

Ten recommendations to improve use of medicines in developing countries

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Inappropriate prescribing reduces the quality of medical care and leads to a waste of resources. To address these problems, a variety of educational and administrative approaches to improve prescribing have been tried. This article reviews the experiences of the last decade in order to identify which interventions have proven effective in developing countries, and suggests a range of policy options for health planners and managers.

Considering the magnitude of resources that are wasted on inappropriately used drugs, many promising interventions are relatively inexpensive. Simple methods are available to monitor drug use in a standardized way and to identify inefficiencies. Intervention approaches that have proved effective in some settings are: standard treatment guidelines; essential drugs lists; pharmacy and therapeutics committees; problem-based basic professional training; and targeted in-service training of health workers. Some other interventions, such as training of drug sellers, education based on group processes and public education, need further testing, but should be supported. Several simplistic approaches have proven ineffective, such as disseminating prescribing information or clinical guidelines in written form only. Two issues that will require a long-term strategic approach are improving prescribing in the private sector and monitoring the impacts of health sector reform.

Sufficient evidence is now available to persuade policy-makers that it is possible to promote rational drug use. If such effective strategies are followed, the quality of health care can be improved and drug expenditures reduced.

Introduction

This paper reviews the current state of knowledge about the effectiveness of strategies to improve the use of medicines in developing countries, and suggests what policy-makers and health system managers can do to accomplish this objective. In some areas, clear evidence about effectiveness already exists; in others, evidence is lacking, and advice is presented on the basis of the best available knowledge.

The World Health Organization (WHO) recommends that activities to strengthen the pharmaceutical sector be organized under the umbrella of a national drug policy.¹ In many countries, a national essential drugs programme is the mechanism for implementing such a policy, usually with emphasis on drug selection, procurement, distribution and use in the public sector. This paper suggests policy options specifically related to encouraging more appropriate use of medicines. On the basis of existing evidence it should be possible to refine the components of essential drugs programmes in this area. In addition, although government officials have greater power in the public sector, they can also take certain measures to encourage more appropriate drug use in the private sector.

Summary of developments of the last 15 years

The 1985 Nairobi conference on the rational use of drugs marked the start of a global effort to promote rational prescribing.² In 1989 an overview of the subject concluded that very few interventions to promote rational drug use had been properly tested in developing countries.³ Since then, the WHO Action Programme on Essential Drugs (WHO/DAP), the International Network for the Rational Use of Drugs (INRUD) and other organizations have collaborated in an international research effort to fill the knowledge gap.^{4,5} Emphasis has been put on developing operational tools and studying the effect of different interventions through research networks, training and support to researchers in developing countries.

The first concrete results of this collaboration were a set of simple indicators for measuring the quality of drug use at health facilities,⁶ and a WHO training manual on the principles of rational prescribing.⁷ Annual international training courses on promoting rational use of drugs and on the teaching of problem-based pharmacotherapy have been held since 1989. In 1995, the International Conference on National Medicinal Drug Policies in Sydney, Australia, recognized

quality use of medicines as one of the four pillars of effective national drug policy, and concluded that consumer movements play an important role in promoting rational drug use and should be supported.⁸ In 1997, the International Conference on Improving the Use of Medicines in Chiang Mai, Thailand, was the first global scientific conference purely devoted to strategies for improving drug use in developing countries. At this conference, the available scientific evidence was critically reviewed in order to identify the most effective intervention approaches, and to identify the current gaps in experience in this area. Many of the conclusions of this paper are based on material presented and discussed at the Chiang Mai conference.⁹ In particular, several comprehensive reviews of published and unpublished reports were undertaken for this meeting.¹⁰⁻¹³

During the last decade many industrialized countries have developed policies similar to those underlying essential drugs programmes in developing countries. For example, in Australia, the Pharmaceutical Benefit Scheme (which covers 85% of all drug use in the country) applies very strict criteria, including comparative cost-effectiveness, for the reimbursement of drugs.^{14,15} In the US, many managed care organizations operate on the basis of clinical guidelines, recommended formularies, and generic substitution.^{16,17} In the UK, practice formularies and budget-holding are increasingly common.¹⁸⁻²⁰ The US also mandates drug utilization review programmes and pharmacist counselling to improve drug use in the publicly-funded Medicaid programme.^{21,22} In Scotland, a collaborative network of the Ministry of Health and professional bodies develops national evidence-based clinical guidelines, with the primary objective of improving the quality of care, not necessarily reducing cost.²³ These examples suggest that there is a global interest in programmes to improve use of medicines, and that many approaches are possible.

