving several rounds of external review. A major change that occurred with the 1985 list was the introduction of complementary medicines, which allowed substitution of therapeutic equivalents. In the first fifteen years, the number of medicines on the list increased slightly, but most changes involved replacement of one preparation with a more therapeutically appropriate or cost-effective preparation. For example, amoxicilline replaced ampicillin, and doxycycline replaced tetracycline. Nevertheless, the seventeenth Essential Medicines List, published in 2011, contains more than 350 active ingredients and is divided into a core list and a complementary list.

Country Study 16-2 Updating the National Essential Medicines List of Kenya

Kenya was one of the first African countries to recognize the importance of the essential medicines concept and developed its own essential medicines list in 1981, based on the WHO model. In 1992, the Ministry of Health decided to intensify its efforts to rationalize the pharmaceutical sector. Those efforts included updating the essential medicines list, rigorously implementing the list as the basis for pharmaceutical management in the public sector, and developing clinical treatment guidelines.

It was decided early on that the review of the essential medicines list and the development of clinical guidelines should be done in tandem. Draft treatment guidelines for the most common diseases and conditions had been prepared by the Ministry of Health, in consultation with university teachers and specialists at provincial hospitals, and distributed widely for comments. Review of the essential medicines list was begun by comparing the drugs from the 1981 national list with those mentioned in the draft treatment guidelines, alongside the 1992 WHO Model List of Essential Medicines.

It was decided to hold two national workshops simultaneously at the same location, one for refining the treatment guidelines and the other for revising the list. This process facilitated interaction between the two development committees and ensured that the new essential medicines list was in keeping with national clinical practice.

The participants in the medicines list workshop were mainly government pharmacists from various departments, joined by a professor of clinical pharmacology and a clinical pharmacist from the University of Nairobi, a senior nursing officer, and the head of the Kenya Essential Drugs Programme. The group based its deliberations on the WHO criteria for the selection of essential medicines (see Box 16-1) and consulted frequently with the clinical guidelines group. Emphasis was placed on medicines required to meet the health care needs of the majority of the population.

The two workshops concluded with a final joint session in which a revised list conforming to WHO criteria was approved. This list included 195 drugs in 256 dosage forms and strengths (fewer than the 1981 version) and was divided into seven levels of care. The process that was

followed resulted in a common base of understanding and commitment toward both the essential medicines list and the treatment guidelines.

The revised essential medicines list was printed in a twenty-eight-page booklet, which included background information, selection criteria, and listings by therapeutic category and level of care, as well as an alphabetical listing with store codes and packing units. This booklet was distributed to all public-sector hospitals, missions, professional associations, and local manufacturers. In the newest edition, published in 2002, the Ministry of Health combined the essential medicines list and the national standard treatment guidelines into one document.

