The Role of Education in the Rational Use of Medicines
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### Abbreviations

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<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AIDS</td>
<td>acquired immunodeficiency syndrome</td>
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<tr>
<td>AMR</td>
<td>antimicrobial resistance</td>
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<tr>
<td>ARI</td>
<td>acute respiratory infection</td>
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<tr>
<td>CBIA</td>
<td>Cara Balajar Ibu Aktif (Mothers’ active learning method)</td>
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<td>CHW</td>
<td>community health worker</td>
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<td>CME</td>
<td>continuing medical education</td>
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<td>DAP</td>
<td>Drug Action Programme</td>
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<td>DANIDA</td>
<td>Danish International Development Agency</td>
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<tr>
<td>DES</td>
<td>diethylstilbestrol</td>
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<tr>
<td>DPT</td>
<td>diphtheria, pertussis, tetanus</td>
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<tr>
<td>DSPRUD</td>
<td>Delhi Society for Promotion of Rational Use of Drugs</td>
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<tr>
<td>DTC</td>
<td>Drugs and Therapeutics Committee</td>
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<tr>
<td>EDM</td>
<td>essential drugs and medicines</td>
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<tr>
<td>EEC</td>
<td>European Economic Community</td>
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<td>EML</td>
<td>essential medicines list</td>
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<tr>
<td>EQUIP</td>
<td>Educators for Quality Update of Indian Physicians</td>
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<tr>
<td>HC</td>
<td>health centre</td>
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<tr>
<td>HIV</td>
<td>human immunodeficiency virus</td>
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<tr>
<td>IEC</td>
<td>information, education and communication</td>
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<tr>
<td>IGD</td>
<td>interactional group discussion</td>
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<tr>
<td>INRUD</td>
<td>International Network for Rational Use of Drugs</td>
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<tr>
<td>IPSS</td>
<td>Instituto Peruano de Seguridad Social (Peruvian Social Security Institute)</td>
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<td>MOH</td>
<td>Ministry of Health</td>
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<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>MSH</td>
<td>Management Sciences for Health</td>
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<td>MTP</td>
<td>monitoring, training and planning</td>
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<tr>
<td>OPD</td>
<td>outpatient department</td>
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<tr>
<td>ORS</td>
<td>oral rehydration salts</td>
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<tr>
<td>PAR</td>
<td>policy, access and rational use</td>
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<td>PHC</td>
<td>primary health care</td>
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<td>PIL</td>
<td>product information leaflet</td>
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<td>PSM</td>
<td>policy and standards of medicines</td>
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<td>RPM</td>
<td>Rational Pharmaceutical Management</td>
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<td>RUM</td>
<td>rational use of medicines</td>
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<td>SEA</td>
<td>South-East Asia</td>
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<td>SEAR</td>
<td>South-East Asia Region</td>
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<td>STG</td>
<td>standard treatment guidelines</td>
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<td>TCM</td>
<td>Technical Cooperation for Essential Drugs and Traditional Medicine</td>
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<td>TB</td>
<td>tuberculosis</td>
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<tr>
<td>WFPMM</td>
<td>World Federation of Proprietary Medicine Manufacturers</td>
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<td>WHO</td>
<td>World Health Organization</td>
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The support provided by Dr Samlee Plianbangchang, Regional Director, WHO South-East Asia Region in the conceptualization development of this document is gratefully acknowledged. The efforts by Prof. Ranjit Roy Chowdhury, former President and Patron, Delhi Society for Promotion of Rational Use of Drugs, and UNESCO Chair in Regional Use of Drugs, Chulalongkorn University, Bangkok in preparing the first draft and contributing to its subsequent development are deeply appreciated.

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The rational use of medicines means – “Patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community.” This definition focuses on four important aspects of the rational use of medicines: correct medication, correct dose, correct duration of treatment and correct cost.

Irrational use of medicines is a serious public health problem worldwide and can be seen as: (a) use of too many medicines per patient; (b) inappropriate use of antimicrobials, often in inadequate dosage and insufficient duration; (c) overuse of injections when oral medication would be more appropriate; (d) failure to prescribe in accordance with clinical guidelines including standard treatment guidelines and prescribing policy; and (e) inappropriate self-medication, often of prescription-only medicines.

It has been estimated by WHO that more than 50% of all medicines are prescribed, dispensed, or sold inappropriately and about 50% of patients do not take them correctly. Thus, medicines are prescribed when they are not needed; wrong, ineffective or unsafe medicines are prescribed; effective and available medicines are underused or they are not used correctly. This scenario underscores the need for educating the prescriber, the dispenser, the retailer and the public, including the patient.

Health professionals need to be trained to communicate effectively with patients on the proper use of medicines and the dangers of untoward effects. The dispenser needs to be knowledgeable in the indications of medicines, their side effects, contraindications and dosages for human use so that accurate information can be provided.
The pharmaceutical companies must observe ethical criteria for medicinal drug promotion with clear responsibility for providing unbiased information about their own pharmaceutical products. Promotion of medicinal drugs must be in conformity with accepted ethical standards.

Public education on the proper use of medicines should be a part of school education to enable informed decision-making at the individual, family, and community levels. Authentic and correct information on medicines for the public should be provided in easy to understand language. Radio communication, useful flyers with visual illustrations and effective public posters are valuable aids for the public. Health fairs, puppet and musical shows, distribution of brochures and appearances of celebrities are useful tools in public education. The mass media should be used to ensure the widest possible coverage of messages.

For the patient, leaflets and brochures in simple language and with clear and understandable labeling are needed. Adequate consulting time for the patient, both by the doctor and the dispensing pharmacist, are crucial for proper understanding of why and how medicines are to be taken, for what purpose and for how long, especially for chronic diseases. The patient must be helped to understand the nature of the illness and its medication. For this purpose, empowerment of the community in general, and the patient in particular, needs to be addressed. In addition, group lectures and discussions, demonstrations, and hands-on training for specific therapeutic methods are needed for properly educating the patient.

Education, with its various approaches, has an important role to play in promoting the rational use of medicines. This awareness must be increased in all relevant sectors. In order to strengthen enabling factors in education, there must be a comprehensive national medicines policy that has a concrete component of education to help improve the rational use of medicines. The infrastructure for such activities will need to be developed or strengthened, and supported with adequate financial and human resources.
Professional interest to improve the rational use of medicines must also be increased and sustained. Social and cultural factors that influence medication need to be taken into consideration in finding ways to improve and maintain the proper use of medicines. Furthermore, novel ways and innovative measures will need to be identified, tested, applied and evaluated in order to bring education to the forefront of the strategy in improving the use of medicines.

I am confident that this publication will be found most useful by health professionals and others interested in promoting the rational use of medicines.

Samlee Plianbangchang, M.D., Dr.P.H.
Regional Director
Executive Summary

Introduction

The rational use of medicines (RUM) contributes to high-quality healthcare while irrational use leads to health hazards and wastage of resources that are already insufficient in the majority of healthcare systems. Overuse, underuse or misuse of medicines that characterize irrational use has been called a problem beyond rationality that persists and is difficult to eliminate. Continuous training is required, combined with monitoring, feedback and reinforcement. Educating all concerned in the appropriate and correct use of medicines becomes a critical strategy to solve the problem of irrational use.

This document presents an account of activities to promote RUM in the WHO South-East Asia Region, in particular, and in other regions as well, providing an overview of the situation. Twelve core interventions that could potentially improve the use of medicines are enunciated that cover medicine use policy; clinical guidelines; essential medicines list; drugs and therapeutic committees; pharmacotherapy teaching; continuing medical education; supervision, audit and feedback; independent medical information; public education; avoidance of perverse financial incentives; enforced regulation and sufficient government support. Three educational strategies are also provided that deal with training of providers, printed materials and media-based approaches highlighting the importance of education in promoting the rational use of medicines. Ten factors that influence the use of medicines are also enumerated as well as four strategies such as educational, managerial, economic and regulatory approaches that are important in improving the use of medicines. In addition, ten
recommendations are listed to suggest policy options for health managers and planners to improve the use of medicines in developing countries.

The primary objective of this document is to give an overview of the regional situation in the rational use of medicines and to advocate for education as a vital component in improving the use of medicines. It also aims to sensitize four categories of people; (a) the public, (b) all categories of health professionals, (c) persons undergoing general education and (d) policy makers, political leaders, planners and bureaucrats to be proactive in promoting RUM. The document also intends to create awareness of the challenges involved so as to motivate all relevant categories of people to find practical, realistic and innovative solutions and implement programmes and activities that would ensure the rational use of medicines.

Regional perspective

The South-East Asia Region has been spearheading the spread of knowledge on the rational use of medicines. Activities that are adjunct to RUM such as selection of cost-effective essential medicines, quality assurance to enable the use of quality medicines, availability and accessibility of essential medicines are also being assisted in the Member countries. An initiative has been launched to reduce counterfeit drugs in the Region.

Some of the countries in the SEA Region have been actively promoting the rational use of medicines. In India, the Delhi Society for Promotion of Rational Use of Drugs has significantly improved availability of essential medicines in the public hospitals in Delhi. It is also instrumental in replicating RUM in other States of India. The Centre for Clinical Pharmacology and Drug Policy Studies at Gadjah Mada University, Yogyakarta, Indonesia has introduced the monitoring, training and planning (MTP) approach to reduce antibiotic use in viral acute respiratory infection. Teaching of clinical pharmacology, use of standard treatment guidelines, rational prescribing and teaching medical students to critically evaluate drug information are some of
the activities of the centre. In Nepal, the International Network for Rational use of Drugs (INRUD-Nepal) has been conducting interventional studies and national training courses regularly since 1992. More than 500 health managers, planners and health workers have been trained. The Chulalongkorn University in Thailand has been coordinating efforts to promote the rational use of medicines among universities, public and private institutions and individuals. Two International Conferences on Improving Use of Medicines were organized in Chiang Mai, Thailand in 1997 and again in 2004.

Challenges identified from past experience

Challenges in the area of rational use of medicines include a lack of an organization that has ownership of the programme. It is not very relevant to inform doctors, nurses, pharmacists, the general public and others about the rational use of medicines in situations when there are no medicines. Access to essential medicines must be coupled with their rational use. The topic of rational use of medicines does not generate the kind of enthusiasm that more easily visible health problems such as avian influenza and HIV/AIDS do. At present, the rational use of medicines is not promoted as much as other health programmes. The availability of medicines in many parts of the world is poor, and prescribers are not always aware of drug prices. Prescribers often do not consider whether the patient will be able to buy the medicines they prescribe. Patients are not in a position to question about the medicines prescribed for them.

There is also 3M issue in RUM – “Medicines Mean Money”. Often, RUM means less profit and income for those dealing with medicines, usually the prescribers or dispensers. This conflict is particularly relevant to South Asia where health insurance is virtually non-existent and health care providers derive part of their income from selling medicines from their own pharmacies. In addition, the vigorous and often excessive promotion by pharmaceutical companies plays an important role. Thus, a health care system that removes perverse financial incentive, regulates promotion and monitors prescribing should be the basis on which education for RUM must be built upon.
Specific challenges by categories are summarized under the following sub-headings:

**Ensuring rational use of medicines:** Not many countries are eager to develop a programme on RUM. In several countries, medicines are not always available in public hospitals and at the primary health centre level. Misinformation leads to irrational use of medicines. Sponsors of medicine programmes do not always give priority to RUM. Sometimes, perverse financial incentives prevent rational prescribing.

**Promoting rational use of medicines in general education:** RUM programmes do not usually get prime airtime on radio or television. Sustained efforts are needed in promoting RUM, which is expensive. The educational programmes must focus on the correct use of medicines. In some countries, product information leaflets are not available and people do not know how to get the correct information.

**Training health professionals:** There is often a lack of communication experts with knowledge on RUM to provide well-tailored information. Teaching curricula in medical, nursing and pharmacy programmes are full and there is no room for additional course module on RUM. Not much hard data is available to show that RUM has health and economic benefits. RUM often loses priority to counterfeit or sub-standard drugs. Health care professionals often do not have ready access to correct information on medicines.

**Obtaining political support:** Programmes on RUM do not get adequate budget. Unjustified and unethical claims for medicines in the press and television counteracts the message of RUM. Regulation on improper promotion of medicines is usually weak or non-existent.

**Public education**

Public education in the appropriate use of medicines is needed because without it, people lack the knowledge and skills to make informed decisions. Public education in the rational use of medicines includes patient instruction at the time of illness in the proper use of prescribed or dispensed medicines and instruction to the public at large, or specific
target groups, in the principles and practical use of appropriate medicines, including non-medicine therapies. Women’s empowerment and education at schools and colleges can act as a facilitating factor in the rational use of medicines. Education can be provided through street plays, patient information leaflets and talks for the lay public. Materials like posters, comics, flip charts, puppet shows, radio/TV programmes, newspapers and magazine articles, songs and documentaries are useful tools. The media could be used more to further the cause of the rational use of medicines and, particularly, to draw the attention of political leaders to support the cause. Awareness can also be created through events such as special days, marches, walks and special postage stamps, awards, public lectures and possible identification of national ambassadors in the rational use of medicines. Some of the specific programmes in public education are summarized below.

Patient-oriented programmes: The Delhi Society for Promotion of Rational Use of Drugs has shown that patients who had proper information about prescribed medicines know about the medicines and how to use them when compared to the control group. They also retained the knowledge of their medicines.

Community-oriented programmes: A randomized controlled study in Nepal showed the impact of an article on the use of medicines in the community. The group who read the article on cough and diarrhoea medicines knew more about the medicines and the precautions to be observed when taking them. A study in Indonesia on the effect of an interactional group discussion on overuse of injections showed that there was a decrease in injections in the intervention group when compared to the control group.

Women, women’s groups and mothers: A study in Nepal evaluated the impact of a wall poster on antibiotics. It revealed that messages with prominent layout were understood by more households than the lengthy and congested message. Another study in Nepal showed the effect of creating awareness among schoolteachers and women’s groups on the use of medicines through training. The results indicated that both groups had better knowledge about medicines at the end of the training period and even two and six months later in schoolteachers.
**Drugstore clerks and sellers:** A study in the Philippines on drugstore clerks and sellers used interactive group discussions with senior drugstore clerks and mothers. Another intervention was face-to-face meetings at the drug stores. Both interventions reduced dispensing of amoxicillin for acute respiratory infections that are caused by virus. There was no change observed in the use of amoxicillin in the control group.

**Programmes for health professionals**

Health professionals, societies and associations must play an important role in spreading the message of rational use of medicines. Doctors, nurses and pharmacists are key personnel who disseminate information on the proper use of medicines. Other categories of health workers in occupational health, administrators in health insurance schemes, wholesalers and retailers of medicines also need to know about the concept and practice of rational use of medicines. Professional associations must take a leadership role in promoting proper use of medicines to their members. The state medical council should include RUM as a component in the continuing education programmes in providing accreditation, which in turn, is used for re-registration or revalidation of practicing licence.

Other programmes for health professionals deal with (a) Projects tested in health professionals; (b) Approaches that have been evaluated in the SEA Region and; (c) Programmes for the health care professionals. Programmes for the future are described to give an overview of the programme.

**Integration into general and specialized education programmes**

Students are at the stage of learning where their knowledge and attitudes are amenable to modification. This is a good starting point to introduce concepts such as rational use of medicines. It may be done at various levels of education such as school and undergraduate college education, education in postgraduate and technical schools, and in
existing orientation and training programmes. Additionally, it would be worthwhile to include the theme of rational use of medicines in an existing programme supported by agencies such as the Rotary Foundation. Nation-wide programmes on women’s studies, family planning associations, as well as the scouts and cubs’ movements are some of the other agencies that could disseminate the theme.

