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# **Revision of Undergraduate Pharmacy Curricula**

**Report on an informal consultation  
in Nyanga, Zimbabwe**

**18-20 April 1997**



**Action Programme on Essential Drugs**

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## Abbreviations

AIDS	Acquired immunodeficiency syndrome
APHA	American Pharmaceutical Association
ARI	Acute respiratory infection
CPA	Commonwealth Pharmaceutical Association
CPD	Continuing Professional Development
DAP	Action Programme on Essential Drugs
DANIDA	Danish International Development Agency
DaTIS	Drug and toxicology information service
EDC	Essential drugs concept
EDL	Essential drugs list
EDLIZ	Essential drugs list for Zimbabwe
GP	General practitioner
FIP	International Pharmaceutical Federation
ICU	Intensive care unit
IDRC	International Development and Research Centre
IHS	Introduction to community health sciences
GLP	Good laboratory practice
GMP	Good manufacturing practice
GSL	General sales list
GTZ	German Society for International Development
JMS	Joint Medical Stores, Uganda
MEDS	Mission for Essential Drugs and Supplies, Kenya
MOH	Ministry of health
MSF	Médecins Sans Frontières
MOHCW	Ministry of Health and Child Welfare, Zimbabwe
NGO	Nongovernmental organization
NDTPAC	National Drug and Therapeutic Policy Advisory Committee
NHS	National Health Services
OTC	Over-the-counter
P	Pharmacy-only medicines
PBL	Problem-based learning
PEDLIZ	Proposed Essential drugs list for Zimbabwe
PHC	Primary health care
POM	Prescription-only medicines
PSD	Pharmacy Services Directorate
PSZ	Pharmaceutical Society of Zimbabwe
PMA	Pharmaceutical Manufacturers Association
RDU	Rational drug use
RPA	Retail Pharmacy Association
RPSGB	Royal Pharmaceutical Society of Great Britain
RSA	Republic of South Africa
SAREC	Swedish Agency for Research in Developing Countries
SBL	Skill-based learning
SCF	Save the Children Fund
STG	Standard treatment guidelines
UPC	Undergraduate pharmacy curricula

USP/DI	United States Pharmacopoeia/Drug Information
UWC	University of the Western Cape
WHO	World Health Organization
ZEDAP	Zimbabwe Essential Drugs Action Programme
ZNDP	Zimbabwe National Drug Policy

## 1. Introduction

Pharmacists are employed in various areas of practice in the health care system. These areas include regulatory control and drug management, community pharmacy, hospital pharmacy, the industry, academic activities, training of other workers and research. In all these fields, pharmacists' aims are to assure optimum drug therapy, both by contributing to the preparation, supply and control of medicines and associated products, and by providing information and advice to those who prescribe or use pharmaceutical products.

However, this profession has experienced a transition over the past three decades where greater emphasis has been placed on the health care team concept and the pharmacist as the drug therapy consultant and drug information and/or toxicology specialist. There has been a further refocusing of pharmacist activities towards the application of drug knowledge and the use of specialized education and practice skills to improve patient care. Consequently, subspecialties within the professional practice of pharmacy have appeared. However, undergraduate pharmacy curricula (UPC) have not steadily kept in pace with these changes in terms of regular reviews of syllabi and curricula.

The role of the pharmacist in the health care system has been one of the areas of concerns of both the organizations representing pharmacists and the World Health Organization for the past decade, as depicted in the documents of professional associations representing pharmacy. Examples are the "Statement of Principle on Self-care including self-medication - The professional role of the pharmacist" published by the International Pharmaceutical Federation (FIP, 1996)<sup>1</sup> and reports of working groups and recommendations of meetings convened by WHO on the role of the pharmacist in the health care system. The first of these meetings was held in Madrid, Spain (WHO, 1989) and focused on the role and functions of the community and hospital pharmacist in the health care system. Other meetings on the role of the pharmacist were held in New Delhi (1988) and Tokyo (1993) (WHO, 1994).

The meeting in Delhi made the first attempt to delineate the body of knowledge and expertise upon which the contribution of pharmacists to health care is based. It then formulated proposals regarding the necessary developments in undergraduate, postgraduate and continuing education of pharmacists, and in the training of support staff.

The meeting in Tokyo focused on the responsibilities of the pharmacist in relation to health care needs of the patient and of the community, i.e. the concept of pharmaceutical care. This meeting recommended that the education and training of pharmacists be based on educational objectives corresponding to their roles, functions and responsibilities in health teams. The group also urged schools of pharmacy to review their methods of curriculum planning and assessment in the light of these principles and stressed the important contributions that students, pharmacy practitioners, and other concerned parties

<sup>1</sup> For full reference, please see Annex 7: References.

have to make in the planning and management of curricula. The following components of curricula should be properly balanced: basic sciences, pharmaceutical sciences, biomedical and clinical sciences, socio-economic and behavioural sciences and practical experience. The group further recommended that WHO monitor, at regular intervals, the implementation of its recommendations.

As a follow up to these and other reports, the Forty-seventh World Health Assembly in 1994 adopted a resolution on the role of the pharmacist (WHA47.12) which, inter alia, called upon pharmacists and their professional associations to support WHO's essential drugs policies, to develop the profession at all levels in accordance with the reports of the above-mentioned meetings, and to promote the concept of pharmaceutical care as a means of furthering the rational use of drugs.

In response to the above-mentioned recommendations and resolutions the WHO Action Programme on Essential Drugs (DAP) convened two consultations; one to review undergraduate pharmacy curricula in eastern and southern Africa in Nyanga, Zimbabwe, from 27 to 30 April 1997, and one to review UPC in the Middle East, at a meeting in Beirut, Lebanon from 24 to 27 June 1997.