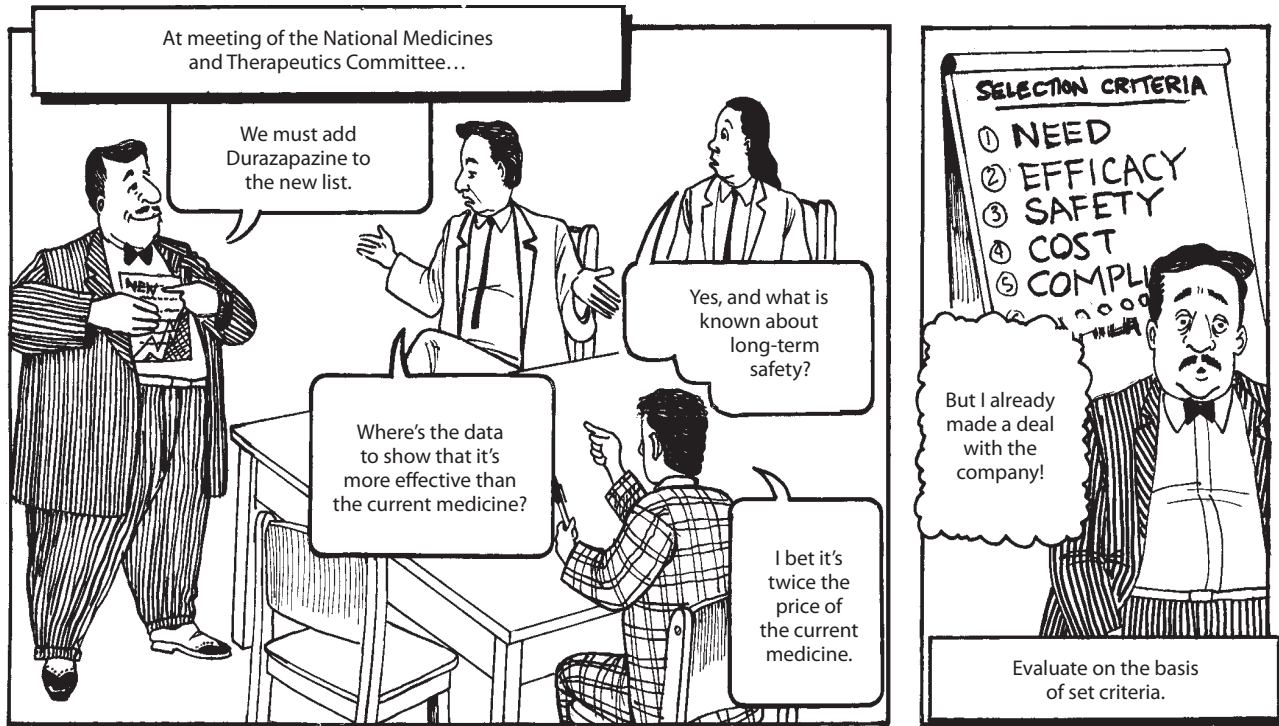
The national drug policy adopted in September 1993 stated that the essential medicines list would be used for (1) public education and information; (2) public-sector procurement, prescribing, and dispensing; (3) paramedical and medical graduate education; (4) in-service training programs for health professionals; (5) preferential import duties and value-added taxes on drugs; (6) selective support for the local pharmaceutical industry; (7) pricing policies; and (8) controlling donations of medicines.

In the late 1980s and 1990s, the government of Kenya turned its focus to managing the HIV/AIDS epidemic. Initially its strategy was centered on behavior change and prevention, but lowered prices and increased access to antiretroviral medicines made treatment a reality for people living with HIV/AIDS in Kenya. The Ministry of Health gathered stakeholders comprising senior clinicians and pharmacists from the government, academic, and private sectors to collaborate on a standard treatment protocol for HIV/AIDS, and clinical guidelines for anti-retroviral treatment were published in 2001; the second edition was published in 2002 (NAS COP 2002).

The process for establishing the most appropriate HIV/AIDS treatment regimens was based on an evaluation of clinical efficacy, cost, and the need for a second line of treatment in case of antimicrobial resistance, adverse effects, or treatment failure. The antiretrovirals established as first- and second-line treatments have been added to the Kenya Essential Medicines List.

