The development, initial implementation and support of a primary health care training programme in rational drug use.

Submitted toward the M.Sc. (Clinical Pharmacology) by:

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Commonly used abbreviations

CHESS	Centre for Health and Social Studies
DTPS	District Team Problem Solving
EDL	Essential Drugs List
EDP	Essential Drugs Programme
HST	Health Systems Trust
INRUD	International Network for the Rational Use of Drugs
ISDS	Initiative for Sub-District Support
MIC	Medicines Information Centre
NDP	National Drug Policy
PCMRC	Primary Care Medicines Resource Centre
SADAP	South African Drug Action Programme
STG	Standard Treatment Guideline
UCT	University of Cape Town
UDW	University of Durban-Westville
UWC	University of the Western Cape
WHO	World Health Organisation

Thesis summary:

The Rational Drug Use Training Project is a district-oriented programme designed to improve rational drug use among primary health care prescribers in the South African public sector. This thesis describes the development of the project and details the initial implementation study in 3 facilities in Region B of KwaZulu-Natal. This was a small **before-after study**, with no control. There were three components:

1. A series of easily collectable **drug use indicators**, adapted from those developed by WHO/INRUD. These allow primary health care staff to monitor their prescribing patterns in a district or facility. Ninety sets of prescribing indicators were collected as a baseline at 3 facilities in KwaZulu-Natal in December 1996, by the district trainers and the Rational Drug Use Training Project staff. The process was repeated in March 1997, after the training intervention, by the district trainers alone.

2. The intervention was a 2-day **training workshop in rational drug use**. This is problem-based and trained on-site in primary health facilities. Training was done by 8 district trainers from Region B who were taught to present the workshop by the Rational Drug Use Training Project staff. The workshop covers principles of prescribing, use of standard treatment guidelines, principles of clinic stock management and principles of good dispensing. Staff are encouraged to develop their self-learning skills through questioning, and seeking answers to clinical and drug related queries.

3. An **set of resources**, including texts, treatment guidelines and information centres, to provide quality, safe and unbiased drug information, are made accessible to staff at primary care level. These are available by post, telephone or e-mail. The Primary Care

Medicines Resource Centre at the University of Durban-Westville was developed as a result of this study.

Significant improvements in prescribing habits were noticed after the study. There was an increase in the percentage of drugs prescribed by their **generic names** ($p=0.000$); an increase in the number of medications **adequately labelled** ($p=0.0132$); a decrease in the **cost of prescriptions** ($p=0.0134$); and a decrease in the number of prescriptions that did not follow **standard treatment guidelines** at all for that diagnosis ($p=0.0109$). The Mann-Whitney U- test was used for statistical analysis. There were no significant changes in the average number of drugs per prescription; the percentage of drugs from the Essential Drugs List; and the number of prescriptions that completely followed standard treatment guidelines. Qualitative feedback was favourable too.

This was a difficult study to undertake. The staff and funding organisation, Health Systems Trust, fell outside of the provincial health structure and met resistance at that level. Regional politics shaped the programme's design. District trainers needed for the cascade approach were not available. District staff remained entrenched in a traditional health hierarchy and found it difficult to function as a team. The will of district prescribing staff to learn was low. Rational drug use training is only one of a number of essential elements of in-service training urgently needed by these staff.

Despite these problems, quantitative and qualitative success was shown. The Training Manual, developed in support of the training, has been in demand. The Primary Care Medicines Resource Centre is growing. Primary care prescribers have been motivated to monitor their own practices and manage their own clinic stock. The project is a successful example of multi-disciplinary and institutional collaboration.

The Rational Drug Use Training Project has expanded to eight other health districts in 1997. A list of criteria, such as the need for a district trainer, have been set. These must be met by the district before training will commence. The project is a resource for Initiative for Sub-District Support, a joint district development programme of Health System Trust and the Department of Health. Most expansion in 1998 will be through this initiative.

The difficulties encountered and achievements made during this small study will be used to support, and hopefully strengthen, the development of the primary health care oriented district health system, so urgently needed by the South African population.

Chapter one: Introduction- placing the thesis in context.

This chapter will:

1. discuss the concepts behind rational prescribing, essential drugs programmes and essential drugs lists.
2. describe the origins of the Rational Drug Use Training Project.
3. set out the objectives of the Rational Drug Use Training Project as a whole, as well as the objectives of the intervention study described in the thesis.

The Rational Drug Use Training Programme is a problem-based, on-site and in-service training programme, that has been running since March 1996. It aims to introduce the principles of safe, efficient and cost-effective prescribing of essential medicines to health workers in small groups, at primary care level in the public sector. **Primary care health staff** may be nurses, doctors or pharmacists, and are those people at the point of first patient contact, from a mobile clinic up to and including health staff working in the outpatient section of a district hospital.

The origins and objectives of the Rational Drug Use Training Project will be set out in this introduction. Firstly, however, three important concepts will be described.

A. Important concepts:

1. Rational Prescribing:

Rational Prescribing is the process of ensuring a patient receives the correct treatment for their diagnosis. If that treatment includes a medicine, the appropriate drug, with the fewest side-effects, must be given in the right dose and dosage form for the correct period of time. This process requires sensible prescribing and dispensing of medicines, as well as patient compliance with the therapy. Furthermore this drug needs to be available, so the stock management and supply system must be functional[1].

Rational prescribing is more than the writing out of a prescription, although this is often the only part of the prescribing process visible to the patient. It signals the termination of the interview and often acts as a replacement for discussion and education of the patient. Further, by supplying the patient with a drug the prescriber is acknowledging the patient is ill and justifying their reason for coming to the health facility[2,3]. Ideally, the prescriber should be working through a series of steps after making the diagnosis to achieve a rational therapeutic outcome. These steps include setting treatment goals for that patient encounter, and selecting the best therapy based on these. This therapy need not include a drug, but if it does, the medication should be selected by looking at the safety, efficacy, suitability and cost of the drug needed[3,4,5].Prescribers need to be able to critically appraise information available to them, about the patient and about the drugs, to make this decision safely. These are skills which have to be learnt[6,7].

Irrational drug use is a widespread problem. Prescribers are influenced by their undergraduate training, which may be outdated or inadequate. They may also be swayed by pharmaceutical product advertising, and the receipt of biased drug information. They may not have access to clear and impartial drug-related information. Patient demand, or perceived patient demand, may change their therapeutic decisions. Patients often request a medicine based on the expectations derived from previous clinical encounters. Similar influences affect the dispenser, who may not have the training, available information or time to dispense drugs safely and provide relevant patient information. Patient compliance with the treatment depends on the attitudes of the health care workers towards the patient, the time spent in explanation and the availability of written information for them to take home. Other factors which may influence compliance are community and cultural beliefs and the lack of public education about health and disease[1,2,3,8].

Typical examples of irrational drug use include over-prescribing, typically of antibiotics or sedatives, using the incorrect drug, or prescribing an inappropriate dosage form such as an injection. Ineffective drugs, such as most of the commercial cough syrups, are widely utilised. These practices occur in both well-and under-resourced countries[3,8,9,10,11,12,13]. It is much more difficult to change an existing habit than it is to engender a good habit at the outset. Ideally all undergraduate health care staff should be taught to prescribe rationally[6,7]. The staff reached by the Rational Drug Use Training Programme are those already working in health care, whose prescribing patterns, good or bad, are already established.

2. Essential drugs lists:

Essential drugs are, according to the World Health Organisation (WHO), those medicines "that satisfy the health care needs of the majority of the population; they should therefore be available at all times in adequate amounts and in the appropriate dosage forms"[1]. They must be affordable to the individual and the community. In the last 40 to 50 years there has been an exponential increase in the number of medicines available for use. Most were only accessible and affordable in developed countries. Developing countries did not have as ready access to drugs now defined as essential. Although some items, often non-essential, were available, particularly in urban areas, these came without independent product information and often at unaffordable prices. Most available data came from potentially biased pharmaceutical company advertisements[6,7].

In the 1970's the WHO created the concept of an **essential drugs list (EDL)**, that would contain quality items the whole population would have access to and could afford. The choice of these products was based on common and important conditions seen in developing countries. The first WHO essential drug list, published in 1976, contained 224 items. Purchasing only this limited selection of drugs was expected to reduce drug costs, usually a leading expense to a department of health. Storage, management and distribution of the supplies would be easier as well[1,3,14].

It has been argued that with the focus on essential drug lists too much importance has been placed on the use of drugs in the primary care setting, when the focus should be on preventative measures[3,15]. Health care workers world-wide are known to over-prescribe. All forms of rational drug use intervention must stress the importance of non-drug management, patient education and counselling. However, for many illnesses such as sexually transmitted diseases, tuberculosis and hypertension, drug management is undeniably important. The WHO essential drugs list does include vaccines and medicines such as oral rehydration solution, important in prevention of childhood illnesses.

3. Essential Drugs Programmes:

Many countries in the developing world now have essential drug lists, but these have to be implemented, and are therefore supported by **essential drug programmes (EDP)**. The WHO Drug Action Programme has lead support for this concept. Initially these programmes looked at improving systems for selecting and procuring drugs for the essential drugs list, and at methods of efficient distribution. of these drugs. However, as essential drug programmes improved drug access more medicines became available for misuse and irrational prescribing. Only in the 1980's did attention fall on the actual utilisation of these substances by the prescribers. Recently much effort, and funding, has been directed toward measuring prescribing patterns and training prescribers in the rational use of drugs[3,8,14,16,17,18]. As yet the evidence that essential drug programmes, including these training efforts, have much sustainable impact on prescribing practices is limited. Only 7 studies have looked at the impact of essential drug programmes in the developing world and only Zimbabwe has managed to show improvement in prescribing practices using a WHO accepted study design, a multi-point time series study [3,8,14,19,20].

B. Processes prompting the development of the Rational Drug Use Training Project:

In late 1995, a number of processes led to the development of the Rational Drug Use Training Programme. These included the *District Team Problem Solving* (DTPS) initiative run by the Centre for Health and Social Studies in KwaZulu-Natal; the World Bank's *Better Health in Africa* programme, in which Professor Peter Folb of the Department of Pharmacology at the University of Cape Town, was involved; and the formulation of the South African *National Drug Policy*, including the Essential Drugs Programme, which placed an increased emphasis on the role of clinical nurse practitioners as prescribers. Further impetus and funding were provided by Health Systems Trust (HST), a non-governmental organisation committed to improving public sector health care in South Africa.

1. The District Team Problem Solving Groups:

The **District Team Problem Solving** programme was an initiative co-ordinated by the Centre for Health and Social Studies, at the University of Natal, and funded by Health Systems Trust. The method is WHO designed and tested, and has been shown to improve the management of primary health care services at a district level[21]. In late 1994, during the early stages of development of the district health system in South Africa, 8 districts in KwaZulu-Natal elected to become involved. Each district chose a working team, comprising people from different sectors of the community that have an influence on health (e.g. health care staff, agriculturists, and economists). Through a series of problem-based workshops, this team selected a priority health problem for their district. For example, the Kokstad region selected their priority problem as being the number of people who default from tuberculosis therapy, while the Msinga team chose to direct their efforts toward decreasing the number of sexually transmitted diseases among scholars. Solving the chosen problem increased knowledge and developed skills within the team that could be applied to other health problems in the future.

At the end of 1995 the groups requested support from Health Systems Trust in improving drug management and rational drug use, as well as in the implementation of the essential drugs programme, expected to be launched later that year[22]. A preference for training on-site, in primary health care facilities, was specified. Dr David Harrison, then the executive director of Health Systems Trust, asked the Department of Pharmacology at the University of Cape Town for help in providing the multi-faceted support needed. It was envisaged that it should include:

- provision of therapeutic guidelines for common conditions;
- access to other drug-related information;
- access to material for training, updating knowledge and continuing education around rational drug use;
- one-on-one support for clinical decision and problem-solving;
- evaluation of the intervention with a view to extending the project[22].

In particular it was asked if the Medicines Information Centre (MIC) at the University of Cape Town could act as a resource for HealthLink. HealthLink, Health Systems Trust's electronic store-and-forward communication network, was being piloted in 4 provinces. The system would provide rural health care workers with up-to-date health-related information and continuing medical education through e-mail. The MIC had realised the need to expand from the existing telephonic response service to a more proactive service, which could include providing drug information to primary health care workers. As the

centre was already on the University of Cape Town's internet server, expansion into e-mail communication would be easily achieved.

Similar drug use needs had already become evident through two other processes: the South African *National Drug Policy,* and the *Better Health in Africa Initiative*.

2. The World Bank Better Health in Africa Initiative:

In 1996 over seven billion rand was spent on pharmaceuticals in South Africa. This was about 25% of the country's total budget for health. Even in the public sector the amount spent on medicines per capita per annum greatly exceeded (approximately seven times) the World Bank suggested norm of U.S. $1.5[13]. WHO and World Bank data have shown that 12% of the money allocated for a drug budget in Africa actually translated into drugs for use by patients[23]. Although this was an average for the African continent, it applies equally in South Africa.

Some of the money was lost through poor drug selection, i.e. choosing to buy the wrong or inappropriate drugs, and inefficient quantification, such as miscalculating the amount of a particular drug needed resulting in over or under-purchasing. Inefficient systems of procurement (which would include decisions as to whether a drug was made locally or bought in, terms of payment and the source of the supply etc.) compounds this loss, and yet more money was wasted through problems with drug distribution and supply. These losses were compounded by poor stock management at health care facilities, where a system for ordering may not be in place, or the drugs may be stored inappropriately, or left until expiry. All losses were worsened by theft at each level[13]. These issues must be addressed at a drug regulatory level.

Figure 1

Causes of waste and inefficiency in drug use in Africa.

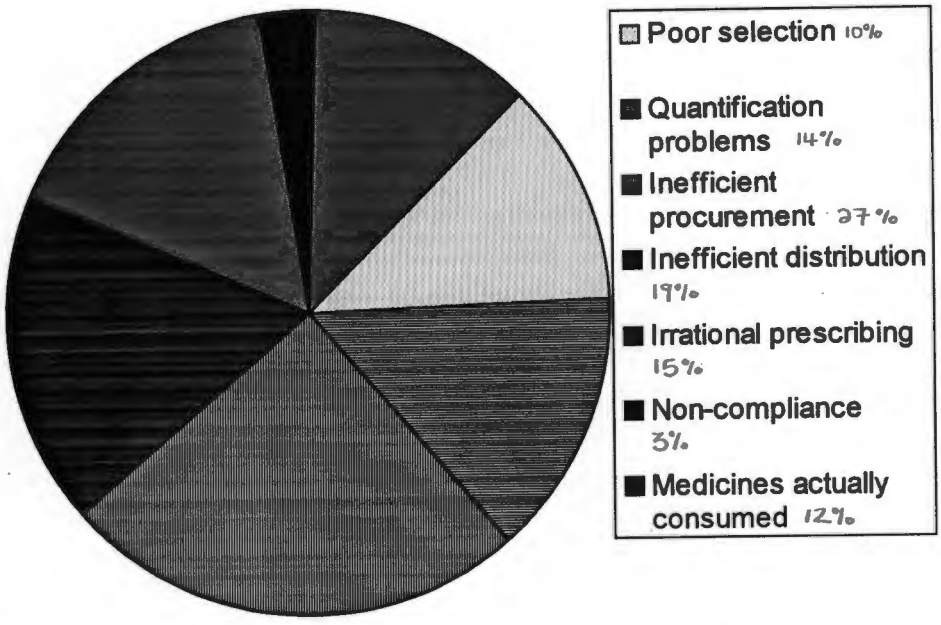
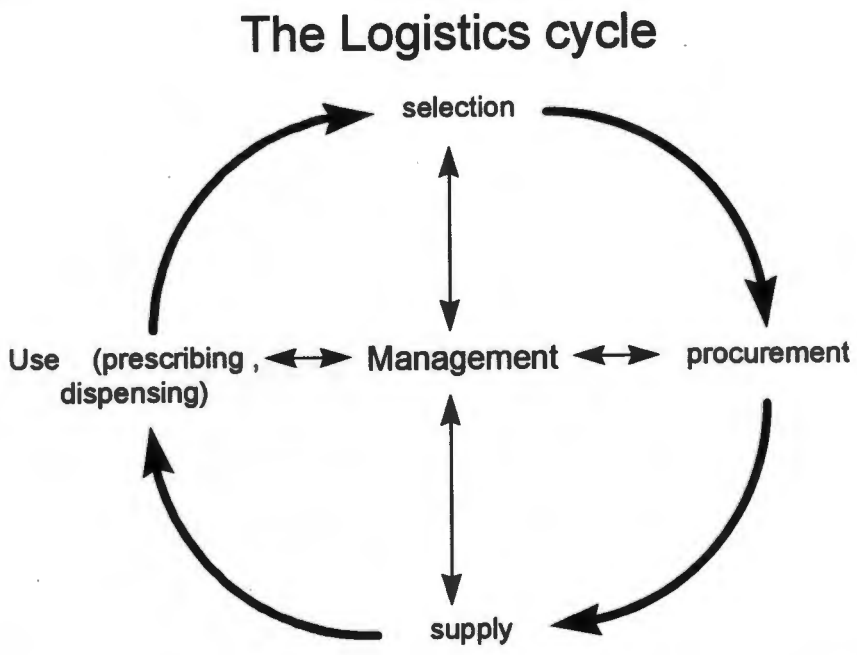


Figure 1 quantifies the amount of wastage due to the problems listed above. Yet more money was lost, however, by irrational prescribing, and non-compliance of patients[23]. Of those medicines which arrived for patient use, a large proportion were prescribed and dispensed by staff who were not adequately trained. Examples of this have been seen during work on the Rational Drug Use Training Project: overburdened nursing sisters with little clinical training were diagnosing and prescribing, staff nurses were dispensing drugs, and general assistants/housekeepers managed stock.

Responsibility for these educational issues lies with every health care worker, as well as with their trainers. The World Bank technical report "Pharmaceuticals policies in sub-Saharan Africa: what more can be done?", written by Professor Peter Folb and Professor Graham Dukes, stated that unless irrational prescribing was addressed, resulting in a change in medicines required by the users (see Figure 2), the profile of drugs selected at national and provincial levels would remain unchanged.

Figure 2



On the other hand, it would be difficult to prescribe rationally if incorrect drugs had been supplied, or there were drugs missing from the facility due to transport problems. To provide safe and effective health care, a secure supply of safe and effective medicines is essential. All these areas of "waste and inefficiency"[13] are interlinked, and the solution to one lies partly within the solution of the others.

The Department of Pharmacology at the University of Cape Town has a strong working base in drug policy and regulation. Together with the Department of Pharmacy at the University of the Western Cape, it forms the WHO Collaborating Centre for Drug Policy, Information and Safety Monitoring. Many staff are involved in the scientific work of the Medicines Control Council (MCC). The South African National Adverse Drug Event Monitoring Centre, a subsidiary of the MCC, is based there. In addition, drug information expertise is readily available, in the form of the Medicines Information Centre and the South African National Formulary unit, as well as the Traditional Medicines Unit.

Until 1996 this expertise provided support to university, other academic and private sector personnel. It was not readily available or accessible to primary care public sector staff. In response to this, and with the acknowledgement that irrational prescribing and poor patient compliance contribute significantly to the inefficiencies and waste in the supply of drugs[23], a Cape Provincial Administration clinical pharmacology registrar post was created from January 1996. This registrar would begin the process of making the drug knowledge and skills of the Department of Pharmacology available beyond the university, to health care staff in the primary health care setting. This occurred at the same time as the Health

Systems.Trust's request for rational prescribing and drug information support. The Health Systems Trust project was seen as the first step toward achieving the Department's goal.

3. South African National Drugs Policy and Essential Drugs Programme:

Shortly after this, in April 1996, the Essential Drugs Programme (EDP) was launched by the Department of Health, as part of the **National Drug Policy**[24]. This included a book of Standard Treatment Guidelines, covering about 90 common conditions. These guidelines covered conditions which could be managed at primary care level, and the first Essential Drug List, published with the guidelines, included about 200 drugs which would be available for use at this level. Guidelines and essential drugs lists for secondary and tertiary care levels are planned for 1998.

Many Southern African countries have Essential Drug Programmes. Zimbabwe's system has been successfully implemented and various indicators, reflecting rational drug use and stock management patterns, are surveyed regularly as part of a time series analysis[14,20,25]. Mozambique's essential drugs are imported by donor companies in the form of a ready made pack, containing about 100 drugs[15].

The introduction of an essential drugs list and a book of standard treatment guidelines alone, without education on their use, is unlikely to have any impact on prescribing patterns[3,8]. Uneven distribution of this information and lack of training interventions in South Africa has led to the belief, in some areas, that the same standards do not apply to all primary care prescribers. An example of this was seen at a few facilities in KwaZulu-Natal: the district doctors did not follow the new standard treatment guidelines, yet the nurse prescribers are obliged to. The guidelines are seen as being "just for nurses".

The South African EDP increased emphasis on primary health care, and with this the role of clinical nurse practitioners as prescribers. At the moment, any nursing sister working in a primary health care position may prescribe medicines from Schedule 1 to Schedule 4, without any form of training either clinically or in pharmacology. They act under the protection of their district or regional authority. Legally, nurses are not supposed to prescribe without a letter of authority from the Department of Health (de Witt, Registrar SA Interim Nursing Council). Having completed post-graduate Primary Health Care training does not, in itself, bestow this authorisation. The South African Interim Nursing Council has no record of those sisters with prescribing authority[26], and it was difficult to trace one in the Department of Health.

Whatever their training, nurses are expected to practice within their competencies. This has lead to confusion- some staff have taken the introduction of the Primary Care Essential Drug List as authority to prescribe any of these drugs, others will dispense medications for diabetes, hypertension or epilepsy, for example, on a doctors script, but would not initiate the therapy, despite most of the drugs being in Schedule 3.

The Democratic Nursing Organisation of South Africa (previously the Interim Nursing Council) is beginning to address the issue by creating standards for any nurse practitioner training course, to ensure the staff trained will have the necessary knowledge and skills to act as an effective prescriber of medicines on the EDL[26]. The South African Drug Action Programme (SADAP), launched in February 1997, has the objective of improving "the effectiveness and efficiency of Health Care in South Africa by providing support for the implementation of the National drug Policy"[27]. There are resources and funding available to address this task.

Training in drug use is urgently needed by prescribing staff. Logistically this is going to be difficult: due to the large numbers and varying degrees of training needed. To take staff out of their clinic setting would complicate things further, by worsening the load on those remaining. Yet if the staff remain in their clinics, trainers would have to be able to reach widespread and isolated areas.

C. Objectives of the Rational Drug Use Training Project:

The Rational Prescribing Training Project was born out of these influences, which seemed to reflect similar needs in the areas of drug use and information. The registrar post at the Department of Pharmacology at the University of Cape Town was filled by Dr Catherine Orrell. A pharmacist, Ms Aarti Kishuna, was released at the request of HST from the Department of Pharmacy at the University of Durban-Westville, to help with the development of the project. Both staff are still fully involved, and, initially, all salaries came from their institutions. Other development costs were covered by Health Systems Trust.

The objectives of the Rational Drug Use Training Project, stated in the original proposal submitted to the Department of Health and Health Systems Trust in March 1996, were[28]:

(i) to support and strengthen the essential drugs programme and its implementation in South Africa i.e. **to improve rational and cost-effective use of medicines** on the primary care essential drugs list, by primary health care workers;

(ii) to describe a **system for training** and development of these prescribers, in the public sector (human resource development), **at the site-of-service**;

(iii) to create the structure and systems of a seeding effect, so that the **trainers** will be selected, trained and supported at a **district level**; they will then participate actively in the training of other primary health care staff, i.e. a train-the-trainers programme.

(iv) to make optimum **use of the infrastructure** and materials that are already in place in the institutions with which the programme will be linked; this refers to information systems, training manuals, trainers, and therapeutics protocols/treatment guidelines, and drug information systems;

(v) to link every component of the system that is to be developed and implemented within this programme to **measurement**, outcome analysis and research;

(vi) to establish and reinforce the principle of **lifelong learning** amongst the healthcare workers concerned;

(vii) to provide technical **support to the national drug policy** of the South African ministry of health; it is a recommendation of the national drug policy that there should be such support[24],and,

(viii)to establish a model that will be generalisable on the African continent, and, furthermore, which will be universally applicable in the developing world;

Strong support has been received from the university departments involved, and from Health Systems Trust. Two major initiatives of Health Systems Trust have been influential: HealthLink, the electronic communication system, which has been installed in many of the health facilities in which the Rational Drug Use Training Programme has worked; and the Initiative for Sub-District Support (ISDS), a joint programme of HST and the Department of Health. The Initiative for Sub-District Support provides multi-faceted support for the implementation of the district health system in previously under-resourced areas. Help is provided particularly at district management level, with a strong focus on improving the delivery of health care as a service.

D. The objectives of this study:

This thesis will describe an intervention study conducted to determine the qualitative and quantitative effect of the Rational Drug Use Training Project. This is a before and after study, with no control group. The dissertation will include:

- A review of similar studies in the developing world,
- A description of the development and content of the study intervention: a 2 day rational drug use workshop, using a train-the-trainers structure,
- Presentation and analysis of prescribing data collected at three primary care facilities in December 1996, before the first set of training workshops. Data collected in March 1997, after implementation of the Rational Drug Use training will be presented as well; the two sets of data compared and the results discussed.
- A discussion of the problems and strengths of the study. A plan for the future of the Rational Drug Use Training Project, applying what has been learnt, will be formulated.

Chapter two: Review of in-service training in rational drug use in the developing world.

This chapter will:

1. describe the results of a literature review of similar rational drug use training studies.
2. comment on the structure of the studies, and the successful methods of training staff in rational drug use.
3. discuss the difficulties in providing good drug information to developing countries.

A. Other studies training in rational drug use:

1. An outline of the Rational Drug Use Training Project:

This thesis concerns the development of a **in-service** training programme in **rational drug use** in a **developing country**. The programme focuses on communicating the concepts behind the rational use of drugs, from managing the stock of a primary health care facility through to rational prescribing and good dispensing practice to groups of health care **trainers**. These concepts are then presented in a workshop format to small groups of staff, at their own facilities, by these trainers. No particular clinical subject is focused on, although all the problem-based cases describe primary care illnesses, such as tuberculosis, sexually transmitted diseases and diarrhoeal disease. If the principles behind

rational prescribing and dispensing are put across clearly and simply, they should be applicable, and the knowledge transferable, across all subjects [29].

Similarly, in measuring the prescribing patterns of a facility, no single drug use indicator is used, rather a broad overview of the prescribing and dispensing patterns at a particular facility are obtained, first as a baseline, then as a means of quantifying the changes due to an intervention, which in this case is the workshop.

The drug use indicators used are derived from those developed by the World Health Organisation (WHO) together with the International Network for the Rational Use of Drugs (INRUD). These indicators measure the use of drugs at primary health care facilities[30]. They delineate a pattern of prescribing for a facility or group of facilities, are reproducible and easy to collect, so can be collected by primary care staff in a clinic setting. This is a simply descriptive procedure and does not indicate the reason for any pattern shown[8,30].

The Rational Drug Use Training Project is not intended to stand alone, as complete in-service training in drug use, but aims to be an introduction to the safe use of medicines, providing encouragement for on-going learning by the staff themselves. The project then provides support for this self-driven learning in the form of reference texts and by providing continuing access to independent primary health care and medicines information centres. The details of the project's structure, and the drug use indicators used, will be discussed in chapter three.

Similar programmes may provide insight into factors which may lead to success in improving drug use at primary care level. Rational drug use, as a science, examining the problems of irrational prescribing and poor patient compliance, is a relatively new field. At lot of attention in this field has, until recently, been focused on well resourced, developed countries, where the health infrastructure, information resources and financing available readily allows structured regulatory or training interventions[3,8,14]. The first International Conference on Improving the Use of Medicines (ICIUM) in developing, under-resourced countries was held only this year (1997).

2. Data sources searched:

Data searches were conducted through internet MEDLINE, the University of Cape Town Medline and the Cochrane database. The searches using Medline through the Medicines Information Centre at UCT used the headings "developing countries", "continuing medical education" and "drug utilisation", but found little on improving rational use of drugs per se. The internet Lycos free MEDLINE search using the headings "in-service" "training", "rational drug use" and "developing countries", found one article, D. Ofori-Adjei et al's

study on the "effect of training on the clinical management of malaria by medical assistants in Ghana"[31]. This had a particular illness as a focus, rather than principles of rational drug use.

These database searches revealed a number of in-service training programmes in some aspect of rational drug use at primary care level in developing countries. The majority of these cover fairly narrow fields. Some focus on improving the management of one disease entity, such as diarrhoeal disease in children or malaria therapy[31,32,33]. Similarly, they may look at improving the use of one drug group e.g. benzodiazepines or antibiotics[34,35].

These studies also tend to use one or two prescribing parameters only, such as the percentage of patient encounters where a patient receives an antibiotic or an injection, or on the problem of polypharmacy[36,37,38]. A number of studies reported on a baseline survey only, which would have been measured to determine prescribing practice as a basis for planning an intervention. Most of these studies use indicators from the WHO/INRUD drug use indicators as tools to measure their impact[30,39].

Further information was gained from the first International Conference on Improving the Use of Medicines (ICIUM) in developing countries. This conference was held in Chiang Mai, Thailand, in April 1997. Many of the important role players in the field of Rational Drug Use were present. However, even here, few studies were found from developing countries that focused on improving drug use in general[8].

3. Results of the search:

The search was for studies that were in-service and preferably on-site at primary health care facilities, which had as their focus the concept of improving drug use as whole. Very few studies looked at globally improving the use of medicines, across most of the WHO/INRUD drug use indicators, in all fields of prescribing. The studies that were considered to meet most of these criteria are described below.

One article by Thomas M. et al "Promoting Drug Use in India"[5], describes a problem-based, clinically oriented workshop held in rural mission hospitals in India. Their objectives are similar to those of the Rational Drug Use Training Project, including encouragement of prescribers to prescribe from an essential drug list, educating health care workers on the concept of rational drug use and providing updated information for commonly used drugs. The group proposed that the principles taught be carried forward and presented to other health care staff by the participants of the workshop. Unfortunately the impact of the workshop was only assessed qualitatively, although the group promoted the periodic assessment of drug use patterns as a prescribing audit from then on. The participants

were said to have benefited from the sessions and their content, which seemed to be fulfilling a need in that field. All the workshops were well attended and those present felt they had gained some understanding of the rationale behind certain treatments.

The same group of authors presented a poster at the ICIUM conference on "The impact of focused workshops on the rational use of drugs"[41]. Here similar problem-based workshops were held in mission hospitals in India, covering problem solving exercises on clinical management, with the focus on selection and rational use of drugs. Each workshop lasted 2 days. Sixty physicians from the hospitals attended the sessions, and 90% of them completed the training. This time the workshops were evaluated by a questionnaire and the measurement of drug use indicators in the mission hospitals before and six months after implementation. There was no control. Although there was a tendency toward improvement in many areas of rational drug use this difference was not statistically significant. The authors concluded that reinforcing workshops would be necessary. Participants expressed a desire for access to an unbiased source of drug information. All the participants in these two studies were medical doctors.

The search of the Cochrane database also found a number of focused drug utilisation studies, but only one article on improving drug use as a whole, Bexell, Lwando and von Hofsten et al's study on "Improving drug use through continuing education: a randomised controlled trial in Zambia."[42].This group conducted three 2-day seminars covering difficulties in rational drug use and how to overcome them, and introducing standard treatment guidelines for common conditions. Three seminars of the same content were held within a period of 4 months at those health centres in the Lusaka district that were randomised to receive the intervention. The prescribers trained here were either medical doctors or clinical officers (staff who have received three years of clinical training after their schooling). Eighty-five percent of the prescribers in these facilities were trained. The WHO/INRUD drug use indicators were measured before, during and 3 months after the seminars, at both intervention and control health centres, to monitor the impact. The study showed that repeated seminars focusing on principles relating to drug use may significantly improve the use of medicines by health care workers. Results showed a decrease in the number of drugs prescribed per encounter ($p=0.005$) and an increase in non-pharmacological therapy.

A paper entitled "Drug use studies and the impact of small group in-service training on improving the use of drugs: a case study of three mission hospitals in Kenya" by J. Gitau[40] was presented at the ICIUM conference during a session on hospital-based interventions. A before-after study with no control group was presented. The intervention was a 5-day participatory seminar which focused on addressing the problems of irrational prescribing, poor dispensing habits and insufficient patient education on drug use. The use of an essential drug list and standard treatment guidelines was also emphasised. The seminar

was presented at three mission hospitals and WHO/INRUD indicators used before and 12 months afterwards to assess the effect of the training. All prescribing and dispensing staff were involved. The intervention was shown to be successful over most drug use indicators, showing a reduction in the number of drugs prescribed per patient, improved labelling and improved patient knowledge. The percentage of encounters in which antibiotics were prescribed only decreased in 2 of the 3 centres. Although the sample size here was small and there was no control, the paper does suggest that this form of intervention, i.e. a seminar format covering broad principles of rational drug use, can be successful.

There were two further studies presented at the ICUIM conference which use a broad range of prescribing indicators to evaluate their intervention. However both the papers focus on the effect of introducing standard treatment guidelines (STG) to a prescribing population alone, rather than on the principles of drug use as a whole. J. Kafuko presented a paper on "Rational drug use in rural health units of Uganda: effect of national standard treatment guidelines on rational drug use"[43]. This was a randomised controlled study. The rural health units were assigned to either receive copies of the newly developed STGs alone, STGs with feedback and training or STGs with feedback, training and 6 months of supervision. The control received none of these interventions. Again the WHO/INRUD indicators were used. Prescribing patterns improved for the two groups receiving both the STGs and training, while it worsened in the group only receiving STGs and remained unchanged in the control. There were no significant differences relating to the supervision.

The other study looked at the effect of STGs and training on the rational use of drugs. K. Wiedenmayer et al's paper entitled "The impact of a pilot intervention (standard treatment guidelines, training) on prescribing patterns in Dar Es Salaam"[44,45], described a randomised controlled study to assess the impact of interactive workshops on all prescribers. A set of STGs was introduced and elaborated on with the intention of improving prescribing. WHO/INRUD prescribing indicators were measured before and 5 months afterwards. These showed little improvement, although there was greater adherence to the STGs after the intervention. The authors felt that the interest shown to the health units simply by the baseline study and repeated visits could have resulted in this positive change. Many more interventions would be needed to change ingrained prescribing habits.

Richard Laing and Dennis Ross-Degnan of the WHO presented a comprehensive review of projects in developing countries which looked at improving the use of drugs in primary care prescribing. They searched Medline, Healthline and the INRUD and WHO databases, for published and unpublished data. Again most of the 59 studies found, excepting those reviewing the implementation of national essential drug programmes or intending to

impact on administrative or management structures, covered specific topics, using a limited number of drug use indicators[14]. The only study mentioned which focused on improving the rational use of drugs as a whole and had not been found in the searches detailed above was de Vries et al's "Impact of a short course in pharmacotherapy for undergraduate medical students: an international randomised controlled study"[29]. Although this is not an in-service study, the problem-based short training course is based on the principles of rational prescribing found in the WHO manual "the Guide to Good Prescribing"[4]. These are the same principles that the Rational Drug Use Training Project utilises. Students are also encouraged to seek independent drug information. De Vries shows that after the training under-graduate medical students could solve clinical problems better than their counterparts who had not received training. These skills were transferable to clinical cases not covered in the training and were sustainable for at least 6 months.

There are only seven published studies which have a similar broad focus to the Rational Drug Use Training Project. Those studies that do show a mixture of successes and failures based on the repeated measurements of the WHO/INRUD drug use indicators. All of them have some positive impact, which in some cases is expressed qualitatively. This data should not be disregarded solely because it is not numeric. The Rational Drug Use Training Project has held many workshops in 1997, not all of which have had post-training quantitative data collected and analysed. However qualitatively, using a structured feedback form, the appreciation and value of training in the field of improving prescribing or the rational use of drugs, is enormous. This is expressed in the studies described above as well.

Those studies that are small and well-controlled are the ones which show the greater quantitative improvement in the pattern of drug use. In these papers, those people that were trained were the only ones whose prescribing was monitored, for example, the groups of medical students in de Vries et al's study, or all the facility's prescribers being trained in the Kenyan mission hospitals monitored by Gitau[29,40,42]. In other studies the statistical effect of the training may have been less marked due to a dilution of trained staff. Prescribing patterns of a whole facility have been monitored, yet only a small group of prescribers had received the in-service prescribing training, as in Bexell's paper[42]. If the training was extended to involve all the clinical staff of the facility, or the study restricted to the people who had been trained, the benefit may be more clearly seen.

Most of the interventions are in the form of participative workshops, that are clinically oriented and problem-based and involve a small group. These workshops are usually short, covering one to two days, except for J. Gitau's study where the intervention was a 5 day seminar[43]. Repeated workshops seem to be beneficial[41,42]. De Vries's study shows the most significant effect of a principles based training programme in rational drug use[29], but

this was for a controlled group of undergraduate medical students, not staff requiring in-service continuing medical education. Otherwise the health care worker that receives the most attention and training in these studies is the doctor.

Not all the studies are randomised and controlled, which may not be ideal, but is likely to reflect implementation problems, such as political difficulties, poor resources and funding. None of the studies employ a train-the -trainers approach, which may have allowed the training to be disseminated within a facility quite rapidly, but which often results in dilution of the content. The KwaZulu-Natal sexually transmitted disease education team uses a train-the-trainer approach to disseminate their guidelines. They train a core group of trainers, as they have found that the information becomes diluted if there is more than one level of trainer. They also note that there is a very high turnover of trainers, requiring ongoing recruiting and training of staff[46]. Other health education programmes have found the train-the-trainers approach successful, such as the Loughborough University Clean Water Project[66] and the WHO Diarrhoeal Disease programme[13]. In these, the trainers are trained for extended periods of time in centres of excellence, before being expected to train others.

The structure and content of the Rational Drug Use Training Project incorporates and reflects aspects of many of these projects, such as the problem-based workshop structure, the encouragement of staff to use independent drug information and the use of the WHO/INRUD drug use indicators to assess impact. However, there are no studies where the largest proportion of prescribers trained are nursing staff, with little basic clinical or pharmacological training. Most studies seem to have more access to staff and training resources and have not needed to resort to a train-the trainers approach. Even so, the studies above are encouraging to the Rational Drug Use Training Project. They show that in-service staff may improve the rational use of drugs for a reasonable period of time, after being exposed to short two to five day workshops that are based on principles of drug use.

B. Rational drug use study structures:

The detailed review by Dennis Ross-Degnan and Richard Laing, "Improving pharmaceutical use in primary care in developing countries: A critical review of experience and lack of experience"[14] considered 59 studies. These were divided into those of acceptable methodology (36/59), and those considered unacceptable (23/59)[8,14]. Acceptable studies included those which were of a randomised control trial structure, a pre-and post intervention study with control, or a time series study, with at least 4 review points. There were only twelve studies from Africa in 1991-1996, of which nine were acceptable. Only four of the seven intervention studies reviewed above would have met these criteria.

1. The need for randomised controlled studies in rational drug use.

A number of points can be made here. Is there a need to evaluate rational drug use as a randomised controlled study? Methods used in working to improve the rational use of drugs should not need to follow the same rigid requirements needed to pronounce a new drug as effective and safe. In the purely scientific world of clinical research individuals are randomised into controlled groups that match basic physical, metabolic and demographic criteria, so that the effect of a single intervention, usually a drug, on one of the groups can be distinguished. The physical effect is then measured and is assumed to be transferable to many other groups. Even when working with individuals there may be problems in assuming this generalisability. Drugs tested in healthy male volunteers, may not have the same kinetics or action in women, children or an ill person.

When the measurement involves interactions with groups of people, there are a lot more criteria to consider. There are so many potential influences on prescribers, dispensers and consumers, as individuals and as health carers, that it cannot be possible to place them in anything but fairly crude groups for randomisation.

In other words, the data from these studies are not necessarily comparable or transferable. One cannot compare the prescribing practices of one clinic to those of another, even in a similar area. The WHO/INRUD indicators, used in most studies, are not detailed enough to consider of the number of prescribers involved, the differences in their backgrounds, be they doctors, nursing or pharmacy staff, or, if in the same group, disparities in training received. They also make no allowance for differing disease

patterns, patient loads, changes in individual prescribing practices from day to day, and other geographical influences, such as access to a clinic. The availability of medical aid cover to the patient may have a large impact on the medication prescribed. A nurse may prescribe an antibiotic to a child whose diagnosis of a bacterial infection is uncertain when she is working in a mobile clinic unit and has no means of following the patient up, yet not prescribe one if she is in a fixed clinic [1,2,8].

Similarly, training methods must learn to respond to the different influences of economics, geography, epidemiology, sociology and culture on prescribing practices. These often mean that a training method successful in one area, will not necessarily be acceptable in another region, and therefore may have to be adapted. Training and education involve the minds of those participating[1,2,8]. If the benefit of a training intervention must be monitored, time series studies, comparing management by the same staff in the same set of facilities over time as training progresses, may be more meaningful.

Applying such high standards, which label so many studies unacceptable, may result in valuable data being lost for people doing work in this field. In a rural, third world setting, it is often difficult to travel. Population and health care facilities are scattered and isolated, and there may be political problems, which do not allow an ideal trial structure to be created. Funding may be limited. These problems are probably widely experienced and the methods they by which they are overcome or are not overcome, need to be discussed, rather than be discounted when an acceptable study design is not achieved. People working at grassroots level in countries with minimal resources, who are most likely to need and benefit from work in the field of rational drug use, are the least likely to reach this scientific pinnacle.

2. Research or monitoring?

Dr Hans Hogerzeil noted that studies must take care not to combine collection of research data with monitoring of any intervention[8]. Again this is a contentious issue. In interventions aimed at improving drug use, drug use indicators are used to audit the prescribers practices. Ideally this should be done by the prescribers themselves. They should take control of the drug use indicators that they feel reflect the areas of practice that need improving. This need not be an external, exam-type exercise, but rather one of self-learning. One of the problems the trainers of the Rational Drug Use Training Project experience is the general lethargy among primary care prescribing staff, who have never been held accountable for the drugs they use, nor given any responsibility for the budget of their facilities. By giving these staff the means to measure and note the effect of their prescribing practices, allowing a response within their control, this attitude may be broken. If prescribing staff are trained to collect and use simple indicators properly and objectively,

then the monitoring of training and improvement of their prescribing practices need not be separate from the research necessary to write up the effect of an intervention[8,54].

C. Methods used in in-service training in rational drug use:

Improving the use of medicines can be done by many means, including legislative and regulatory methods, such as the implementation of essential drug programmes (EDP) or restrictions on the release of a particular medication[1,8,47].The benefits of these essential drug programmes are difficult to assess[14]. The one group which has quantitatively shown success, the Zimbabwe Essential Drug Programme[20,25,30], has evaluated the programme through measurement of the WHO/INRUD drug use indicators. These indicators are user-based and when collected for a group of prescribers or a facility give a broad outline of their prescribing habits, allowing problem areas to be identified[30].

1. Monitoring drug use through the prescribers:

The impact of an essential drug programme seems to be most easily measured through the users, the prescriber and dispenser. Good, rational drug prescribing habits are assumed to translate into good patient care. There are many interventions in developing countries which aim to improve various aspects of the drug use patterns of these prescribing staff[8,14]. It would be useful to know which methods of training are successful in changing and sustaining prescribing patterns. Often a change in knowledge is not reflected by a change in practise. Once the participant is removed from the training set-up, the influences of habit, patient load and patient demand supersede the new knowledge[8,47].

The INRUD/WHO drug use indicators are a well known, easily used and well structured means of measuring prescribing practice. These indicators provide some uniformity and standard of reference for the large number of interventions aimed to improve various aspects of rational drug use in developing countries[30,47]. There is no doubt that irrational prescribing as reflected by these indicators can be harmful, but researchers should not be content to show a decrease in the number of drugs prescribed per patient encounter, or a decreasing cost of medicines. These figures may not actually result in improved patient care[8]. Aspects such as patient satisfaction with their treatment and the likelihood of compliance are often overlooked in the rush to train prescribers and monitor drug use indicators. Drug use indicators are only measuring tools. Improving the use of medicines is a means to improve the care of patients, not an end in itself.

One of the 4 main topics on which the ICIUM conference focused was "strategies to improve the use of medicines by health care providers". Educational methods employed in

successful studies, in developing countries have been briefly reviewed here[2,8,14,47]. The focus has been broadened from those studies with rational drug use in itself as a topic to include any study improving any aspect of rational drug use, such as the management of one disease or the use of one drug.

In 1991 Quick et al introduced the International Network for the Rational Use of Drugs (INRUD) in a paper entitled Intervention research to promote clinically effective and economically efficient use of pharmaceuticals[16]. They reinforce the message that pharmaceuticals need to be used rationally, not only for patient safety, but because they form a major expenditure in any developing country's health budget. However in 1991 INRUD felt most attempts to improve drug use by prescribers had not been properly evaluated either from a methodological or an effect point of view. They suggest a number of educational strategies to improve drug use, including in-service training, exposure to printed materials, counselling at points of face-to-face contact and media input, such as posters, television or radio presentations.

Hans Hogerzeil's 1995 paper, Promoting Rational Prescribing: an international perspective, discussed some of these strategies which had proved effective for prescribing education[47]. Most of these had only been tested in developed countries. By the ICIUM conference in April 1997 the success of many of these strategies had been evaluated in developing countries too. Many studies employ more than one of these strategies to ensure success. Successful strategies do not only apply to the field of rational prescribing training. Many are based on similar successes in the field of sociology and education[8]. Being successful implies that the training strategy changed prescribing practice according to measured drug use indicators.

2. Successful training strategies:

- **A workshop format.** In many studies short one to two day workshops are successfully employed to impart an educational message. Being involved in a workshop implies interactive participation of the staff in the learning process[41,44,48,49,50]. However, it may not be the workshop format alone which is successful. Some of the other methods listed below may contribute to the effect of these workshops. Most workshops, allowing for active participation over a limited time frame, must involve smaller groups and be focused on selected, fairly narrow topics.

- **Small group teaching or face to face interactions**. Small group teaching (less than 20 participants) has been frequently shown to be more effective than attempting to teach a large group. The facilitator can be sure of each participant's active involvement and concentration through eye contact. Some studies show that a higher proportion of the

participants invited to a small group session are likely to attend, than of those invited to a lecture. One on one or persuasive training is even more ideal, although this is harder to co-ordinate and may prove to be more expensive[38,39,42,47,48,51,52,53,54].

- **Contextualised training**, for example, on-site training, has increased impact initially. Learners recall knowledge better when in they are in the same situation as when the knowledge was learnt[55]. Community based studies, that is those where the education is based in the same or similar communities as the health professional is to work, show greater impact[8,56,57].

- **Using a focused topic**. Most of the primary health care interventions target specific topics (ARI 44%, diarrhoea 36%) and one prescribing problem (e.g. polypharmacy 24% or overuse of antibiotics 76%)[14]. This narrow focus has also been shown to be effective. After interventions related to these topics, drug use indicators reflecting that field tend to show improvement. The topic of focus must be chosen carefully so as to cover a locally relevant disease or problem[8,31,58,59]. These subjects are somewhat limited, and training needs to be to expanded on to include the management of chronic illnesses, such as asthma or diabetes, and more topics related to adult medicine[8].

- **Repeated training** improves effect. Repetition of any presentation of a topic, be it in a small group or a workshop or even a lecture, improves the impact[8,14,42,47].

- **Problem-based learning**. Students are required to learn through solving a clinically related problem, which should be similar to ones they face in their practice. This form of teaching encourages self-directed learning, and requires active participant involvement. The trainer does not provide a ready-made solution, but assists the participant to seek their own. Participants can apply the principles learnt while solving the particular problem given in the session to other problems faced in daily practice i.e. the problem-solving skills should be transferable[8,29,60,61,62].

Although all these methods may show an improvement in prescribing initially, most groups only monitor that impact for 6 months. Whether the effect of the intervention is sustainable beyond that is not known. Populations, including health care staff, shift and migrate, so the people that receive education at one point, may not be there later. With all training, there needs to be supervision and on-going evaluation to maintain the impact[15,43,47,63].

3. Less successful strategies:

- It has been repeatedly shown that dissemination of **printed materials alone,** including national Standard Treatment Guidelines (STG) has little impact on prescribing practices. Printed material is useful, especially if visually startling, when supplied simultaneously with some educational intervention[2,5,8,21,43,44,47]. Having staff or peer groups participate in the production of a treatment guideline is even more effective than an introduction to completed STGs [8,44,46,64,65].

- **Didactic lectures or seminars** seem to have a short-lived impact. As compared to a workshop, didactic teaching implies a passive role of the participant. Information is supplied for absorption only. Often these lectures are given to large groups, which may contribute to the lack of effect[8,47,66].

In-service training is usually voluntary. The Rational Drug Use Training Project has found that attendance at training sessions is often limited to nurse prescribers, despite local doctors and pharmacists having been asked to participate. There seems to be the attitude in rural areas of South Africa that training in drug use is "just for nurses". Supplying the training alone is not enough to ensure attendance. Avorn et al, in their 1983 paper, "Improving drug therapy through educational outreach", note that a small proportion of doctors invited actually attend continuing medical education sessions and if, there are repeated sessions, it is largely the same doctors who attend them all[2]. Non-coercive methods are needed to improve attendance by doctors who are often relying on their undergraduate skills and promotional literature to make their prescription choice. Although unfeasible in developing countries, a lot can be learnt from the pharmaceutical companies, whose glossy promotions presented at a face-to-face interview, on-site in the doctors office, frequently with a number of "gifts" as further incentives, seem to be so successful[2,3,8].

Doctors or trainers who train prescribers often do not follow the principles taught themselves, and the reasons for this such as fear of losing their patients, should be explored. Knowledge itself is not enough. It needs to be applied. To really improve prescribing both the undergraduate prescriber, in formal medical, nursing or pharmacy training institutions, need to be included in rational drug use training programmes[2,8,29]. They need to be given the skills and information necessary to assess a drug critically, without being unduly influenced by patient pressure or drug promotions.

It must not be forgotten that any training that occurs in rational drug use, be it a focused study or global drug use that is being examined, will not be effective in isolation. If a

patient does not take the drug, then, however rational the prescription, it had not been of any use. Why do communities wants to be treated with so many medicines; why does patient demand exist? Why do mothers bring their children to clinics with what seem to be trivial ailments? Often this may be because of poor public education, that has been reinforced by poor prescribing habits, such as the liberal administration of cough syrups and antibiotics[1]. Community education is as important a part of rational prescribing as are the logistics of drug procurement and supply[3,14,17]. Patients have a right to ask if their prescription comes from the essential drug list. A educated consumer is a useful training tool: they make demands and ask questions of their prescribers who must then reconsider and defend the prescription[8].

As the consumers are important, so is the country's political will to improve the use of drugs. The whole system, from top level political activism, resulting in the creation of National Drug Policies and Essential Drug Programmes, through to the educational strategies employed to educate the clinicians, and public education of the consumers, must be co-ordinated before the use of medicines will improve[2,8,15,17].

D. Provision of drug information to prescribing staff in isolated areas.

Rational prescribing requires access at all times to information about drugs. This information should be unbiased, clear and accurate. The information received by prescribing staff in developing countries often is limited to that taught during their under-graduate degree. In contrast to prescribers in developed countries who receive a lot of information, promotional and otherwise, and who may be required by their governing bodies to participate in continuing medial education programmes, prescribers from developing countries come to rely on their undergraduate knowledge alone. With changes in drug availability, new drugs being produced and changes in treatment guidelines, this knowledge is soon outdated. New information, such as up-to-date textbooks and journal subscriptions, are expensive, and may only be available in an unfamiliar language. When little information is received, the ability to use and critically appraise information is often lost. Promotional literature from drug companies can be very influential in this situation and impartial information in needed to complement this input[1,2,3,67]. It is the patient who suffers from the lack of up-to-date unbiased information, and poor application of it. [68].

The Rational Drug Use Training Project staff have noted that the texts supplied during the workshop (the Medunsa Primary Health Care Formulary[69], The South African Standard Treatment Guidelines and Essential Drug List[70]) are often the only new source of unbiased information received by rural facility staff in many years. Staff are very grateful for the new information supplied. Despite this, they have to be reminded to use it during the workshops. Many staff have to be taught how to use the index of the books. Nurses are still using guidelines received during their nursing degree, up to a decade beforehand. Yet there are usually colourful posters on the walls of the facility, supposedly supplying educational messages, but promoting a particular drug or product.

This lack of information and the inability to use it when supplied is reflected in many other developing countries[3]. In some, up-to-date information, in the form of texts or journals, is not even available in academic centres such as university libraries[67]. This maldistribution of information needs to be rectified.

1. what information is needed?

It is difficult to make generalisations as the needs of prescribers differ widely. Primary information, such as trial data, may be less useful in an isolated practice than unbiased secondary resources, which review and combine primary data. Doctors may require

different information from nurse prescribers and disease or cultural patterns may vary, as will the depth of information already available. Patients need another sort of information again.

There must be a balance between the groups acting as the source of information, for example, the WHO or journal companies, taking too autocratic a role in deciding what is important for developing countries to know, and them simply sending information indiscriminately, when the staff receiving it may not have the skills to assimilate it. Information sent should be individualised as much as possible, considering the requests of the recipients, who know what the local priorities are. If a country has an essential drug list, there needs to be safe information covering at least those drugs, that is consistently available[3,67,68,71]. Costing information may be considered important too[1].

2. Who supplies the information?

As with prescribing training, there needs to be a regulatory component to the provision of information. Without government backing little will be sustainable. Ideally the government should support a co-ordinating body which allows co-operation between sources of information (perhaps a university library/information centre or the pharmaceutical industry), addresses priorities and ensures the high standard of this information. There should be laws ensuring the promotional output of the pharmaceutical companies makes no false or unverifiable claims[68]. In South Africa the Medicines Control Council fulfils the regulatory roles and the new South African Drug Action Programme is beginning to co-ordinate sources of drug information.

There are a number of large companies and networks which provide information to under-resourced countries. These include the World Health Organisation, which can create information "packs" relevant to a particular developing country; the British Medical Journal Publishing Group, which sells a number of copies of the BMJ at affordable prices to medical staff in developing countries; and the International Network for the Availability of Scientific Publications, which promotes and co-ordinates the exchange of information between providers and users world-wide[67,68]. Within South Africa there are a number of centres which act independently of each other at present, but are potential sources of unbiased drug literature, such as a number of university libraries, the Medicines Information Centre at the University of Cape Town, the Transvaal Pharmaceutical Society (TPS), and the Primary Care Medicines Resource Centre (PCMRC) at the University of Durban-Westville[71].

3. How to disseminate the information?

Even in South Africa, which is relatively well resourced, with up-to-date drug information centres and libraries, and with first world technology, there are huge areas of the country that cannot access safe, clear and impartial drug information[72]. One of the difficulties in dissemination of medical literature is it's bulk. Paper is heavy and expensive to transport, and is subject to all the inefficiencies of distribution which affect actual supply of drugs. It has been suggested that distribution be done through a central, again perhaps governmental, co-ordinating body. Fair dissemination of the literature to various recipients will need planning and co-operation at all levels of the health care system[1,67,73]. Even within a health care facility information can arrive and remain within a superintendent or matron's office and never be made available to other health care workers.

The problem of bulk can be overcome by supplying summary data, such as regular drug bulletins. Alternatively, electronic media may be useful, and more rapid. Most medical journals are available on CD-ROM, at much less than of the cost of subscribing. Some companies are working on providing information by satellite to small receiving stations on the ground, which then use the telephone system to distribute the information further.

Electronic mail is a fast and relatively cheap means of accessing remote areas using the telephone system, yet phone networks in developing countries are not always reliable and the computer equipment required may be expensive[67,68]. HealthLink, a project of Health Systems Trust, based in Durban, is a non-government organisation which aims to provide health workers in isolated areas with access to information resources by developing the use of e-mail. They provide under-resourced facilities with computers and access to a networking system. Primary care staff are trained to utilise these facility effectively. This allows health care workers to receive information relating to drugs and clinical skills. They can also join one of many discussion groups. Many of the facilities involved in the Rational Drug Use Training Project, also a project of Health Systems Trust, have access to HealthLink computers[72,74]

4. How to optimise the use of the resources?

If staff are provided with free access to information there may still be problems with utilisation. With paper resources, such as texts and bulletins, people may have become so accustomed to not using references that they may continue not to do so. They may have to be re-introduced to the process of verifying their data and need to learn to discriminate between a good source of information and a biased one [67,75]. Using computers may be a new and intimidating venture for some staff. A introduction to the computer and training in

the functions available needs to be provided as well. Support will have to be sustained until the system is being utilised adequately.

The Rational Drug Use Training Project hopes to re-introduce the principle of active information seeking to primary health care staff, encouraging and re-encouraging them to use any resource available: personnel, texts or HealthLink.

Chapter three: Methods- development of the intervention and the measuring tool.

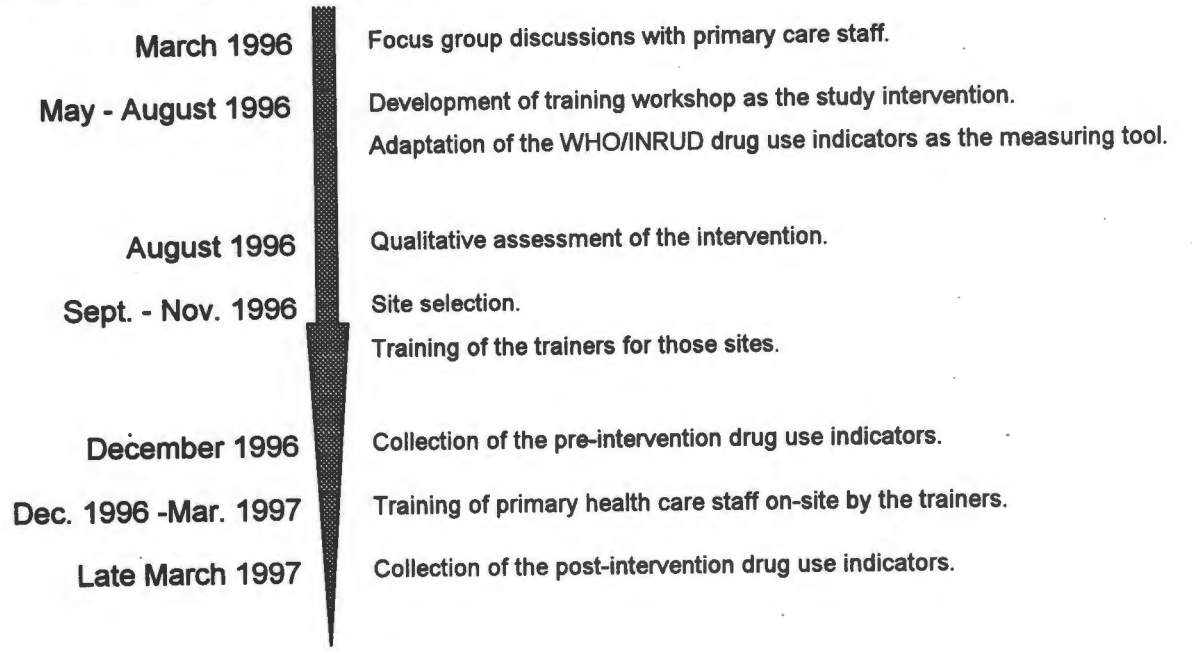
This chapter will:

1. outline the process and results of focus group discussions with primary health care staff on the need for rational drug use training.
2. discuss the development and content of the 2-day training workshop which forms the study intervention.
3. outline the drug information resources available to and stemming from the Rational Drug Use Training Project.
4. discuss the adaptation of the WHO/INRUD drug use indicators for use as the measuring tool.

This chapter, particularly sections 3c and 3e, should be read together with Appendix One, the Trainers Folder.

A. Outline of the study timing and structure:

Figure 3: Study timing and structure



B. Focus group discussions (March 1996)

While the District Team Problem Solving groups (DTPS) had identified the broad need for promoting rational drug use among primary health workers, the actual drug-related needs of these staff had not been elucidated. The first part of the development of the Rational Drug Use Training Project required meetings with primary care staff from the DTPS groups (divided into 4 northern and 4 southern KwaZulu-Natal groups), as well as staff from primary care facilities in the Western Cape, to identify particular needs they perceived in the process of prescribing and managing drugs at a district level.

1. Who participated?

In KwaZulu-Natal this process was co-ordinated by the Centre for Health and Social Studies (CHESS), which was directing the district teams. The CHESS staff were given a list of questions to present to the teams that outlined the areas the focus group discussions would cover. The district teams defined people within their districts who would be interested in contributing to a focus group discussion on these topics. The four

Southern KwaZulu-Natal teams, Msinga, Kokstad, Kilmun and Izingolweni arranged dates for the discussions to be held in the last week of March 1996. The four northern teams had been canvassed more informally at a meeting of the teams as a group in late January 1996. It was decided that, if the needs from the 4 southern groups were widely disparate, then detailed discussions would be arranged with the northern groups. This was not necessary.

In the Western Cape the need for focus group discussions was discussed with staff of the Regional Services Council and the Cape City Council. Two groups of prescribing staff were identified, from Day Hospitals and Clinics in the Western Cape. These staff were either prescribing already or studying further in primary care. These meetings took place in April 1996.

In KwaZulu-Natal, the groups were made up of nursing sisters, pharmacists, pharmacy assistants and doctors. These meetings were held in local Community Health Centres or, in one case, in the district hospital in Kokstad. In the Western Cape, only nurses were present. These groups met at Day Hospitals.

2. Topics for discussion:

The discussions began with a brief introduction of the people present, outlining their roles in health care. The rational drug prescribing programme objectives were introduced, including the idea of a train-the-trainer structure. Emphasis was placed on the role these people could play in shaping the planned in-service training. Once the training was established, these groups would benefit from it at the earliest opportunity.