### **Objectives of the Nyanga conference**

The main objective of the consultation was to produce an outline of a core UPC relevant for countries in eastern and southern Africa. Specific objectives were to:

1. review current curricula of schools of pharmacy in eastern and southern Africa with a view to identifying teaching problems related to pharmacy practice, pointing out innovation and aspects missing in the curricula;
2. exchange experiences and information on the undergraduate pharmacy curricula;
3. identify available teaching materials;
4. recommend core skills of pharmacists in eastern and southern Africa;
5. develop an action plan to improve undergraduate pharmacy education in eastern and southern Africa.

In addition to the above objectives, questions to be addressed by the consultation included those listed below.

1. What is the current content of UPC in eastern and southern Africa?
2. What are the knowledge, skills and attitudes currently needed for a pharmacist?
3. Which public health and management issues need to be included in UPC?
4. Which training materials are already available, and which need to be developed?
5. Which constraints can be identified to developing a master's level programme in public health pharmacy?
6. What are the research opportunities that exist in testing interventions and evaluating the impact of essential drugs programmes?
7. What should the role of schools of pharmacy be in upgrading pharmacy technicians?

## Participants and opening

There was a total of 21 participants from Ethiopia, Kenya, South Africa, Sudan, Tanzania, Uganda and Zimbabwe. 16 participants were pharmacists, three were medical doctors and two were pharmaceutical chemists. Nine were deans/chairpersons of faculties of pharmacy, eight were professors and senior lecturers, and four were resource persons from governmental or international organizations. The list of participants is attached as Annex 2.

## Method of work

The consultation was opened by Mr Chidarikire, Director of Pharmacy Services of the Ministry of Health and Child Welfare, Zimbabwe. The first evening was devoted to introducing the participants, a joint dinner, and the "gallery of expert" exercise. The theme of the first working day was the essential drugs concept and the future role of the pharmacist in Africa. The theme of the second day was pharmacy education and how to change it; and the third (half) day was devoted to making an action plan. On days one and two, there were small working groups of six to seven participants from different countries. On the last day, participants prepared a plan of action for their own countries or institutions. The programme is attached as Annex 1.

## 2. Presentations

### Practical implications of the essential drugs concept

Dr Hans Hogerzeil, WHO Action Programme on Essential Drugs

WHO's mission in essential drugs has remained what it was when the Action Programme on Essential Drugs was formed in 1981: "To contribute to reduced morbidity and mortality from common illnesses by collaborating with countries to develop and implement national drug policies and programmes which ensure equity of access to essential drugs, rational use of drugs and drug quality within the context of the national health policy".

The essential drugs concept (EDC), of which the WHO Model list is only one aspect, is based on the following observations and guiding principles: in any health care setting, the majority of health problems can best be treated with a limited range of carefully selected drugs. In any case, most clinicians routinely use less than 200 drugs. Training should therefore emphasize the proper selection and use of these few drugs, as supply and quality assurance activities can be carried out most effectively and most economically for a selected range of pharmaceutical products, and drug information is easier with fewer drugs.

The essential drugs concept is now widely accepted as a pragmatic approach for providing the best of modern, evidence-based, cost-effective health care. The concept is as valid today as it was twenty years ago. The EDC does not exclude all other drugs, but the concept does focus on therapeutic decisions, professional training, public information and financial resources for those treatments which represent the best balance of efficacy, safety, quality and cost for a given health care setting. With appropriate adaptation, the essential drugs concept is valid across the full range of health care, from teaching hospitals to rural health facilities, in developed as well as developing countries.

WHO/DAP aims to improve the use of drugs by prescribers and the general public in order to maximize the potential contribution of pharmaceuticals to preventive and curative health care and to ensure the cost-beneficial allocation of resources. Overprescribing, incorrect prescribing, uncontrolled sale of drugs by unqualified staff, and ineffective use of medicines by consumers are among the major concerns with respect to the use of drugs. Objective, reliable, and easily understandable drug information is still lacking in many communities. Much needs to be learned to improve prescribing, dispensing practices and public education. Improved undergraduate education, in-service training, and supervision are essential for all health professionals involved in prescribing, dispensing, or other aspects of drug management. Fundamental to this process are clinical guidelines for diagnosis and treatment, which are locally developed, evidence-based, and regularly updated according to changing morbidity and therapeutic requirements. Prescriber training and supervision, and drug procurement and supply should all follow these guidelines.

**Box 1: Example of good training material****Questions students may ask about each drug when reviewing drug treatment**

*Herxheimer A. Towards parity for therapeutics in clinical teaching: Lancet, 1976(ii)1186-1187*

<b>Name:</b>	For each drug listed, which is the approved or generic name?
<b>Class:</b>	To what class does each drug belong?
<b>Aim:</b>	What aim is to be achieved with each drug? What disorder is to be corrected, what symptom is to be relieved?
<b>Observations:</b>	What observations can be made to judge whether the aim has been achieved?
<b>Route and dosage:</b>	By what route, in what dose, and at what intervals is each drug to be given, and why?
<b>Alternatives:</b>	What other remedies might have been chosen instead of these drugs? Is this drug a good choice (efficacy, safety, cost)?
<b>Duration:</b>	How long should treatment go on, and when and how could a decision be made to stop?
<b>Elimination:</b>	How is the drug eliminated? Will the patient's illness change the usual pattern of distribution and effects of the drug?
<b>Unwanted effects:</b>	What undesirable effects may occur from this drug? Are they acceptable? What is their approximate frequency?
<b>Interactions:</b>	Are there any other drugs which should be avoided while the patient is receiving this treatment? If yes, what are they and why should they be avoided?
<b>Patient's ideas:</b>	What does the patient believe about the drug? What has (s)he been told about it? And what has (s)he remembered? Does (s)he need additional information?