**Educating policy makers, political leaders, planners and bureaucrats**

It is evident that political will is necessary for implementing a successful programme on the rational use of medicines. Policy makers, political leaders, planners and bureaucrats need to be made aware of and motivated to promote the rational use of medicines. One method could be by using the media and disseminating information in newspaper articles, editorials, press releases and through TV. Another way could be by inviting them to meetings, make keynote addresses and meet experts in the area of rational use of medicines. Having a special day such as Rational Use of Medicines Day once a year or giving awards for outstanding work in the area of rational use of medicines would be useful.

Initiation of a briefing programme for bureaucrats and incentives to encourage scientists and policy makers to work together should be pursued. There is a need for governments to have a long-term strategy and to have focal points for programmes on rational use of medicines, including a knowledge centre and sustained support for continuing medical education programmes. Successful results are possible if backed by the political will of policy makers, political leaders, planners and bureaucrats. It is imperative to get them involved and interested.

The involvement of communication experts to prepare appropriate messages and deliver these to the public, health professionals, students, policy makers, politicians and bureaucrats will go a long way in strengthening the programme on education in the rational use of medicines.
Vision for the future

Approaches to enhance the role of education in the rational use of medicines are presented. It includes: (a) general measures such as the establishment of a knowledge centre on the rational use of medicines, greater use of electronic media and resources for providing education and information. (b) Empowerment of the general public/consumers in the proper use of medicines. (c) Greater involvement of professional societies of doctors, pharmacists, nurses and other categories of health personnel such as medical laboratory technologists, physiotherapists, occupational health personnel are needed in promoting the rational use of medicines; and (d) involving policy makers, political leaders, planners and bureaucrats in guiding strategic planning, initiating activities and providing resources to promote the rational use of medicines. However, as mentioned earlier it is vital to health care system that allows education to have its full effect and also discourages bad practice.
The rational use of medicines requires that patients receive medications appropriate to their needs in doses that meet their individual requirements, for an adequate period of time, and at the lowest cost to them and their community (1). Unfortunately, the irrational use of medicines is a major problem worldwide. WHO estimates that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that only about half of all patients take them correctly. Fig. 1 shows data from the WHO Policy and Standards of Medicine database of drug use surveys done in developing and transitional countries in Asia, Africa and Latin America. According to the survey, only about 40% of patients treated at primary health care

**Figure 1: Regional variation in prescribing (1990-2004)**

Source: WHO Policy & Standards of Medicines database, August 2004. (Baseline data covering all diseases and all ages.)
level (mostly in the public sector) were treated in compliance with standard treatment guidelines.

The overuse, under use, or misuse of medicines results in wastage of scarce resources and widespread health hazards (2). Thus, rational use of medicines would bring health care within the reach of the poor by reducing costs. Access to health care and, therefore, to essential medicines is a human right (3, 4). Essential medicines are those that satisfy the priority health care needs of the population. Thus, if they are available, affordable, are of good quality and used properly, medicines can offer simple, cost-effective answers to many health problems. There is, therefore, a need to develop educational strategies for health care practitioners and consumers in the rational use of medicines.

It has been stated in the WHO Essential Medicines Strategy 2004-2007 that up to 50% of the medicines in the world may be wasted due to inappropriate prescribing and patients’ failure to comply with appropriate treatment regimens (5). This appears to be a colossal waste of resources and misuse of medicines in a situation where lack of access to life-saving and health-supporting medicines for two billion poor people of the world stands as a direct contradiction to the fundamental principle of health as a human right (6, 7).

In 1999, WHO estimated that roughly 80% of the global population without access to essential medicines was living in low-income countries (Fig. 2). In contrast, only 0.3 percent of those lacking access to essential medicines lived in high-income countries (8). What is most disturbing is that even though a large percentage of the health expenditure in these countries is on medicines, the medicines that do reach the people are not well utilized.

Irrational use of medicines is a serious problem worldwide. Policies to promote rational use of medicines need to address the prescribers, dispensers and consumers of medicines as well as manufacturers and sellers, and traditional healers. All these actors have an important influence on how drugs are used. A variety of strategies and interventions are needed to influence medicine use (9). The 12 core interventions for promoting the rational use of medicines are given in Box 1.
Figure 2: Distribution (%) of country income groups without access to essential medicines in 1999


Box 1: Twelve core interventions to promote the rational use of medicines

(1) A mandated multi-disciplinary national body to coordinate medicine-use policies
(2) Clinical guidelines (standard treatment guidelines, prescribing policies)
(3) Essential medicines list based on treatment of choice
(4) Drugs and therapeutics committees in districts and hospitals
(5) Problem-based pharmacotherapy training in undergraduate curricula
(6) Continuing in-service medical education as a licensure requirement
(7) Supervision, audit and feedback
(8) Independent information on medicines
(9) Public education about medicines
(10) Avoidance of perverse financial incentives
(11) Appropriate and enforced regulation
(12) Sufficient government expenditure to ensure availability of medicines and staff

Source: Promoting rational use of medicines: core components (9).
Educational strategies for health care practitioners and consumers are essential but frequently neglected or inappropriate. Education in the rational use of medicines includes patient instruction on the principles and practical application of the use of medicine including non-medicine therapy and instruction at the time of illness on appropriate use of prescribed or dispensed medicine(s). These activities form a part of a comprehensive approach that also includes undergraduate and postgraduate medical education, continuing medical education or in-service training, standard treatment guidelines, independent information on medicines, ethical drug promotion, and balanced information provided from the industry as compared to other independent sources.

During a technical briefing seminar at WHO/HQ in 2005 (10), Holloway discussed the education strategies with a goal to inform or persuade providers and consumers by providing information to improve the rational use of medicines (Table 1).

The importance of providing reliable information on the use of medicines to professionals, both during their education as well as an

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<th>Strategy</th>
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<tr>
<td>Training of providers</td>
<td>• Undergraduate education</td>
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<td></td>
<td>• Continuing in-service medical education (seminars, workshops)</td>
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<td></td>
<td>• Face-to-face persuasive outreach, e.g. academic detailing</td>
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<td></td>
<td>• Clinical supervision or consultation</td>
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<td>Printed materials</td>
<td>• Clinical literature and newsletters</td>
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<td>• Formularies or therapeutic manuals</td>
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<td></td>
<td>• Persuasive print materials</td>
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<tr>
<td>Media-based approaches</td>
<td>• Posters</td>
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<td></td>
<td>• Audio-tapes, plays</td>
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<td>• Radio, television</td>
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ongoing activity during their professional career, should be recognized. In addition, patients need to be provided information about the medicines being prescribed. This needs to be fully recognized as a tool for promoting better use of medicines. It is expected that there would be a change in the situation if these two activities are undertaken aggressively. The current wastage of medicines due to irrational prescribing and erratic compliance would be reduced and more people, particularly the poor, would receive medicines and take them properly.

It is not that the poor are not spending on medicines, but today, a large proportion of this expenditure is unnecessary and wasteful, very often leading to impoverishment. A good programme on the rational use of medicines complemented by a programme providing information and education for all concerned in the proper use of medicines would go a long way in improving this situation.

Presently, most governments and private organizations are reluctant to allocate resources for this component because they may not have realized the importance of providing such information. It should be clearly understood that all efforts made in other areas, for example, the large percentage of resources allocated for purchase of medicines, establishment of distribution systems and quality assurance mechanisms, would be largely wasted if the medicines are not prescribed and taken as they should be. More emphasis should be placed on these last two important steps, which if improved, could render the whole system more effective and less wasteful than it is now.

Educational strategies are very important in promoting the rational use of medicines. However, educational strategies alone will not be sufficient to ensure continued rational use of medicines. There are many other factors that influence the use of medicines and unless these are addressed, it will not be possible to change provider and consumer behaviour concerning drug use. Fig. 3 illustrates the different factors which influence the use of medicines. Health professionals are influenced by prior knowledge, habits, workplace conditions, access to information, their relationship with peers and whether they are...
supervised. Consumers are likewise influenced by their knowledge, access to information and social and cultural factors.

The different kinds of strategies to improve the use of medicines are shown in Fig. 4 and can influence both providers and consumers. Educational strategies such as training, workshops, posters and printed materials aim to inform and persuade providers and patients. Nevertheless, it is important to understand the other strategies available as educational strategies are unlikely to have sustained long-term impact without implementation of other appropriate strategies. Managerial strategies aim to guide decision-making. For example, supplying only essential medicines in public sector facilities makes it much more likely that only essential medicines will be used in the public sector. Economic strategies aim to provide financial incentives to institutions, providers and patients. Unfortunately, many health systems incorporate perverse economic incentives which actually promote irrational use of medicines. For example, prescribers who must earn their income from the selling of medicines are likely to prescribe more medicines and more costly medicines than those who do not earn their income from selling medicines. Hospitals that make money from selling medicines
are more likely to sell more costly medicines. Some of these medicines may not actually be needed by the patients. Regulatory strategies aim to restrict choices by law. The drug regulatory authority is responsible for many of these restrictions which would include registering drugs for marketing, licencing prescribers and drug outlets, and regulating drug promotional activities. The strategies to improve the use of medicines are shown in Fig. 4.

To improve use of medicines in developing countries, a variety of educational and administrative approaches have been tried targeting both professionals and the public. Laing, Hogerzeil & Ross-Degnan (2001) reviewed the experiences of the last decade, to identify which interventions were effective in developing countries and suggest policy options for health managers and planners (11). They observed that many promising interventions are relatively inexpensive and simple methods are available to monitor drug use and to identify inefficiencies. Box 2 summarizes their recommendations.

In his keynote address at the Second International Conference on Improving Use of Medicines, at Chiang Mai, Thailand in 2004, the WHO Regional Director for South-East Asia, Dr Samlee Plianbangchang, stated that “A drug should not be seen simply as a chemical but a chemical plus the information for its correct use. Often, prescribers do

**Figure 4: Strategies to improve the use of medicines**

<table>
<thead>
<tr>
<th>Educational:</th>
<th>Managerial:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Inform or persuade</td>
<td>✓ Guide clinical practice</td>
</tr>
<tr>
<td>– Health providers</td>
<td>– Information systems/STGs</td>
</tr>
<tr>
<td>– Consumers</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Economic:</th>
<th>Regulatory:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Offer incentives</td>
<td>✓ Restrict choices</td>
</tr>
<tr>
<td>– Institutions</td>
<td>– Market or practice controls</td>
</tr>
<tr>
<td>– Providers and patients</td>
<td></td>
</tr>
</tbody>
</table>

Source: WHO/INRUD course on promoting rational use of medicines, data on website (http://www.who.int/medicines).
not always have unbiased information such as formularies or standard treatment guidelines. On this issue, one important factor may be that health care systems do not always provide for effective education, either for health personnel or to the public. The point in this regard is on supplying drugs, with little or no emphasis on ensuring their rational use. Providing the right information should be an essential part of the drug supply system to fully ensure rational use, but unfortunately this is rarely done. The drug information that is readily available is from the pharmaceutical companies. These are primarily aimed at promoting the use of specific products, but not necessarily for the health benefit of the people.” (12).

Box 2: Ten recommendations to improve use of medicines in developing countries

The intervention strategies that have proven effective in some settings are:

- Standard treatment guidelines
- Essential drugs list
- Pharmacy and therapeutic committees
- Problem-based basic professional training
- Targeted in-service training of health workers

Some of the interventions which need further testing but should be supported:

- Interaction of health providers and consumers on proper use of medicines
- Training of pharmacists and drug sellers
- Educating the public about medicines by consumer organizations

Issues that require a long term equity approach:

- Improving prescribing in the private sector
- Monitoring key pharmaceutical indicators in health and regulatory sector’s reform

This document covers a variety of educational approaches for four groups of the population; namely, the public, health professionals, students in schools and universities and finally political leaders, policy makers and planners, where education could play an important role in improving the use of medicines. Different components of an educational programme such as printed materials, face-to-face meetings, interactive group discussions or training, problem-based learning, audit and feedback are relevant to the four groups. A range of possible interventions or activities is included in the educational programme of each group. Thus, there is some repetition as there are common areas that need to be emphasized for each of the four groups.

The primary objective of this document is to give an overview of the regional situation with regard to the rational use of medicines by giving information and advocating education as a vital component in improving the use of medicines. It aims to sensitize four categories of persons who need to understand and believe in the rational use of medicines and become actively involved in supporting and observing the principles and practices of the rational use of medicines. These categories of people are:

- The public
- All categories of health professionals
- Persons undergoing general education, and
- Policy makers, political leaders, planners and bureaucrats.

The document also reviews the challenges, and identifies what needs to be done to create awareness and educate the four categories of people in order to motivate them to find practical, realistic and innovative solutions and implement programmes and activities in order to ensure the rational use of medicines.

It is hoped that this document would initiate more activities in this neglected area and would lead to better use of medicines by all concerned, including the poor and the marginalized groups in the population.
Regional Perspective

WHO has been spearheading the spread of knowledge on the rational use of medicines in Member countries in the South-East Asia Region. Quality assurance, availability and accessibility of essential medicines and their rational use are being carried out in Bangladesh, Bhutan, the Democratic People’s Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, and Sri Lanka. To further develop this initiative in the Region, the National Agency for Drug and Food Control in Indonesia and the Food and Drug Administration in Myanmar are being strengthened. Enactment of legislation to institutionalize a National Drug Policy was assisted in Bhutan and Sri Lanka. Quality control of medicines and bulk purchasing of quality generic medicines to improve access and their proper use have been developed in Maldives. Development of national guidelines on cost-effective and rational use of medicines for medical professionals is being assisted in Timor-Leste. An initiative to reduce counterfeit drugs in the Region has been launched to promote the use of quality medicines. Some examples of country activities in the rational use of medicines are given below and also in Table 2 (p. 45) on the impact of interventions undertaken in the South-East Asia Region. It can be seen from the table that most interventions to promote the rational use of medicines in the Region that have been properly evaluated have been educational in nature and targeted prescribers in public primary health care facilities. A few interventions have targeted private pharmacies and the community, but none targeted private health professionals, which provide up to 80% of health care in many countries in the Region.
India
The Delhi Society for Promotion of Rational Use of Drugs (DSPRUD) has played a significant role in improving the medicine situation in government hospitals in the National Capital Territory of Delhi. Drug information materials were distributed by DSPRUD in Delhi and other States in India. These include the Essential Drugs List and Standard Treatment Guides.

Indonesia
The Centre for Clinical Pharmacology and Drug Policy Studies at Gadjah Mada University, Yogyakarta, has carried out a number of studies for improving the rational use of medicines. These studies include monitoring, training and planning (MTP) approach to rationalize antibiotic use in viral acute respiratory infection and to improve quality use of medicines in hospitals. Clinical pharmacology teaching, focusing on problems in medicine use, formulary and standard treatment guidelines; improving the quality of self-medication through mother’s active learning process and training of medical students to critically evaluate drug information and advertisements to promote rational prescribing are some of the areas of activity of the Centre.

Nepal
The International Network for Rational Use of Drugs in Nepal, INRUD-Nepal, has been actively conducting interventional studies and national training courses in promoting rational drug use since 1992. INRUD-Nepal has been holding a six-day, in-service training programmes on RUM for a decade. Nineteen groups including more than 500 health managers, planners and health workers have been trained.