Figure 16-3 Sample form for proposing revisions in essential medicines lists

ADDITION/DELETION/SPECIAL AUTHORIZATION FORM	
	<input checked="" type="checkbox"/> Formulary Addition <input type="checkbox"/> Deletion <input type="checkbox"/> Request for Special Authorization
Section A To be completed by doctor	<p style="text-align: center;"><u>Ciprofloxacin</u></p> <p>Name(s) of medication (generic and brand) _____ Name of manufacturer _____</p> <p>Desired dosage: <input checked="" type="checkbox"/> Tablet <input type="checkbox"/> Capsule <input type="checkbox"/> Injection</p> <p>Other (specify): _____</p> <p>Estimated usage: <input checked="" type="checkbox"/> Routine <input type="checkbox"/> Emergency <input type="checkbox"/> Clinical Evaluation</p> <p>Is similar-acting medication stocked now in pharmacy? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p> <p>If yes, please explain advantages of this medication:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p style="text-align: center;"> <u>Ndawa N.</u> Name of requesting medical/dental officer <u>Guc-Havare</u> <u>Ndawa</u> Signature <u>January 16, 1998</u> Date </p> <p style="text-align: center;">Forward completed form to attention of: Chairman, National Formulary Committee</p>
Section B To be completed by medical supplies officer	<p style="text-align: center;">Central Medical Stores Report</p> <p>Cost of requested medication: <u>32-65 (250 mg Tab)</u></p> <p>Cost of similar-acting item stocked: <u>N/A</u></p> <p>Remarks (advantages, disadvantages): <u>Ciprofloxacin has been added to the WHO Model List of Essential Drugs (1995, Tech. Rep. Series 850)</u></p> <p><u>Gerritt Dawee</u> <u>February 12, 1998</u> Medical Supplies Officer Date</p>
Section C To be completed by formulary committee	<p style="text-align: center;">Formulary Committee Report</p> <p>Determination: <input type="checkbox"/> Rejected <input checked="" type="checkbox"/> Approved: S (Specialist-Use) _____ Level of Use _____</p> <p>Reasons: <u>LEAST COSTLY ORAL MEDICATION PROVIDING 95% CURE RATE IN THESE SEXUALLY TRANSMITTED INFECTIONS (NB—RESTRICTED TO THESE INDICATIONS ONLY).</u></p> <p><u>Vanyaganya, E.</u> <u>March 14, 1998</u> Formulary Committee (Chairman) Date</p>
(Formulary Addition/Deletion & Special Authorization / Page 2) Pertinent Pharmacological Data on Medication	
Therapeutic Action and Indications for Use: As a third-line treatment of chancroid and/or gonorrhoea Note: (A) First-line drugs are now marginally efficacious. (1) (B) Prolonged courses of erythromycin (second-line treatment of chancroid-haemophilis ducreyi) do not heal ulcers.	
Side Effects, Toxicity, and Precautions: Side effects: CNS stimulation; hypersensitivity reactions; interstitial nephritis; photosensitivity; dizziness or lightheadedness; headache; nervousness; insomnia; gastrointestinal disturbances. Relative contraindications: Hypersensitivity; renal function impairment. Caution: There is limited experience of the effect of concurrent HIV infection on adverse effects profiles. (2)	
Dosages (Maximum and Minimum): 500 mg as a single dose in adults.	
References: (1) Ndawa et al, "Efficacy of STD Treatment Regimens in a Genito-Urinary Clinic in Harare." Centr. Afr. J. Med. 3, 1995, pp. 36-40. (2) USP-DI 1994 and manufacturer's product data sheet.	



Existing therapeutic classification systems also differ in their complexity; some systems may have five or six levels of subdivision. The level of complexity should be appropriate to the intended use of the system. In general, public pharmaceutical supply programs should strive for a noncomplex therapeutic classification system that is readily understood by midlevel medical workers and trained supply clerks as well as by pharmacists and physicians.

Increasingly, essential medicines programs are adopting the Anatomical Therapeutic Chemical (ATC) classification scheme used in the WHO Model List of Essential Medicines. In the ATC system, medicines are divided into different groups based on the body organ or system on which they act and their chemical, pharmacological, and therapeutic properties (WHO Collaborating Centre for Drug Statistics Methodology 2009). The searchable website is http://www.whocc.no/atc_ddd_index. This relatively straightforward system has been adopted by UNICEF and by most international nonprofit suppliers of essential medicines. Therefore, national and local programs will find price comparisons and ordering are easier if this system is adopted.

16.8 Sources of information

In most developing countries, the sources of current information available for medicine selection decisions are limited. (Chapter 34 discusses sources of drug information and how to assess them.)

Many academicians prefer to base the selection of essential medicines on information from original research articles, which requires compiling articles from journals for comprehensive review. The randomized controlled trial is becoming the “gold standard” both to establish medicine efficacy and to determine the comparative efficacy of different medicines for the same clinical problem. Results from such studies are not easily obtainable, unfortunately, so selection decisions must usually be made on the basis of the best available evidence.

Many respected reference texts and periodicals, such as drug bulletins, critically assess and synthesize the best available evidence. Of the many valuable resources that may be consulted, *Martindale: The Extra Pharmacopoeia* is particularly useful because it contains summaries on more than 5,300 medicines and information on the composition of 70,000 medicinal preparations. Other publications, such as the *British National Formulary*, contain comparative evaluations of individual drugs or of therapeutic groups. Independent drug bulletins, such as the *Medical Letter on Drugs and Therapeutics* and the *Drug and Therapeutics Bulletin*, regularly prepare comparative reviews of medicines and therapeutics.