The questions presented were:

- Do you have **treatment guidelines** for use in the management of common disorders on a day-to-day basis? If so, do you use them? Are they helpful? If not, would you find such guidelines of use?
- Do you have any problems when it comes to prescribing a medicine? Do you have **access to drug information**, such as details on interactions, side-effects, dosage, indications and contra-indications? If not, would you like this information to be made available to you? How would you like this to be done?
- Do you experience **difficulties with the ordering, storage and distribution** of drugs to your health facility? In what way?

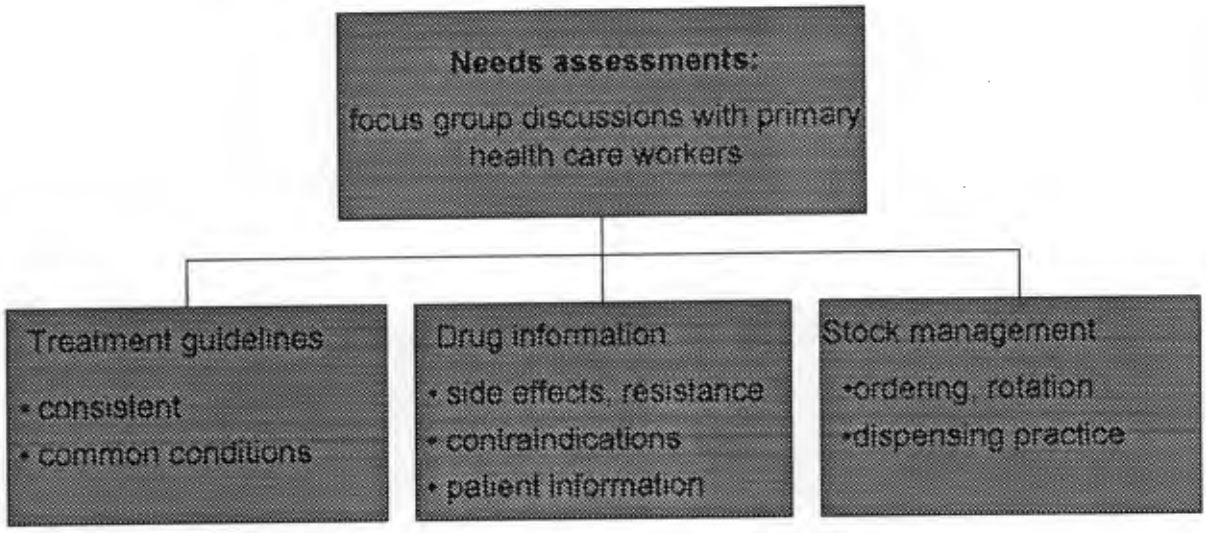
The staff were asked to comment on the best way to structure a programme that might begin to address their drug-related needs. They were asked to consider the timing of training, who should attend, and how they could be released from other duties. It was emphasised that they would need to be active particiapants in the process, as learning and change cannot be forced. At the end of the discussions, they were given the option of selecting one drug use problem that, as a group, they could begin to address themselves.

3. Results:

Figure 4 shows the major areas of need as identified by the 6 focus group discussions. These needs were remarkably similar. The outcome of the discussions confirmed the needs as identified by the original DTPS groups, which had shaped the questions asked. Importantly, these needs were wider than the provision of treatment guidelines and drug related information. Actual training on the use of drugs, including the management of drug stock and dispensing, was requested. The discussion will first look at the common needs, and then at other problems raised by the groups.

Figure 4:

Results of Focus Group Discussions



a) Standard Treatment Guidelines (STG):

In all groups the lack of any source of either drug or disease related information was marked. Information that was available was out of date or covered a narrow field, such as information on the syndromic approach to sexually transmitted diseases.

Staff requested a set of **treatment guidelines** that would cover most common conditions, such as hypertension or diarrhoeal disease. It was emphasised that these guidelines must be followed consistently by prescribers at all levels of the public sector, including district hospitals. Patients often go to a hospital or a private general practitioner for treatment initially, then return to a public sector primary care facility for follow-up care or for a repeat prescription. On occasion, a patient will pay an inclusive rate to be seen by a private doctor, who does not dispense the medicines required, but writes a prescription that the patient must take to a public sector facility. These facilities may not be able to provide the expected treatment, as it does not conform with their treatment guideline. This becomes frustrating for the staff, and confusing for the patients, and, constitutes an abuse of the public service.

The need for a standard set of therapeutic guidelines was addressed shortly after the focus group discussions by the introduction of the first edition of the South African Standard Treatment Guidelines and Essential Drug List[70] in April 1996. Staff who participate in the Rational Drug Prescribing workshop receive a copy of this "green book". This publication does not address the issue of private sector differences in prescribing, such as the use of "non-essential" drugs, nor does it provide guidelines for district hospital prescribing (these secondary level therapeutic guidelines are being developed).

There are problems with some of the therapeutic guidelines in the "green book". A few dosages are considered to be incorrect, and particular national workgroup recommendations have not been followed. It was not released widely for comment before publication. The layout is often unclear, and is not consistent. There are 2 indexes. The book is not user-friendly in its present form. Comments on the "green book" have been encouraged by the inclusion of an amendments page in the first edition, and these will be considered in the second edition, which should be complete in early 1998[70].

The Department of Health of KwaZulu-Natal had already produced a Primary Health Care Handbook and Medicines List[76]- the "red book". This is meant to be used in preference to the "green book" in that province. Although it may provide protocols which are more locally specific, the production of a new edition in April 1997 undermines the efforts of the national government to produce clear and consistent clinical guidelines. It too has

problems with unclear treatment protocols and poor layout and is not comprehensive, even at a primary care level. Whether KwaZulu-Natal should be allowed to continue to have access to drugs that are not on the national essential drugs list, is a point for debate. Ideally the effort and time put into the new "red book" should have contributed to the national programme. This "green book"-"red book" argument continues.

There are other sources of treatment protocols. For example, SmithKline Beecham have produced a Primary Health Care Manual. These are available to public sector staff, but they would have to buy them themselves. For the purposes of this project, the guidelines recommended are the South African Standard Treatment Guidelines and Essential Drug List[70]. These are part of the Essential Drug Programme, which this project hopes to support. Ninety common primary care conditions are covered, copies are available free to all health care staff, and there is a specific channel through which comments and criticism can be received. They are regularly updated.

At some of the groups it was noted that providing the staff with STGs alone may not help. It is easier to carry on practising as usual, than to look something up and make a change. They would need an introduction to the use of STGs in the form of a seminars or workshops. Someone locally would have to be responsible for promoting this process.

b) Drug Information:

Access to **unbiased written drug information** was on average very poor. Telephonic or electronic access to information was minimal. The difference between a treatment guideline, which would simply direct the choice of treatment, and a drug formulary, which would provide more detailed information on specific drugs, had to be explained. Similarly the differences, and the importance of these differences, between independent and unbiased sources of information, such as the South African Medicines Formulary, and potentially biased publications funded by specific drug companies trying to sell their product, such as the Monthly Index of Medical Specialities (MIMS), had to be clarified.

Staff particularly wanted information on drug interactions, contraindications and patterns of antibiotic resistance. When asked where they currently found such information, the answer was often that they didn't, or if they did, a nurse would call a doctor or a pharmacist, if available. The doctors may refer to a MIMS or a South African Medicines Formulary. In the Western Cape, most of the Day Hospital staff had access to one of these publications, whereas staff from KwaZulu-Natal did not. Many nursing staff find the SAMF quite complex. It provides too much information and is too detailed for their needs. This complexity discourages its use, even when it is available.

There are drug information centres in South Africa which provide unbiased drug information by telephone to all health care professionals. When asked if they used such a service the answers varied. Some staff had not heard of them, others were not allowed to phone out of the clinic, and certainly not to another province. One or two nursing staff had called a centre and been told their medical officer must phone, as the centre only dealt with doctors and pharmacists. There was a general feeling that a contact number would be useful, particularly if the service was geared toward primary health care information.

The consensus was that information provided at a facility should be in written format. Information was often needed while out in the districts, while running the mobile clinic units. Here a manual or textbook would be an appropriate source of information. Some of the clinics in KwaZulu-Natal had recently had computers installed by the HealthLink team. They could see the advantage having an electronic link to an information source but they were wary of using the computers. They were concerned about the time it might take to receive an answer to a query using this means too. Electronic information alone could not answer all their drug information needs.

It was noted that written information rapidly becomes outdated. Some staff were still using worn paper manuals with some treatment guidelines and drug information from the 1980's. If written information is supplied, there must be a mechanism for updating or renewing it. Provided each district established an "information network", comprising one person who is in contact with both the staff of the district and someone involved in the training programme, perhaps through e-mail on HealthLink, updated information could be received monthly, or even weekly. This could be structured as a continuing medical education programme for district staff.

Staff have become unused to looking up information themselves, due to the lack of readily available sources and their workload. They are unaware of problems a particular drug may have, or interactions that may be provoked. They would not only have to trained in the use of any information that is made available, but also be re-oriented toward wanting to use it.

c) Stock management and dispensing:

The management of stock in most primary health care facilities is left to the nursing staff. Most have not received training in this field, and have learnt to order, pack shelves and monitor stock by trial and error. There are few pharmacists in primary health care facilities in rural KwaZulu-Natal. District hospitals may have a pharmacist, or a pharmacy assistant. Western Cape peri-urban Day Hospitals are more fortunate, only the smaller clinics lacked pharmacy support.

Those pharmacy staff that are available feel overrun with work. They manage the dispensary and dispense medicines to patients at their health facility, as well as managing the drug supply to the clinics in their district. All the pharmacy staff that attended our focused group discussions recognised the need for the nurses to be trained, both in rational drug use and stock management, but could not take on this task themselves. Provision of patient information could be addressed by a pharmacist or pharmacy assistant too, should staffing and time constraints allow.

In some regions, relationships between nursing and pharmacy staff appeared strained. Nurses feel that clinic requests receive little attention. They receive drugs which differ from those they ordered, arrive late and are near to expiry. They feel that as they are doing a pharmacists job, they should receive the necessary training and support.

When asked if they would appreciate training in the field of managing a dispensary, attitudes varied widely. The staff in KwaZulu-Natal were keen for such training. Although this work is not part of their expected role as nurses, they knew that they had to do it, as the chance of a pharmacist being appointed to their facility was extremely small. In the Western Cape, with better staffing conditions, those staff unfortunate enough not to have pharmacy support managed their stock reluctantly, and were less happy to be trained to do it properly. They felt that it was not part of their job description, and they were not reimbursed for it. They were concerned that it would become expected of them, should they receive training. Despite this they did acknowledge the need!

d) Other particular problems:

(1) Izingolweni:

Pharmacist-nursing staff relations in this district were particularly strained. Beside the problems mentioned, the pharmacist in their district refused to promote the rational use of drugs. This shows the lack of insight into the potential of extending the role of pharmacists to include training. Staff found it difficult to work as a team, which forms an essential part of creating a successful district health system.

(2) Kokstad:

Staff in this district were overwhelmed by patient numbers. Since the 1994 elections, their district has provided health services for a large number of people from the old Transkei. Mobile clinics are seeing up to 300 patients per day. Certain staff are having to take on tasks completely out of their fields, such as general assistants dispensing medications and the domestics cleaners helping to prepack the bulk medication stock.

This again brought up the issue of staff needing training for a job which is not in their job description. The view taken at the discussions was that ALL staff involved in any way in handling medicines need training, whether or not they are officially performing the task. There is an obvious need for them to be performing these exceptional functions, which may impinge on patient safety.

Some nursing sisters in this district also noted the need for an improved **patient education** programme regarding drug or medicine use, particularly for geriatric patients. Only patient education could improve patient compliance in the long term. They suggested using pamphlets, which must be available in a number of languages and handed out as the medications are dispensed. This was the problem they elected to address themselves. With the help of the pharmacist from Kokstad Hospital and the Rational Drug Use Training Project staff, they would collate patient information leaflets on common disease entities.

(3) Kilmun:

This district expressed no particular problems. They re-emphasised that information needs to be available for the mobile teams, as well as the fixed clinics. The staff were keen to begin monitoring their dispensing practices. The INRUD dispensing indicators were forwarded to them, with instructions, so they could begin this project.

(4) Msinga:

The district of Msinga, on the Tugela River, had similar problems to the others, compounded by the frequent breakdown of their telephone service. This meant that the e-mail system, installed by HealthLink, was inoperable. It was agreed that one of the Rational Prescribing Training project staff, as well as one of the district staff, would approach Telkom about this recurrent problem. At that time Telkom had agreed to supply all clinics with telephones as part of their Reconstruction and Development Project work.

(5) Western Cape groups:

The problems outlined are the same in the Western Cape. Due to fewer staffing problems and better access to medical staff, they are probably less urgently in need of being addressed. Patients can be referred on within a few hours. The staff were much less enthusiastic about participating in ongoing training or in extending their roles in any way, even to the benefit of their patients.

e) Structure and timing of training:

The question as to how any training should be presented, and when, was asked. There were some firm answers:

- Training **on-site** would be preferred.
- Training must fit into working hours. Most staff used Friday afternoons as training days, for feedback or continuing medical education.
- Training should be open to all staff involved in handling medicines, even if they are not doing this officially.
- The staff were happy with the concept of a train-the-trainer approach i.e. a selected person from their district, or from each facility, would receive training in rational drug use, who would then disseminate the information to other members within the district. This system would rely on regular meetings of staff.
- The need to monitor drug use, or measure prescribing patterns, was accepted as being a reasonable way of monitoring the effect of any such training.

f) Implications for the Rational Drug Use Training Project:

The structure of the Rational Drug Use Training Project developed from these needs and limitations. The severe time constraints must be considered, as must the knowledge that dissemination of written material alone, without any concomitant introduction or education, was ineffective. The project must be formed of three essential components:

1. a **training workshop**, to introduce the rational drug use material and encourage use of other resources. This workshop acts as the **intervention** of the study presented here;

2. **reference materials and supporting resources**, through either texts, or e-mail and telephonic access to a drug information centre; and

3. A built-in **method of measuring** prescribing and dispensing practices. These drug use indicators are the measuring tool used to assess the impact of the intervention.

C. Study intervention: Development of the structure and content of the training workshop (May to August 1996):

1. On-site, train-the-trainers structure:

a) Difficulties:

The request for on-site training seemed to be the biggest obstacle to setting up the training programme. There are a **large number** of prescribing staff, some with adequate training, but most without. Even those with enough basic training, including doctors, still prescribe irrationally, and would benefit from a review of drug use practices.

Many of these staff work in **remote areas**. Some work from mobile units. Although most of the health facilities visited during the focus group discussions had access to telephones, some did not. This would have to be considered when planning resources and support for any continuing medical education programme.

On-site training would allow staff to be trained without leaving their homes. At the focus group discussions it was specified the training should be held during working hours. Such on-site, in working hours teaching may be convenient for the staff, but is likely to be **disruptive to the functioning of the clinic**. Staff would have to be freed from other duties to attend. The clinic may have to limit patient numbers or close, if all staff were to participate. Community leaders should be involved in the decision to close a clinic for staff education meetings.

In an isolated clinic it becomes impractical and expensive for any trainers to return to the site repeatedly. More than one afternoon, the time presently set aside for ongoing education, would be necessary to convey any worthwhile message about rational drug use. Transport and financial limitations mean that training would need to be covered in one session. Yet this session cannot be too long, or involve too many staff, as a clinic should not be that extensively disrupted.

All **training equipment** such as easels or overhead projectors would have to be brought in by the trainers. Clinics are often not geared for training purposes. Free space for teaching may be limited. The learning environment is unlikely to be ideal. There are few spaces in a busy clinic that are not being fully utilised during the day. Even if the room is

not occupied at all times, it may act as a tea room or store room, making disruptions likely. Tables and chairs are not necessarily going to be sufficient or comfortable.

Despite the numerous difficulties with developing an on-site project, it was felt that every effort must be made. A number of staff canvassed in the focus group discussions felt neglected in terms of resources and continuing medical education. They were sceptical that anything would come from the discussions. Many were surprised that they had been consulted with regard to this programme.

b) Advantages:

The Rational Drug Prescribing Project had limited capacity to provide training to large numbers of health care workers. There were only two training staff. Taking this, and the above factors into consideration, a **train-the-trainers structure** was adopted. Primary health care staff had found this approach acceptable at the discussions. It would allow most primary care staff to be trained by someone familiar to them, and who would speak the same **language**. If a trainer was district based, the problem of distance and access to remote sites would be minimised.

Initially the concept of a seeding effect was entertained. The original people chosen by the community and local health care workers as trainers would participate actively in the training of other primary care staff in the district, and those they trained would train others in turn, forming a pyramidal structure until all health care workers were reached[28]. This idea was modified after review of other train-the-trainer projects, where it was found that the effect and message of the training became lost after more than one tier of trainers[47,66]. Trainers also need close and well-facilitated supervision and support to maintain effectiveness[8,43,63]. With one level of trainers, each selected, trained and supported at district level, this dilution effect may be minimised. Each trainer would be trained and personally known by the Rational Drug Prescribing Project staff. Input would be focused on these staff, and efforts made to keep in close contact. They would also act as a link with primary health care facility staff, for passing on information and receiving drug queries, after the initial presentation of the workshop. This system is based on the assumption that trainers will be available.

This approach would fit with both the department of Health's **district-based** health care system, and with established provincial methods to disseminate information, i.e. nursing sisters who are trained as trainers and visit clinics to teach on sexually transmitted diseases and family planning. Presently, in KwaZulu-Natal, this system is region- not district-based. These people, or others, could be trained to promote rational drug use as well.

The groups trained would be small. **Small group teaching** seems to have greater impact on sustainability of the information[8,52,58,77]. Besides this, in the clinic setting, space is often limited. Ideally there should be 8 to 12 people at each workshop. Then the group can work in small groups when discussing clinical cases, with time for each case to be presented to the whole group as well. With larger numbers there is less time for individuals to think about, develop and present cases themselves. Too much time is spent listening to others, which does not encourage individual thinking skills. Active participation of all staff is less easily achieved.

2. Content and timing:

The focus group discussions identified three training areas: standard treatment guidelines, drug information and stock management. The workshop would need to cover these issues, yet be flexible, both in time and content. It would need to be relevant to staff working at primary care level. Time for a single session of on-site training is limited and it would be impossible to cover any significant amount of basic pharmacology. A modular programme developed from these constraints. Four modules were planned, all of which were principles-based, illustrated by clinical and practical examples, in a problem-based manner.

The four modules would cover:

1. The principles of **prescribing**.
2. Principles of safe and effective use of **standard treatment guidelines**.
3. Principles of **managing stock** at clinic level.
4. Principles of good **dispensing** practice.

Each module could, if necessary, stand alone and be taught in a single 3 to 4 hour afternoon session. District trainers could train one module at a time over a number of weeks, or if that was not practical, bring them all together in a 2 day workshop format. A longer session would keep the staff concentrated on the topic of rational drug use and allow time within the session for discussion of measurement of prescribing practices. Having the same staff exposed to all the modules may be beneficial, as these staff would cover a number of aspects of rational drug use, allowing discussion around how this could be implemented within their facility.

Although beneficial for staff to attend all the modules, this may be impractical and unnecessarily disruptive to the clinic. Prescribing staff need only attend the first two, those who dispense need only attend the last two. Staff with no clinical experience may find clinical-based modules unnecessary (1 and 2). However, most of the nursing sisters in primary health care facilities, and a few of the doctors, act as both prescribers and dispensers. The nurses often manage stock as well. These people would find all the modules valuable.

The modules do not include teaching on basic pharmacology. The knowledge primary health care workers have of the medicines they use varies. Staff were encouraged to use an information source to seek answers to drug or clinical questions during the workshop. This was provided in the form of texts. The emphasis of the workshop was not to teach details, but to provide a structure for safe and effective drug prescribing and dispensing, which would be transferable from the practical cases used as examples in the workshop to other cases encountered in daily practice[29]. Should the district trainer approach be successful, this initial workshop would open channels for providing further information, which may include some education on basic pharmacology. Even should this structure fail, the staff would have the texts as a source of drug information.

There is a profound sense of lethargy among primary care staff, nursing staff in particular. Due to the lack of resources and input into primary health care, the lack of monitoring and supervision of nursing practice, the lack of training in both drug use and clinical skills, many patients receive drugs unnecessarily, and the questions about appropriateness and safety are not even asked. Poor public education and scanty knowledge of health and disease contribute. Patients rarely ask questions or demand information of their health care worker. The workshop points out that there are questions to be asked, and shows the staff that using resources to hand, many clinical questions can be answered. Patient information is emphasised.

The content of the workshop is presented in **Appendix One, The Trainer's Folder and Appendix Two, The Training Manual**. The Trainer's folder contains all the material a district trainer needs to present the workshop, including overhead projector slides and a suggested timetable. The Training Manual contains details of all the modules. This is published as an ISDS Training Manual by Health Systems Trust, and is supplied to all the participants of the workshop. The workshop will only be outlined here.

From the outset the participants must know that they are to interact, and that the training will not be a didactic. It is important to establish times for beginning and ending the

modules, as some staff may have to travel some distance within their district to reach the facility at which the workshop is being held. There is an widely held expectation that training should finish early on a Friday.

a) Module one: The principles of prescribing (3½ to 4 hours)

Module One begins with an introduction to rational prescribing (see Principles of Rational Prescribing in Appendix One). The participants need to understand that this is a process, much more than the writing out of a prescription, and requires patient compliance to be successful. A goal of the workshop is to achieve safe and effective prescriptions for all patients. Examples of irrational prescribing, such as unnecessary antibiotic therapy or polypharmacy, are discussed. The essential drugs list concept is introduced next. Participants need an understanding of the how a medicine is selected for the primary care essential drug list, which contains only 200 drugs. Overhead projector slides are used to illustrate these points.

In line with the National Drug Policy, all drug names used during the training are generics[24]. The difference between proprietal or brand names, used by companies to advertise their products, and generic names, usually an international non-proprietary name given by the WHO, is explained. The number of different proprietal names for cotrimoxazole (bactrim, septran, purbac)are used to illustrate this point. It is far easier for staff and patients to remember one common name per drug. Having to prescribe in the generic reduces the influence that potentially biased information provided by pharmaceutical industry may have on the prescriber. It is also safer. An example is quoted, from a nursing sister at a day hospital in the Western Cape, of patients being told for a month that the "bactrim" they had been prescribed was out-of-stock and being sent home without treatment. Only when the sister-in-charge visited the dispensary was it discovered that the provincial tender had changed and that now cotrimoxazole was available as "septran", of which there were many boxes on the shelves. The person dispensing had not known that these two products contained the same drug. Prescribing in the generic name also allows the dispensing staff to dispense the cheapest form of the drug that is available[3,8,78,79].

This whole module is based on the WHO production, the Guide to Good Prescribing[4]. This manual breaks down the prescribing process into a set of 6 stages. Participants are given a clinical example, usually Case 1a, a five year old child with otitis media, and are required to explain the step by step process they would use to ensure the child leaves them with rational treatment. All 6 steps or principles are present in every clinical encounter. The staff are told that they may not be learning anything new, but by becoming aware of the

process they all use, and creating a firm structure for a clinical consult, they can ensure that in future each patient will be treated rationally.

The six principles of prescribing are:

(1) Define the problem

Before any treatment is given a diagnosis must be reached. For this a history must be taken and an examination done. Many clinic records contain diagnoses such as "cough", "runny nose" or "joint aches". These are descriptions of symptoms, not diagnoses. A diagnosis would be the reason why a patient has these symptoms. For example, in Case 1a, the diagnosis would be otitis media, not fever or ear pain.

(2) Set your treatment goals:

Having made the diagnosis, staff are asked what they need to achieve with this patient. By establishing particular objectives unnecessary treatment may be avoided. In Case 1a the treatment goals would be to treat the infection, reduce any fever and relieve the pain.

(3) Choose the most suitable treatment for the patient:

For each treatment goal a therapy is discussed. An important question asked at this time is, "do you need to use a drug?" Other therapeutic options such as education or reassurance of the patient and non-drug measures are emphasised. If a case could not be managed at the clinic, it may be referred.

If a drug is going to be prescribed it must be effective, safe and suitable for this particular patient. The concept of a **high risk patient** is introduced. Certain groups of patients are more likely to experience interactions or complications with the therapy, for example, someone with renal disease or on another medication. These patients should be of more concern to prescribing staff and any medication prescribed should be checked, that is looked up in texts, for suitability and safety.

(4) Start the treatment:

Once the treatment is chosen, a prescription must be written. The participants must realise that the person who writes the prescription is responsible for any adverse effects a patient may experience due to those drugs.

(5) Give advice, information, instructions and warnings to the patient:

In step 3 the patient was educated about their disease. This step reinforces this explanation, and adds details on the drugs prescribed. Staff must know where to find relevant information and how to explain it to the patient in lay terms. Issues which may improve **compliance** are important. Emphasis is placed on spending time with the patients.

(6) Monitor the treatment:

Staff are asked if they want to see their patient again and if so when. They are reminded that when the patient returns they must review their treatment goals to see whether they have achieved them. If they have not, they need to begin the 6 steps again, and review their management.

This process is interactive, and usually takes ninety minutes to two hours to complete. Many examples of problems with choosing treatment, patient compliance, and patient demand are raised by the participants. Often staff say that they will not have the time to find an answer by looking something up. They will not necessarily need to research every drug used for every patient, but only those where they are unsure of the information the patient needs or need to be sure of the patients safety. In many cases the patient rush at the clinic is over by lunchtime, and the afternoons are relatively quiet. If one or two patients need extra information, it should not increase the work load. Alternatively, a patient could be asked to return in the afternoon.

The rest of module one comprises problem-based group work. Staff are asked if they have any clinical cases they wish to bring forward for discussion, otherwise cases are taken from those found at the back of the trainers folder (Appendix one). All these cases describe common primary health care problems such as childhood respiratory tract infections or asthma. Many of the cases are stratified, so that the case becomes more

complex, by making the patient "high risk" or by adding a drug that is likely to cause a complication or interaction. The staff are asked to break into groups of three or four and to work through the clinical case they are given in a rational manner, making use of the six principles of prescribing, until they come to a decision on the patient's management, education and follow-up plan. They are told they may use any resources available to them, including the texts provided with the workshop, any other information available within the clinic, or even to phone or e-mail an outside resource.

One of the group is asked to present their choice of management to the rest of the group for comments at the end of the session. The trainer facilitates the session, answers queries and encourages the participants to seek their own answers. As the groups complete the first part of the case, the trainer provides the second part, and the third, when needed. These complexities are received as challenges, and usually greatly enjoyed.

This first group session should take about an hour to complete, then a further hour is needed for each of the groups to present their cases, explain and, if necessary defend, their management patient education. They explain how their management changed when the case became complicated. The trainer should be strict about the participants keeping to the structure of rational prescribing, especially ensuring that patient education on the medicines is covered. Many nursing staff can elucidate on non-drug management of, for example, fever or urinary tract infections, but tend to skip over drug information and side-effect advice to the patient, which they may not know themselves. There is often no sense of concern that this drug may do damage to their patients if they prescribe it without knowing its potential effects. The group should be asked to return to their texts and find these details before their management is accepted.

Staff need a long time (up to an hour and a half) to work through one stratified case thoroughly. They have to be reminded to use their resources, and often express surprise at finding the answer to their question in a text. Other problems arise due to the lack of clinical training and skills, when prescribers are unable to come to a diagnosis from the symptoms prescribed.

Before the end of module one a summary of the principles of prescribing is given. Staff are reminded that there is often no need to use a drug and if they do they MUST be sure it is safe. Further, no matter how rational their prescription is, if the patient does not take the treatment then the prescription is worth nothing. Patient education is very important.

b) Module two: Use of standard treatment guidelines (STG) (2½ to 3 hours)

This module discusses the advantages and disadvantages of standard treatment guidelines by taking the participants through a number of questions based on four examples of differing STG for the condition of opthalmia neonatorum (see Standard Treatment Guidelines: development and use in Appendix One). All participants should have a copy of the green South African Standard Treatment Guidelines and Essential Drug List[70], either provided by the province or by the Rational Drug Use Training Project staff. The trainer makes sure they understand that STG are meant to be practical recommendations to assist the prescriber and are not meant to be followed absolutely rigidly in all cases.

Some points the trainer must ensure are understood are:

- The best guidelines are made for **local** use. Using a guideline from another country, while relevant for the disease there, may not be geographically or culturally appropriate for South African use, and may recommend therapies which are not available.
- A STG should be from an **unbiased** source, i.e. one should be careful of using a guideline that recommends using a product which is produced by the same company that is producing the guideline.
- A guideline should be a **consensus** opinion based on all available data and preferably of multi-disciplinary origin, that is, it should include consultation with all involved parties be they medical, nursing or auxiliary staff.
- Any guideline must be **clearly laid out**, so that it is easy to read and understand.
- An STG should be regularly **updated**.

For an STG to be valid, safe and effective, all the above points must be incorporated. Staff are then asked to consider problems that may occur in using STGs. The most important is that a guideline may be too restrictive, and not allow for individual variation in management. They may not recommend non-drug management or education of the patient. On the other hand having a set of STGs may stop prescribers from thinking about each patient as an individual. Guidelines provide a recommendation based on the average patient. The patient that is consulting the prescriber at present should not be considered to be the average, and therefore every recommendation should be checked for suitability in that patient's case.

The participants have to remember they have two choices to make about the use of treatment guidelines:

1. Which guideline to choose?
2. Is the treatment recommended in the guideline chosen safe and suitable for THIS patient?

Following this introduction to module two, which occupies half an hour, the staff are given another set of clinical cases to work through in small groups. They are asked to follow the six principles of prescribing, but to take notice of the treatment guideline they are using. They are also restricted to 15 minutes for each part of their case, to try and mimic an actual prescribing session.

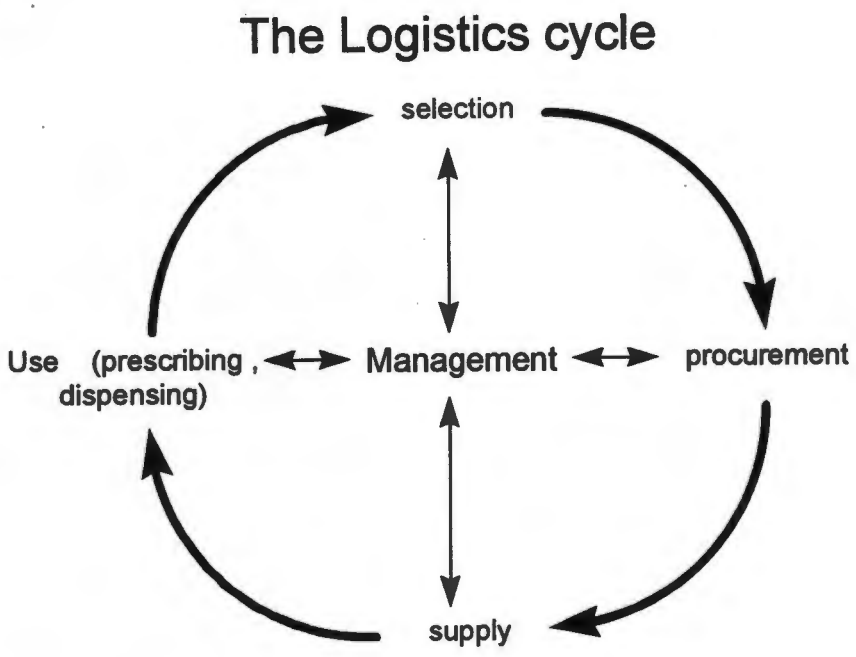
Each case is again presented to the whole group. The trainer should be more passive in this session, allowing the group as a whole to decide whether a case has been managed correctly or not. Input should only be given if a particular point needs to be emphasised or the management seems to be off track and is not picked up by the group. At the end of module two, one of the staff is asked to summarise the main principles of prescribing again.

The last 2 modules move away from clinical management and concentrate on managing of drug stock in their facilities. These two modules were developed by Mrs Aarti Kishuna, the pharmacist who is one of the staff of the Rational Drug Use Training Project. They are adapted from the Management Sciences for Health textbook, "Managing Drug Supply"[3]. Details of the content of these modules may be found in the Trainers Folder (Appendix One).

c) Module three: Principles of stock management (2½ to 3 hours)

This module focuses on managing of stock at the facility and, whenever possible, is taught in the dispensary of the facility where training is given. The logistics cycle is reviewed with emphasis on the role played by the users.

Figure 5



The participants are asked:

- What is the goal of your drug ordering and supply system? How does stock get to your facility?
- What problems are there in managing this at present?
- How can the facility achieve this goal?

Although decisions about drug selection are made at provincial or national level, the staff are shown how they, as prescribers and dispensers, influence these decisions from the districts by the way they handle the distribution and use of medicines at individual facilities. Staff in charge of the primary health care facilities need to ensure they have a constant, regular supply of drugs. These drugs must be the ones that are used by the clinic staff, be safe and effective and must be available before they expire.

Many dispensaries are small and crowded, and are often too warm for safe keeping of drugs. Vaccines are kept in fridges, but there is no back-up power supply should the electricity fail. Boxes of medications may be piled on the floor due to lack of space, making the first-in-first-out (FIFO), or first-expired-first-out systems (FEFO) of stock rotation difficult to follow. Drugs are present both in bulk packs and loose for dispensing. There tends to be no system for quantification of drugs used on-site or issued to mobile clinics, nor for determining when stock must be reordered. The sister-in-charge must manually count the stock before placing an order. Stock frequently runs out, and may only be replaced a few weeks later. Due to access or transport problems and several and varying sources of supply, clinics end up with drugs they did not order and receive ones

they did not request. There is a tendency for clinics to receive older drugs, near their expiry dates.

The participants are asked to remember the issues brought up while in the dispensary for discussion in the feedback session later in the day. Most of the problems fall into two categories: inadequate resources, which may have to be addressed at a district or provincial level, and problems in the ordering and drug distribution system. Although supply issues may be best addressed at district level too, a lot of the problems due to drug ordering could be reduced if the system of storing and maintaining stock at the clinics was organised, and if there was a clear line of responsibility. Having a record of the stock would assist in storage and ordering, but also supply important information for management decisions. Staff are asked to focus on this issue and discuss means of addressing it as a facility.

There are number of different systems of managing stock. The stock card system is advocated by the Rational Drug Use Training Project. This system is in place in some larger health facilities, such as district and provincial hospitals, already. These cards record stock data for each item in the dispensary and must be updated when stock is added or removed (see Module Three, Appendix One). Recording these transactions should improve accountability.

Staff are asked whether they can see the benefits of implementing a system of stock management. The staff in charge of the facility, who have to count and order the stock, and the staff who work in the dispensary, who receive, stack and dispense the stock, are often enthusiastic. The rational drug prescribing training team can supply any facility willing to try a stock card system with the cards. Most of the facilities accept this offer, and some implement the system themselves, in a book, or on home-made cards before the printed stock cards arrive.

d) Module four: Principles of good dispensing practice (2½ to 3 hours)

This last module leads the participants through the process of dispensing, again preferably in the dispensing environment so practical problems can be discussed. Emphasis is placed on the important role of the dispenser in the education of the patient. There is a tendency in clinics to consider dispensing a lowly task and to allocate it to people untrained for the job[75]. This process includes:

- reading and interpreting the prescription, and querying anything that is not understood. A prescription must be legible.

- retrieving the medication from the shelf and double-checking to make sure the correct drug has been fetched. This needs a system of storing the drugs, either by medication group, such as antibiotics, anti-hypertensives, etc., or in alphabetical order. Some dispensaries are so small and crowded that retrieval can be a problem.

- preparing the medicines by counting tablet numbers or reconstituting a powdered drug. A hygienic environment is essential, as patients ingest these medications. Often many simple resources such as counting trays and measuring cylinders are not available. Untrained staff reconstitute antibiotics by eye and are responsible for breaking up bulk supplies into patient-ready packs.

- Labelling the drugs: Staff are asked what information should ideally be on a label. The name of the patient, the name of the drug, the dosing plan and the expiry date of the medicine should all be present. The absence of any one of these could compromise patient safety. Clinics frequently run out of labels, or are supplied with labels that are too big and cover the name and expiry date of the drug that is printed on the bottle.

- Delivery of the drug to the patient: In the first module it was established that a patient needs to know the reason they must take the medicine, how much they must take, when they must take and for how long. All severe or common side effects should be discussed. If the prescriber is the dispenser as well, then the full responsibility falls with them. However, often the prescribers are rushed and rely on dispensers to provide this essential service of patient education. In many clinics the dispensers are not trained for the task, and may be performing it unofficially. They will not necessarily have the drug knowledge to pass on to the patient. Many patients leave primary care facilities unaware of what they have been given the treatment for, and with scanty information on dosing.

  Staff are asked to remember these problems for discussion later in the feedback session. They are then asked to divide up into groups again, and are given patient cards, with prescriptions, from the hosting health facility's records. They are asked to role play a dispensing encounter with one person being the patient and another being the dispenser. The dispenser must interpret the prescription and deliver the drugs to the patient, with all the appropriate information. The patient must ask questions. The others in the group are asked to observe the encounter, and make comments, both on the prescription itself, as to whether it is appropriate for the diagnosis on the patient card or is written correctly, and on the patient education given. They are then asked to explain their experiences to the whole group afterwards, under the facilitation of the trainer. This exercise is fun, and works well,

with the staff who act as patients expressing that they felt they weren't given enough time or attention, and the dispensers feeling pressured. Again staff have to be reminded to look for information about a drug if it is not known.

e) Feedback and "way forward" session (1 to 1½ hours):

Here the participants learn about drug use indicators, and how to monitor their own prescribing practices. They are asked to fill in a qualitative feedback form for the facilitators. Then they are asked to list and rank the problems they have elucidated in the 2 days of the workshop, be they in rational prescribing, use of STGs, stock management or dispensing. The trainers facilitate a brainstorming discussion on how the primary care staff, at their facilities, using their resources, can begin to address some of the issues. If the issue of improving the management of stock is chosen, then one person is elected to take responsibility for the introduction of the stock card system. If they need to address the lack of resources, such as not having a measuring cylinder or labels, someone is assigned to phone their depot hospital and place an order for these items. Usually one of the sisters-in-charge sits on the district committee and can bring up other issues e.g. poor drug delivery or provision of nearly expired stock, at this forum. Dates are set for when these tasks must e completed.

The trainers encourage the staff to realise they need not wait passively for the problems to be solved by others, and that they can only improve the service they provide by taking an active role in changing it. If training is done by a district trainer, that person is left in charge of supervising the activities. Otherwise one of the rational drug prescribing project trainers co-ordinates with staff in charge of the facility to arrange a follow-up visit for a review of the progress made. Staff are left with a homework clinical case sheet, containing the names and contact numbers of both Rational Drug Use Training Project trainers as well as contact details of the Medicines Information Centre at the University of Cape Town and the Primary Care Resource Centre at the University of Durban-Westville. They are encouraged to make contact with one of the trainers by sending in the completed case, by post, phone or e-mail.

D. Reference materials and supporting drug information resources:

As the workshop is introduced the staff are given 3 references. These are:

1. The Rational Drug Prescribing Training Course Training Manual (Appendix 2)

This contains the workshop content, including relevant definitions and a number of clinical cases to illustrate the points being made. Simple points on how to give medicines, such as by inhaler, or draw up an injection, are included. Staff at workshops are reassured that all the theoretical input is in this book, so they need not spend time writing notes, but can concentrate on participating actively. Contact addresses of the trainers are given. This manual was published in November 1996, and although it is given free to the staff as part of the workshop, it is sold privately for R25.00 a copy to cover the costs of printing.

2. The South African Standard Treatment Guidelines and Essential Drug List[70]

This is published by the Department of Health and is supplied free to health care workers in primary care facilities. If participants do not yet have a copy, they are supplied with one. The indexing of the book often needs explanation as the index for drug names is separate form the index of disease entities.

This book contains the list of drugs considered essential for use at primary health care level. Staff are asked to try and restrict themselves to this list when prescribing during the workshop and in the future. In places this list has not been implemented, and there are still non-essential drugs available and essential drugs missing from clinic supplies.

This book also contains a number of standard treatment guidelines for use at primary care. These are used when working though the clinical cases in modules 1 and 2 of the workshop. Staff are encouraged to use the comments page towards the back of the book to send in any input on content, drug doses or layout that they may be concerned about. This will then be considered for the following editions.

3. The Medunsa Primary Health Care Formulary

This is edited by Steven Donahue and Helene Möller[69]. This book is a drug formulary that was compiled in the Northern Province with the participation of a number of primary health care workers.

The South African Medicines Formulary, produced by the Department of Pharmacology at the University of Cape Town, although providing independent and clear drug information. is prohibitively expensive and contains too much information, which was considered off-putting by the staff involved in the focus group discussions. The Medunsa formulary is geared for staff working at primary care level. Although it was produced before the release of the essential drug programme, the medicines it covers are relevant. The book provides drug information on commonly used drugs, which is not usually supplied with standard treatment guidelines.

These three publications allow most questions arising from primary care cases to be answered. Once staff have been taught how to access the information in these books, they are usually pleased about how many queries they can answer themselves. At times drugs are recommended for use, such as ciprofloxacin in the treatment sexually transmitted diseases, which are not covered in the Medunsa formulary. Or a case may be quite complex and help is needed in coming to a rational prescription. Then the staff need to access information from another source.

The workshop was not designed to stand alone, but to introduce staff to the principles of rational drug use, including the ongoing need for independent, clear and unbiased drug information. Once introducing this need, direct access to some information had to be supplied.

4. Medicines information support centres

Both of the trainers of the workshop are based at institutions which have unbiased independent drug resource centres.

(1) The Medicines Information Centre (MIC):

Catherine Orrell is based at the University of Cape Town, in the Department of Pharmacology and works with the **Medicines Information Centre**. Staff may choose to contact the MIC directly, as it is open to queries from all health care professionals, or to go

through the trainer, who acts as a familiar interface. Until 1996 the MIC focused on queries at hospital level, and from the private sector. One of the initiating factors for the Rational Drug Use Training Project was the need for the Department of Pharmacology, including the MIC, to extend their services to primary care, public sector staff. All queries are now welcomed.

(2) The Primary Care Medicines Resource Centre:

Aarti Kishuna, one of the Rational Drug Use Training Project staff runs the **Primary Care Medicines Resource Centre** at the University of Durban-Westville. This centre came about through the expansion of the Rational Drug Use Training Project and the realisation that primary health care staff in KwaZulu-Natal need a resource and training centre that is geared toward primary care information, and that is local to them. Many staff cannot telephone out of the province. The centre opened in early 1997, with funding from Health Systems Trust, but may be provincially funded from 1998. This centre is small, but has resources to provide a researched, unbiased answer to any query of a primary care nature. If a query falls beyond the scope of the Primary Care Medicines Resource Centre, it is handed on to the MIC. There are links with other departments at UDW and with the University of Natal's medical school. These reactive functions will however form only a small part of the centre's role.

The most important function of the Primary Care Medicines Resource Centre (PCMRC)will be to encourage the rational use of drugs proactively by supporting training and research through the Rational Drug Use Training Programme. Regional continuing medical education meetings will be organised, and periodic drug information bulletins published to focus on topics of interest. The trainer at the PCMRC is also actively involved with the KwaZulu-Natal essential drug programme committee.

(3) How are these centres accessed?

Some primary health care facilities have been donated a computer, with **e-mail**, by HealthLink. HealthLink staff provide health care workers at the clinics with training on the use of the system. Both Rational Drug Use Training Programme trainers, and both information centres are on e-mail. Queries can be answered within a few hours by this route. It is also a means of continuing medical education. Primary health care staff are sent weekly problem-based clinical cases, written by the Rational Drug Use Training Project staff, for them to manage rationally. Clinical and prescribing information is supplied the following week with the next instalment.

Contact can be made with the trainers or information centres **telephonically** or by **post** as well. It as been found that despite having access to these resources, staff at primary care still need encouragement to use them. The barrier of lethargy and the excuse of too little time still need to be broken. Persistent efforts on the part of the Rational Drug Use Training Programme trainers and HealthLink are resulting in a slow increase in communication between these tertiary institution-based resource centres and primary health care facilities.

E. Method of study assessment: the drug use indicators (July to August 1996):

One of the original requests from Health Systems Trust, strongly supported by the trainers of the Rational Drug Use Training Programme and their supervisors, was that the effect of the programme be measurable. The impact of the workshop and ongoing support in rational prescribing had to be quantified. This means of measuring had to be straightforward and easily explained to primary health care staff who would be responsible for collection of any data.

The International Network for the Rational Use of Drugs (INRUD) and the World Health Organisation (WHO) have developed a method of assessment of rational drug use. This involves the collection of a series of drug use indicators published in the WHO manual "Measuring Drug Use in Health Care facilities"[30]. These indicators quantify many of the areas of rational drug use which are covered in the workshop. The core drug use indicators include:

1. Prescribing Indicators

- Average number of drugs per encounter
- Percentage of drugs prescribed by generic name
- Percentage of encounters with an antibiotic prescribed
- Percentage of encounters with an injection prescribed
- Percentage of drugs prescribed from the essential drugs list or formulary

2. Patient care Indicators

- Average consultation time
- Average dispensing time (time that dispensing personnel spend with the patient)
- Percentage of drugs actually dispensed
- Percentage of drugs adequately labelled
- Patients knowledge of correct dosage

3. Health Facility Indicators

- Availability of a copy of the essential drugs list or formulary
- Availability of key drugs

It is recommended that the prescribing indicators are collected retrospectively and the others prospectively. These indicators are highly standardised and can be used in any country without much adaptation. They have been tested widely. They illustrate a baseline

prescribing pattern which can be used to increase awareness of prescribing or dispensing problems and to identify and prioritise problems for further elucidation and intervention[30,82,83]. They can then be used to quantify the impact of such an intervention. It has to be remembered that these indicators may highlight problems with the rational use of drugs, but they do not provide explanations for them.

The Rational Drug Use Training Programme chose to adapt these core indicators for ease of use. The indicators are presented on two forms, one that collects **facility-based data** and the other for **prescription-based data**. These forms and details of collection are found in the Trainers Folder (Appendix One). These are the second draft of indicator forms, adapted after consultation with primary health care staff in the early stages of data collection. No indicators were changed, but the forms have been clarified and the layout improved.

The forms are filled in by health care facility staff, who are taught how to complete them during the feedback session of the workshop. To become familiar with the forms and rectify any potential misunderstandings they are given a number of prescriptions from the facility to practice collecting the data on or, if time allows, data are collected from patients attending the facility that day. Participants are shown how to collate this information later in the same session. For their purposes relevant results can be obtained using simple mathematics to obtain sums and averages for each indicator.

These data are not only collected as a means of monitoring the impact of the training workshop introduced by the Rational Drug Use Training Programme, but to help the health care staff audit their own prescribing practices, which may act as a motivation for the staff to improve them. The staff must come to own these indicators. They are encouraged to display the results of data collection prominently in their clinics and to aim to achieve more rational use of drugs the next time that the indicators are collected[8].

1. Facility based indicators:

All the data for the Rational Drug Use Training Project are collected prospectively. The facility-based indicators determine the type of facility, the nature of the staff working there and the information resources available at that facility. This form is usually completed by the sister-in-charge of the facility involved.

Stock management indicators are included on this sheet. These indicators check a selected list of drugs for availability, whether they have expired and whether they are stored correctly. This list of 10 drugs is adapted from the WHO recommended list[30] and

covers 10 drugs from a wide range of drug groups (e.g. antibiotics, analgesics, anti-hypertensives)and dosage forms (oral, inhaled, injectable, topical etc.). The list covers both adult and paediatric preparations, and both prophylactic and curative therapies. All the drugs come from the South African Essential Drugs List. Ideally all 10 should be available, before expiry and stored under the correct conditions. The last three questions of the form are subjective assessments of staff opinions. They provide some qualitative data about the support the staff receive in relation to drug use and the Essential Drugs Programme.

2. Prescription based indicators:

The prescription-based indicator sheet is designed so that one form is completed for each patient encounter. If no drugs are prescribed for a particular patient participating in the data collection, a form must still be completed, to ensure the calculated average number of drugs per encounter is accurate. **Rational prescribing, use of standard treatment guideline** and **dispensing indicators** are included here. Two indicators that are less easy to standardise have been added. These are the cost of the dispensed medication, and whether the prescription is in accordance with the standard treatment guideline for the diagnosis recorded on the sheet. These are included in the INRUD/WHO list of complementary drug use indicators[30,82].

Other core WHO indicators have not been included, such as the percentage of encounters where an antibiotic or an injection is prescribed. The way the form has been designed requires that the prescription is recorded in full, as written by the prescriber, in the first table under the heading "Indicators for each drug". Indicators such as the two above can be determined from this prescription at a later date. Having the prescription recorded also allows the Rational Drug Use Training Project trainers to verify details of data collected by the health care workers, such as the number of drugs prescribed by generic name, or that come from the Essential Drugs List. Whether the treatment is in accordance with the STG for that diagnosis can be confirmed as well, and drug costs can be calculated after the data collection session.

Other indicators not collected include those requiring timing of consultations and dispensing. These were removed as they were felt to be too complex and labour-intensive to collect. The final list of indicators can all be collected prospectively, within one day, and by one staff member.

Collection of some of the indicators may require clarification:

- The **Essential Drugs List** used is the South African National Essential Drug List for primary care[70]. If the prescriber is from KwaZulu-Natal and the drug in question is not found on this list, it is acceptable as an EDL drug if found in the KwaZulu-Natal Primary Health Care Handbook and Medicines List[76]. All medicines prescribed should come from these lists.

- Cotrimoxazole, simple linctus, calamine lotion and aspirin are accepted as **generic names**. Panado and betedine lotion are not. Generally if a name is printed on the South African EDL it is accepted as generic. Ideally all drugs should be prescribed by generic name.

- Whether a treatment is in accordance with the stated diagnosis may be subjective. Four categories are given as options, but in analysis only "0" and "3" are considered. In these cases the treatment either does not correspond with the stated diagnosis at all, or it corresponds perfectly. If there are two diagnoses, both must correspond perfectly to receive a "3".The South African National Standard Treatment Guidelines and Essential Drug List[70] is taken as the standard which must be met. In KwaZulu-Natal, STGs from the Primary Health Care Handbook and Medicines List[76] are acceptable as standards too. Ideally, all diagnoses should follow the STG, but this is a goal which, will take some time to achieve, due to the national STGs not being acceptable to all health care staff as yet, existing poor prescribing habits and patient demand.

- **Costing of the dispensed drugs** is given simply as the cost to the province of these drugs, according to the tender price list. It does not include transport or distribution costs, nor does it include the levies charged. For those prescribed medicines where the duration of treatment is not specified, the cost of the smallest unit is used e.g. a 50ml bottle of paracetamol, or 20 tablets of aspirin. The expected average cost of pharmaceuticals per capita in South Africa is R30.00. Each patient is expected to visit 3 times in the year, so each prescription should have an average cost of R10.00[18,85].

  A decrease in this cost reflects only a monetary improvement. It does not signify improved patient care, a decrease in polypharmacy or improved appropriateness of prescribing in any way.

- **Patient knowledge** is assessed by asking them to repeat what they know about the medicine they have been given. The interviewer should be speaking the same language as the patient. They are expected to know how much, how often and for how long they must take each medicine, as well as any major side-effects. Those given a "0" or a "1" are grouped and patient knowledge here is considered to be inadequate. Those given a "3" have good knowledge of their medications. The balance of patients have reasonable

knowledge. Determining which category the patient falls into is a very subjective process. This is one of the two indicators which cannot be verified at a later date.

- **Writing a correct prescription and labelling correctly**: The 2 tables on the "Indicators for each drug" sheet are used to determine if the prescription and the label have been written properly. For a drug to be counted as having been prescribed correctly ALL the following must be present on the prescription: the name of the drug, the strength (in milligrams: one tablet, or one teaspoon, is not accepted as adequate, because a number of medications are available in more than one strength), the dosing required and the duration of treatment. If the amount of drug to be dispensed is specified, e.g. one bottle, or 28 tablets, that is accepted as a duration of treatment instead.

  Similarly, for labelling, ALL the information must be present to be counted as a correct label. The patient's name, the drug name, the dosing instruction and the date of expiry of a drug must be displayed. Labelling is the other indicator which cannot be verified later.

  Details of collection and collation of the drug use indicators can be found under Collection of Indicators in the Trainer's Folder.

3. Qualitative assessment:

After the development of the workshop it was tested qualitatively on a group of 19 primary health care staff at Addington Hospital in August 1996 and three groups of prescribing staff in the Western Cape. After the workshop the following questions were asked:

1) Have you found the content of this course useful/relevant to your practice?

2) Were the clinical examples used appropriate?

3) Were the teaching methods appropriate?

If not, what would you prefer:
Didactic
Discussion/debates
Student-guided
Clinical cases
Other (please specify)

4) Was there enough time?

5) Will you be able to apply these principles of prescribing in the future?

If not, why not?

6) Do you have any suggestions for our future courses?

7) Any other comments?

Feedback from these four sessions was positive. The case examples were considered to be practical and realistic. The problem-based training method was found to be enjoyable and interesting. It was suggested here that after each group-work session the groups should have the opportunity to present their cases to everyone else for feedback. Other than adding this to the original programme, the structure and content changed very little.

Both the workshop and the drug use indicators were complete by August 1996. The indicators were first used later in the year as part of a test study. This study and both the qualitative and quantitative results will be described in Chapter four.

Chapter four: Study design, implementation and results from December 1996 and March 1997, with interpretation.

This chapter will:

1. give details of the study structure, including the training-the- trainers process, sites of implementation and timing of data collection.
2. present the drug use indicator results, both pre-and post-intervention, with discussion.
3. present and discuss the qualitative results.

A. Study structure:

This study presented here is a pre/post study with no control. The intervention is the workshop described above, implemented by pre-trained trainers. The drug use indicators are the measuring tool. After qualitative assessment of the intervention, the project structure needed to be brought together as a whole. Financial and staffing constraints limited the size of the study. The selection of the study site was restricted by the local political environment. As well as these issues, the project was having difficulties in being accepted at Department of Health level both provincially and nationally, despite verbal support during the early phases of development.

1. Site selection:

There was a need to prove the worth of the programme before it could be accepted and implemented widely. The plans for implementation would involve one site. Ideally this site should have been a health district, as this was the structure within which the programme had been designed to function.

In late 1996, district boundaries had not been clarified in he Western Cape. Both regional and district boundaries had been established in KwaZulu-Natal. In some regions regional health directors had been appointed, and the district health system was beginning to be implemented. Region B of KwaZulu-Natal (Pietermaritzburg, and the area west toward the Drakensberg) had a regional director, who was approached about the project. She allocated 3 health facilities for The Rational Drug Use Training Project's study. These included the Underberg community health centre (involved in the focus group discussions), and 2 other clinics, East Street and Imbalenhle, closer to Pietermaritzburg. Staff from the facilities were selected to act as trainers.

These sites were not within one district, which was not ideal, but would still allow for a train-the-trainers approach at a regional level, with collection of drug use indicators at these 3 facilities. Initially this would be a before-and-after study, which over time should become a interrupted time series study. No clinics were used as controls. The drug use indicators are not subtle enough to take into account the effect of different types and numbers of prescribing staff and their various skills may have on the data, making comparisons and randomisation between clinics difficult. Using only 3 facilities meant the study was manageable within the limited resources of the Rational Drug Use Training Project.

2. Training of trainers:

The Rational Drug Use Training Project staff, called the **primary trainers** (Aarti Kishuna, Catherine Orrell), from provincial academic units, presented the workshop in the study site to a selected number of **district trainers**. Ideally these people should be existing primary care nurse trainers or primary care nurses and pharmacists with an interest in training. Many of the districts do not have staff in these roles. Eight clinical nurse practitioners were released to act as district trainers. Three of these staff had been trained as trainers already, although only 2 had training posts at the time. One had attended the testing

workshop at Addington in August 1996. The others were staff from the facilities, who were also expected to maintain a full daily clinical and managerial load.

These eight staff were trained to present the training workshop over two sessions in October and November 1996. They were given Trainer's Folders containing the materials necessary for them to present the workshop themselves. After this training, the district trainers would teach primary health care staff at the 3 facilities, with continued support from the primary trainers, who are otherwise free to move on to the next district (see Figure 8: plan for district dissemination).

As the first step in the implementation of the programme at the three study facilities the district trainers were assisted by the primary trainers to collect the pre-implementation drug use indicators. Then they were left to present the workshop, which included instruction to the staff on how to collect their own indicators. In time clinic staff would be able to audit their own prescribing habits with minimal district trainer input.

The primary trainers would be present again at the district trainer's first or second presentation of the training programme, to provide feedback and advice on the training. The clinic staff with the assistance of their district trainer would do collection of post-intervention indicators.

Two of the three facilities (Underberg and Imbalenhle) allocated to the project, as initial sites, were community health centres providing comprehensive services such as X-rays and maternity. One (East Street) was a clinic, with simple preventative and curative facilities only. All had daily access to, usually part-time, a doctor and a pharmacist. The majority of prescribers were nursing sisters. Electricity, telephones and running water were supplied at all 3 sites. They had all had HealthLink computers installed before the training began and so had access to the Rational Drug Use Training Project staff by e-mail as well as by telephone.

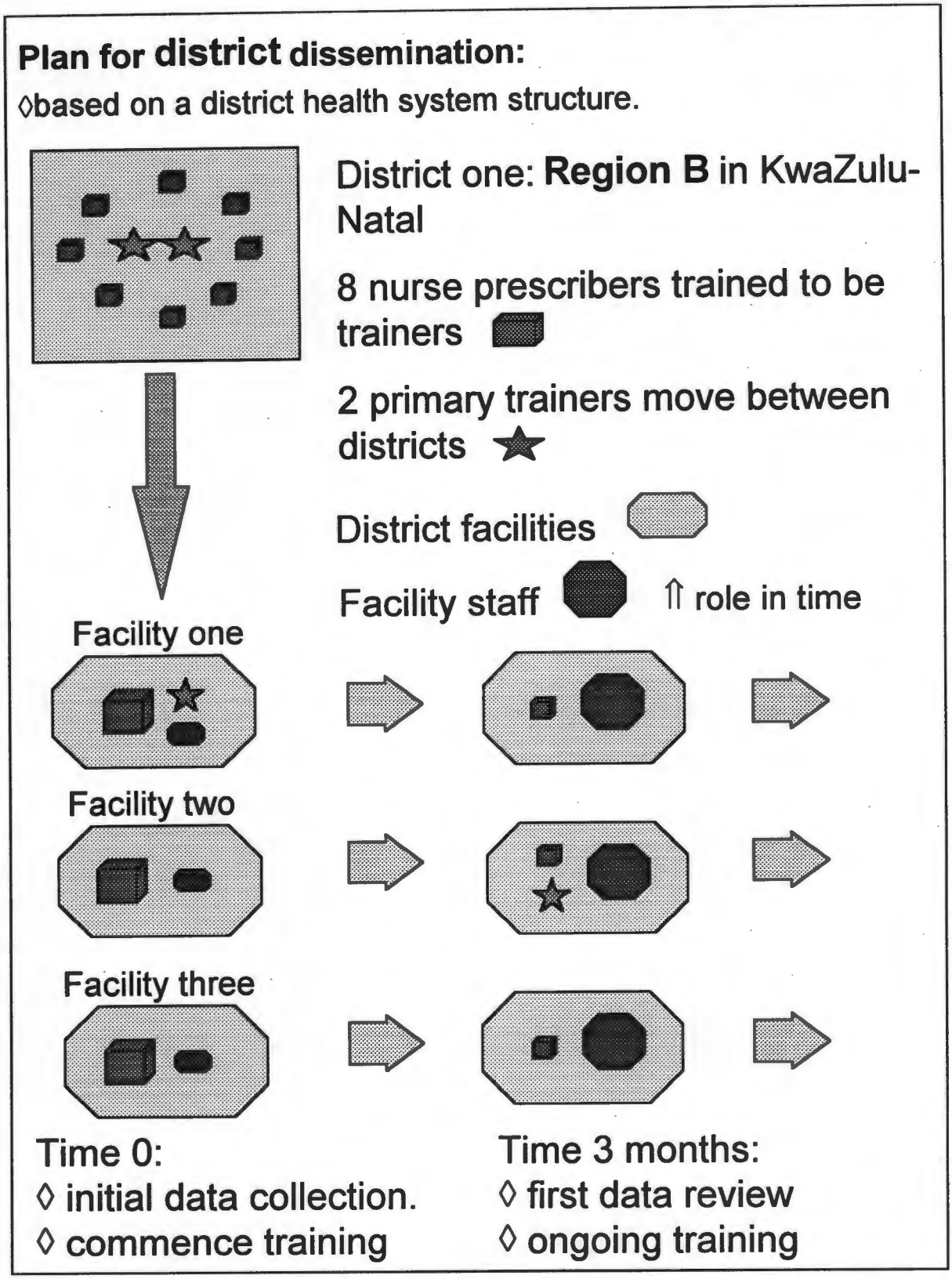

Plan for district dissemination:
◊based on a district health system structure.
District one: Region B in KwaZulu-Natal
8 nurse prescribers trained to be trainers
2 primary trainers move between districts
District facilities
Facility staff
⇑ role in time
Facility one
Facility two
Facility three
Time 0:
◊ initial data collection.
◊ commence training
Time 3 months:
◊ first data review
◊ ongoing training

Figure 6

3. Timing of the study:

The workshop and training details were presented to these 8 trainers at East Street clinic in October and November 1996. It was ensured that each of the three facilities had at least one staff member present who was willing to take on the training of the staff in that facility, after the collection of the baseline drug use indicators. Each of these trainers received the Trainers Folder (Appendix one) with details on how to structure and present the modules. The use, collection and collation of drug use indicators was explained and a time arranged with the staff from each of the three facilities when the base-line indicators could be collected. The primary trainers were present at this first collection.