Thailand
The First and Second International Conferences on Improving Use of Medicines was held in Chiang Mai in 1997 and in 2004, jointly organized by seven collaborating organizations including the Thai Network for Rational Use of Drugs (ThaiNRUD or INRUD-Thailand) – an organization of the International Network for Rational Use of Drugs.
ThaiNRUD has been coordinating efforts to promote the rational use of medicines among universities, public and private institutions as well as among individuals.

Three main recommendations came from the conference in 2004 where more than 472 participants from 70 countries presented their experiences. The recommendations were to:

1. Implement national medicines programmes to improve medicines use that should be:
   - Long term, with continued stakeholder commitment and adequate human resources
   - Cover all levels of health care in the public and private sectors
   - Based on local evidence, from the inbuilt monitoring system

2. Scale-up successful interventions which include:
   - Multi-faceted coordinated interventions rather than single ones
   - Structured quality-improvement processes possibly through Drugs and Therapeutics Committees
   - Monitoring the impact of interventions

3. Implement interventions to address community medicines use through:
   - Improving patient adherence as part of global treatment programmes
   - Encouraging school programmes
   - Regulating pharmaceutical promotion
Challenges Identified from Past Experience

The challenges are grouped under 4 categories:

4.1 Ensuring rational use of medicines

(1) One of the main problems in providing information on the rational use of medicines is the lack of a specific body or an organization that has ownership of this programme. Rational Use of Medicines is not a special unit in most governments; it is not owned by the Drug Regulatory Authority of a country or by the Directorate-General of Health Services. The government is used to working in clear-cut compartments and is comfortable with a vertical structure for, let us say, TB, HIV/AIDS, prevention of blindness, poliomyelitis or malaria. Programmes in the rational use of medicines cut across all these and other programmes, but there is no focal point and no staff in government departments to initiate activity or implement and monitor programmes in this important field. A Knowledge Centre for Rational Use of Medicines should be created.

(2) It is felt by some that programmes on the rational use of medicines and lists of essential drugs are meant for developing countries. Many countries would not like to be classified as a developing country or a poor country and so are not very eager to develop such programmes. Similarly, some “role-model” clinicians used to believe that a list of essential medicines and adherence to this list may be a solution for government hospitals in the public sector who care for the poor, but are not meant for the affluent public.
Both these opinions are flawed. Today, the essential medicines concept is becoming more universally accepted than it was 10 years ago. Improving access to essential medicines has become Target 17 of the UN Millennium Development Goals for collective action (6).

(3) In several countries, medicines are not always available in the public sector hospitals or at the primary health centre level. They may be available for three or four months in a year. A genuine feeling among health systems managers is that it is not very relevant to tell doctors, nurses, pharmacists, the general public and others about the rational use of medicines when there are no medicines. However, it needs to be emphasized that more rational use of medicines would lead to less wastage and better availability of medicines. In the past, most managers have not examined whether the use of medicine is rational or measured the level of wastage. A simple tool such as the VEN system would be helpful. The VEN System categorizes medicines as vital (V), essential (E) and nonessential (N). It is useful in prioritizing the purchase of medicines and preventing stockouts.

Actions to improve access to essential medicines have, however, been identified. They are rational selection and use, affordable prices, sustainable financing and reliable health and supply systems (5).

(4) The issue of rational use of medicines does not generate in politicians, policy makers and bureaucrats the enthusiasm that a more easily visible health problem like HIV/AIDS does. This low profile nature of the topic and near invisibility of this programme makes it difficult to project it as a priority for any country. There needs to be a greater awareness about health hazards and escalating costs from irrational use to generate interest in RUM.

(5) Priorities do change and this sometimes adversely affects programmes that are set up to provide information about the rational use of medicines. An example has been given in this paper where the modules on the rational use of medicines in
an induction course for doctors entering government service were dropped when the source of funding for the course changed (p. 57).

(6) Sometimes, there is a nexus between a pharmaceutical company and a doctor whereby the doctor prescribes the drug of that particular company. In this situation, providing information about the rational use of medicines is not likely to make much headway.

The pharmaceutical manufacturer provides drug information and educational materials for consumers and supports many related activities undertaken by medical, pharmacy and other related associations. The information provided may have commercial implications, which, in turn, could lead to consumer demand. This sometimes may not be rational from a cost-benefit or public health point of view. An attempt should be made to ensure that the manufacturer’s contribution does not promote inappropriate use of medicines or influence consumers with biased information on medicines.

(7) Irrational use of medicines occurs because irrational use does not always bring poor results. Thus, it is difficult to identify and show that it is wrong. For example, antibiotics are not always useful in acute viral bronchitis in most healthy young adults. The malady is usually self-limiting and is rarely followed by secondary bacterial infection. It usually gets cured in 7 to 10 days with supportive treatment. Taking an antibiotic will not necessarily affect the outcome and, in fact, the patient may think that the cure is due to the antibiotic.

(8) Irrational use of medicines exists partly (and some may say largely) due to the misinformation that is carried out by the manufacturer who obviously sees a greater profit due to greater turn-over. Hence, control of irrational use as well as promoting rational use require that this misinformation be controlled. In this context, encouraging patients and prescribers to be critical about drug information is vital.
4.2 Promoting rational use of medicines in general education

(1) It has not been easy to obtain airtime for programmes on the rational use of medicines either on radio or television. If airtime is given, it is usually given when people would not be listening to the radio or watching television.

(2) It has been seen that one or two exposures to programmes in the rational use of medicines do not make a difference. Sustained efforts are needed and this is not only difficult but is also expensive. Sustainability of such programmes is a problem. It has been observed that the enthusiasm generated by a programme – be it an exhibition, lecture, street play or a puppet show – becomes less after the actual event is over.

(3) While over-use of medicines is irrational, under-use is also irrational; e.g., overuse of antibiotics and under-use of oral rehydration salts are irrational use of medicines. Education must focus on the correct use, irrespective of over- or under-use. E.g., using an older medicine such as ephedrine for bronchial asthma is not a correct use of medicine. A medicine of choice is salbutamol, which is more specific and effective.

(4) Providing information to the patient is an important part of education on the rational use of medicines. For proper empowerment, the focus should also be on providing information on how to get information. Thus, educating consumers on good sources of information (some of which are easily accessible such as Product Information Leaflets or PIL) should be stressed. Strategies such as requiring PIL as a part of the registration requirement for medicines should be emphasized. At present, some countries do not insist on PIL. This is an important opportunity for education in the rational use of medicines that is being missed.

4.3 Training health professionals

(1) There are experts in communication also called transnational scientists (knowledge brokers) who are very good in
communicating messages. These experts would be the right persons to advise governments on how to get the message out to the people in a well-packaged manner. Unfortunately, these experts who could make a difference are in the private sector, are expensive and are not usually accessible to the government. It is important to work in collaboration with the industry so that the services of such experts could be obtained as part of industry’s contribution to this important programme. However, care should be taken that the industry does not promote inappropriate use of medicines.

(2) The medical, nursing, and pharmacy curricula are full and it is not easy to find additional time for the subject of rational use of medicines. If the topic is not included in the curriculum and questions are not set at the examination, it would not be studied by the undergraduates. One way to ensure that the students read the modules in rational use of medicines is to include such a subject in the curriculum and to set a question on it in the examination.

(3) Not much research has been done in the areas of health economics or therapeutics to demonstrate the economic and health benefits of programmes in the rational use of medicines. There is, therefore, no hard data to show the economists and others who allocate resources.

(4) Even in the field of medicines, rational use unfortunately, becomes a low priority because there are other pressing problems such as spurious and substandard or poor quality drugs, and paucity or absence of medicines which take up the attention of the authorities.

(5) Pharmaceutical companies, through their medical representatives, provide information about their medicines to the doctors. Unless the doctor is also provided objective and up-to-date information on the correct use of medicines, he or she accepts the pharmaceutical representative’s version that could lead to irrational use of medicines. Thus, the prescribers and the consumers should be alert about the information provided by
the company. There is a need for independent information generated/provided by the government/university for comparison with the information provided by the pharmaceutical company.

### 4.4 Obtaining political support

(1) Another problem that has been touched upon earlier is that while governments are willing to provide sizeable funds for health programmes like containment of malaria or elimination of leprosy, they are not convinced of the need to give funds for providing information, creating awareness and for health education. This could be because the Health Education and the Information, Education and Communication (IEC) departments have not, in the past, yielded much results or just because the policy makers believe that this is a low priority area when compared to other pressing needs. One of the solutions is to provide a percentage of the budget for information; e.g. 5% of the budget may be set aside for providing training and information on medicines.

(2) Unjustified and unethical claims for medicines are appearing in the press and on television. This conveys a very wrong message which counteracts the work done in spreading the message of rational use of medicines in the community. There does not appear to be any regulation of such activity.

(3) These are only some of the problems impeding the rational use of medicines, the provision of information about medicines and their proper use to the public, the professional and paraprofessional staff.

### 4.5 Implementation of WHO-recommended policy to promote rational use of medicines

WHO has recommended national strategies to promote the rational use of medicines as previously mentioned in Box 1. These 12 core interventions are based on evidence from the experiences gained over the past 20 years to promote the rational use of medicines ever since the definition of rational use of medicines
The Role of Education in the Rational Use of Medicines was first formulated in Nairobi in 1985. Much of this evidence was presented at the two international conferences on improving the use of medicines held in Thailand in 1997 and 2004. Fig. 5 shows data from the WHO Technical Cooperation for Essential Drugs and Traditional Medicine database of the pharmaceutical situation surveyed in 146 WHO Member States through a questionnaire in 2003. Unfortunately, it can be seen that many of the policies recommended by WHO are not being implemented. Without appropriate policies, it will be very difficult to achieve rational use of medicines through education alone because of all the other conflicting messages and incentives generated in health care systems because of inappropriate activities.

**Figure 5: Distribution (%) of countries implementing various activities towards promoting rational use of medicines**

<table>
<thead>
<tr>
<th>Activity</th>
<th>% Countries Implementing Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug use audit in last 2 years</td>
<td></td>
</tr>
<tr>
<td>National strategy to contain AMR</td>
<td></td>
</tr>
<tr>
<td>Public education in last 2 years</td>
<td></td>
</tr>
<tr>
<td>Independent CME for prescribers</td>
<td></td>
</tr>
<tr>
<td>DTCs in most referral hospitals</td>
<td></td>
</tr>
<tr>
<td>Information centre for prescribers</td>
<td></td>
</tr>
<tr>
<td>EML for insurance reimbursement</td>
<td></td>
</tr>
<tr>
<td>STGs updated in last 5 years</td>
<td></td>
</tr>
<tr>
<td>EML updated in last 5 years</td>
<td></td>
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</tbody>
</table>


*Results of survey conducted in 146 Member States.

AMR = Antimicrobial Resistance, CME = Continuing Medical Education, DTC = Drugs and Therapeutics Committee, EML = Essential Medicine List, STG = Standard Treatment Guidelines
The overall aim of public education in the use of medicines is to provide individuals and communities with information, and to foster skills and confidence, which will enable them to use medicines in an appropriate, safe and judicious way. Public education in the appropriate use of medicines is needed, because without it, people lack the skills and knowledge to make informed decisions.

Public education in the rational use of medicines includes patient instruction at the time of illness in the appropriate use of prescribed or dispensed medicines and instruction of the public at large, or specific target groups, in the principles and practical application of appropriate medicines use, including non-medicine therapies.

Policy makers and health administrators are generally reluctant to fund programmes aimed at educating the public about the proper use and common misuse of medicines because they are not convinced of the importance of doing so. On the other hand, large sums of money are allocated for other components of the programme such as procurement and distribution of medicines. One reason for this is that the benefits of educating the public in the proper use of medicines are not seen immediately, and the need for sustained interventions is not appreciated.

Without sufficient knowledge about the risks and benefits of using medicines and when and how to use them, people will often not get the expected clinical outcomes and may suffer adverse effects. This is true for prescribed medicines, as well as medicines used without the advice of health professionals. Governments have a responsibility to
ensure both the quality of medicines and the quality of information about medicines available to consumers. This will require:

- Ensuring that over-the-counter medicines are sold with adequate labeling and instructions that are accurate, legible, and easily understood by the public. The information should include the name of the medicine, indications, contraindications, dosages, drug-interactions, and warnings concerning unsafe use or storage.

- Monitoring and regulating advertising on television, radio, newspapers and the internet, which may adversely influence consumers as well as prescribers.

- Running targeted public education campaigns, which take into account cultural beliefs and the influence of social factors. Education about the use of medicines may be introduced into the health education component of school curricula or into adult education programmes such as literacy courses.

The following section describes some of the studies carried out using educational interventions aimed at the public. Many of these studies have been only qualitative in nature and have not quantified the benefits. The section is arranged by different types of target groups and approaches.

### 5.1 Patient-oriented programmes

The Delhi Society for Promotion of Rational Use of Drugs carried out a study on the comprehension of patients to information provided on medicines they were prescribed (13). It clearly indicated that patients who were provided the information knew more about these medicines and how to use them than the control group of patients who were not provided the information. It was further shown that the patients retained this knowledge and remembered salient features of the medicines being taken by them. However, the study is incomplete because the follow-up to demonstrate that this knowledge enhanced compliance and that the enhanced compliance resulted in improved therapeutics and reduction in expenditure on medicines, has not yet been done. This
study demonstrates the weaknesses of most of the studies done on the effect of public education on the rational use of medicines.

A study providing adequate information to general practice patients about their drugs prescribed at primary health care facilities was undertaken by Akici et al. (2004) in the School of Medicine, Marmara University, Istanbul, Turkey (14). A total of 1618 patients were asked about the name(s) and effect(s) of the drug(s) on their prescription. Factors that might influence the background knowledge and perception of patients such as sociodemographic characteristics, drug-use habits and practitioners’ attitude were also questioned. The level of education and gender had a positive impact on recalling drug names. Patients who received a refill prescription, with a chronic disease and who had self-medication before applying to the health centre reported more accurate information. It was inferred that patients, particularly who are poorly educated, males, and who received a first prescription know little about their prescribed medicines. These results also suggest that a patient’s knowledge about medicines is an important issue regarding their rational use which deserves urgent improvement.

5.2 Community-oriented programmes

The Department of Essential Drugs and Medicines Policy, WHO/HQ, and the University of Amsterdam organized an International Training Course on Promoting Rational Drug Use in the Community. It was hosted by the Makerere University, Child Health and Development Centre in Entebbe, Uganda in 2001 (15). Twenty-nine participants from ministries of health, universities, development agencies, and nongovernmental organizations in 17 countries attended this course. The sessions explored how to identify and prioritize community medicine use problems and how to develop appropriate public education intervention strategies and communication channels, pre-testing materials, impact evaluation, fund raising and networking. The course received wide acclaim for its innovative approach to community education in developing this course, with emphasis on interventions that take into account the social and economic context in which health and medicine-seeking behaviours occur and on developing strategies with community inputs.
A well-designed study has been carried out by Kafle and his colleagues in Kathmandu and Lalitpur districts in Kathmandu Valley in Nepal (16). This was a randomized controlled study on the impact of an article on drug use in the community. The group who was provided this article had better information and knowledge about the use of commonly used medicines in the community such as medicines for diarrhoea and cough. This group, consisting of 92 households, also knew more about the precautions to be observed when medicines are taken in the presence of liver and kidney diseases than the control group of 100 households. Again, the benefits accruing from this improved level of knowledge have not been studied in either therapeutic or economic terms. One could only presume from this and the earlier study (15) that better knowledge led to better use of medicines but the actual quantified data which would lead policy makers to invest in such programmes is lacking.