Assessing patterns of use and defining problems

Before activities are started to promote rational drug use an effort should be made to describe and quantify the problem. Several well-established survey methods are available for this purpose. Probably the simplest method is an 'ABC' analysis of drugs procured to identify high-cost examples of inefficient drug use.²⁴ For example, in Yemen it was found that the top ranked drug import in terms of total cost was injectable lincomycin.²⁵ In one study in Indonesia injectable tetracycline was responsible for the second highest drug expense.²⁶ Such procurement analysis can be done at provincial, district or facility level. More refined analyses can compare the relation between morbidity statistics of certain diseases and the observed consumption of relevant drugs, or compare the consumption of alternative treatments within a certain therapeutic category, such as antidepressants or cephalosporin antibiotics.

Another assessment method is a prescribing and patient care survey, using the WHO health facility drug-use indicators.^{6,27} These quantitative indicators are now widely accepted as a global standard for problem identification and have been used in over 30 developing countries. The indicators can also

be used to make comparisons between regions or countries, to measure the impact of interventions, and for supervision purposes. An indicator-based assessment can be followed by more detailed studies on individual drugs or specific diseases. The WHO indicators record exactly *what* is prescribed, dispensed and communicated to patients, but not *why*. For this latter aspect other techniques are needed. A simple manual of applied qualitative methods, such as focus-group discussions and structured interviews, is available from INRUD.²⁸ There are similar standard methods for investigating drug use in communities.²⁹

Countries and institutions will benefit from regular drug-use surveys, using simple indicators. A time-series of such surveys is extremely useful to monitor performance towards set targets, and can also serve as a baseline for planned interventions. The best example of a series of biennial national drug-use surveys is from Zimbabwe.³⁰ In Indonesia monthly self-monitoring with basic rational drug-use indicators in individual health centres and at district level has proved very effective to improve drug use.³¹

Recommended approaches

Several activities have proved very useful and effective in promoting rational drug use, and should now be recommended for general use. These are: standard treatment guidelines; essential drug lists; drug and therapeutic committees; problem-based basic training in pharmacotherapy; and targeted continuing education. However, when these activities are being implemented, care is necessary to ensure success. In the following section the best available advice is summarized for each of these interventions to maximize their effectiveness.

(1) Establish procedures for developing, disseminating, utilizing and revising national (or hospital-specific) standard treatment guidelines

Whether they are called standard treatment guidelines (STGs), clinical policies, treatment protocols or best-practice guidelines, structured approaches to diagnosis and therapy have considerable potential to promote rational drug use.³² Guidelines vary in complexity from simple algorithms to detailed protocols that include diagnostic criteria, investigations needed, patient advice, and cost information. The success of guidelines in changing practice seems to depend on many factors, including: the complexity of the targeted practice; the credibility of the group developing the guidelines; involvement of end-users in the development process; the format of the resulting guidelines; and, most importantly, how they are disseminated.³³ In a number of settings where STGs have been developed by an expert committee and simply sent out to health workers, no impact has occurred.

Improving the use of medicines through STGs requires both initial work and continuous effort. It is now generally accepted that STGs in developing countries should be developed for each level of care, based on the prevalent morbidities and the competency of available prescribers (physician, nurse, medical assistant, community worker). Substantial involvement and

consultation of end-users helps to ensure the practicality of diagnostic and treatment recommendations, and the acceptability of guideline content and format.³⁴ As far as possible, the selection of treatments should be evidence-based and take into account local economic realities.³⁵

When completed, the STGs should be introduced through an official launch combined with an intensive training programme. Supervision and further training should reinforce their use. In a study from Uganda by Kafuko and others, provision of STGs alone was compared with facilities receiving either training alone or training plus supervision.³⁶ Statistically significant improvements were obtained for reducing the number of drugs prescribed, injection use and increasing generic drug use. Compliance with recommended guidelines was significantly improved for malaria and diarrhoea. Improvements in consultation and dispensing times and in adequacy of drug labelling were also observed. When the two intervention groups were compared, improvements were somewhat greater in the combined (training and supervision) group, though this was not always statistically significant.