Collection was done prospectively and over one day at each site. Each sister-in-charge completes the "Indicators per facility form" on the day of collection. Then 30 "Indicators per prescription" sheets are gathered from each facility. A point was chosen where the patient had completed his/her consultation, and collected their medication from the pharmacy, yet still had their prescription, usually on a patient card, in hand. In order to spread the load over the day, the average number of patients seen in a day (information found on the "Indicator per facility" form) was divided by 30, and that number used as an approximate sampling interval. At Underberg 60 patients were expected daily, so every second patient was asked to consent to an interview, whereas Imbalenhle and East Street saw on average 300 patients a day, so every 10th patient was asked to participate[30].

Patients were asked if they would object to being asked some questions about their illness and the medications they had received. They were asked by a staff member of the clinic, in their own language. None of the patients refused to speak to the trainers.

a) Pre-intervention data collection:

In December 1996, ninety-six prescriptions were collected from the 3 facilities. These act as baseline prescribing data. Both Rational Drug Use Training Project staff and the facility's trainers were present. These data were collated at the University of Cape Town by one of the project's staff, and the results returned to all the facilities as soon as possible for display. Any immediate problems, such as dispensing of unreconstituted antibiotics, or the wrong medicine, were noted by staff linked to the facility and feedback was given to prescribing staff the following day.

b) Training in rational drug use:

The 8 trainers were then asked to arrange training in rational prescribing for other staff at their clinics, within the following 3 months. At Imbalenhle 2 trainers, and at Underberg 1 trainer ran a full workshop for the nurse prescribers working in those facilities. At East Street the trainer had difficulty in organising the workshop as she and other staff had leave, so a full 2-day workshop was never presented. The material was presented to the staff at a number of less formal sessions instead. Only the Underberg trainer was a sister actually qualified to do in-service training. During this period the training staff could contact the Rational Drug Use Training Project staff at any time for guidance and advice.

c) Post intervention data collection:

In March 1997 a second set of prescribing indicators was collected. These indicator forms were sent by post to the trainers for each facility, and they were asked to repeat the process as they had done it in December 1996. Frequent e-mail reinforcing messages were also sent. A total of 90 prescription forms were returned to the regional Department of Health within 3 weeks. These were collated and analysed at the University of CapeTown in early May 1997.

The results of these 2 sets of data are presented below. Staff were encouraged to repeat the collection three months later (June 1997), but this was only done in the Impendle/Pholela/Underberg sub-districts of Region B, as part of continuing direct Rational Drug Use Training Project staff input through the Initiative for Sub-District Support. This data forms part of another study, focused on these sub-districts alone, and will not be presented here.

B. Results:

The pre and post results were collated and then analysed. Most of the statistics used are simple statistics such as the mean and median values. For comparative purposes non-parametric statistics were used after confirming skewness with Shapiro-Wilk's W test. The non-parametric tests used were the Mann-Whitney U test for comparing 2 data sets and the Kruskal-Wallis analysis of variance for more than 2 data sets. Significance was taken as a p value of <0.05. Statistica Version 5 was the package used.

Appendix 3 gives more details of the data. A complete data set is available on disc.

1. Table of ideal values:

Drug use indicator	Ideal value
Number of drugs used per encounter	1.6 to 1.8[84]
Percentage from essential drugs list	100%
Percentage prescribed by generic name	100%
Completely followed STG for the stated diagnosis	100%
Did not follow the STG at all	0%
Percentage of drugs with a correct prescription line	100%
Percentage of drugs labelled correctly	100%
Percentage dispensed	100%
Mean cost per prescription	R 10.00[18,85]
Patient knowledge good	100%
Patient knowledge inadequate	0%

2. East Street clinic:

a) Facility information:

This clinic sees about 300 patients per day, and is open 6 days a week. The majority of prescribers are nursing staff (5 in total), but they have a pharmacist and one doctor visiting the facility daily. Until the clinic had a HealthLink computer installed in mid-1996 there was no source of unbiased information immediately accessible to the staff of the clinic. No standard treatment guidelines or essential drugs list were available until supplied to the trainer involved in the Rational Drug Use Training Project. At the time of collecting indicators the sister-in-charge felt that her staff had a good knowledge of medicines, and felt safe in treating patients. However they did not feel supported in the implementation of the Essential Drugs Programme. The only introduction they received had been from the staff of the Rational Drug Use Training Project.

Drugs are supplied by the regional hospital, Northdale. Of the 10 key drugs which were checked for in the pharmacy, only 7 were present. No mebendazole tablets, ferrous salts or pots of benzoic acid and salicylic acid were available. The storage conditions were inadequate, with the ambient temperature in the dispensary being 29°c. The seven drugs which were available were all still within the use-by date.

b) Table 1. Prescribing indicators collected in December 1996 and March 1997 at East Street clinic.

Indicator:	December 1996	March 1997	p value
Number of prescriptions	30	32	
Total number of drugs	96	86	
Mean (median) number of drugs used per encounter	3.2 (3.0)	2.68 (2.0)	0.0225 ❶
Percentage from the EDL	68%	66%	NS
Percentage prescribed by generic name	24%	31%	NS

Completely followed STG for the stated diagnosis	6.7% (2/30)	15.6% (5/32)	NS
Did not follow the STG at all	30.0% (9/30)	3.1% (1/32)	0.0392 ❷
Percentage of drugs with a correct prescription line	44.6%	27.7%	0.0306 ❶ worse
Percentage of drugs labelled correctly	71.1%	87.0%	0.0317 ❶
Percentage dispensed	100%	100%	NS
Mean cost per prescription	R 7.64	R 5.41	NS
Mean cost per item	R 2.11	R 1.85	NS
Patient knowledge good	23.3% (7/30)	6.2% (2/32)	NS
Patient knowledge inadequate	33.3% (10/30)	71.8% (23/32)	0.0054 ❷

Data details presented in Appendix three (page a)
NS = not significant
❶ = Mann-Whitney U-test (non-parametric)
❷ = Odds ratio with Yates correction.

The East Street trainer was on leave through much of the 3 month period available to her for training purposes and the staff were trained over a number of sessions late in the 3 month period. The training material and references supplied to her were available to the clinic during this time. During the collection of indicators this trainer had been visibly impressed by one incident when metronidazole was prescribed for a patient, but penicillin dispensed. These drugs are dispensed in similar bottles and have similar appearing labels. She reported this to her staff the following morning.

The before and after results show a significant decrease in the number of drugs prescribed, and fewer cases of the treatment guidelines not being followed at all. Labelling of the medicines had improved, perhaps due to the trainer's input on this point immediately after the indicators were collected. However, there were fewer correct prescription lines. This tendency for the prescription lines to worsen is seen throughout the data and is disappointing. One reason for this could be that the first time the indicators

were collected, they were collected by the Rational Drug Use Training Project staff as well as the clinic trainer. The clinic staff were aware of the presence of outsiders, and that prescriptions were being collected. They may have taken care to ensure their prescriptions were written correctly that day. The second set of data, collected by the trainer alone, would have been a less threatening situation and not prompted the same change.

There were no other significant changes here. The limited input by the trainer and fact that the clinic now had access to STGs may have been enough to cause these improvements. That this clinic was the focus for the train-the trainers rational drug prescribing workshop may also have contributed to the staff being more aware of their prescribing habits.

3. Underberg community health centre:

a) Facility information:

This facility is relatively small (6 prescribing nurses and 1 sessional doctor) and only sees an average of 60 patients per day. This made the staff very aware of the collection of the base-line drug use indicators. They are open 5 days a week. Again they have daily access to a doctor (the district surgeon visits for 15 minutes to half an hour) and a part-time pharmacist. The pharmacist only deals with the district surgeon's prescriptions. They had received the South African National Essential Drug List for primary care[70] with treatment guidelines prior to the Rational Drug Use Training Project visit, although no other input about the Essential Drugs Programme had been given. Although HealthLink had installed an e-mail link, the staff did not feel they had adequate access to unbiased drug information, though they feel they have enough knowledge to treat patients safely.

Their medicines and supplies are received from Northdale Hospital, which acts as a regional depot. All 10 of the key items were present, and available before expiry. Storage conditions were generally secure and the temperature was 24°c (ideal 15°c to 25°c[3]). Vaccines were kept in a normal fridge which had no temperature monitor.

b) Table 2. **Prescribing indicators collected in December 1996 and March 1997 at Underberg community health centre.**

Indicator:	December 1996	March 1997	p value
Number of prescriptions	31	27	
Total number of drugs	63	67	
Mean (median) number of drugs used per encounter	2.03 (2.0)	2.48 (2.0)	NS
Percentage from the EDL	71%	87%	NS
Percentage prescribed by generic name	18%	52%	0.0003 ❶
Completely followed STG for the stated diagnosis	25.8% (8/31)	14.8% (4/27)	NS
Did not follow the STG at all	22.6% (7/31)	3.7% (1/27)	0.0412 ❷
Percentage of drugs with a correct prescription line	33.3%	4.0%	0.0034 ❶ worse
Percentage of drugs labelled correctly	24.0%	86%	0.0000 ❶
Percentage dispensed	100%	100%	NS
Mean cost per prescription	R 10.24	R 6.49	NS
Mean cost per item	R 6.11	R 2.56	0.0014 ❶
Patient knowledge good	3.2% (1/31)	48.1% (13/27)	0.0002 ❸
Patient knowledge inadequate	22.6% (7/31)	25.9% (7/27)	NS

Data details presented in Appendix three (page a)
NS = not significant

❶ = Mann-Whitney U-test (non-parametric)
❷ = Odds ratio with Yates correction.
❸ = Odds ratio with one-tailed Fisher exact.

This is the facility which had the most improvement in prescribing practices. The trainer here was a sister who had been previously taught to train. She presented a full workshop to all the staff at the community health centre.

There was no significant decrease in the number of drugs used per encounter, but their original figure was low. Both the percentage of drugs used from the EDL and those prescribed by generic name increased, although only the increased proportion of generics prescribed was significant. Again the number of drugs prescribed correctly significantly decreased, while labelling improved. Labelling, however, is one of the indicators which cannot be verified on the indicator forms. The use of STGs improved, in that fewer prescriptions appeared to be unrelated to the diagnosis stated, though no more followed the guideline completely.

The cost per item decreased significantly in the second set of data. The first set of data contained a number of expensive medications, such as captopril and the combination anti-hypertensive Brinerdin.

There was an increase in patient knowledge as well. This is another non-verifiable indicator and further time series points will be needed to confirm this tendency.

4. Imbalenhle community health centre:

a) Facility information:

Imbalenhle is large facility, seeing at lest 300 patients a day. They are open 6 days a week. There are 10 outpatient-prescribing nurses and two doctors working there daily. A pharmacist runs the dispensary. The sister-in-charge said the staff did have access to unbiased drug information, but felt this access was not adequate. The facility had very recently had a HealthLink computer installed and the staff was wary of using it as yet. They had copies of the KwaZulu-Natal Primary Health Care Handbook and Medicines List[76], but did not have a copy of the South African National Essential Drug List for primary care[70] and had received no support in the implementation of the EDP. The staff felt that their knowledge of medicines was poor and need to be improved.

Nine of the 10 key medicines were available. Mebendazole tablets were not. All were stored adequately (temperature 25°c) and available before the expiry date.

b) Table 3. **Prescribing indicators collected in December 1996 and March 1997 at Imbalenhle community health centre.**

Indicator:	December 1996	March 1997	p value
Number of prescriptions	35	31	
Total number of drugs	106	89	
Mean (median) number of drugs used per encounter	3.02 (3.0)	2.87 (3.0)	NS
Percentage from the EDL	81%	79%	NS
Percentage prescribed by generic name	32%	48%	0.0368 ❶
Completely followed STG for the stated diagnosis	8.6% (3/35)	12.9% (4/31)	NS
Did not follow the STG at all	40.0% (14/35)	25.8% (8/31)	NS
Percentage of drugs with a correct prescription line	29%	6.7%	0.0116 ❶ worse
Percentage of drugs labelled correctly	35%	4.3%	0.0007 ❶ worse
Percentage dispensed	100%	94.2%	NS
Mean cost per prescription	R 9.82	R 4.41	NS
Mean cost per item	R 2.82	R 1.49	NS
Patient knowledge good	28.6% (10/35)	74.2% (23/31)	0.0006 ❷
Patient knowledge inadequate	22.9% (8/35)	0% (0/31)	0.0138 ❷

Data details presented in Appendix three (page a)
NS = not significant
❶ = Mann-Whitney U-test (non-parametric)
❷ = Odds ratio with Yates correction.

Imbalenhle is a large clinic. There were 2 trainers involved in training the workshop to the nurse prescribers. Prescribing doctors were not trained. The effect of the training may be diluted by those untrained, as drug use indicators reflect the prescribing habits of all these staff.

There was a tendency toward fewer drugs per encounter, and improved following of treatment guidelines, but neither of the changes were significant. There was a significant increase in the proportion of drugs prescribed generically. Here both labelling and prescription of drugs worsened. This may be an accurate reflection of practice, or be due to a misunderstanding in the collection of the indicators, so that insufficient data was recorded on the indicator forms. For example if the volume (50ml) or number of tablets (28) to be dispensed is stated in the prescription, that value is taken to reflect the duration of treatment. If this number was not recorded on the indicator form, then duration of treatment would be missing, and the prescription line recorded as incorrect. The trainers were warned of this before they collected data.

There was a remarkable improvement in patient knowledge. Again, this data cannot be verified. It seems unlikely that such improvement would come about by prescribing training alone, and may also reflect a misunderstanding in the collection of this data. Staff may not have been as strict as the primary trainers in their questioning of the patients.

5. Facility comparison:

A limited comparison between clinics is presented here, as there is little to be gained from comparing them individually. They have different types and numbers of prescribers who have received dissimilar basic training. Despite efforts to ensure the prescribing training received was uniform, even that differed in practise. Only objective values will be presented, such as drugs per encounter, drugs from the EDL and costing.

a) Table 4. **Comparative clinic data before training.**

December 1996	East Street	Underberg	Imbalen-hle	p value
Mean (median) number of drugs used per encounter	3.2 (3.0)	2.03 (2.0)	3.02 (3.0)	0.0012 ❶
Percentage from the EDL	68%	71%	81%	NS
Percentage prescribed by generic name	24%	18%	32%	NS
Percentage of drugs with a correct prescription line	44.6%	33%	29%	NS
Percentage of drugs labelled correctly	71%	24%	35%	0.0000 ❶
Mean cost per prescription	R 7.64	R 10.24	R 9.82	NS
Mean cost per item	R 2.11	R 6.11	R 2.82	0.0021 ❶

NS = not significant
Shaded block shows significantly different figure.

❶ = using Kruskal-Wallis analysis of variance (non-parametric)

b) Table 5. **Comparative clinic data after training.**

March 1997	East Street	Underberg	Imbalen-hle	p value
Mean (median) number of drugs used per encounter	2.68 (2.0)	2.48 (2.0)	2.87 (3.0)	NS
Percentage from the EDL	66%	87%	79%	0.0025 ❶

Percentage prescribed by generic name	31%	52%	48%	0.0319 ❶
Percentage of drugs with a correct prescription line	27%	4.0%	6.7%	0.0001 ❶
Percentage of drugs labelled correctly	87%	86%	4.3%	0.0000 ❶
Mean cost per prescription	R 5.41	R 6.49	R 4.41	NS
Mean cost per item	R 1.85	R 2.56	R 1.49	NS

NS = not significant
Shaded block shows significantly different figure.
❶ = using Kruskal-Wallis analysis of variance (non-parametric)

Other than the increased cost per item prescribed in Underberg and the better labelling of medication at East Street, the clinics at baseline showed fairly similar prescribing patterns. Underberg prescribes significantly less drugs per encounter.

In the second data set, it is the clinic that received the less formal training, East Street, that seems to be most different. Less drugs are used from the EDL and prescribed by generic name than the other clinics, yet this clinic shows the best overall prescription and labelling figures. However, comparing each clinic's results over time has more value than comparing these disparate facilities to each other.

6. Combined data set, pre and post training:

a) Table 6. **Combined data, pre and post training.**

The data have been combined and compared here. This increases the sample size and may render the results more generalisable.

Drug Use Indicator:	December 1996	March 1997	p value	Ideal
Number of prescriptions:	96	90		
Total number of drugs prescribed:	265	242		

Drugs per encounter	2.76	2.68	NS	1.3 to 2.0
Percentage of drugs from the Essential Drugs List:	73.9%	77.2%	NS	100 %
Percentage of drugs prescribed by generic name	25%	48.3%	0.0001 ❶	100 %
Completely followed STG for that diagnosis:	13.5% (13/96)	14.4% (13/90)	NS	100 %
Did not follow STG at all:	31.2% (30/96)	11.1% (10/90)	0.0016 ❷	0%
Correct prescription line:	35.0%	13.3%	0.0000 ❶ worse	100 %
Drug labels adequate:	43.0%	58.2%	0.0186 ❶	100 %
Drugs dispensed	100%	98.3%	NS	100 %
Cost of prescription	R9.27	R5.39	0.0134 ❶	
Cost per item	R3.63	R1.94	0.0025 ❶	
Patient knowledge good	18.7% (18/96)	41.1% (37/90)	0.0015 ❷	100 %
Patient knowledge inadequate	26.0% (25/96)	33.3% (30/90)	NS	0%

Data details presented in Appendix three (page a)

STG = Standard Treatment Guidelines

Shaded blocks are significantly different.

❶ = Mann-Whitney U-test (non-parametric)

❷ = Odds ratio with Yates correction.

b) Analysis of combined pre-intervention data set (December 1996):

Using Spearman's R correlation coefficient, analysis of the first set of data showed that, as would be expected, as the number of drugs per prescription increases so the cost of

the prescription increases (p=0.0000, Spearman's R=0.5436). Interestingly, as the proportion of drugs on each prescription that are from the EDL increase, there is a significant decrease in total prescription cost, i.e. if 80% of the drugs on a prescription were from the EDL, it is likely to be cheaper than if only 20% of the drugs came from the EDL (p=0.0199, Spearman's R -0.2386). Furthermore, if a drug is prescribed by its generic name it is significantly more likely to be from the EDL, than not (p=0.0176, Spearman's R= 0.2431).

The data from the prescriptions shows that it is cheaper to prescribe fewer drugs, and cheaper to use the drugs selected for the Essential Drugs List. As generic prescribing is encouraged, so should the number of drugs prescribed from the EDL increase. The level of adherence to the STGs, however, did not influence the cost of the prescriptions (Kruskal-Wallis analysis, not significant).

c) Analysis of the post-intervention data (March 1997):

Correlations shown in the first data set continue for the second. As the number of drugs per prescription increases, so does the cost of that prescription (p=0.0000, Spearman's R0.5327). Similarly, as more drugs are prescribed by generic name, the more likely they are to come from the EDL (p=0.0213, Spearman's R=0.2360). The greater the proportion of drugs that come from the EDL, the cheaper the prescription (p=0.0175, Spearman's R -0.1337). Therefore it may be said that as more drugs are prescribed generically, the cheaper (and hopefully safer) the scripts should become. This may be one of the reasons that the South African National Drug Policy states that all prescribing should be by non-propriety or generic names[24].

d) Comparison of the two data sets:

On comparison of the second set with first set, some positive are trends seen. It is encouraging to note the increase in generic prescribing, the decrease in cost of prescriptions and an improvement in the use of Standard Treatment Guidelines (STG). Through Kruskal-Wallis analysis of the whole data set it can be shown that when STGs are followed, the drugs used are significantly more likely to come from the Essential Drug List (p=0.0005). As the STGs supplied to the facilities, through their trainers, come from the South African Standard Treatment Guidelines and Essential Drug List [70], this is to be expected.

Although not significant, there is a decrease in the number of drugs prescribed per prescription, and an increase in the number of drugs used from the Essential Drugs List.

The WHO ideal value for the number of drugs per encounter is 1.2 to 2.0[84]. These data nearly reach that goal, and staff should aim to maintain these figures. It is not ideal that a year into the implementation of the South African Essential Drug Programme up to quarter of the drugs prescribed, and dispensed do not come from the essential drug list (EDL). Many of the staff had had no information about, or a copy of, the EDL until they participated in the Rational Drug Use Training Project.

Actual prescription lines are very badly written. This is the only indicator which is significantly worse overall after the training, despite a portion of the workshop being devoted to this topic. Tablet and syrup strengths, in milligrams, are rarely recorded, and neither is the duration of treatment specified. The worse prescriptions in the second set, may more accurately reflect practice. One of the reasons for the deterioration seen may be due to greater effort to prescribe correctly when the Rational Drug Use Training Project staff were present at the first data collection. All the staff in the facilities were aware of the data collection process, and knew that prescriptions were being examined. It had been explained that they were not being assessed, but simply being recorded anonymously to determine a baseline prescribing pattern for that whole facility. However, there would still have been an element of awareness when writing their scripts that day. The second set of data was collected by a staff member, the trainer, of that clinic, which may have been a less threatening occasion.

Another reason for the poorer prescription lines after the training may be that the volume of medicine or tablet numbers was not transferred to the indicator forms. This data would be then be missing during collation. Missing dosage or duration information may compromise patient safety, particularly if the prescribers are not dispensing the medication themselves. A prescription is not considered correct unless ALL details are present, i.e. drug name, strength, dosing schedule and duration of treatment. For example, in the first set of data, a prescription line such as *hydrochlorothiazide 25mg daily x 28* indicates 28 tablets are to be given, and describes the duration of treatment. This would be considered correct. If however the line read *hydrochlorothiazide 25mg daily* it would be considered incorrect as there is no indication how long this treatment needs to be taken. If this hypothesis is correct, it is the fault of the Rational Drug Use Training Project staff, who should have specifically made this clear to the trainers. Further training will need to be given in this area.

Drug costs are significantly less in the second data set. Both prescription costs fall near to the expected value of R10.00 a script[18,85]. These costs are only the tender prices. No levies or transport costs are included.

More time sequences will need to be done to confirm these figures and to monitor duration of the improvement. There are a number of factors that could have affected

these figures that may be unrelated to prescribing training, such as the second set being collected by the nurse 'trainers" alone, and not with Rational Drug Use Training Project staff present. Most of these data can and have been verified/checked, except for the labelling of the medication and patient knowledge in the second data set. Checking these indicators would require actually seeing the labels on the medication, or interviewing the patient.

There was no control on staff movement or alternative training received during the three month time period of the study. However, the only other training in rational drug use available in South Africa is taught by Medunsa in Mpumalanga. It is unlikely that staff from KwaZulu-Natal would have attended training in another province.

With the data here improved prescribing practices cannot be directly related with better patient outcomes. The tendency toward using the South African National Standard Treatment Guidelines and drugs from the Essential Drugs List is very promising though, as both of these processes have been designed to improve health care for patients in the public sector.

7. Qualitative results:

After each workshop staff were asked to comment on the structure, teaching methods, time allocated and relevance of the training on a structured feedback form. An open ended question on improvements for the future was asked as well. These results analyse feedback from the test workshops (total of 50 participants) held in KwaZulu-Natal and the Western Cape and the staff trained as trainers in the study (8 trainers).

Nearly all the participants (89%) found the principles on which the course was based relevant and useful; and the clinical cases used contextual and appropriate for primary care. They would like more cases to be brought by the staff themselves, rather than the facilitators and for a broader range of situations to be covered. This should be easily feasible in the clinic setting, but though the option is always offered it is rarely taken up. Most of the staff decided it would be generally useful to feed the workshop content back to colleagues at their health centres on their return.

66% thought they would be able to apply the principles learnt to their daily clinical practice. Those who felt it would be difficult to apply the principles supplied reasons such as: drugs needed are often not available and there are no resources (textbooks, journals, formularies) at their health facility to answer queries related to drug use. Some said they

simply would not have the time due to patient numbers, although it had been highlighted that information need not be sought for everyone, only for problem patients or drugs. They felt the clinical set-up is often not conducive for patient education, made worse by limited staff numbers, time constraints, and patient illiteracy.

72% felt that the 2-day period for the workshop was enough time. A few of the workshops were held in training colleges or hospitals. On these occasions a number of the staff had to travel long distances home and so had to leave early. The afternoon sessions then became rushed and it was felt that more time should be made to complete the workshop satisfactorily. The texts supplied i.e. Medunsa's Primary Health Care Formulary and the South African Essential Drug List and Standard Treatment Guidelines (STGs) for Primary Care, were welcomed and appreciated. It was felt these texts would become valuable clinic resources The need for up-to-date drug information and well-structured, reliable STGs was reiterated. This need was one voiced at the focus group discussions. Drugs specified on these STGs should be available at the clinics.

All of the staff appreciated the support shown and promise of ongoing contact by telephone, letter and e-mail. Rural clinic staff have felt themselves isolated from health information in the past and had had little introduction to the Essential Drug List (EDL) concept. The most overwhelming aspect of the feedback was the number of requests for more workshops, ongoing training and regular updates on drug information and the EDL. Importantly, it was thought that this training would be best held at the clinics and community health centres, and not in training institutions. All clinical staff should be exposed to it. The problem-based, participatory structure of the workshop was enjoyed, and found to be interesting, stimulating and fruitful.

Additional comments were that the nurses, who will play a large role in the implementation of the Essential Drugs Programme (EDP), need to be better represented on the Essential Drugs committees. They need to be much better informed of the progress of the EDP and their role in it. Nurses in general need more authority both to prescribe and to question the prescriptions of others, including doctors.

These qualitative and quantitative results have been promising. Despite difficulties with the study and data collection, the quantitative data show a general improvement in the rational use of drugs. The option remains for the Rational Drug Use Training Project staff to develop a larger randomised controlled trial to assess the impact of such rational drug prescribing training with greater accuracy.

Alternatively, these results could be accepted and, with provincial support and a functioning district training system, the focus expanded to other district trainers and individual health care facilities. Involvement of the prescribing staff in monitoring and adapting their own behaviour should be emphasised. The Rational Drug Use Training Project staff would train the district trainers and otherwise act in a supportive and informative capacity.

Problems and achievements of this study will be discussed in Chapter Five.

Chapter five: Difficulties and achievements.

This chapter will:

1. discuss problems with the development of the study, the study structure, site and trainer selection.
2. discuss various achievements of the study, including the improvement in and awareness of rational drug use, the development of the Primary Care Medicines Resource Centre and the Training Manual (Appendix 2)

A. Difficulties with the study:

The development of the Rational Drug Use Training Project was based on certain assumptions. Firstly, it was assumed that the district health system was in place, and that district training staff would be available. The focus group discussions gave rise to the understanding that there would be time for training in the clinics and that in-service training would be acceptable. The Rational Drug Use Training Project staff presumed that once the requested resources and training were provided that they would be fully utilised within primary health care facilities. Many of these assumptions proved to be mistaken.

Although the programme was developed using a "bottom-up" approach, beginning with an understanding of the primary health care staff and their needs, effective implementation required a "top-down" approach, with acceptance and support of the project at national,

and more importantly, provincial and regional levels. A number of problems were encountered during this process. The South African health system was in a state of flux, with the implementation of the regional and district-based health system and the shifting of decision-making capacity away from the national Department of Health. Although it was recognised that training in many fields, including rational prescribing, was essential for primary health care workers, there were few districts that could support and sustain such training, even when it was available. The motivation of neglected nurse prescribers to learn was low. The project's financial and personnel resources were limited. These problems will be discussed further.

1. Acceptance and funding of the project

There were many political barriers to introducing the Rational Drug Use Training Project even at one site. The programme was designed to be implemented at a district level, in support of the change in the health system. It was intended to be a national initiative and it was to the people at national and provincial level involved with the Essential Drugs Programme that the project was presented initially.

a) At National level:

At national level, the project was introduced to personnel in the Department Human Resource Development and the Department of Pharmaceutical Services, while still in its early stages. It was established, in March 1996, that the training could contribute to the implementation of the essential drugs programme and would fall under the auspices of the South African Drug Action Programme, once that was properly established. It was suggested that funding for the project could come from Overseas Development Administration (ODA) moneys expected to be donated within a few months, or from the World Bank. Professor Rachel Gumbi, the National Director of Human Resource Development, who had worked with Professor Peter Folb on the World Bank "Better Health in Africa" initiative (one of the initiating factors of the Rational Drug Use Training Project) agreed to present the project at her next World Bank panellist meeting and to write a general letter of support. One of the Rational Drug Use Training Project staff was to be involved in the development of the drug use indicators to monitor the implementation of the essential drug programme.

After continued meetings, both political and financial support failed to materialise. A few months later, in June 1996, the project was told by staff reporting directly to Professor Gumbi, during a meeting called to present the project's progress, that its work was

politically incorrect as it came from the "ivory tower", previously advantaged University of Cape Town, and had not canvassed all the "black" universities. This was said despite the University of Durban-Westville being partner in the project. Involvement had been offered to the Department of Pharmacy at the University of the Western Cape, as part of the World Health Collaborating Centre for Drug Policy, together with the Department of Pharmacology at the University of Cape Town. Staff at Medunsa, also working in rational prescribing, were aware of the project at this time too. If this blanket disapproval, at national level, of work coming from previously "white" institutions is widespread, it may result in the loss of programmes and staff who could significantly contribute to the growth of the country.

During this period a number of source funds were delayed until the resolution of the "Sarafina" incident. Furthermore, with the implementation of the district health system, a decision was taken that funds for projects based at a district level, such as the Rational Drug Use Training Project, should come from provincial or district sources. Department of Health monies were being distributed to the provinces. Health Systems Trust (HST) had been providing funding as needed for development of the project up until this point. As it became evident that Department of Health funding was not to be forthcoming, a more formal agreement was reached with HST in July 1996, to maintain the development of the Rational Drug Use Training Project for a year. This money is still in use.

The South African Drug Action Programme (SADAP) came into existence later than expected. Although the director, Dr. Wilbert Bannenberg, was appointed in November of 1996, the training co-ordinator post was only filled in May 1997. SADAP is aware of the progress of the Rational Drug Use Training Project and the work remains listed as one of the resources available to them.

b) Provincial and district political problems:

(1) The Western Cape:

The political difficulties continued on a provincial and university level. In the Western Cape, the health districts were not yet in place. The chair of the Western Cape Essential Drug Committee felt that support and funding would not be available for the Rational Drug Use Training Project. The organisational structure was not yet developed and there was no one at provincial level with the portfolio to adopt the programme.

Contact was made with the Mitchell's Plain district in June 1996, then the pilot district for the Western Cape, but the district politics and structure were still under discussion, and

they could not accommodate any training that relied on a district system. This held for most of the districts in the Western Cape's four regions.

The University of the Western Cape's (UWC) Department of Pharmacy had become the academic department most closely associated with the implementation of the essential drugs programme in the Western Cape. Despite much involvement and frequent updates on the progress on the Rational Drug Use Training Project initially, they had not continued to collaborate. Comments were received that, despite not being involved themselves, they felt the project should not be collaborating with the University of Durban Westville, outside the province. Efforts from national level regarding implementation of the essential drugs programme were directed solely to UWC. The Rational Drug Use Training Project, despite offering, was not asked to contribute in any way, although all parties were aware of the project.

As the Rational Drug Use Training Project found repeated difficulties in being accepted in the Western Cape, training efforts shifted largely to KwaZulu-Natal in late 1996.

(2) KwaZulu-Natal:

Politically, progress was much more easily made in KwaZulu-Natal. The district system was better established than that of the Western Cape. Health Systems Trust (HST), a non-government organisation, well known for their health systems research and their HealthLink project, backed the Rational Drug Use Training Project and provided many links with key people in the provincial Department of Health. Contacts had been made within the KwaZulu-Natal Essential Drugs Committee and one of the Rational Drug Use Training Project staff was invited to sit on this committee. Many decisions at provincial and regional level regarding the rational use of drugs have been referred to the Rational Drug Use Training Project staff through this involvement.

There were a few implementation problems even within this province. At one point, in August 1996, all work on Health Systems Trust projects, including HealthLink and the Rational Drug Use Training Project was unilaterally frozen by senior staff in the KwaZulu-Natal provincial health structure. It was felt that the province was out of control of new developments. This problem was resolved, but lead to a two month delay (August to October 1996) in the implementation of the Rational Drug Use Training Project.

The province has become accustomed to projects being funded by Health Systems Trust. Funds, hardware or training offered by HST are readily accepted, and a common response to a problem or shortage of money has been to ask Health Systems Trust to provide sponsorship. HST is however, often the only source of such funds in this under-

resourced province, and as a non-governmental organisation, dispenses with much of the bureaucracy involved in requesting a provincial post or funding. This may lead to problems of dependency, and also to problems in sustaining a project. If the funding for a venture remains external, and never falls within the responsibility of the health structure, then the venture will cease when the funding is cut. The provincial Department of Health has been reluctant to provide any financial input toward the training of its staff by the Rational Drug Use Training Project. The project still runs from HST funding.

2. Study structure:

a) Site selection:

Once the workshop had been designed and the tools for measuring this intervention completed, a site for implementation had to be chosen. Ideally the site, a health district, should have been selected randomly from the district of a province in which the Rational Drug Use Training Project was developed, either KwaZulu-Natal or the Western Cape.

There were a number of problems in finding such a district site. There was little enthusiasm for a Western Cape district to act as the initial site. As well as the district boundaries not being fully established, the essential drug committee was involved in gathering a set of baseline drug use data from a wide selection of districts in the province, as part of a national process examining drug management. Training in rational drug use was not on their agenda in November 1996.

The project had been presented to the community and staff of the Mitchell's Plain district, then the pilot health district of the Western Cape, a few months earlier and the concept received with enthusiasm. Community members wished to discuss the ideas in a wider community forum, but by the time the Rational Drug Use Training Project was ready for implementation, nothing had been heard from them.

Because of the lack of support and structure in the Western Cape, a district in KwaZulu-Natal was selected. This was not chosen randomly, but selected because of its involvement with both the District Team Problem Solving groups and Health Systems Trust's **Initiative for Sub-District Support** (ISDS). The Initiative for Sub-District Support is a new collaborative venture of the Department of Health and Health Systems Trust. The initiative provides support for the implementation of the district health system in previously under-resourced areas. The focus is at district management level, to improve the delivery of health care as a service through co-ordinated and sustained management teams.

Politically these were "ready-made" openings into the district. Structurally, due to input by these processes, the area was more likely to approximate an ideal district system and therefore would be the best to show how the Rational Drug Prescribing Training programme may benefit primary health care prescribers. The chosen district, Underberg, was part of the Kilmun District Team Problem Solving (DTPS) group, which had participated in the focus group discussions, and the Impendle/Underberg/Pholela Initiative for Sub-District Support site. It fell into Region B of KwaZulu-Natal.

With the involvement of David Harrison, then executive director of Health Systems Trust and the driving force behind the development of the ISDS, Dr Nyembezi, the regional director of Region B, was approached. The Rational Drug Use Training Project objectives were explained and ideas for initial implementation in randomly selected facilities of one district discussed. Dr Nyembezi was enthusiastic about the project, but was not content with only one district being involved. Although offers were made for other districts of Region B to receive training as soon as the project had completed the Underberg training, it was decided that no one district should be taught in isolation. Together with the regional training co-ordinators, the three sites were chosen for the Rational Drug Use Training Project. The Rational Drug Use Training Project were not party to the selection of these facilities and were not given the criteria used for the choice.

Imbalenhle, East Street and Underberg are relatively well resourced facilities, with access to pharmacists and doctors. Imbalenhle and East Street are peri-urban. They do not necessarily reflect the site or staff complement of an average KwaZulu-Natal primary health care facility. A scientific approach to selection and randomisation of the facilities was impossible in the prevailing political climate.

b) Data collection:

When indicators were collected at these three facilities in December 1996 and March 1997, the patients were interviewed as they left the clinic. Patients were not asked which prescriber they had seen and may have consulted with either medical or nursing staff. Although the trainers were asked to train all the prescribing personnel at their facilities, none presented the workshop to the doctors. There is a marked division perceived between nursing and medical training activities. The effect of training on prescribing practices may have been diluted in the data collected in March 1997, as the medical staff did not receive the rational drug use training.

Although the second data set was collected by the trainers alone, the staff of the Rational Drug Use Training Project had been present in a supervisory capacity during the collection of the first set of data. Having people who are obviously not from the community collecting prescriptions may have increased the prescriber's awareness of their prescribing. This would have resulted in a more favourable prescribing pattern in the first data set than would usually be the case.

The indicator collection forms are as standardised as possible, but there is room for subjective differences to dominate in two of the prescribing indicators: 1) whether the prescription conforms with the standard treatment guideline for the stated diagnosis, and 2) the adequacy of the patient's knowledge on the medications dispensed. The first of these was validated during collation by the Rational Drug Use Training Project staff, as both the diagnosis and prescription are given. The quality of patient understanding cannot be verified after the data is collected. The only other indicator which cannot be checked at a later date is the labelling of dispensed medications.

c) Timing of training:

Another assumption of the Rational Drug Use Training Project staff was that the trainers would have time within the working week to train their facility's staff. The Rational Drug Use Training Project staff had been assured by the selected trainers that this would be possible. However both the East Street and Imbalenhle trainers (who had never previously been trained to teach) discovered that they had difficulty in fitting the training into their workload. The Underberg trainer, who previously was a nurse trainer, did not have any problems with the task.

Three months may have been too short for these staff to implement the training fully, particularly as this time fell over the Christmas period, when many staff were on leave. These trainers may have found the expectations of them, and the responsibility for training, along with their other duties, to be too great. In future, the recommendation must be made that selected trainers are fully trained as trainers before they participate in the Rational Drug Use Training Project.

3. Study staffing:

a) The trainers:

(1) Selection of the trainers:

The Rational Drug Use Training Project developed as a train-the-trainers programme. A project that relies on a cascade approach to dissemination requires the trainers to be fully able to teach, and preferably dedicated to the task. The clinical workload of the primary care prescribers at whom rational drug use training was aimed was too large to allow them to act as trainers. It was assumed that district trainers would be available, and that these people would be solely involved in training. These trainers would be the same people that disseminate other training, such as the sexually transmitted disease protocols and family planning information. They would be taught to teach in rational drug use as well.

The eight trainers selected for the Rational Drug Use Training Project by the regional office of Region B were not all dedicated trainers. There was no district or community involvement in their selection. Despite specifying that the people attending the train-the-trainers workshop should be trainers, to allow dissemination of the programme, five of the staff had had no prior training experience. They were nursing sisters and expected to share the clinical and managerial load of their facility. A two-day workshop may have been too brief to give these staff the skills needed to train it themselves. Three had been trained to be nurse trainers, although the training sister from Underberg was not working as such and held a clinical position. The other two nurse trainers were from the provincial Department of Health and not linked to any facility or district. They were asked to provide support to the trainers at the other two facilities, Imbalenhle and East Street.

(2) Loss of trainers:

There was a high attrition rate of the training staff. Two of the three nurse trainers left their posts within a month of the second data collection. They moved on to work in the regional and provincial health offices. The five nursing sisters who remained in their clinical posts did not wish to continue to be trainers. If the cascade approach to disseminating and sustaining training is to be successful, this rapid loss of training staff will have to be dealt with. Similarly, staff trained by the trainers may also have moved on, before the second

data set was collected. This is a problem experienced in other train-the-trainer programmes[44].

Another system, such as self-driven distance learning, through workbooks and manuals, as used by the Perinatal Education Programme[86], appears to be a more sustainable option at present. However, at the original focus group discussions the importance of on-site, visible training in previously neglected facilities was emphasised. The train-the trainers approach will continue to be the method adopted by the Rational Drug Use Training Project. When district trainers are appointed, who are dedicated to the task of disseminating information to the districts facilities, as has been discussed and planned by many health districts across the country, this problem may fall away. A number of health districts have begun to appoint district training co-ordinators. From 1998 onwards a cascade approach will fit more easily within the district structure.

b) Clinic prescribing staff:

(1) Implementation and acceptance of continuing medical education:

Some health facilities have time set aside for staff training. Often this is neglected, or clinical and managerial work interfere. Continuing medical education is not a high priority for the nurse prescribers, particularly in the areas of drug use, or stock control, as these do not fall within their role as nurses. Reasons for this low priority are multiple. The most common reason given for not giving or attending training, or not using resources, is that they do not have enough time. A review of patient time schedules by Sister Lindiwe Zuma, from the Impendle district of Region B, shows that although the clinics are busy in the mornings, they quieten after lunchtime and the hours from 3pm onwards are usually quiet. There should be time available for teaching purposes.

Even in those clinics where resources such as texts and treatment guidelines are available, they are rarely used. When working through the clinical cases in modules one and two of the Rational Drug Use Training Project's workshop, staff must be continually reminded to look for answers. Staff, perhaps being unsure of their own clinical skills, feel that the patients would look upon them as poor clinicians should they use a text during a consultation. A change in attitude is needed. Trap and Lessing in the Essential Drugs Monitor number 21 (1996) note, "If the Reverend can open the Bible many times daily without losing credibility so can we open the Essential Drugs List many times daily"[87]. This applies to all references. Patients need to be educated to understand that it is in their interests to have their drug or dosing information checked. This education is best done by the staff prescribing for them.

(2) Disempowerment of nursing staff:

Possibly a bigger problem is the poor motivation and morale of clinic staff. They have few incentives to take on any extra work or show initiative in training. With the implementation of the Essential Drugs Programme their role as primary care givers has increased. They have not received any financial benefit commensurate with this increase in responsibility. Their legal status as prescribers is questionable. Very few of the prescribing staff have provincial or national permission to prescribe. Legal cover is supposed to come from the district authorities but this appears undefined and nebulous, and many staff are not informed about it.

They receive little support from medical or pharmacy staff in their region. Doctors in particular are considered unapproachable as they are frequently impolite when a nurse asks a question or queries a prescription. The part-time medical staff use different, or no, standard treatment guidelines. The South African Standard Treatment Guidelines and Essential Drug List[70] is considered to be for nurse prescribers only. District hospital pharmacists are frequently unreceptive to clinic stock management problems. Hospital drug supply always takes precedence over clinic needs.

The original eight trainers were asked to train all the prescribing staff at their facilities. They did not train any non-nurse prescribers. This stems from the indifference of the medical staff to nursing requirements. The health hierarchy is firmly entrenched. Nursing staff find it difficult to approach doctors. Most doctors and pharmacists do not see their role as including nurse training and support. The majority of doctors, many of whom only work for the public sector on a part-time sessional basis, and pharmacists who were invited to attend rational drug use training were too busy to attend. The concept of a district team, with all disciplines working together, essential in achieving a functional district health system, is far from being achieved.

(3) Clinical skills:

The Rational Drug Use Training Project trains in drug use skills. These assume the diagnosis has already been made. Repeated problems arise during the training as the prescribing staff lack diagnostic and clinical skills. One sister, who ran a primary health care unit, could not diagnose a typical wheeze. Many nursing staff did not diagnose nor even query meningitis in Case 3, discussed in the workshop: *a 6 month old boy from a children's home is brought to you by his carer. He has been irritable for 2 days and has not wanted to eat. He started vomiting this morning. On examination you find he has a stiff*

neck and a few red spots on his skin (see Appendix 1). Diagnoses have been made of chicken pox or multiple insect bites, and the child sent home.

The drug use indicators collected by the Rational Drug Use Training Project do not assess clinical skills. The level of clinical competence or incompetence at primary care prescriber level has not been quantified. Staff vary widely in their abilities.

It is essential that clinic staff, who see many patients daily, are competent, yet they are not receiving the in-service training needed. Very few can be released to attend six or twelve month primary health care courses organised by the Democratic Nursing Organisation of South Africa (DEMOSA). There is a provincial team in KwaZulu-Natal developing a number of clinical modules, including diagnostic skills and basic pharmacology, which would be taught over a year as in-service training. At the end of this time staff would be qualified to diagnose and prescribe. The South African Drug Action Programme will also be addressing these issues.

Occasionally even more basic skills can be lacking. Staff have difficulty with the mathematics needed for simple formulae used in the stock management module for calculate monthly drug consumption. Others do not know how to use the index of a book.

Adequate in-service training will not be in place for a number of years. District trainer posts may be created and filled slightly sooner. In the meantime staff must be encouraged to accept whatever training is available. They must learn to use resources optimally, which will require encouragement to ask questions and to use texts, treatment guidelines and e-mail facilities where available. This encouragement needs not only to come from outside the district, from sources like the Rational Drug Use Training Project, but from staff within their district. The various disciplines of the district teams must pull together and work as a whole.

4. Equipment and resources

a) Training facilities:

Primary health care facilities are often small. In few is there space to hold a training session comfortably. The initial train-the-trainers workshop was held in a small room of about 3 x 4 metres, usually used as a tea-room. There were no tables, and the proceedings were interrupted regularly by staff using lockers and the kettle. At other clinics the electricity was cut intermittently so the overhead projector could not be used

and lighting was poor. These problems can make the sessions physically stressful, and are disruptive to the concentration of the participants.

b) Reference resources:

Material resources are often lacking. Although the trainers had each been given the reference texts for the Rational Drug Use Training Project workshop, these were often the only source of unbiased treatment guideline and drug information for the whole facility at which they were training. Due to the financial limitations of the project, texts could not be supplied to all of the prescribing staff. This function should fall within the role of a district trainer. Regional and Provincial Departments of Health need to be made aware that this lack of information is adversely affecting patient well-being.

c) Stock and dispensing equipment:

At all of the facilities visited by the Rational Drug Use Training Project there have been problems with stock supply. Clinics frequently do not receive stock ordered, or receive the wrong quantity. At times the equipment necessary for dispensing safely, such as tablet counters or measuring cylinders, are missing. Some stock is supplied in bulk and needs to be packaged by nursing staff into patient-ready packs. However the plastic packets or small bottles needed for this are not supplied. Similarly, labels are either in short supply, too small to fill in patient and dosing details or so large the name and expiry date of the medicine are hidden.

Training in correct stock management and dispensing skills is undermined when the infrastructure to support correct practice is not available.

B. Achievements of the study:

1. Improvement of Rational Drug Use:

a) Identification of problems:

The Rational Drug Use Training Project has shown that rational drug use information, using a train-the-trainers approach, with a problem-based workshop as an intervention, quantitatively improves drug use, as described by the prescribing, dispensing and stock management drug use indicators. Importantly, the project had advantages beyond the immediate study results reflected by these indicators.

There were a number of structural, staffing and resource difficulties which future train-the-trainer studies will have to address. Political difficulties will also have to considered early in the planning phases. None of these hurdles will be easy to overcome, and will require persistence on the part of the study staff. Support of personnel at provincial, regional and district levels of the health hierarchy is essential. They need to be made aware of the advantage of sensible study structures, that produce reproducible results. True commitment at all levels of the health structure, from the department of health, through academic institutions to district health teams, is essential for any in-service training programme to be successful and sustainable in the present South African context. Without this support any project will fail.

The problems faced here are likely to be similar to those faced by health personnel working in similar fields in other developing countries. These obstacles may explain why 39% of studies in developing countries pertaining to rational drug use are unable to meet the INRUD/WHO criteria for adequate study design[14]. It would be more useful to analyse the reasons why these studies fell short of these criteria, with the hope of overcoming the problems in the future, than to exclude them from review.

b) Awareness and empowerment of staff:

The training received by the staff created an awareness of the problems they have regarding rational drug use. They learn that certain practices, such as dispensing an unreconstituted antibiotic or unlabelled medications, can compromise the safety of their patients. They learn the reasons behind the selection of drugs for the essential drugs list,

the importance of using treatment guidelines and why generic prescribing is preferred. They discover why polypharmacy may be dangerous, and how to use available resources to check the safety of drug combinations. The qualitative feedback received is always positive, particularly with regard to training content and the use of the information and principles in their own clinical practice.

The structure of the study allows primary care staff to address these issues themselves. Staff are encouraged to take control of their situation. They must establish who in the district team is responsible for any particular problem and to be proactive in their approach to the solution. The use of the drug use indicators identifies areas in the prescribing and dispensing process where problems are occurring. These indicators can be collected by the primary health care staff themselves and solutions are often achievable within the facility. To improve prescription writing, or labelling of medications does not need regional or even district input. Staff can take ownership of the measuring and improvement of their own prescribing practices.

Many examples of this ownership have been seen. In two of the Region B clinics in KwaZulu-Natal the staff initiated a stock management system within days of participating in the Rational Drug Use Training Project. Another three groups have looked at the problem of over-prescription of cough mixtures, and asked their district or regional pharmacist to stop supplying these drugs. Although primary health care staff have little incentive to take on these added roles, once empowered to do so they can be a driving force to improve health care by the district health team.

2. The Primary Care Medicines Resource Centre

The lack of unbiased information resources in the public health primary care sector has been obvious throughout. This was one of the major needs identified during the focus group discussions at the beginning of the project and the need was re-emphasised at each facility where training took place. This resulted in a proposal from the Rational Drug Use Training Project staff to Health Systems Trust in early 1997 for the development of a medicines resource centre to address this need. This centre would be an administrative and information support base for the existing Rational Drug Use Training Project.

By February 1997 a small centre staffed by one of the Rational Drug Use Training Project staff had been established in the Department of Pharmacy at the University of Durban-Westville (UDW). Resources available include up-to-date computer equipment with word-processing facilities, electronic mail and internet access. Medline and the Micromedix and Drugdex databases are accessible.

The centre acts as an information resource for primary health care staff. This is primarily done proactively, though collection and dissemination of primary care guidelines and relevant drug information to primary care facilities by e-mail and telephone. Regular drug bulletins and sponsored continuing medical education meetings are planned.

The centre also answers drug and primary health related queries. Technical and clinical support is received from other departments of UDW and the University of Natal medical school. Secondary or tertiary level health care questions are referred to the Medicines Information Centre at the University of Cape Town.

Throughout 1997 the centre has become increasingly busy. Funding for 1998 has been requested from the KwaZulu-Natal provincial Department of Health. Finances from this source would be desirable as the centre needs to achieve independence from funding organisations for sustainability. If the centre falls within the provincial health structure this may be achieved.

3. The Training Manual

The content of the two-day workshop was compiled as a Training Manual in November 1996 (Appendix 2), to be given to each participant. Some of the content is based on the Guide to Good Prescribing[4], particularly the section on the Principles of Prescribing. These principles are reinforced in the manual by a number of clinical examples, adapted to the South African primary care context. Other sections are adapted from the Management Sciences for Health book, Managing Drug Supply[3].

Health System's Trust funded the printing of 500 copies, which are distributed without charge, so as not to infringe copyright. Shortly after printing a demand for these training manuals from health care workers in other provinces was noted. The manuals had been designed to complement the Rational Drug Use Training Project workshop. A decision was taken that they should not stand alone, but rather remain part of the Rational Drug Use Training Project package. Although as many as 200 primary health care staff have participated in the workshop since the inception of the project, all 500 copies have been distributed. The production of this manual seemed to give the project much more credibility as a training programme with both primary care and Department of Health staff. Demand for training in rational drug use increased as these manuals were disseminated.

In January 1998 a second edition of the Training Manual will be produced. The basic content will be similar, but the layout will take the form of a self-learning workbook, allowing staff to work through the principles of prescribing and dispensing themselves.

4. Success as a collaborative programme

The Rational Drug Use Training Project has required staff from different provinces, varying sectors of the public health care system and non-government organisations to work together with a similar purpose. The project is a successful example of an effort which has linked two academic units, the Department of Pharmacy at the University of Durban-Westville (UDW) and the Department of Pharmacology at the University of Cape Town (UCT). The staff team comes from both institutions, and the medicines information centres at both (the Primary Care Medicines Resource Centre and the Medicines Information Centre) are fully collaborative.

The Rational Drug Use Training Project staff have different backgrounds. Ms. Aarti Kishuna is a pharmacist and Dr. Catherine Orrell is a medical doctor. Without the integration of these two disciplines the development of the training project would not have been possible. The clinician missing from the rational drug use team is the nurse practitioner. The Rational Drug Use Training Project staff have worked successfully with a number of nurse prescribers both as trainers and participants of the programme. As the programme expands a nurse practitioner will be recruited as a trainer. District prescribers and pharmacists need to learn to work together in a similar team. The differing experiences of each of the team members are mutually beneficial.

The project is also an example of how knowledge and technology from tertiary institutions and academic units can be utilised in a primary health care setting. Through the medium of the Rational Drug Use Training Project staff and the Primary Care Medicines Resource Centre, supported by HealthLink, a connection is made between the queries and problems experienced by staff in primary health care facilities and the tertiary resources that might provide the answers.

In many ways the Rational Drug Use Training Project has been successful, despite the difficulties faced during development and the initial study described here. The demand for training has increased throughout 1997, and training has occurred in a number of different provinces. The importance of any such training being consistent in with provincial, regional and district training plans cannot be emphasised enough.

Chapter six: Since March 1997 and the future.

This chapter will:

1. discuss the progress of the Rational Drug Use Training Project since March 1997.
2. set out the proposed structure for 1998, and describe specifications set by the Rational Drug Use Training Project before training will be commenced in any district.
3. look at recommendations for the future of any similar training during the development of the district health system.
4. conclude with a review of the objectives achieved by this study and the Rational Drug Use Training Project.

A. Interventions from March to October 1997:

This study described here represents the beginning of the Rational Drug Use Training Project. Since the second set of data was collected in March 1997, the project has been invited to train in a number of districts. Training can be divided into districts that are linked to Health Systems Trust's Initiative for Sub-District Support, and those where the invitation has come from the districts or regions themselves.

1. Initiative for Sub-District Support sites:

Each Initiative for Sub-District Support site has a facilitator, who works closely with the district management team in the implementation of the district health system. If drug use is noted to be problem by this team then the Rational Drug Use Training Project, as an Initiative for Sub-District Support resource, is called upon to work with the district team in addressing the issues identified. The project has been invited to four of the Initiative for Sub-District Support sites (ISDS) so far:

- the Kakamas district (May and August 1997),
- the Impendle/Underberg/Pholela (IUP) district of Region B, KwaZulu-Natal (June and August 1997),
- the Kalahari region of the Northern Cape (August 1997), and
- the Tonga/Shongwe districts of Mpumalanga (September 1997).

In these sites full implementation of the project has occurred. The workshop is presented to district staff, who are then expected to take the process forward. These staff have largely been nurse prescribers, but most groups have included pharmacists and district health staff. Drug use indicators have been collected in the Kalahari, Kakamas and IUP sites so far. This data is their baseline collection before facility training. Plans for this dissemination are made by the Rational Drug Use Training Project staff together with the district staff during the initial workshop.

Staff in all districts have been willing to introduce a stock card system. Many began the system spontaneously after attending the workshop, before stock cards were delivered. The stock card system at Kakamas clinic was the first successful stock management system completed. Primary health care staff have also agreed to adopt generic prescribing, and to continue to utilise available treatment guidelines and resources in attaining the goal of rational prescribing. After each session a report is written listing the problems noted in rational drug use in that district and the plans are made to address these issues (see Appendix 4: Reports from Initiative for Sub-District Support sites).

In all the ISDS sites there has been the advantage of having a facilitator already involved at management level, who is on-site for a large amount of the time, and who has identified rational drug use as an area of importance for development and training. They have been able to identify people within the district to take on the role of drugs co-ordinator, to take responsibility for driving the rational drug use process. This greatly helps with the sustainability of interventions initiated by the Rational Drug Use Training Project.

2. Other sites:

a) Western Cape:

During attempts to find support to implement the whole project in the Western Cape, the training workshop has been presented a number of times as a training course alone, in the Mitchell's Plain district of the Western Cape, to two groups of prescribing nurses from the Western Cape Regional Services Council, and to another two groups of prescribing staff from the Day Hospital Services. These workshops were not held on-site and there seemed to be a great deal of difficulty in releasing nursing staff from their clinical duties to attend them.

In May 1997 a full workshop was held with a group of 6 staff from the Mitchell's Plain Day Hospital. Three nursing staff, one of whom was a nurse trainer, two doctors and a pharmacist attended. A number of plans were made with the group, including:

- the collection of drug use indicators by medical students who visit the day hospital as part of their community health training,
- the training of other prescribing staff in the principles of rational drug use, by one of the doctors who participated in the Rational Drug Use Training Project workshop, during their weekly continuing education meeting, and
- ideas for improving the overload on their pharmacy staff by identifying the 10 commonest drugs prescribed and giving each prescriber a small supply of these items for immediate dispensing.

b) KwaZulu-Natal:

In KwaZulu-Natal requests for training are frequently received by the staff of the Rational Drug Use Training Project, though the Primary Care Medicines Resource Centre. Other than the initial training in Region B, continued through involvement in the Impendle/Underberg/Pholela ISDS site, training has been begun in the following regions:

- Region F, at Kwadabeka clinic (July 1997),
- Region A, at Gamalake clinic (July 1997),
- Region G, at Clinic number five, Madedane (October 1997), and
- Region H, at Hlabisa District municipal offices (October 1997).

In these non-ISDS sites, the structure of the project has remained similar. Sustaining the intervention has been more difficult as there is frequently nobody in the district team in charge of drug use or taking responsibility for in-service training. Plans, however, have been made by all the groups to take the rational drug use process forward (see Appendix 5: Reports from non-ISDS sites).

In August 1997 three nurse trainers who were present at the Rational Drug Use Training Project workshop at Gamalake presented the workshop in its entirety, using the Trainer's Folder, to all the other staff in the area. They collected a set of drug use indicators beforehand as well. Post intervention data is not yet available. The only other people who have shown initiative in taking the project forward, without supervision, are three of the few doctors who attended these workshops, one from Kwadabeka clinic, one from Hlabisa and one from Mitchell's Plain. It is rare that nursing staff volunteer to lead further training.

The Rational Drug Use Training Project has been much in demand in 1997. A large number of workshops have been held and plans for the future of rational drug use made. Undoubtedly some of these plans will come to fruition, but many will not. The Rational Drug Use Training Project staff, at present capacity, cannot sustain interventions in all the districts where they have been initiated. Both time and staff numbers are limited.

Those districts which seem to have been most successful in sustaining the process are those with staff in a supervisory capacity who are dedicated to the tasks of implementing in-service training programmes and improving drug use. To ensure the efforts of the Rational Drug Use Training Project staff achieve the greatest benefit a set of requirements has been developed. The district management teams must ensure that these are met before rational drug use training begins.

B. Specifications for district implementation of the Rational Drug Use Training Project.

1. Structure during 1997:

During 1997 each district that requested rational drug use input was asked to provide a venue, within a health care facility. All the district trainers should attend the session. Another specification was that the workshops include only ten to twelve participants. These requirements were given verbally to the district person who would be co-ordinating the programmes. No requests for training were refused.

The requirements of the Rational Drug Use Training Project staff have not always been met. A few sessions have had no trainers attending, as they either had not been appointed or were busy elsewhere. These sessions developed similar problems to those encountered during the initial study described. Once the staff of the Rational Drug Use Training Project left the district, the process of developing rational drug use stops as there is no-one to take the responsibility of supervising the ongoing process.

Some workshops have been held outside of a health care facility. This hampers the teaching as there are no clinic cards to draw on for prescribing examples and no dispensary to practically orient the training. In each place there has been many more than twelve participants. In Mpumalanga twenty-nine people attended one session. Although reflecting the huge demand for input, such large sessions do not achieve the level of concentration and active participation needed for the workshop to be successful.

For 1998 the plan for implementing rational drug use in districts needed to be modified. Staff of the Rational Drug Use Training Project cannot continue to train in every district that requests training. Both staff have other commitments, to the Primary Care Medicines Resource Centre as well as to their academic departments. This limits the time available for travelling. It is also not efficient to persist in training in districts that do not have the will, means or staff to make the changes needed to disseminate the project further.

2. Plans for 1998:

The plan for implementation of the Rational Drug Use Training Project needs to be more structured. District staff need to be made aware of exactly what the project offers and what commitments must be made from their side before implementation will occur.

a) Capacity of the Rational Drug Use Training Project

Presently the Rational Drug Use Training Project offers to:

- help identify existing gaps in prescribing, dispensing and stock management practices at primary health care facilities through the collection of drug use indicators.
- assist in the prioritisation of training needs identified by the collection of the drug use indicators.
- train a two day practical modular in-service training programme to district trainers or drug co-ordinators to improve their capacity to promote and support all aspects of rational drug use. The trainers can then conduct similar workshops throughout the district.
- facilitate in the implementation of the essential drugs programme at district level by encouraging the use of treatment guidelines and generic prescribing.
- provide ongoing support for rational drug use through supervision of projects implemented and through the resource centres (the Primary Care Medicines Resource Centre and the Medicines Information Centre) linked to the programme.

In 1998 the Rational Drug Use Training Project is hoping to increase its staff to include a nurse prescriber, who will assist both in the work of the Primary Care Medicines Resource Centre and with the training. Until this time, plans for the future must take the resources that are presently available into account. Requests for training in a district will be screened and the personnel involved provided with a list of requirements for training.

b) District training criteria

The district will be required to meet certain criteria before the Rational Drug Use Training Project will begin training in that district:

(1) In house planning undertaken by the district team before the training:

Ideally the **district team** should be a functioning managerial unit. They need to identify and reach consensus on their needs regarding supply, management and rational use of drugs. Improving drug use in their district should be a high priority issue. Both management and health care workers must express commitment to improving rational drug use.

The Rational Drug Use Training Project needs to have been introduced to this team and the relevant **provincial staff** (regional and provincial pharmacists and regional health director) informed of the intention to train in rational drug use before the training commences. At this initial stage the strategy for the implementation must be outlined. This will include:

- an assessment of the district's present drug use problems,
- the proposed method of intervention,
- the intended results or outcomes provided by the intervention (measured by collection of drug use indicators and systems review), and
- plans for ongoing support in rational drug use. This support must be identified from either local resources or those provided by the Rational Drug Use Training Project.

(2) Staffing:

Each district needs at least a designated **district drug co-ordinator** (responsible for drug management and rational use of drugs) and a **primary health care trainer**. These staff will attend the Rational Drug Use Training Project workshop which will train them to teach a workshop on the rational use of drugs in turn. They will learn how to co-ordinate the collection and collation of drug use indicators to monitor prescribing practices within their district.