### Box 2: Example of learning objectives

#### **Learning objectives for Clinical Pharmacology of Respiratory Disease, University of Aberdeen, Scotland** (for medical students, abbreviated)

- To appreciate the relevant clinical pharmacology of the principal drugs used in the management of, and be prepared to discuss the management of acute severe asthma, chronic asthma, episodic asthma, wheeze, acute and chronic bronchitis, type 1 and type 2 respiratory failure, and allergic rhinitis;
- to appreciate the different routes of administration of drugs in respiratory diseases and understand the optimal techniques of drug administration;
- to understand the place of therapeutic drug monitoring in asthma.

The principal drugs used in respiratory disease include: beta 2 agonists, **salbutamol**, **terbutaline**, **orciprenaline**, **salmeterol**, **methyl xanthines**, **theophylline**, **aminophylline**, **cromoglycolate**, **ipratropium**, **ketotifen**, **doxapram**, **nikethamide**, **hydrocortisone**, **betamethasone**, oxygen therapy (drugs in bold to be learned in detail; other drugs as example of a therapeutic group).

#### **Recommended reading:**

The British Thoracic Society "Guidelines for management of asthma in adults":  
Chronic persistent asthma. *BMJ* 1990; 301: 651-53.

Acute severe asthma. *BMJ* 1990; 301: 797-800.

Leading article. *BMJ* 1990; 301:771-772.

## The Zimbabwe Essential Drugs Action Programme (ZEDAP)

Mr Aidan Chidarikire, Director of Pharmaceutical Services, Zimbabwe

The pharmaceutical authority in Zimbabwe is composed of a multidisciplinary team from both public and private sectors. The public sector is the Ministry of Health and Child Welfare (MOHCW) under which the Pharmacy Services Directorate (PSD) operates; the authority in the private sector includes the Pharmaceutical Society of Zimbabwe (PSZ), the Pharmaceutical Manufacturers Association (PMA), Retail Pharmaceutical Association (RPA) and the Department of Pharmacy in the Faculty of Medicine, University of Zimbabwe.

Mr Chidarikire mentioned the many activities of ZEDAP, including the preparation of treatment guidelines and training activities. ZEDAP operates under the auspices of the MOHCW and was established in 1986 with financial support from the Danish International Development Agency (DANIDA) and WHO, Geneva. ZEDAP's main objectives are to ensure a regular supply of low cost quality drugs in the government and low profit services, and to ensure rational and optimal drug use.

The first proposed list of essential drugs for Zimbabwe (PEDLIZ) dates back to 1981. It was seen as one of the first national steps towards rationalizing treatment, reducing drug costs and ensuring an equitable quality of care in all health facilities. The list was revised in 1985 as the Essential Drugs List for Zimbabwe (EDLIZ), when it became officially adopted as the country's essential

drugs list. Therapeutic guidelines were also included for the first time, thus drawing together two key elements of rational drug use: drug availability and therapeutic information. The next comprehensive review of EDLIZ took place in 1989, although minor revisions were made to the list in 1987 and 1988. The most recent revision was completed in 1994.

The demanding job of reviewing and updating EDLIZ on a continual basis has been undertaken by various committees. ZEDAP has played a major role in the editorial work since 1987 and acts as the secretariat for the present committee responsible for EDLIZ, a multi-disciplinary team called the National Drug and Therapeutic Policy Advisory Committee (NDTPAC), and other activities related to components of the Zimbabwe National Drug Policy. The section on treatment guidelines has continually expanded and the latest edition, for instance, gives more information on HIV-related diseases, paediatrics, burns and anaphylaxis.

With regard to ZEDAP and NDTPAC training activities, during 1988-1989 approximately 175 workshops were carried out throughout Zimbabwe. Over 5000 health professionals from specialists to primary health care workers were trained in rational drug use. In the same period drug availability rose from 30-40% to 80%. The target of 90% drug availability was never reached as evidenced by regular national surveys (every two years) performed by ZEDAP. For good practice to be sustained, training must be a continuous process. In addition, support supervision is very important, especially at district level. Annual courses on drug management supervision and rational drug use directed to pharmacists working in the public sector have been introduced.

## Modern pharmacy practice

Professor M. Richards, The Robert Gordon University, Aberdeen

The paper presented by Professor M. Richards on the impact of the Nuffield Report on pharmacy practice and training in the UK is given in Annex 3. The Nuffield Report was written by the Committee of Enquiry into Pharmacy by the Nuffield Foundation in October 1983. The terms of reference were to consider the present and future structure of pharmacy, its current and future contribution to health care, and to review the education and training of pharmacists accordingly.

The Nuffield Report, published in January 1986, has had a major impact on the profession and the government in the UK. On the basis of this report, the pharmacy degree course at The Robert Gordon University in Aberdeen was completely revised. The Nuffield Report relates very closely to the subject of the revision of UPC, and aspects of the findings would be helpful, together with some more recent developments in pharmacy practice. This report was also used as one of the background documents in WHO consultative meetings on the role of the pharmacist in the health care system.

## The role of the pharmacist in public health

Professor Richard Laing, Boston University, Boston

A review of the history of pharmacists in public health from 1932 to 1996 reveals that little progress in colleges or schools of pharmacy has been made in including public health aspects in pharmacy practice in both undergraduate and postgraduate pharmacy curricula. Although many activities of a pharmacist are centred on drugs, the potential contribution of the pharmacist to national public health programmes is often overlooked. There are many areas where there would be a need for public health pharmacists in developing countries such as: disease prevention and health promotion; planning for health care; planning, managing, and evaluating drug supply systems; providing direct personal health care; developing and promoting drug legislation; training health care workers in national health programmes, e.g. tuberculosis, malaria, leprosy, blindness, acute respiratory infection (ARI), AIDS and family planning.