To be realistic, STGs must be time-limited and open for regular revision. STGs will gain greater acceptance if the focus is put on improving the quality of care, rather than simply reducing cost. National STG manuals should be consistent with treatment guidelines issued by national disease programmes, such as malaria, diarrhoea, tuberculosis and sexually transmitted diseases control. The first edition of the STGs should be reviewed after 1 year, as there are usually errors, omissions or ambiguities; after that, the revision interval can be 2–3 years. Once they are finalized, STGs should be used for pre-service training and examinations; in-service training; as a basis for supervision and audit; and for developing a list of essential drugs.

(2) Establish procedures for developing and revising an essential drug list (or hospital formulary) based on treatments of choice

In most settings an Essential Drug List (EDL) is a very important component of an essential drugs programme.¹ In the past, an EDL was typically drawn up by selecting drugs from existing stock lists or formularies. However, it is now generally recommended that the selection of drugs be based on a list of common conditions and complaints and the treatments of choice for these conditions as defined in STGs.²⁴ Thus, the EDL is a natural result of the national STGs. The drugs included in the treatment guidelines for a certain level of health care will constitute the EDL for that level. Ideally, the two should be developed together, as was done in Kenya.³⁷ The recommended criteria for the selection of essential drugs are published elsewhere.³⁸ To prevent conflicts of interest, manufacturers should not be involved in the decision-making process of defining an EDL.

Many national EDLs now indicate the level of use for each drug, e.g. dispensary, health centre, general hospital, or referral hospital.³⁹ Like STGs, the leveled EDL should be revised frequently. The EDL can be used as the basis for procurement and distribution of drugs, and for developing a national

formulary. It can also be used to identify product areas for selective support to the national pharmaceutical industry, for targeted quality assurance, or as a basis for insurance reimbursement. Simply producing and distributing an EDL has been shown to have no effect.⁴⁰ As with clinical guidelines, EDLs must be actively implemented.

Implementing an EDL or formulary in referral hospitals is sometimes perceived as an unnecessary restriction on specialists' freedom to prescribe. Some of these perceptions can be overcome by developing supplementary STGs and EDLs for defined specialist departments (e.g. the oncology guidelines in Zimbabwe).^{41,42} Flexibility can also be increased by reserving a certain percentage of the hospital drug budget for non-formulary items. However, a budgetary set-aside invites misuse and should be monitored carefully.

(3) Require hospitals to establish representative Pharmacy and Therapeutics Committees with defined responsibilities for monitoring and promoting quality use of medicines

The beneficial effect of hospital Pharmacy and Therapeutics Committees (PTCs) in monitoring and promoting quality use of medicines and containing costs in hospital and other institutional settings has been generally accepted in developed countries.⁴³ Unfortunately, there has been little critical evaluation of the clinical or economic impacts of this approach in developing countries. Despite the lack of evidence from developing countries, we nevertheless recommend that PTCs should be established in each referral hospital, and probably in all general hospitals. This action will require both policy direction and institutional support.

Two essential tasks of a PTC are to develop and revise institutional STGs (usually adapted from national guidelines), and to maintain an institutional EDL or formulary.^{44,45} The PTC can also perform drug utilization reviews, using drug consumption data or simple prescription surveys, and establish systems for audit of patient records, peer-review and continuing education. Antibiotic utilization and infection control are two cross-cutting topics that can serve as a focus for PTC activities.⁴⁶ While computerized databases may not exist in developing countries, hospital clinical and pharmacy records can be manually reviewed for audit and feedback. Operations research is needed in both public and private hospitals in developing countries to determine how PTCs can function most effectively.

If PTCs do not exist in a country, the Ministry of Health should require that they be established, at least in large hospitals. Materials to assist the committees in their initial phase may need to be developed. Publication in national journals of the results of establishing PTCs and of the success of specific approaches may help other committees to get started.

(4) Implement problem-based training in pharmacotherapy in undergraduate medical and paramedical education based on national STGs

The quality of basic training in pharmacotherapy can have an impact on prescribing in the long term by helping to establish

good habits and inoculating students against future negative influences on their prescribing. Rational pharmacotherapy teaching should be linked both to national STGs and to the essential drugs list. National STGs should therefore be developed in close collaboration with senior staff of medical and paramedical teaching institutions and be used in basic curricula. All pharmacology teaching should be based on generic names. Copies of the EDL and STG manuals should be freely available to all students.