This training will take place in a health facility at one of the Initiative for Sub-District Support (ISDS) sites. It may involve staff in similar roles from a number of districts. This will decrease the number of workshops that need to be held by the actual Rational Drug Use Training Project staff. After this training the district training staff will present the workshop at health care facilities in their district. One of the Rational Drug Use Training Project staff will attend the first of these workshops in each district.

(3) Other commitments:

Before training commences the district team must be committed to implementing a number of systems such as generic prescribing, a clinic stock card system, regular collection and collation of drug use indicators, and the use of national (or other) standard treatment guidelines. They must be prepared to sustain these systems.

Support will be provided in some areas by the Rational Drug Use Training Project, including:

- review of stock management systems,
- evaluation of workshops in rational drug use facilitated by the district trainers,
- critical evaluation of data collected, and
- provision of unbiased drug information resources and support.

Results of all drug use indicator collections should be sent to the Rational Drug Use Training Project.

If these criteria are met, the Rational Drug Use Training Project will be able to expand into a supervisory and supportive role. As training of initial workshops will be limited to two dedicated staff from each district, who each have the responsibility to maintain rational drug use principles, staff from four to six districts can be trained together. Workshop numbers will therefore be limited, and remain within the capacity of the present Rational Drug Use Training Project staff. The train-the-trainers workshop can then be expanded to include a module on training methods, and to include a longer, more practical session on collection of the drug use indicators.

(4) Intermediate plan:

Presently few sites other than the districts supported by the Initiative for Sub-District Support will be able to meet all these criteria. However, the ISDS is a joint Department of Health and Health Systems Trust project and these sites act as models, or pilot sites for the national district health system. In time, non-ISDS sites will follow a similar pattern, and dedicate similar staff.

An intermediate plan for training in rational drug use is being formulated. The training manual (Appendix 2) is going to be modified into a workbook that can be used as a self-learning distance teaching programme. Support will come from the Primary Care Medicines Resource Centre. This training is less intensive and has no time pressure. Rational Drug Use Training Project staff will not need to be on-site for this teaching and can continue to train in sites with the specified district staff.

C. Recommendations for the future of district in-service training

The public health service will continue to be staffed by people whose undergraduate training has not fully equipped them for their role as prescribers. These staff must be brought up to the standard of clinical competency necessary to serve the population safely until new graduates with appropriate skills can support them. Standards of competency will be set by the Democratic Nursing Organisation of South Africa (DEMOSA) and the Department of Health. How will the large numbers of prescribers of varying ability reach this standard?

1. Sustainability through district trainers:

District systems need to include a structure for providing staff with continuing medical education. It is not feasible, through expense, staff shortage and inconvenience, to move people to other regions or provinces for protracted training. There are a number of means of providing training within the district.

1. Distance teaching self-learning programmes, such as the Perinatal Education Programme[86], could be introduced to groups at each health facility.
2. On-site training could be provided through a train-the-trainers cascade approach, such as the Rational Drug Use Training Project and the KwaZulu-Natal sexually transmitted diseases education team[46] use.
3. Experts from the provincial or regional tertiary institutions could be invited to provide district-based teaching.

It is difficult to maintain this training from outside a district. All methods would benefit from a system of supervision and co-ordination. Although in-service training is seen to be important, this supervision is lacking at district and clinic level. **Dedicated district-based primary health care trainers** are essential for the implementation and maintenance of district in-service training.

District trainers need to be motivated for and employed at district level. The trainers cannot be fixed at any particular health facility. They need to be flexible and mobile within the district. This allows them to develop a good working relationship both with the health care workers and the communities in which they work.

Apart from training, the trainers need to assess, monitor and supervise any in-service training in the district and should be equipped with the necessary skills and tools, such as drug use indicators, to do so. They must be granted the authority to provide in-service training to all levels of primary care staff, including doctors, when it is needed. They would have to work closely with health facility supervisors (medical superintendents or sisters-in-charge) to prioritise training needs and identify staff requiring particular training.

True commitment to this process, however, must come from all levels of the health system, i.e. district, regional and provincial.

2. Clinical Training:

Prescribing training is not the only training need in the districts. Mathematical skills, basic pharmacology and clinical knowledge often appear inadequate too. In a few of the districts it was noted that the nurses, perhaps unsure of their diagnostic skills, did not examine their patients, preferring to rely on the history.

Ideally, a structured in-service course in primary care medicine, pharmacology and clinical skills should be available to all prescribing staff. This could be presented though any of the methods described above. Rational drug prescribing training should be one of a number of modules. Staff would be accredited with each module as they complete it, and receive clinical and prescribing qualifications on completion of them all.

3. Access to Information:

a) Standard Treatment Guidelines:

National and provincial treatment guidelines and primary health care medicines lists are poorly disseminated and are unavailable in most primary health care facilities. Often the Rational Drug Use Training Project provided the first exposure of primary health care staff to the essential drug list, introduced in April 1996, that was meant for their use. Input to these facilities from the national essential drugs campaign needs to be reviewed. The introduction of the second edition of the South African National Standard Treatment Guidelines and Essential Drugs List for Primary Health Care[70] would be an ideal opportunity for this.

b) Other references:

Nursing staff need to be encouraged to use available resources e.g. reference texts and e-mail. Training in the use of books and some basic mathematical teaching should accompany all in-service training until these habits are entrenched. HealthLink provides training in the use of the e-mail, but staff still express uncertainty about the use of their computer. If possible all in-service training should support the use of e-mail for those facilities where it is available.

Supply of relevant materials should be a responsibility of the district trainers.

c) The Primary Care Medicines Resource Centre:

Staff in primary health care in every province should have ready access to a centre such as the Primary Care Medicines Resource Centre. This centre could play a key role in co-ordinating provincial in-service training, as well as in the dissemination of new or revised treatment guidelines and safe drug information to primary care facilities. It should also act as a service for answering drug queries. Staff in primary care facilities often cannot call outside their province and need the information to be available locally.

Such a centre requires a minimum of funding and space. If placed in a university or other tertiary academic environment the resources required will already be available. While the centre is being established it can be staffed by one person quite adequately, preferably by someone involved in drug use i.e. either a pharmacist or a prescriber.

If each province created such centre they could be linked together and to their district training staff, to form a country-wide network in support of the shift to primary health care medicine happening in South Africa.

4. Management systems:

In few of the districts visited, that had not had Initiative for Sub-District Support input, was there an effective drug management system. The people responsible for clinic drug supply were often hard to identify. Clinic dispensaries run unsupervised for months at a time, and none had an effective method of monitoring stock. These problems need to be addressed by the district for all clinics in a co-ordinate manner. Particular **drug co-ordinating staff** need to be employed and made responsible for the regular and safe ordering and supply of drugs to district facilities. Primary health care staff cannot be expected to apply the

principles of rational drug use if not supported by a functioning stock management system.

D. In conclusion:

Most of the objectives of Rational Drug Use Training Project and this study have been met. The project has developed and implemented a system for training prescribers in the rational use of drugs on-site in a district framework. The work supports national drug policy and the essential drugs programme. The results of the training are measurable, both quantitatively and qualitatively. The project utilises all available resources, including HealthLink, primary care district staff and tertiary information centres. Emphasis is placed on building capacity within districts, by promoting a district trainer system, encouraging prescribing and dispensing staff to take responsibility for their own learning and monitoring of their prescribing practices. Problems and achievements of the process have been discussed and a plan for the future has been formulated.

Some important lessons have been learnt. Firstly, Local and national politics can impact detrimentally on the development and training of programmes. Studies cannot be scientifically sound if they are restricted by local political influence. Despite government involvement in the initiation of this project, and repeated efforts to canvas and recruit all interested parties, this initiative met with resistance throughout. Little direct comment on the reasons behind this have been received. The timing of the study may have been poor, as the Department of Health is only beginning with its training plans at present. Criticism has been received about the origins of the training staff, the small sample size of the study and the lack of a control, with little cognisance taken of its achievements. It is concerning that attempts to contribute to the future of South Africa are so repeatedly and negatively criticised.

Secondly, training in one field cannot occur in isolation. Rational drug use training serves little purpose if clinical and diagnostic skills are poor. Similarly, rational prescribing cannot take place without drug supply infrastructure. There has to be full district and regional involvement at all levels of drug use. District health staff have to learn to function as a team.

Without the support, financial, structural and otherwise, of Health Systems Trust and Initiative for Sub-District Support, the Rational Drug Use Training Project would have failed. As it is, it is a successful example of multi-disciplinary and institutional collaboration, that has shown benefit in its initial phases by improving the prescribing practices of primary health care staff in a small study. Rational drug use training is only one of a number of essential elements of in-service training urgently needed by these staff, but the problems met and achievements made during the development of this on-

site, train-the-trainers programme should help to develop and support the primary health care oriented district health system, so urgently needed by the South African population.

Thesis references

1. WHO technical report series: The use of essential drugs. 6th report of the WHO expert committee, no.850, WHO, Geneva, 1995

2. Avorn J, Soumerai SB. Improving drug-therapy decisions through educational outreach *The New England Journal of Medicine*, Vol. 38, No. 24, pp. 1457-1463, June 16, 1983

3. Quick J et al (ed). Managing Drug Supply 2nd edition, Management Sciences for Health, Kumerian Press, USA, 1997

4. Hogerzeil H, Henning R H, de Vries T P, Fresle D. Guide to Good Prescribing:A practical manual WHO, Geneva, 1995

5. Thomas M, Mathai D, Cherian A M, Seshadri M S, Ganesh A, Moses P. Promoting rational drug use in India *World Health Forum,* Vol. 16 (1), pp. 33-35, 1995

6. Spivey P. Training for Prescribers *Africa Health*, pp. 9-12, May 1996

7. UK Medicines Resource Centre Prescribing New Drugs *Essential Drugs Monitor*, No. 19, pp. 15-16, 1995

8. Plenary sessions and proceedings of the first International Conference on Improving the Use of Medicines: state of the art and future direction Chiang Mai, Thailand, April 1997

9. Pugeda M L, Carandang E D. Indicators to assess rational drug use in the Philippines Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

10. Dikasso D, Gobe Z, Mariam S Prescriber's drug use pattern Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

11. Uwaegbute A C, Ene-Obong H N, Onwurah A E. The use of drugs in the management of diarrhoeal disease in rural Nigeria Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

12. Dikshit R K, Desai C K, Desai M K, Shah M H, Shah U H. Treatment of Malaria- how and why in general practice Poster presentation at the International Conference for Improving the Use of Medicines, Thailand, April 1997

13. Dukes G, Folb P. Pharmaceutical policies in Sub-Saharan Africa: what more can be done? Report of the World Bank Africa Technical Department: Population, Health and Nutrition division, December 1993

14. Ross Degnan D, Laing R, Santoso B, Ofori-Adjei D, Diwan V, Lamoureux C, Hogerzeil H. Improving pharmaceutical use in primary care in developing countries: a critical review of experience and lack of experience Prepared for the International Conference on Improving the Use of Medicines, Thailand, April 1997

15. Snell B. Primary Health Care and the Use of Medicines: A background paper for Eritrean middle level health worker trainees Unpublished, Eritrea, 1992

16. Quick J D, Laing R O, Ross-Degnan D G. Intervention research to promote clinically effective and economically efficient use of pharmaceuticals: the International Network for the Rational Use of Drugs *J Clin Epidemiology*, Vol. 44 (Suppl 2), pp. 57S - 67S, 1991

17. Proceeds of the International Conference on National Medicinal Drug Policies The Way Forward *Australian Prescriber*, Vol. 20 (Suppl 1), 1997

18. Bannenberg W. Expected costs of prescriptions in South Africa personal e-mail communication, May 1997

19. Gani L, Tangkilisan A, Pujilestari L. An educational approach to improve management of diarrhoeal disease among public physicians in Jakarta Unpublished report, Applied Diarrhoeal Disease Research project, 1995

20. Zimbabwe Ministry of Health and Child Welfare Essential Drugs List for Zimbabwe, including guidelines for the treatment of medical conditions common in Zimbabwe Zimbabwe Essential Drugs Action Programme, 3rd edition, 1994

21. Mametja D, Moolman J. Making district health care a reality in KwaZulu-Natal, Health Systems Trust, October 1995

22. Written communication between Health Systems Trust and Professor Peter Folb, available from the Department of Pharmacology, UCT, November 1995 to January 1996.

23. The World Bank Better Health in Africa: experience and lessons learnt The World Bank, Washington, 1994

24. National Drug Policy for South Africa Department Of Health, January 1996

25. Trap B, Nathoo K J, Chinyanganya F, Chidarikire A. Indicator studies: a powerful and useful management tool in the monitoring, evaluation and planning of essential drugs

programmes. An analysis and discussion of usefulness form studies carried out in Zimbabwe from 1989 to 1996 Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

26. de Witt K. Criteria for the authorisation of registered nurses under Section 38a of the Nursing Act South African Interim Nursing Council reference Int.356/97, May 1997

27. Bannenberg W. Objective of the South African Drug Action Programme Personal e-mail communication, 22July 1997

28. Folb P, Kishuna A, Orrell C. Proposal for the implementation of a programme for primary care prescribers promoting rational drug use at primary care level in South Africa Department of Pharmacology, UCT, March 1996

29. de Vries TPGM, Henning RH, Hogerzeil HV, Bapna JS, Bero L, Kafle KK, Mabadeje AFB, Santoso B, Smith AJ. Impact of a short course in pharmacotherapy for undergraduate medical students: an international randomised controlled study *The Lancet*, Vol. 346, pp. 1454-1457, December 2, 1995

30. Action Programme on Essential Drugs How to investigate drug use in health facilities: Selected drug use indicators World Health Organisation, Geneva, 1993

31. Ofori-Adjei D, Arhinful D K. Effect of training on the clinical management of malaria by medical assistants in Ghana *Soc Sci Med* Vol. 42, pp. 1169, 1996

32. Chowdhury A K A, Khan O F, Matin M A, Khadiza B, Galib M A. Effect of standard treatment guidelines with or without prescription audit on prescribing for diarrhoea and acute respiratory infection in some government health facilities of Bangladesh Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

33. Hetta O M, Lundstrom K J. Training rural health staff for oral rehydration therapy in southern Sudan *Trop Doct*, Vol. 14, pp. 151-154, 1984

34. Chavez Matamoros A. Impact of a one-day workshop on rational use of benzodiazepines for general practitioners in a Costa Rican health facility Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

35. Jakrawantana W K, Yingsaeree S N, Auttapracha A N. Effect of multiple intervention on cefotaxime use in Lampang provincial hospital Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

36. Hadiyono J P, Suryawati S, Danu S S, Sumatono, Santoso B. Interactional group discussion: results of a controlled trial using a behavioural intervention to reduce the use of injections in public health facilities *Soc Sci Med*, Vol. 42, pg.1185, 1996

37. Hadiyono J E P, Suryawati S, Danu S S, Sumatono, Santoso B. An innovative behavioural intervention to reduce the use of injections in public health facilities Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

38. Angunawela I, Diwan V, Tomson G. Experimental evaluation of the effects of drug information on antibiotic prescribing: a study in outpatient care in an area of Sri Lanka *Int J Epidemiology*, Vol. 20, no. 2, pp. 558-564, 1991

39. Ross-Degnan D, Laing R, Quick J, Ali H M, Ofori-Adjei D, Salako L, Santoso B. A strategy for improved pharmaceutical use: the International Network for the Rational Use of Drugs *Soc Sci Med*, Vol. 35 (11), pp. 1329-1341, December 1992

40. Gitau J N. Drug use studies and the impact of small group in-service training on improving the use of drugs: a case study of three mission hospitals in Kenya Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

41. Thomas M, Cherian A H, Mathai D, Impact of focused workshops on rational use of drugs Poster presentation at the International Conference for Improving the Use of Medicines, Thailand, April 1997

42. Bexel A, Lwando E. Improving drug use through continuing education *J Clin Epidemiology*, Vol. 49, pp. 355-357, 1996

43. Kafuko J M, Zirabumuzaale C, Bagenda D. Rational drug use in rural health units of Uganda: effect of national standard treatment guidelines on rational drug use UNICEF/Uganda, August 1996

44. Wiedenmeyer K, Mtasiwa D, Majapa Z, Lorenz N. The impact of a pilot intervention (standard treatment guidelines, training) on prescribing patterns in Dar Es Salaam Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

45. Wiedenmeyer K. Promotion of Rational Drug Use and Standard treatment Guidelines *INRUD News*, Vol. 7, No.1, March 1997

46. Hoosen P. Syndromic management: operational difficulties Paper presented at the Joint Congress of the Infectious Diseases and Sexually Transmitted Diseases Societies of South Africa, September 1997

47. Hogerzeil H. Promoting Rational Prescribing: an international perspective *Br J Clin Pharm*, Vol. 39, pp. 1-6, 1995

48. Soumerai SB Factors influencing prescribing *Aust J Hospital Pharm*, Vol. 18 (Suppl), No. 3, 1988

49. Lopez Linares R. Efficacy of the educational intervention for rational drug use Presented at the International Conference on Social and Cultural Aspects of Pharmaceuticals, The Netherlands, October 1991

50. Naivalulevu L. Training for rational drug use *ARI News*, Vol. 18, 1990

51. Chowdhury A K A, Khan O F, Matin A, Haque Z, Bhuiya A L. Impact of standard treatment guidelines and small group training on prescribing for diarrhoea in under-five

children in Thana Health Complexes in Bangladesh International Network for the rational Use of Drugs, 1995

52. Santoso B, Suryawati S, Prawitasari J E, Ross-Degnan D. Small group intervention in improving appropriate drug use in acute diarrhoea Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

53. Arhinful D K, Ofori-Adjei D. Evaluation of the client-provider interaction in the distribution of oral contraceptives by private drug outlets in Ghana using the simulated client method Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

54. Sunartono, Darminto, Suryawati S, Prawitasari J, Bimo, Santoso B. Impact evaluation of self-monitoring of drug us indicators in health facilities: experience from Gunungkidul, Indonesia Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

55. Sheline M D. Teach a student to fish: problem-based teaching in medical education *NCMJ*, Vol. 53, No. 2, February 1992

56. Proceedings of The international symposium on problem-based learning The Network of Community-Oriented Educational Institutions for Health Sciences, Durban, September 1996

57. Schmidt H G. Foundations of problem-based learning: some explanatory notes *Medical Education*, Vol. 27, pp. 422-432, 1993

58. Qazi S A, Rehman G N, Khan M A. Standard management of acute respiratory tract infections in a childrens hospital in Pakistan: impact on antibiotic use and case fatality *WHO bulletin*, Vol. 74 (5), pp. 501-507, 1996

59. Chavez Matamoros A, Lee D, Castali C, Fisher M, Rosales O, Bellegarige B. Improved physician compliance with national ARI guidelines following a workshop on ARI and prescribing audits in El Salvador health facilities Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

60. Curtale F, Siwakoti B, Lagrosa C, LaRaja M, Guerra R. Improving skills and utilisation of community health volunteers in Nepal *Soc Sci Med* Vol. 40 (8), pp. 1117-1125, 1995

61. Pandey M R, Daulaire N, Starbuck E, Houston R, McPherson K. Reduction in total under-five mortality in western Nepal through community-based antimicrobial treatment of pneumonia *Lancet*, Vol. 338, pp. 993-997, 1991

62. Roesin R, Suntanto A, Sastra K, Winarti A. ARI intervention study in Kediri, Indonesia: a summary of study results *Bull Int Union Tuberculosis Lung Dis*, Vol. 65, pg. 23, 1990

63. Kafle K K, Pradhan Y M S, Shrestha A D, Karkee S B, Das P L, Shrestha N, Prasad R R. Better primary health care delivery through strengthening the existing supervision/monitoring system Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

64. Chalker J, Phuong N K. Combating the growth of resistance to antibiotics: antibiotic dose as an indicator for rational drug use Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

65. Santoso B, Suryawati S, Saleh-Danu S. A randomised controlled study to evaluate the impact of a short course in pharmacotherapy for undergraduate medical students Poster presentation at the International Conference for Improving the Use of Medicines, Thailand, April 1997

66. Edwards R. Loughborough University Clean Water Project Personal e-mail communication, February 1996

67. Kale R. Health information in the developing world *BMJ*, Vol. 309, pp. 939-942, October 8, 1994

68. Smith R. Meeting the information needs of health workers in developing countries *BMJ*, No. 7074, Vol. 314, editorial, January 11, 1997

69. Donahue S, Möller H. Primary Health Care Formulary Medical University of South Africa, June 1995

70. Essential Drugs Programme: Standard Treatment Guidelines and Essential Drugs List for Primary Health Care Department of National Health, 1996

71. Sterky G, Tomson G, Diwan VK, Sachs L. Drug Use and the Role of Patients as Prescribers *J Clin Epidemiol* , Vol. 44, Suppl II, pp. 67S-72S, 1991

72. HealthLink Electronic Information and Resources Catalogue HealthLink, Durban, August 1997

73. Le Grand A, Hogerzeil H V, Haaijer-Ruskamp F M. Feasibility study for a resource centre on intervention research in rational use of drugs Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

74. Health Systems Trust Annual Report 1996 Health Systems Trust, Durban, 1996

75. Gerald M. National Drug Policy and Rational Drug Use: a model curriculum for developing countries J Clin Epidemiology, Vol. 44 (Suppl 2), pp. 95S - 99S, 1991

76. A Primary Health Care Handbook and Medicines List KwaZulu-Natal Department of Health, April 1997

77. Gonzalez Ochoa E, Armas Perez L, Bravo Gonzalez J R, Cabrales Escobar J, Abreu Suarez G. Prescriptions of antibiotics for mild acute respiratory tract infections in children *Bull Pan American Health Organisation*, Vo.30 (2), pp. 106-117, 1996

78. Suvanakoot et al. An evaluation of a regulation for dispensing drug products under generic name: case study of Ramathibodi hospital Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

79. Mansfield P R. How does pharmaceutical company promotion affect prescribing? Poster presentation at the International Conference for Improving the Use of Medicines, Thailand, April 1997

80. Pein L, Truscott A, Cottrill A, Kirby H, Strätling A (ed). Primary Clinical Care Manual SmithKline-Beecham Pharmaceuticals, 1992

81. Malawi Government Ministry of Health Malawi Standard Treatment Guidelines Malawi Essential Drugs Programme, 2nd edition, 1993

82. Nabiswa A, Godfrey R. Irrational drug prescribing in developing countries *Lancet*, Vol. 343, pp. 358-359, February 5, 1994

83. Hogerzeil HV, Bimo, Ross-Degnan D, Laing RO, Ofori-Adjei D, Santoso B, Azad Chowdury AK, Das AM, Kafle KK, Mabadeje AFB, Massele AY. Field tests for rational drug use in twelve developing countries *The Lancet*, Vol. 342, pp. 1408-1410, December 4, 1993

84. Isah A O, Ross-Degnan D, Quick J, Laing R, Mabadeje A F B. The development of standard values for the WHO drug use prescribing indicators Oral presentation and poster at the International Conference for Improving the Use of Medicines, Thailand, April 1997

85. Ferrinho P, Valli A .Cost of drugs at an urban primary health care centre in Alexandra, South Africa *Ann Soc Belg Med Trop,* Vol. 74(4), pp.327-38, December 1994

86. Wood D (ed). Perinatal Education Programme: Manual II Newborn Care

87. Trap B, Lessing C. Zimbabwe: targets prescribing of opinion leaders *Essential Drugs Monitor*, No. 21, pg. 4, 1996.

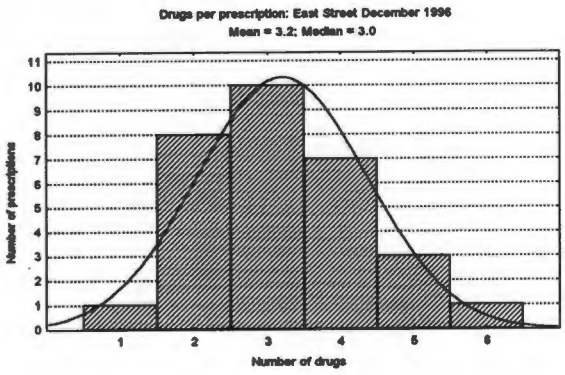
Appendix Three:

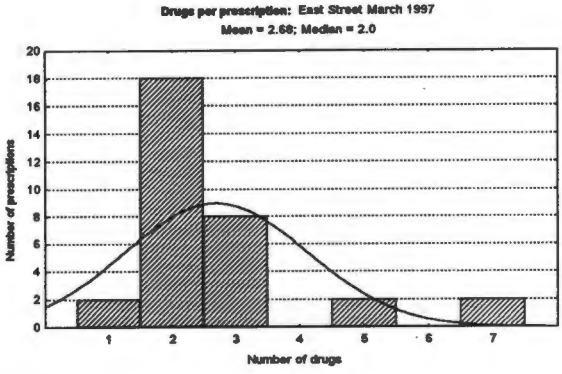
The Appendix contains data in support of tables 1 to 6 in Chapter Four.

- Data is presented in the order of the table content. Pre-and post-results for each clinic and the combined data are presented graphically. All data in tables 4 and 5 is contained within tables 1 to 3.
- The package used for the statistics was Statistica Version 5.
- Significance was taken as $p<0.05$.
- Actual prescriptions collected, as well as tabulated raw data are available for review.

Drugs prescribed per encounter

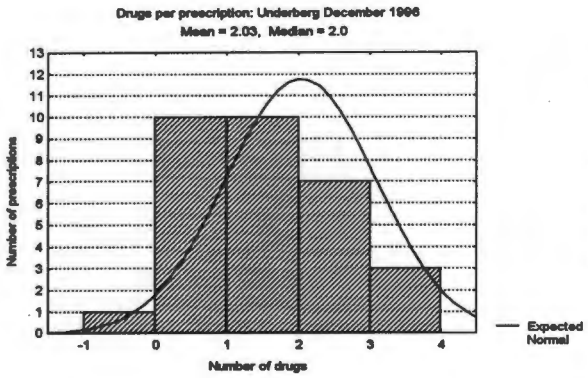
From Table 1 (pg. 76):

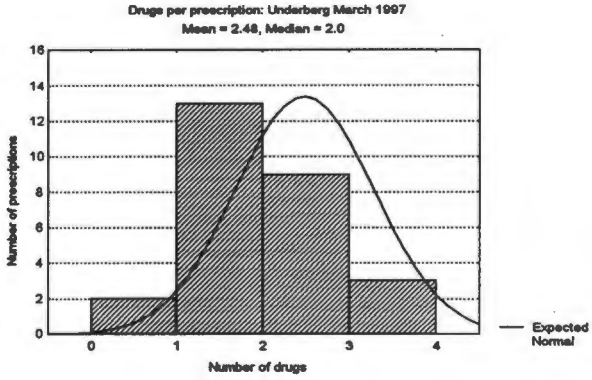




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). Comparisons of drugs per prescription in December 1996 and March 1997 done using Mann-Whitney U-test (non-parametric) $p=0.0225$.

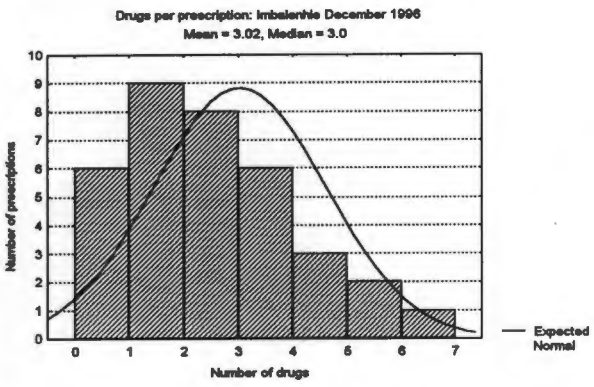
From Table 2 (pg. 79):

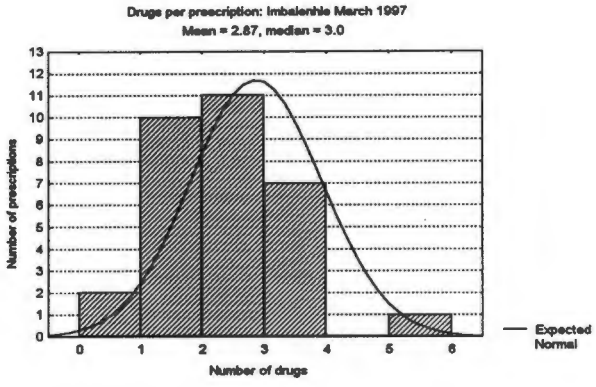




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). Comparisons of drugs per prescription in December 1996 and March 1997 done using Mann-Whitney U-test (non-parametric). $p=0.0850$, not significant.

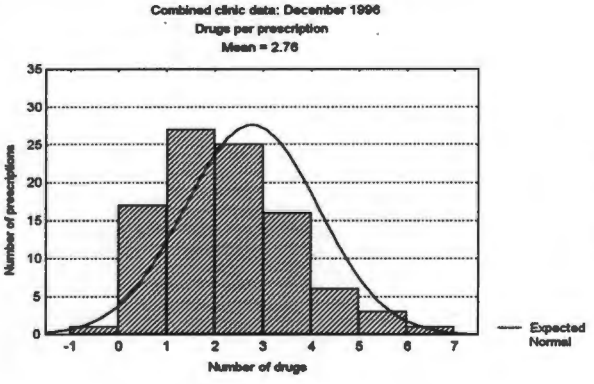
From Table 3 (pg. 81):

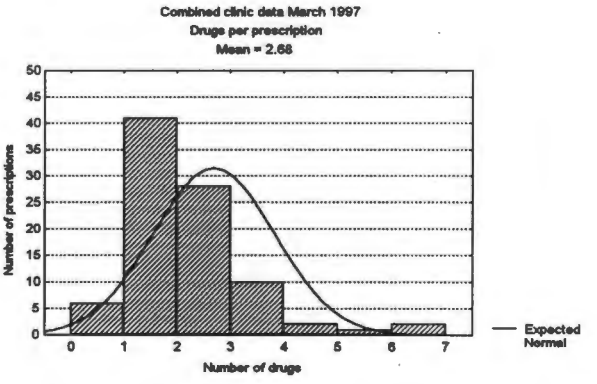




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). Comparisons of drugs per prescription in December 1996 and March 1997 done using Mann-Whitney U-test (non-parametric). $p=0.9232$, not significant.

From Table 6 (pg. 84):



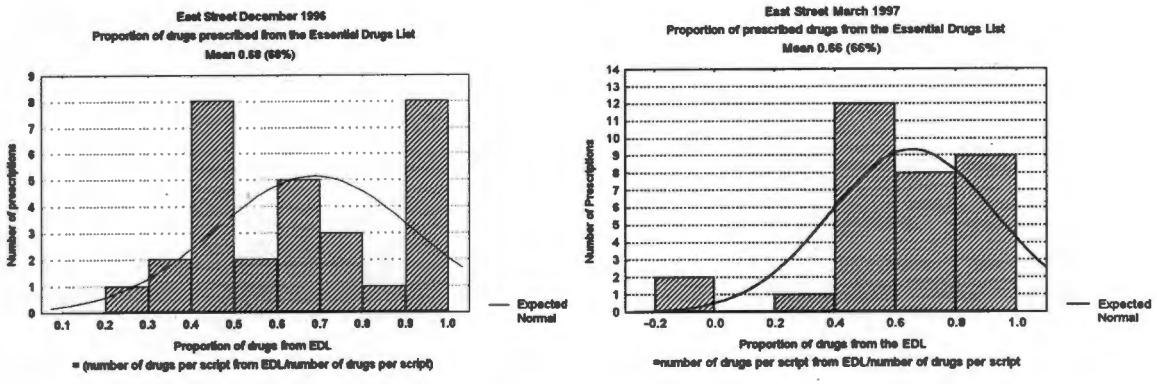


The data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). Comparisons of drugs per prescription in December 1996 and March 1997 done using Mann-Whitney U-test (non-parametric). $p=0.7457$, not significant.

Percentage of drugs from the Essential Drugs List

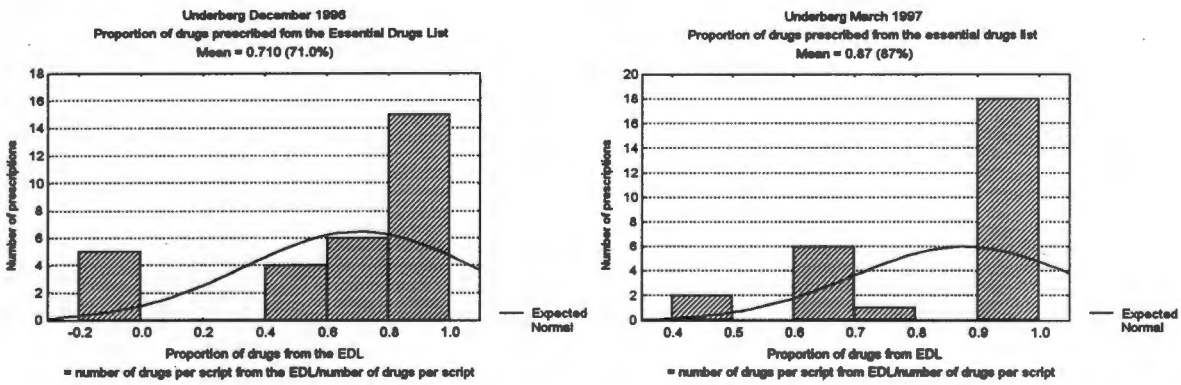
For these histograms the right hand margin of each block represents the value of the block on the x axis.

From Table 1 (pg. 76):



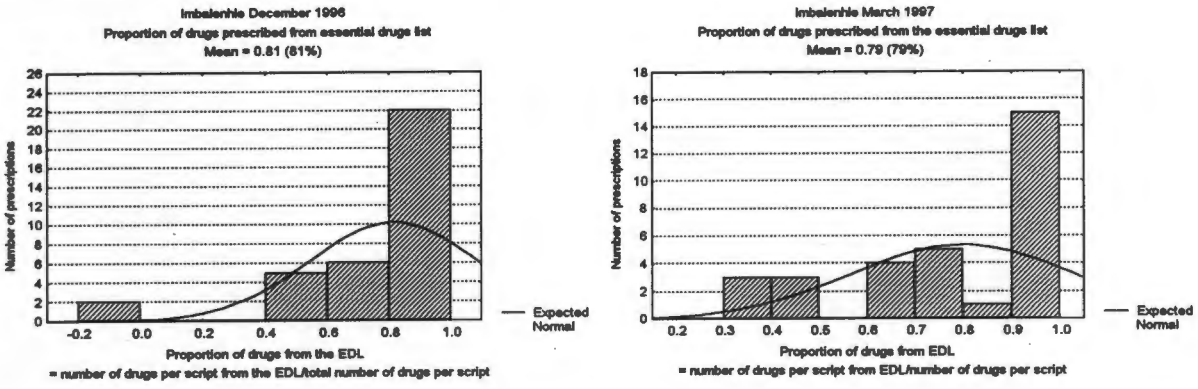
The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.0000$). The Mann Whitney U test was used to compare the data sets. There was no significant difference ($p=0.7836$).

From Table 2 (pg. 79):



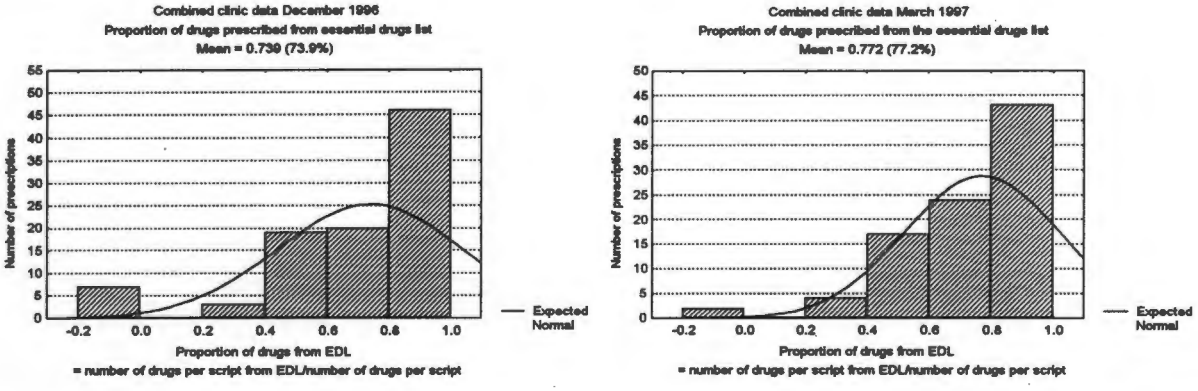
The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.0000$). The Mann Whitney U test was used to compare the data sets. There was no significant difference ($p=0.1330$).

From Table 3 (pg. 81):



The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.0000$). The Mann Whitney U test was used to compare the data sets. There was no significant difference ($p=0.5502$).

From Table 6 (pg. 84):

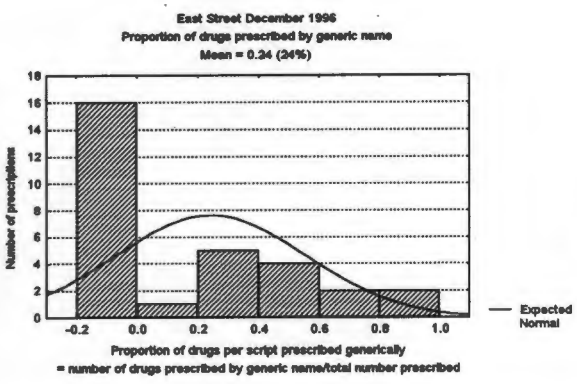


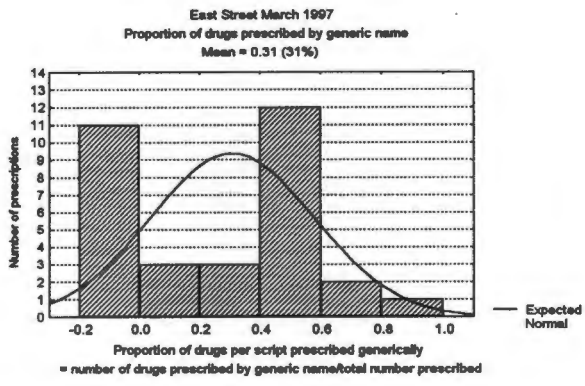
The data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.0000$). The Mann Whitney U test was used to compare the data sets. There was no significant difference ($p=0.6945$).

Percentage of drugs prescribed by generic name

For these histograms the right hand margin of each block represents the value of the block on the x axis.

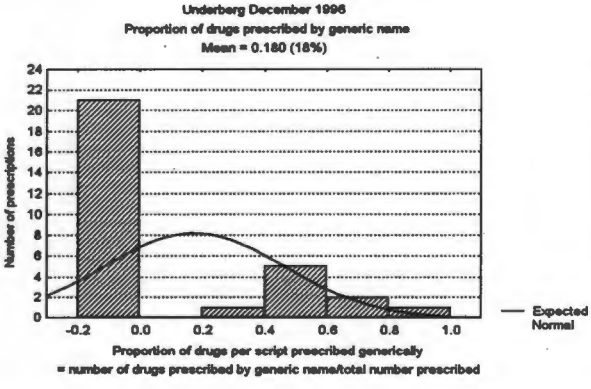
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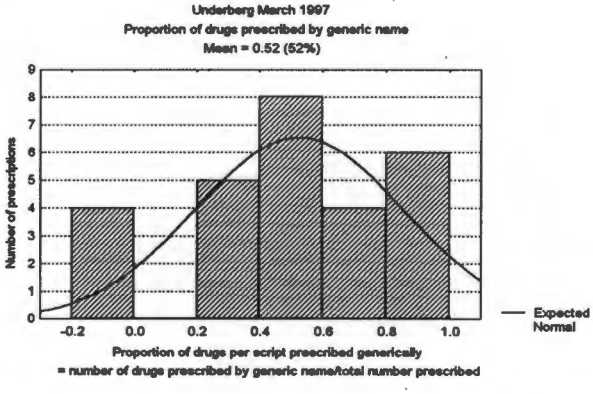




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was no significant difference ($p=0.2312$).

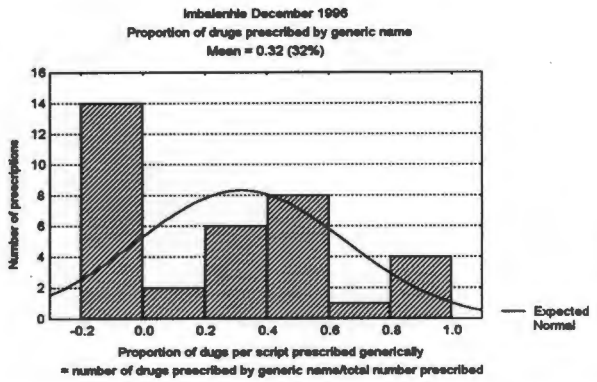
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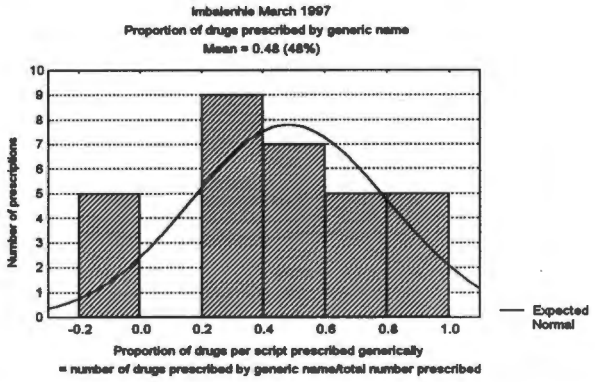




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant difference ($p=0.0003$).

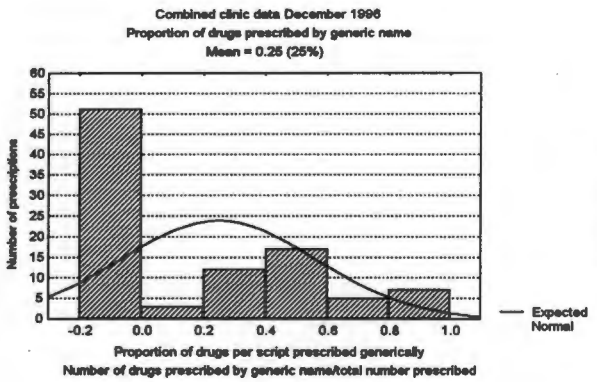
From Table 3 (pg. 81):

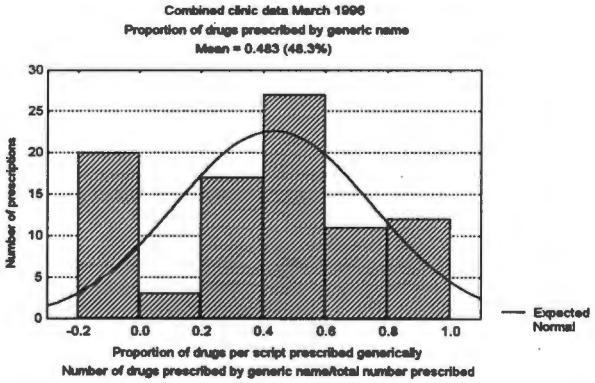




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant difference ($p=0.0368$).

From Table 6 (pg. 84):





The data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant difference ($p=0.0001$).

Accordance of prescriptions with the standard treatment guideline for the stated diagnosis.

The number of prescriptions which completely followed the standard treatment guidelines were counted, manually, using the original "Indicator per Prescription forms" collected at each facility, both in December 1996 and in March 1997. The same process was followed for those prescriptions which did not correspond with the treatment guidelines at all. These numbers are presented in brackets on tables 1 to 3 and 6.

Using the programme Epi-info, the odds ratio was determined using a two by two table. The Yates corrected p value was taken.

From Table 1 (pg. 76):

East Street		Followed STG completely	Did not follow STG completely
		+	-
post-training	+	5	27
pre-training	-	2	28

Yates corrected p-value = 0.4762. Not significant.

East Street		Did not follow STG at all	Followed STG to some extent
		+	-
post-training	+	1	31
pre-training	-	9	21

Yates corrected p-value = 0.0392. Significant.

From Table 2 (pg. 79):

Underberg		Followed STG completely	Did not follow STG completely
		+	-
post-training	+	4	23
pre-training	-	8	23

Yates corrected p-value = 0.4802. Not significant.

Underberg		Did not follow STG at all	Followed STG to some extent
		+	-
post-training	+	1	26
pre-training	-	7	23

One tailed Fisher exact p-value = 0.0412. Significant.

From Table 3 (pg. 81):

Imbalenhle		Followed STG completely	Did not follow STG completely
		+	-
post-training	+	4	31
pre-training	-	3	32

Yates corrected p-value = 0.8650. Not significant.

Imbalenhle		Did not follow STG at all	Followed STG to some extent
		+	-
post-training	+	8	23
pre-training	-	14	21

Yates corrected p-value = 0.3374. Not significant.

From Table 6 (pg. 84):

Combined clinic data		Followed STG completely	Did not follow STG completely
		+	-
post-training	+	13	77
pre-training	-	13	83

Yates corrected p-value = 0.8650. Not significant.

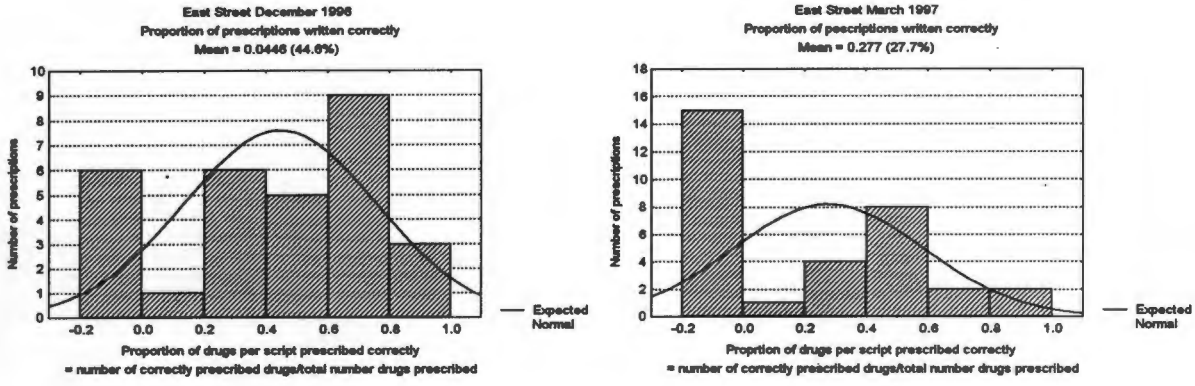
Combined clinic data		Did not follow STG at all	Followed STG to some extent
		+	-
post-training	+	10	80
pre-training	-	30	66

Yates corrected p-value = 0.0016. Significant.

Percentage of drugs with a correct prescription line

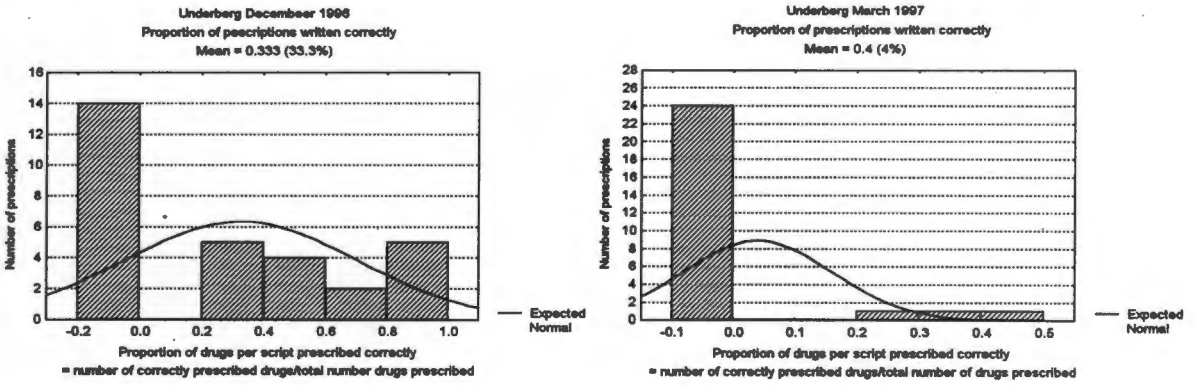
For these histograms the right hand margin of each block represents the value of the block on the x axis.

From Table 1 (pg. 76):



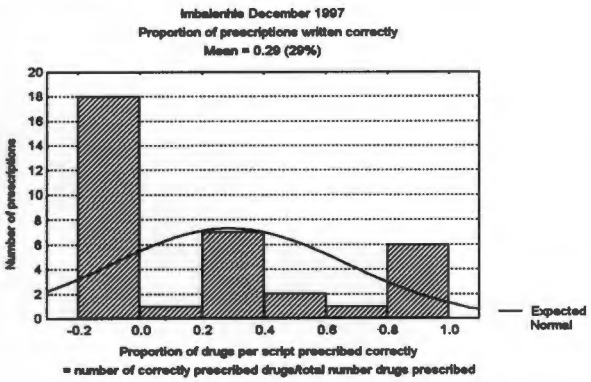
The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant worsening ($p=0.0306$) in the writing of prescriptions.

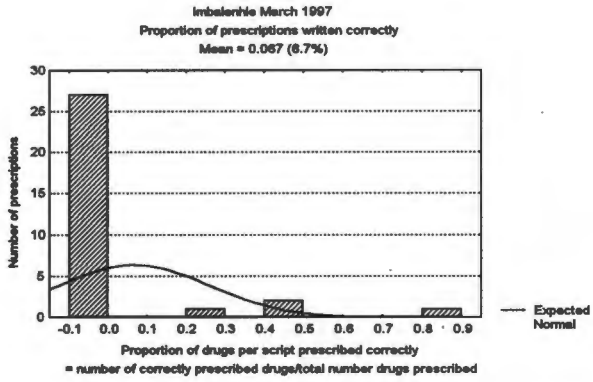
From Table 2 (pg. 79):



The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant worsening ($p=0.0034$) in the writing of prescriptions.

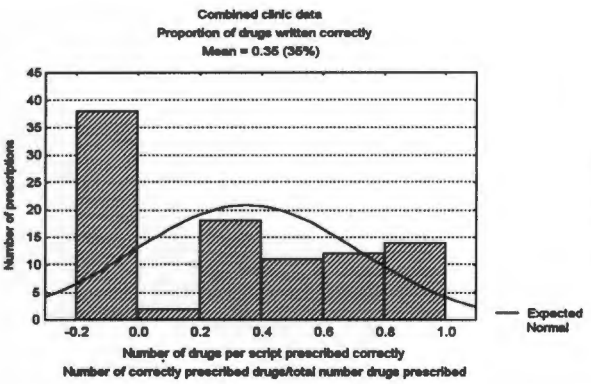
From Table 3 (pg. 81):

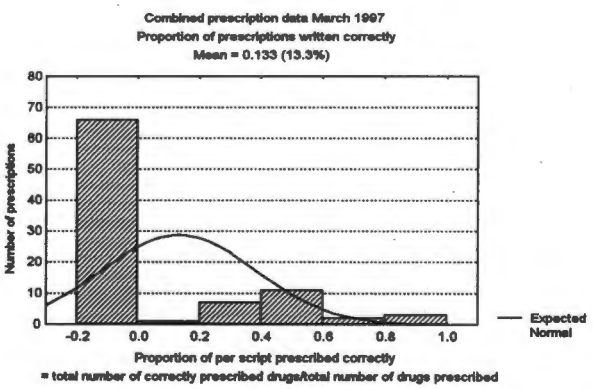




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant worsening ($p=0.0116$) in the writing of prescriptions.

From Table 6 (pg. 84):



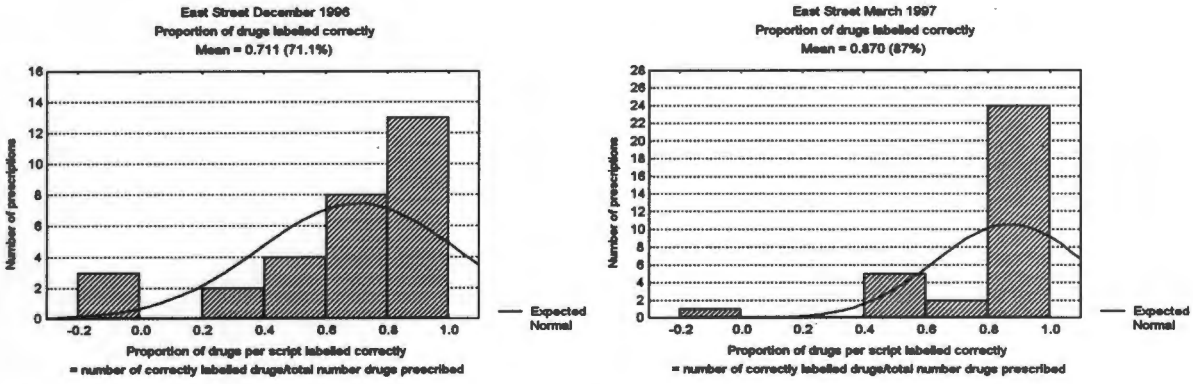


The data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant overall worsening ($p=0.0000$) in the writing of prescriptions.

Percentage of drugs labelled correctly

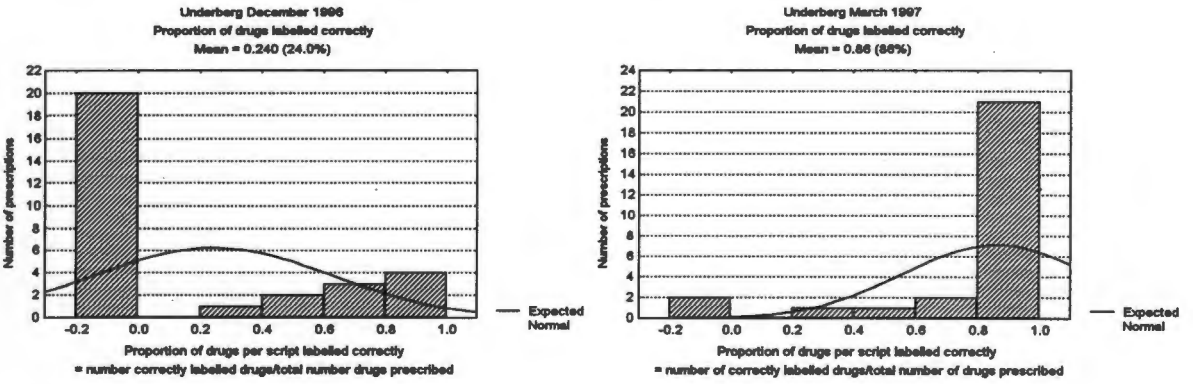
For these histograms the right hand margin of each block represents the value of the block on the x axis.

From Table 1 (pg. 76):



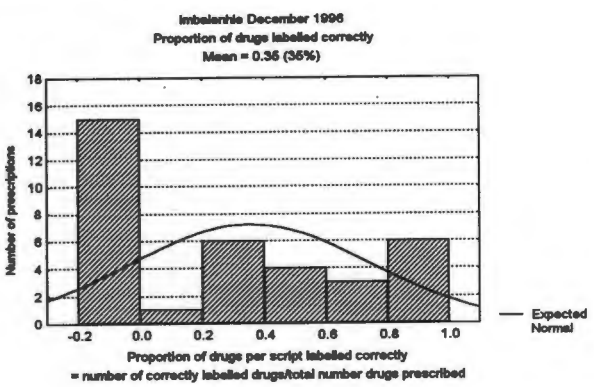
The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant improvement ($p=0.0317$) in drug labelling.

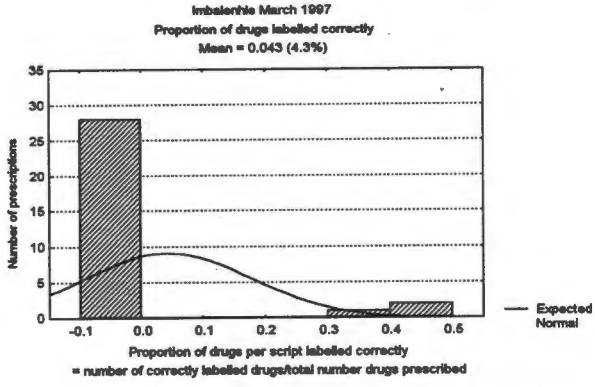
From Table 2 (pg. 79):



The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant improvement ($p=0.0000$) in drug labelling.

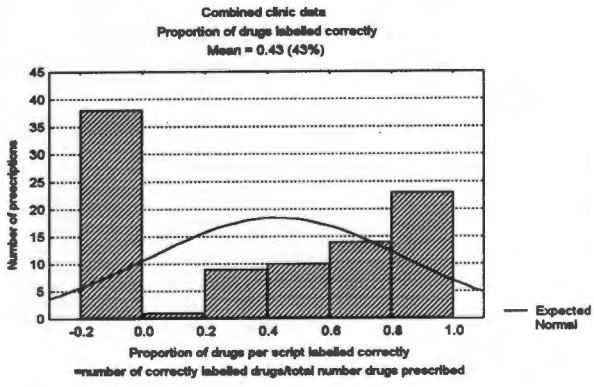
From Table 3 (pg. 81):

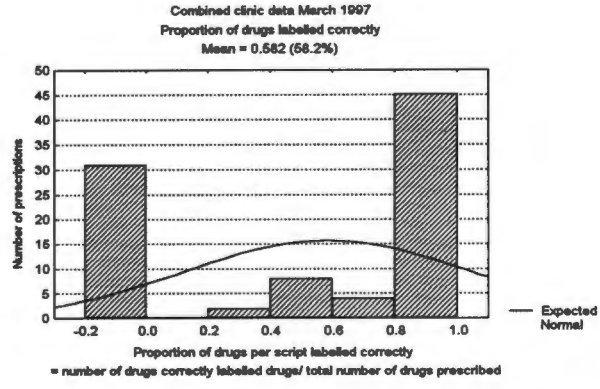




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant worsening ($p=0.0007$) in drug labelling.

From Table 6 (pg. 84):



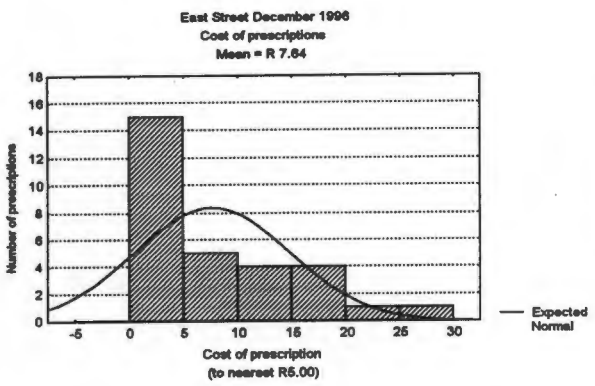


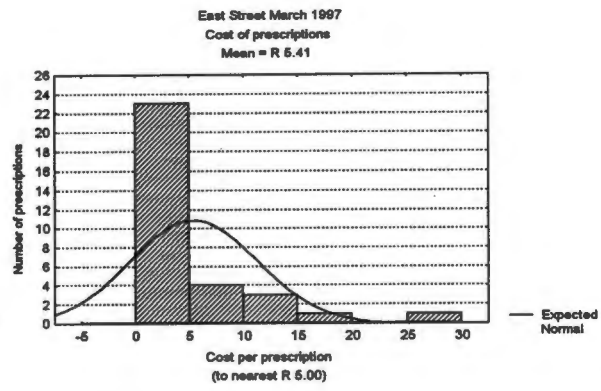
The data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant overall improvement ($p=0.0186$) in drug labelling.

Mean cost per prescription

For these histograms the right hand margin of each block represents the value of the block on the x axis.

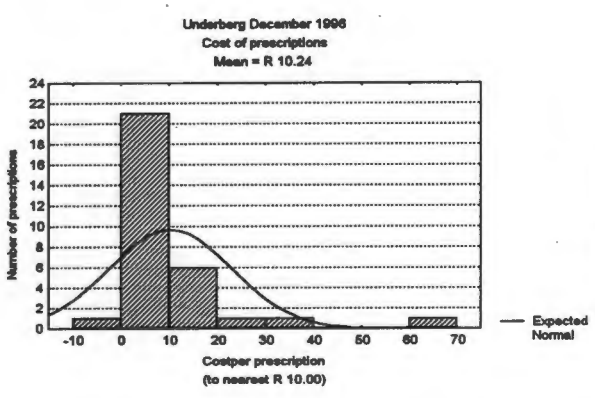
From Table 1 (pg. 76):

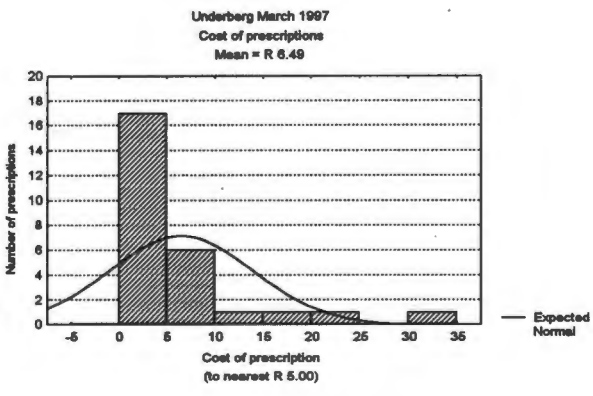




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was no significant decrease in cost ($p=0.2781$).