There is a great need for schools and colleges of pharmacy to include public health aspects in both undergraduate and postgraduate curricula and to create more training opportunities for public health pharmacists. Examples of this can be found in Indonesia (postgraduate curriculum), in the state of Ohio, USA (proposed model curriculum) and in Thailand (the Thai example of UPC).

### Box 3: some examples of training in public health pharmacy

#### Social Pharmacy Unit, Chulalongkorn University, Bangkok (undergraduate)

- pharmacy orientation
- public health
- public health pharmacy
- pharmacy law and ethics
- health policy, planning and management
- consumer protection
- regulation and law enforcement

#### Gadja Mada University, Yogyakarta (postgraduate)

- new course in master's in drug system management programme
- full time or part time (1 or 2 years) plus supervised project
- students, regulators, district and hospital pharmacists, hospital administrators, district medical officers
- problem-oriented, lectures and cases
- integrated with other public health courses including statistics, public health introduction and elective options
- taught in Bahasa Indonesia and English

## Research opportunities for schools of pharmacy

Professor Richard Laing, Boston University, Boston

Drug-related operational research can be done at all levels of the health care system, such as primary (e.g. health facilities, drug retailers and private

practitioners), secondary (e.g. hospitals, warehouses and medical stores) and tertiary (e.g. teaching hospitals, drug companies, national organizations). Research can also be done by different sectors. Examples include public (e.g. health, defense, social security), commercial (e.g. industry, professionals, retail sector) and non-profit-making organizations (e.g. missions and nongovernmental organizations (NGOs)). There are many potential links between schools of pharmacy and other groups and the possible researchers, which could lead to very fruitful collaborative research. Examples are the drug and therapeutic committees in teaching hospitals, health systems research departments, central medical stores, schools of public health, commercial organizations and NGOs. There are also many opportunities for involving (even junior) students in simple drug utilization surveys and other research projects.

### **Skill-based pharmacy training at the School of Pharmacy, Aberdeen**

Professor M. Richards, The Robert Gordon University, Aberdeen

Undergraduate pharmacy education should be based on the right balance between pharmacy science and pharmacy practice. One of the components of the undergraduate training in pharmacy practice at The Robert Gordon University in Aberdeen is a unit on the essential drugs concept and rational drug use (also see Annex 6). The aim of the unit is to provide students with an understanding of the issues surrounding the essential drugs concept and rational use of drugs. The subject is taught under the following headings: health care and drugs, traditional medicine and attitudes to health, the world drug situation, the rational use of drugs, health economics and pharmacoconomics, the essential drugs concept and drugs list, national drug policies, the role of the pharmacist and drug supply.

### **The pharmacy curriculum in Harare, Zimbabwe**

Professor Ossy M.J. Kasilo, Dr Farai W. Chinyanganya and Dr Lameck Chagonda

The curriculum of the Department of Pharmacy of the University of Zimbabwe is composed of four main subject areas, namely pharmaceutics and pharmaceutical technology, pharmaceutical chemistry and pharmacognosy, pharmacology and clinical pharmacy. Pharmaceutics and pharmaceutical technology, and pharmaceutical chemistry are taught from the first year through to the third, whereas pharmacognosy in first year and some aspects of clinical pharmacy are taught in the second year and about 80% in the third year.

Service teaching of clinical pharmacology, biochemistry, business studies, forensic pharmacy (taught by representatives from the pharmaceutical professional body), chemistry and community medicine is done by both faculty and non-faculty staff. As such, it is not always easy to coordinate and directly monitor students' needs. Because the Department of Pharmacy follows the Faculty of Medicine's administrative structure, making the lecture timetables for pharmacy and medical students coincide is sometimes problematic. The duration of the course is currently three years and a one year pre-registration period during which the department has no direct control, except when students are part of the department. Aspects missing in the Zimbabwe UPC include

computer skills, competence-practice skills, adequate research and teaching equipment, and effective teaching methods. There was also a lack of complementary services and computers.

Successful aspects of the UPC in Harare were field rural assignments, clinical assignments, the drug and toxicology information service, teaching the essential drugs concept and rational drug use (by ZEDAP staff), health systems research, quality assurance of the programme and a multidisciplinary teaching staff. A detailed account of their presentations is reported in Annexes 7 and 8 respectively.

### **Innovative and successful teaching components of current curricula**

Rather than being asked to present a general outline of the curricula from the different schools of pharmacy represented, participants were invited to mention only one or two components in their curricula which they considered very innovative and/or successful. A summary of these points is given below.

#### **Uganda**

In Uganda pharmacy students, together with the medical students at Makerere University, receive problem-based pharmacotherapy teaching in groups of 20-25 students, using the WHO Guide to Good Prescribing. Many medical and pharmacy lecturers had attended courses on problem-based pharmacotherapy teaching held in Groningen (Netherlands) or Cape Town (South Africa).

#### **Tanzania**

In Tanzania at the Muhimbili College of Health Sciences, Dar es Salaam, clinical pharmacy is taught in the School of Pharmacy through student participation in ward rounds at the teaching hospital. The innovative aspect is that pharmacy students study the patient records the evening before the round, in the presence of a clinical pharmacist lecturer. This way the students are very well prepared for the ward rounds, can confidently contribute the typical pharmaceutical viewpoint in a rational way, and learn to participate (and be appreciated) in multidisciplinary teams.

Another interesting initiative is to hold student competitions, e.g. on evaluating certain patient records or prescriptions. Free copies of the latest United States Pharmacopoeia, Drug Information Section (USP/DI) are made available by the USP as prizes.

#### **South Africa**

In one school in South Africa, pharmaceutical chemistry, which normally was taught through lectures, is now being taught through self-learning, group work and problem-solving. Groups of four students choose a certain drug or drug group, and collect and present all relevant information on it following a specific list of questions. Examples of questions are: overview, chemistry, physical structure, formulation, pharmacology and applied science. Later in the fourth year each student gets similar assignments, with more emphasis on clinical

aspects. This example shows that problem-based learning is possible, even in a subject that is commonly taught in a traditional way.