There are proven strategies to improve the quality of pharmacotherapy teaching. Probably the most important is to develop teaching objectives based on the knowledge, skills and attitudes required by students in their future professional life. These teaching objectives should be detailed, published and used for teaching, for examinations and even for staff appraisals. In most settings, the amount of basic science should be drastically reduced, and classroom lecturing should be restricted to those subjects where the transfer of knowledge is essential. Instead, problem-solving skills should be promoted and interdisciplinary problem-based learning encouraged. Examinations should reflect the teaching approach; this may imply the need to replace written examinations with continuing and skill-based assessments.

The WHO *Guide to good prescribing*⁴⁷ is a practical manual for medical students on the principles of rational prescribing. The manual is intended to support problem-based learning, and its positive impact on prescribing skills has been demonstrated in a randomized controlled trial.⁴⁷ Students from the groups receiving the training performed significantly better than controls in the seven medical schools included in the trial. The students learned how to apply their skills for problems covered in the teaching as well as new problems. The improvement was demonstrated to last for at least 6 months after the training session in all of the medical schools. Two-week practical training courses in this approach intended for university lecturers and clinical teachers are offered annually in the Netherlands, Japan and South Africa. The manual is currently being adapted for training other professions, such as pharmacists in Uganda and nurses in Indonesia and South Africa. A teacher's guide is under development.

Nowhere is an integrated approach so important (and its absence so dramatic) as in the clinical phase of the undergraduate medical training; in these few years most future prescribing habits are acquired. Pharmacotherapy teaching in the clinical phase should be objective-based, problem-based (with a focus on common conditions), interdisciplinary (both for teachers and students) and constantly referring to national or hospital STGs and EDLs.

Within nursing curricula, a problem may exist around the issue of teaching nurses to prescribe. In large hospitals nurses carry out the prescribing instructions of doctors. However, in many countries, nurses are posted to rural health facilities where they diagnose and prescribe as well as manage the drug supply of the facility. Obviously, nurses in these settings should be trained to do this work. Training of pharmacists in public health aspects of their profession and public health students in drug issues may also be beneficial.

If there is no existing focus on problem-based training in pharmaco-therapeutics, national consultative workshops may help to build awareness of the value of the approach. These would ideally bring together local medical educators with others who use this new approach from the region. Such workshops have been successfully used in Indonesia and in the Philippines. If there is no focus on public health pharmacy in schools of pharmacy, regional consultative meetings can also be used to expose pharmacy teachers to these ideas; such regional meetings were held recently in Zimbabwe and Lebanon.⁴⁸

(5) Encourage targeted, problem-based in-service educational programmes by professional societies, universities and the Ministry of Health, and require regular continuing education for licensure of health professionals

In most developing countries, few options exist for regular in-service education of health professionals. Furthermore, doctors, paramedics and pharmacists have little incentive to participate in continuing education programmes, since their licensure rarely depends on such participation. The only well-established source of information about drugs and therapeutics is the pharmaceutical industry, whose primary motivation is the promotion of specific products rather than improvement in the quality of care. It is necessary to revise regulations for professional licensing to require regular participation in unbiased educational activities, as is done in many industrialized countries.

One strategy to which many countries devote resources and staff time is the production of printed bulletins and pharmaceutical newsletters. As an isolated activity this approach has failed universally though it may play a role as part of face-to-face education.³⁵

Many countries have experience in organizing specific training programmes to improve the use of medicines, particularly in the public sector.⁴⁹ These programmes are frequently organized by the national essential drugs programme, by vertical disease control programmes, or within the context of donor-funded projects. There is a need to evaluate the success of different approaches, and to establish coordinated, ongoing quality improvement programmes as a routine Ministry of Health function. Wherever possible, students should be introduced to the need for continuing education during their basic training. Evidence for the effectiveness of continuing medical education exists in developed countries though similar results have not yet been reported from developing countries.^{35,50,51}

Methods that have been tested include large group and small group training,⁵² as well as focused on-site training. One study showed that both approaches may be equally effective for improving treatment for specific problems but the effects of the small group teaching may be more sustained and cost-effective.^{52,53} In some cases, training activities have been combined with improved supervision or monitoring.⁵⁴ In a study from Zambia, the impact of three continuing education seminars for staff working in urban general health centres was evaluated.⁵⁵ In this randomized study, the average number of

drugs prescribed decreased significantly from 2.3 to 1.9 in the intervention facilities. There were improvements in history taking, examination, diagnosis and treatment of patients, including a reduction in the use of antibiotics.