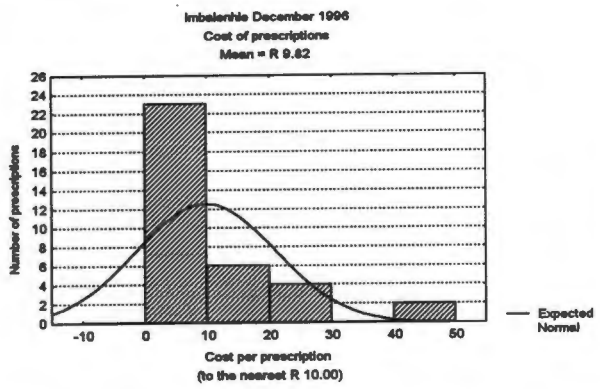
From Table 2 (pg. 79):

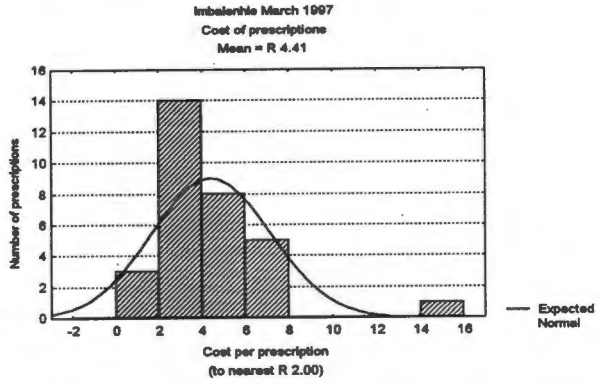




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was no significant decrease in cost ($p=0.0504$).

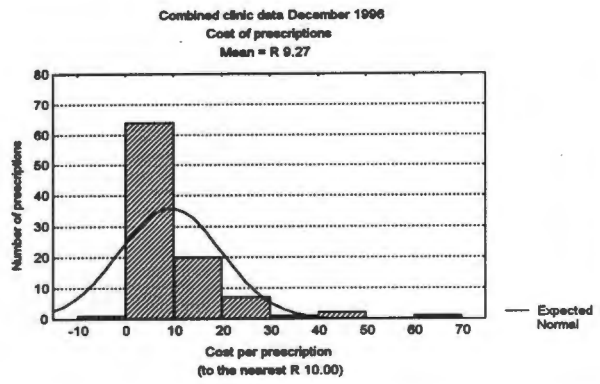
From Table 3 (pg. 81):

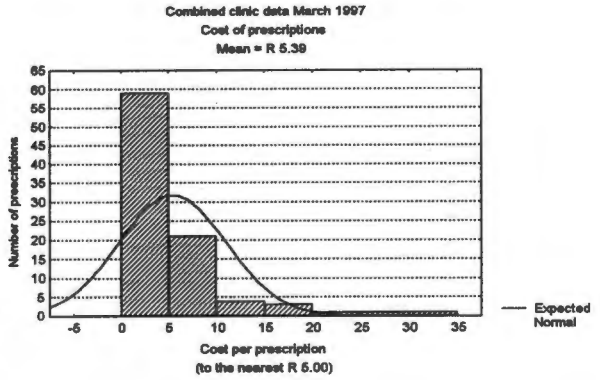




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was no significant decrease in cost ($p=0.3288$).

From Table 6 (pg. 84):



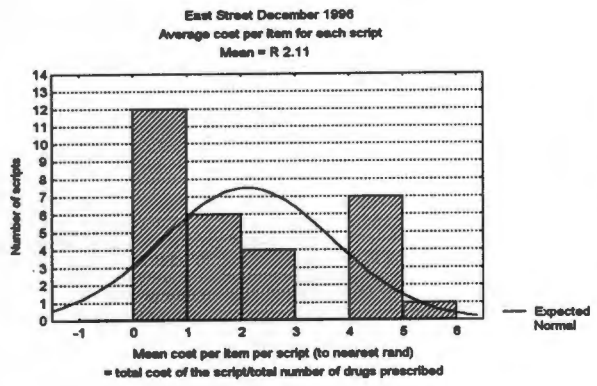


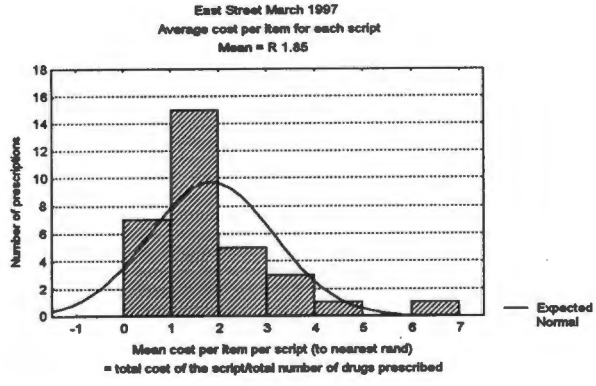
The data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant overall decrease in prescription cost ($p=0.0134$).

Cost per item

For these histograms the right hand margin of each block represents the value of the block on the x axis.

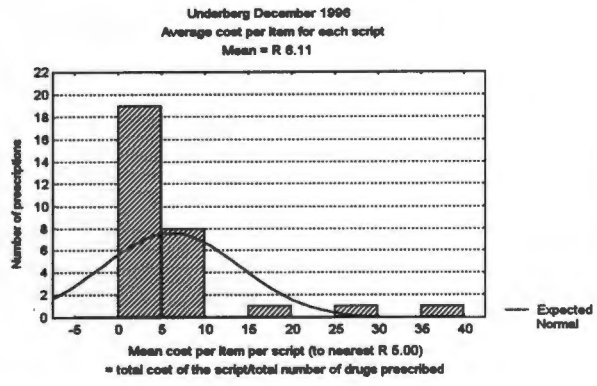
From Table 1 (pg. 76):

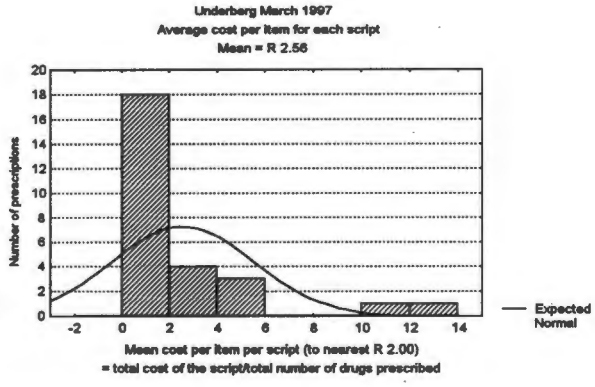




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was no significant decrease in cost per item ($p=0.9103$).

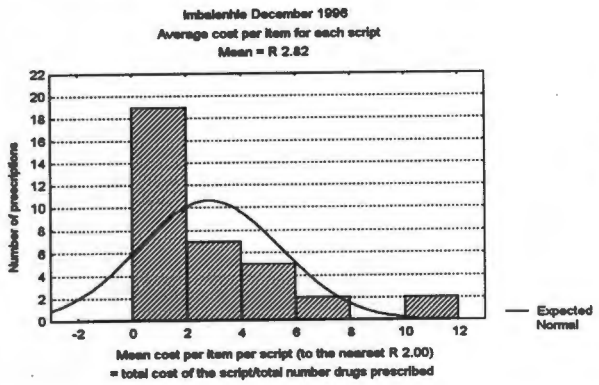
From Table 2 (pg. 79):

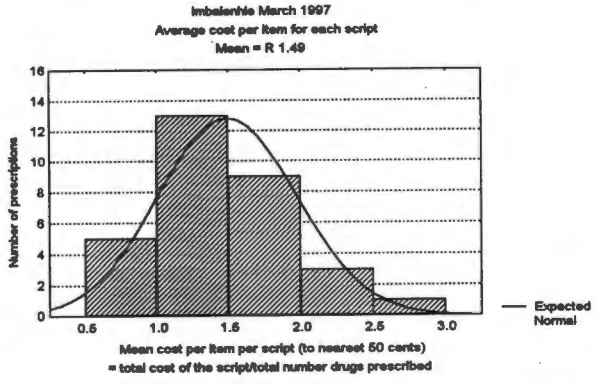




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant decrease in cost per item ($p=0.0014$).

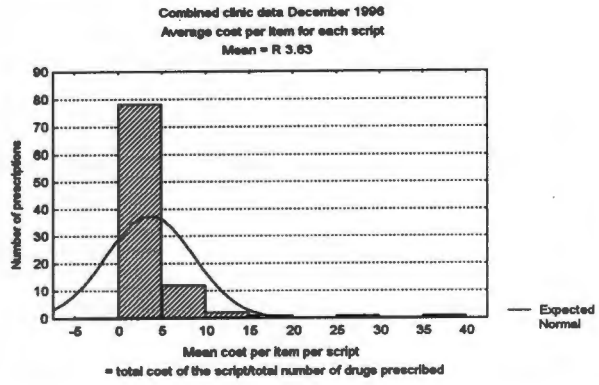
From Table 3 (pg. 81):

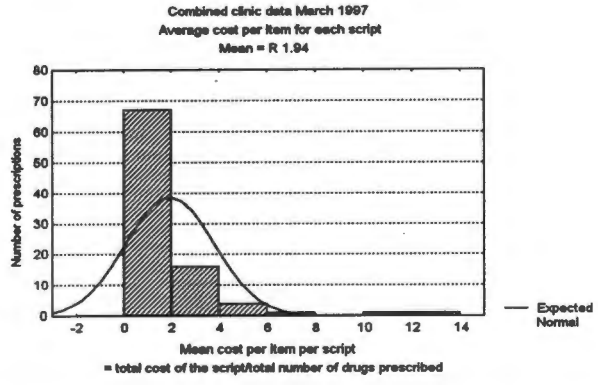




The total data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was no significant decrease in cost per item ($p=0.1614$).

From Table 6 (pg. 84):





The data were confirmed to be skew using the Shapiro-Wilks W test ($p<0.000$). The Mann Whitney U test was used to compare the data sets. There was a significant overall decrease in cost per item ($p=0.0025$).

Patient knowledge

The number of who had good knowledge of their medicines were counted, manually, using the original "Indicator per Prescription forms" collected at each facility, both in December 1996 and in March 1997. The same process was followed for those patients whose knowledge was inadequate. These numbers are presented in brackets on tables 1 to 3 and 6.

Using the programme Epi-info, the odds ratio was determined using a two by two table. The Yates corrected p value was taken.

From Table 1 (pg. 76):

East Street		Patient knowledge good	Patient knowledge not good
		+	-
post-training	+	2	30
pre-training	-	7	23

Yates corrected p-value = 0.1217. Not significant.

East Street		Patient knowledge inadequate	Patient knowledge other than inadequate
		+	-
post-training	+	23	9
pre-training	-	10	20

Yates corrected p-value = 0.0054. Significant.

From Table 2 (pg. 79):

Underberg		Patient knowledge good	Patient knowledge not good
		+	-
post-training	+	13	14
pre-training	-	1	30

Yates corrected p-value = 0.0002. Significant.

Underberg		Patient knowledge inadequate	Patient knowledge other than inadequate
		+	-
post-training	+	7	20
pre-training	-	7	23

Yates corrected p-value = 0.9915. Not significant.

From Table 3 (pg. 81):

Imbalenhle		Patient knowledge good	Patient knowledge not good
		+	-
post-training	+	23	8
pre-training	-	10	25

Yates corrected p-value = 0.0006. Significant.

Imbalenhle		Patient knowledge inadequate	Patient knowledge other than inadequate
		+	-
post-training	+	0	31
pre-training	-	8	27

Yates corrected p-value = 0.0138. Significant.

From Table 6 (pg. 84):

Combined clinic data		Patient knowledge good	Patient knowledge not good
		+	-
post-training	+	37	53
pre-training	-	18	78

Yates corrected p-value = 0.0015. Significant.

Combined clinic data		Patient knowledge inadequate	Patient knowledge other than inadequate
		+	-
post-training	+	30	60
pre-training	-	25	71

Yates corrected p-value = 0.3532. Not significant.

Appendix Four: Initiative for Sub-District Support reports

Rational Drug Use Training Project
Impendle/Pholela/Underberg sub-districts, KwaZulu-Natal
18 June 1997

The training workshop of the Rational Drug Prescribing Training Program, was held at Gomane clinic, in the Impendle sub-district on June 17 and 18 1997. Gcina Radebe, the ISDS facilitator for the Impendle/Pholela/Underberg district co-ordinated the course. Sr. Lindiwe Zuma hosted the training- her hospitality was appreciated by everybody.

The Gomane clinic had informed the local community that the clinic would be operating for emergencies only on those 2 days, so that most of the staff could attend. Staff were also present from Nxamalala and Pholela clinics. 14 staff attended both days of training: and all 4 modules (principles of prescribing, use of treatment guidelines, stock management and dispensing) were presented.

Feedback: All staff found the training enjoyable and relevant, although they felt more time was needed to absorb the information, and that all clinical staff should be trained They would like more practical examples of stock management systems. If possible they would like to learn prescribing through actual patient consultations.

It was felt that to implement rational prescribing at their clinics, extra staff would be necessary. More support and supervision would be needed to ensure correct application of the principles. Pharmacy staff of the referring hospital should be more involved.

What can be done to improve rational drug use in this sub-district? What are the problem areas and **how to go forward...**

1. Stock management: need stock control cards, in an easy, clear format. Used to be done in this area but was poorly introduced and eventually abandoned. Will need support to re-introduce. Commitment must come from all staff that use the dispensary. Are all willing to try. Gcina suggests a meeting with Aarti, Barbara and sisters in charge of the clinic. Aarti will supply cards next week to start (may be provincial cards already available). Gomane: Lindiwe Nzimande, Nxamalala: Lindiwe Dlamini/Bongiwe Mjwara, Pholela: Clara Dlamini will take responsibility for starting the process off. Review in August.

2. Do not know where to enquire if have a problem in drug management/stock control. Gcina: drug supply is being looked at by Barbara. A responsible person in the central supply needs to be identified. Discuss with district task team tomorrow.

3. Is a need for more training: Laura Campbell will be organising PHC training (need clinical input: how to o/e chests, feel pulse), also need more drug and prescribing training. Catherine Orrell will communicate with Laura and Gcina about this. All prescribing staff need this training.

4. There is a need to monitor prescribing habits. Staff agree to collect 30 prescriptions per facility. Forms will be sent with stock cards. Clinics will take responsibility for the collection and Gcina will collect the forms after the 7 July1997. These will be analysed by the PCMIC and reports sent to the clinics and the district teams..

5. Training must be shared! People must go back and report on the training to all other clinic staff.

Gomane: Ntombizonke Kumani; Nxamalala: Lindiwe Dlamini; Pholela: Busi Ndlovu. Will feed back by 27/6/97, before the indicators are taken. Will discuss at this feedback who will collect the indicators.

Rational Drug Use Training Project
Kakamas clinic, Northern Cape
19-23 May 1997

The Rational Drug Prescribing Training Course is a project funded by Health Systems Trust. The aim of this project is to encourage all prescribers at primary care level, be they nurses, pharmacists or doctors, to prescribe medicines in a safe, efficient and cost effective manner. The project was introduced in the Kakamas sub-district on 20 and 21 May 1997.

Aarti Kishuna, a pharmacist from the Department of Pharmacy at the University of Durban-Westville (UDW), collected a number of "drug-use" indicators at the Kakamas clinic. These include factors that would reflect the resources and workload of each facility, as well as the prescribing practices of the staff working there. Unfortunately, in the time available we could not collect a full sample of these indicators. Sister Tina Swartz and other sisters from the mobile clinics will be completing the collection, after which the results will be collated and send back to the staff and sub-district.

Ms Kishuna then trained Sr. Swartz in the practical principles of dispensing and stock management, while in the clinic's pharmacy. Implementing a Stock Card System was discussed and it was decided that it would be a feasible idea for the clinic, but not the mobile units at present. Aarti Kishuna and Lesley Bamford undertook to supply the clinic with stock cards. Sister Swartz, with support from the hospital and mobile sisters will begin to apply the system. Catherine Orrell and Lesley will assess, with the sisters, how well it is running at the end of July 1997.

This stock management and dispensing training is part of a 2-day problem-based program, the second day of which was trained by Catherine Orrell, a doctor from the Department of Pharmacology at the University of Cape Town (UCT). The second day included discussion on the principles of prescribing (based on the WHO production, The Guide to Good Prescribing), and an overview of the use of Standard Treatment Guidelines. It is a clinically based session, using patient examples. Although this training was appreciated, it was evident that, with the change of emphasis in the clinic's role from preventative to curative health, more clinical training for the nurse practitioners is needed as soon as possible.

Of the 4 sisters supposed to be working at the clinic, only one was available for the workshop. In fact, only 2 sisters were present at that time, one of whom was left to run the clinic. This problem of not being able to gather the staff together for training is widespread, and does not only occur here. It does need to be addressed. On discussion with sisters from the Kakamas hospital and mobile clinics, 2 days have been set aside for all of them to attend a repeat workshop on 31st July and 1st August.

Part of the training program is to provide support on a longer term basis to primary health care staff as well. All staff are given a Medunsa Primary Care medicines formulary, a copy of the Essential Drug Program Standard Treatment Guidelines for Primary Health Care, and a course Training Manual. These were also provided for the staff who will be trained in July, so they can read and use them in advance. Another form of support is through Healthlink, an email system which connects the health care facilities The staff were shown how to use the system and set a goal of sending at least one message to each of Aarti and Catherine before their next visit. Clinical or drug queries can be answered this way, by communication with the Primary Care Medicines Information Centre at UDW, or the Medicines Information Centre at UCT.

The response to the program was enthusiastic. Many concrete, manageable goals were set. With further support and training, as planned for July, the Kakamas sub-district should see the beginnings of improvement in their prescribing and stock management.

Rational Drug Use Training Project
Kakamas District
31/7/97-1/8/97

Review of Stock Record System at Kakamas Clinic: 31 July 1997.

In May of 1997, the Rational Drug Prescribing Project was introduced in the Kakamas district, by Aarti Kishuna and Catherine Orrell. One of the results of the workshop was a commitment by the staff of Kakamas clinic to implement a **stock card system**, as a means of managing their stock of drugs and medicines. This card system, if well maintained, will show how much of any particular drug or medicine is available at any moment, and provides, at a glance, a record of how much is being used per month and whether it is necessary to re-order the drug yet or not. Kakamas clinic is the first clinic among the ISDS sites to implement this system.

Sister Tina Swartz and Mrs Francis Titus received the stock cards in early June. By June 23rd they had filled in a card for each of the drugs in their storeroom. Kakamas clinic receives drugs from the depot in Kimberly. It usually takes three weeks for an order to arrive after it is placed. As well as holding medicines for its own use, the clinic acts as a depot for the mobile clinics, which service the district. Stock issued to these units must also be recorded.

On July 31st 1997, the system had only been in place for a month. The benefits, though, were already being seen: it is much easier and quicker to order stock knowing the rate of consumption of each drug, so allowing ordering before the drug levels get too low. It had taken some time to get used to the system, particularly learning which name of the medicine was its trade name and which its **generic name**. The generic name is the one that needs to be recorded on the card, to simplify the system and, in the long run, make it easier for staff and safer for patients.

Presently only Sister Swartz and Francis Titus are recording on the cards. They make sure they are there to **record when drugs are issued** to the mobile sisters or the clinic sister's trolleys and adjust the balance accordingly. The mobile sisters are being shown how to do this, and, once the system is running smoothly, will be doing this themselves. The cards have been placed in firm plastic bags, to protect them. These are bags saved from the packaging of some patient ready treatments. This is an excellent idea!

By working through the system other problems have been overcome. All stock, whether in a closed box or open and available on the shelf, forms part of the balance recorded on the card. Non-drug items, such as bandages, needles and condoms, each have their own cards too. When **any item is received, it is recorded** and the number added to the previous balance to create a new balance. This has all been done very competently. There was some uncertainty about which document number should be written on the card when receiving the drugs. Usually the person who receives the drugs, also signs a receipt. The number of this receipt (which may be called a dispatch number) should be recorded on the card too. Then, if there are any problems with the drugs, it is easy to trace when they were delivered and from where.

The WHO has a list of 10 key drugs that should be present in any primary health care facility. This has been adapted for a South African context to include the following medicines:

- oral rehydration fluid
- co-trimoxazole tablets
- procaine penicillin injection
- paediatric paracetamol syrup

hydrochlorothiazide tablets
ferrous salts and folic acid
mebendazole tablets
tetracycline eye ointment
benzoic acid and salicylic acid ointment
salbutamol inhaler

At Kakamas clinic all of these drugs, or equivalents (e.g. chloromycetin eye ointment, not tetracycline), were available. All were within the expiry dates. The stock cards for each were checked and on the whole were excellent.

Some of the drugs are used frequently enough for an average **re-order level** to have been calculated. Sister Swartz is working her way through the drugs, calculating this re-order level from the **monthly consumption** (i.e. the average number of units, packets or bottles, that have been issued each month), knowing that she has to wait three weeks to receive any order, and her stock level should never fall to zero. Most of the re-order levels found were correct. One or two were too low, i.e. the item may have been out of stock before the order arrived.

Re-order levels can be worked out as follows:
If 360 bottles of paediatric paracetamol syrup are used every month, and it takes *3 weeks for stock to arrive*, we need to re-order when we have 270 bottles left, equal to *3 weeks supply* (i.e. if we use 360 bottles a month and there are 4 weeks a month, we use 90 bottles a week, and therefore 270 in 3 weeks). However, if the order was a week late, we would then have no paracetamol syrup for that week. This is where **safety stock** is needed: stock we have in case of delays, or unexpected demand for a particular item. We may keep a 2 weeks supply as safety stock. In this case, that would be 180 bottles. So we re-order when the balance falls below (270 + 180) 450 bottles. By the time our supply arrives in 3 weeks we will be down to our safety stock.

Sr. Swartz orders drugs once a month. The **amount to order** then equals the average monthly consumption. If Kakamas clinic only wanted to re-order every 2 months, then twice the monthly consumption should be requested. A problem at this clinic, though, is **lack of space**. When the monthly stock arrives their store room is filled- 2 months supply would not be practical here. The **maximum level** of any item you have, should never be more than you can use before it expires. Remember that those items that expire first, should be used first. Kakamas clinic has 3600 condoms that need to be used before November 1997!

Although there have been a few small problems in Kakamas Clinic's stock management system, they have to be complemented on a superb beginning. They are the first clinic in any of the Initiative for Sub-District Support sites to have actually taken the initiative and got the system going. In a few months time (October 1997) the system will be reviewed again. The Rational Drug Prescribing Project team would like to thank Sister Tina Swartz and Mrs. Francis Titus for providing with such an excellent example for others to follow. Hopefully they continue to see the benefits too!

Rational Drug Prescribing Workshop: 1 August 1997.

A single day workshop was held at Kakamas Hospital on 1 August 1997, as planned in May. 5 sisters attended: 2 from the hospital, 2 from the mobile clinic services and 1 from Kakamas clinic. The workshop included a session on rational prescribing, followed by clinical cases, with the emphasis on patient education and safe use of medicines. Sr. Tina Swartz explained about the

stock card system now being used at the clinic, followed by a discussion on safe dispensing practices.
Lastly, the collection of drug use indicators was discussed. A set of indicators had been collected by staff at the clinic in June 1997, but there had been a few mistakes made. One of the problems seemed to be due to temporary staff being asked to record the data, without fully understanding the process. The prescribing indicator form was clarified, and the staff agreed to collect another set of 30 prescriptions from Kakamas clinic within the next month. These will be sent to Aarti Kishuna for collation.

The feedback for the day was positive. All the staff found the content was relevant and useful, but that time was a little short. In 3 months time, while the stock card system is being reviewed, another set of indicators can be collected to see if there has been any change, hopefully an improvement, in prescribing patterns.

Rational Drug Use Training Project
Kalahari Region, Northern Cape
7th and 8th August 1997

On the 7th and 8th August the Rational Drug Prescribing Program was presented to staff of the Kalahari region. Dr Lesley Bamford, ISDS facilitator for the Kalahari ISDS site, introduced the program to Marian Loveday, the regional director for health, who then co-ordinated the 2 day training at Kathu. Irrational prescribing has been identified as a problem in the region. A stock management system is also needed urgently. Sister Manong, their newly appointed Chief Professional Nurse for the region, will be visiting the region's clinics this month, and will take on the collecting and assessing of **drug use indicators** as one of her roles, to determine the local prescribing patterns.

The training was attended by 23 sisters from all the clinics in the Kalahari region. The first day covered the principles of rational prescribing, with clinical examples, as well as principles of dispensing. Principles of stock management and the stock card system were introduced in the afternoon. Further clinical cases in rational prescribing were given to the group as homework. The second day covered the use of Standard Treatment Guidelines, a session working through the homework cases, and an introduction to the collection and use of drug use indicators. The workshop ended with a feedback session and with brainstorming the way forward for each facility. It was a great advantage to have the regional director present, both so the staff felt their problems were being heard in a neutral environment, and because of the pertinent information about the provincial health services which she provided.

Issues and concerns brought up at the workshop will be taken to Farook Shaiknag, in the provincial office.

Some issues related to drug use were identified, and decisions made for the region during the workshop:

- **Patient demand** for drugs seems to influence prescribing behaviour greatly. There is a perception among nursing staff that patient demand is great, especially for non-essential items such as cough syrups. However, the sisters at Vanzylsrus clinic withheld cough syrups from their communities, while educating about the lack of useful effects these syrups have. There has been a concern that patients are having serious coughs "treated" with cough syrups, instead of being investigated for TB. Cases of TB are therefore being missed. Although there was an initial "boycott" of the clinic, the patents returned after a short while and there is now no longer a demand for this placebo. Prescribers CAN influence patients too!

  The sisters at the workshop took a decision to stop the irrational prescribing of cough syrup. Syrup will no longer be supplied in large quantities to the Kalahari region.

- Staff must not be afraid of **using the reference books** they have access to, to look up information on treatment for a patient **while the patient is there**. It is believed that patients view this negatively i.e. the prescriber can not be competent if they look things up in a book. This is not the case- and it was agreed that a patient can be made to feel more cared for if a prescriber emphasises that they are checking to tailor the treatment specifically for that person. All staff will receive a copy of the Medunsa Primary Health Care Formulary, to complement their EDL book.

- **Lack of dispensing equipment** in some of the clinics, such as labels for bottles, and tablet counting trays or measuring cylinders. These will be ordered as a regional order, by Marian.

The issue of the labels that are available being too big, and covering the name of the drug on the packaging, will be considered by Marian and Farook Shaiknag.

- None of the clinics have a system for **monitoring stock** at present. Although establishing one was felt to be important, staff were concerned about the time this will require of them. The regional office is employing more staff from the 1st of September. Most of the bigger, busier clinics will have extra personnel. From then, one person at each clinic will be given the responsibility of monitoring the dispensary, including ordering drugs, and therefore they will implement the stock card system. Aarti and Catherine will provide the first batch of stock cards, if they are not available provincially, and are available to provide support and review the system as necessary.

- **Private doctors** are charging patients large consultation fees and, although they are dispensing doctors, they send the patients on to the clinic with a script which the public sector is expected to fill. The patients believe that the consultation fee they paid to consult the doctor includes the drugs, which are actually being provided by the public sector. This is an abuse of the provincial system by the private doctors. From last month a referral letter must be completed by every private doctor when referring patients to a clinic. No prescriptions will be filled without the patient being assessed by the clinic staff, on receipt of this letter.

  As the lack of referral letters are a problem between public health facilities too, all the staff will try, from now on, to make a point of sending one with every patient transferred.

- Some other points which will be looked at by Marian Loveday: defining the procedure for **expired stock**, enquiring about the availability of **antibiotic bottles** that are already graduated for mixing, and, distributing the list of drugs which nurses (S1-S4)are covered by the province to prescribe. All prescribing in the region from now on will be done <u>by generic name only</u>!

Feedback on the workshop was positive. Most staff felt that they liked the problem-based approach, and would appreciate more workshops in the future. All staff at their clinics should be exposed to this type of information. A "Trainers Folder" has been given to the Regional Director, supplying all the training materials for such a workshop. Hopefully more will be given by local trainers! Aarti Kishuna and Catherine Orrell are available to assist whenever necessary.

Thank-you to the Kalahari region for their excellent hospitality.

cc

Rational Drug Use Training Project
Pholela Clinic workshop, KwaZulu-Natal
14th and 15th August 1997

The second Rational Drug Prescribing workshop in the Impendle-Underberg-Pholela district was held on the 14th and 15th of August 1997, in Pholela clinic. It was organised by the ISDS co-ordinator for this site, Gcina Radebe. 15 staff, largely from Pholela and Gomane clinics, attended. The district co-ordinators, Sisters Nzimande and Mchunu, were present as well. Unfortunately the SASO from St. Apollinaris, who has been involved in the implementation of a stock card system for the district, as was recommended in the first workshop, could not attend. There were also no staff present from Underberg clinic.

The 2 day course was trained as planned: the first day covering Rational Drug Prescribing and the use of Standard Treatment Guidelines, with a series of problem-based clinical cases. The second day looked at clinic stock management and the process of dispensing. The use of Drug Use Indicators was discussed; after which a problem solving session was held, looking at problems experienced with drug use at clinic level, and possible solutions. Time was short on the first day, as people from Pietermaritzberg arrived late, and had to leave early.

Problems arising from the workshop:

1. **No trainers were present**: this point was emphasised after the first workshop. The present trainers of the Rational Drug Prescribing program cannot return to this region to train again, until 1998. This program has to be perpetuated from <u>within the district</u> for it to be successful.

   The issue of dedicated trainers was discussed. At provincial and regional level, although the need for a district trainer to co-ordinate district training in all fields is admitted, the posts have not been yet been created and filled. Some development is occurring through the Primary Health Care Training Co-ordinating Committee. The next meeting will be on 20 August 1997, at which the district co-ordinators will highlight this need for trainers.

   In the meantime each person at the workshop will feed the content back to staff in their clinics who could not attend the training. Presently the following are tasked with this: at Gomane, Ntombizonke Kumani; at Nxamalala, Lindiwe Dlamini; and at Pholela, Busi Ndlovu. Sr. Kumani has left Gomane, and will be replaced with Sisters Njokwe and Ngcoba. At Nxamalala, they are happy with Sr. Dlamini in this role, as now all their staff have attended the training. All staff have now been trained at Pholela too, results of this workshop will be given toSr. Ndlovu by Nurse Jili. This will be completed by the end of August.

   At Gqumani, Sr.L Miya, and at Sandenezwe, Sr. Ngubane and Staff Nurse Bennie will feed back. They need to collect drug use indicators too. Both these tasks will be completed by the end of September.

   Sr. Mchunu, the district co-ordinator, will train at Gwala and collect the drug use indicators there. She will do this by the end of September.

2. **Clinical training is necessary**: some of the staff have difficulty interpreting clinical signs and coming to a diagnosis. Clinical skills training, appropriate for a primary care setting, are urgently needed. People have not been trained to diagnose. Dr. Laura Campbell will be beginning training next month. Staff are asked to approach her, via the district co-ordinators, if they wish to be trained.

3. **Collection of Drug Use Indicators**: Staff from Nxamalala, Gomane and Pholela are thanked for their collection of Drug Use Indicators. There were a few problems, such as it not being clear which option on the indicator form was marked or more than one prescription being written on one indicator form. The reason for collecting the indicators, and the method of doing this, was clarified at this workshop. Results of the collection were displayed:

Drug Use Indicator	Gomane	Nxamalala	Pholela	Ideal value
Patient name on prescription?:	32/32=100%	31/31=100%	33/33=100%	100%
Prescribers signature present?	100%	100%	100%	100%
Average number of drugs prescribed per clinical encounter:	70/32= 2.2	63/31= 2.1	57/25= 2.3	1.2 to 2.0
% of the drugs which come from the EDL:	69/70= 98.6%	62/63= 98.4%	54/57= 94.4%	100%
% of the drugs prescribed by generic name:	43/70= 61.4%	59/63= 93.7%	55/57= 96.5%	100%
% of treatments which completely follow STG for the stated diagnosis:	5/32= 15.6%	9/31= 29.1%	11/25= 44%	100%
% of treatments which did not follow STG at all:	0%	0%	2/25= 8%	0%
% of prescribed drugs which were dispensed:	100%	100%	100%	100%
% drugs prescribed adequately:				
% drugs labelled correctly:	62/70= 88%	9/31= 29.1%	22/25= 88%	100%
Patient knowledge of drugs was good:	14/32= 43.8%	27/31= 87%	11/25= 44%	100%

8 of the prescriptions from Pholela clinic could not be used. It was felt that, as the people who collected the indicators had already been trained, there may have been a tendency to write what should have been there, rather than what was actually written. A point to challenge this was made by one of the staff members at the workshop: the staff who had attended the first workshop had educated them already about rational prescribing, and, for example, they were now aware and were trying to prescribe from the EDL and by generic name.

The same sisters responsible for feedback will collect drug use indicators at Sandanezwe and Gqumani. Further sets of indicators will be collected in a few months time- this will be co-ordinated by Gcina Radebe, together with the district co-ordinators.

4. **Stock management**: Stock cards were delivered to Gomane, Nxamalala and Pholela clinics the week after the first workshop. Terence Stafford, the SASO from St. Apollinaris hospital agreed to help the clinics with this task. At first month review it seems to be going well; facilitated by the sisters-in-charge. Another review will be done in a few months time.

There needs to be closer monitoring of environmental conditions in the storerooms, and closer watch made of expiry dates. These tasks are the responsibility of each sister-in-charge. Terence Stafford will be the district person involved.

Nxamalala has a lack of storage space, and are unable to keep their drugs secure in the day. Sister T. Zuma will address this issue by the end of August.

5. **Distribution of Supplies from Edendale**: Delivery of drugs is erratic. A) There are long delays between ordering and arrival of the drugs, and drugs sometimes do not arrive on the day expected. This happens because orders are not ready at Edendale: which happens in turn as the order books are slow in arriving at Edendale pharmacy.
   B) At Sandenezwe, Gqumani and Gwala drugs often arrive too late in the day, after the clinics have closed, as the drugs have to be fetched by a shared clinic driver. There is no dedicated drug delivery vehicle.

   There is some confusion with ordering system required by Edendale. The requisition of supplies from the clinics to Edendale and the distribution from Edendale to clinics needs rationalising.

   Both these issues will be looked at by the district co-ordinators, Sisters Nzimande and Mchunu, in this month. Terence Stafford and Laura Campbell were identified as people who could assist in this process.

Course feedback was positive. Staff enjoyed the course and it's manner of presentation. They felt they gained knowledge from the course, which they will be able to apply to their everyday clinic practice. They also recognise that they need more training, both clinical skills related and in the rational use of drugs. Many staff requested more such training.

The IUP district has begun the process toward ensuring rational drug usage is practised in their district. Nxamalala clinic, in particular, must be congratulated on their stock management system, which they began to implement before their stock cards were delivered! This whole process of rational drug use training, implementation of the stock card system and monitoring of improvement through collecting drug use indicators should be reinforced, hopefully using and building skills within the district.

Rational Drug Use Training Program
Tonga-Shongwe districts, Mpumalanga
25-26 September 1997

The Rational Drug Prescribing Training Project was invited to the Initiative for Sub-District Support Tonga-Shongwe site by the ISDS facilitators, Zama Nxumalo and Steven Donahue. Tonga and Shongwe are 2 districts of the Lowveld region of Mpumalanga province. The training was extended shortly before the time to include staff from the other 2 regions of the Lowveld by the director of Primary Health Care, Nomonde Bam, and the Curative and Diagnostic Program Director, Molly Smit. This resulted in large numbers attending, which is not ideal for a participative workshop. Training in the supply, management and use of drugs in the other regions of Mpumalanga, in particular the Highveld region, is being undertaken by the province in collaboration with Medunsa.

The 2 day problem-based workshop, covering the principles of prescribing, stock management and dispensing, was held at Sikwahlane clinic in Shongwe. This clinic, although it had no running water or electricity, was quiet and had a large waiting area which comfortably seated all the participants. 30 staff, including nursing staff, Human Resource Development district training co-ordinators, pharmacists and doctors attended. Mr Renier Botha of Stratmed also attended the second day. Time was limited, due to late starting times, particularly on the first day, and by early finishing times necessitated by having participants attending from distant areas. Both the facilitators and participants felt the training was rushed.

The 2-day program covered:

- **Day one:** an introduction to the principles of rational prescribing and the use of standard treatment guidelines, reinforced by 2 problem-based clinical case solving sessions.
- **Day two:** Principles of stock management, with emphasis on a clinic stock record system. Training in good dispensing practices and a brief introduction to the use of Drug Use Indicators. Feedback and forward planning for this region.

Points made in the summary and "way forward" discussions:

1. Next steps for **training in rational prescribing and collection of drug use indicators**: The group present was quite diverse. Most people were from the Tonga/Shongwe districts, but there were HRD co-ordinators and district pharmacists from outside this area. Dr. Steven Donahue proposed that the district and regional plans be discussed separately.

- <u>The Lowveld region</u>: Some commitment had been made at regional level to continue this training. Those trainers present from the other districts (Thandi Shabongu, Joyce Sibanyoni, Gabriel Mashile and Landi Bezuidenhout), as well as the HRD co-ordinators from Tonga and Shongwe (Johanna Mashabane and Zodwa Sibiya), felt they could present this program to others. They must fit the timing of this in with other in-service training planned. Measurement of drug use indicators must be discussed and co-ordinated by this group as well. A trainers folder, containing all the materials used by the facilitators in the 2 days, and drug use indicator forms, has been provided. More guidance on methods of training for the trainers is needed though, and the Rational Drug Prescribing Training Project trainers were asked to return to observe a workshop taught by one of these trainers.

  Mr Swanepoel, the pharmacist from Shongwe hospital said he could pass the information on to other pharmacists at the regional pharmacists meeting. The suggestion was made that

more basic pharmacology training and input is needed for prescribing nursing staff. The district staff were asked to involve their doctors and pharmacists in this process.

- Tonga/Shongwe district: Nurses from the different clinics were asked to report the content of the training course back to their colleagues there. This should be done by the 10 October 1997. Johanna and Zodwa will co-ordinate this and ensure clinics not present at the workshop receive feedback too. They will also consider presenting the principles of rational drug use using real patient examples.

2. **Implementation of a stock card system**: It was accepted that some form of clinic stock record system should be implemented. Although the sisters in charge of clinics were concerned about the time involved in the implementation, and whether they would receive support and training throughout this process, they realised they should be discussing how this process could best be adapted for them, before a system is imposed on them from provincial level. The stock card system therefore needs to be discussed at a district and regional level and brought in with instruction as a standard operating procedure. Stratmed have already implemented stock cards at the hospitals in this region, which can feasibly be adapted for clinic use as well.

3. Other problems: Problems such as a lack of small containers to dispense bulk stock into, no labels and poor stock supply were also discussed. Stratmed, the company responsible for the procurement and supply of drugs from a provincial to a district level in Mpumalanga, recognises these issues as being problems and is in the process of addressing them. There seems to be a shortage of some stock at national level. Stock of a scarce item is shared between clinics. In the Tonga/Shongwe district clinics are visited on a weekly basis to ensure stock has arrived and orders are collected. Clinics need to let their district pharmacist know about any problems with their supply of stock, which can then be addressed at district level.

Feedback on the 2 days from the participants was positive. The workshop was enjoyed, the clinical examples generally considered appropriate, and the principles learnt considered applicable to daily practice. They enjoyed being taught in the clinic setting too. The major complaint was lack of teaching time. Most staff requested an extra day, but one or two would like the trainers to spend a week at each clinic in the district! Other suggestions included that during a workshop a real patient is followed from arrival to the point of receiving therapy. Conceptually this idea is excellent, but would difficult to implement in a large group that is together for a short period of time. Perhaps those that take the training forward could structure such a process for staff, on an individual level, in clinics.

The facilitators enjoyed their 2 days as well, and look forward to being invited back to the district to participate in a follow-up workshop. The staff of the Rational Drug Prescribing Training Project are available for any support or advice needed in collecting drug use indicators or presenting these workshops or simply for answering drug queries.

For further information please contact Catherine Orrell on 021.406 6353 (correll@uctgsh1.ac.za) or Aarti Kishuna on 031.82 3217 or 204 4358 (pcmic@healthlink.org.za).

Appendix Five: Reports from non ISDS sites

Rational Drug Use Training Project
Gamalake Clinic, Region G, KwaZulu-Natal
16-18 July 1997

The Rational Drug Prescribing Project was introduced in this region from 16-18 July 1997. Sister Janet Dalton co-ordinated. This is a region where focus group discussions were held last year. 12 staff attended the session: 10 nursing staff (senior professional nurses), Sr. Dalton as regional co-ordinator and Dr Christiane Horwood from Amatikulu. The pharmacist from Murchison Hospital was invited, but did not attend.

Three days were planned for this region.

- **Day one**: Introduction to Rational Prescribing and use of Standard Treatment Guidelines
- **Day two**: Introduction to use of Drug Use Indicators and collection, by the trainees, of 30 scripts. Stock management and Dispensing training.
- **Day three**: Analysis of scripts. Feedback and forward planning for this region.

30 prescriptions were collected on the morning of the 17th July by the trainees. 30 consecutive patients were interviewed due to the limited time available. These are the results found:

Drug Use Indicator:	Result (30 scripts)	Ideal:
Number of drugs in total	**74**	
Number of drugs per prescription	**2.4**	1.2 to 2.0
Percentage of drugs from the Essential Drug List	**80%** (64/74)	100%
Percentage of drugs prescribed generically	**24%** (18/74)	100%
Percentage of drugs dispensed	**100%** (74/74)	100%
Percent completely following Standard Treatment Guideline (STG) for that diagnosis	**36%** (11/30)	100%
Percent not following STG at all	**3%** (1/30)	0%
Percent of patients with good knowledge of drugs given (know how much, how often; how long to take the drugs; and common side-effects)	**26%** (8/30)	100%
Percent of patients with no knowledge of drugs at all	**0%** (0/30)	0%
% drugs correctly prescribed (drug name, strength, dosing and duration of treatment all specified)	**9%** (7/74)	100%
% drugs correctly labelled (patient and drug name, dosing and expiry date all specified)	**1%** (1/74)	100%

This process was simply an exercise, using a small sample. These data give a broad overview of prescribing habits and form a basis for choosing areas in which more training will be useful. The anonymity of this process was emphasised.

Staff will be collecting similar indicators from their own facilities in the next few weeks. All the sisters present will feed the content of the three day workshop back to the other staff at their health facilities.

Problems, and the way forward:

1. Lack of teamwork: The nursing staff feel they are being increasingly targeted as first-line primary health care workers, but the support they need, both in training and from their fellow professionals is lacking. They find some doctors will not listen to nurse referrals or advice and are generally resistant to change. The example was given of doctors not following the new provincial standard treatment guidelines for sexually transmitted diseases (STD). They were also aware that a pharmacist who had been invited to this session had not arrived. It was emphasised that ALL professionals should attend this type of in-service training: and from hospitals as well as clinics and mobiles.

It was felt that this problem needed to be dealt with at a district level. All staff present will determine to whom they can direct their problems and comments. Many of the clinics have staff on the district health team e.g. Sr. Zukulu from Port Shepstone primary health care centre; but Assisi has nobody at present. Gugu Mpofu will find out who will take this role for them.

2. Drug supplies and management of stock: There are a number of problems with drug supply in this region. The hospitals from which they are supposed to receive drugs often are *understaffed* and cannot cope with the clinic's demand e.g. Port Shepstone Hospital, Kokstad Hospital, forcing the clinics to order direct from the PMSC. Other hospitals *refuse to supply* more stock than was given the previous month, despite the demand having increased. Often less stock arrives than has been ordered. Other problems: some medicines are supplied in large packets e.g. in 100s, when only 20 are needed for treatment, but no plastic packets are supplied so that tablets can be divided up; although new STD guidelines are in place the drugs are received packaged for the old guidelines; and recently no red labels have been supplied for "not by mouth" medicines, which causes concern as the packaging of some drugs e.g. benzylbenzoate and co-trimoxazole, are very similar.

The issues of understaffing and drug supply will be discussed with Sr. Janet Dalton, by some of the trainers (Sr. Iris Naidoo, Sr. Mavundla) at the district primary health care meeting on the 22nd July 1997.Each clinic will motivate to the PMSC for the supply of packets and red "poison" labels. Sr. Sylvia Makaluxa will co-ordinate this request.

Those clinics not already using a *stock record card system* will implement one in the next month. They will request the provincial stock cards from the PMSC and discuss the system at the next district primary health care meeting.

3. Patient demand and "drug shopping": A number of the sisters were concerned about patient demand. It is felt that if the staff do not supply a patient with the medicines they want, they will simply drug "shop" and go to another clinic. Occasionally staff have been threatened physically by patients when they have not complied with their demand.

The solution to these problems have to be long term plans for community education. Each staff member must play a role by educating her patients. It was accepted that, although some patients are unreasonable, many will respond to education and advice about drug use.

4. Poor access to unbiased drug information: Staff will apply to the KwaZulu-Natal provincial library system for books they need. They will use the Primary Care Medicines Resource Centre at the University of Durban-Westville too.

5. Staff shortage and lack of clinical skill: Training has not increased in relation to the increase in emphasis on nurses as primary health care givers. Staff need more training in clinical skills as well as rational drug use.

   In this group a number of the sisters act as trainers. Their work load has increased with the regionalisation of health training, yet there has been no increase in the number of trainers. There is an urgent need for more dedicated primary health care trainers to be employed.

The 13 staff that attended the rational drug use training found it relevant and educative. They felt all clinic staff should receive similar training, perhaps with a little more basic pharmacology. The workshop was seen as being practical and easy to follow. The emphasis on patient health education was welcomed. Staff have been encouraged to take this training forward, as well as to take responsibility for, and help to address, problems in their districts: Aarti Kishuna and Catherine Orrell will support this process where-ever possible.

Rational Drug Prescribing Training Project
Kwamsane, Hlabisa District, KwaZulu-Natal
13-14 October 1997

The Rational Drug Prescribing Training Project was invited to the Hlabisa district by Dr. Yvonne Ganley. Dr Ganley is the community doctor for the 11clinics in the Hlabisa district, responsible for in-service training of the nurse prescribers running these clinics. She had identified problems with rational prescribing and management of stock in these clinics. Eleven staff, one nurse prescriber or staff nurse from 10 of the district clinics, and a SASO from the Hlabisa hospital pharmacy attended the 2 day training. Matron Mayise, the community matron, attended some of the sessions.

The first day of the training covered the principles of rational prescribing and the use of standard treatment guidelines, using a clinical, problem-based approach. Staff applied these principles to primary care clinical cases. Clinic stock management and good dispensing practice were covered on the second day. Kwamsane clinic dispensary was visited by the participants for hands on teaching. The collection and collation of drug use indicators were discussed throughout the session.

Feedback from the staff was positive. They appreciated the training, although they would have liked more time for the workshop, and felt they would be able to apply the principles taught to their own practice in the future. They would like the other health staff in the district to receive the training too.

Problems related to drug management and use in the district were identified and solutions discussed:

Lack of funds for drugs: Two new clinics have been built in the district recently. There has been no commensurate increase in funding for medications to the district. Sam Mdluli, the SASO from Hlabisa Hospital pharmacy reported that the district had already overspent their drug budget for this year. Apparently the clinics had each been allocated a budget by the PMSC, but neither the clinic staff or the matron was aware of whether these funds were available for use. The superintendent of Hlabisa Hospital, Dr Drisedale, is addressing these issues. Dr Ganley will report results back to the clinics.

Problems in ordering and supply of medicines: Some of the staff mentioned that at times stock they ordered does not arrive or arrives in lower quantities than requested. They have no safety stock in reserve for these occasions. The SASO, Sam Mduli, reminded them that this only happens when he is out of stock at the hospital, while awaiting supplies from the depot. If his stock is low he prioritises the hospital.

Both the nursing staff and SASO agreed that some of these problems could be overcome if the clinics could accurately quantify their drug usage. None of the 11 primary health care facilities in the district have any stock monitoring system. One of the staff had recently ordered 10 000 packets of paracetamol (10's) in an attempt to build up a 3 month safety stock. She had no way of determining how much her clinic actually used, so simply guessed the figure. In fact this is more than is used by the whole district, including the hospital!

After discussions with the participants it was decided to implement a "pilot" a clinic stock card system in the district's 2 new clinics. Their patient load is still quite small, so there will be staff

available for the increased work required initially. Commitment to the task will be important. Management systems are less entrenched in these new centres, so a new system may be more readily accepted. Sr. June Mashego of Ntondweni Clinic and Sr. Thandi Mathebula of Esiyembeni Clinic will be implementing the system, with the support of Dr. Yvonne Ganley and the other workshop participants. Stock cards will be supplied by Aarti Kishuna before the end of October 1997, and implementation will be reviewed by one of the Rational Drug Prescribing Training Project staff after a 3 month trial period (December 1997, January and February 1998). If the system is considered successful it will be implemented in all the facilities in the Hlabisa district.

Prescribing and Dispensing indicators: Another point that arose was that costs of medications to the district could be reduced if the staff prescribing was rationalised. Dr. Ganley will co-ordinate the collection of drug use indicators, to provide a baseline description of prescribing patterns. She will co-ordinate the collection of 30 prescribing indicators from each of the 11 clinics before the end of November 1997. Catherine Orrell will collate these data and return it to Hlabisa before the middle of December 1997.

Staff will discuss the results and request training as needed.

Feedback to other clinic staff: It was emphasised that each of the participants should take responsibility for teaching the content of the workshop to the other staff at their facilities who were not able to attend. This should apply to any in-service training received. All clinics have at least one hours dedicated training time a week. Participants agreed to that they will report back at their facility within 2 weeks from the workshop, i.e. by the 31 October 1997.

The Hlabisa district has agreed to implement a number of processes that will lead to the improvement of drug use in the district. The staff of the Rational Drug Prescribing Training Project will provide support for this process by reviewing the drug use indicators and stock card system, as well as acting, through the Primary Care Medicines Resource Centre, as a drug information resource.

Rational Drug Use Training Project
Kwadabeka Clinic, Region F, KwaZulu-Natal
13 -14 July 1997

The Rational Drug Prescribing Project was introduced to Region F on 13th and 14th July 1997. Sister Kay Naidoo co-ordinated and organised the venue at Kwadabeka. 13 staff attended: 11 nurses (professional nurses and senior professional nurses), 1 doctor and 1 pharmacist. The 2 days covered the introduction to rational prescribing, the use of Standard Treatment Guidelines, stock management and dispensing training, as well as an introduction to the use of drug use indicators.

Problems identified in this region:

1. Some of the clinics in this region e.g. Mpumalanga, fall under the pharmacy at Edendale hospital. They find they are **unsupported by the pharmacists**, who do visit, but are often over-critical and provide little practical help. The clinics often receive drugs nearing their expiry date, or are given less than what they order. No explanation is offered for this. A similar situation was experienced at Kwadabeka clinic, until a pharmacist was employed there.
2. There is **little clinic or primary care involvement in policy**. It is felt that systems are introduced in a top-down fashion e.g. the new STD protocols, which were introduced recently, after which the clinic was given a week to implement them. One of the problems rising from this was the sudden decrease in tetracycline use (doxycycline being recommended instead), despite the large amounts which were still in stock, causing a great deal to be wasted.
3. The nursing staff find the **doctors and pharmacists unapproachable** and hard to communicate with. If a problem with a doctor's prescription or a dispensed drug is brought to their attention by a nurse, that advice is often brushed aside or ignored.
4. **Electricity supply**: Mpumalanga clinic is often without electricity. There has been no back-up system installed for the care of the medications which must be kept cold, e.g. vaccines. The clinic were told that no gas fridges were allocated to them.
5. **Tuberculosis treatment**: Firstly treatment comes in varying forms of packaging. Some clinics have patient ready packs, although tablets have to be removed if the patient weighs under 50 kilograms. Others receive bulk packet of individual drugs which must be divided up, and yet others receive combination tablets, not in patient ready packets. Further problems arise with the introduction of the new TB treatment guidelines: some facilities use the old ones, others the new ones.

Plans for the way forward:

- Improve teamwork within facilities and the district health team: there are regular district health team meetings. The issues of teamwork and rational drug use will be discussed at the next one (Dr. Les Pitt) for the Outer West Council. Clinics will try to organise regular staff meetings at which issues of teamwork and problems with prescriptions can be discussed. Sr. Virginia Malinga will do this for Kwadabeka clinic. There may be a problem with the part-time doctors, who rarely attend or become involved with clinic meetings.
- All staff, nurses, doctors and pharmacists, should receive in-service training on rational drug use. All groups have been noted to prescribe and dispense irrationally at times. This training may have to be held after hours, as some staff, particularly the part-time doctors who may be running a practice too, are reluctant to attend in working hours.
- Feedback from the 2 day rational drug prescribing course will be given to all other staff. This will be done by Friday 25/7/97. Sister Lindiwe Nqwenya from Botha's Hill clinic noted that rational prescribing had already been identified as a problem there and they were beginning to work on it.

- A prescribing survey will be done at all the clinics in the region. These data will be collated and used to identify areas in which training is needed or for which simple guidelines could be useful e.g. drug interactions/standardising TB therapy. The prescribing indicator form will need to be adapted to make it clearer and staff will need to meet to discuss how they are going to standardise their input. Sr. Malinga will organise this. People responsible are:

Sr. N. Mkhize: Kwa-Ngolisi clinic Sr. D.D.Mabaso: Molweni clinic Sr. N.J. Sibisi: Fredville clinic Sr. V.V. Malinga: KwaDabeka clinic Sr. L. Nqwenya: Botha's Hill clinic Sr. Khumalo: Mpumalanga.

The process of informing the superintendents and staff, delivery of prescribing indicator forms and collection of drug use indicators will happen before the 31st July. The results will be reported at the August district health team meeting and a summary of the findings will be sent to Aarti Kishuna. Aarti and Catherine Orrell are available for help at any time.

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Rational Drug Use Training Project
Madadene clinic number 5, Region G, KwaZulu-Natal
16-17 October 1997

The Rational Drug Use Training Programme was first introduced to Region G, KZN, in June 1997. Ms Kishuna presented an overview of the programme at the regional pharmaceutical meeting held at Dundee hospital. There was general consensus amongst all present that the region would benefit from the RDU workshop. Subsequently an invitation to conduct the workshop was extended to us by the Regional Director, Maxie Bouwer.

The workshop was held on the 16th and 17th of October 1997. The regional office coordinated and organised the venue at Madadeni Clinic.18 staff attended: 16 nurses (14 were professional nurses and senior professional nurses, 2 were staff nurses), 1 doctor and 1 pharmacist. The staff nurses and the pharmacist only attended the second day of the workshop, the doctor attended the first day, with the remaining nurses attending both days. Of the 14 professional nurses, 8 were PHC trainers/supervisors. Together with the doctor, they are responsible for in-service training in this region.

The 2 days covered the introduction to rational prescribing, the use of Standard Treatment Guidelines, stock management and dispensing training, as well as an introduction to the use of drug use indicators.

Problems identified in this region:

1. training is targeted largely at the nurses with little emphasis on doctors and pharmacists. This results in problems during the implementation of certain training programmes, the perception being that nurses must change their behaviour whilst the other categories of healthworkers continue as they were.
2. supply of drugs is a problem, especially at those facilities that fell under the former KwaZulu Department of Health. For e.g. Madadeni hospital has 12 clinics and 1 mobile clinic affiliated to it. Madadeni hospital supplies drugs to these clinics as well as to Charles Johnson Memorial (CJM) hospital. Newcastle hospital, on the other hand, (former NPA) has just one primary care clinic affiliated to it. This clinic is situated on the same premises as the hospital. Supply of drugs to the clinic is not a problem here.
3. The existing shortage of staff, especially pharmacy staff, hinders proper management and supply of drugs.

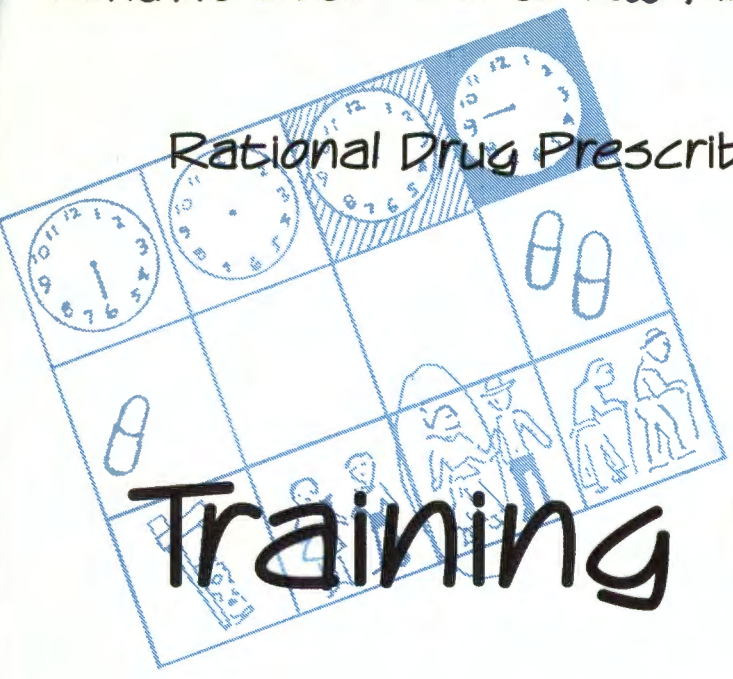
Plans for the way forward:

Action	Deadline	Person Responsible
1. Feedback to other health care workers and managers	**31 October 1997**	**CJM: N.E Zwane Msinga: Phumele Dlamini Dundee: Maria Sithole Newcastle: Thandiwe Dlamini Madadeni: Nana Gama**
2. Identify existing prescribing, dispensing and stock management practices through the collection of drug use indicators	**31 December 1997**	**The PHC trainers and supervisors from the different areas will co-ordinate with the individual clinics and facilitate the collection of**

		the indicators.
3. Training in Rational Drug Use. 3.1. Acquisition of EDL books and primary health care formularies	Will only commence in 1998. Dates still to be confirmed	PHC trainers and supervisors, together with Dr Likibi. Dr Likibi has the RDU training folder which contains the relevant transparencies used in the teaching. 3.1. Aarti Kishuna will liaise with the regional office to determine the best way of providing the necessary texts.
4. Introduction of a stock record card system	Will be implemented once the RDU training has been undertaken	PHC supervisors and trainers, and Mr Meijering (pharmacist) to supervise

Register of participants

Name	Region/Area	Role
NE Gama	Madadeni Hospital	PHC Trainer
TT Buthelezi	Nquthu District	PHC Supervisor
GD Ndlovu	Madadeni Clinic No. 5	Sister-in-Charge
NE Zama	CJM Hospital	PHC Trainer
T Dlamini	Newcastle Hospital	PHC Trainer
M Sithole	Dundee Hospital	PHC Trainer
N Malotana	Church of Scotland Hospital	Sister -in-Charge
Dr Likibi	Madadeni PHC	PHC community doctor
M Buthelezi	Dundee	Clinic Sister
SB Mkhize	Newcastle PHC	PHC Supervisor
FA Nkosi	Newcastle PHC	Mobile Sister
NG Zondo	Church of Scotland Hospital	Mobile Sister
MB Zulu	Church of Scotland Hospital	Clinic sister
LP Dlamini	Church of Scotland Hospital	PHC Supervisor
G Mbele	Madadeni PHC	PHC Supervisor
DR Mkwana	Newcastle PHC	SASO
J Meijering	Newcastle Hospital	Pharmacist
MP Radebe	Newcastle PHC	SASO



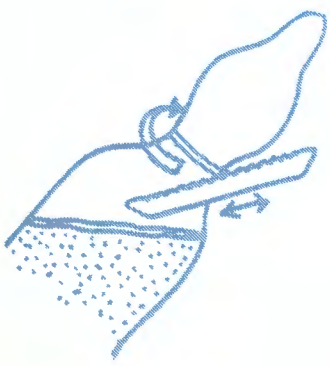
Rational Drug Prescribing Training Course

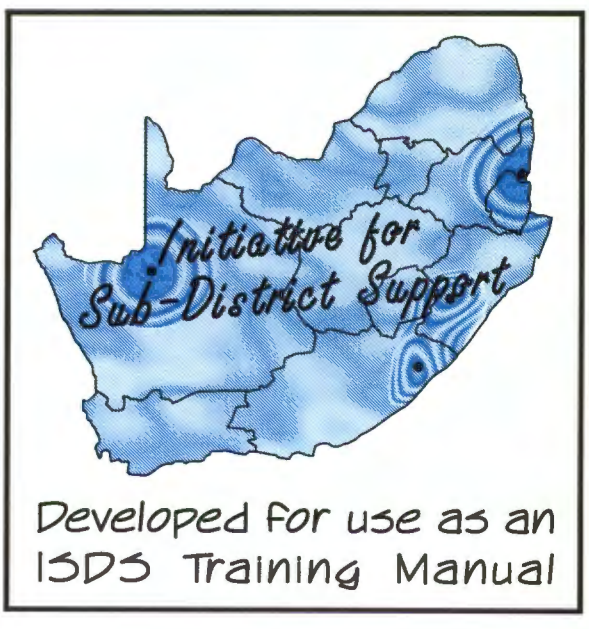
Training Manual



ERRATUM

Please note that the correct email address for Cathrine Orrell is :
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Developed for use as an ISDS Training Manual

Rational Drug Prescribing Training Course

Training Manual

Produced as part of a joint programme of the Universities of Durban-Westville and Cape Town

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ONE
Introduction

This manual focuses on the *process* of prescribing. It gives you the tools to think for yourself and not blindly follow what other people think and do. It will help you to understand why certain national or departmental standard treatment guidelines have been chosen, and teaches you how to make the best use of such guidelines.

We aim to encourage all prescribers at primary care level, be they nurses, pharmacists or doctors, to prescribe medicines in a safe, efficient and cost effective manner. *Rational prescribing* is the *process* of making sure that the diagnosis, advice and treatment for any given patient are correct, and, if a medicine is used, that it is the correct choice. The medicine must be given in the correct dose over the right period of time. The patient must know enough about their medication to understand why and when they must take it and what side-effects to worry about. Importantly the drug must be available in appropriate quality and quantity at this time.