In Witwatersrand University it was noted that more final year pharmacy students opted for internships in the private sector. A deliberate effort was then made to expose them to public sector health facilities earlier in the study period. Now 90% of students choose longer internships in the public sector after graduation, probably due to the fact they are now much more aware of what it can offer them professionally.

Another initiative in the same school is to involve pharmacy students in a hypertension clinic where they review patient medication and measure blood pressure, this way they become involved in patient care. The same school also prepares students in clinical pharmacy through problem-based exercises.

In the University of the Western Cape, a course on "Introduction to Community and Health Sciences" (IHS) has been jointly planned by staff from a number of health related departments (the faculties of dentistry, community and health sciences, the school of pharmacy, the Western Cape Community Partnership Project and the Academic Development Centre). This course introduces students to their main subject area, which is health sciences as a whole rather than just one technical aspect of it. It also introduces students to changes which have taken place in the health sciences in the past few years. The course on IHS is objective-based, truly interdisciplinary and supports the general principle of primary health care on the basis of a team approach.

### **Zimbabwe**

The B. Pharm. (Hons.) degree programme in the Department of Pharmacy at the University of Zimbabwe exposes students to practice settings in rural underserved areas. The three year programme includes courses in community medicine and clinical pharmacy (currently comprising the essential drugs concept, rational drug use, drug information and therapeutics, toxicology and over-the-counter medications). Development of communication skills and the role of the pharmacist as a member of a health care team and a drug expert are emphasized. Ward rounds at teaching hospitals in a multi-disciplinary team are undertaken on average three times a week; there are also retail and industrial internships. The appointment of practicing non-academic pharmacists as honorary lecturers is a strategy to enhance practice-based pharmacy teaching.

The programme also exposes students to primary health care and teaches them how to interact with other professionals through rural assignments. Outreach programmes in a periurban municipal health authority are designed to teach coordination of pharmaceutical services in both management and clinical areas, to teach practice-based clinical pharmacy, and to engage students and staff in community-based research and community service. These outreach activities show that exposing students to practice settings early in their education may influence them to practice in underserved rural areas after graduation or at some point in their careers (see also Annexes 7 and 8).

### **3. Working groups and panel discussions**

#### **What is missing in undergraduate pharmacy education?**

Subjects currently missing in UPC differ in type and number for pharmacy schools in various countries. For example, in most countries clinical pharmacy and communication skills were not included in UPC. The following list was obtained by compiling all the missing subjects from participants.

Clinical pharmacy should incorporate ward rounds, clinical and rural assignments, therapeutics, pharmaceutical care, hospital pharmacy, national drug policy, drug management and supply, public health, the essential drugs concept and rational drug use. Communication skills, operational research skills, clinical skills, pharmacy skills, multi-disciplinary team development and quality assurance were deemed missing in UPC. Knowledge on quality assurance is an important attribute which all pharmacists should possess. Computer skills, professional networking within the different spheres of pharmacy, epidemiology, health economics, continuing education, teaching skills (developing materials, evaluation skills), clinical guidelines, drug registration guidelines, WHO policies on health, primary health care concepts, personnel and financing management, institutional pharmacy management, and drug and poison information, were also identified areas missing in some curricula.

#### **Skills of the pharmacist in a changing world: recommended pharmacy services in Africa in 2000-2025**

The required skills of future pharmacists are directly linked with their changing roles and responsibilities. Therefore, before an outline of a core curriculum for countries in eastern and southern Africa can be made, the present and future roles and responsibilities of pharmacists had to be redefined. This exercise was done through three working groups which produced sets of core skills deemed necessary for a pharmacist practicing in eastern and southern Africa from 2000 to 2025 (the period in which the pharmacy students of today will be professionally active). The three different lists of core skills were then regrouped, combined, reduced in some aspects and expanded in others by a small working group. This combined list was then reviewed by all groups and further refined to include practice areas, focus items, functions and roles, enabling knowledge, and required attitudes and skills. The outcome of this exercise is given in Table 1. This summary of recommended services in Africa can very well serve as the basis for need-based or skill-based undergraduate pharmacy curricula.

**Table 1: Pharmacy services in Africa from 2000 to 2025**

Recommended roles and responsibilities of a pharmacist in eastern and southern Africa from 2000 to 2025, with a summary of the required knowledge, attitudes and skills.

Practice area	Focus item	Functions/roles	Knowledge, skills and attitudes
<b>Management</b>	Human resources Pharmaceuticals and medical supplies Material & equipment Finance Time Information systems Stock Waste Drug donations National drug policy	Planning Selection Quantification Procurement Distribution Storage Rational use Communication Supervisory support	Tendering procedures Managerial skills Contract specifications Legislative competence Financial management skills Business, accounting Leadership skills Computer skills Information storage, retrieval & utilization skills Communication skills Good procurement practices Problem solving Human resource management skills Contract development Procurement and quantification skills EDL, RDU and STG development skills NDP knowledge Pharmacoeconomics Inventory
<b>Pharmaceutical care</b>	Patient (human/animal) Prescriber Other health care provider	Communication Prescription processing Patient interaction Pharmacist initiated therapy (PIT) Dispensing Monitoring therapy Evaluation Counselling Screening Refer Educate Record keeping Ensure RDU ADRs (detection monitoring, evaluation, reporting) Poisoning and toxicology Pharmacovigilance	Communication skills Health care structure Product knowledge (human/animal) Therapeutic drug monitoring Pathophysiology Pharmacotherapy Pharmacokinetics Knowledge of disease states Inter- and intra-professional/personal interactive skills Professional/biomedical legal and ethical skills Socio-behavioural sciences Professionalism Knowledge of indemnity and liability Clinical competence Good pharmacy practice Iatrogenic diseases Drug-induced diseases
<b>Information, education and communication</b>	Health care provider Health care consumer Government departments and other NGOs	Quantitative & qualitative research Dissemination of information Teaching Supervision Provide health information Influence lifestyles Perform comparative cost analysis Advocacy	Information storage, retrieval (& electronic data bases) and utilization Communication skills Research methodology and evaluation skills Training and preceptor skills Socio-behaviour skills Pharmacoeconomics