Our critical review of developing country training interventions has shown that the most effective in-service education is likely to be problem-based, repeated on multiple occasions, focused on practical skills, and linked to the use of STGs. Traditional training methods have been shown to be less effective than adult education techniques which use interactive methods, such as discussion and feedback, as has been found in developed countries.⁵⁶ When the roles of supervisors and trainers are combined, the impact of in-service training on prescribing practice is further enhanced. These approaches may require the training of trainers and supervisors to use these adult education techniques.

Since most work identified has focused on public sector prescribers, there is a need for further study of the efficacy and cost-effectiveness of continuing education for private sector providers. In the private sector, professional societies and associations are likely to be the most effective mechanisms for providing this training.⁵⁷

Promising approaches

In some settings impressive improvements in drug use have been achieved with innovative interventions.^{52,53,60,61,63} While these approaches would not be recommended yet for widespread implementation, they are worth testing in other settings and for other types of prescribing problems. Such testing will require collaboration between relevant departments of universities as an important first step. If a pilot programme is successful, it is advisable to expand the scheme slowly and not to jump from a single pilot project to a national programme. Whenever new interventions are tested, it is important to look for unintended consequences that might reduce or even negate improvements in practice.

(6) Stimulate an interactive group process among health providers or consumers to review and apply information about appropriate use of medicines

Group process has long been a fundamental strategy for encouraging behaviour change employed by social scientists.^{58,59} Group development of treatment norms, in which small numbers of prescribers meet to review a clinical problem and develop strategies for practice improvement, has also shown remarkable potential in several settings. In Indonesia, doctors and paramedics were brought together to discuss high injection use with a group of patients. Clinical issues were discussed, but more importantly expectations and misconceptions about injections were debated. This interactive group discussion resulted in sudden sustained decline in injection use.⁶⁰ Prior to the intervention the rate of injections per consultation was 69.5%, which was reduced in the intervention group to 42.3%. In comparison, in the control group the decline was from 75.6 to 67.1%. In Mexico, groups of doctors reviewed diarrhoea and ARI treatment algorithms, developed common approaches and participated in peer

review for 6 months thereafter, which led to a dramatic and sustained increase in several measures of quality.⁶¹ The study compared physicians who received initial training and participated in a peer review process with control physicians from the same setting. Prescription antibiotic use for acute diarrhoea decreased in the intervention group from 78.8 to 39.3%, while ORT use increased from 31.4 to 58.4%. Long-term follow-up demonstrated a prolonged effect, significantly different from that shown by the control prescribers. Similar sustained improvements occurred in the treatment of acute respiratory infections.

These interventions were then extended to district and state level facilities with similar results.⁶² An interactive group approach has also been used with community members. In Indonesia, groups of mothers were taught how to review drug package inserts and make decisions about informed purchasing of OTC drugs; this step led to a change in the patterns of drug purchases, especially reductions in the purchase of duplicative products.⁶³ As a result of the small group intervention, families reduced their monthly purchase of brand-name drugs from 5.3 per month to 1.5 per month, compared with a seminar group in which the reduction was from 5.7 to 4.3 and a control group where the change was from 5.6 to 5.2. The impact of these interventions stems from the powerful forces generated during group discussions. Members of the group absorb group norms and are motivated to change their practices more profoundly than in a passive learning environment.

(7) Train pharmacists and drug sellers to be active members of the health care team and to offer useful advice to consumers about health and drugs

In many countries, the reality of shortages of human resources and consumer preferences dictates that pharmacies and drug shops are the major source of pharmaceutical advice and treatment to the public. However, many retail settings are staffed by personnel with little or no training in health care or pharmaceuticals. In Nepal, considerable work has been done to upgrade the skills of drug sellers, including their prescribing and dispensing practices.⁶⁴ Studies in Kenya and Indonesia have shown that it is possible to improve the diarrhoea treatment practice of pharmacy staff through a combination of focused small-group training and building up their self image as health professionals.⁵⁷ In this two country study, sales of oral rehydration salts increased by 33% in Kenya and 34% in Indonesia. Sales of antidiarrhoeals decreased by 17% in Nairobi and by 29% in Indonesia. In the Philippines, targeted training of local drug vendors improved the quality of their practice, particularly for drugs which have an inherent safety risk.⁶⁵ Pharmacists and drug sellers play an important role in drug recommendation and retail purchase, and replication and extension of these studies are urgently needed.