To meet this goal we have developed a short **problem-based training course** for primary care prescribers that is taught in their own environment. The content of the course comes from needs expressed during focus group discussions by staff at primary health care facilities in KwaZulu-Natal and the Western Cape. To evaluate prescribing practices and to monitor changes resulting from the training we have included a series of **"drug-use" indicators** (Appendix one). The project will be supported and sustained by the **development of a network** of references and resources: from texts supplied at the time of training and telephonic access to a local pharmacist, to e-mail via HealthLink to the Medicines Information Centre in Cape Town or Durban

The Course

- Small groups of 8-10 staff are taught at their own health care facility.
- They are taught by one, or perhaps two, trainers at a 2-day workshop.
- Using common clinical problems, the participants learn how to prescribe rationally.
- They are given practical points on using standard therapeutic guidelines.
- While in their own dispensary they are advised on efficient management of a dispensary.
- Giving patients information on their illness and medication is emphasised.

Measurement

- "Drug-use" indicators will be collected at every facility, before and after the training.
- These include factors that would reflect the resources and workload of each facility, as well as the prescribing practices of the staff working there.
- They would be collected by the trainer to start with, but in time the staff at each clinic will learn to collect this data so they can audit their own practice. (See Appendix one.)

The Future

In time a network will be built to support every prescriber:

- All participants are encouraged to look up or **ask** for information they need.
- The trainers will be accessible at all times to the people they train.
- Detailed drug information is available now by telephone or e-mail (Healthlink) to the Medicines Information Centre in Cape Town. That information is being made more accessible by the creation of local information centres. A small information centre will be running at the University of Durban-Westville from January 1997.

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TWO
Problem-based learning

Clinical training often focuses on diagnosing rather than on treating skills. Sometimes students are only expected to copy the prescribing behaviour of their clinical teachers, or existing standard treatment guidelines, without explanation as to *why* certain treatments are chosen.

Bad prescribing habits lead to ineffective and unsafe treatment, worsening of illness, distress and harm to the patient, and higher costs. They also make the prescriber vulnerable to influences which can cause irrational prescribing, such as patient pressure, bad example of colleagues and high-powered salesmanship. Changing existing prescribing habits is very difficult. So good training is needed *before* poor habits get a chance to develop.

> **Problem-based learning** is an instructional method in which you as the learner are presented with a clinical problem as a starting point. The patient's problem is discussed and you identify the knowledge you need to understand and solve it. Any new knowledge needed must be found by the learners and used to answer the problem. Teachers guide the problem-solving process but do not provide the answers.

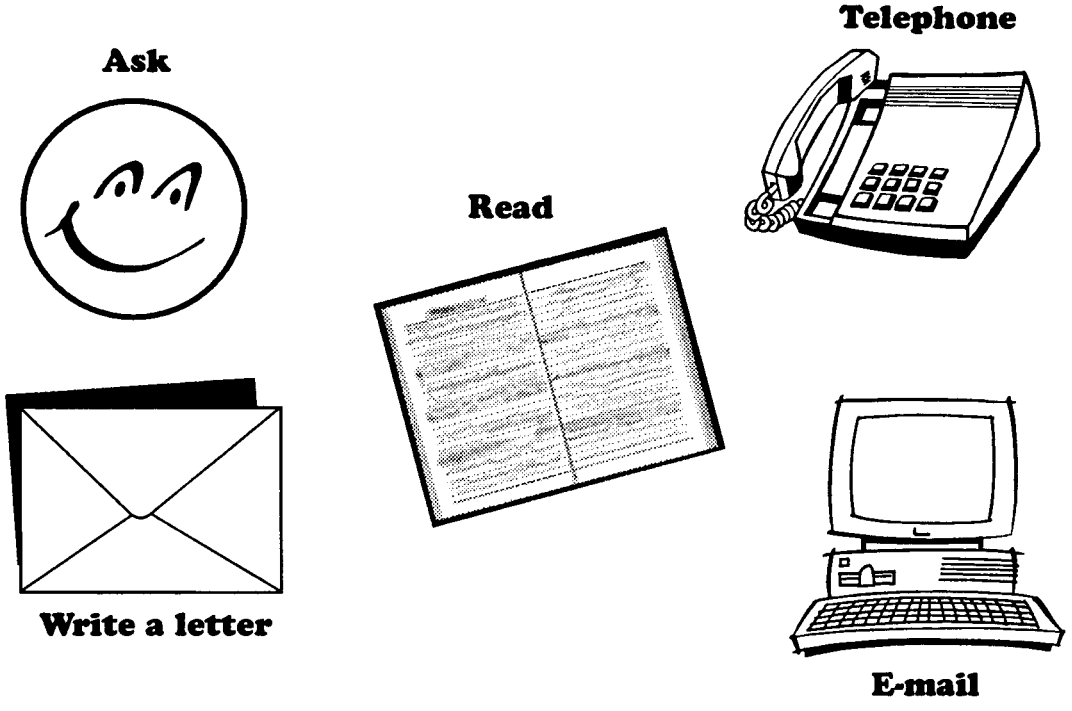
Another name is "learning in a functional context": the problems are arranged to be similar to ones the staff face every day at work. A process of active learning is used, where the staff, while solving the problem of their patient, learn *why* that particular answer is appropriate. This can be seen as a challenge, although it may be difficult for someone used to passive teaching to adapt to this less teacher-dependent approach initially. Large amounts of satisfaction and excitement are generated from successfully solving a problem in this way. The method used to solve the problems is remembered and can be used by the prescribers when faced with a similar real problem at work.

Community-based education is education based in the same or similar community as the health professionals are to work. Knowledge acquired in the relevant context is remembered even better. The focus is on preventive medicine, health promotion and health maintenance, in which patient education plays a large part.

THREE
Rational drug prescribing

When you see a patient you go through a process which leads you to the treatment. First you need to define the patient's **problem** (the **diagnosis**). After that, you have to specify the **therapeutic objective** i.e. decide what exactly you want to achieve with your treatment. Then **choose a treatment** of proven efficacy and safety, from different alternatives. In South Africa our choice of drugs will be from the Essential Drugs List. You then **start the treatment**, for example by writing an accurate prescription, and providing the patient with clear **information and instructions**. After some time you **monitor the results** of the treatment; only then will you know if it has been successful (have you achieved your treatment objectives?). If the problem has been solved, the treatment can be **stopped**. If not, you will need to re-examine all the steps.

Most importantly you need be able to ASK for help if you are uncertain about your patient's problem or the treatment for it. You can speak to someone, refer to a book, or write to, phone or email your nearest information centre.



A worried mother brings her 6 month old child to you. He has had watery diarrhoea for 2 days. He is managing to take fluids by mouth, but he vomited twice yesterday. On examination he is not feverish, is awake and alert, but has signs of dehydration (decreased skin turgor, dry mouth and rapid pulse). You spend some time advising the mother on the management of diarrhoea and prescribe oral rehydration fluid as needed for the next 5 days.

Let's look at this example. When you observe experienced clinicians, the process of choosing a treatment and writing a prescription seems easy. They reflect for a short time and usually decide quickly what to do. But don't try to imitate this! Choosing a treatment is more difficult than it seems, and to gain experience you need to work very systematically.

In fact, there are two important stages in choosing a treatment. You start by considering your '**first-choice' treatment** which is the one you are familiar with. The second stage is to check that your first-choice **treatment is suitable** for this particular patient by going through the steps above. So, in order to continue, we should define our first-choice treatment for acute watery diarrhoea. There are a number of clinical examples in Appendix two for you to practice on.

Choosing your 'first-choice' treatment

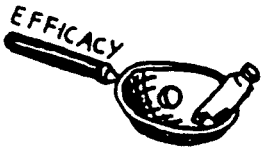
What is your first-choice treatment for acute watery diarrhoea?

In general, there are four possible approaches to treatment:

1. information and advice;
2. treatment without drugs (e.g. dietary management);
3. treatment with a drug; and
4. referral.



Combinations are also possible.

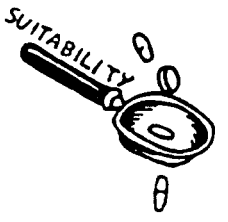


1. For acute watery diarrhoea, **information and advice** can be given, explaining that the child has an infection (probably due to virus) of the gastrointestinal tract that will get better by itself in a few days. Advise the mother to continue milk or breast-feeds and other regular feeding, while carefully observing the child for worsening symptoms. **2. Non-drug treatment** for this condition would be giving additional fluid (rice water, fruit juice or homemade sugar/salt solution) as often as the child will take it. **3. Drug management** would be oral rehydration fluid (ORF) by mouth or by nasogastric tube if the child is vomiting excessively. There are a number of anti-diarrhoeal agents such as loperamide (imodium) the use of which is NOT reommended, especially for children. Antibiotics are commonly used to treat diarrhoea too, and again are NOT recommended. These drugs will be discussed below. 4. The last therapeutic possibility is to **refer** the patient for further analysis and treatment. For initial treatment of acute watery diarrhoea this is not necessary.



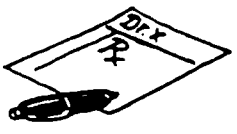


Rather than reviewing all possible drugs for the treatment of acute watery diarrhoea every time you need one, you should decide your first-choice treatment beforehand. The general approach would be to make a list of possible treatments, and to choose your **'first-choice' treatment** on the basis of a comparison of their efficacy, safety, suitability and cost. In South Africa your choice in primary care will be limited to those drugs on the **Essential Drugs List (EDL)**. This list means that part of the process of choosing the best treatment has been done for you.



What are essential drugs?

They are those medicines which are critically required for the management of 90-95% of common and important conditions in our country. These medicines must all meet with high standards of safety, quality and efficacy.



What do you need to know about your treatment? Always ask yourself **"do I need a drug"** at all? If you are going to be using a drug you need to know a number of things about it:

- what is it for? (licensed indications, is it first-or second-line treatment?)
- how effective is it? (usually trial-based knowledge)
- how safe is it? (contra-indications, **interactions** with other prescribed drugs or **over-the-counter drugs**, allergies)
- who should NOT receive it? (check for being a **high risk patient**: children, geriatric, pregnant, breast-feeding, liver or renal disease, DM, porphyria etc.)
- how is it given and for how long? (convenience to patient, dose)
- what does it cost?

i.e. Choose your drug treatment on the basis of efficacy, safety, suitability and cost

Weighing these facts is the most difficult step, and one where you must make your own decisions. Prescribers work in varying socio-cultural contexts with many treatment options available. The aim of this manual is to teach you **how**, and not **what**, to choose, within the possibilities of your health care system.

In the case of acute watery diarrhoea extra fluids and ORF will be needed to correct the loss of water and electrolytes, as well as for rehydration. This will prevent further dehydration too. Although ORF will not cure the diarrhoea, most childhood watery diarrhoea is caused by a self-limiting viral infection and will get better in 5-7 days on its own. By preventing dehydration we prevent any harm to the child.

Anti-diarrhoeal agents, such as loperamide, are not indicated, especially for children, as they do not cure the problem. Body fluids continue to be lost into the intestines, but are not passed as loose stools. This gives the false impression that 'something is being done' while the child is still becoming dehydrated. In a primary care context in South Africa, anti-diarrhoeals are unlikely to be prescribed as they are not on the EDL. However, they are sold over-the-counter in the private sector, so we need to know a little about them so we can educate our patients about their potentially harmful effects.

Antibiotics, such as cotrimoxazole, metronidazole and ampicillin, are not effective in treating watery diarrhoea, as this is usually caused by a virus, not a bacteria or a protozoa. Antibiotics are only indicated for persistent bloody and/or slimy diarrhoea, which is much less common than watery diarrhoea. Metronidazole is mainly used for proven amoebiasis.

So having thought about the problem, for most patients with acute watery diarrhoea, advice and non-drug management will be effective if it is practical and acceptable for the patient's circumstances. Advice is certainly safer and cheaper than drugs. If we do decide on a drug we would give ORF alone. If the drug treatment is not effective after 3-5 days, the diagnosis should be reconsidered and patient compliance checked.

Your 'first-choice' treatment is therefore: advice to continue feeding, to give extra fluids, either homemade (non-drug) or ORF (our 'first-choice' drug treatment) and to observe the child carefully.

The process of rational prescribing

Now that we have decided on our first choice treatment for acute watery diarrhoea, we can review the process of rational prescribing as a whole. This process consists of six steps, each of which is discussed briefly, using the example of our patient with diarrhoea.

Step 1: Define the patient's problem

That is, come to a diagnosis by using your clinical skills of questioning, listening and examining. If one diagnosis is impossible, come to a differential diagnosis. What *could* this be?

Our patient's problem can be described as one of acute watery diarrhoea. This is the symptom which is bothering the patient; but from the clinician's viewpoint there might be other dangers and concerns. We would have to exclude any underlying causes for the diarrhoea, such as poor hygiene or malnutrition. There could be socio-economic problems too.

Remember, any single complaint may have many origins (a disease, a need for reassurance, a drug side-effect, polypharmacy etc.) What is the underlying problem for each of the following patients?

Patient 1:	*Woman, 23 years. Complains of a sore throat but is also very tired and has enlarged lymph nodes in her neck. Slight fever. She has come for the results of last week's laboratory tests.*
Patient 2:	*Woman student, 19 years. Complains of a sore throat. Slight redness of the throat; but no fever and no other findings. She is a little shy and has never consulted you before for such a minor complaint.*
Patient 3:	*Woman, 32 years. Very sore throat, caused by a severe bacterial infection, despite penicillin prescribed last week*
Patient 4:	*Man, 67 years. He comes for his medication for the next two months. He says that he is doing very well and has no complaints. He only wants a prescription for digoxin 0.25 mg (60 tablets), isosorbide dinitrate 5 mg (180 tablets), furosemide 40 mg (60 tablets), salbutamol 4 mg (180 tablets), cimetidine 200 mg (120 tablets), prednisolone 5 mg (120 tablets), and amoxicillin 500 mg (180 tablets).*

Patient 1 (sore throat)	Her blood test confirms your clinical diagnosis of AIDS. Her problem is that the sore throat is a symptom of an underlying disease.
Patient 2 (sore throat)	You noticed that she was rather shy and remembered that she had never consulted you before for such a minor complaint. You ask her gently what the real trouble is, and after some hesitation she tells you that she has not menstruated for 3 months. Her real concern had nothing to do with her throat.

Patient 3 (sore throat)	A careful history of patient 7, whose bacterial infection persists despite the penicillin, reveals that she stopped taking the drugs after three days because she felt much better. She should, of course, have completed the course. Her problem has come back because of inadequate treatment.
Patient 4	He states that he has no complaints. But is there really no problem? He may suffer from a heart condition, from asthma and from his stomach, but he definitely has one other problem: **polypharmacy**! It is unlikely that he needs all these drugs. Some may even have been prescribed to cure the side effects of another. In fact it is a miracle that he feels well. Think of all the possible side effects and interactions between so many different drugs: hypokalemia by furosemide leading to digoxin intoxication is only one example.

These examples illustrate that one complaint may be related to many different problems: a need for reassurance; a sign of underlying disease; a hidden request for help in solving another problem; a side effect of drug treatment; and non-adherence to treatment. So the lesson is: don't jump to therapeutic conclusions!

Define the patient's problem:

- **Disease or disorder**
- **Sign of underlying disease**
- **Psychological or social problems, anxiety**
- **Side effect of drugs**
- **Refill request (polypharmacy)**
- **Non-adherence to treatment**
- **Request for preventive treatment**
- **Combinations of the above**

Step 2: Specify the therapeutic objective

What do you want to achieve?

By deciding on specific goals you can avoid unnecessary drug use. These objectives can be very obvious, but they are not always going to be. The patient's reason for visiting you and your treatment objective may NOT be the same. **Discuss** your ideas with your patient. Informed consent improves compliance.

In our patient the diarrhoea is probably caused by a viral infection, as it is watery (not slimy or bloody) and there is no fever. She has signs of dehydration which is the most worrying problem. The therapeutic objective in this case is therefore (1) to prevent further dehydration and (2) to rehydrate. Not: to cure the infection! Antibiotics would be ineffective anyway. Our final objective would be (3) to prevent any further episodes from occurring.

Patient demand

A patient may demand a treatment, or even a specific drug, and this can give you a hard time. Some patients are difficult to convince that a disease is self-limiting or may not be willing to put up with even minor physical discomfort. There may be a 'hidden' **psycho-social problem**, e.g. long-term use and dependence on benzodiazepine. In some cases it may be difficult to stop the treatment because psychological or physical dependence on the drugs has been created. Patient demand for specific drugs occurs most frequently with pain killers, sleeping pills and other psychotropic drugs, antibiotics, nasal decongestants, cough and cold preparations, and eye/ear medicines.

The **personal characteristics and attitudes** of your patients play a very important role. Patients' expectations are often **influenced** for example: by the past (the previous clinician always gave a drug), by the family (the drug that helped grandma so much), by advertisements to the public.

Although patients do sometimes demand a drug, prescribers often **assume such** a demand even when it doesn't exist. So a prescription is written because the physician thinks that the patient thinks... This also applies to the use of injections, or 'strong drugs' in general.

Patient demand for a drug may have several symbolic functions. A prescription makes a patient's complaint into an illness. It may also fills the need for something to be done, and symbolises the care of the clinician. It is important to realize that the **demand for a drug is much more than a demand for a chemical substance.**

There are no rules about how to deal with patient demand, except one: be sure that you talk with the patient and give a careful explanation. You need good communication skills to be a good clinician. Find out why the patient thinks that way. Make sure you have understood the patient's arguments, and that the patient has understood you. Never forget that **patients are partners** in therapy; always take their point of view seriously and discuss the reasons behind your treatment choice. Your arguments are usually convincing, provided they are understandable.

Your enemy when dealing with patient demand is **time**, i.e. the lack of it. Talking and explanation take time and often you will be rushed. However, in the long run it is worthwhile.

What would be your treatment objective in the following patients?

Patient 5: *An elderly gentleman comes to you complaining of constipation. He lives alone and eats poorly as he is afraid of walking too far as his arthritis becomes painful, and so cannot get to the shops. His GP prescribed codeine tablets for the pain.*

Patient 6: *Woman student, 19 years. Complains of a sore throat. Slight redness of the throat, no other findings. After some hesitation she tells you that she is three months overdue. On examination, she is three months pregnant.*

Patient 7: *Woman, 24 years. Consulted you 3 weeks ago, complaining of constant tiredness after delivery of her second child. She is slightly pale, but has a normal Hb. You had already advised her to avoid strenuous exercise. She has now returned because the tiredness persists and a friend told her that a vitamin injection would do her good. This is what she wants.*

Patient 5 (constipation) In this patient there are a number of factors contributing to the constipation: poor diet, lack of exercise and the opiate pain tablet, codeine. Our treatment objectives are to relieve his constipation, then to prevent it happening again. We must give advice on eating high fibre foods, drinking lots of fluids and trying to exercise more frequently. As he is elderly he may need support of family and friends to achieve this. We should change his analgesic to one less likely to cause constipation, e.g. paracetamol. If the constipation is severe we could prescribe our 'first-choice drug' (a stat saline enema or a few days of liquid paraffin). If it persists, further examination is needed to exclude other diseases, such as colon cancer.

Patient 6 (pregnancy) In Patient 6 you will have recognized Patient 2 who complained of a sore throat while her real problem was the suspected pregnancy. You will not solve her problem by prescribing something for her throat. The therapeutic objective depends on her attitude towards the pregnancy and she will probably need counselling more than anything else. The therapeutic objective is then to assist her to plan for the future. This will probably not involve drug treatment for her sore throat. Moreover, the fact that she is in early pregnancy should stop you from prescribing any drug at all, unless it is absolutely essential.

Patient 7 (tiredness) In Patient 7 there is no clear cause for the tiredness and it is therefore difficult to make a rational treatment plan. Having excluded anaemia you may guess that as a young mother with small children and perhaps a job outside the home, she is overworked. The therapeutic objective is therefore to help her reduce physical and emotional overload.

To achieve this it may be necessary to involve other members of the family. This is a good example of the need for non-drug therapy. Vitamins will not help, and would only act as a placebo. In fact, they would probably act as a placebo for yourself as well, creating the false impression that something is being done.

As you can see, in some cases the therapeutic objective will be straightforward: the treatment of an infection or a condition. Sometimes the picture will be less clear, as in the patient with unexplained tiredness. It may even be misleading, as in the student with the

sore throat. You will have noticed that specifying the therapeutic objective is a good way to **structure your thinking**. It forces you to concentrate on the real problem, which limits the number of treatment possibilities and so makes your final choice much easier.

Specifying your therapeutic objective will prevent a lot of unnecessary drug use. It should stop you from treating two diseases at the same time if you cannot choose between them, like prescribing antimalarial drugs and antibiotics in a case of fever.

It will also help you avoid unnecessary prophylactic prescribing, for example, the use of antibiotics to prevent wound infection, which is a very common cause of irrational drug use.

It is a good idea to discuss your therapeutic objective with the patient before you start the treatment. This may reveal that (s)he has quite different views about the cause of an illness, diagnosis and treatment. It also makes the patient an informed partner in the therapy and improves compliance.

Step 3: Choosing a suitable treatment

You have already decided the most effective, safe, suitable and cheap treatment for acute watery diarrhoea. But now you have to check whether this treatment is also suitable for our particular patient: is the treatment also **effective** and **safe** in this case? You cannot assume that this 'first-choice' treatment will always be suitable for everyone.

In our example there may be reasons why the advice is unlikely to be followed. Although the mother is unlikely not to have the utensils and ingredients to prepare her own rehydration solution (8 teaspoons of sugar and half a teaspoon of salt in a litre of clean water), she may be still be unable to provide enough nutrition and adequate hygiene for her child. So although this advice should still be given, your treatment should be checked for suitability. Is it effective, and is it safe?

Oral rehydration solution (ORF/sorol) is simply a sugar and electrolyte solution and is generally safe as long as it is diluted fully, according to the instructions on the packet. Underdiluted solutions are too salty and can cause hypernatraemia. Early treatment with ORF has been shown to be effective in decreasing the number of deaths due to diarrhoea.

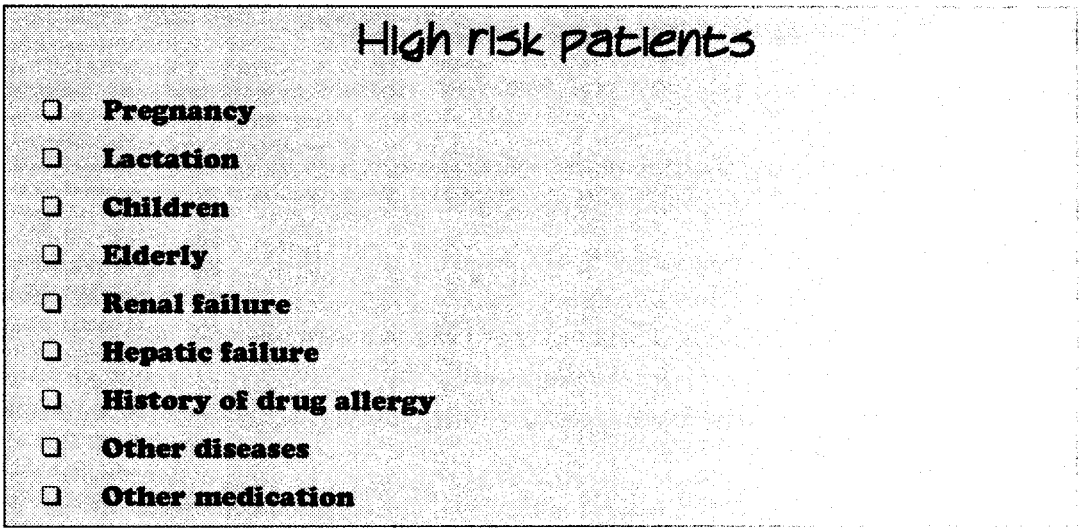
Is your treatment suitable?

a. Effectiveness (indication, convenience)

Review whether the active substance is likely to achieve the therapeutic objective, and whether the dosage form is suitable for the patient. **Convenience** contributes to patient adherence to the treatment, and therefore to effectiveness. Complicated dosage forms or packages and special storage requirements can be a problem for some patients.

b. Safety (contraindications, interactions and high risk groups)

Contraindications are determined by the mechanism of action of the drug and the characteristics of the individual patient. Drugs in the same group usually have the same contraindications. Some patients will fall into certain **high risk groups**. Any other illnesses should also be considered. Some side effects are serious for categories of patients only, such as drowsiness for drivers. **Interactions** can occur between the drug and nearly every other substance taken by the patient. Best known are interactions with other prescribed drugs, but you must also think of over-the-counter drugs the patient might be taking. Interactions may also occur with food or drinks (especially alcohol). Some drugs interact chemically with other substances and become ineffective (e.g. tetracycline and milk). Fortunately, in practice only a few interactions are clinically important.



Decide if the active substance and dosage form of your 'first-choice' treatment is suitable (effective, safe) for each patien.

Patient 8: *Man, 45 years, who suffers from asthma. Uses a salbutamol inhaler. A few weeks ago you diagnosed essential hypertension (145/100 on various occasions). You advised a low-salt diet, but his blood pressure remains high. You decide to add a drug to your treatment. Your 'first-choice' drug for hypertension in patients under 50 is atenolol tablets, 50 mg a day.*

Patient 9: *Girl, 3 years. Brought in with a severe acute asthmatic attack, probably precipitated by a viral infection. She has great difficulty in breathing (with an expiratory wheeze, but no green sputum), little coughing and a slight temperature (38.2°C). Further history and physical examination are normal. Apart from minor childhood infections she has never been ill before and she takes no drugs. Your treatment for such a case is a salbutamol inhaler.*

Patient 10: *Woman, 22 years, 2 months pregnant. Large abscess on her right forearm. You decide that she will need surgery soon to drain the abscess, but in the meantime you want to relieve the pain. Your 'first-choice' drug for common pain is acetylsalicylic acid (aspirin) tablets.*

Patient 8 (hypertension) Atenolol is a good drug for the treatment of essential hypertension in patients below 50 years of age, and it is very convenient. However, like all beta-blockers, it is relatively contraindicated in asthma. Despite the fact that it is a selective beta-blocker, it can worsen asthmatic problems, especially in higher doses. If the asthma is not very severe, atenolol can be prescribed in a low dose. In severe asthma you should probably switch to diuretics; almost any thiazide is a good choice.

Patient 9 (child with acute asthma)

In this child a fast effect is needed, and tablets work too slowly for that. Inhalers only work when the patient knows how to use them and can still breathe enough to inhale. In the case of a severe asthma attack this is usually not possible; moreover, some children below the age of five may experience difficulties with an inhaler. Intravenous injection in young children can be very difficult. If an inhaler cannot be used, the best alternative is to give salbutamol by nebuliser.

Patient 10 (abscess) This patient is pregnant and will soon be operated on. In this case acetylsalicylic acid is contraindicated as it affects the blood clotting mechanism and also crosses the placenta. You should switch to another drug that does not interfere with clotting. Paracetamol is a good choice and there is no evidence that it has any effect on the foetus when it is given for a short time.

In all these patients your 'first-choice' drug was not suitable, and in each case you had to change either the active substance or the dosage form, or both. Atenolol was contraindicated because of another disease (asthma); an inhaler was not suitable because the child was too young to handle it; acetylsalicylic acid was contraindicated because it affects the blood clotting mechanism and because the patient is pregnant.

For each of the following cases decide whether the dosage schedule is suitable (effective, safe) for the patient. Adapt it where necessary.

Patient 11: *Woman, 43 years. History of insulin dependent diabetes for 26 years. Stable on treatment with two daily doses of insulin, 20 IU and 30 IU. Recently mild hypertension was diagnosed, and diet and general advice have not been sufficiently effective. You would like to treat this condition with a beta-blocker. Your 'first-choice' drug is atenolol 50 mg once daily.*

Patient 12: *Woman, 50 years. Chronic rheumatic disease, treated with your 'first-choice' drug, indomethacin, 3 times 50 mg daily plus a 50 mg suppository at night. She complains of pain early in the morning.*

Patient 13: *Woman, 56 years. Newly diagnosed depression. Treated with amitriptyline 25 mg, one tablet daily at night, given 30 tablets.*

Patient 11 (diabetes) β-blockers counteract the effect of insulin. This means that higher concentrations of insulin are needed for the same effect. The daily dose of insulin must be raised. β-blockers may also mask any signs of hypoglycemia. For these two reasons you may decide to change to another drug group that does not affect glucose tolerance, e.g. calcium channel blockers.

Patient 12 (pain at night)

The plasma concentration of indomethacin probably falls below the effective level early in the morning. Any change in medication should therefore aim at increasing the plasma level in that period. You could advise her to take the evening dose later, or to set the alarm in the night to take an extra tablet. You could also increase the strength of the evening suppository to 100 mg, while decreasing her first morning tablet to 25 mg.

Patient 13 (depression)

A dose of 25 mg per day is not enough to treat her depression. Although she can start with such a low dose for a few days or a week, mainly to get used to side effects of the drug, she may finally need 100-150 mg per day. With 30 tablets the quantity is sufficient for one month, if the dosage is not changed before that time. But is it safe? At the beginning of the treatment the effect and side effects cannot be foreseen. And if the treatment has to be stopped, the remaining drugs are wasted. The risk of suicide also has to be considered: depressive patients are more likely to commit suicide in the initial stages of treatment when they become more active because of the drug, but still feel depressed. For these reasons 30 tablets are not suitable. It would be better to start with 10 tablets, for the first week or so. If she reacts well you should increase the dose.

Examples of drugs for which you should raise the dose slowly

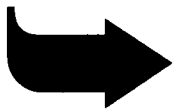
- **Tricyclic antidepressants (amitriptyline, imipramine)**
- **Some anti-epileptics (carbamazepine, valproic acid)**
- **ACE-inhibitors in patients using diuretics**
- **Some hormonal drug therapies (corticosteroids, levothyroxin)**
- **Opiates in cancer**

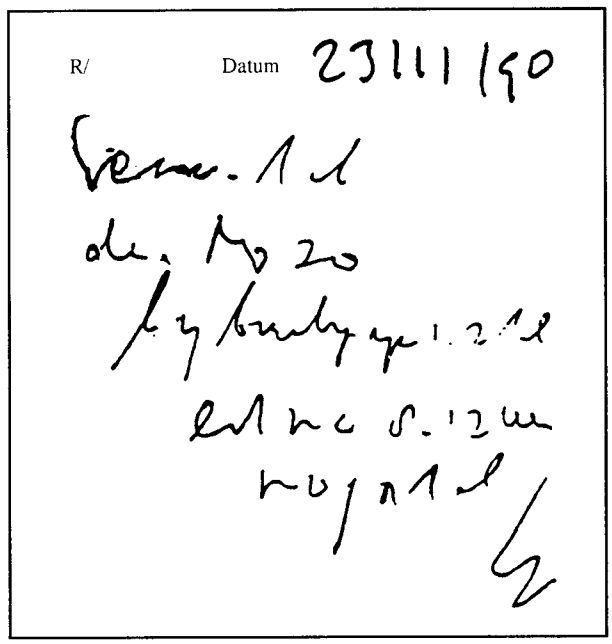
In summary, checking whether your 'first-choice' drug is also suitable for the patient in front of you is probably the most important step in the process of rational prescribing. It also applies if you are working in an environment in which essential drugs lists, formularies and treatment guidelines exist. In daily practice, adapting the dosage schedule to the individual patient is probably the most common change that you will make.

Step 4: Starting the treatment

Going back to our original patient with acute watery diarrhoea, the advice should be given first, with an explanation of why it is important. Be brief and use words the patient can understand. Then you can write your prescription. This must contain all the information necessary for the person dispensing (as this may be someone other than yourself), as well as information intended for the patient. Write clearly!

"Do not write like this!"





Information that must appear on a prescription

Name and address of the prescriber, with telephone number (if possible)

This is usually pre-printed on the form. If the dispenser has any questions about the prescription, (s)he can easily contact the prescriber.

Date of the prescription

In many countries the validity of a prescription has no time limit, but in South Africa a prescription is only valid for one month after the date it was written.

Name and address of the patient; age (for children and elderly)

Name and strength of the drug

You should write the name of the drug *and* the strength. It is strongly recommended to use the generic (nonproprietary) name e.g. furosemide instead of Lasix; ciproflaxocin instead of ciprobay. This means that you do not express an opinion about a particular brand of the drug, which may be more expensive for the patient. It also allows the dispenser to maintain a more limited stock of drugs, and dispense the cheapest drug. However, if there is a particular reason to prescribe a special brand, the trade name can be added.

The strength of the drug indicates how many milligrams each tablet, suppository, or milliliter of fluid should contain. Try to avoid decimals and, where necessary,

write words in full to avoid misunderstanding. For example, write propranolol 20 milligrams, not 0.020 milligrams or 20 mg. Badly handwritten prescriptions can lead to mistakes, and it is the legal duty of the prescriber to write legibly. Instructions for use must be clear and the maximum daily dose mentioned. Use non-erasible ink.

Dosage form and total amount

Only use standard abbreviations that will be known to the dispenser e.g. PO for by mouth, mg for milligram.

Information for the package label

Some information should be copied by the pharmacist onto the label of the package. This includes how much of the drug is to be taken, how often, and any specific instructions and warnings. These should be given in lay language. Do not use abbreviations or statements like 'as before' or 'as directed'. When you say 'as required', or PRN, you must state the maximum dose per day and the minimum time between doses.

Prescriber's initials or signature.

Write a prescription for each of the following patients. Prescriptions are discussed below.

Patient 14: *Boy, 5 years. Pneumonia with greenish sputum. Your 'first-choice' treatment is amoxicillin syrup.*

Patient 15: *Woman, 70 years. Moderate congestive cardiac failure. For several years on digoxin 0.25 mg 1 tablet daily. During the visit she complains of slight nausea and loss of appetite. No vomiting or diarrhoea. You suspect side effects of digoxin, and call her doctor. As she has an appointment with him next week, and he is very busy, he advises you to halve the dose until then.*

Prescrition for patient 14

Dr B. Who
12 Farmstreet
Kirkville
Tel: 3876

R/ date 1 Nov 1994

Amoxicillin 50 mg/ml
Susp. da 100 ml
S. 3 dd 5 ml. Finish course
(add 5 ml spoon)

B. Who

Ms/Mr Patient 14
Address:
Age: 5 years

Prescrition for patient 15

Dr B. Who
12 Farmstreet
Kirkville
Tel: 3876

R/ date 1 Nov 1994

Digoxin 0.125 mg
tablets da no. 7
S 1 dd 1 tablet

B. Who

Patient 15
Ms/Mr
Address:
Age: 70 years

In summary, a prescription should include:

- ❑ **Name, address, telephone of prescriber**
- ❑ **Date**
- ❑ **Name, address, age of patient**
- ❑ **Generic name of the drug,**
- ❑ **Drug strength and dosage form,**
- ❑ **Total amount to be given**
- ❑ **Label: instructions, warnings**
- ❑ **Signature or initials of prescriber**

Step 5: Give information, instructions and warnings

We must be sure that our patient have an understanding of why they are being treated. Our patient with diarrhoea should be informed the fluids and ORF given will prevent dehydration and other complications of the diarrhoea, but is not a cure of the viral illness in itself. The diarrhoea should stop by itself in a few days, but until then the child will continue having loose stools. As well as the extra fluids and ORF, normal feeds, including milk feeds, should be continued. They should be advised to come back if the diarrhoea has not settled in 3-5 days, or before if it becomes worse or the child begins to vomit excessively etc. Finally the mother should be advised to follow the dosage/mixing instructions carefully. It's a good idea to ask her to summarise the key information in her own words, to be sure that it is clearly understood.

On average, 50% of patients do not take prescribed drugs correctly, some of whom do not take them at all. The most common reasons are that the symptoms got better, side effects have occurred, the drug is not seen to be effective, or the dosage is too complicated for the patient, particularly the elderly. Non compliance may have no serious consequences. For example, irregular doses of a thiazide still give the same result, as the drug has a long half-life. But drugs with a short half-life (e.g. phenytoin) or a narrow effective and safe blood level (e.g. digoxin) may become ineffective or toxic if taken irregularly.

A well chosen drug treatment consists of as few drugs as possible (preferably only one), with rapid action, with as few side effects as possible, in an appropriate, simple dose, (one or two times daily), and for the shortest possible duration.

How to improve patient compliance

Prescribe a well-chosen treatment

Create a good clinician-patient relationship

Take the time to give information, instructions and warnings

A good clinician-patient relationship is established through the clinician having a respect for and an understanding of the patient's feelings and viewpoints. You must be willing to discuss ALL issues with the patient who should be seen as your partner in the treatment of their illness. Patients need information, instructions and warnings to provide them with the knowledge to accept and follow the treatment and to acquire the necessary skills to take the drugs appropriately. In some studies less than 60% of patients had understood how to take the drugs they had received. Information should be given in clear, common language and it is helpful to ask patients to repeat in their own words some of the core information, to be sure that it has been understood.

Ways of improving patient compliance

Patient leaflets

Patient leaflets reinforce the information given by the prescriber and dispenser. The text should be in clear, common language and in easily readable print.

Pictures and short descriptions

If the patient cannot read, try using pictures to teach them to take their medicines. If they are not available, make them for your own 'first-choice' drugs, and photocopy them (see Appendix 3).

Day calendar

A day calendar indicates which drug should be taken at different times of the day. It can use words or pictures: a low sun on the left for morning, a high sun for midday, a sinking sun for the end of the day and a moon for the night.

Drug passport

A small book or leaflet with an overview of the different drugs that the patient is using, including recommended doses.

Dosage box

The dosage box is becoming popular in industrialized countries. It is especially helpful when many different drugs are used at different times during the day. The box has compartments for the different times per day (usually four), spread over seven days. It can then be refilled each week. If cost is a problem, the box can be made locally from cardboard. In tropical countries a cool and clean place to store the box will be necessary.

Even if the patient aids described here are not available, with creativity you can often find your own solutions. The important thing is to give your patients the information and tools they need to use drugs appropriately.

Look at the following prescriptions and list the most important instructions and warnings that should be given to the patient. You may consult your pharmacology books.

Patient 16:	*Woman, 28 years. Vaginal trichomonas infection. Treatment: metronidazole 500 mg, 1 vaginal tablet daily for 10 days.*
Patient 17:	*Man, 45 years. Newly diagnosed essential hypertension. Treatment: atenolol 50 mg, 1 tablet daily.*
Patient 18:	*Boy, 5 years. Pneumonia. Treated with amoxicillin syrup, 5 ml (= 250 mg) three times daily.*
Patient 19:	*Woman, 22 years. Migraine. Treatment: paracetamol 500 mg, 2 tablets 20 min. after metoclopramide 10 mg 1 suppository, at the onset of an attack.*

Patient 16 (vaginal trichomonas)

As in any infection the patient should be told why the course has to be finished completely, even when the symptoms disappear after two days. The patient should also be informed that treatment is useless if the partner is not treated as well. Careful and clear instructions are needed for vaginal tablets. If possible, pictures or leaflets should be used to show the procedure (see Appendix 3). Side effects of metronidazole are a metal taste, diarrhoea or vomiting, especially with alcohol, and dark urine. Give a clear warning against the use of alcohol.

Patient 17 (essential hypertension)

The problem with the treatment of hypertension is that patients rarely experience any positive effect of the drugs, yet they have to take them for a long time. Compliance may be very poor if they are not told why they should take the drug, and if treatment is not monitored regularly. The patient should be told that the drug prevents complications of high blood pressure (angina, heart attack, cerebral problems). You can also say that you will try to decrease the dose after three months, or even stop the drug entirely. Remember to check whether the patient has a history of asthma.

Patient 18 (boy with pneumonia)

The patient's mother should be told that the penicillin will need some time to kill the bacteria. If the course of treatment is stopped too soon, the stronger ones will survive, and cause a second, possibly more serious infection. In this way she will understand why it is necessary to finish the course. Knowing that any side effects will disappear soon will increase the likelihood of compliance. She should also be told to contact you immediately if a rash, itching or rising fever occur.

Patient 19 (migraine)

In addition to other information the important instruction here is that the metoclopramide (preferably a suppository) should be taken 20 minutes before the analgesic, to prevent vomiting. Because of possible sedation and loss of coordination she should be warned not to drive a car or handle dangerous machinery.

Giving information and instructions

1. **Effects of the drug**

   Which symptoms will disappear; and when; how important is it to take the drug; what happens if it is not taken;

2. **Side effects**

   Which side effects may occur; how to recognise them; how long will they remain; how serious they are; what to do if they occur;

3. **Instructions**

   When to take; how to take; how to store; how long to continue the treatment; what to do in case of problems;

4. **Warnings**

   What not to do (driving, machinery); maximum dose (toxic drugs); need to continue treatment (antibiotics);

5. **Next appointment**

   When to come back (or not); when to come earlier; what to do with left-over drugs;

6. **Everything clear?**

   Everything understood; repeat the information; any more questions?

This may seem a long list to go through with each patient. You may think that there is not enough time; that the patient can read the package insert with the medicine; that the dispenser should give this information; or that too much information on side effects could even decrease compliance. Yet it is the prime **responsibility of the prescriber** to make sure that the treatment is understood by the patient, and this responsibility cannot be shifted to the dispenser or a package insert. Maybe not all side effects have to be mentioned, but you should at least warn your patients of the most dangerous or inconvenient side effects. Having too many patients is never accepted by a court of law as a valid excuse for not informing and instructing a patient correctly.

Step 6: Monitor (and stop?) the treatment

If our first patient, with diarrhoea, does not return, he is probably better. If there is no improvement and he does come back there are three possible reasons: (1) the treatment was **not effective**; (2) the treatment was **not safe**, e.g. because of unacceptable side effects; or (3) the treatment was **not convenient**, e.g. the dosing was hard to follow or the taste of the medicine was unpleasant. Combinations are also possible.

You have learned how to choose a rational drug treatment, how to write the prescription and what to tell your patient. However, even a well chosen treatment may not always help the patient. Monitoring the treatment lets you know whether it has been successful or whether you need to do something more. **Have you achieved your therapeutic objectives?** You chose the treatment on the basis of efficacy, safety, suitability and cost. You should use the same criteria for monitoring the effect, but in practice you could ask two questions: is the treatment effective? Are there any side effects? To do this you need to **keep in touch** with your patient.

When your patient leaves the clinic, you could either:

(1) explain to the patient what to do if the treatment is not effective, is inconvenient or if too many side effects occur (passive monitoring: done by the patient) or

(2) you could make an appointment for the patient to see you again, to check if the treatment has been effective yourself (active monitoring).

You will need to decide after what interval the patient must return. This will depend on the type of illness, the duration of treatment, and the maximum quantity of drugs to prescribe. At the start of treatment the interval is usually short; it may gradually become longer, if needed. Three months should be the maximum for any patient on long-term drug therapy. Even with active monitoring the patient will still need to be given information, instructions and warnings.

If the disease is cured, the treatment can be stopped (unless it needs to be continued for a fixed time e.g. antibiotics, TB therapy). However, if the patient's symptoms continue, you will need to consider whether the diagnosis, treatment, compliance and your monitoring were all correct. In fact the whole process starts again.

If the disease is not yet cured or is chronic, and the treatment is effective and without side effects, it can be continued. If serious side effects have occurred you should reconsider your selected drug and dose, and check whether the patient was correctly instructed. Many side effects are dose dependent, so you may try to lower the dose before changing to another drug. Sometimes there may be no solution to the problem. For example, in chronic diseases such as hypertension, careful monitoring and improving compliance to the treatment may be all that you can do. In some cases you will change a treatment because the focus switches from curative to palliative care, as in terminal cancer or AIDS.

If you decide to stop drug treatment you should remember that not all drugs can be stopped at once. Some drugs have to be tailed off, by decreasing the dose.

Some examples of drugs in which a slow reduction in dose should be considered

- ❑ **Antiepileptics**
- ❑ **Antidepressants**
- ❑ **Antipsychotics**
- ❑ **Cardiovascular drugs e.g. methyldopa, beta-blockers**
- ❑ **Corticosteroids**
- ❑ **Hypnotics/sedatives e.g. benzodiazepines**
- ❑ **Opiates e.g. morphine**

In the following cases, try to decide whether the treatment can be stopped or not.

Patient 20: *Man, 40 years. Review visit after pneumonia, treated with oral ampicillin (2 grams daily) for one week. No symptoms remain, only slight unproductive cough. Examination normal.*

Patient 21: *Woman, 52 years. Mild hypertension for the past two years. Responded well to a thiazide diuretic (25 mg daily). The maintenance dose has already been decreased twice because her blood pressure had dropped to around normal. She regularly forgets to take the drug.*

Patient 22: *Man, 75 years. Had been prescribed diazepam for one week, because of sleeplessness after his wife died six months ago. He asks for more, because he is afraid he will still not be able to sleep.*

Patient 20 (pneumonia)

The course of treatment was defined in advance. It was effective and without side effects. The ampicillin can be stopped.

Patient 21 (mild hypertension)

This treatment seems effective and without side effects. The patient is no longer hypertensive and may not need continued therapy, especially since she regularly forgets to take the drug. You can stop the treatment for assessment but you must continue to monitor the patient.

As the patient wants to continue the treatment it was obviously effective. However, benzodiazepines can produce psychological and physical dependence when taken regularly for more than a few weeks. In addition, tolerance develops quickly and this can lead patients to take more than the recommended dose. You should explain this to the patient and also tell him that the nature of the sleep induced by such drugs is not the same as normal sleep, but the result of suppressed brain activity. Encourage him to try to return to natural sleep patterns; possibly a warm bath or a hot milk drink will help to promote relaxation before bedtime. It may also help to encourage him to express his feelings about his loss; acting as a sympathetic listener is probably your major therapeutic role in this case, rather than prescribing more drugs. In this case the drug can be stopped at once because it was only used for one week. This cannot be done when patients have taken benzodiazepines for longer periods of time.

In summary: Was the treatment effective?

a. Yes, and disease cured: Stop the treatment

b. Yes, but not yet completed:

- ❑ **Any serious side effects?**
- ❑ **No: treatment can be continued**
- ❑ **Yes: reconsider dosage or drug choice**

c. No, disease not cured: Check all steps.

- ❑ **Diagnosis correct?**
- ❑ **Therapeutic objective correct?**
- ❑ **'First-choice' drug suitable for this patient?**
- ❑ **Drug prescribed correctly?**
- ❑ **Patient instructed correctly?**
- ❑ **Effect monitored correctly?**

Conclusion

So, what at first seems just a simple consultation of only a few minutes, in fact requires a quite complex process of professional analysis. What you should *not* do is copy the clinician and memorize that treatment. Instead, build your clinical practice on the core principles of choosing and giving a treatment, which have been outlined. The process is summarised below.

The process of rational treatment:

Step 1:	**Define the patient's problem**
Step 2:	**Specify the therapeutic objective** **What do you want to achieve with the treatment?**
Step 3:	**Choosing suitable treatment** **Check effectiveness and safety**
Step 4:	**Start the treatment**
Step 5:	**Give information, instructions and warnings**
Step 6:	**Monitor (and stop?) treatment**

Keeping up-to-date

Knowledge and ideas about drugs are constantly changing. New drugs come on the market and experience with existing drugs expands. Side effects become better known and new indications or ways of using existing drugs are developed. In general a clinician is expected to know about new developments in drug therapy. For example, if a drug-induced illness occurs which the clinician could have known and prevented, courts in many countries would hold them liable. Lack of knowledge is not an excuse.

How can you keep up-to-date? Make a list of available types of information. There may be a number of options: journals (nursing, medical, pharmacological), reference books, national or regional drug information centres, and locally produced formularies (SAMF, Primary Health Care Formularies).

You must remember that some information sources may be produced with the intention of making the drug look favourable so that you will prescribe it. Be careful to be sure your information is **unbiased**.

In South Africa the Medicines Information Centre in Cape Town will answer most drug queries. They can be contacted by:

(1) telephone: (021) 448 3202

(2) e-mail <micguest@uctgsh1.uct.ac.za>

(3) letter: c/o Dept of Pharmacoloy, Medical School, University of Cape Town, Private Bag, Rondebosch, 7700.

In KwaZulu-Natal there will be a smaller information centre opening from January 1997. At any time you can contact either of the authors of this manual (we work at the above centres too).

Aarti Kishuna on 031-820 2358 (pcmic@healthlink.org.za)
Catherine Orrell on 021-406 6353 (correll@uctgsh1.ac.za)

You will not need information on every patient you see. But for that one you are worried about: call somebody, read a reference or e-mail!!!!

FOUR
Standard treatment guidelines (STGs)

What are treatment guidelines? They are practical recommendations to help the prescriber based on consensus using all available data. They are intended to guide and improve medical practice. They do not HAVE to be followed.

Guide-lines available in South Africa include: The Essential Drug Programme STGs for primary health care, Medunsa Primary Health Care Formulary, KwaZulu-Natal Management Protocol for Primary Care Nurses, SmithKline Beecham Primary Health Care Manual.

Anyone can produce a guideline (all clinics or hospitals have their own protocols: what works best for them), but to be valid, safe and effective it should be:

- of multidisciplinary origin i.e. every involved party should be **consulted**.
- based on thorough review of literature regarding each **specific** clinical situation.
- reached by group **consensus**.
- **unbiased** i.e. has the best interests of the patient in mind, not the pharmaceutical company whose drugs may be used.
- **clear** and practical (using treatments that are safe, efficient, suitable and available!)
- regularly updated.

There are advantages and disadvantages to using guidelines:

Advantages:

- they assist in decision making,
- they are a synthesis of many people's knowledge,
- explicit guidelines have been shown to improve practice,
- are usually up-to-date factually.

Disadvantages:

- they may be too restrictive or recommend a treatment that is not available locally,
- they may stop prescriber from thinking about each patient as an individual.

A prescriber is more likely to use a guideline:

1. When they actually involved in the creating of the guideline. This may happen in your own clinics. National guidelines quite often need some local adaptations and input.
2. When exposed to an education campaign on a particular problem.
3. When they are unsure about a clinical problem.
4. When a guideline has significantly improved a patients outcome in the past i.e. when the guideline is good.

In summary STGs are there to help. As long as you are aware of their shortcomings they can be a very useful and important clinical tool. If you doubt a guideline, cross check it!

FIVE Stock Management

Introduction

It is important to remember that how you manage drugs at your health facility impacts on the supply of drugs at both National and Provincial levels. To fully appreciate this it becomes necessary to understand the logistics of drug supply.

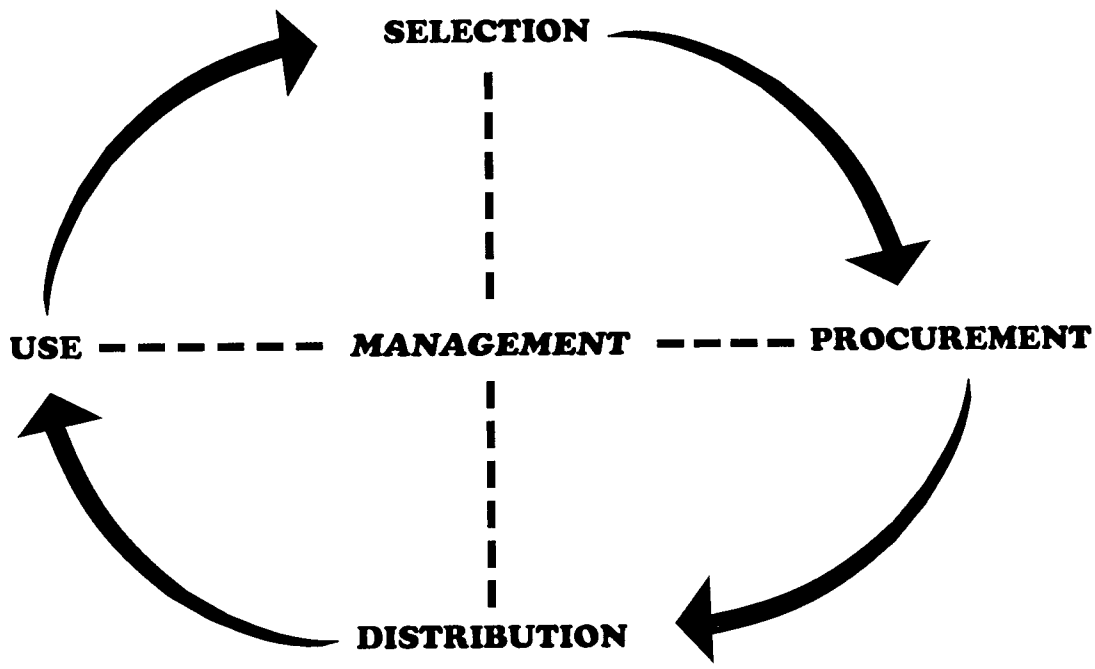
Logics of drug supply

Logistics is defined as the science of *procuring*, *maintaining* and *transporting supplies*.

In drug supply, it includes all aspects of the process required to bring a *drug* from the *supplier* to the *dispenser* and finally to the *individual patient*.

The primary functions in the logistics cycle of a drug supply fall into four categories.

Figure 1 The Logistics Cycle



Source: MSH, 1981 : 11

Drug Selection:	includes what products should be available and in what quantities.
Procurement:	includes purchasing methods, finance, terms of payment, sources of supply, quality assurance, decision to make or buy.
Distribution:	includes import management, inventory control, storage, waste management and transport.
Use:	includes prescribing and dispensing practices, packaging and labelling, training auxiliary personnel and educating consumers.

Decisions regarding Selection and Procurement of drug supplies are generally made at Provincial and National levels. You, in turn, influence such decisions by the manner in which you manage your facilities drug supplies at district level in terms of the Distribution and Use of these drugs. Bearing these issues in mind we realise that efficient management of drug supplies at your facility becomes a crucial concern. Why? It becomes important in order to meet the following goal - the goal governing efficient stock management.

Goal

To ensure the constant and regular supply of safe and effective drugs at the health facility

To achieve this goal we will now discuss the following issues which impact on how you manage your supply of drugs at your district-based health facilities.

Drug ordering

The quantities of drugs needed by your facility are estimated by considering how much of drugs you presently have on hand in your storeroom and how much of drugs you have already used up. This information will be provided to you if you have maintained stock records for each drug. An example of a stock record card is presented in Figure 2.

CLINIC/PHARMACY STOCK RECORD CARD

Description: _____
Stock No: _____
Unit of Issue: _____
Bin Location: _____
Alternatives: _____

MINISTRY OF HEALTH
Department of Medical Supply

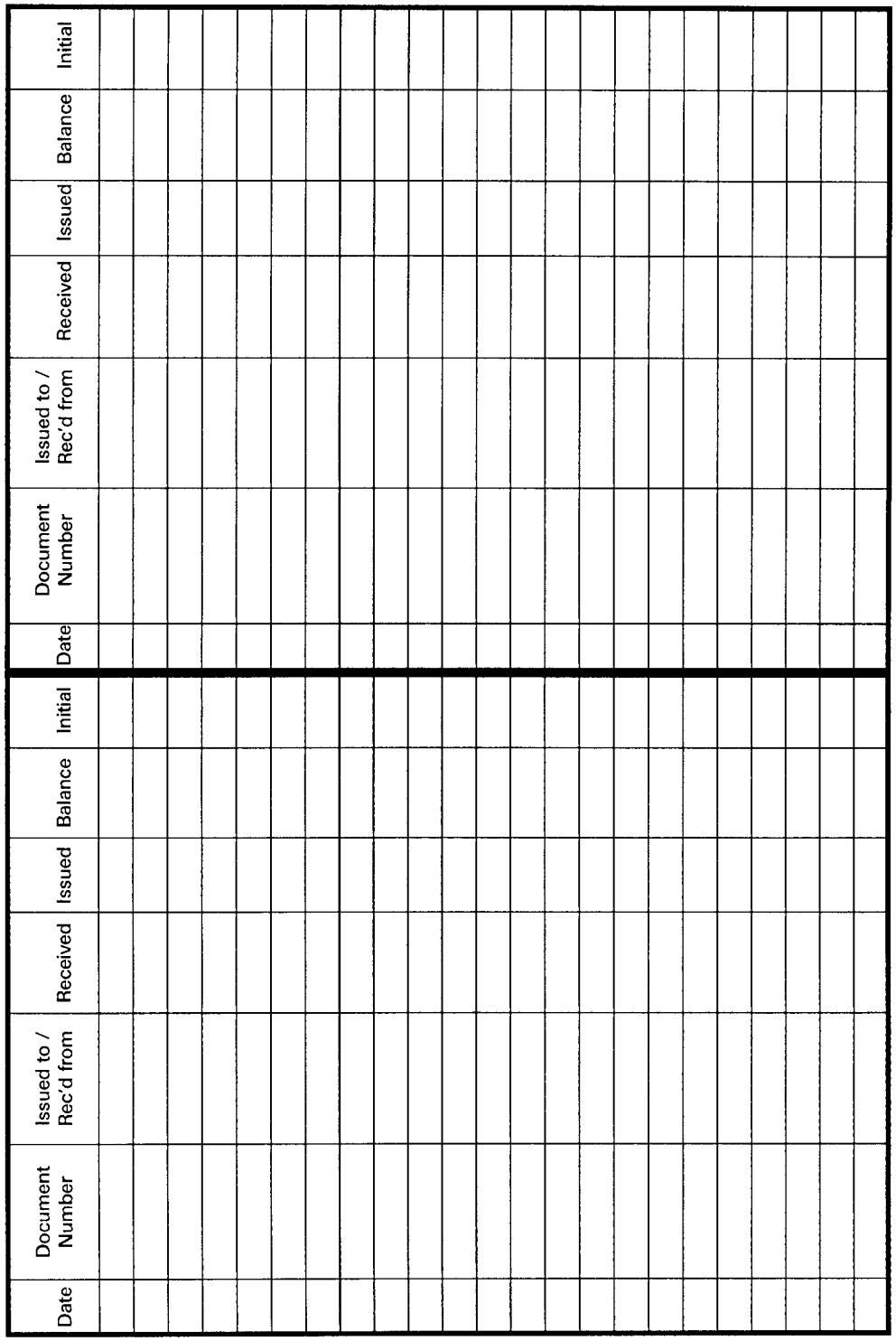
Estimated Monthly
Consumption: _____

Recorder Level: _____
Order Quantity: _____
Maximum Level: _____
Review Period: _____
Safety Stock: _____

Date	Document Number	Issued to / Rec'd from	Received	Issued	Balance	Initial	Date	Document Number	Issued to / Rec'd from	Received	Issued	Balance	Initial

Figure 2a Sample Clinic Stock Record Card (Front)

Figure 2b Sample Clinic Stock Record Card (Back)



Description and Stock No:	Description describes the item e.g. Aspirin tabs, 325mg. Stock number follows a logical sequence based on therapeutic categories, the order of products on the shelves, or any system you have used to store your drugs.
Unit of Issue	Refers to the pack size of the drug, e.g. 500 tablet jars of aspirin.
Reorder level	You may have set a stock level for each of your drugs. As soon as the total of the drugs you have in stock plus the stock on order falls below the recorder level, you must place another order.
Estimated Monthly Consumption	This is an average figure representing your recent consumption/use of the particular drug. This figure may be calculated by adding up the total amount of the drug you have used for the past year and dividing this total by 12. This will tell you how much of the drug you may have used, on average, per month.
Order Quantity	You may have a set order quantity for each drug, Every time you place an order it is for this quantity of drug. Should the consumption of a drug increase then you will have to increase your order quantity.
Maximum Level	You may have set a maximum level for each drug in order to help determine the quantity that needs to be ordered each time an order is placed.
Review Period	You may have set a review period during which time you review stock levels and initiate orders. Review periods can be two, three, four, or twelve months.
Safety Stock	Safety stock is the stock over and above what you actually use. It is the stock you keep for emergencies.
Receipt and issue Information	Each time stock is received into the inventory or issued, the transaction must be recorded. This information provides a record of stock movement and running stock balance.
Document No:	When drugs are received the reference number of the receiving document should recorded. When drugs are issued there should be a numbered requisition form on which the amount requested is indicated. In your case this should be the prescription.
Initials	It is a good idea for the person issuing or receiving drugs to sign on their initials on the stock record card. This will help should queries arise.

The information contained on a stock record card helps you to:

- determine the quantity of each drug that you need to order.
- determine how much of each drug you have used.

What system do you presently use to identify the following:

- how much stock of a drug you have on hand and how much you have used.
- the quantity of drugs that are to be ordered.
- how often should you order your drugs.

The supply period is the time between when you receive your drug orders from the feeder hospital/depot. If you order and receive drugs once a week then your supply period is weekly. Factors that effect your consumption/use patterns and thereby influencing your supply period include:

- seasonal variations
- disease outbreaks
- rainy conditions - this is an issue when your facility is situated in an area that becomes inaccessible during rainy weather.

Stock taking

Stock taking should be performed regularly. This will inform you whether your stock record system is effective or not. It will also help identify staff who require further training in using the stock record system appropriately.

Storage

Poor storage conditions result in the deterioration of your drugs. This in turn leads to poor quality of drugs which could be harmful to patients, especially the tetracylines.

Factors affecting storage:

- heat
- moisture
- light

Therefore you must maintain adequate storage conditions by ensuring:

- good circulation of air through the use of airconditioners/fans
- dryness

Arrangement of stock

Drugs should not be stored on floors. Most of your dispensary have shelves upon which to store your drugs.

Store similar dosage forms together e.g. Liquids, tablets/capsules.

Store either using therapeutic classes or alphabetically.

Stick labels on shelves to identify items.

Rotate stock by using the FIFO system i.e. First stock in must be first stock out.

Bear in mind the expiry dates of stock. Use the FEFO system, i.e. First expired must be first used.

Special storage conditions

Vaccines:	Require refrigeration. Maintain the cold chain at all times.
Narcotics and Controlled Substances:	Store in a secure place which has limited access.
Combustibles e.g. alcohol, fuel, ether:	Store in special rooms which are separated from normal storage areas.

Whilst storerooms need to have ready access, precautions must be taken to ensure adequate security of stock.

Indicators for stock management

- Availability of the Essential Drugs List
- Availability of a selected number of essential drugs.
- Quality of drugs: Percentage adhering to recommended storage.
  Percentage of drugs expired.