Practice area	Focus item	Functions/roles	Knowledge, skills and attitudes
<b>Quality assurance</b>	Product Services Processes Systems Curriculum courses	Provide quality service to all Analyse and evaluate data Conduct product analysis Record keeping	Product, services, processes knowledge and skills Analytical /technical skills Quality control skills Adherence to GMP & GLP Appraisal skills Record keeping
<b>Health systems research</b>	Health system components - Public - Private - NGOs - Traditional Project information data	Project proposal development Project implementation Result analysis Evaluation Dissemination of results Planning	Epidemiology - biostatistics Public health Health systems research Report writing Medical ethics Clinical trials Literature evaluation Computer skills and information technology
<b>R &amp; D and pharmaceutical production</b>	Quality product	Assure all aspects of product quality (manufacturing, packaging, labelling)	Pharmaceutical technology Instrumentation Analytical skills Legal/regulatory aspects GMP and GLP QC and QA Innovation Pharmacology Pharmacognosy Pharmaceutical chemistry Biopharmaceutics and pharmaceutical microbiology
<b>Regulation and ethics</b>	Legislative laws Regulatory acts	Licensing premises Licensing & registration of persons Inspections Drug registration Regulate professional practice Post-market surveillance Clinical trials approval Advertising control Advisory role	Communication Acts and regulations for health professions Conflict resolution Drug literature evaluation skills Drug registration procedures Certification schemes/harmonization Medicines and regulatory act (human/animal)
<b>Marketing</b>	Ethical criteria for medicinal drug promotion Quality product Profession/individual profit	Product detailing Partnership in health delivery team Community service	Ethical business principles Communication skills Interpersonal skills Environment/work place & financial skills

Practice area	Focus item	Functions/roles	Knowledge, skills and attitudes
Education and training	Student Community service University service Research Professional development Facilities	Teaching Research Publication Professional service Curriculum development (CD) Quality assurance in CD Vision and leadership Assessment and evaluation	Teaching skills (PBL/SBL) Assessment skills Planning Peer evaluation Evaluation by students Negotiating skills Communication skills Curriculum development skills Research skills Aims and objective writing skills Leadership skills Conflict resolution skills Financial management skills Human resources management skills Professional developments skills Academic practice policies

Compiled by: Professor Ossy Kasilo and Dr W. Chinyanganya (Harare), Professor Anastasia N. Guantai (Nairobi), and Dr Mariette Lowes (Pretoria).

### Problems identified, possible constraints to curriculum changes and how to improve undergraduate pharmacy curricula

Working groups from each of the participating pharmacy schools discussed the problems and constraints in introducing changes in curricula, and prepared plans of action for introducing such changes in their institutions. The common elements in the various group presentations are summarized below.

#### Problems identified in current UPC

Problems identified in current UPC varied from one country to the next. The following problems and constraints were mentioned more than once:

- admissions criteria do not allow for admission of older students, diploma holders or holders of other relevant degrees and certificates;
- the courses contain subjects and materials that are not directly relevant to the practice of pharmacy;
- there is a lack of written learning objectives for courses as a whole and for individual subjects and lectures;
- there is a lack of courses directly relevant to pharmacy practice, e.g. hospital pharmacy, community pharmacy, clinical pharmacy and pharmaceutical care;
- there is a lack of logical sequencing of subject material and lectures;
- there is a lack of postgraduate programmes and continuing education.

#### Possible constraints to curriculum changes:

- bureaucratic and formal approval procedures;
- difficulty in convincing policy-makers;
- financial constraints for workshops, staff retraining, material development, rural assignments, teaching aids, teaching and research;
- increase in student numbers without an increase of facilities;
- low pay for pharmacy lecturers when compared to private practice incomes;

- lack of teaching materials and information technology;
- lack of training for teaching staff;
- need to adapt teaching facilities (e.g. rooms for observed standardized clinical examination);
- resistance to change by some teaching staff;
- resistance by professional bodies against a new definition of the profession;
- shortage of appropriately qualified staff.

### **How to improve undergraduate pharmacy curricula**

Many groups proposed a gradual introduction of the necessary changes in curricula. Most presentations contained one or more components of the logical sequence outlined below.

First, there is a need to identify the problems and the gaps in the curriculum. This can be done by reviewing the professional roles and functions of the pharmacist of the future (using Table 1 as a basis). On this basis, educational objectives should be developed. At this stage it is also recommended to already consider the methods for assessing students, as their performance should be assessed against these learning objectives. For example, if the learning objective is a skill (e.g. communication skills), this skill should be assessed in the examination (probably by continuous assessment during the course, or an OSCE examination, but not through an essay question or multiple choice examination).

Second, on the basis of the learning objectives, the best teaching methods, training materials and learning activities should be chosen; and the sequence of the materials and teaching should be made. On this basis the changes in the curriculum should be proposed.

Third, getting the proposed changes accepted and implemented requires that all stakeholders (students, teachers and the governing bodies of the faculty or university) should be convinced of the need for change and of the relevance and feasibility of the proposed changes. For this purpose the necessary resources should be defined and balanced against the anticipated advantages. This can perhaps best be done by one or more workshops with teaching staff (and students).