An interesting study on the use of a flip chart to teach the correct use of medicines was carried out in Bangladesh. The educational material to improve drug use and understanding was developed jointly by WHO, DANIDA and PATH (U.S. Programme for Appropriate Technology in Health). The Bangladesh Essential Drugs Programme provided educational messages and pictures in view of the low literacy levels in the population. Again, the effects of this innovative programme on the knowledge of the recipients or on compliance have not been measured.

Hubley (2006) has reviewed studies on patient education in the developing world. He states that health education programmes also improved adherence to regimens for the treatment of acute respiratory infections, malaria prophylaxis and treatment and use of ivermectin to prevent onchocerciasis (17). Hubley describes in detail the Leeds health education programme which has carried out extensive searches for health promotion interventions directed at communities in the developed world (18). Reports identified in this review show that well-planned educational programmes can be effective in communicating information to patients; e.g. to reduce their use of injections, improve adherence to regimens for antibiotics and other medicines, proper
treatment of acute respiratory infections, malaria prophylaxis and treatment of onchocerciasis using ivermectin.

A well-planned communication programme carried out in Indonesia reduced injections in public health facilities (19). More than 60% of patients received at least one injection on visiting the public health facilities. The effect of Interactional Group Discussion (IGD) was studied in overuse of injections. Prescribers as well as patients participated in the study. While the prescribers stated that patients demanded injections, most patients indicated that giving an injection was decided by the prescriber although there were some who asked for an injection. The participants were guided in their discussion on the principles of injection use and the possible risks of misuse. A small scale study showed that there was a decrease in injection use in the intervention group when compared to the control group indicating that IGD could reduce the unnecessary use of injections. Further observation in a limited study showed that the reduction was sustained for at least two years (Fig. 6). Communicating the results of this intervention study to policy makers, health officials and the public created a nation-wide movement with an impact on injection use in Indonesia (20).

**Figure 6: Long-term impact of interactive group discussion (IGD) intervention on injection use**

![Graph showing long-term impact of IGD intervention on injection use](image)

The Delhi Society for the Promotion of Rational Use of Drugs organized a workshop on “Education of the Public” in the rational use of drugs in 2004. The workshop recommended that the following strategies be adopted for training in rational use of medicines. Use of posters, radio, television, newspapers, magazines, persuasive print material, clinical literature and news materials, one-to-one interactive visits at the community level, open house meetings on rational use of medicines and involvement of the Resident Welfare Associations in the dissemination of information on rational use of medicines.

5.3 Women, women’s groups and mothers

Kidane & Marrow (2001) reported on the effect of teaching mothers to provide home treatment for malaria in Tigray, Ethiopia (21). The researchers surveyed 37 groups of villages, calculated the under-five mortality rates and then paired the villages according to their rates. One village of the pair, randomly selected, had all the mothers trained in providing treatment for malaria while the other village served as the control. This intervention of training the mothers resulted in a major reduction in under-5 mortality in holoendemic malaria areas. The method seemed to be replicable in most circumstances and therefore, more such studies should be carried out. Providing information and some training to the mothers was not difficult.

The importance of mothers and women in general being utilized as agents for inducing change and making a difference has not been emphasized adequately. It is believed that empowerment of women – mothers, wives, grandmothers – in better use of medicines could be an important step. Another example of this has been provided by Bratt (2001) in Port-of-Spain, Trinidad (22). By educating mothers in the use of Oral Rehydration Therapy, he was able to reduce admissions and mortality by 50% at the two major hospitals in Port-of-Spain. Bratt observes that mothers are desperately hoping for health education and will follow guidelines and instructions provided these are given with kindness and patience by persons in whom the community and the mothers in the community have confidence.
Women, although not recognized as health care workers are, in fact, responsible for 70% to 80% of all health care in developing countries (7). Women bring home medicines and administer them to the children. Women therefore must have sufficient knowledge to select the medicines that are available without prescriptions and to ensure that the medicines brought into the house are used properly. The mother is the most important health worker for her children and that role extends to the purchasing and administration of medicines.

Kafle et al. (2001) conducted a study to evaluate the impact of a wall poster on antibiotics developed by the organization, Pharmaceutical Horizon of Nepal (PHON), (23). The study was conducted in Lalitpur, one of the districts of Kathmandu valley, and included 150 randomly selected households. The wall poster in the national language (Nepali) was circulated through a newspaper published in the national language. The households were interviewed one month after circulation of the poster. The study found that the messages highlighted by prominent layout were understood by more households than the lengthy and congested message.

In another study, Kafle et al. (2001) showed the effect of creating awareness among school teachers and women’s groups on the use of medicines in the community (24). This study was conducted in association with the Alliance for the Prudent Use of Antibiotics. The study was carried out on 28 literate housewives and 24 school teachers. The intervention consisted of training in the use of medicines for 25 hours extended over five days. The results indicated that there was a significant improvement in the knowledge of school teachers even two and six months after training. Each group was its own control before the intervention. They knew more about the use of antibiotics, vitamins and tonics, cough preparations and DPT vaccine and expired drugs after the training. Similarly, the women’s groups such as housewives also had much better knowledge at the end of the training period. Again, the effects of this important knowledge have not been assessed.
5.4 Drugstore clerks and sellers

Drugstore clerks and sellers of medicines are not para-professional staff and yet have considerable influence on the rational use of medicines, since a large number of persons go directly to drug shops and pharmacies and depend on the drug sellers to tell them what medicines to take. The public then purchase these medicines and take them. Self-medication is very common in developing countries. The WHO publication on Public Education in Rational Drug Use (1997) states that in some parts of the world, up to 80% of illness episodes are self-treated with modern pharmaceuticals (25). An interesting study has been carried out on drug sellers in the Philippines. Sai et al. (2001) state that the inappropriate dispensing practices of drugstore clerks in the Philippines contribute immensely to irrational use of drugs (26). Their first intervention was to hold a moderated interactive group discussion with senior drugstore clerks and mothers. The second intervention was to conduct face-to-face visits to the drugstores. One result of both interventions was a significant decrease in the dispensing of amoxicillin for acute respiratory infections that are usually viral infection. There was no change in the use of amoxicillin in the control group.

The Makerere Institute of Social Research and the Danish Bilharziasis Laboratory organized a workshop on “People and Medicines in East Africa” in 1998 in Uganda (27). Several studies presented in this workshop underlined that self- and home-treatment of common ailments is widespread in rural and urban areas in East African countries. Further, potent pharmaceuticals, especially antimalarials are generally available and not always used appropriately by the public. In this workshop, researchers presented different intervention initiatives to improve drug use. The researchers from Kenya had trained shopkeepers in improved medicine selling practices resulting in improvement in sales in terms of choice of appropriate medicines. Researchers in other countries may wish to experiment with similar innovative training methods.
A study carried out at Lagos in Nigeria evaluated what drug sellers know about malaria and how they treat their customers. The tools for the study were in-depth interviews and an observer-administered questionnaire. The studies were carried out in 67 drug outlets in the Lagos metropolis. Some of the results are very interesting and demonstrate clearly the need for educating this group of persons in the rational use of medicines. Only 21% of the respondents knew and recommended the correct paediatric dose of chloroquine. Thirty-three percent knew about the safety of chloroquine in pregnancy and breastfeeding. Forty-nine percent said they administered injections at their outlets while 75.4% said they preferred treating acute malaria by injections rather than by oral tablets. The authors concluded that there is a need for an educational intervention to correct the misconceptions about malaria among drug sellers. Further, they should be encouraged to use Standard Treatment Guidelines (28).

Another study was carried out in Nepal with pre- and post-comparison of two interventions—action-oriented small group face-to-face training combined with reinforcement materials, and audit feedback using retailer specific practice—randomly allocated to four different medicine retailer groups. The study concluded that short, focused small group training is effective to improve retailers’ practices (29).

### 5.5 Varied approaches to public education

Several other approaches have been used to provide information about the proper use of medicines and about the harmful effects of irrational use of medicines.

**Street theatre**

Street theatre performed both at urban and rural centres is one such approach. The Delhi Society for Promotion of Rational Use of Drugs organized street plays in association with four women’s colleges in Delhi on different days. The message given was that of India’s Prime Minister Pandit Jawahar Lal Nehru who said that “if a women gets educated, the entire society gets enlightened.” There was great interest...
Box 3: Raising public awareness and calling for public action via street theatre in Germany

“I’ve seen your theatre bus, it is wonderful!” “Let me tell you what happened to ME…” “BRAVO! Please let me sign your petition to send to drug company X.” Such are the comments that followed the BUKO Pharma-Kampagne street theatre performances across Germany. This grassroots NGO, funded by the Lutheran Church and the European Community, recruits actors from all over the country to perform in principal shopping areas during peak hours, and in local assembly halls or schools in the evenings. Flyers and information booklets about a selected topic are also distributed, and members of the audience may have the opportunity to sign protest cards or a petition. During the day, a pertinent slide show may be shown in the theatre bus; evening (“inside”) performances are often followed by a slide show and lecture/discussion.

The themes of the street theatre performances vary from general education about rational drug use, to the very specific issue of decreasing the use of benzodiazepines (sedatives), to raising the public’s awareness to certain actions of pharmaceutical companies in developing countries. Themes are developed according to the priorities of the BUKO Pharma-Kampagne, and are discussed by a multi-disciplinary planning group consisting of pharmacists, medical doctors, community members and street theatre performers (often social/political activists).

The medium of street theatre was selected in order to reach the “common people”, whom the group feels may be difficult to reach via printed materials only. The success of this activity depends largely on the commitment and motivation of the actors. BUKO Pharma-Kampagne puts on 1-2 tours per year, with 30 performances per tour; each performance reaches between 10-50 people. They judge their success by the reaction of the audiences, and claim that besides funding, their only real constraint is bad weather.

in the plays that were eagerly watched by the people, including students and teachers.

Street plays on the rational use of medicines have been performed in Germany. The BUKO Pharma-Kampagne uses street theatre presentations to raise public awareness about rational drug use. The themes of the performances vary from general education about rational drug use to the very specific issue of decreasing the use of benzodiazepines. The BUKO Pharma-Kampagne puts on plays once or twice per year with 30 performances per tour. Each performance is attended by 10 to 50 persons. It is difficult to assess the impact of such street plays. Immediate interest in the theme of the play does not perhaps lead to any change in behaviour. The sustainability of this type of intervention is also not of a high order.

Other approaches used in different countries are briefly described below. The effects of such interventions have not usually been measured. Where measured, the results have been summarized in Table 2 (p. 45).

**Printed materials**

A European Union (EU) legislation (Council Directive 92/97 EEC) stipulates that medicines dispensed in the Union must be accompanied by a printed Patient Information Leaflet (PIL). This PIL contains information which the EU considers a responsible patient should know. This move has been welcomed both by prescribers and the public. The Standards Committee of the General Medical Council in the United Kingdom has agreed that doctors prescribing medicines should be familiar with the information on a PIL and should be able to explain it to the patient.

The Australian Government has drawn up guidelines after considerable public discussions on the provision of information to patients about proposed treatment and procedures. These guidelines have been widely circulated to health professionals and to the public in Australia. The government has recognized that public education can be an effective tool for promoting appropriate use of medicines.
The usefulness of educational materials in providing information to the public needs to be assessed. It is generally believed that a face-to-face discussion is the best way of providing information which may lead to a change in behaviour. However, in spite of this knowledge, educational material for informing the public about medicines continues to be prepared and disseminated. Some of the types of educational material prepared are posters, leaflets, comics, news articles, flip charts, puppets, radio spots, radio programmes, TV spots, TV programmes, songs and jingles, scripts for theatre, books and booklets, instructional materials and videos.

**Public lectures**

Empowering the public to know more about the medicines they use is another approach which could be followed. In association with the Bharatiya Vidya Bhawan and the India International Centre, DSPRUD has organized a series of public lectures in Delhi where experts provide information on diseases and on the proper use of medicines for a number of conditions. These included backache, stroke, medicines used in old age, mental depression, arthritis, hypertension, Alzheimer’s disease, gastrointestinal diseases and diabetes. There was active interaction at the end of each lecture and the audience was encouraged to talk about or ask questions related to their illness and the medicines they take. The Leeds Metropolitan University offers a 10-week course in community-based health education and health promotion with specialist options, including one on medicines and essential drugs. Participants either finish after 10 weeks or study further in their distance education programme for a diploma (18).

**School projects**

School education programmes have been tried in developed countries (25). In an attempt to provide 11 to 12-year-old children in Australia with more information on the use of medicines, a group has developed a school resource kit called “Using drugs for good or ill : the Tay-Kair” kit. Tay-Kair is a jolly fellow – also a child – from outer space who wants to know just what these mysterious things on earth called drugs are. This kit has been the subject of assessment as a pilot project in
Students are “open” to new information; learning is their job. Students are also prone to using medications, especially in order to study well during examination time.

Knowing this, the higher-educational institutions (non-university) in Belgium requested Projekt Farmaka, a non-profit independent organization, to assist. The result, designed and developed by a planning group consisting of a pharmacist, prescribers and students, was an innovative “pill-box” of information destined for distribution in schools and student clubs. The choice of subject matter in these “pill-boxes” was based on the most common illnesses and complaints and on the most commonly used medicines by students. The main message? “Use a medicine ONLY WHEN IT IS NEEDED.”

But activities went far beyond the simple distribution of the “pill-boxes”. Information stands were set up during school breaks and at lunchtime, with displays and posters. In order to get a “pill-box”, a student had to complete a quiz form with five pertinent questions. Workshops were held with the students to discuss the information. The mass media also participated, with radio interviews and television announcements.

The campaign was well timed. It was held during the examination period, when students are prone to taking vitamins and “pep pills”, and to having sleep-related problems. The students were particularly open to discussions about medications, and wanted to learn more. Some schools have established a “medicines panel” to disseminate additional information about problem drugs, and to discuss issues like sports and diet. Other schools are organizing question-answer sessions focusing on medications.

The “pill-box” concept was innovative and sparked people’s curiosity. The materials could be improved, to be sure, and future campaigns will take into consideration more of the students’ views on content, in addition to design.

schools in Queensland, New South Wales, Canberra and South Australia and has now been given clearance for distribution by every state and territory public education authority in Australia.

Another innovative project for students is the novel “Pill Box” information campaign in secondary schools in Belgium. The “Pill Box” information which will be distributed to students and students’ clubs has as its main message – “Only when it is needed” – meaning, use a medicine only when it is needed. A campaign was carried out during which information stands were set up during school breaks and at lunchtime, with displays and posters. Workshops were held with the students to discuss the information in the Pill Box. The mass media also participated and radio interviews and television announcements were made regularly. It was observed that the students were particularly open to discussions about medicines and wanted to learn more. The Republic of Latvia has also set up Pill Boxes. The sustainability and continued impact of such campaigns remain to be assessed.

Sweden has launched a nationwide programme on medicines to be implemented in all schools. The Swedish programme ensures that rational use of medicines is introduced into textbooks, that it is included in the curriculum and that eventually, schools throughout the country would expose the young students to the concept of rational use of medicines (25).

In the USA, pharmacy students in one programme are teaching younger children about drug safety and drug compliance and encouraging students to take more responsibility for their own health. The Michigan Model of Comprehensive School Health Education was aimed at primary school children and adolescents. Teachers were trained to raise awareness about health problems and reduce risk behaviours. In Texas, “Tex’s Team” were established whereby pharmacy students are used to teach groups of 8- to 9-year-olds about drug safety and compliance. In Iowa, members of the Young Pharmacists Committee worked with children 5 to 7 years of age and encouraged them to take responsibility for their own health and to ask questions from the pharmacist. Their talks to the youngsters were complemented by video screenings and discussing newspaper articles (25).
The “Good Use of Medicines” project in France produced a widely disseminated teaching kit for 9- to 11-year-olds containing a cartoon and exercise booklet, a poster and teaching notes (25). More attention is being given to programmes introduced in different parts of the world for children. This is a sphere of activity that needs to be developed in countries of the South-East Asia Region.