Reference: Management Sciences for Health.
Managing Drug Supply. Boston, Massachusetts, U.S.A., 1981.

SIX
Principles of good dispensing practices

Dispensing is concerned with the preparation and supply of drugs. Because you receive pre-manufactured drugs at your health care facility, dispensing for you involves the supply of drugs to your patients.

Goal

At the completion of this training session you would be in a position to fulfil the following goal:

> **Ensure that an effective form of the correct drug is delivered to the right patient, in the prescribed dosage and quantity, with clear instructions, and in a package which maintains the potency of the drug**

Since most of your patients will be swallowing the drugs you dispense to them it is absolutely important to maintain your dispensing environment in a clean and tidy manner at all times.

Figure 1 An untidy dispensing environment



Source: MSH, 1981 : 185

The principals of good dispensing fall into five categories. These are :

- Interpretation of the request (written or oral)
- Retrieval
- Formulation (counting, pouring, compounding)
- Processing/Labelling
- Delivery

Interpreting the request

Do the following to ensure that you fully understand any requests for drugs made to you.

- Ask yourself what drug product is requested.
- Do you understand the drug order, i.e. if you have received a written prescription - it must be legible.
- If the prescription was given orally - it must be understood.
- Repeat the request to the prescriber/patient to ensure that no misunderstandings exist regarding the request for drugs.

Retrieval

Now that you have understood the prescription you need to retrieve the drug/s from the dispensary stock.

- Read the label on the stock bottle. The stock bottle contains either tablets, capsules or liquids in bulk from which smaller quantities/volumes can be counted/poured. Look at the product name, strength, dosage form and expiry date.
- Repeat the label reading two more times (before counting the tablets/capsules or pouring out liquids and immediately after).
- Return the stock drug to the original shelf position immediately after formulation.

Formulation

Pre-manufactured drugs need to be counted, poured or reconstituted.

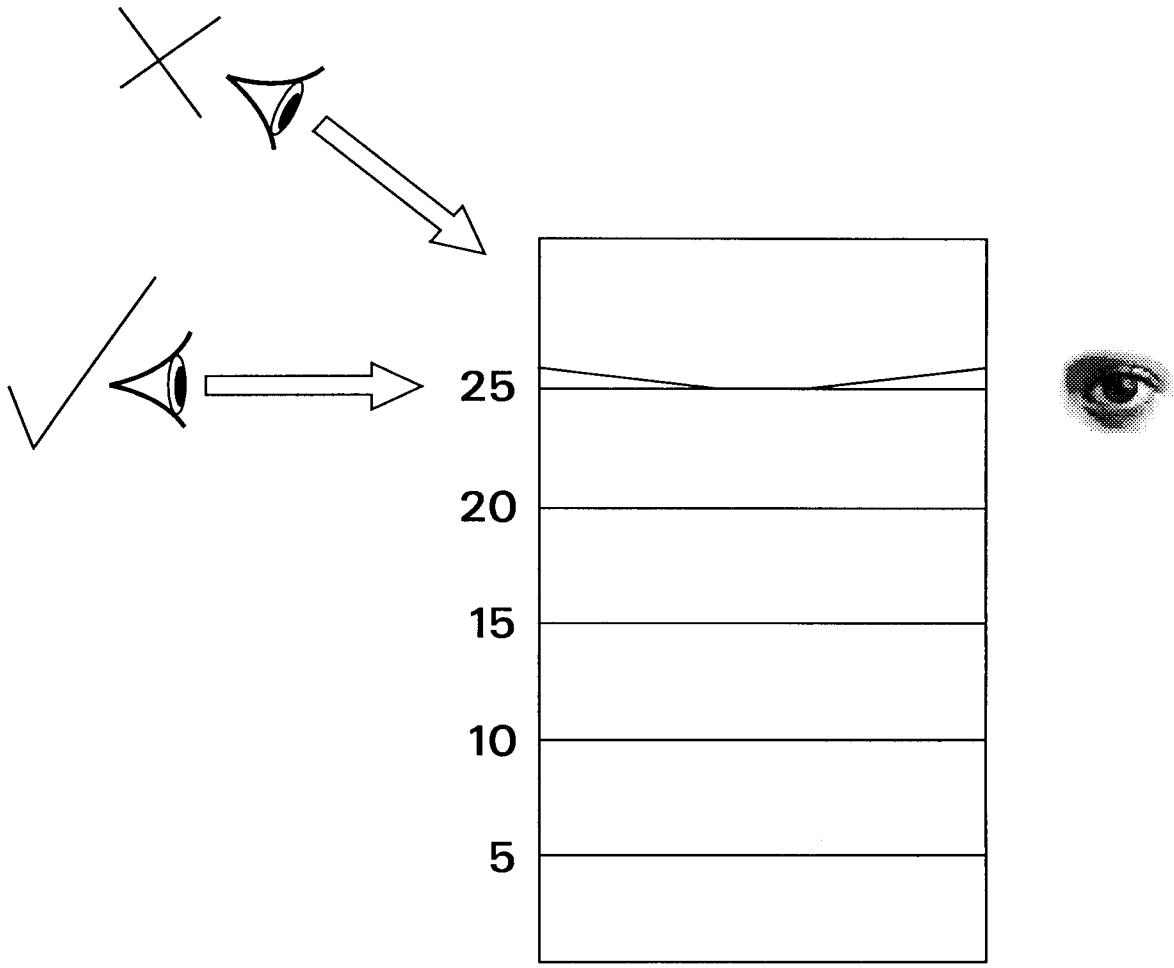
Prevent cross contamination of your drugs by using clean utensils. For instance when counting tablets or capsules wipe the tablet counter after each use. Similarly when measuring liquids rinse out the measuring cylinder between measurements.

Follow this technique when measuring liquids, eg. the reconstitution of antibiotics.

a. Choose the smallest measuring cylinder that will hold the required volume.

b. Hold the measuring cylinder at eye level with a finger positioned to show the true meniscus. The true meniscus is the lowest part of the liquid surface. This must be in line with the top of the graduation mark of the measuring cylinder as indicated in this diagram.

Figure 2 The true meniscus



c. Carefully pour the liquid into the centre of the measuring cylinder.

d. Add this quantity of liquid/water, in small amounts, to the bottle containing the antibiotic powder. Shake the bottle to ensure dissolution of the powder.

When counting tablets or capsules count in 5's rather than 10's to avoid making mistakes.

REMEMBER !!!

Short counts lead to drug therapy failures especially with antibiotics. Why?

Over counts have financial implications. Why?

As a dispenser you must be aware of the physical signs indicating deterioration of the drug product. These include changes in the colour, smell and consistency of the drug product.

Processing/labelling

After having formulated the prescription, i.e. having counted out the required number of tablets or capsules, or having reconstituted an antibiotic you now have to package the drug/s into appropriate containers which are adequately labelled.

Packaging affects the quality of medicine. Therefore think of the following when you pack out your drugs.

a. The container must be rigid enough to prevent damage to the contents.

b. The packaging must not react with the contents, eg. do not wrap tablets in absorbent paper. Why?

c. The closure of the packaging must prevent -

   access to moisture

   loss of moisture from creams and ointments

   entry of dirt or other contaminants.

d. The closure must be easy to remove and replace.

e. If your drug product is sensitive to light ensure that this is protected by dispensing these products into amber coloured bottles.

f. It must be easy to label the container correctly.

Drugs may either be pre-packed from bulk containers or packed into course-of-therapy packages. In course-of-therapy packaging the drugs are prepacked into sealed plastic bags/ containers containing the complete course of treatment, eg. fifteen amoxil capsules for a five day course of treatment.

After having packed out the drug into an appropriate container you then need to label your container adequately.

The labels on dispensed medicines should -

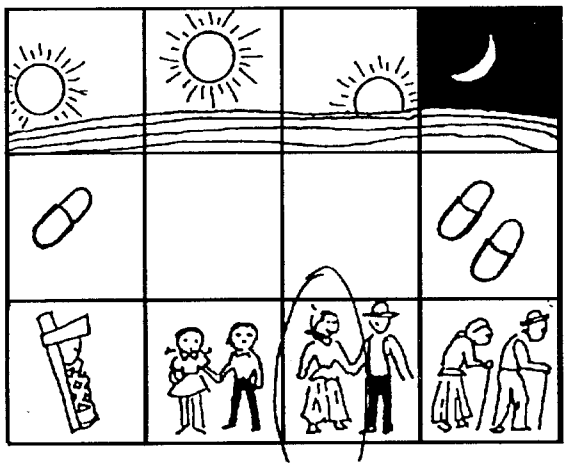
a. Give the patient clear and complete instructions on how to take or use the drug.

These instructions may be demonstrated through the use of certain symbols as indicated in the diagram.

Figure 3 Examples of Symbolic Labelling

TO ENCOURAGE CORRECT DOSAGE AND INTERVAL

By the Sun



Tablets



Capsules



Teaspoons



Drops

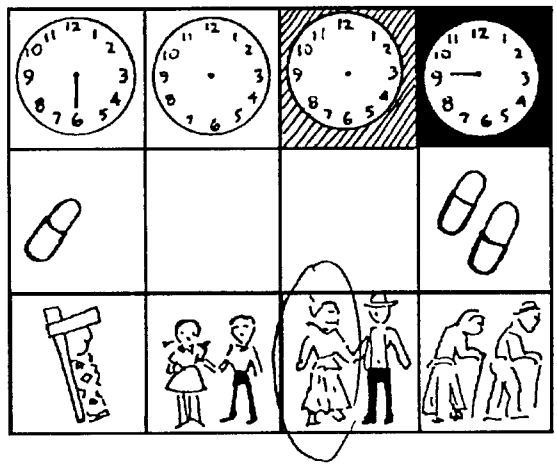


Stamps or drawings the dispenser can use to indicate number of tablets, capsules, teaspoons, or drops to be taken

OR

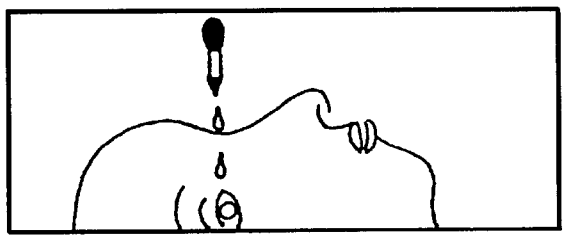
By the Clock

Mother:
take one capsule in the morning and two at bedtime

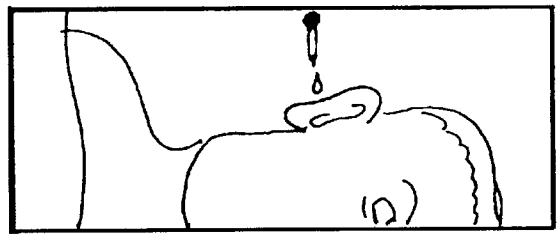


TO ASSURE CORRECT ROUTE OF ADMINISTRATION

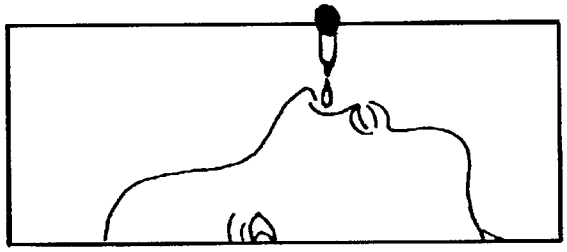
Eye drops



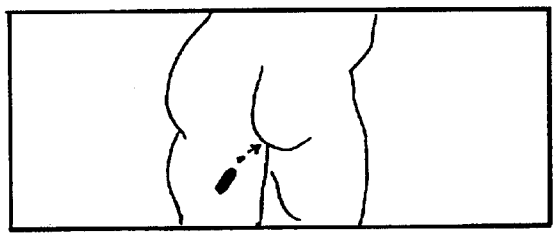
Ear drops



Nose drops



Suppositories



Source: MSH, 1981 : 455

b. Indicate the storage conditions necessary to ensure full potency throughout the treatment period, eg. store reconstituted antibiotics in the refrigerator to maintain its stability.

c. Be neatly written and carefully displayed on the container. Although you may use symbols to demonstrate the dosage instructions, you should also make certain that you have written out these instructions. Why?

   Never write a label as 2x3x5.

   A proper label must have the name of the patient, name of the drug, strength of the dosage form, quantity, dosage instructions and the date or prescription book reference number.

Delivery

Once you have labelled the prescribed medicines adequately you then hand over this to the patient.

This is when appropriate and relevant counselling of the patient regarding the use of the drug has to be provided to improve compliance.

It must be remembered that the prescriber has a responsibility to diagnose and prescribe. S/he will explain the illness and prognosis to the patient. The dispenser is responsible for providing the following information to the patient :

Mode of action of the drug.

- The method and time of administration or application.
- Potential good and bad effects of the drug.
- Factors influencing the drug's activity and relate this to the patients lifestyle, eg. food/drink/activities/habits.
- Provides patient education in order to improve compliance. Both the prescriber and dispenser must be aware of the different factors which influence patient compliance. These are emphasised in the picture over.

Figure 4 Factors Influencing Patient Compliance



Source: MSH, 1981 : 451

Indicators assessing the quality of the dispensing practice

- Percentage of scripts dispensed according to the prescriptions.

$$\frac{\text{no. of scripts dispensed according to prescriptions}}{\text{total number of prescriptions actually dispensed}} \times 100$$

- Percentage of patients with adequate knowledge of dosage instructions.

$$\frac{\text{no. of patients interviewed with adequate knowledge of dosage instructions}}{\text{total number of patients interviewed}} \times 100$$

- Percentage of dispensed drugs adequately labelled.

$$\frac{\text{no. of patients interviewed with adequately labelled drugs}}{\text{total no. of patients interviewed}} \times 100$$

Reference: Management Sciences for Health.
Managing Drug Supply. Boston, Massachussets, U.S.A, 1981.

Appendix one

Drug use Indicators

These indicators will be used to:

- assess drug use patterns within district-based facilities before the training,
- measure the success of the intervention post-implementation

The use of these indicators is explained as part of the rational prescribing training programme. The initial data collection at a facility will be done by the district trainers with staff help, but any subsequent collection should be done by the staff members themselves. Data for the whole facility will involve filling in a form as outlined below. Prescription data will be collected by observation of clinical practice during the day of collection.

The data collected will be captured in a relational database on Paradox. Each entry will have a unique number, called the prescription number. Any indicators entered under that number can be related in a statistical and narrative sense to any other or any other set.

Sampling

Facilities include the outpatient department of a district hospital, community health centres, clinics and mobiles.

Sampling of the facilities will be dependent on the number of facilities per district. In each region there should be a maximum of 20 facilities sampled. The number of patient encounters/prescriptions reviewed per facility would be 30, resulting in a total of 600 encounters for each region.

The indicators will be analysed to give a score which will reflect the prescribing patterns for each district and region. This data will be given to the facilities staff as a form of audit of their own work. This will enable problem areas to be identified and worked on and areas of excellence to be noted and praised.

Indicators to be collected

Indicators for the whole facility: the format is that of a form which would be completed for each facility.

The following forms may be photocopied and used to collect the indicators for each facility, ○ (circle) the appropriate number that corresponds to your answer, or write in your answer where indicated with a line.

Name of Facility ..... Prescription Number

Address .....

.....

.....

.....

1) Type of facility (A1):
   - 3 District Hospital OPD
   - 2 Community Health Centre
   - 1 Clinic
   - 0 Mobile clinic
2) Number of patients seen at the facility per day (A2)? .....
3) Number of workdays in a year (A3) .....
4) Degree of access to a Section 38a nursing sister (A4):
   - 3 at the clinic daily
   - 2 weekly visits
   - 1 monthly visits
   - 0 visits less than monthly
5) Degree of access to a pharmacist (A5):
   - 3 at the clinic daily
   - 2 weekly visits
   - 1 monthly visits
   - 0 visits less than monthly/never
6) Degree of access to a doctor (A6):
   - 3 at the clinic daily
   - 2 weekly visits
   - 1 monthly visits
   - 0 visits less than monthly/never
7) Predominant source of medicines (A7):
   - 3 Regional Hospital services
   - 2 State supplies
   - 1 From the manufacturers directly
   - 0 Donations

8) Do you have immediate access (i.e. can be obtained from within the facility and can be used within a few minutes) to an unbiased source of drug information (A8)?

1 yes

0 no

Unbiased sources of drug information include the South African Medicines Formulary, the Medunsa Primary Health Care Formulary or other reference textbooks. They do NOT include any potentially biased information produced by a pharmaceutical company.

9) Do you have immediate access to Standard Treatment Guidelines (STGs) (A9)?

1 yes

0 no

These may be local, district or national guidelines.

10) Is there a copy of the South African National Essential Drugs List immediately available (A10)?

1 yes

0 no

11) Annual budget for medicines in Rands (A11.1) and US dollars (A11.2)?

12) Source of the information provided in questions 7 and 11(A12)?

3 available from the facility itself

2 within the same district

1 within the same province

0 outside the province/not available

13) Number of key drugs available for use (see list below) (A13): .....

14) Number of key drugs used before expiry date (A14): .....

15) Number of key drugs stored correctly (A15): .....

List of key drugs:

oral rehydration fluid
procaine penicillin injection
chloroquin tablets
mebendazole tablets
benzoic acid and salicylic acid ointment
vitamin A tablets
cotrimoxazole tablets
paediatric paracetamol syrup
ferrous salts and folic acid
tetracycline eye ointment

16) In general, how do the staff at your facility feel about their knowledge of medicines (A15)?

3 knowledge is excellent

2 good, feel safe treating a patient

1 poor, needs to be improved

0 non-existent

17) How do the staff feel about the access they have to drug information (references/textbooks/ by phone or e-mail) (A16)?

3 access is excellent

2 good, feel information is available when needed

1 poor, access needs to be improved

0 not accessible at all

18) Do your staff feel supported in the implementation of the EDP (A17)?

3 yes, support is excellent

2 good, feel support is available

1 poor, support needs to be improved

0 no support at all

Indicators for each prescription: This data will be collected on a separate form for each prescription reviewed

Name of Facility ..... Prescription Number

Address .....

.....

.....

.....

1) Is the name of the patient on the script (B1)?

   1 yes

   0 no

2) Does the signature of the prescriber appear (B2)?

   1 yes

   0 no

3) The number of drugs prescribed (B3): .....

4) Number of prescribed drugs that are on the EDL (B4): .....

5) Number of drugs that have been prescribed by their generic name (B5): .....

6) Is the prescription in accordance with the STGs for that diagnosis (B6)? .....

   3 Yes

   2 almost all points coincide

   1 some points coincide

   0 not at all

7) Total cost of the prescription (B7): .....

8) Number of drugs prescribed that were actually dispensed (B8): .....

9) Number of dispensed drugs adequately labelled: (To be labelled properly there must be ALL of the following on the label: the name of the patient, the name of the drug, the dosage instructions and the date of drug.) (B9) .....

10) Total cost of dispensed medication (B10): .....

11) Did the patient have an adequate knowledge of dosage instructions: (Patient should know ALL of the following: how much, how often and for how long to take their medication, as well as common side-effects. e.g. "I must take amoxil, one capsule three times a day for five days and it may make me have loose stools.") (B11)

   3 knowledge was good (all 4 points known)

   2 Knowledge was reasonable (knew 2 or 3 points)

   1 Little knowledge (knew one point only)

   0 did not have any knowledge of the instructions.

Indicators for each drug

Please record the names of all the medications prescribed (as written), their strength, dose and the duration of treatment.

(From this we can work out the costs required above.)

Name of medication:	Strength of medication:	Dose of medication:	Duration of treatment:
e.g. Amoxcil	250 mg	PO, 6 hrly	10 days

Appendix two

Clinical cases

These cases can be used to practice your skills at prescribing rationally. There are 12 cases. Subsections a. b. and c. are variations on the same case.

Case 1a A 5 year old boy presents to you with a 3 day history of a painful left ear, and tender glands in his neck.

Case 1b A 5 year old boy presents to you with a 3 day history of a painful left ear, and tender glands in his neck. He has an allergy to penicillin.

Case 1c A 5 year old boy presents to you with a 3 day history of a painful left ear, and tender glands in his neck. He has an allergy to penicillin. He has a history of kidney problems.

Case 2a A 24 year old woman presents with her first episode of frequency and burning pain on passing urine. This has been happening for 3 days. She is otherwise well.

Case 2b A 24 year old woman presents with her first episode of frequency and burning pain on passing urine. This has been happening for 3 days. She is otherwise well. She is breastfeeding a 2 month old baby.

Case 2c A 24 year old woman presents with an episode of frequency and burning pain on passing urine. This has been happening for 3 days. She is otherwise well. She is breastfeeding a 2 month old baby. This is her fifth episode of urinary tract infection over the past year.

Case 3 A 6 month old boy from a children's home is brought to you by his carer. He has been irritable for 2 days and has not wanted to eat. He started vomiting this morning. On examination you find he has a stiff neck and a few red spots on his skin.

Case 4a An 18 month old child arrives at your clinic for his routine check-up and vaccinations. He weighs 9 kg. His mother tells you he has had 4 episodes of diarrhoea this year.

Case 4b An 18 month old child arrives at your clinic for his routine check-up and vaccinations. He weighs 9 kg. His mother tells you he has had 4 episodes of diarrhoea this year. His fingerprick Hb is 9.5g/dl.

Case 4c An 18 month old child arrives at your clinic for his routine check-up and vaccinations. He weighs 9 kg. His mother tells you he has had 4 episodes of diarrhoea this year. His fingerprick Hb is 9.5g/dl.You notice oral candidiasis and some enlarged lymph nodes under his arms.

Case 5a A previously well, but quite overweight woman comes to you complaining of thirst, having to drink a lot of water and pass lots of urine over the past few months. On urine dipstix there is +++ Glucose and her fingerprick glucose is 11.4 mmol/L.

Case 5b A previously well, but quite overweight woman came to you 3 months ago with symptoms of Diabetes Mellitus. She returns, having tried your treatment, with headaches and flashes if front of her eyes, especially on straining. Her Glu is 6.0, but her blood pressure is 150/110.

Case 6a A 23 year old man is brought in from work complaining of a tight, wheezy chest for the past hour. He does not smoke but has recently been apprenticed to a carpenter.

Case 6b A 23 year old man is brought in from work complaining of a tight, wheezy chest for the past hour. It turns out that he has had this problem before and uses his sister's inhaler when he needs to. The wheezing has been getting worse: he needs to use the inhaler twice a week now for wheezing and he has been coughing at night.

Case 6c A 23 year old man is brought in from work with an acute asthma attack and generally worsening symptoms. He had a car accident 5 years ago after which he had fits. He is taking carbamazepine and has not had a fit for a year now.

Case 7a A young woman is helped into the clinic. She has a sprained ankle which is quite swollen and painful. She asks for something for the pain.

Case 7b A young woman is helped into the clinic. She has a sprained ankle which is quite swollen and painful. She asks for something for the pain. She is 28 weeks pregnant.

Case 8a A 15 year old schoolgirl comes to Family Planning asking for an oral contraceptive . She has been sleeping with her boyfriend for a month and is worried about becoming pregnant.

Case 8b A 15 year old schoolgirl comes to Family Planning asking for an oral contraceptive . She has been sleeping with her boyfriend for a month and is worried about becoming pregnant. She has had TB for 4 months and is being treated on Isoniazid and Rifampicin.

Case 8c A 15 year old schoolgirl comes to Family Planning asking for an oral contraceptive. She has had TB for 4 months and is being treated on Isoniazid and Rifampicin. She has noticed that her boyfriend has an ulcer on his penis. It does not hurt him at all.

Case 9a A 54 year old man comes to you with a bite on his arm from his dog. He is worried that it may be infected.

Case 9b A 54 year old man comes to you with a bite on his arm from his dog. He is worried that it may be infected. He has congestive cardiac failure controlled on furosemide and digoxin.

Case 9c A 54 year old man comes to you with a bite on his arm from his dog. He is worried that it may be infected. He has congestive cardiac failure controlled on furosemide and digoxin. His Slow K tablets have run out. He has been feeling nauseous of late and felt his heart beating very fast.

Case 10a An 8 month old boy is carried in by his mother. He has had watery diarrhoea for the past 2 days. His mum has not noticed any blood or mucus in the stool, nor has she seen any worms. He has not vomited either. You find he is slightly dehydrated.

Case 10b The 8 month old boy that you saw 2 days ago with mild watery diarrhoea now returns to you. Mum says he is refusing to drink and is vomiting everything she gives him. This time when you examine him he seems lethargic, has cold hands and feet and is very dehydrated.

Case 11a A 9 year old girl who you have seen in the town comes to you saying she has a cough and is coughing up green phlegm. She had a cold last week. She has a mild fever, with a temperature of 37.5°, and is breathing at 24 breaths a minute. Her chest is clear.

Case 11b The 9 year old girl who you saw yesterday with a cough producing green phlegm has come to you again. When she coughs her chest hurts on the left side. She now has a fever, with a temperature of 38.5°, and is breathing at 40 breaths a minute. You can hear some crackles over her left lower chest.

Case 12a A worried 36 year old woman comes to your clinic complaining of lower abdominal pain and a smelly vaginal discharge.

Case 12b A worried 36 year old woman comes to your clinic complaining of lower abdominal pain and a smelly vaginal discharge. For the last few weeks she has thought she was pregnant, but 2 days ago she had bad stomach cramps and passed some clots of blood.

Appendix three

How to give medications

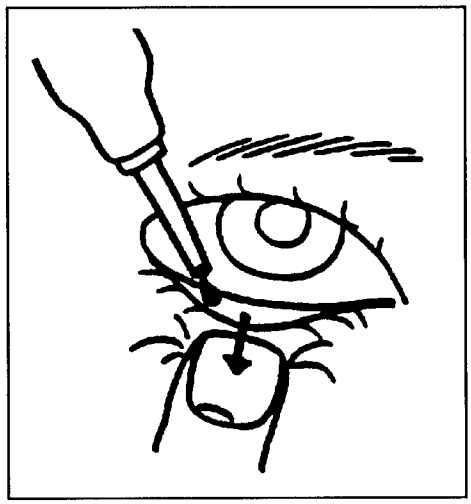
Information, in simple language, on how to administer eye drops to a child or how to use an inhaler is not always easily available. This appendix contains step by step guidance on how to give medicines by different routes. This information is included because you are responsible for your patient's treatment, even if that treatment is actually administered by someone else, either a nurse, or by patients themselves. You will often need to explain to patients how to administer a treatment correctly. You may also need to teach other health workers.

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1. Eye Drops

1. Wash your hands.
2. Do not touch the dropper opening.
3. Look upward.
4. Pull the lower eyelid down to make a 'gutter'.
5. Bring the dropper as close to the 'gutter' as possible without touching it or the eye.
6. Apply the prescribed amount of drops in the 'gutter'.
7. Close the eye for about two minutes. Do not shut the eye too tight.
8. Excess fluid can be removed with a tissue.
9. If more than one kind of eye-drop is used wait at least five minutes before applying the next drops.
10. Eye-drops may cause a burning feeling but this should not last for more than a few minutes. If it does last longer consult a doctor or pharmacist.



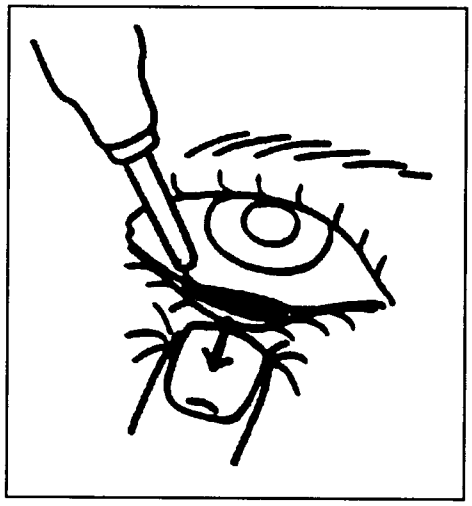
Steps 4 and 5

When giving eye-drops to children

1. Let the child lie back with head straight.
2. The child's eyes should be closed.
3. Drip the amount of drops prescribed into the corner of the eye.
4. Keep the head straight.
5. Remove excess fluid.

2. Eye ointment

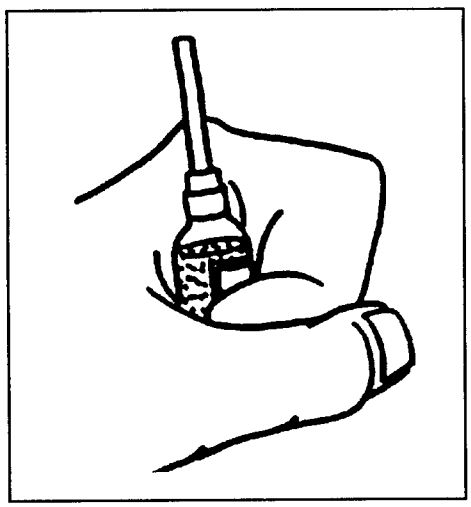
1. Wash your hands.
2. Do not touch anything with the tip of the tube.
3. Tilt the head backwards a little.
4. Take the tube in one hand, and pull down the lower eyelid with the other hand, to make a 'gutter'.
5. Bring the tip of the tube as close to the 'gutter' as possible.
6. Apply the amount of ointment prescribed.
7. Close the eye for two minutes.
8. Remove excess ointment with a tissue.
9. Clean the tip of the tube with another tissue.



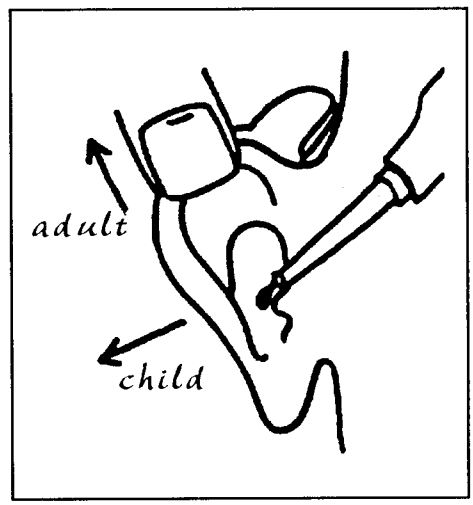
Steps 4 and 5

3. Ear drops

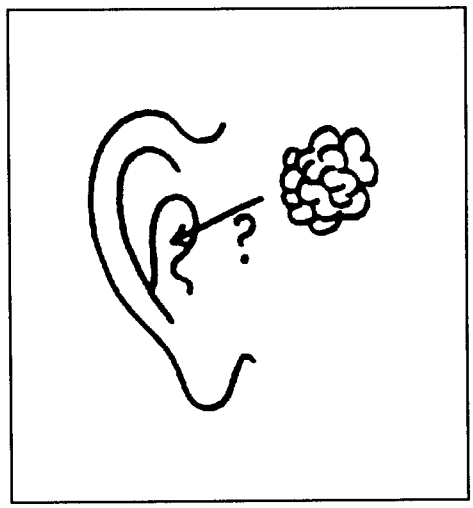
1. Warm the ear-drops by keeping them in the hand or the armpit for several minutes. Do not use hot water tap, no temperature control!
2. Tilt head sideways or lie on one side with the ear upward.
3. Gently pull the lobe to expose the ear canal.
4. Apply the amount of drops prescribed.
5. Wait five minutes before turning to the other ear.
6. Use cotton wool to close the ear canal after applying the drops ONLY if the manufacturer explicitly recommends this.
7. Ear-drops should not burn or sting longer than a few minutes.



Step 1



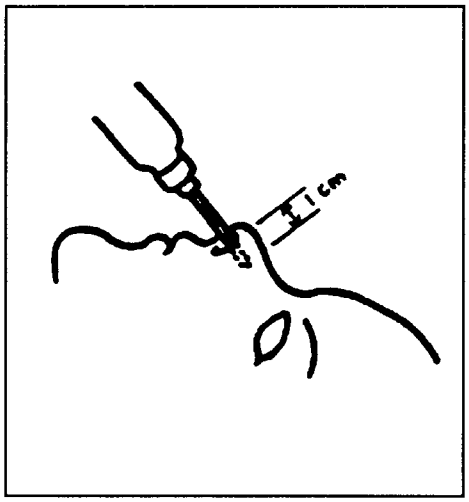
Steps 2 and 3



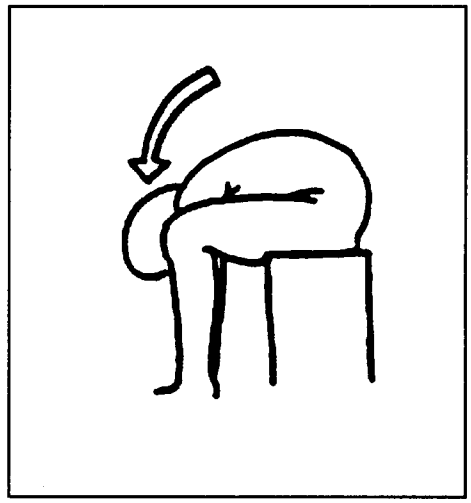
Step 6

4. Nasal drops

1. Blow the nose.
2. Sit down and tilt head backward strongly or lie down with a pillow under the shoulders; keep head straight.
3. Insert the dropper one centimetre into the nostril.
4. Apply the amount of drops prescribed and remove the dropper.
5. Immediately afterward tilt head forward strongly (head between knees).
6. Sit up after a few seconds, the drops will then drip into the pharynx.
7. Repeat the procedure for the other nostril, if necessary.
8. Rinse the dropper with boiled water.



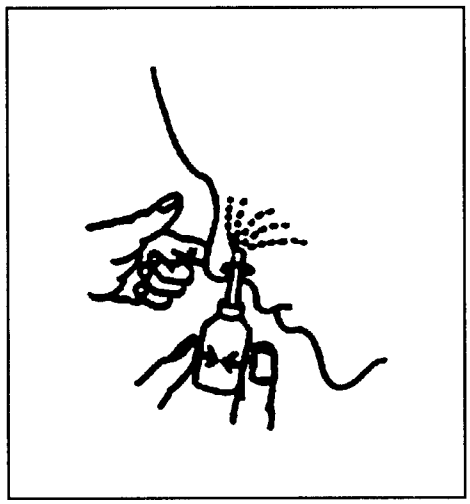
Steps 2 and 3



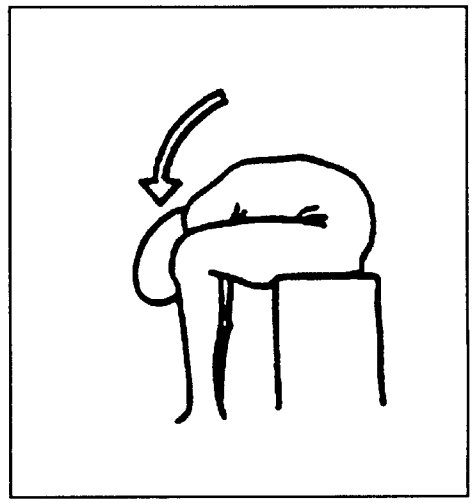
Step 5

5. Nasal spray

1. Blow the nose.
2. Sit with the head slightly tilted forward.
3. Shake the spray.
4. Insert the tip in one nostril.
5. Close the other nostril and mouth.
6. Spray by squeezing the vial (flask, container) and sniff slowly.
7. Remove the tip from the nose and bend the head forward strongly (head between the knees).
8. Sit up after a few seconds; the spray will drip down the pharynx.
9. Breathe through the mouth.
10. Repeat the procedure for the other nostril, if necessary.
11. Rinse the tip with boiled water.



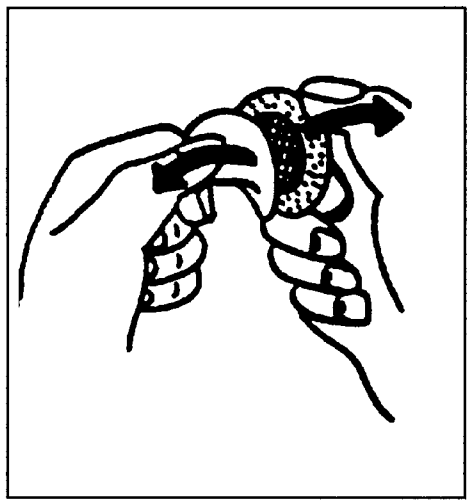
Steps 4 and 5



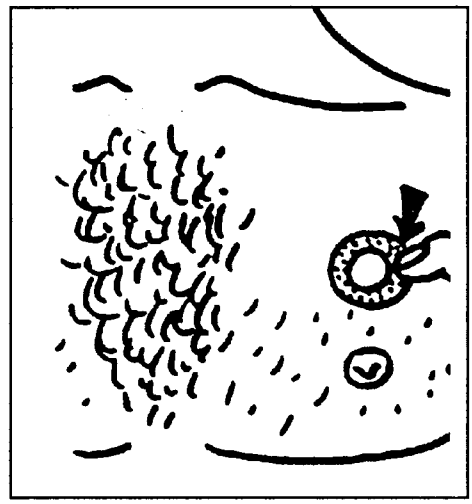
Step 7

6. Transdermal patch

1. For patch site see instructions included with the drug or check with your pharmacist.
2. Do not apply over bruised or damaged skin.
3. Do not wear over skin folds or under tight clothing and change spots regularly.
4. Apply with clean, dry hands.
6. Clean and dry the area of application completely.
7. Remove patch from package, do not touch 'drug' side.
8. Place on skin and press firmly. Rub the edges to seal.
9. Remove and replace according to instructions.



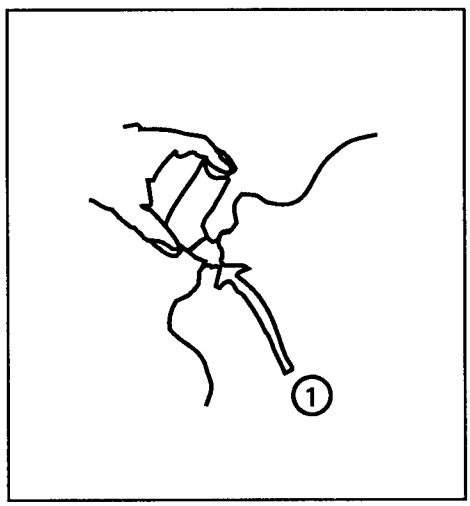
Step 7



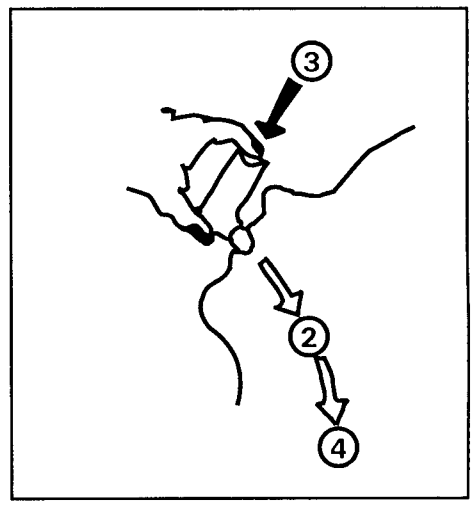
Step 8

7. Inhaler

1. Cough up as much sputum as possible.
2. Shake the inhaler before use.
3. Hold the inhaler as indicated in the manufacturer's instructions (this is usually upside down).
4. Place the lips tightly around the mouthpiece (1).
5. Tilt the head backward slightly.
6. Breathe out slowly, emptying the lungs of as much air as possible.
8. Breathe in deeply (2) and squeeze the inhaler (3), keeping the tongue down.
9. Hold the breath for ten to fifteen seconds.
10. Breathe out through the nose.
11. Rinse the mouth with warm water.



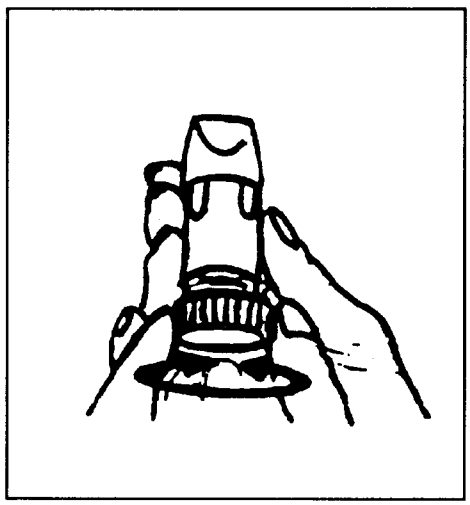
Steps 4 and 5



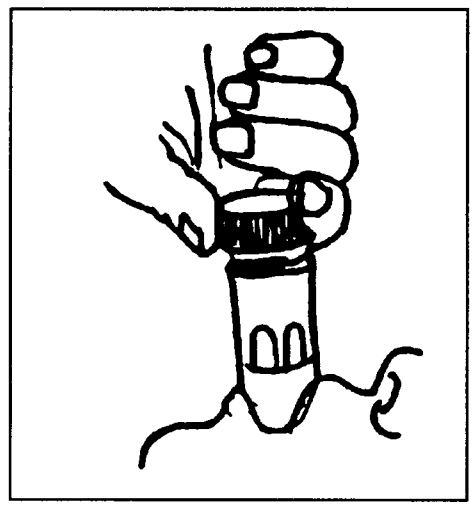
Step 8

8. Inhaler with capsule

1. Cough up as much sputum as possible.
2. Place the capsule(s) in the inhaler according to manufacturer's instructions.
3. Breathe out slowly and empty lungs of as much air as possible.
4. Place lips tightly around the mouthpiece.
5. Tilt head backward slightly.
6. Take a deep breath through the inhaler.
7. Hold the breath for ten to fifteen seconds.
8. Breathe out through the nose.
9. Rinse the mouth with warm water.



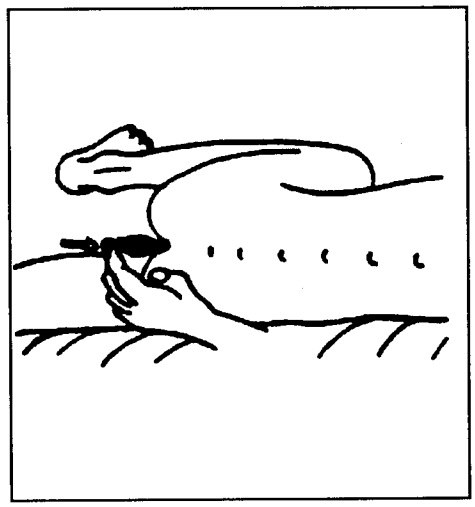
Steps 4



Steps 5

9. Suppository

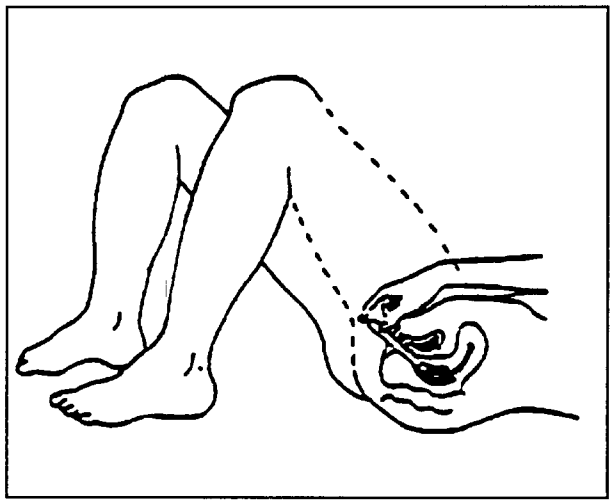
1. Wash your hands.
2. Remove the covering (unless too soft).
3. If the suppository is too soft let it harden first by cooling it (fridge or hold under cold running water, still packed!) then remove covering.
4. Remove possible sharp rims by warming in the hand.
5. Moisten the suppository with cold water.
6. Lie on your side and pull up your knees.
7. Gently insert the suppository, rounded end first, into the back passage.
8. Remain lying down for several minutes.
9. Wash your hands.
10. Try not to have a bowel movement during the first hour.



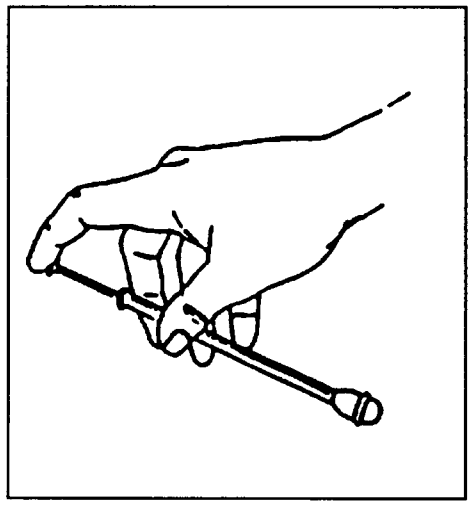
Step 6

10. Vaginal tablet with applicator

1. Wash your hands.
2 Remove the wrapper from the tablet.
3. Place the tablet into the open end of the applicator.
4. Lie on your back, draw your knees up a little and spread them apart.
5. Gently insert the applicator with the tablet in front into the vagina as far as possible, do NOT use force!
6. Depress the plunger so that the tablet is released.
7. Withdraw the applicator.
8. Discard the applicator (if disposable).
9. Clean both parts of the applicator thoroughly with soap and boiled, lukewarm water (if not disposable).
10. Wash your hands.



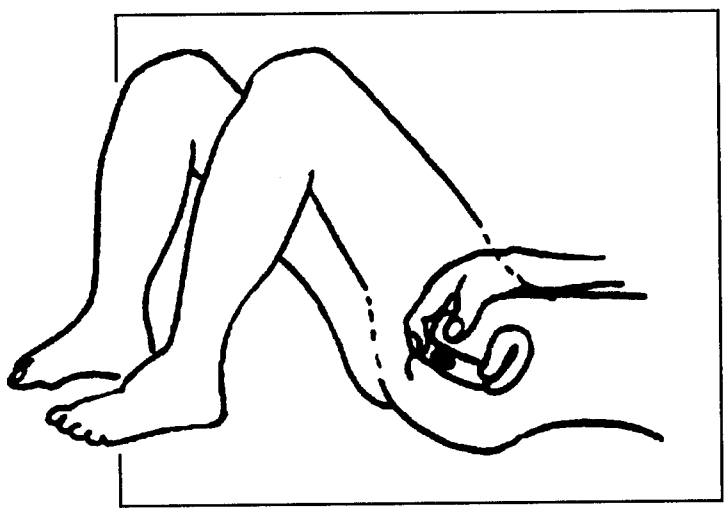
Steps 4 and 5



Step 6

11. Vaginal tablet without applicator

1. Wash your hands.
2. Remove the wrapper from the tablet.
3. Dip the tablet in lukewarm water just to moisten it.
4. Lie on your back, draw your knees up and spread them apart.
5. Gently insert the tablet into the vagina as high as possible, do NOT use force!
6. Wash your hands.

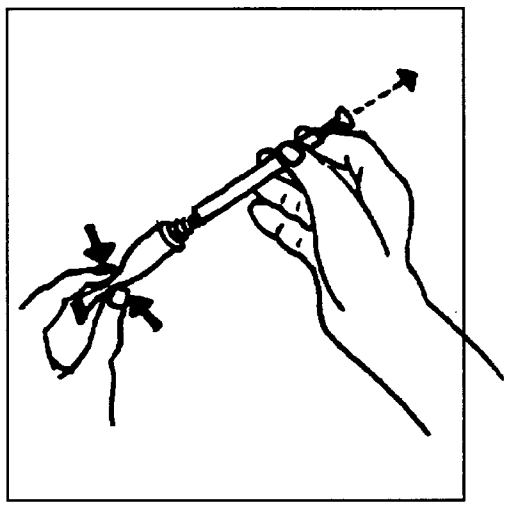


Steps 4 and 5

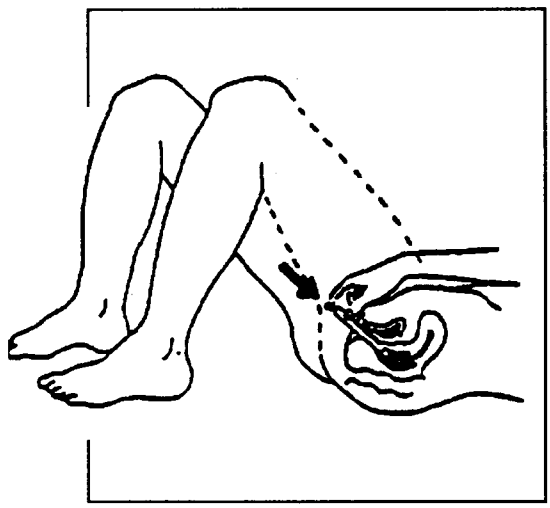
12. Applying vaginal creams, ointments and gels

(most of these drugs come with an applicator)

1. Wash your hands.
2. Remove the cap from the tube containing the drug.
3. Screw the applicator to the tube.
4. Squeeze the tube until the required amount is in the applicator.
5. Remove the applicator from the tube (hold the cylinder).
6. Apply a small amount of cream to the outside of the applicator.
7. Lie on your back, draw your knees up and spread them apart.
8. Gently insert the applicator into the vagina as far as possible, do NOT use force.
9. Hold the cylinder and with the other hand push the plunger down thus inserting the drug into the vagina.
10. Withdraw the applicator from the vagina.
11. Discard the applicator if disposable or clean thoroughly (boiled water) if not.
12. Wash your hands.



Steps 4 and 5



Steps 7 and 8

Appendix Four

The use of injections

There are two main reasons to prescribe an injection. The first is because a fast effect is needed, and the second is because the injection is the only dose available that has the required effect. A prescriber should know how to give injections, not only for emergency and other situations where it might be necessary, but also because it will sometimes be necessary to instruct other health workers or the patients themselves.

Many injections are prescribed which are unnecessarily dangerous and inconvenient. Nearly always they are much more expensive than tablets, capsules and other dosage forms. For every injection the prescriber should strike a balance between the medical need on the one hand and the risk of side effects, inconvenience and cost on the other.

When a drug is injected certain effects are expected, and also some side effects. The person giving the injection must know what these effects are, and must also know how to react if something goes wrong. This means that if you do not give the injection yourself you must make sure that it is done by someone who is qualified.

A prescriber is also responsible for how waste is disposed of after the injection. The needle and sometimes the syringe are contaminated waste and special measures are needed for their disposal. A patient who injects at home must also be aware of this problem.

General practical aspects of injecting

1. Aspirating from ampoules (glass, plastic) *Page* 70
2. Aspirating from a vial 71
3. Dissolving dry medicine 72
4. Subcutaneous injection 73
5. Intramuscular injection 74
6. Intravenous injection 75

Apart from the specific technique of injecting, there are a few general rules that you should keep in mind.

1. Expiry dates

Check the expiry dates of each item including the drug.

If you are in a mobile check the drugs in stock regularly to make sure that they have not passed the expiry date.

2. Drug

Make sure that the vial or ampoule contains the right drug in the right strength.

3. Sterility

While preparing the injection all material should be kept sterile.

Wash your hands before starting to prepare the injection.

Disinfect the skin over the injection site.

4. No bubbles

Make sure that there are no air bubbles left in the syringe.

This is more important in intravenous injections.

5. Prudence

Once the protective cover of the needle is removed extra care is needed.

Do not touch anything with the unprotected needle.

Once the injection has been given take care not to prick yourself or somebody else.

6. Waste

Make sure that contaminated waste is disposed of safely. (glass, plastic)

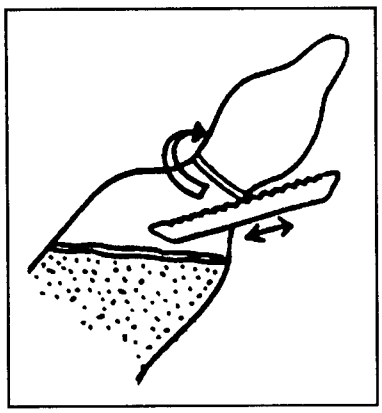
Asirating from ampoules

Materials needed

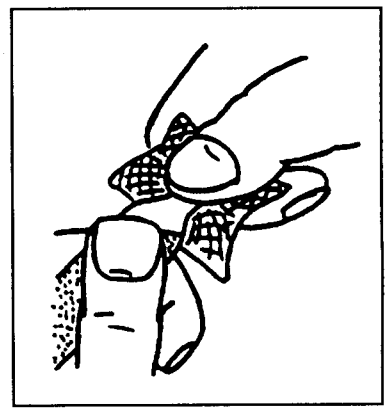
Syringe of appropriate size, needle of required size, ampoule with required drug or solution, gauze.

Technique

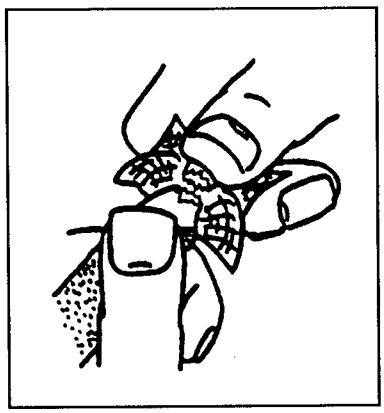
1. Wash your hands.
2. Put the needle on the syringe.
3. Remove the liquid from the neck of the ampoule by flicking it or swinging it fast in a downward spiralling movement.
4. File around the neck of the ampoule.
5. Protect your fingers with gauze if ampoule is made of glass.
6. Carefully break off the top of the ampoule (for a plastic ampoule twist the top).
7. Aspirate the fluid from the ampoule.
8. Remove any air from the syringe.
9. Clean up; dispose of working needle safely; wash your hands.



Step 4



Step 5



Step 6

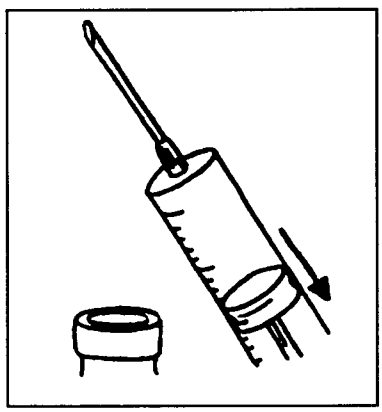
Asirating from a vial

Materials needed

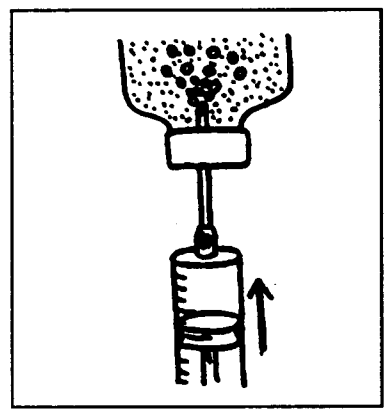
Vial with required drug or solution, syringe of the appropriate size, needle of right size (im, sc, or iv) on syringe, disinfectant, gauze.

Technique

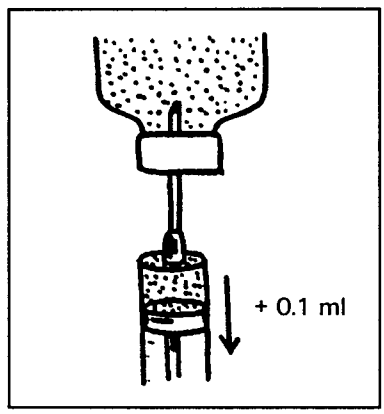
1. Wash your hands.
2. Disinfect the top of the vial.
3. Use a syringe with a volume of twice the required amount of drug or solution and add the needle.
4. Suck up as much air as the amount of solution needed to aspirate.
5. Insert needle into (top of) vial and turn upside-down.
6. Pump air into vial (creating pressure).
7. Aspirate the required amount of solution and 0.1 ml extra. Make sure the tip of the needle is below the fluid surface.
8. Pull the needle out of the vial.
9. Remove possible air from the syringe.
10. Clean up; dispose of waste safely; wash your hands.



Step 4



Step 6



Step 7

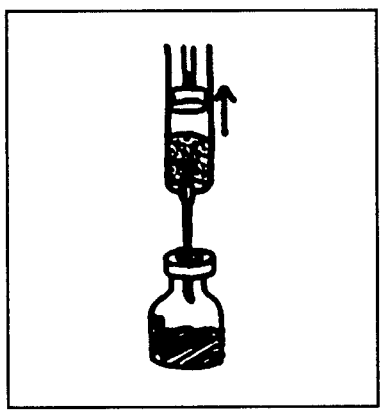
Dissolving dry medicine

Materials needed

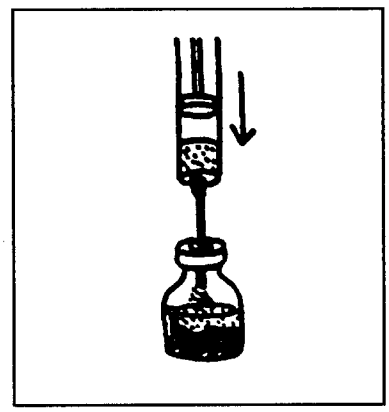
Vial with dry medicine to be dissolved, syringe with the right amount of solvent, needle of right size (iv, sc or iv) on syringe, disinfectant, injection needle, gauze.

Technique

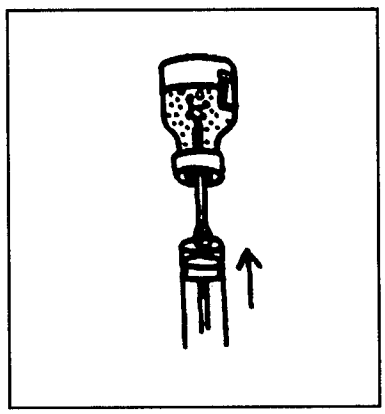
1. Wash hands.
2. Disinfect the rubber cap (top) of the vial containing the dry medicine.
3. Insert the needle into the vial, hold the whole upright.
4. Suck up as much air as the amount of solvent already in the syringe.
5. Inject only the fluid into the vial, not the air!
6. Shake.
7. Turn the vial upside-down.
8. Inject the air into the vial (creating pressure).
9. Aspirate the total amount of solution (no air).
10. Remove any air from the syringe.
11. Clean up; dispose of waste safely; wash hands.



Step 4



Step 5



Step 8

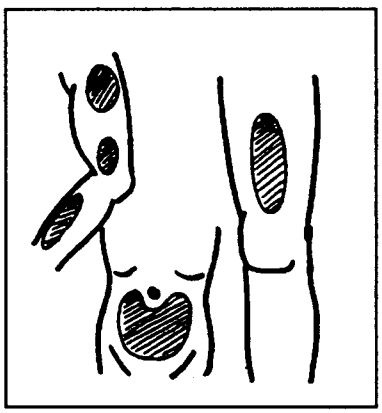
Subcutaneous injection

Materials needed

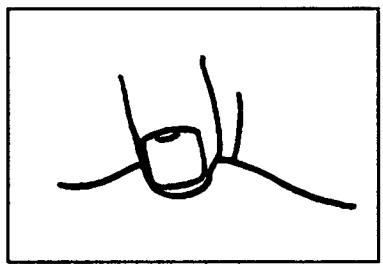
Syringe with the drug to be administered (without air), needle (Gauss 25, short and thin; on syringe), liquid disinfectant, cotton wool, adhesive tape.

Technique

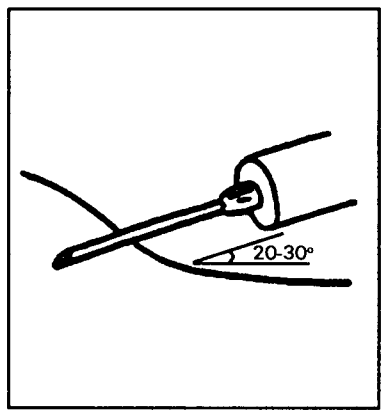
1. Wash hands.
2. Reassure the patient and explain the procedure.
3. Uncover the area to be injected (upper arm, upper leg, abdomen).
4. Disinfect skin.
5. 'Pinch' fold of the skin.
6. Insert needle in the base of the skin-fold at an angle of 20 to 30 degrees.
7. Release skin.
8. Aspirate briefly; if blood appears: withdraw needle, replace it with a new one, if possible, and start again from point 4.
9. Inject slowly (0.5 - 2 minutes!).
10. Withdraw needle quickly.
11. Press sterile cotton wool onto the opening. Fix with adhesive tape.
12. Check the patient's reaction and give additional reassurance, if necessary.
13. Clean up; dispose of waste safely; wash hands.



Step 3



Step 5



Step 6

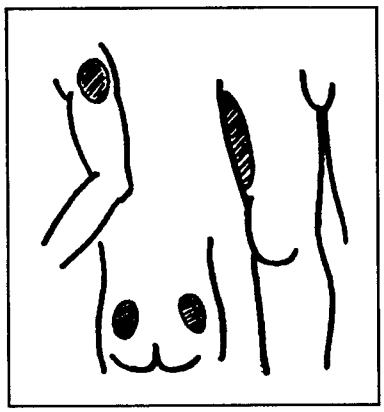
Intramuscular injection

Materials needed

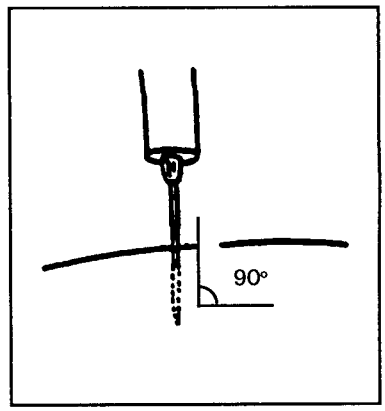
Syringe with the drug to be administered (without air), needle (Gauss 22, long and medium thickness; on syringe), liquid disinfectant, cotton wool, adhesive tape.