It is not necessary to overhaul the whole curriculum immediately; it can be very beneficial to introduce changes in one or more subjects only. It should be noted that changes in teaching one subject (e.g. problem-based learning of clinical pharmacy) can generate considerable support from students, who generally appreciate this type of teaching, to introduce similar teaching methods in other subjects.

### **The role of pharmacy schools in upgrading pharmacy technicians**

Pharmacy technicians (as well as pharmacy assistants, dispensers and other pharmacy support staff) play an important role in the health care system, given the great shortage of pharmacists in most developing countries, especially in government health services. The levels of training were different in the countries represented at the consultation meeting. In many countries, pharmacy support

staff were trained by ministries of health without much input from schools of pharmacy.

However, despite these differences in their training, pharmacy technicians perform a variety of tasks in the countries in which they are employed; in principle under the supervision of licensed pharmacists, but in reality very often without such supervision. Other health professionals and non-professionals may also be delegated pharmaceutical functions, such as dispensing, ordering drugs, and giving drug information to patients; they are rarely properly trained for these tasks.

Participants recommended that training pharmacy technicians should be planned in collaboration with pharmacists and other professionals as appropriate, and should be supervised by schools of pharmacy. Additional specific recommendations are given in Section 4.

## Summary of important observations

### On the pharmacy profession

- The functioning of the pharmaceutical system is a very good entry point to discuss and promote the quality of medical care.
- Patients are willing to pay for good quality health care and service delivered.
- More emphasis on the public health aspects of pharmacy in Africa is justified because:
  - good curative services are essential for the credibility of the health care system as a whole, and a prerequisite for cost-sharing systems;
  - essential drugs can have a large health impact, e.g. in the treatment of diarrhoea, respiratory tract infections, malaria, meningitis and tuberculosis;
  - a large portion of the health budget may be spent on pharmaceuticals and there is great potential for savings;
  - when pharmacists show that they can improve drug availability and the quality of care, and show savings on the drug budget, they will have a relatively high status.
- There are many research opportunities for both pharmacy students and pharmacists in many areas of pharmacy practice, including public health, community pharmacy, and hospital pharmacy.
- Essential drugs and rational use of drugs are important concepts, also for developed countries.

### On pharmacy education

- Undergraduate pharmacy education should be based on the knowledge, skills and attitude required of the pharmacist of the future.
- Curriculum change is possible.
- Problem-based pharmacy training is possible and should be considered.
- Pharmacy practice, community pharmacy, clinical pharmacy and public health aspects are important for undergraduate and postgraduate pharmacy curricula.
- The aim of the revised curricula is to better serve patients and the community.
- Multidisciplinary teaching and learning are to be promoted, as they will enhance the role and acceptance of pharmacists in the therapeutic teams.

## 4. Recommendations

The consultation recommended that undergraduate pharmacy curricula be reviewed in order to accommodate the changing role of the pharmacist in Africa. They called these recommendations the "Nyanga Declaration".

### General recommendations

In order to maintain the relevance of undergraduate education to changing patterns of practice, curricula should be kept under regular review by schools of pharmacy, not only in eastern and southern Africa, but also in other African countries. The exercise should be performed by academic pharmacists, together with pharmacists from all aspects of practice and other concerned parties, such as health administrators, specialists in curriculum management and evaluation, WHO, International Pharmaceutical Federation (FIP), Commonwealth Pharmaceutical Association (CPA) and specialists in multidisciplinary areas relevant to pharmacy practice.

Colleges, schools and departments of pharmacy should take immediate action to review their pharmacy curricula. In doing so they should ensure that course content and process are in line with the changing role of the pharmacist and should provide graduate pharmacists with adequate knowledge, skills and attitudes.

Undergraduate pharmacy curricula should:

- be objective-based, using multidisciplinary teaching and learning;
- reflect and respond to national needs;
- offer a balance between basic sciences, pharmaceutical sciences, biomedical and clinical sciences, socio-economic and behavioral sciences, practical experience and courses related to the implementation of patient-oriented practice;
- allow for time allocation and study credits to be adapted to new priorities;
- sequence the material more logically to avoid duplication; teaching by outside experts should be planned and supervised carefully;
- provide more time for students' self-learning, problem-solving and independent work;
- provide electives/optional courses in order to allow specialization.

### Course objectives and teaching methods

- Clear objectives should be developed for courses and for each individual subject (see example in Annex 5).
- Different teaching methods should be developed and used according to the needs of the subject; examples are case studies, problem-solving and self learning.

- The problem-solving based learning method should be encouraged, wherever appropriate.
- Integrated and multidisciplinary teaching should be promoted, e.g. through joint teaching of pharmacy, medical and other health care students; schools of pharmacy should also maintain or establish close links with schools of medicine.
- Students should be exposed to all pharmacy practice areas, e.g. public and private sectors, industry and, where appropriate, to NGOs.
- Rural, clinical and industrial assignments should be integrated in the UPC.
- Student research projects should be encouraged; teaching staff could also benefit from such activities.
- Pharmacy schools should be involved in the planning and structuring activities of the pre-registration year in order to make it more relevant.
- A code of practice for the recruitment of pre-registration trainees and employers of pre-registration trainees should be developed (as is the case in the United Kingdom).

### **Lecturers and student assessment**

Examiners' questions, marks and grading should be scrutinized by external examiners appointed from outside the country. Assessment methods should reflect the teaching objectives.

### **Training materials and audio-visual aids**

- Guidelines should be developed on how to prepare adequate training materials and time should be allocated for such an activity.
- Training materials should be evaluated by peers, former students and external examiners.
- All schools of pharmacy should be upgraded to comparable standards in terms of teaching aids and other materials that improve the quality of teaching.
- Course content should contain materials that are directly relevant to the practice of pharmacy.
- Specific teaching materials relevant to local needs should be developed, e.g. case studies for problem-based learning.
- The use of WHO and regional training materials should be encouraged.
- Audio-visual aids should be available to all pharmacy schools.
- Documentation equipment such as computers with CD-ROMs and photocopiers are essential for self-learning and should be made available.