The WHO Model List of Essential Medicines is a useful reference, derived from the consensus of recognized international experts and updated every two to four years. In 2007, WHO published the first Model List of Essential Medicines for children, revising it in 2008 and 2011 to include missing medicines for children, using evidence-based

clinical guidelines. The medicines on this list are widely acknowledged to be safe, efficacious, cost-effective, and of acceptable quality. Consulting essential medicines lists from other countries may also be useful. Many drug regulatory authorities post essential medicines lists and formularies on their websites.

Sufficient information on efficacy, safety, and dosages—particularly for risk groups such as children, pregnant women, and the elderly—is often difficult to obtain for newer drug products. Because the relative merits of newly marketed pharmaceuticals are unknown until clinical experience has accumulated or appropriate comparative trials with other medicines are undertaken, it is advisable to delay the inclusion of such medicines until sufficient information is available from reliable independent sources.

16.9 Implementing and updating essential medicines lists

The development and use of lists of essential medicines have enormous implications for pharmaceutical procurement, local production, supply, training, prescribing, and supervision. However, many essential medicines lists, treatment guidelines, and formulary manuals have been developed, printed, and forgotten. There are many reasons for such failures.

Reasons for failure

Probably the most common reason for failure is not involving as wide a group of national experts and policy makers as possible. Lists and guidelines developed by individuals, departments, or institutions operating in isolation are bound to fail, as are those that are not updated regularly. They lack credibility, and other interested parties will not accept them. Another common mistake is a lack of both a purpose and a medicine policy framework. Such weaknesses provide an opportunity for pressure groups to defeat the endeavor. Also, if the whole selection process lacks openness and transparency, or if no procedure exists for incorporating suggestions and additions, the lists and guidelines are likely to fail. Last, failure can result if selections are perceived as unrealistic (for example, listing sophisticated medicines for lower health care levels in resource-poor settings).

Gaining acceptance of essential medicines lists

The development and use of a national list of essential medicines are cornerstones of a national medicine policy. The formulation and acceptance of a national medicine policy are, in most cases, based on the concept of essential medicines and entail the development of a list. An essential medicines list can be developed without a medicine policy, but it

Table 16-3 Key factors in successfully developing and implementing an essential medicines program

Key factor
<ul style="list-style-type: none"> Establish a transparent process for creating and updating the list of essential medicines, providing a voice for key stakeholders but ensuring a scientific, evidence-based process.
<ul style="list-style-type: none"> Link the essential medicines list to clinical guidelines for diagnosis and treatment, involving both specialists and primary care providers.
<ul style="list-style-type: none"> Actively engage support from medical opinion leaders, senior clinicians, training institutions, professional organizations, nongovernmental organizations, and the public.
<ul style="list-style-type: none"> Make the list of essential medicines, formulary manuals, and standard treatment guidelines widely available in all health care facilities and to all health care providers in both printed and electronic versions.
<ul style="list-style-type: none"> Consider launching new or revised lists with the involvement of senior government officials, such as the minister of health or the president, and intensive press coverage.
<ul style="list-style-type: none"> Make clear the specific legal or administrative authority of the essential medicines list for training, procurement, reimbursement, and public information.
<ul style="list-style-type: none"> Consider establishing an administrative or budgetary mechanism to allow the limited supply and use of nonlisted medicines (for example, by certain specialist units).
<ul style="list-style-type: none"> Regularly update the list so that it reflects therapeutic advances and changes in cost, antimicrobial resistance patterns, and public health relevance.

Source: WHO 2002.

cannot be developed without wide agreement on the purpose and use of the list.