**Mass media**

The World Health Assembly (WHA) in 1998 took up the issue of increasing use of electronic communications for promotion of medicinal products and was concerned with uncontrolled advertising, promotion, and sale of medical products using the internet. The WHA through its Resolution WHA51.9 on *Cross-border advertising, promotion and sale of medical products using the internet* appealed to the industry, health professions, consumer organizations and interested parties to encourage their members, where appropriate, to promote the formulation and use of good information practices consistent with the principles embodied in the WHO Ethical Criteria for Medicinal Drug Promotion.

Direct-to-consumer advertising is being used increasingly to inform the public and to influence their opinion, attitudes and behaviour on matters relating to medicines, which in turn, influence their purchase and use. This type of advertising allows pharmaceutical manufacturers to market medicines directly to the public via television, radio, print media, and the internet. However, the information provided should be reliable, accurate, truthful, informative, balanced, up-to-date, capable of substantiation, and in good taste. The information advertised should be regulated as much as possible.

Several projects have been developed where information about the use of medicines is provided through telephone services (25). Such telephone services have been set up in Peru where the programme, Hello, IPSS was initiated. It is a system of orientation, information and medical education for health. The Sierra Leone Medical and Dental Association holds a weekly one-hour phone-in programme called,
“What the doctor says”. Tele-info Medicines provides health information to people in the Netherlands. DES Action, Canada, runs a telephone service. DES Action, USA, runs a television and radio programme. The Pills and Older Persons Project (POPP) in Australia, used radio spots and newspaper articles, complemented by a relaxation video. Another Australian project, Tranquilizer Recovery and New Existence (TRANX), used newspapers, radio and television. Med-Smart runs a telephone advisory service for enquiries about medicines and a telephone reminder service for “at risk” consumers. Switzerland has also established a phone service to provide the public with objective information about medicines.

The beneficial effects of a short but intense educational programme in Mexico is summarized in Box 5.

5.6 Approaches that have been evaluated in the SEA Region

The effect of interventions for improving rational use of medicines have been evaluated in different countries with a focus on private pharmacies and communities. They are briefly described in Table 2 (p. 45) with references from 30 to 41.

5.7 Constraints in public education

A common goal of public education and communication includes changing harmful behaviour of a particular group of people. Behaviour change, however, takes place along a process that begins with awareness of an issue or problem and culminates in adopting a new behaviour that will address or solve that problem. The interventions to raise awareness and provide knowledge may be effective even if aimed at a large, unspecified target audience.

This brief review of the activities undertaken so far clearly indicates that while some efforts are being made in educating the public on the rational use of medicines, they are not coordinated, many lack sustainability while evaluation of the impact of innovative approaches
The role of education in the rational use of medicines has not been built into new programmes. There are, of course, several constraints, which have to be surmounted. Some of these are:

- the low priority generally accorded by countries to programmes for educating the public,
- paucity of funds for such programmes partly due to the low priority given to these programmes and partly due to competing demands of high priority areas,
- scarcity of published materials developed for these programmes,

Box 5: Michoacan, Mexico holds a campaign: Towards the Rational Use of Drugs

Given evidence of an overabundant use of medications by the general population, of an over-prescription of medications by medical doctors, and of unethical drug promotion, a nongovernmental organization in one state of Mexico embarked on a short but intense education campaign. Participants in the planning were prescribers, government officials, community members, students, the media, and communication experts.

The campaign targeted the general public, and also prescribers and medical students. Materials developed included posters, leaflets, press articles, slides, radio and television programmes, and posters for doctors. Many of the printed materials were displayed at points of prescription; others were used during three-day seminars held at the local medical school. The mass-media broadcasts lasted for three months, with increasing intensity just prior to the medical school conferences.

Feedback after the campaign was very positive. Medical professionals and students expressed increased awareness of the problems. The pharmacology curriculum of the local university was revised. Articles published in the local and national press suggested a significant change in general knowledge about rational drug use.

### Table 2: Impact of interventions undertaken in the South-East Asia Region

<table>
<thead>
<tr>
<th>Country</th>
<th>Reference</th>
<th>Facility</th>
<th>Prescriber</th>
<th>Intervention</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nepal 1996</td>
<td>Kafle 1998 (30)</td>
<td>Private pharmacies</td>
<td>Trained layperson</td>
<td>Small group training on diarrhoea and ARI with feedback</td>
<td>Acute Diarrhoea: ORS increased by 15% &amp; antibiotics by 10-20%; Pneumonia: Antibiotic use increased by 25%; Pregnancy: iron-folate use reduced by 6-9%.</td>
</tr>
<tr>
<td>Indonesia 1992</td>
<td>Ross-Degnan et al 1996 (31)</td>
<td>Private pharmacies</td>
<td>Trained layperson</td>
<td>Educational outreach with one-to-one meetings with shop owners and counter assistants on management of acute diarrhoea.</td>
<td>ORS increased by 21% &amp; anti-diarrhoeals reduced by 20%.</td>
</tr>
<tr>
<td>Thailand 1991</td>
<td>Podhipak et al. 1993 (32)</td>
<td>Private pharmacies</td>
<td>Trained laypersons and pharmacists</td>
<td>Small group training plus STGs on treatment of acute diarrhoea.</td>
<td>In trained laypersons, ORS increased by 2%, antibiotics reduced by 7% &amp; anti-diarrhoeals reduced by 10%; In pharmacists, management unchanged.</td>
</tr>
<tr>
<td>Thailand 1997</td>
<td>Karolinska Institutet (33)</td>
<td>Private pharmacies</td>
<td>Pharmacy assistants</td>
<td>Shop inspection by regulators, small group training of shop owners and counter assistants and peer review in groups using self-filled forms.</td>
<td>ORS use increased by 11% in management of acute diarrhoea by compliance with STGs remained virtually changed.</td>
</tr>
<tr>
<td>Country</td>
<td>Reference</td>
<td>Facility</td>
<td>Prescriber</td>
<td>Intervention</td>
<td>Outcome</td>
</tr>
<tr>
<td>---------------------</td>
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<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Nepal 2002</td>
<td>Karkee et al. 2004 (34)</td>
<td>Households</td>
<td>Community members</td>
<td>Public education campaign involving training of teachers and school children plus street theatre performed by the children</td>
<td>Increase in use of antibiotics for pneumonia by 10-15% and increase in consultation with female community health volunteer by 25%.</td>
</tr>
<tr>
<td>Nepal, Kathmandu 1984</td>
<td>Pandey et al. 1989 &amp; 1990 (35, 36)</td>
<td>Households</td>
<td>Community members</td>
<td>Community case management - CHWs trained to identify and treat acute childhood pneumonia</td>
<td>Infant mortality due to ARI reduced by 59%</td>
</tr>
<tr>
<td>Bangladesh 1986</td>
<td>Fauveau et al. 1992 (38)</td>
<td>Households</td>
<td>Community members</td>
<td>Community case management - CHWs trained to identify and treat acute childhood pneumonia</td>
<td>Infant mortality due to ARI reduced by 26%</td>
</tr>
<tr>
<td>India 1985</td>
<td>Reddaiah &amp; Kapoor, 1991 (39)</td>
<td>Households</td>
<td>Community members</td>
<td>CHWs &amp; mothers trained on ARI, immunization and drug supply.</td>
<td>Infant mortality due to ARI reduced by 40%</td>
</tr>
<tr>
<td>India 1993</td>
<td>Bang et al. 1999 (40)</td>
<td>Households</td>
<td>Community members</td>
<td>CHWs trained to manage the neonatal problems including birth asphyxia and sepsis</td>
<td>Infant mortality reduced by 46%</td>
</tr>
<tr>
<td>India 1998</td>
<td>Anand et al. 2004 (41)</td>
<td>Households</td>
<td>Community members</td>
<td>Community case management - CHWs trained to identify and treat acute childhood ARI &amp; diarrhoea</td>
<td>Infant mortality reduced by 13%</td>
</tr>
</tbody>
</table>

• high cost of printed material and high cost of using the electronic media even though these costs are usually lower than educational strategies involving face-to-face encounters,

• weak or non-existence of an infrastructure that can undertake activities to promote the rational use of medicines,

• paternalistic attitude of health professionals towards consumers and patients. Illiterate patients cannot question about the prescribed medicines and are taken as dispensed.

• low priority given to the rational use of medicines by policy makers,

• the imbalance between objective information about medicines and information provided by the pharmaceutical companies, and

• lack of experts in communication who are interested in working in the field of rational use of medicines. There needs to be awareness of this issue and appropriate incentives must be given to improve the situation.

This document has so far highlighted the importance of providing information about the proper use of medicines to the public and health professionals. It has described some of the work being carried out. It has also listed the different mechanisms available – face-to-face meetings, written messages, use of the radio, the electronic media and the folk media – and has identified the prevailing constraints.

5.8 Recommendations for community programmes

With these considerations in mind, one can now try to identify some groups, among the many, at whom educational programmes in the rational use of medicines could be aimed. There are many groups which come to mind – all of whom could profit by participating in the programmes. However, mechanism(s) need to be identified for interaction of relevant groups to achieve the educational objective. The different groups that could be considered are:

• Patients and Patient Groups
Women’s Groups and Self-Help Groups
• Resident Welfare Associations
• School Children
• School Teachers
• Village Communities
• Farmers’ Groups
• Religious Groups and
• Nongovernmental Organizations (NGOs).

It is felt that patients need to be provided information with the hope that their relatives would also benefit from this exchange of knowledge. A second group would be women’s groups and mothers. The importance of initiating programmes for women and for women’s groups and mothers has been repeatedly stressed in the UN Millennium Development Goal Document (7). The third group is the students of today – the citizens of tomorrow. It is interesting that although studies on children have been initiated in many parts of the world, such studies have not been carried out, by and large, in countries of the South-East Asia Region.

An active, aggressive and well-planned programme should therefore be initiated for patients, women and mothers and for children, including adolescents. All three groups would be interested in participating in the programmes – the patients because they are using the medicines, the women and the mothers because they are looking after their families and also because they would not like money to be wasted on unnecessary medicines. The children would be interested because they are naturally curious at this age and are eager crusaders once they are convinced that what they are doing is the right thing. Let us look at each of these groups and identify what mechanisms should be used.

Patients, patients’ relatives and patient groups

Objective information about a selected number of medicines and how these should be used could be given to this group by means of a
face-to-face dialogue with trained communicators. This dialogue should be accompanied by written information, succinctly and simply written in the language of the patient. Patient Information Sheets of 50 medicines in English and Hindi have already been prepared by DSPRUD. Other organizations would also have similar material. It is felt that this one simple intervention would make a difference. The pilot studies carried out would indicate the points to be included in the final study protocol. These studies should be planned so that measurements could be made before and after the interventions. Once the results are obtained from a few studies, it would not be necessary to document all such studies from a research point of view.

**Women, women’s groups and mothers**

Today, there are women’s groups in all countries. There are also self-help groups. Mothers would have to be identified through these groups. One mechanism to be used for making this group aware of the concept and practice of rational use of medicines would be through radio programmes. These programmes should be broadcast when these women are relatively free and could listen in. The UN Millennium Goals Document has identified the radio as a powerful medium for effecting changes (7). The programmes would have to be interesting and should bring out the salient features of better therapeutics at reduced costs. There should always be time for a question/answer session to make the programmes more participatory. Again, if possible, another mechanism that could be used would be face-to-face dialogue with well-trained communicators with sufficient knowledge on the rational use of medicines.

Improvement of knowledge on medicines most commonly used in households and the quality of self-medication through mothers’ active learning method (CBIA – Cara Belajar Ibu Aktif in Indonesia) has been shown by Suryawati (Fig. 7). The study showed that the scores of knowledge increased significantly in both the CBIA group and the seminar group in comparison to controls, where there was no change. In addition, the increase in knowledge in the CBIA group was significantly greater than among mothers attending the seminar (42).
Schoolchildren and adolescents

Some of the programmes that have been effective in educating children are described briefly in this section.

The Pill Box programme appears to have been successful in several countries including Belgium and France. This entails the preparation of a pillbox full of information about medicines interestingly written. The message could be the same as used earlier – “Only when it is needed” or it could be another message. The programme would need to be introduced after convincing the teachers of its benefits. The programme would not succeed unless their support is obtained and should be introduced in a phased manner at centres where the teachers show an interest.

The Pill Box should be complemented by a host of other activities relating to the rational use of medicines at the school – quiz forums, workshops, radio programmes, posters, announcements, painting competitions, displays and other means of creating interest.
Another activity aimed at schoolchildren would be to follow the Swedish model and ensure that rational use of medicines is introduced at the school level (p. 41).

Although these groups have been given priority in the programme of creating awareness and providing information, this does not mean that some programmes should not be introduced in other groups too. However, the objective is to implement well-planned programmes with built-in mechanisms to measure impact, both in therapeutic and health terms, as well as in economic terms. It would be easier to start by carrying out the studies in carefully selected segments of the population with carefully selected interventions. This is what has been done in Sweden (25).

5.9 Future programmes

It is important now to look to the future. One thing is very clear – that studies undertaken from now on should include an evaluation component. The impression that studies of the type described are “soft” studies and that hard data and quantitative information will not emerge from them must be changed. If this perception persists, then the resources needed for these programmes will not be obtained.

Another important consideration to keep in mind is that the personnel of the Information, Education and Communication (IEC) departments of the government may have played an important role in the past but today the need is also for trained professionals with knowledge in the rational use of medicines inducted into the IEC programmes.
Doctors, nurses and pharmacists comprise the group to whom the public turns to when they want information about medicines. These professionals must keep themselves up-to-date by attending conferences, workshops, and seminars on medicines including those on rational use of medicines. The lack of knowledge about programmes like the rational use of medicines among these very important categories of professionals is startling. These programmes should have an inbuilt system providing training in proper prescribing and dispensing practices, and in regular monitoring of interventions to promote rational use of medicines. Once these prescribers are trained, they could play a more positive role in spreading the message on the rational use of medicines.

If doctors, nurses and pharmacists are not aware about the benefits of these programmes, they could unwittingly play a negative role. However, there are other categories of health paraprofessionals who also need to know about the rational use of medicines. Some of these other categories are occupational health personnel, technologists (technicians working in laboratories), administrators dealing with health insurance schemes, stores management personnel, wholesalers and retailers of medicines. They should know about the concept and practice of the rational use of medicines. A study of the literature shows that some efforts have been made to create awareness in doctors, pharmacists and stores personnel. The other categories of persons dealing with health have not been looked at. Of all the countries in the South-East Asia Region, Thailand has made headway in not only providing information to nurses but in involving them in programmes on the rational use of medicines (p. 63, under Thailand).
6.1 Methodologies tested in health professionals

Several methods tested in health professionals include printed materials, face-to-face meetings, one-to-one meetings, undergraduate education and continuing medical education, education in associations with audit, feedback and supervision, and problem-based teaching methods. The electronic interactional programmes has a scope in the future. They are briefly described below.