(8) Encourage active involvement by consumer organizations in public education about drugs, and devote government resources to support these efforts

At a policy level the central government has a responsibility to ensure the quality of drugs and also of the information that

accompanies them. There may also be a need to regulate advertising, and to require clear statements of risks and potential adverse drug reactions. Consumer-oriented package inserts can increase understanding in literate communities. Public education activities have been included in some essential drug programmes, but these activities are usually carried out by NGOs and consumer organizations. In 1997, a global survey by WHO concluded that there is a great need for public education about medicines, even in developing countries with limited resources.⁶⁶ The survey identified many examples of public education about drugs, but unfortunately many of these projects were poorly supported, documented and evaluated. The survey concluded that gains due to these programmes are probably incremental, but that results are difficult to evaluate with classical methodologies. This important area therefore needs much more understanding, research and support.

Drug representatives and other promotional activities by pharmaceutical companies have a major influence on prescribing and on drug use by the general public. WHO has published ethical criteria for drug promotion,⁶⁷ but very few countries have written or enforced regulations to make these ethical criteria effective. Their impact is therefore not yet clear and much more work is needed in this area.

Crucial gaps in experience

(9) Develop a strategic approach to improve prescribing in the private sector through appropriate regulation and long-term collaborations with professional associations

So far most efforts at improving drug use have focused on the public sector, particularly at the primary care level.¹⁰ The private sector frequently provides better access to pharmaceuticals for the general public than does the public sector, although there tends to be an urban focus.⁶⁸ Yet, the private sector has unfortunately been neglected by public policy-makers. To change practices in the private sector, it is important that policy-makers understand the motivations of private providers. Public servants frequently perceive that private practitioners are purely interested in profit rather than in the quality of their practice. However, recent experiences have shown this perception to be an oversimplification. Generally, all practitioners are interested in their status as health professionals, and their position within the community. Professional associations, with a majority of their membership in the private sector, are often willing to establish programmes to improve the skills or knowledge of their members. Considerable opportunities exist for improving drug use through better licensing and inspection.⁶⁹ Finally, controls on advertising and regulations regarding unethical promotion of drugs can be implemented by national governments and institutional administrators.

To stimulate long-term improvements in drug use in the private sector, a range of strategies should be considered. Licensing of practitioners and premises is traditionally used by governments to regulate the private sector. When possible, enforcement of these regulations should not be simply punitive, but combined with positive efforts to improve performance. Encouraging professional associations to provide an

accreditation system and continuing education programmes has many benefits. Changing the way governments or insurance companies reimburse drug expenditures may also have positive effects on drug use.

(10) Establish systems to monitor key pharmaceutical indicators routinely in order to track the impact of health sector reform and regulatory changes

Fundamental changes are occurring in health systems and in the economics of health systems. These changes, which are likely to have profound effects on drug use, have been reviewed in a number of publications.¹³ Many decisions on health system structure and financing, health reform and decentralization may have negative impacts on drug use.⁷⁰ For example, introducing patient fees in the form of a fixed charge may lead to over-consumption of drugs, while introducing separate fees for each drug may tend to reduce access among the poor, unless there are exemption mechanisms.⁷¹ Decentralization of budgeting and control may lead to inefficient procurement processes, which result in increased drug prices as well as a breakdown in supervision systems. Within decentralized systems, problems may also develop in referral systems and in training activities, leading to inequity between districts.⁷²

The key message for policy-makers is that policy changes that accompany health sector reform are likely to have effects on drug use. There is a need to establish simple systems to monitor key pharmaceutical indicators that might change as a result of implementing system-wide reforms. Several sets of pharmaceutical indicators have already been developed and tested.^{73,74} Policy-makers and managers should select a few locally appropriate indicators and collect them on a regular basis in order to be able to respond in a timely way to negative changes.

Conclusions

Experiences during the last 15 years have taught us that there are many possible approaches for policy-makers and health system managers to encourage improved use of medicines. In this paper we have recommended ten approaches that we feel would establish a sound, broad-based programme for quality drug use leading to better quality of care and improved cost effectiveness. Five strategies can be recommended on the basis of proven success in both developing and industrialized countries: standard treatment guidelines; essential drug lists; pharmacy and therapeutic committees; problem-based basic professional training; and targeted in-service education. Three approaches, while not widely tested yet, offer great promise: interactive discussions among peers; drug seller training; and consumer education. Finally, two approaches require longer-term policy commitment: private sector outreach through professional associations; and regular monitoring of key pharmaceutical indicators.

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