In developing a national list of essential medicines, it is important to obtain the support of professional organizations, such as the national medical and pharmaceutical associations. They should be consulted from the start and should be informed about the reasons for developing a list and the selection criteria. The same is true for senior clinicians and teachers from medical and pharmacy schools, who are often leading national figures involved in the process of medicine registration. Arguments in favor of the essential medicines concept and the advantages of a limited list of medicines (see Table 16-1) should be discussed with those individuals. The acceptance of the list by senior specialists and other health care workers can be further enhanced by their involvement in the development of the list, treatment guidelines, and formulary manual (see Chapter 17) and by generous acknowledgment of their contributions. The obvious advantages of a consistent set of training and information materials and a corresponding system of pharmaceutical supply offset most professional resistance.

When the list is completed and printed, it is important to give it national prominence and credibility through a launching campaign. This step should involve the highest level of government officials, such as the minister of health

ASSESSMENT GUIDE

Management structure of the National Essential Medicines List (NEML)

- Has an NEML been officially adopted and distributed countrywide?
- Is there an official medicines committee whose duties include updating the NEML?
- Has the NEML been updated and distributed countrywide in the past five years?
- Is there a national medicine policy statement to promote and define the use of the NEML?
- What are the selection criteria for the NEML?

Outcome of the selection process

- What are the total number of medicines on the NEML (in dosage forms and strengths) and the number of medicines per level of health care?
- Is there duplication of therapeutically equivalent products on the NEML?

Use of the NEML (public sector)

- Is procurement in the public sector limited to medicines on the NEML?

- What is the value of medicines from the NEML out of the total value of medicines procured?
- What percentage of health facilities has a copy of the NEML available?
- What is the number of medicines from the NEML out of the total number of medicines prescribed?
- Do pharmaceutical donations comply with the NEML?
- Is the concept of essential medicines part of the curriculum in the basic training of health personnel?

Use of the NEML (private sector)

- Is the NEML used to promote national pharmaceutical production?
- Is there at least one major incentive for selling essential medicines at low cost?
- Are essential medicines sold under INNs in private drug outlets?
- Of the fifty best-selling medicines in the private sector, how many are on the NEML?

or the president, and intensive press coverage. A national conference can emphasize points such as the advantages of the list, the national consensus in defining the health needs of the population at large, and the cost-effective use of limited resources.

Authority of essential medicines lists

Specifying the purpose of the list at an early stage is critical. Will procurement and distribution of medicines in the public sector be limited to products on the list? Is a change in legislation or regulation needed for enforcing the use of a list, or perhaps a decree? Will exceptions to the list be allowed? If so, on what grounds and by which authority?

Pressure will be brought to provide patients with medicines not on the essential medicines list. Exceptions to the official list must be controlled by administrative or budgetary methods. Health services often require a written request for special authorization of nonlisted medicines (for example, the form in Figure 16-3) and have procedures for evaluating and approving such requests. A budgetary maximum may also be used for such exceptions—a maximum of 5 to 10 percent of the pharmaceutical budget, for example. Such a budget for nonlisted medicines is usually effective in ensuring acceptance of the list by district authorities and clinical specialists; without such a safety valve, many lists are

perceived as too rigid and are likely to be undermined. In addition, if certain nonformulary medicines are commonly ordered, they may be considered for inclusion when the list is revised.

Finally, an open and transparent system of regular updates is an absolute prerequisite to maintain the authority and acceptance of an essential medicines or formulary list. Table 16-3 lists the factors that are important in developing and implementing the elements of an essential medicines program. ■

References and further readings

★ = Key readings.

- NASCOP (National AIDS and STD Control Programme [Kenya]). 2005. *Guidelines for Antiretroviral Drug Therapy in Kenya*. Nairobi: NASCOP.
- OECS/PPS (Organisation of Eastern Caribbean States/Pharmaceutical Procurement Service). 2002. *Regional Formulary and Therapeutics Manual*. 6th ed. Castries, St. Lucia: OECS/PPS.
- Savelli, A., H. Schwarz, A. Zagorskiy, and A. Bykov. 1996. *Manual for the Development and Maintenance of Hospital Drug Formularies*. Submitted to the U.S. Agency for International Development by the Rational Pharmaceutical Management Project. Arlington, Va.: Management Sciences for Health. <<http://erc.msh.org/mainpage.cfm?file=2.3.1.htm&module=drugs&language=english>>