Printed materials

A variety of printed educational materials have been developed and tested. These include Standard Treatment Guidelines (STGs), drug formularies, journals, bulletins and package inserts. For example, STGs have helped in improving the drug cost/patient cost in Nepal, and in reducing injection use in Indonesia (43), Nepal (44), Sri Lanka (45), and Thailand (46). Proper use of STGs have also helped in reducing use of drugs for diarrhoeal diseases and increasing use of ORS in India (47, 48, 49) and Thailand (46).

Face-to-face meetings

Face-to-face meetings in small groups and large groups are very useful ways of providing information that may lead to a change in behaviour. Small group training on diarrhoea and on ARI, with feedback, in Nepal, resulted in increasing use of ORS by 15% and reduction in antibiotics use by 10-20% respectively (30). Further, antibiotic use in pneumonia increased by 25% and iron-folate use reduced by 6-9%. Small group training plus self-monitoring in diarrhoea treatment resulted in a 15% increase in use of ORS, and a reduction in antibiotic use by 60%, but by 1-7% only without self-monitoring in Nepal (50).

Interactional Group Discussions between prescribers and consumers led to a reduction in injection use by 19% and number of drugs per patient by 7% in Indonesia (51). Face-to-face contact between prescribers and dispensers with trained educators is effective but requires considerable human and financial resources.
One-to-one meetings

In Indonesia, Ross-Degnan et al. (1996) have observed that educational outreach with one-to-one meetings with shop owners and counter assistants in private pharmacies, led to increased use of ORS by 21% and the use of antidiarrhoeals reduced by 20% (31).

Continuing medical education, undergraduate education

The impact of a short, interactive training course in pharmacotherapy, using the Guide to Good Prescribing, was measured in a controlled study with 219 under-graduate medical students in Groningen, Kathmandu, Lagos, Newcastle (Australia), New Delhi, San Francisco and Yogyakarta. The impact of the training course was measured by three tests, each containing open and structured questions on the drug treatment of pain, using patient examples. Tests were taken before the training, immediately after, and six months later. After the course, students from the study group performed significantly better than controls in all patient problems presented. This applied to all old and new patient problems in the tests, and to all six steps of the problem solving routine. The students not only remembered how to solve a previously discussed patient problem (retention effect), but they could also apply this knowledge to other patient problems (transfer effect). At all seven universities both retention and transfer effects were maintained for at least six months after the training session (52). The Guide to Good Prescribing has been widely acclaimed as an innovative and very practical teaching tool. Further, the companion book, Teacher’s Guide to Good Prescribing, provides the main message that problem-based pharmacotherapy teaching is possible within the structure of a traditional (non problem-based) curriculum (53).

Audit and feedback

Auditing the use of medicines could reveal the pattern of use, prescribing behaviour and evidence of polypharmacy, which could increase the risk of drug interactions. Setting standards in the form of standard treatment guidelines and assessing conformity to them in prescribing through performance reviews should be part of the programme on the rational use of medicines. The study on prescribing
monitors, evaluates and if necessary, suggests modifications in prescribing patterns to make prescribing rational and cost-effective. Audit and feedback is used with good results in developed countries. If practiced in developing countries, it would be helpful in promoting the rational use of medicines.

**Teaching methods**

Problem-based learning is one of the best ways to teach *how* to prescribe, and not *what* to prescribe. Research over the years has shown that students who have been trained by problem-based training methods gain about the same level of knowledge, but perform better on skills and attitude when compared to other students. Pharmacotherapy teaching should develop critical appraisal skills that are crucial if students are to become rational prescribers. Therefore, the students need to be equipped with skills to critically review not only medical literature but also promotional material and the prescribing patterns of clinicians.

**Electronic interactional programme (e-RUM)**

Electronic discussion groups (E-drug) have paved the way for interaction and exchange of information in areas such as WHO Pharmaceutical Newsletters, and WHO Drug Information. A similar discussion group should be set up for electronic communication in the area of the rational use of medicines.

Country examples in the rational use of medicines are described below.

**Cambodia**

Chareonkul, Khun and Boonshuyar (2002) conducted a study on rational drug use in three pilot health centres in Kampong Thom Province in Cambodia (54). Baseline information was obtained to design a strategy to address irrational prescribing practices in these health centres. The percentages of appropriate prescriptions for treating malaria, diarrhoea and acute respiratory infection treatments were 68.3%, 3.3% and 45% respectively. Inappropriate prescriptions were
mostly due to unsuitable doses, incorrect drugs, and the improper duration of treatment. The results of the study suggest that continuing education of prescribers as well as health care providers, and monitoring of public education programmes would be beneficial.

**India**

The Delhi Society for Promotion of Rational Use of Drugs has been holding workshops in rational use of drugs throughout the country. These are typically two-day workshops in which doctors from both the public and the private sectors take part. These workshops are very popular and have been attended by over 1000 doctors. The faculty is provided by DSPRUD and consists of experts – clinical pharmacologists, pharmacologists and pharmacists who have been working in this field. The movement has spread and such workshops are now being organized by state societies in Rational Use of Medicines such as the Rajasthan Society, the Himachal Pradesh Society, and similar societies in West Bengal, Bihar and Punjab. Active programmes are being carried out in Andhra Pradesh, Maharashtra and Tamil Nadu. All these activities were planned and carried out by the India-WHO Programme in Essential Drugs and implemented by DSPRUD.

The effects of such programmes have also been assessed in different studies. The programmes in India, by and large, go a long way in providing information and creating awareness. It has been seen that participation at one workshop is not enough to alter prescribing behaviour. If such workshops are held regularly, there is a possibility of changing the prescribing behaviour.

The type of intervention described above pays dividends and spreads the message to a much wider segment of the population than individual studies can. Two such interventions have been initiated in India by DSPRUD in conjunction with the Health University of Maharashtra and the Government of Rajasthan. Training modules in the rational use of drugs were prepared for inclusion in the undergraduate medical curriculum for all medical colleges in the state of Maharashtra. These modules were then discussed at the level of the Health University of Maharashtra and approved and adopted with
some modification. These have now been included in the curriculum for Pharmacology. This means that through one intervention, all undergraduates in 17 medical schools in Maharashtra – all affiliated to the Health University – are now being made aware of the rational use of medicines. This is the type of intervention that needs to be encouraged. Furthermore, the impact on prescribing needs to be assessed and the results published.

In the state of Rajasthan, all doctors who join the state health service go through an orientation course before their first posting. The Rajasthan group working with DSPRUD developed a module on the rational use of drugs. After approval, it was included in the orientation programme. Thus, all doctors in government service would become exposed to the concept and practice of the rational use of medicines. The module was used for several years. Unfortunately, this module was dropped. The reason is interesting and illustrative of the problems that arise at the ground level. The earlier induction programme was supported by the World Bank. The officers implementing the programme thought that the module on the rational use of drugs was important. The funding source was changed after a few years, and the Reproductive and Child Health Programme started funding the induction programme and the module was removed because the officials in charge of this programme did not feel it was necessary to include a module on the rational use of medicines. This underlines the need for evaluation of impact on prescribing. If it is seen that there is significant improvement in prescribing coupled with savings in resources, the donor would like to support such a programme.

Several workshops have been held for pharmacists and stores management staff but most of these have been held to improve management procedures of medicines procurement, storage and distribution. These workshops carried out, for example, regularly at the National Institute of Pharmaceutical Education and Research (NIPER), Chandigarh and at the College of Pharmacy at Annamalai University, under the auspices of DSPRUD have markedly improved the functioning of the medical stores. Stocks-out days have decreased, drugs near expiry dates are not being supplied and access to medicines
has increased. Similar results have been obtained in programmes for stores personnel in the state of Delhi and in the Greater Mumbai Municipal Corporation (Chaudhury RR, personal communication, 2006).

**Indonesia**

Hidayati and Munawaroh (2002) carried out a randomized controlled study involving two groups of 24 health centres to measure the impact of small group discussions in improving health centres’ paramedics’ compliance to standard treatment guidelines in pneumonia and acute respiratory infection (55). The results demonstrated that the prescribers who underwent small group discussions performed better than the control group. This study was aimed at improving prescribing behaviour in paramedics but during the study, the paraprofessional staff got to know about the rational use of medicines. This is one of a number of studies published where the effect on paramedical staff has been studied.

The Centre for Clinical Pharmacology and Medicine Policy Studies of Gadjah Mada University, Yogyakarta, developed and field-tested an innovative Monitoring, Training, and Planning (MTP) approach to reduce inappropriate prescribing in hospitals. This followed a successful field test in Indonesia involving six hospitals, Cambodia (24 hospitals) and Laos (28 hospitals), which achieved good results. The use of inappropriate medicines has been significantly reduced. Moreover, such an approach can be incorporated into existing hospital managerial activities (20). WHO organized a bi-regional workshop in December 2005 to disseminate the experience in implementing the MTP approach to other countries in the South-East Asia and Western Pacific Regions.

The MTP approach is based on the concept that a successful intervention should focus on a specific problem, address the underlying factors, use a problem-solving approach, repeat the intervention, be interactive, provide feedback to prescribers, and carry out monitoring and supervision. The MTP approach is an adult-learning, problem-based intervention. The MTP approach includes the use of indicators to measure the magnitude of the problem (monitoring component),
discussion about underlying factors and how to improve the situation (training component), and setting the improvement target (planning component). Because MTP is a self-learning activity involving all providers in health facilities, it is expected that the impact will be sustainable. The long-term impact in reducing inappropriate antibiotic use in acute respiratory infections (ARIs) has been evaluated. A time-series pre- and post-intervention without a control group design was applied. Twenty-four health centres were involved, and each conducted an MTP activity for antibiotic overuse in ARI in August 1999. Feedback was given in October, 2000 (14 months post-intervention), February 2002 (30 months), and May 2003 (45 months), followed by serial data collection. The percentage of patients receiving antibiotics was calculated based on 30 prescriptions/month randomly selected from each facility. The study population was children aged 0–14 years with ARI as a single diagnosis, and the outcome measure was the percentage of children with ARI receiving antibiotics. It was concluded that the MTP approach, in combination with feedback, significantly reduced the inappropriate use of antibiotics in ARI, and the impact was sustained after almost four years. With intensive discussions and self-learning

![Figure 8: Impact of Monitoring, Training and Planning (MTP) approach in reducing inappropriate use of antibiotics](image)

Figure 8: Impact of Monitoring, Training and Planning (MTP) approach in reducing inappropriate use of antibiotics

Source: Suryawati & Santoso (2004). MTP approach is effective in reducing inappropriate medicines use in hospitals (20).
activities during the process, MTP enabled prescribers to be more sensitive and proactive in promoting appropriate drug use.

The conclusions of MTP intervention to reduce inappropriate use of medicines in 45 hospitals are given in Box 6.

**Box 6: Conclusions of MTP Intervention**

- The MTP approach is effective for reducing inappropriate medicine use in hospitals, including drug use problems in hospitalized patients.
- The MTP approach is feasible to implement at minimum cost, and feasible to be incorporated in the existing hospital managerial activities.
- The MTP approach is promising for a nation-wide implementation.

Source: Suryawati & Santoso (2004). MTP approach is effective in reducing inappropriate medicines use in hospitals (20).

Suryawati and Santoso (1997) trained medical students in Indonesia, who were about to commence their clinical internships, to recognize exaggerated claims or extension of indications without substantial scientific support, misinformation on adverse effects to minimize perception of potential hazards, inappropriate recommendations for drug use and dosage schedules, incorrect information on pharmacokinetic and pharmacodynamic profiles, and insufficient warning and precautions information (56). This training was found to be effective even at 12 months after exposure suggesting that it is a useful method to equip the students with knowledge and skills to critically assess drug information and advertisements.

**Iran**

A community-based outpatient practice of antibiotic use in Tehran, Iran, was conducted by Mohagheghi et al. (2005) to develop interventional strategies in rationalizing drug and especially antibiotic use (57). A 10% random sample of all prescriptions by practitioners in
south of Tehran and kept in a data bank was taken. Based on the values of drug use indicators, an interventional programme, a programme of continuing medical education (CME) targeting rational use of drugs was designed. Eighty general practitioners (GPs) who contributed to the data bank were selected and allocated to two groups – an intervention group and a control group – each group having 40 GPs. The drug use indicators determined through the data bank showed that 19% of all prescribed medicines were antibiotics, which ranked second only to analgesics and central nervous system medicines which accounted for 24%. The percentage of encounters with an antibiotic prescribed were lower in the intervention group compared with the control group but the difference was not statistically significant. The investigation inferred that rational use of antibiotics can improve by appropriate educational interventions, using CME programmes.

**Laos**

Keohavong et al. (2006) carried out a study to evaluate rational drug use patterns with a focus on prescribing and dispensing practices for providing information to policy makers. The results were used for further planning and identifying intervention strategies for public health facilities in the Lao People’s Democratic Republic (58). The WHO operational package for monitoring and assessing country pharmaceutical situation indicators was used for data collection. While 74% of patients knew how to take the medicines they received, 47% received antibiotics, and 18% received injections. Among under-five children with simple diarrhoea, 47% received antibiotics, 77% received oral rehydration salts and 5% received antidiarrhoea medicines. Among under-five children with mild/moderate pneumonia, 91% received one of first-line antibiotics and 41% of non-pneumonia patients of any age received antibiotics. It was inferred that the use of medicines in the Lao People’s Democratic Republic was not fully appropriate in terms of rational prescribing and dispensing practices. Since prescriptions for antibiotics, injections, non-essential drugs, and non-generics are still high, information on the use of medicines provided is insufficient. Therefore, continuous health education programmes for both health staff and the public are needed.
Nepal
Kafle and Dhungana (2001) carried out a randomized controlled study in 80 health posts in nine districts; studying the effect of small group training and peer group discussions to improve the use of medicines by using Standard Treatment Schedules. It was clearly seen that peer group discussion held at the district headquarters during the monthly or bimonthly meetings of health workers improved the use of medicines for common health problems (59). The Ministry of Health has piloted this strategy in all primary health care facilities of Chitwan district. It has been going on for more than two years in the district. There is significant improvement in prescribing based on treatment guidelines and it has markedly reduced the cost of treatment for the patient (60).

Nigeria
Ogunnowo and Asuzu (2003) evaluated the rational prescribing practices of doctors and medical students at Igbo-Ora Comprehensive Hospital, Nigeria (61). The aim of the study was to determine the level of rational drug prescribing practices by doctors and medical students as well as to assess the impact of the teaching of rational drug use on the prescribing skills of students. A checklist, developed according to the key indices of a rational prescription was used to rate prescriptions obtained from randomly selected case notes in the period 1975, 1985 and 1995 by means of a scoring system. It was observed that teaching of rational drug therapy had improved the rational prescribing practices of medical students and it was felt that there is a need for a sustained effort to maintain rational drug prescribing by students and doctors.

Philippines
The Philippine Society for Microbiology and Infectious Disease carried out a study among private physicians at two Metro Manila Hospitals. The interventions assessed were a lecture and discussion symposium and an interactive case-oriented discussion. The study was carried out on treatment for acute cystitis. The results showed that adherence to the guidelines increased significantly after these interventions (62).
There are several other studies on the prescribing behaviour of doctors but again these are not aimed at creating mass awareness among doctors and paraprofessionals about the rational use of medicines. There are some very carefully designed studies on the effects of different intervention measures on prescribing behaviour.

**Thailand**

The School of Nursing at Chulalongkorn University carried out a series of workshops on the rational use of drugs. Training modules were prepared after discussing the results of the workshops. These training modules have been included in the curriculum of undergraduate nurses at Chulalongkorn University. Through this action, all nurses trained at Chulalongkorn University are exposed to programmes in the rational use of medicines with a positive impact on nurse behaviour and prescribing/dispensing practices.