Technique

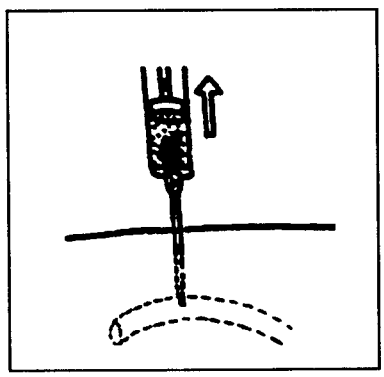
1. Wash hands.
2. Reassure the patient and explain the procedure.
3. Uncover the area to be injected (lateral upper quadrant major gluteal muscle, lateral side of upper leg, deltoid muscle).
4. Disinfect the skin.
5. Tell the patient to relax the muscle.
6. Insert the needle swiftly at an angle of 90 degrees (watch depth!).
7. Aspirate briefly; if blood appears, withdraw needle. Replace it with a new one, if possible, and start again from point 4.
8. Inject slowly (less painful).
9. Withdraw needle swiftly.
10. Press sterile cotton wool onto the opening. Fix with adhesive tape.
11. Check the patient's reaction and give additional reassurance, if necessary.
12. Clean up; dispose of waste safely; wash your hands.



Step 4



Step 5



Step 6

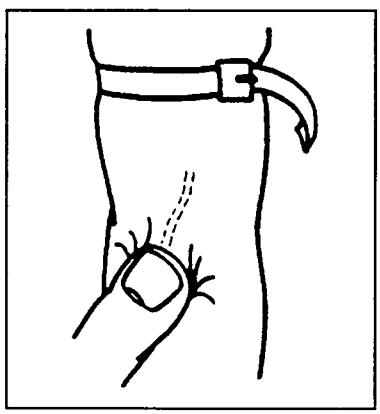
Intravenous Injection

Materials needed

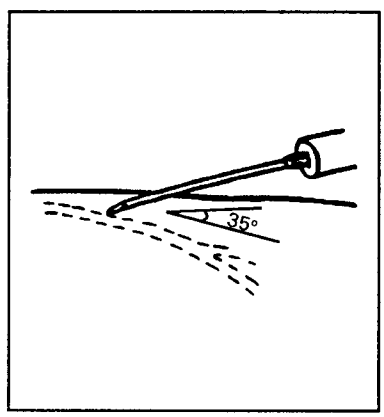
Syringe with the drug to be administered (without air), needle (Gauss 20, long and medium thickness; on syringe), liquid disinfectant, cotton wool, adhesive tape, tourniquet.

Technique

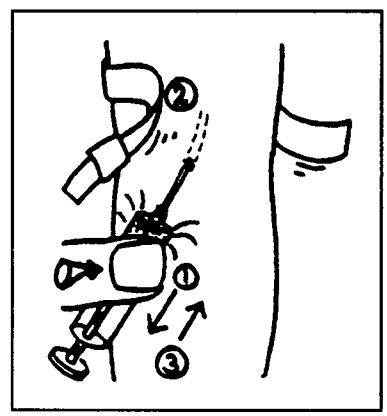
1. Wash your hands.
2. Reassure the patient and explain the procedure.
3. Uncover arm completely.
4. Have the patient relax and support his arm below the vein to be used.
5. Apply tourniquet and look for a suitable vein.
6. Wait for the vein to swell.
7. Disinfect skin.
8. Stabilize the vein by pulling the skin taut in the longitudinal direction of the vein. Do this with the hand you are not going to use for inserting the needle.
9. Insert the needle at an angle of around 35 degrees.
10. Puncture the skin and move the needle slightly into the vein (3-5 mm).
11. Hold the syringe and needle steady.
12. Aspirate. If blood appears hold the syringe steady, you are in the vein. If it does not come, try again.
13. Loosen tourniquet.
14. Inject (very) slowly. Check for pain, swelling, hematoma; if in doubt whether you are still in the vein aspirate again!
15. Withdraw needle swiftly. Press sterile cotton wool onto the opening. Secure with adhesive tape.
16. Check the patient's reactions and give additional reassurance, if necessary.
17. Clean up; dispose of waste safely; wash your hands.



Step 8



Step 9



Step 11 to 14

Notes

RJ Date 23/11/90

Rational Drug Prescribing training program.

Trainers folder.

Rational Drug Prescribing training project

(A joint programme of the University of Durban-Westville with the University of Cape Town. Supported by Health Systems Trust.)

Introduction:

The aim of this project is to encourage all prescribers at primary care level, be they nurses, pharmacists or doctors, to prescribe medicines in a safe, efficient and cost effective manner. *Rational prescribing* is the *process* of ensuring correct diagnosis, correct advice and treatment and, if a medicine is used, that it is the correct choice for any given patient. The medicine must be given in the correct dose over the right period of time. Patient compliance in this process is critical.

To meet this goal we have devised a short **training course** for primary care prescribers. To evaluate prescribing practices and to monitor changes resulting from the training we have included a series of **"drug-use" indicators**. The project will be supported and sustained by **development of a network** of references and resources: from texts supplied at the time of training to telephonic or e-mail access to the Primary Care Medicines Resource Centre at the University of Durban Westville or to the Medicines Information Centre in Cape Town.

The Course:

- Small groups of 8-10 staff are taught at their own health care facility.
- They are taught by one, or perhaps two, trainers at a 2-day workshop.
- Using clinical examples the participants learn how to prescribe rationally.
- They are given practical points on using standard therapeutic guidelines.
- While in their own dispensary they are advised on efficient management of a dispensary.
- Giving patients information on their illness and medication is emphasised.

A group of people nominated by the community of a district to be that district's trainers would be approved by the area's regional director. The trainers will be trained to facilitate the 2-day workshop, by Aarti Kishuna and Catherine Orrell. They would then go on to teach the programme, while being strongly supported, at all of the health facilities in their district.

This process has been canvassed with KwaZulu-Natal's essential drug programme committee and with a number of people involved in primary health care training in other provinces. District trainers need to be selected, so the training of primary care prescribers can begin.

Measurement:

- "Drug-use" indicators will be collected at every facility, before and after the training.
- These include factors that would reflect the resources and workload of each facility, as well as the prescribing practices of the staff working there.
- They would be collected by the district trainer to start with, but in time the staff at each clinic will learn to collect this data so they can audit their own practice.

The future:

In time a network will be built to support every prescriber:

- All participants are encouraged to look up or **ask** for information they need.
- The trainers will be accessible at all times to the people they train.
- Detailed drug information is available now by telephone or e-mail (Healthlink) to the Medicines Information Centre in Cape Town. That information will be made more accessible by the creation of local information centres.

The whole programme is available for review at any time. For further information please contact Catherine Orrell on 021.406 6353 (correll@uctgsh1.ac.za) or Aarti Kishuna on 031.82 3217 or 204 4358 (pcmic@healthlink.org.za).

Rational Drug Prescribing Training Course

Notes to the trainer

This folder contains teaching material for the workshop in rational drug prescribing. It has the information for collection of drug use indicators for measuring prescribing patterns too.

Most of the contents are self explanatory. The sheets called Homework and Feedback will have to be copied and given to every participant.

Please call Catherine (021-406.6353) or Aarti (031-82 3217) if you have any problems at all.

Rational Drug Prescribing Training Course.

Modules One and Two: Teaching plan

08h30 **Introduction to rational drug prescribing project:**

- Introduce the facilitators and then ask the group to introduce themselves, mentioning their names and roles in their health care facility. Write clear name tags.
- Move tables into group-friendly position; try and establish level of prior prescribing and dispensing training.
- Outline contents and structure of both days, goals and objectives, how to monitor success.
- Introduce the concept of Drug Use Indicators: when to use them and their value.
- Points to emphasise: interactive workshop format; value comes from participants active involvement and self-instruction.

09h00 Introduction to concept of **rational drug prescribing** (see notes and overheads).

- Based on clinical examples, and includes the use of drug use indicators.
- Points to emphasise: need to know and use resources; to ASK for help.
- Introduce Drug Use Indicators which cover prescribing.

10h15 Tea

10h30 Group work

- **Group work** on rational prescribing using clinical cases. Develop memory aide for the 6 prescribing points addressed.
- Each person/pair given their own clinical case to rationally prescribe for, then examples worked through in small groups. Each group can present their case to the rest.

13h00 Lunch

14h00 **Standard Treatment Guidelines**: development and use (see notes and overheads).

- Discuss Drug Use Indicators which cover use of Standard Treatment Guidelines.

14h30 **Group work** with clinical cases, using STGs and rational drug prescribing principles (as above).

16h00 Home.

Rational Drug Prescribing Training Course

Modules Three and Four: Teaching plan

08h30 Introduction
- Content and timing of the day

09h00 Principles of **Stock Management** (until 12h30 with break for tea)
- Logistics of Drug Supply
- Drug ordering
- Drug storage
- Indicators for stock management

Review Drug Use Indicators which cover stock management.

10h15 tea.

10h30 Principles of Good **Dispensing** Practice
- Interpreting the request
- Retrieval
- Formulation
- Processing/labeling
- Delivery

Includes mock-dispensing practical session, using prescriptions from the health facility.
Review Drug Use Indicators which cover dispensing.

13h00 lunch.

14h00 **Feedback session**:
- Fill in feedback forms. One per participant, anonymous. Collect them all.
- Give out homework cases, with contact numbers.
- Look at prescribing and dispensing problems in the staff's district and brainstorm solutions (simple and practical steps that are achievable).
- Set specific goals for this district: **the way forward**.....

Rational Drug Prescribing Training Course

MODULE ONE

Principles of rational prescribing

Points to be made:	*Teaching aide/method:*
What is **rational prescribing**? It is a **process** of treating a patient : to ensure correct diagnosis, correct treatment and, if a drug is used, that it is the correct choice for that patient and given in the right dose over the right period of time. Patient compliance in this process is critical.	Slide 1 (What is Rational Prescribing?) Question presented to students, their ideas requested. Answers collated and written up on a board or overhead until a reasonable definition is reached. Slide 2 (confused patient) Emphasis placed on **process**.
What are **essential drugs**? How does a medicine come to be on our Essential Drugs List? Those medicines which are critically required for the management of 90-95% of common and important conditions in our country. These medicines must all meet with high standards of safety, quality and efficacy.	Question presented for discussion. Slide 3 (definition of Essential Drugs) shown once discussion complete. Slide 4 (efficacy, safety, suitability graphic)
What do we as prescribers need to know? 1. How to **choose a drug** rationally. 2. How to **write a prescription** correctly. **Generic** names of drugs must be used (only one per drug, not biased toward any company, less confusion, can choose the cheaper drug). 3. What **information to tell** a patient. 4. How **to monitor** the treatment accurately. 5. How to **ask for help**!	Question presented for discussion. Why are generic names better? Slide 5: Ask someone else, use references, phone, e-mail, letter.
WHO has produced a Guide to Good Prescribing. The prescribing process is seen as consisting of 6 phases. 1. Define the patients problem. 2. Specify the therapeutic objective. 3.Choose a suitable treatment. 4. Start the treatment. 5. Give information, instructions and warnings. 6. Monitor (and stop) the treatment.	Slide 6 (therapeutic guideline)
All phases are present in any clinical encounter. By making yourself **aware** of them you can ensure that the encounter is successful too. If you need help with any point, ASK.	Present a clinical case (e.g.Case 1a). These will be used to illustrate the prescribing process.

1. Define the problem:

That is, come to a diagnosis by using your clinical skills of questioning, listening and examining.
If one diagnosis is impossible, come to a differential diagnosis. What *could* this be?
Remember, any single complaint may have many origins (a disease, a need for reassurance, a drug side-effect, polypharmacy etc.)

Students define the problems of the case.

2. Specify your therapeutic objectives:

What do you want to achieve?
By isolating specific objectives you can avoid unnecessary drug use. These objectives can be very obvious, but they are not always going to be.
The patients reason for visiting you and your treatment objective may NOT be the same.
Discuss your ideas with your patient. Informed consent improves compliance.

Student decide the therapeutic objectives, by discussion, for the case.

3. Choose the most suitable treatment for your patient:

Is reassurance and advice all that is needed?
Is a referral necessary?
Do you need to use a drug?

Students make decisions on how therapeutic objectives are to be met.
Slide 7: Asked to explain the illness and present advice as if to a patient.

Ideally, if a drug is needed, you should have drugs for each illness that you know well and prefer to use. In primary care they should come from the Essential Drugs List.

Asked to choose a drug as if it is to.be.taken by the patients in the clinical cases.

What do you need to know about each drug?
♣ what is it for? (licensed indications, first-line?)
♣ how **effective** is it? (personal or trial-based knowledge- why will this drug work?)
♣ how **safe is** it? (contra-indications, **interactions** with other prescribed drugs or **over-the-counter drugs**, allergies)
♣ who should NOT receive it? (check for being a **high risk** patient: children, geriatric, pregnant, breast-feeding, liver or renal disease, DM, porphyria etc)

Asked to give examples of high risk patients. (Given part 1b and 1c- how will the management change?

♣ how is it given and for how long? (convenience, dose)
♣ what does it cost?
i.e. Efficacy, safety, ease of treatment, cost, suitability.

Slide 4 again.

4. Start the treatment:

Write a **clear** prescription:
Name and address of prescriber, with phone number.
Date of prescription.
Name and strength of drug. GENERIC names only.
Dose and total amount to be given.
Prescriber's signature.
Name (and age if a child) of the patient.

Advice, information, instructions and warnings!!!

Slide 8 (bad prescription)

Students asked to write the prescription for the case. Asked to debate what needs to be on any prescription and why.

What should be on the label?

5. Give advice, information, instructions and warnings to the patient.

Ensure your patient has an **understanding** of why they are being treated.
For each drug explain *how much* must be taken, *when* it should or should not be taken and *for how long*. Warn about common *side-effects* and what to do when they happen.
Compliance is improved with well chosen treatment, good prescriber-patient relationship, **time** spent with explanation (preferably in the patient's own language), written/pictoral advice, dosing boxes.
Ask your patient to repeat your advice to you.

Discuss how compliance could be improved?

6. Monitor (and stop) the treatment.

Which medicines need to be stopped, which reduced and which are ongoing?
Do you need to see the patient again?
People who return may have a problem:
- ♣ treatment is not working.
- ♣ side-effects are unacceptable.
- ♣ treatment is not convenient.

Discuss for the case.

Why do people return?
Discuss solution to each.

Summary of 6 points. Again emphasise prescribing as a process and to ASK for help when needed.

Slide 6 again as summary

–What is rational prescribing?

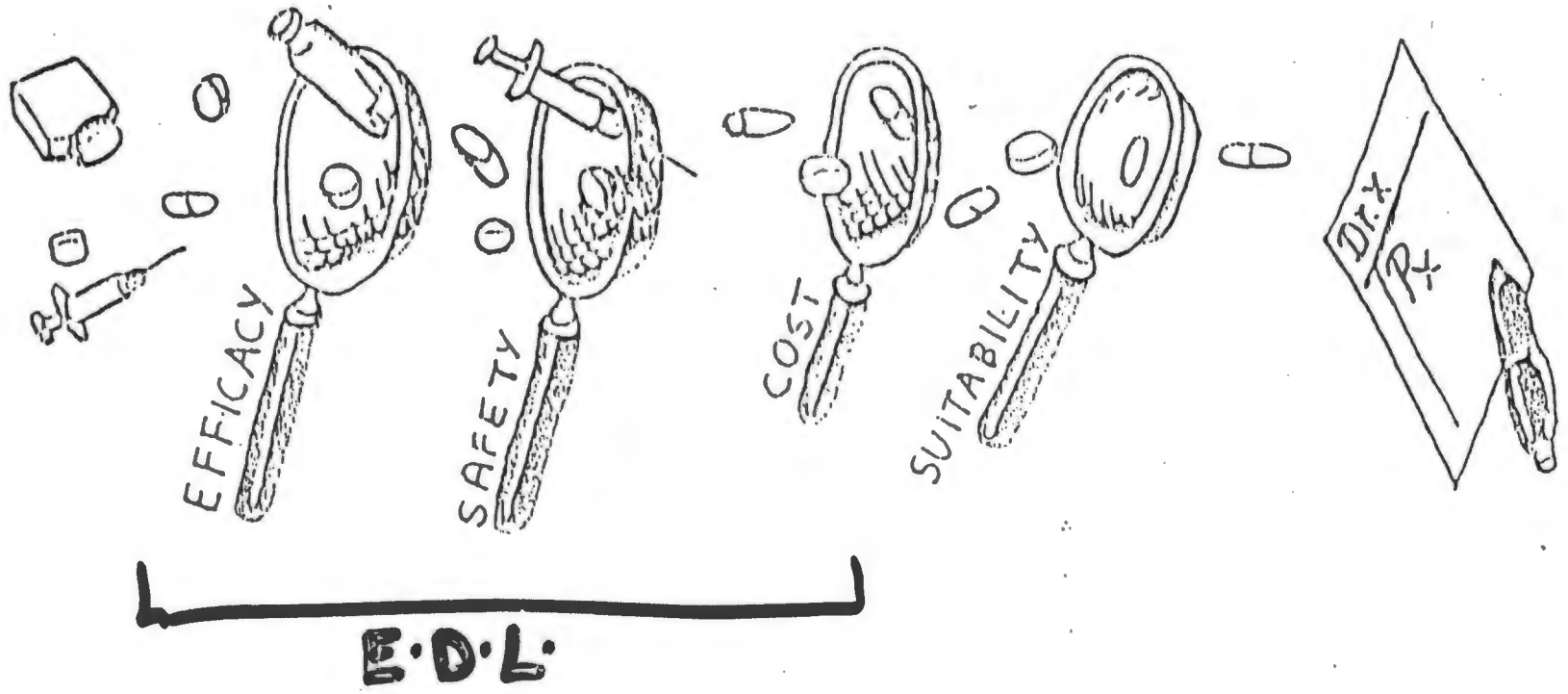



DO YOU UNDERSTAND?

Essential Drugs:

- Those medicines which are critically required for the management of 90-95% of common and important conditions in our country.
- These medicines must all meet with high standards of safety, quality and efficacy.

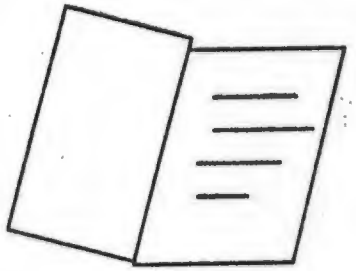
Slide 4



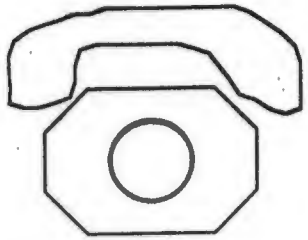
Asking for help.....



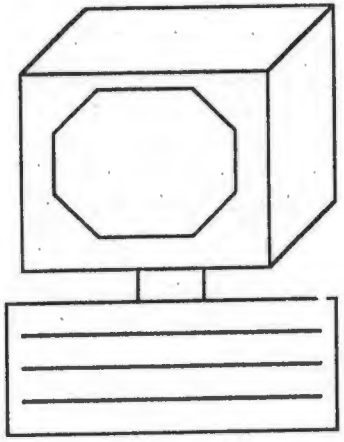
Ask



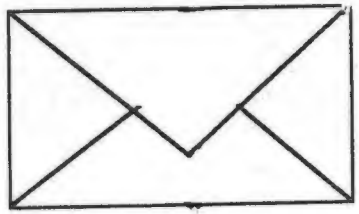
Read



Telephone



E-mail



Write a letter

SUMMARY

THERAPEUTIC GUIDELINE

PROBLEM

DIAGNOSIS	1.-	Define the patient's problem
	2.-	specify treatment objectives
CHOOSE TREATMENT	3.-	Determine first choice treatment • give information/advice • treat without drugs • treat with a drug: • refer for treatment • (combinations)
	-	Check suitability for the patient
START TREATMENT	4 -	Write a prescription CLEAR
	5 -	Give information, instructions and warnings NB NB NB
MONITOR TREATMENT	6 -	Monitor (and stop?) treatment

Do you NEED to use a drug ??

call : Catherine Orrell [orrell@ucthpsu.uct.ac.za 021-4066353
Aarti Kishuna [031-823217 pcmic@healthlink.org.za


doctor, this drug gives me pain in my stomach
oh, that's no problem, I can prescribe you a drug for that

Rational Drug Prescribing Training Course

MODULE TWO

Standard Treatment Guidelines: development and use

Points to be made	*Teaching aide/methods*
What are treatment guidelines? ♣ practical recommendations to help the prescriber ♣ based on consensus using all available data	Slide 1: Question posed to students.
Include: Essential Drug Programme STG's, Primary Health Care Formulary STG's, KwaZulu-Natal Management Protocol for Primary Care Nurses, SmithKline Beecham primary Health Care Manual	Do they know of any?
They are intended to guide and improve medical practice. They do NOT HAVE to be followed. They may help in containing costs.	What is their purpose?
Anyone can produce a guideline but to be valid, safe and effective it should be:	Who makes guidelines?
♣ of multidisciplinary origin i.e. every involved party should be **consulted**.	What is a good guideline?
♣ based on thorough review of literature regarding each **specific** clinical situation.	***4 examples***
♣ reached by group **consensus**, preferably with the involvement of the users. ♣ **unbiased** i.e. has the best interests of the patient in mind, not the pharmaceutical company whose drugs may be used. ♣ **clearly presented** and practical. ♣ available! ♣ regularly updated and reviewed.	Ask: Which one would you choose and why?
Advantages: ♣ assist in decision making ♣ are a synthesis of many people's knowledge ♣ explicit guidelines have been shown to improve practice ♣ are usually up-to-date factually ♣ can save time and money	What are the advantages?
Disadvantages: ♣ may be too restrictive ♣ may stop prescriber from thinking about each patient as an individual ♣ are only for the AVERAGE patient!	What are the disadvantages?

When is a prescriber likely to use a guideline?

1. When unsure clinically.
2. When actually involved in the creating of the guideline.
3. When exposed to an education campaign on a particular problem.
4. When a guideline has significantly improved a patients outcome.
5. When the guideline is good!

Two points where you have to be careful:
one: which guideline you use (unbiased, local, know it works, drugs are available etc.)
two: how you apply it to YOUR patient. Is this treatment suitable in this case?

References:
1. Broclain,D. (ed) "Clinical Guidelines: Quality First" *Prescrire International* Dec 1994; 3(14):188-190.
2. Grimshaw J and Russell T "Effect of clinical guidelines on medical practice: a systematic review of rigorous evaluations" *The Lancet* Nov 1993; 342:1317-1322.
3. Moulds RFW "The role of national therapeutic guidelines" *Australian Prescriber* 1996;19(1):13-15.
4.Onion CWR and Walley T "Clinical guidelines: development, effectiveness,implementation and effectiveness" *Postgrad Med J* 1995;71:3-9.

What are treatment guidelines?

Opthalmia neonatorum: Zimbabwe 2 (eye care).

- **Defined** as a discharging sticky eye with red swollen eyelids in any baby during the first 28 days of life.
- **Treat**: Clean eyes with clean swab and apply tetracycline 1% eye ointment hourly for 4 days, then 4 times a day for 10 days.
- Initiate systemic antibiotics in baby and refer baby AND PARENTS to hospital: procaine penicillin (IM) 60000u.

Opthalmia neonatorum: South Africa

- The most common cause is an infection acquired from the mother's birth canal during delivery. No child should develop this as it is preventable .
- **Treatment objectives**: to prevent the condition from developing and spreading and to cure it when it does occur.
- **Prevent**: routine administration of tetracycline opthalmic ointment at birth.
- **Treat**: eye irrigation with saline, and use tetracycline eye ointment 2-4 hourly PLUS erythromycin 62.5 mg 4 times a day for 7 days. Continue treatment for up to 1 week only.
- **Refer**: Severe purulent discharge for optimal Gonococcal treatment.

Opthalmia neonatorum: Zimbabwe1 (STDs).

- **Defined** as conjunctivitis occurring in the first 3 weeks of life.
- **Prevent** by routinely applying tetracycline eye ointment at delivery.
- **Treat**: Irrigate conjunctiva - sterile sodium chloride (0.9%) hourly on the first day and 4 hourly over the next 2 days.

  PLUS - kanamycin (IM) 25 mg/kg as a single dose.

Module 3

STOCK MANAGEMENT

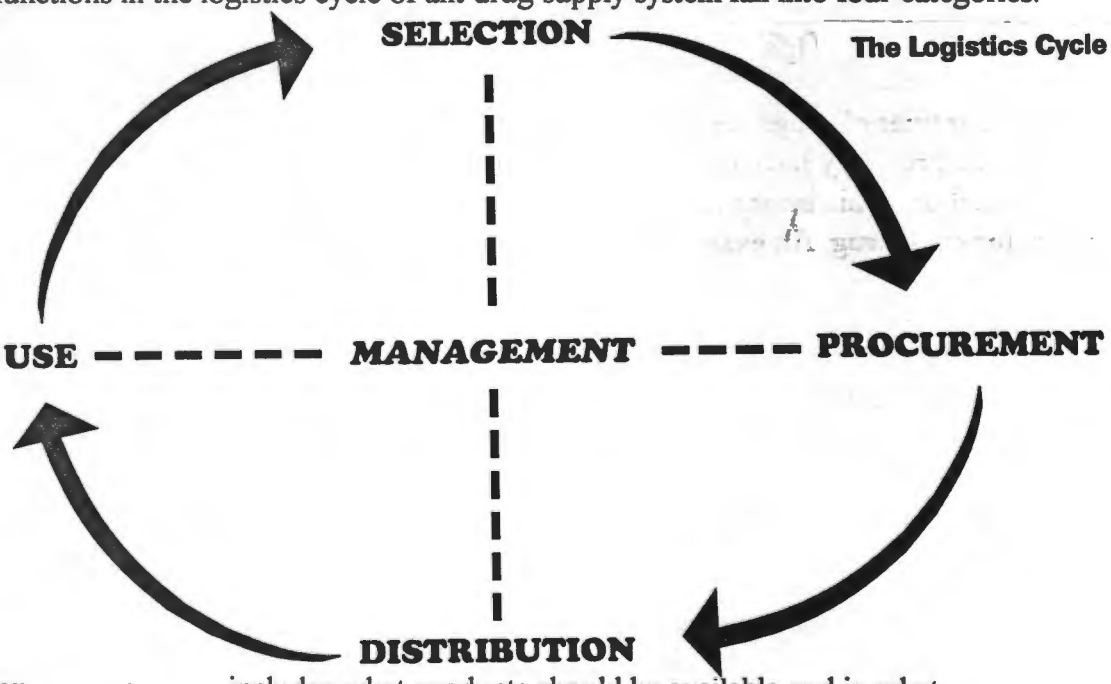
INTRODUCTION

It is important to remember that how you manage drugs at your health facility impacts on the supply of drugs at both National and Provincial levels. To fully appreciate this it becomes necessary to understand the logistics of drug supply.

LOGISTICS OF DRUG SUPPLY

Logistics is defined as the science of *procuring, maintaining* and *transporting* supplies.
In drug supply, it includes all aspects of the process required to bring a ***drug*** from the ***supplier*** to the *dispenser* and finally to the *individual patient*.
The primary functions in the logistics cycle of ant drug supply system fall into four categories.

Figure 1 **The Logistics Cycle**



Drug Selection : includes what products should be available and in what quantities.

Procurement : includes purchasing methods, finance, terms of payment, sources of supply, quality assurance, decision to make or buy.

Distribution : includes import management, inventory control, storage, waste management, and transport.

Use : includes prescribing and dispensing practices, packaging and labelling, training auxiliary personnel, and educating consumers.

When is a prescriber likely to use a guideline?

1. When unsure clinically.
2. When actually involved in the creating of the guideline.
3. When exposed to an education campaign on a particular problem.
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4.Onion CWR and Walley T "Clinical guidelines: development, effectiveness,implementation and effectiveness" *Postgrad Med J* 1995;71:3-9.

Decisions regarding Selection and Procurement of drug supplies are generally made at Provincial and National levels. You, in turn, influence such decisions by the manner in which you manage your facilities drug supplies at district level in terms of the Distribution and Use of these drugs. Bearing these issues in mind we realise that efficient management of drug supplies at your facility becomes a crucial concern. WHY? It becomes important in order to meet the following goal - the goal governing efficient stock management.

GOAL

TO ENSURE THE CONSTANT AND REGULAR SUPPLY OF SAFE AND EFFECTIVE DRUGS AT THE HEALTH FACILITY

To achieve this goal we will now discuss the following issues which impact on how you manage your supply of drugs at your district-based health facilities.

i. DRUG ORDERING

The quantities of drugs needed by your facility are estimated by considering how much of drugs you presently have on hand in your storeroom and how much of drugs you have already used up. This information will be provided to you if you have maintained stock records for each drug. An example of a stock record card is presented in Figure 2.

Figure 2 Sample Clinic Stock Record Card
(refer to attached notes)

Figure 2a Sample Clinic Stock Record Card (Front)

CLINIC/PHARMACY STOCK RECORD CARD

MINISTRY OF HEALTH

Department of Medical Supply

Description: Paracetamol 500mg tab — Reorder Level: 10 packets

Stock No: packets of 25 — Order Quantity: 50 packets

Unit of Issue: packets of 25 — Maximum Level: 250 packets

Bin Location: Row E. shelf 2 — Review Period: 3 months

Alternatives: — Consumption: 50packets/day — Safety Stock: 5 packets

Date	Document Number	Issued to / Rec'd from	Received	Issued	Balance	Initial	Date	Document Number	Issued to / Rec'd from	Received	Issued	Balance	Initial
15/5	batch1	mp pharm	25	–	25	JC							
16/5	batch1	anR X12	–	4	16	JC							

Description and Stock No.	:	Description describes the item eg. Aspirin tabs., 325mg. Stock number follows a logical sequence based on therapeutic categories, the order of products on the shelves, or any system you have used to store your drugs.
Unit of Issue	:	Refers to the pack size of the drug, eg., 500-tablet jars of aspirin.
Reorder Level	:	You may have set a stock level for each of your drugs. As soon as the total of the drugs you have in stock plus the stock on order falls below the reorder level, you must place another order.
Estimated Monthly Consumption	:	This is an average figure representing your recent consumption/use of the particular drug. This figure may be calculated by adding up the total amount of the drug you have used for the past year and dividing this total by 12. This will tell you how much of the drug you may have used, on average, per month.
Order Quantity	:	You may have a set order quantity for each drug. Every time you place an order it is for this quantity of drug. Should the consumption of a drug increase then you will have to increase your order quantity.
Maximum Level	:	You may have set a maximum level for each drug in order to help determine the quantity that needs to be ordered each time an order is placed.

Review Period	:	You may have set a review period during which time you review stock levels and initiate orders. Review periods can be two, three, four or twelve months.
Safety Stock	:	Safety stock is the stock over and above what you actually use. It is the stock you keep for emergencies.
Receipt and Issue Information	:	Each time stock is received into the inventory or issued, the transaction must be recorded. This information provides a record of stock movement and a running stock balance.
Document No.	:	When drugs are received the reference number of the receiving document should be recorded. When drugs are issued there should be a numbered requisition form on which the amount requested is indicated. In your case this would be the prescription.
Initials	:	It is a good idea for the person issuing or receiving drugs to sign on their initials on the stock record card. This will help should queries arise.

The information contained on a stock record card helps you to :

- ♦ determine the quantity of each drug that you need to order;
- ♦ determine how much of each drug you have used.

What system do you presently use to identify the following :

- ♦ how much stock of a drug you have on hand and how much you have used;
- ♦ the quantity of drugs that are to be ordered;
- ♦ how often should you order your drugs.

The supply period is the time between when you receive your drug orders from the feeder hospital/depot. If you order and receive drugs once a week then your supply period is weekly. Factors that affect your consumption/use patterns and thereby influencing your supply period include :

- seasonal variations
- disease outbreaks
- rainy conditions - this is an issue when your facility is situated in an area that becomes inaccessible during rainy weather.

STOCK TAKING

Stock taking should be performed regularly. This will inform you whether your stock record system is effective or not. It will also help identify staff who require further training in using the stock record system appropriately.

ii. STORAGE

Poor storage conditions results in the deterioration of your drugs. This in turn leads to poor quality of drugs which could be harmful to patients, especially the tetracyclines.

Factors affecting storage :

- heat
- moisture
- light

Therefore you must maintain adequate storage conditions by ensuring :

- good circulation of air through the use of airconditioners/fans;
- dryness

ARRANGEMENT OF STOCK

Drugs should not be stored on floors. Most of your dispensary have shelves upon which to store your drugs.

Store similar dosage forms together, eg. Liquids, tablets/capsules.

Store either using therapeutic classes or alphabetically.

Stick labels on shelves to identify items.

Rotate stock by using the FIFO system, i.e First stock in must be the first stock out.

Bear in mind the expiry dates of stock. Use the FEFO system, i.e. First expired must be first used.

SPECIAL STORAGE CONDITIONS

Vaccines : require refrigeration. Maintain the cold chain at all times.

Narcotics and Controlled Substances : store in a secure place which has limited access.

Combustibles, eg., alcohol, fuel, ether : store in special rooms which are separated from normal storage areas.

Whilst storerooms need to have ready access precautions must be taken to ensure adequate security of stock.

iii. INDICATORS FOR STOCK MANAGEMENT

- Availability of the Essential Drugs List
- Availability of a selected number of essential drugs
- Quality of drugs : Percentage of drugs adhering to recommended storage
  Percentage of drugs expired

Module 4

PRINCIPLES OF GOOD DISPENSING PRACTICES

GOAL

ENSURE THAT AN EFFECTIVE FORM OF THE CORRECT DRUG IS DELIVERED TO THE RIGHT PATIENT, IN THE PRESCRIBED DOSAGE AND QUANTITY, WITH CLEAR INSTRUCTIONS, AND IN A PACKAGE WHICH MAINTAINS THE POTENCY OF THE DRUG

Five major activities are needed to ensure an effective Dispensing Practice. These are :

- Interpretation of the request (written or oral)
- Retrieval
- Formulation (counting, pouring, compounding)
- Processing/Labelling
- Delivery

Remembering that the patient will generally be ingesting the dispensed drug it is imperative that sanitary conditions and procedures are maintained in the dispensing environment.

Figure 1 An untidy dispensing environment



i. INTERPRETING THE REQUEST

The following needs to be considered to ensure that the request for the drug/s is fulfilled satisfactorily :

- what drug product is requested.
- drug order is understood, i.e. if written - it must be legible.
  If given orally - it must be understood.
- repeat the request to the prescriber/patient.

ii. RETRIEVAL

- read label on the stock bottle. Look at the product name, strength, dosage form and expiry date.
- repeat label reading two more times (before formulation and immediately after).
- return stock drug to the original shelf position immediately after formulation.

iii. FORMULATION

- pre-manufactured drugs need to be counted, poured or reconstituted.

  Short counts lead to drug therapy failures especially with antibiotics. Why?

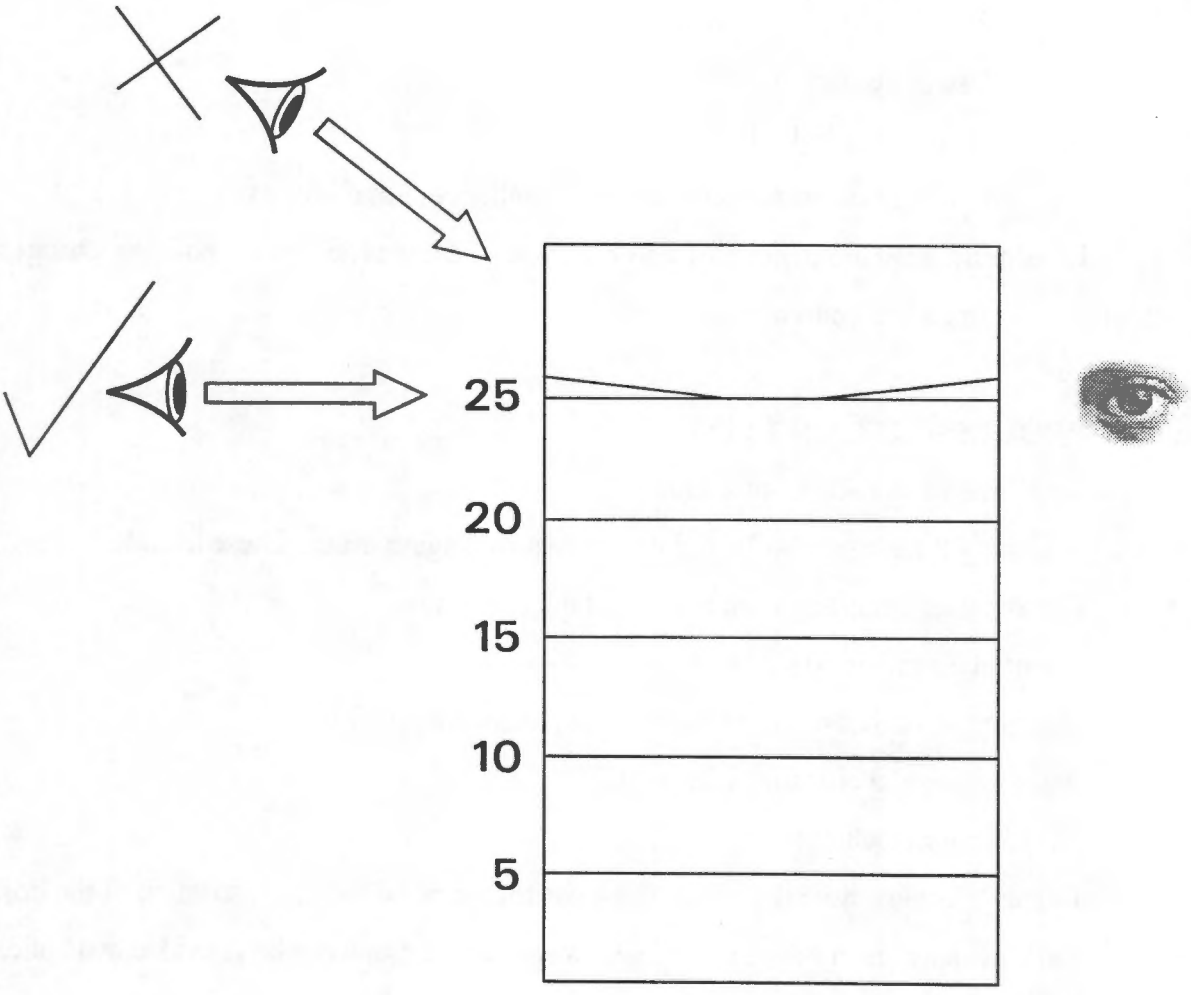
  Over counts have financial implications. Why?

  Protect against cross-contamination by using clean utensils, eg. Tablet counter must be wiped after each use.

  How do you reconstitute your antibiotics?

  Use a measuring cylinder. Fill in the required quantity of water. Assess this by looking at the meniscus. See Figure 2 .

Figure 2 The true meniscus



- protect against deterioration of drugs due to
  - (a) exposure to moisture. How?
    Tightly closed containers
    Use of desiccants
  - (b) exposure to light. How?
    Use light resistant containers, eg. Amber coloured bottles.

Dispensers must note signs of deterioration of drug products by noticing changes in colour, smell and consistency.

iv. PROCESSING/LABELLING

Packaging affects the quality of medicine.

Good Dispensing Practices must be followed when packaging drugs. These include :

- Use of tablet counters when counting tablets/capsules.
  Count in 5's rather 10's.
  Use graduated measuring cylinders when dispensing liquids.
- Label individual containers adequately.
  2x3x5 (poor labelling)
  Proper label must have the name of the patient, name of the drug, strength of the dosage form, quantity and dosage instructions. Dosage instructions can be provided symbolically. However, one must also write in the instructions.
  (Pictures of symbols use for dosage instructions)
- Containers used to package drugs into must be suitable for the product. Do not use containers that the drug would react with resulting in deterioration of the product.
  For example, do not use absorbent paper towels to wrap the tablet into. Do not use plastic bottles that may adsorb the drug. Always use clean containers to prevent contamination.

Drugs may either be pre-packed from bulk containers or packed into course-of-therapy packages. In course-of-therapy packaging the drugs are prepacked into sealed plastic bags/containers containing the complete course of treatment.

v. DELIVERY

Delivery involves the actual handing over of the drug to the patient.

At this point adequate counselling of the patient regarding the use of the drug has to be provided. It must be remembered that the prescriber has a responsibility to diagnose and prescribe. S/he will explain the illness and prognosis to the patient. The dispenser is responsible for providing the following information to the patient :

- Mode of action of the drug.
- Potential good and bad effects of the drug.
- Factors influencing the drug's activity and relate this to the patients lifestyle, eg. Food/drink/activities/habits.
- Provides patient education in order to improve compliance.

INDICATORS ASSESSING THE QUALITY OF THE DISPENSING PRACTICE

- Percentage of scripts dispensed according to the prescriptions.
- Percentage of patients with adequate knowledge of dosage instructions.
- Percentage of dispensed drugs adequately labelled.

Collection of Indicators

The following procedure should be followed when indicators are collected:

1. Position yourself at the exit of the clinic when you cannot create any disturbances and where you can interview patients without been interrupted.

2. Inform staff at the clinic of your activity. Reassure staff that this is not an exercise in policing people, rather it serves as an indicator of the quality of service your facility is providing.

3. Interview patients as they exit the clinic while they are still carrying their prescription cards as well as their dispensed medicines. You must obtain the persons permission prior to interviewing. Explain what you are doing and why.

Indicators for each prescription check and record the following:

- Number 1: Diagnosis. Should there not be a diagnosis recorded on the patients' card you must record the symptoms that were written down. This part of the indicator form must be filled in. Do not leave it blank. If nothing is recorded on the patients' card, get the patient to tell you what s/he has been treated for.

- Number 2 and 3: Tick 1 if the patients name is on the card, tick 0 if the name is not on. Do the same for the prescriber's name. An illegible signature can be given a "yes".

- Number 4: Record the actual number of drugs that have prescribed on the patients card. Include STAT doses, injections and vaccines. If no drugs have been given simply write 0.

- Number 5: Use the South African Essential Drugs List (EDL) or the KwaZulu-Natal Primary Health Care Handbook, to check to see how many of the prescribed drugs appear on these EDLs.

- Number 6: Check, using the South African EDL and the formulary which drugs have been prescribed according to their generic (non-propriety) names.

- Number 7: Based on the diagnosis and using the treatment guidelines of the EDL, determine whether the prescription actually follows the recommended treatment fully (3) or not at all (0).

- Number 8: Ask the patient to show you the drugs that have been dispensed. Find out whether any STAT doses were administered, orally or as an injection. All drugs dispensed must be counted.

- Number 10: Ask the patient to tell you how s/he will take each of their medicines and what the common side effects will be.

Indicators for each drug:

- for each prescription write down the name of the drug, the strength of the medication, dose of the medication and duration of treatment. This information must be recorded **exactly as it appears** on the prescription. If information is missing on the prescription indicate this with a -.

- check each medicine the patient has received to determine whether the name of the patient, the name of the drug, the dosing instructions, and the expiry date of the medicine are **visible on the label**.

Collating the information:

It is important that you collect thirty indicator forms. That means you must interview thirty patients from your clinic. You can do this over a few days.

- Add up the number of prescriptions with a patient name (question 2) and the number with a prescribers signature (question 3). Divide each total by 30 (the number of prescriptions you collected.) If you multiply by 100 this will give you a percentage. For example: 21 out of 30 prescriptions had a signature, therefore 21/30 x 100 = 70% had a signature.

- For the number of drugs per encounter (question 4) and the number of drugs dispensed (question 8), count the total number of drugs for all the forms, then divide each total by the number of patient encounters (30) to give the number of drugs per encounter. For example 106 drugs prescribed in total in a set of 35 patient encounters = 106/35= average of 2.87 drugs prescribed per encounter.

- The number of medicines prescribed which are from the EDL (question 5) and the number prescribed by generic name (question 6) are each added up and divided by the total number of drugs prescribed. This figure is multiplied by 100 to give a percentage e.g. 85 drugs out of 106 prescribed came from the EDL. Therefore 85/106x100 = 80.2% of the drugs prescribed come from the EDL.

- Questions 7 and 9: Look to see how many of the prescriptions follow the guidelines completely (or not at all), and how many of your patients have good (or no) knowledge of their medicines, by adding up the number of "3"s and "0"s for each. Divide these totals by 30 and express as a percentage by multiplying by 100. For example if 9 prescriptions out of 30 encounters receive a "3", or follow the treatment guidelines completely, then 9/30x100 = 30% of prescriptions follow the STGs completely for the diagnosis stated.

- For a drug to be counted as having been prescribed correctly ALL 4 of the columns in the table must be complete. If the amount of drug to be dispensed is specified, e.g. one bottle, or 28 tablets, that is accepted as a duration of treatment instead.

- Similarly, for labeling, ALL the information must be present to be counted as a correct label. The patient's name, the drug name, the dosing instruction and the date of expiry of a drug must be displayed.

The total number of drugs that have been correctly prescribed or labeled, according to these criteria, are calculated, and divided by the total number of drugs prescribed. This figure is multiplied by 100 to give a percentage.

The results of your findings must be presented back to the staff at your clinic. They can be displayed as a graph.

Drug use Indicators

These indicators will be used to:
* assess drug use patterns within district-based facilities pre-implementation
* measure the success of the intervention post-implementation

The indicators are taught as part of the rational prescribing training programme. The initial data collection at a facility will be done by the clinic trainers with help from the clinic staff. Any subsequent collection should be done by the staff members themselves. Data for the whole facility will involve filling in a form as outlined below. Prescription data will be collected by observation of clinical practice during the day of collection. Remember: all the data are anonymous! There is no way of relating the results to a particular prescriber.

The data collected will be captured in a relational database on Statistica. Each entry will have a unique number, called the prescription number. Any indicators entered under that number can be related in a statistical and narrative sense to any other or any other set. Please send all your data to either Aarti Kishuna or Catherine Orrell.

Sampling:

Facilities would include the outpatient department of a district hospital, community health centre, clinics and mobiles.

The number of patients interviewed in each health facility would be 30. To work out which patients to see, take the total number seen on average at that facility per day, e.g.150, and divide by 30 (samples needed) e.g.150/30=5. In this case every 5th patient would be interviewed.

You need to interview patients at a point when they are holding their record cards, with their prescription, and the drugs dispensed to them. Ask their permission to talk to them first.

The indicators, once analysed, will reflect the prescribing patterns of each facility, district and region. This data will be given to the facilities staff as a form of audit of their own work. This will enable problem areas to be identified and worked on and areas of excellence to be noted and praised.

Indicators to be collected

ONE: Indicators for the whole facility: the format is that of a form which would be completed for each facility. Please circle the number next to your answer. This is NOT a score, only a way of differentiating the answers.

1) Type of facility (circle the number):

3	District Hospital OPD
2	Community Health Centre
1	Clinic
0	Mobile clinic

2) Number of patients seen at the facility per day?

3) Number of workdays in a year?

4) Degree of access to a Section 38a nursing sister:

3 at the clinic daily
2 weekly visits
1 monthly visits
0 visits less than monthly

5) Degree of access to a pharmacist:

3 at the clinic daily
2 weekly visits
1 monthly visits
0 visits less than monthly/never

6) Degree of access to a doctor:

3 at the clinic daily
2 weekly visits
1 monthly visits
0 visits less than monthly/never

7) Predominant source of medicines:

3 Regional Hospital services
2 State supplies
1 From the manufacturers directly
0 Donations

8) Do you have immediate access (i.e. can be obtained from within the facility and can be used within a few minutes) to an unbiased source of drug information?

1 yes
0 no

Unbiased sources of drug information include the South African Medicines Formulary, the Medunsa Primary Health Care Formulary or other reference textbooks. They do NOT include any potentially biased information produced by a pharmaceutical company e.g. MIMs.

9) Do you have immediate access to Standard Treatment Guide-lines (STGs)?

1 yes
0 no

These may be local, district or national guide-lines.

10) Is there a copy of the South African National Essential Drugs List immediately available?

1 yes
0 no

11) Annual budget for medicines in Rands?

12) Source of the information provided in questions 7 and 11?

3 available from the facility itself
2 within the same district
1 within the same province
0 outside the province/not available

13) Number of key drugs available for use (see list below, check in the dispensary for qu. 13-15):

14) Number of key drugs used before expiry date:

15) Number of key drugs stored correctly:

List of key drugs:

oral rehydration fluid
cotrimoxazole tablets
procaine penicillin injection
paediatric paracetamol syrup
hydrochlorothiazide tablets
ferrous salts and folic acid
mebendazole tablets
tetracycline eye ointment
benzoic acid and salicylic acid ointment
salbutamol inhaler

16) In general, how do the staff at your facility feel about their knowledge of medicines?

3 knowledge is excellent
2 good, feel safe treating a patient
1 poor, needs to be improved
0 non-existent

17) How do the staff feel about the access they have to drug information (references/textbooks/by phone or e-mail)?

3 access is excellent
2 good, feel information is available when needed
1 poor, access needs to be improved
0 not accessible at all

18) Do your staff feel supported in the implementation of the EDP?

3 yes, support is excellent
2 good, feel support is available
1 poor, support needs to be improved
0 no support at all

TWO: Indicators for each prescription: This data will be collected on a separate form for EACH prescription i.e. one per patient. Please circle the number next to your answer. This is NOT a score, only a way of differentiating the answers.

1) What is the diagnosis given?

2) Is the name of the patient on the script?
- 1 yes
- 0 no

3) Does the signature of the prescriber appear?
- 1 yes
- 0 no

4) The number of drugs prescribed:

5) Number of prescribed drugs that are on the EDL:

6) Number of drugs that have been prescribed by their generic name:

7) Is the prescription in accordance with the STGs for that diagnosis?
- 3 Yes
- 2 almost all points coincide
- 1 some points coincide
- 0 not at all

8) Number of drugs prescribed that were actually dispensed:

9) Total cost of dispensed medication:

10) Did the patient have an adequate knowledge of dosage instructions: (Patient should know ALL of the following: how much, how often and for how long to take their medication, as well as common side-effects e.g. "I must take amoxil, one capsule three times a day for five days and it may make me have loose stools.").
- 3 knowledge was good (all 4 points known)
- 2 Knowledge was reasonable (knew 2 or 3 points)
- 1 Little knowledge (knew one point only)
- 0 did not have any knowledge of the instructions.

Indicators for each drug:

Please record the names of all the medications prescribed (as written), their strength, dose and the duration of treatment. (From this we can work out the costs required above.) NB: The labelling information that is written in line 1 of the second table, should correspond with the drug that is written in line 1 of the first table.

	Name of medication:	Strength of medication:	Dose of medication:	Duration of treatment:
e.g.	Amoxil	250 mg	PO, 6 hourly	10 days
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Indicate whether the following information is written **<u>on the label</u> of each of the drugs dispensed**. Use the same order as above.

	Patient name:	Drug name:	Dosing instructions:	Expiry date of drug:
e.g.	no	yes	yes	yes
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Rational Drug Prescribing Training Program

Indicators for the whole facility: the format is that of a form which would be completed for each facility. Please circle the number next to your answer. This is NOT a score, only a way of differentiating the answers.

1) Type of facility (circle the number):

3 District Hospital OPD
2 Community Health Centre
1 Clinic
0 Mobile clinic

2) Number of patients seen at the facility per day?

3) Number of workdays in a year?

4) Degree of access to a Section 38a nursing sister:

3 at the clinic daily
2 weekly visits
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0 visits less than monthly

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3 at the clinic daily
2 weekly visits
1 monthly visits
0 visits less than monthly/never

6) Degree of access to a doctor:

3 at the clinic daily
2 weekly visits
1 monthly visits
0 visits less than monthly/never

7) Predominant source of medicines:

3 Regional Hospital services
2 State supplies
1 From the manufacturers directly
0 Donations

8) Do you have immediate access (i.e. can be obtained from within the facility and can be used within a few minutes) to an unbiased source of drug information?

1 yes
0 no

Unbiased sources of drug information include the South African Medicines Formulary, the Medunsa Primary Health Care Formulary or other reference textbooks. They do NOT include any potentially biased information produced by a pharmaceutical company e.g. MIMs.

9) Do you have immediate access to Standard Treatment Guide-lines (STGs)?

1 yes
0 no

These may be local, district or national guide-lines

10) Is there a copy of the South African National Essential Drugs List immediately available?

1 yes
0 no

11) Annual budget for medicines in Rands?

12) Source of the information provided in questions 7 and 11?

3 available from the facility itself
2 within the same district
1 within the same province
0 outside the province/not available

13) Number of key drugs available for use (see list below, check in the dispensary for qu. 13-15):

14) Number of key drugs used before expiry date:

15) Number of key drugs stored correctly:

List of key drugs:

oral rehydration fluid
cotrimoxazole tablets
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paediatric paracetamol syrup
hydrochlorothiazide tablets
ferrous salts and folic acid
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tetracycline eye ointment
benzoic acid and salicylic acid ointment
salbutamol inhaler

16) In general, how do the staff at your facility feel about their knowledge of medicines?

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2 good, feel safe treating a patient
1 poor, needs to be improved
0 non-existent

17) How do the staff feel about the access they have to drug information (references/textbooks/by phone or e-mail)?

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2 good, feel information is available when needed
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0 not accessible at all

18) Do your staff feel supported in the implementation of the EDP?

3 yes, support is excellent
2 good, feel support is available
1 poor, support needs to be improved
0 no support at all

Indicators for each drug:

Please record the names of all the medications prescribed (as written), their strength, dose and the duration of treatment. (From this we can work out the costs required above.) NB: The labelling information that is written in line 1 of the second table, should correspond with the drug that is written in line 1 of the first table.

Name of medication:		Strength of medication:	Dose of medication:	Duration of treatment:
e.g.	Amoxil	250 mg	PO, 6 hourly	10 days
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Indicate whether the following information is written **on the label of each of the drugs dispensed**. Use the same order as above.

	Patient name:	Drug name:	Dosing instructions:	Expiry date of drug:
e.g.	no	yes	yes	yes
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Rational Drug Prescribing Training Program

Indicators for each prescription: This data will be collected on a separate form for EACH prescription i.e. one per patient.

Please circle the number next to your answer. This is NOT a score, only a way of differentiating the answers.

1) What is the diagnosis given?

2) Is the name of the patient on the script?
- 1 yes
- 0 no

3) Does the signature of the prescriber appear?
- 1 yes
- 0 no

4) The number of drugs prescribed:

5) Number of prescribed drugs that are on the EDL:

6) Number of drugs that have been prescribed by their generic name:

7) Is the prescription in accordance with the STGs for that diagnosis?
- 3 Yes
- 2 almost all points coincide
- 1 some points coincide
- 0 not at all

8) Number of drugs prescribed that were actually dispensed:

9) Total cost of dispensed medication:

10) Did the patient have an adequate knowledge of dosage instructions: (Patient should know ALL of the following: how much, how often and for how long to take their medication, as well as common side-effects e.g. "I must take amoxil, one capsule three times a day for five days and it may make me have loose stools.").
- 3 knowledge was good (all 4 points known)
- 2 Knowledge was reasonable (knew 2 or 3 points)
- 1 Little knowledge (knew one point only)
- 0 did not have any knowledge of the instructions.

11) Please indicate if this is a doctor's or a nurse's script:

Rational Drug Prescribing Training Course

Feed-back Form

Please help us by giving comments on the training programme in which you have just participated. There are a few specific questions we would like answers to, but all general comments are welcomed and will be considered. If you would like a personal response, please add your name and address to the top of the form.

1) Have you found the content of this course useful/relevant to your practice?

2) Were the clinical examples used appropriate?

3) Were the teaching methods appropriate?

If not, what would you prefer:
Didactic
Discussion/debates
Student-guided
Clinical cases
Other (please specify)

4) Was there enough time?

5) Will you be able to apply these principles of prescribing in the future?

If not, why not?

6) Do you have any suggestions for our future courses?

7) Any other comments?

Thankyou for your assistance in improving the course. We aim to keep in touch with you all so we can support you and you can support each other in prescribing rationally.

Don't forget to ask for help when you need it!

Rational Drug Prescribing Training course

Homework

As a means of initiating ongoing contact between you and ourselves we would like you to answer a clinical query using the principles of prescribing that you learnt in the course.

Clinical query:

A young woman comes to you complaining of burning retrosternal pain after some meals. It is worse if she eats tomatoes or spicy foods and if she lies down too soon after eating. She is taking tetracycline for acne. Otherwise she is well and your examination is completely normal.

The principles are:
1. Define the patients problem.
2. Specify the therapeutic objective.
3. Choose a suitable treatment.
4. Start the treatment.
5. Give information, instructions and warnings.
6. Monitor (and stop) the treatment.

Do not forget to **ask for help** if you need it.

To be complete the answer should reach us within 10 days from today. If you have a computer in your clinic send your answer by e-mail to:
- ♣ Catherine at <correll@uctgsh1.uct.ac.za> or
- ♣ Aarti at <pcmic@healthlink.org.za>

We can also be contacted by telephone, and by ordinary post, but only send your answers this way if you have not got access to a computer.

♣ Catherine: Dr Catherine Orrell (021-406.6353)
Department of Pharmacology,
University of Cape Town
Private Bag
Rondebosch
Cape Town 7700

♣ Aarti: Mrs Aarti Kishuna (031-82.3217 or 204.4358)
Department of Pharmacy
University of Durban-Westville
Durban

We hope you found the course beneficial. Please send us your answer as soon as possible. We will be keeping in touch!

Case 1a

- A 5 year old boy presents to you with a 3 day history of a painful left ear, and tender glands in his neck.

Case 1b

- A 5 year old boy presents to you with a 3 day history of a painful left ear, and tender glands in his neck.
- He has an allergy to penicillin.

Case 1c

- A 5 year old boy presents to you with a 3 day history of a painful left ear, and tender glands in his neck.
- He has an allergy to penicillin.
- He has a history of kidney problems.

Case 2a

- 24 year old woman presents with her first episode of frequency and burning pain on passing urine. This has been happening for 3 days. She is otherwise well.

Case 2b

- 24 year old woman presents with her first episode of frequency and burning pain on passing urine. This has been happening for 3 days. She is otherwise well.
- She is breastfeeding a 2 month old baby.

Case 2c

- 24 year old woman presents with an episode of frequency and burning pain on passing urine. This has been happening for 3 days. She is otherwise well.
- She is breastfeeding a 2 month old baby.
- This is her fifth episode of urinary tract infection over the past year.

Case 3

- A 6 month old boy from a children's home is brought to you by his carer. He has been irritable for 2 days and has not wanted to eat. He started vomiting this morning.
- On examination you find he has a stiff neck and a few red spots on his skin.

Case 4a

- An 18 month old child arrives at your clinic for his routine check-up and vaccinations.
- He weighs 9 kg. His mother tells you he has had 4 episodes of diarrhoea this year.

Case 4b

- An 18 month old child arrives at your clinic for his routine check-up and vaccinations.
- He weighs 9 kg. His mother tells you he has had 4 episodes of diarrhoea this year.
- His fingerprick Hb is 9.5g/dl.

Case 4c

- An 18 month old child arrives at your clinic for his routine check-up and vaccinations.
- He weighs 9 kg. His mother tells you he has had 4 episodes of diarrhoea this year.
- His fingerprick Hb is 9.5g/dl.
- You notice oral candidiasis and some enlarged lymph nodes under his arms.

Case 5a

- A previously well, but quite overweight woman comes to you complaining of thirst, having to drink a lot of water and pass lots of urine over the past few months.
- On urine dipstix there is +++ Glucose and her fingerprick glucose is 11.4 mmol/L.

Case 5b

- A previously well, but quite overweight woman came to you 3 months ago with symptoms of Diabetes Mellitus.
- She returns, having tried your treatment, with headaches and flashes if front of her eyes, especially on straining.
- Her Glu is 6.0, but her blood pressure is 150/110.

Case 6a

- A 23 year old man is brought in from work complaining of a tight, wheezy chest for the past hour.
- He does not smoke but has recently been apprenticed to a carpenter.

Case 6b

- A 23 year old man is brought in from work complaining of a tight, wheezy chest for the past hour.
- It turns out that he has had this problem before and uses his sister's inhaler when he needs to. The wheezing has been getting worse: he needs to use the inhaler twice a week now for wheezing and he has been coughing at night.

Case 6c

- A 23 year old man is brought in from work with an acute asthma attack and generally worsening symptoms.
- He had a car accident 5 years ago after which he had fits. He is taking carbamazepine and has not had a fit for a year now.

Case 7a

- A young woman is helped into the clinic. She has a sprained ankle which is quite swollen and painful. She asks for something for the pain.

Case 7b

- A young woman is helped into the clinic. She has a sprained ankle which is quite swollen and painful. She asks for something for the pain.
- She is 28 weeks pregnant.

Case 8a

- A 15 year old schoolgirl comes to Family Planning asking for an oral contraceptive . She has been sleeping with her boyfriend for a month and is worried about becoming pregnant.

Case 8b

- A 15 year old schoolgirl comes to Family Planning asking for an oral contraceptive . She has been sleeping with her boyfriend for a month and is worried about becoming pregnant.
- She has had TB for 4 months and is being treated on Isoniazid and Rifampicin.

Case 8c

- A 15 year old schoolgirl comes to Family Planning asking for an oral contraceptive .
- She has had TB for 4 months and is being treated on Isoniazid and Rifampicin.
- She has noticed that her boyfriend has an ulcer on his penis. It does not hurt him at all.

Case 9a

- A 54 year old man comes to you with a bite on his arm from his dog. He is worried that it may be infected.

Case 9b

- A 54 year old man comes to you with a bite on his arm from his dog. He is worried that it may be infected.
- He has congestive cardiac failure controlled on furosemide and digoxin.

Case 9c

- A 54 year old man comes to you with a bite on his arm from his dog. He is worried that it may be infected.
- He has congestive cardiac failure controlled on furosemide and digoxin.
- His Slow K tablets have run out. He has been feeling nauseus of late and felt his heart beating very fast.

Case 10a

- An 8 month old boy is carried in by his mother. He has had watery diarrhoea for the past 2 days.
- His mum has not noticed any blood or mucus in the stool, nor has she seen any worms. He has not vomited either.
- You find he is slightly dehydrated.

Case 10b

- The 8 month old boy that you saw 2 days ago with mild watery diarrhoea now returns to you. Mum says he is refusing to drink and is vomiting everything she gives him.
- This time when you examine him he seems lethargic, has cold hands and feet and is very dehydrated.