- ★ WHO (World Health Organization) 2002. *WHO Policy Perspectives on Medicines: The Selection of Essential Medicines*. Geneva: WHO. <http://whqlibdoc.who.int/hq/2002/WHO_EDM_2002.2.pdf>
- . 2007. *Proposed Procedure to Update and Disseminate the WHO Model List of Essential Medicines*. Technical Report Series 946 (Annex 5). <http://www.who.int/medicines/publications/essential_meds_committeereports/TRS946_EMedLib.pdf>
- WHO (World Health Organization) Collaborating Centre for Drug Statistics Methodology. 2009. *Guidelines for ATC Classification and DDD Assignment 2010*. Oslo: WHO Collaborating Centre for Drug Statistics Methodology. <<http://www.whooc.no/filearchive/publications/2010guidelines.pdf>>
- WHO/DAP (World Health Organization/Action Programme on Essential Drugs). 1994. *National, Regional, and International Essential Drugs Lists, Formularies, and Treatment Guides*. Geneva: WHO/DAP. <http://whqlibdoc.who.int/hq/1994/WHO_DAP_94.2.pdf> A list of published essential drugs lists, formularies, and treatment guidelines.
- ★ WHO (World Health Organization) Expert Committee on the Selection and Use of Essential Medicines. 2008. *The Selection and Use of Essential Medicines. Report of the WHO Expert Committee, October 2007 (Including the Model List of Essential Medicines for Children)* Geneva: WHO. (Updated every two years.) <http://www.who.int/medicines/publications/essentialmeds_committeereports/TRS_950.pdf>
- WHO (World Health Organization) Expert Committee on Specifications for Pharmaceutical Preparations. 2009a. *WHO Expert Committee on Specifications for Pharmaceutical Preparations*. 43rd report. Geneva: WHO. <http://www.who.int/medicines/publications/pharmprep/PDF_TRS953_WEB.pdf>
- ★ ———. 2009b. *WHO Model List of Essential Medicines*. 16th ed. WHO: Geneva. <http://www.who.int/selection_medicines/committees/expert/17/sixteenth_adult_list_en.pdf>
- WHO/GPE (World Health Organization/Global Programme on Evidence for Health Policy). 2003. *Guidelines for WHO Guidelines*. Geneva: WHO/GPE.

Glossary

Bioavailability: The rate and extent of availability of an active ingredient from a dosage form as measured by the concentration/time curve in the systemic circulation or its excretion in the urine.

Branded generics: Generic pharmaceutical products marketed under brand names.

Drug: Any substance in a pharmaceutical product that is used to modify or explore physiological systems or pathological states for the benefit of the recipient.

Drug product: A unique combination of drug(s), strength, and dosage form (for example, ampicillin 500 mg capsule).

Efficacy: The ability of a medicine to produce the purported effect, as determined by scientific methods.

Formulary list: A list of medicines approved for use in a specific health care setting.

Formulary manual: A manual containing clinically oriented, summary pharmacological information about a selected number of medicines. The manual may also include administrative and regulatory information pertaining to medication prescribing and dispensing.

Formulary system: The principles, criteria, procedures, and resources for developing, updating, and promoting the formulary (essential medicines) list.

Generic name: The locally approved or nonproprietary name of a drug. It is generally the International Nonproprietary Name given by WHO.

Generic pharmaceutical products: Products marketed by any producer under nonproprietary or locally approved names.

International Nonproprietary Name (INN): A globally recognized name developed by WHO to facilitate the identification of pharmaceutical substances or active pharmaceutical ingredients. A nonproprietary name is also known as a generic name.

Multisource pharmaceutical products: Pharmaceutically equivalent products, available from different manufacturers, that may or may not be therapeutically equivalent.

Pharmaceutical equivalents: Products that contain the same amount of the same active substance(s) in the same dosage form, meet the same or comparable standards, and are intended to be administered by the same route.

Pharmaceutical product: A dosage form containing one or more drugs along with other substances included during the manufacturing process.

Therapeutic equivalents: Pharmaceutically equivalent products whose effects with respect to both safety and efficacy are essentially the same, when administered in the same molar dose, as can be derived from appropriate studies (bioequivalence, pharmacodynamic, clinical, or in vitro studies).