**Uganda**

Obua et al. (2004) conducted a study to determine the effectiveness of a face-to-face educational intervention on the treatment of acute respiratory infection (ARI), malaria, and non-dysenteric diarrhoea by private physicians in three urban areas of Uganda (63). A total of 108 private physicians was divided into intervention (n=30) and control (n=78) groups. Surrogate patients, trained to simulate presenting symptoms and signs of the target conditions, served as subjects for the collection of the data on the medical practices and prescribing behaviours of the physicians. Intervention physicians attended a one-day interactive educational seminar where the principles of rational drug use and the National Standard Treatment Guidelines for treating the target were discussed. Baseline data indicated high rates of inappropriate treatment practices by both, the intervention and the control groups. There was very high antibiotic use for acute respiratory infection (90%), for malaria the injections rates were very high (>30%), and high rates of polypharmacy (more than three drugs per patient). After the intervention, some remarkable behaviour change was observed in prescribing practices in the intervention group. The antibiotic prescribing in the intervention group decreased by 23%,
and use of unnecessary combination products for malaria by 28%. There were trends to indicate better adherence to guidelines for ARI and malaria, and a marginal decrease in drug costs. The face-to-face educational intervention resulted in small improvements in the key prescribing practices of private physicians. Further, an intervention that involved repeat contact with prescribers and which would deal with economic considerations would need larger improvements. In addition, the private physicians need to be sensitized to and encouraged to use the National Standard Treatment Guidelines, and attempts should be made to improve their prescribing habits which should be supported by community education.

**Zimbabwe**

An interesting study has been carried out in Zimbabwe by Trap and her colleagues. A training programme was launched in 1995 for supervisory skills for district pharmacy staff. The results of the training were assessed by studying adherence to Standard Treatment Guidelines and to the protocols developed for stock management. The results showed that following supervision, overall stock management improved significantly. Similar improvements were demonstrated for adherence to standard treatment guidelines. The objective of the study was to improve performance and the pharmacists in the study benefited also by knowing more about the programme on the rational use of medicines (64).

The Department of Essential Medicines Policy and Standards of the World Health Organization has been instrumental in organizing and supporting workshops and training courses in the rational use of medicines all over the world. They also recently organized courses for Drugs and Therapeutics Committees and in other areas. The International Network for Rational Use of Drugs (INRUD) has also been carrying out similar work. These efforts have certainly increased the awareness of doctors and pharmacists – and in some countries, nurses – about the rational use of medicines. There does not appear to have been much activity in providing information to other categories of paraprofessional staff about the rational use of medicines. There has hardly been any attempt, as far as one can see from the literature,
to inform occupational health personnel, physiotherapists and technicians on the rational use of medicines even though these persons work in a hospital setting. Similarly, there appears to have been no attempt to create awareness among hospital administrators, managers of insurance systems and administrators who work in health care settings.

6.2 Approaches that have been evaluated in the SEA Region

Approaches that have been used and evaluated in different countries in the Region are briefly described in Table 3 (p. 66) with references.

6.3 Future programmes for health care professionals

Looking at the efforts made in the last 20 years, it becomes clear that much has been achieved in increasing awareness about the rational use of medicines among medical and paramedical persons. One needs to remember that this programme began from scratch and that it is not easy to put into operation a concept that is unlike TB, poliomyelitis or HIV/AIDS. One does not see very often the beneficial effects of a programme in the rational use of drugs or the harmful effects of irrational use of medicines (p. 23, paragraph 7).

When one looks at the enormity of the problem and the extent and scope of the solutions, it appears that the approaches used so far will have to be modified. While it is important and useful to hold workshops or conduct research, this will not transform a hospital-based programme into a national movement in the rational use of medicines. Several new approaches are suggested below. One approach would be to work through professional bodies and to convince them to take a leadership role. Thus, as far as doctors are concerned, the medical associations could take up these programmes as an integral part of their activities. That this is possible indeed has been demonstrated in India in cities like New Delhi, Gwalior, Kolkata and Coimbatore where the local medical associations, together with DSPRUD organized well-
### Table 3: Impact of interventions undertaken in South-East Asia Region: Interventions targeting the public sector prescribers

<table>
<thead>
<tr>
<th>Country</th>
<th>Reference</th>
<th>Facility</th>
<th>Prescriber</th>
<th>Intervention</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nepal 1992-5</td>
<td>Holloway et al. 2001 (54, 55)</td>
<td>Public PHC</td>
<td>Paramedics</td>
<td>Fee per drug item as compared to fee per prescription</td>
<td>STG compliance improved by 14% and drug cost/patient decreased by 30%.</td>
</tr>
<tr>
<td>Nepal 1994</td>
<td>INRUD Nepal 1995 (56)</td>
<td>Public PHC</td>
<td>Paramedics</td>
<td>Onsite supervision and monitoring with feedback to prescribers</td>
<td>STG compliance improved by 20% and injection use decreased by 10%.</td>
</tr>
<tr>
<td>Nepal 2000</td>
<td>Kafle 2001 (57)</td>
<td>Public PHC</td>
<td>Paramedics</td>
<td>Small group training plus self-monitoring on diarrhoea treatment</td>
<td>ORS use increased by 15% and antibiotic use decreased by 60% (but by 1-7% without self monitoring).</td>
</tr>
<tr>
<td>India 1993</td>
<td>DSPRUD 2001 (58) Murali 2004 (59)</td>
<td>Public PHC</td>
<td>Paramedics</td>
<td>Central drug procurement and distribution according to EML plus regular drug bulletins</td>
<td>ORS use increased by 9% and antibiotic use decreased by 6%.</td>
</tr>
<tr>
<td>India 1998</td>
<td>Sharma et al. 2002 (60)</td>
<td>Public PHC</td>
<td>Doctors</td>
<td>One-day workshop with interactive discussion for doctors on ARI and diarrhoea</td>
<td>ORS use increased by 9% and antibiotic use decreased by 6%.</td>
</tr>
<tr>
<td>Sri Lanka 1988</td>
<td>Angunawela et al. 1991 (67)</td>
<td>Public hospital and PHC</td>
<td>Doctors and paramedics</td>
<td>STGs for antibiotics mailed to prescribers some of whom attended seminar on antibiotics</td>
<td>Antibiotic use decreased by 7% in both groups whether STGs alone were received or STGs with seminar.</td>
</tr>
<tr>
<td>Indonesia 1992</td>
<td>Hadiyono et al. 1996 (62)</td>
<td>Public PHC</td>
<td>Doctors and paramedics</td>
<td>Interactional Group Discussion (ICD) between prescribers &amp; consumers, to reduce injection use.</td>
<td>Injection use decreased by 19% and number drugs per patient by 7%.</td>
</tr>
<tr>
<td>Indonesia 1994</td>
<td>Sunartono &amp; Santoso, 1995 (63)</td>
<td>Public PHC</td>
<td>Doctors and paramedics</td>
<td>Self monitoring of prescribing following IGD discussion between prescribers and consumers</td>
<td>Injection use decreased by 22% and number drugs per patient by 15% and results sustained over 2 years</td>
</tr>
<tr>
<td>Indonesia 1993</td>
<td>Santoso et al. 1996 (64)</td>
<td>Public PHC</td>
<td>Doctors and paramedics</td>
<td>STGs &amp; training on diarrhoea via small group interactive discussions versus large group seminar</td>
<td>Antibiotic use decreased by 7-13%, anti-diarrhoal drug use decreased by 7-21% &amp; ORS use increased by 3-5%</td>
</tr>
<tr>
<td>Indonesia 1999</td>
<td>Hidayati &amp; Munawarooh 2002 (65)</td>
<td>Public PHC</td>
<td>Paramedics</td>
<td>Training on ARI management plus self-monitoring and feedback seminar</td>
<td>Inappropriate antibiotic use in upper respiratory infections reduced by 35% &amp; drug cost per patient by up to 46%</td>
</tr>
<tr>
<td>Thailand</td>
<td>Pagiaya &amp; Garner, 2005 (66)</td>
<td>Public PHC</td>
<td>Nurses</td>
<td>3-day workshop on STGs plus educational outreach with face-to-face prescribing feedback</td>
<td>ORS use increased by 10%, drug costs reduced by 15%, but antibiotic use for ARI &amp; diarrhoea was unchanged.</td>
</tr>
</tbody>
</table>
attended meetings in the rational use of medicines. A medical association of doctors with branches throughout the country has the means of informing many doctors about the programme that will never be possible if one organization tries to do it alone. The complementary activity would be to convince professional societies of cardiologists, nephrologists or oncologists that a programme in the rational use of medicines would benefit the patients. These organizations could then take the lead in disseminating the message to all their members. A whole series of continuing medical education programmes could be held – in general by the medical association and specifically by professional societies. The respective state Medical Councils should accord accreditation to these seminars and workshops so that attendance could be credited to the participants of these programmes for the purpose of re-registration or revalidation of licence.

The other interventions include audit and feedback, which has been used extensively and with good effect in developed countries where it is financed by the government. In addition, developing and distributing clinical guidelines (standard treatment guidelines, prescribing policies) which provide a benchmark of prescribing will encourage rational prescribing. Such clinical guidelines should form the basis of all education on prescribing. Unfortunately, many countries do not have updated guidelines, governments do not provide funds for development and regular updating of guidelines, and training institutions often do not use clinical guidelines that are developed and updated.

**Education of interns, residents and medical students**

The rational use of medicines depends upon the knowledge, attitudes and practices of the prescribers. At the graduate level, a focus of teaching about medicines is stimulation of interest to seek pharmacological knowledge. The pharmacotherapy teaching for undergraduate and postgraduate training programmes for health professionals should be problem-based and skill-based. The teaching method should aim to transfer the practical skill of prescribing rather than just the knowledge on medicines. Further, the aim should be on the development of lifetime prescribing skills and the ability to critically assess medicines information. They should be encouraged in the
rational use of medicines, and avoid irrational prescribing, e.g., use of too many medicines per patient, inappropriate use of antimicrobials often in inadequate doses for non-bacterial infections, overuse of injections when oral formulations would be more appropriate and failure to prescribe according to clinical guidelines. They should be sensitized to pharmacoeconomics to ensure that medicines are used in a therapeutically sound and cost-effective way. Additionally, they should also be trained in development of skills for educating and prescribing to promote the rational use of medicines. The use of WHO’s Guide to Good Prescribing (52) with incorporation of problem-based pharmacotherapy teaching methods in the education programmes will be useful to achieve the above objectives.

Based on positive experiences in Groningen (The Netherlands), followed by a large international study involving seven medical schools in developed and developing countries, WHO has developed a manual for undergraduate medical students on the principles of rational prescribing – Guide to Good Prescribing (52). This Guide not only helps students to select P(ersonal) drug (i.e. a set of first-choice drugs) in a rational way, but also, understand and use existing national and international treatment guidelines, formularies, text books and other sources of drug information. Further, the Guide presents the students with a normative model for pharmacotherapeutic reasoning.

The Teacher’s Guide to Good Prescribing (53) is a companion volume to the Guide to Good Prescribing. One of the objectives of this manual is to assist in mobilizing support for problem-based pharmacotherapy teaching. The main message of this Teacher’s Guide is that problem-based pharmacotherapy teaching is possible within the structure of a traditional (non-problem based curriculum) and practical information on how to implement it.

_pharmacists’ training_

The pharmacists could be approached by the association of pharmacists while the Pharmacy Councils could also exert a beneficial influence in spreading the word to pharmacists. This is important because very often, the patient goes to the pharmacist for medicine. The pharmacist,
if trained in the practice of rational use of medicines, would provide proper advice and the appropriate medicine to the patient or the person seeking an over-the-counter medicine for a minor condition. The Delhi Pharmaceutical Trust has been running annual courses for community pharmacists in Delhi and the rational use of medicines is always included in such courses.

Inclusion of clinical pharmacy training in undergraduate and postgraduate courses has been shown to improve the rational use of medicines. A part of this training includes pharmacists participating in ward rounds advising on medicines for inpatients, monitoring prescriptions in outpatient departments, running drug information centres, participation in Drugs and Therapeutics Committees, undertaking drug use evaluation studies, etc.

**Nurses’ training**

Studies carried out in Thailand demonstrate clearly that if the lead in providing information and creating awareness among nurses is spearheaded by the nurses themselves, then much can be achieved (p. 63, under Thailand). A nursing college or an association of nurses or the Nursing Council could take up the challenge. Problem-based pharmacotherapy training with knowledge of standard treatment guidelines and the essential medicines list are essential for having a good basis in improving future use of medicines.

In South Africa, nearly all patients presenting at rural clinics are diagnosed and treated by nurses who are often not trained for this task. There are referral possibilities to general doctors at the district hospital level, but such hospitals may be as much as 100 kilometers away in some areas. Prescribing problems are common and serious. In the Northern Province of South Africa, a training programme was developed by the Medical University of South Africa (MEDUNSA) for in-service training of primary health care nurses. The programme has also been used for in-service training of medical practitioners (52, 53).

An impact analysis of a training programme in the Northern Province, South Africa was made. About 250 nurses and other
paramedical prescribers were trained in rational prescribing during a three-and-a-half day course using the six-step model of Guide to Good Prescribing. By means of a staggered intake into the programme a prospective controlled study could be done on the actual prescribing indicators before and after the training. The results indicated statistically significant better prescribing for upper respiratory tract infection, one of the subjects taught at the course. There was an increase in non-drug treatment, generic prescribing and compliance with the 1996 South African Primary Health Care Standard Treatment Guidelines, and a decrease in the average number of drugs per prescription, the use of antibiotics and the use of injections. Similar improvements were noted in the treatment of diarrhoea and vomiting (52, 53).

**Other paramedical health workers**

For other categories of personnel such as health assistants and auxiliary health workers, their training programmes should be based on common medical conditions for which they have been trained to treat and dispense medicines. There must be continuing in-service education also accompanied by face-to-face interactions using printed materials. Printed materials alone without face-to-face interactions have been found to be ineffective in improving prescribing of medicines.

In addition to these continuing education programmes for doctors, pharmacists, nurses, health assistants and auxiliary health workers, every effort should be made to include modules on creating awareness about the subject in the relevant undergraduate curriculum of these persons. The vision therefore is that not only would the persons under training receive the initial exposure but that continuing programmes of education would reinforce the knowledge at regular intervals. Another approach would be to introduce modules into the induction course for new entrants to medical, pharmacy and the nursing services. Unless these different strategies are developed and implemented, the continuity that one would like to see in giving information about the rational use of medicines to all, at all times, would not be created and doctors, nurses, pharmacists and others would not become motivated.
6.4 Programmes for the future

Another point which needs to be stressed is the need to create tools for use in different programmes. It is only through these tools that awareness can be created in a constructive manner. Some of the tools include lists of essential medicines for use at different levels of health care, standard treatment guidelines, national and hospital formularies.

Finally, we should not forget that today, facilities exist for dissemination of information through the use of information technology. The development of communication systems via the internet presents new opportunities for professional education of health care providers and for promoting rational and evidence-based medical care and appropriate use of medicines. Until now, programmes in the rational use of medicines have not taken advantage of these modern methods and of the unique possibility of communicating and collaborating online. A successful example of such a programme is the Collaborative Online Learning (COL): a new distance education method developed at Boston University. Not only do the participants learn from the organizers of the programme but they also learn from each other. Wiecha has published a good description of the potential of such a system in the Essential Drugs Monitor, No. 33 (2003).

In conclusion, it appears that there are enormous possibilities of converting an institute/hospital-based programme into a national programme by using the many approaches possible to disseminate the message of rational use of medicines to all categories of health professionals.
Integration into General and Specialized Education Programmes

The strategy for integrating education and awareness on the rational use of medicines into general education programmes, as distinct from medical and pharmaceutical education will be considered under the following three headings:

- Schools and undergraduate college education
- Education in postgraduate and technical schools
- Inclusion in existing orientation and training programmes.

### 7.1 Schools and undergraduate college education

School teachers are role models in inculcating good habits and moral values in students. School education programmes have been tested in developed countries and very much appreciated, like the Medi-Studt project in Belgium focusing on secondary school students. This project had “info-pill-box”, information stands and a quiz about topics of particular interest (p. 40, Box 4). The choice of subject matter in these “pill boxes” was based on the most common illnesses and complaints, and on the most commonly used medicines by students. The main message was use of medicine only when it is needed. The pillbox concept was innovative and sparked people’s curiosity. The materials could be improved by including the views of students on content in addition to design.

Similarly, the Michigan Model of Comprehensive School Health Education targeted primary school children and adolescents. It was
aimed to raise awareness of health problems and reduce risk behaviours related to alcohol and tobacco use, sexually transmitted diseases and AIDS. Teachers were trained to add these issues to their ongoing health education components, and manuals were developed for teachers and patients. Similar awareness programmes using simple language should be developed about the effects of misuse, overuse or under use of medicines related to common diseases. Similarly, based on the “Tex’s Team” approach, 8 to 9-year-old children could be taught about using medicines safely and the importance of compliance e.g. for common diseases like malaria and tuberculosis.

A few other approaches that have been used successfully in other programmes are mentioned. These include painting competitions on the theme, production of school plays and skits, organization of photographic exhibitions and posters, marathon runs, and production and distribution of pamphlets.

Students in schools and undergraduate colleges could be informed about the harmful effects of using too many medicines. They can also be informed that medicines are not always necessary, that in most instances an oral pill is as good as a more expensive injection and that when antibiotics are taken, the whole course of treatment should be completed as otherwise the microorganisms may become resistant to the antibiotics being used which may then be ineffective. These are simple messages. About 10 such messages should be identified and disseminated among persons taking their first college course. These undergraduates would not only observe these simple guidelines for better use of medicines but they could also spread the same messages to others.

7.2 Postgraduate and technical schools education

If the message of rational use of medicines is conveyed to school children and college students, there is absolutely no reason why postgraduate students – at least in the Institutes of Management, the Institutes of Technology and selected universities should be left out of this programme. It may not always be possible to have special sessions to educate them on the rational use of medicines. With such a level of education, it
should be possible to inform them on how to get information on medicines. Furthermore, all these institutes have orientation courses for students as they begin their course. A module on rational use of medicines could be included in this orientation programme. At this level, it would be worthwhile also to include a small module on how to use the common, over-the-counter medicines. This information would strengthen the ability of these persons to take a medicine when required. Such an add-on value to the module would make the part about rational use of medicines more interesting and more acceptable.

In general, health programmes have not utilized the potential goodwill and the force that exists in our colleges and institutions outside the field of health. Other programmes in areas such as environment and agriculture have been able to get the support of large numbers of persons for spreading the message they want to give. There are potential resources in the Institutes of Technology and the Institutes of Management that have not so far been utilized. Since a programme in the rational use of medicines should be a much broader programme than merely aimed at health workers, the efforts made at school and undergraduate levels could be beneficially continued also at the postgraduate level.

### 7.3 Group approach

Rather than depending upon a single person to expand the theme, it would be preferable to use the group approach or coalition/partnership approach.

**Coalitions/Partnerships**

There is enough successful evidence in keeping the message on RUM alive from the existing coalitions related to international and national agency coalitions such as INRUD, NGOs, and groupings of academic/non-profit organizations. Thus, it would be worthwhile to include the theme of rational use of medicines to existing programmes. The Rotary Foundation, the nationwide programmes of the Centre for Women Studies, the Family Planning Associations, the Scouts and Cubs movement are some of the bodies that could take up the programme. It would be much easier if societies promoting rational use of medicines
could link up and form partnerships with these organizations that already have a youth programme.

A large number of organizations could be involved in supporting or conducting public education work. These groups include professional organizations such as pharmacists and medical associations, international organizations such as WHO and UNICEF, governments represented by the Ministry of Health, nongovernmental organizations and consumer groups, the universities and training institutions, the schools, the pharmaceutical industry and the media.

The professional groups such as medical and pharmacy associations could influence the members to gain commitment to the concept of public education, and help in material development for projects. The international organizations could assist in sensitizing governments and their partners to include education strategies in national drug policies and programmes, in producing training material and in mobilizing adequate funds. The government can assist in ensuring that public education is included in medicine-related policies and activities for systematic and sustainable implementation.

The NGOs could play a role in designing, implementing and supporting public education activities. The universities and other institutions should support the work through training of students, providing research and evaluation expertise and through linking good prescribing practice with rational use of medicines by the public. The schools are very important in creating an understanding of the benefits and risks of medicines and core information about their use. The materials developed need to be formally integrated into the school curriculum. The pharmaceutical industry is providing consumer information materials on medicines and financial support for dissemination of such information. However, there may be an overlapping of interest in providing educational materials, and commercial gains. Thus, it is important to ensure that industry contributions do not promote inappropriate medicine use and that they provide truthful information. The media could give a public voice so that a balanced coverage is possible. The media should be provided full information about public education programmes so that it can easily process them for a wider audience. The media can impart the “good” or the “bad” picture about the project.
8.1 Political leaders

It has been well recognized that political will is needed for the implementation of any successful programme. This became clearer when, after 10 unsuccessful years of attempts to introduce a programme in the rational use of medicines in India, it suddenly became possible in Delhi State when the newly appointed Minister of Health identified this programme with himself. In six years, the successful Delhi programme became a national and international model and a success story.

In the Delhi programme, the minister was strongly motivated and so education or creation of awareness was not necessary. However, usually politicians may not even be aware of a programme like the rational use of medicines. How does one create such motivation in politicians and ministers?

One way is through the use of the media. A minister may not read all the reports, papers and notes sent to him but he is very interested in what appears in the press about his department and about him. An editorial, for example, in a national daily newspaper clearly stating that the Delhi model in Rational Use of Drugs should be adopted by the Government of India would be of interest to him. It would, therefore, be useful to have a continuous flow of information about the programme in the newspapers in the form of articles, editorials, press releases and breaking news.

Another way of getting parliamentarians and ministers involved and interested in the programme is to invite them to come and
inaugurate meetings or give the valedictory address. This could enable them to know much more about the programme.

Finally, in addition to the approaches described above, an attempt could be made to develop links with 2 or 3 parliamentarians who are interested in the programme and keep them informed of what is being done, invite them to special meetings and send them materials produced. The time and effort spent on this would probably be richly rewarded in the long run for the programme.

Having a special day – the Rational Use of Medicines Day – once a year is another way of catching the attention of parliamentarians and ministers as well as health professionals and the public. This would be similar to the presently identified days known as World Anti-Tobacco Day or World Tuberculosis Day.

The institution of one or two awards for outstanding work in the field of rational use of medicines is yet another way of educating the parliamentarians and members of the legislature about the programme. These awards should be bestowed on the winners with a lot of media publicity.

8.2 Policy makers

Providing information about the programme to policy makers may or may not seem to be useful when the information is not requested or needed. Nevertheless, it is important to be proactive and create opportunities to provide information to policy makers. Subsequently, there would be opportunities to present more information about the programme on the rational use of medicines as it is needed and will be requested. This would become an opening for further sharing of information and to foster development of the programme.

In view of the social significance and economic benefits of a programme in the rational use of medicines, the attempt to create awareness about the programme should not be confined to members of parliament and the legislature interested only in health but should also include others whose interests may be in finance, economics, social justice and poverty. The programme also needs to be presented within the framework of a human rights approach.
The topic of the rational use of medicines should be included as a discussion subject whenever there is an opportunity such as meetings of Ministers of Health, meetings of parliamentarians or meetings of industrialists. In the field of population, a group has been created – Forum for Parliamentarians for Population, and regular meetings are held. In fact, in a unique gesture, the Indian parliament held a special meeting only to discuss HIV and AIDS. Such approaches should also be kept in mind.

Several of the approaches described to create awareness among parliamentarians and political leaders could also be used for creating awareness in bureaucrats. However, the general approach has to be slightly different because there are already programmes and courses of orientation for bureaucrats. Modules on the rational use of medicines should be prepared and included in the training programmes. This topic should also be included at meetings of bureaucrats when economic development is discussed. At every opportunity, it should be emphasized that investing in resources for health and for programmes in rational use of medicines is an integral part of economic development and would eventually bring benefits – not only in the social sector, but also in the economic sector.

In the approach to bureaucrats, maximum leverage should be obtained from the fact that a programme on the rational use of medicines prevents unnecessary expenditure, saves money, is economically beneficial and, at the same time, helps to improve the health of the patient. More studies demonstrating the economic benefits of the programmes should be carried out and the results presented in economic terms. The cost resulting from the fact that in some instances, 20% of hospital admissions are due to misuse or irrational use of medicines should be calculated. This expenditure could, to a large extent, be prevented. Similarly, the fact that the cost of procuring the same medicines separately could be reduced by 30% by one intervention – that of pooled procurement, in the case of Delhi State, should be emphasized at relevant meetings. The fact that access to medicines and coverage of population can be increased by programmes needs to be emphasized. In other words, the approach to bureaucrats should be much more evidence-based than the approach to politicians, who need a conceptual and socially productive approach.
Bureaucrats who are not dealing with health matters should also be exposed to the benefits of programmes on the rational use of medicines. Because the tenure is usually three to four years, there will be regular changes in the hierarchy. It would be beneficial to provide information to those who may one day hold a position in the health department.

A focused, evidence-based, up-to-date presentation, not more than 10 to 12 minutes, should be ready at all times and this should be presented to bureaucrats when they come to take charge of any department dealing with health. This presentation, made early in the tenure of the official should be accompanied by a short, well prepared “fact sheet” which should be left with the official after the presentation.

Once a bureaucrat gets committed to the programme and he/she is convinced that the programme is altruistic and beneficial to the population, he/she could become a very powerful advocate for change. By virtue of his/her official position, his/her links with other bureaucrats and his/her extensive contacts with different segments of society, he/she could do much more for the programme than any medical or health person could do.

The ideal combination for success is, of course, a committed triad of a politician with political will, an enlightened bureaucrat and a professional technocrat – in this case a doctor. This type of team could achieve a lot for any programme as past experience in several states in India, including the National Capital Territory of Delhi, clearly demonstrates.

It would be foolhardy, counterproductive and unfortunate if the bureaucrat is treated just as a cog in the administrative machinery and approached only when files get clogged. A positive, aggressive effort on a continuing basis needs to be made to get the commitment of the bureaucrats concerned. In this attempt, the materials to be used should be clear, focused and evidence-based so as to convince the official that the beneficial effects would come in a short time and would be for the people. By doing this, mutual trust and respect will develop and the inherent suspicion and built-in skepticism that the persons concerned are advocating a programme for their own benefit in some way would be overcome. Once that is achieved, a fruitful and mutually beneficial relationship could be initiated.
9.1 General measures

- It is essential that more resources be made available for providing education and information about the proper use of medicines and for creating the necessary public awareness on the rational use of medicines. However, even if more resources are not immediately available, existing resources should be allocated.

- The media could be used more to further the cause of the rational use of medicines and particularly to draw the attention of political leaders to this subject.

- More use should be made of the electronic media to disseminate the message of rational use of medicines and information on medicines. The role of Internet Interpersonal Communication should also be explored.

- A knowledge centre should be created for the rational use of medicines. This knowledge centre should provide reliable, objective and evidence-based information, which is the foundation of rational medicine use. In addition, a mandated multidisciplinary national body to serve as the focal point to coordinate medicine use policies is needed.

9.2 Empowerment of general public/consumers

- Information on the use of medicines should be provided, as a priority, to three categories of the public who would be able
to make a difference. These are the patients who consume the medicines, and thereby improve compliance, women and mothers who play an important role in the health care of the family and school children, the citizens of tomorrow, who must have a proper perception about the use of medicines. As far as possible, programmes of face-to-face education should be planned as these have the most impact.

- Programmes on information about medicines should be carefully introduced to students in colleges, other than the health-oriented colleges, in universities, in technical institutes and in management schools. There is a vast resource of persons at these centres who could play a useful role in promoting the rational use of medicines.

9.3 Health professionals

- The undergraduate curriculum for doctors, pharmacists and nurses should contain well prepared modules on the rational use of medicines. These should be taught and should become part of the examination system.

- In addition, professional societies and the medical/pharmacy/nursing associations need to be involved to take up the task of organizing continuing medical education programmes in this subject. Widespread dissemination of information to professionals can only be possible through these bodies.

- Training programmes need to be initiated for those categories of health personnel who have not yet been exposed to the concept and practice of rational use of medicines – physiotherapists, occupational health personnel and medical laboratory technologists – to have knowledge at least at the level of the consumer.

- Research should be carried out on aspects of use of medicines and especially on the expected economic benefits and therapeutic benefits of using medicines properly.
• Experts in communication should be engaged to prepare appropriate messages and deliver these to the public, health professionals, students, policy makers, politicians and bureaucrats.

• Use should be made of media events such as special days, marches and walks, special postage stamps, awards, public lectures and possibly identification of national ambassadors in the rational use of medicines.

9.4 Policy makers

• All Induction Training Programmes for bureaucrats should include modules on the rational use of medicines and the therapeutic and economic benefits, in addition to ethical considerations, inherent in such a programme.

• Incentives should be given to encourage scientists and policy makers to work together using transnational scientists making organizational changes, redefining the starting point for knowledge transfer, expanding the accountability horizon and acknowledging the complexity of policy making.

• There should be sustained support for the continuing medical education and other education programmes so that a long-term strategy could be planned and initiated.

• A mandated multidisciplinary national body to coordinate medicine use policies, when established, should regularly monitor the use of medicines, analyze data, disseminate information and make recommendations to further promote the rational use of medicines.

These are some of the possibilities for future activities. Each of these areas could be expanded into a programme in the rational use of medicines.
References


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(47) Delhi Society for Promotion of Rational Use of Drugs and INDIA-WHO Essential Drugs Programme. Impact of an educational intervention on prescribing behaviour of physicians with a focus on antibiotic use on ARI and diarrhoea at primary health centres in Delhi, Research on Rational Use in India: A Glimpse. Delhi, 2001.


Suggested Further Reading


A vital component in promoting the rational use of medicines is awareness of the need for educating all concerned in the correct use of medicines. This publication provides an overview of the activities in this area in the WHO South-East Asia Region and the challenges that need to be overcome.

Comprehensive and informative, the publication aims to create awareness on the need for improvement in the rational use of medicines through public education, programmes for health professionals, and by integration of teaching of this topic in general and specialized education programmes. The importance of educating policy makers, political leaders, planners and bureaucrats is also highlighted.

The publication provides a clear roadmap for the future. It includes:

1. general measures such as establishment of a knowledge centre on rational use of medicines, greater use of electronic media and resources for providing education and information.

2. empowerment of the general public/consumers in correct use of medicines.

3. involvement of professional societies and other categories of health personnel such as physiotherapists, occupational health personnel and medical laboratory technologists in addition to doctors, pharmacists and nurses to improve the rational use of medicines; and

4. involving policy makers, political leaders, planners and bureaucrats in guiding strategic planning and initiating activities in the rational use of medicines.