### **Academic staff and research activities**

- Staff at schools of pharmacy, colleges and departments of pharmacy need to undertake ongoing service activities.
- Attitude changes towards good pharmacy practice for staff (and students) should be promoted.
- Staff development should be encouraged through attendance to seminars, workshops, continuing education lectures/courses and refresher courses.

- Research and publications which have local bearing should be encouraged and supported.

### **International contacts**

Regional and international staff exchanges between schools of pharmacy in the region and elsewhere for specific assignments should be encouraged.

### **Approaches to changing curricula**

- All stakeholders should recognize the need for change.
- Specific staff time should be allocated for curricula reform.
- Personal contacts with staff who have either similar problems or experience in curriculum development should be encouraged.
- A bottom-up approach should be promoted, but with high-level support for the principles of curricula reform.
- Schools of pharmacy should bear in mind that support for change can be increased by proving that revised UPC will be more cost-effective.

### **What to delete? How to save time?**

- The teaching of basic chemistry and other basic subjects should be balanced with other subjects.
- Teaching time for compounding should be reduced.
- Practical aspects of traditional subjects and related report-writing should be streamlined to save student time.
- Overlapping and duplication in curricula should be identified and removed or reduced as appropriate.
- Self-supporting pharmacy schools are not viable with less than 60 students per year; if there are less than 60 students per year, their number can be increased to 60 without any increase in staff being necessary.

### **Role of pharmacy schools in upgrading pharmacy technicians**

- Pharmacy technicians should be recognized as part of the pharmacy profession.
- Training pharmacy technicians should be planned in collaboration with pharmacists and other professionals as appropriate and should be supervised by schools of pharmacy.
- Admission criteria to schools of pharmacy should be changed to enable diploma holders from recognized certified colleges to join the degree programme.
- A proper career path should be created for pharmacy technicians.
- A legal and regulatory body should be created for regulating and licensing the profession both in the public and private sectors.

## Annex 1: Programme

### Sunday, 27 April (evening)

**Theme: Introduction**

Introduction of participants, gallery of experts

Social hour, welcome dinner

### Monday, 28 April

**Theme: The role of the pharmacist in the health care system**

Official opening

Practical implications of the essential drugs concept

*Dr Hans V. Hogerzeil, WHO Action Programme on Essential Drugs*

The Zimbabwe Essential Drugs Action Programme, MOH/ZEDAP

*Mr Aidan Chidarikire, Director of Pharmacy Services, MOHCW*

Coffee

Modern pharmacy practice

*Professor Michael Richards, School of Pharmacy, Aberdeen, Scotland*

The role of the pharmacist in public health

*Professor Richard Laing, School of Public Health, Boston University*

Discussion

Lunch

Working groups:

Core skills of the pharmacist in a changing world

What is missing in undergraduate pharmacy education?

Research opportunities for evaluating essential drugs programmes

*Professor Richard Laing, School of Public Health, Boston University, USA*

### Tuesday, 29 April

**Theme: How to improve undergraduate pharmacy education**

Summary of the previous day

Skill-based pharmacy training at The Robert Gordon University  
*Professor M. Richards, School of Pharmacy, Aberdeen, Scotland*

The pharmacy curriculum in Harare  
*Professor Ossy MJ Kasilo, Dr Farai W. Chinyanganya,  
Dr Lameck Chagonda, Department of Pharmacy, Harare*

Coffee

Innovative and successful components of current curricula  
Presentations by participants

Lunch

Working groups:  
How to improve undergraduate pharmacy curricula

Tea

Plenary discussion  
The role of pharmacy schools in upgrading pharmacy technicians

Forum discussion

### **Wednesday, 30 April**

**Theme: Making an action plan**  
Summary of previous day

Working groups:  
Preparing an action plan, constraints for change

Coffee

Presentation of action plans and plenary discussion

Other topics for discussion

Lunch

## Annex 2: List of participants

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## **Annex 3: The impact of the Nuffield Report on pharmacy practice and training in the United Kingdom**

*Paper presented by Professor Richards OBE, Head of School of Pharmacy, The Robert Gordon University, Aberdeen, AB10 1FR, Scotland, UK.*

### **Introduction**

In the recent context the greatest formative influence on pharmacy practice in the UK has resulted from the setting up of the Committee of Enquiry into Pharmacy by the Nuffield Foundation in October 1983. The committee had as terms of reference "to consider the present and future structure of pharmacy in its several branches and its several branches' potential contribution to health care, and to review the education and training of pharmacists accordingly".

This relates very closely to what we are concerned with in our conference and aspects of the findings will be helpful and encouraging for us to consider together with some more recent developments in pharmacy practice. The Nuffield Report which was published in January 1986 has had a major impact on the profession and the government. It was in fact the lever that I used to completely reorganize the pharmacy degree course at The Robert Gordon University when I took up the Head of School post in September 1986.

### **The Nuffield Report**

The Nuffield Report consists of 150 pages and almost 100 recommendations. Obviously it is not possible to deal with all aspects of the report in this presentation but the most relevant proposals and their outcomes will be considered.

#### **Community pharmacy**

The report predicted a move towards more original pack dispensing, a greater use of information technology, closer working links with general medical practitioners similar to what had happened in the hospital sector, and a change in the way pharmacists interact with the public. Possible developments in this latter area included: advice on symptoms, response to special needs - the elderly, pregnant women and lactating mothers; domiciliary services - feeding, terminal care, compliance; health education - lifestyle, diet, vaccination programmes; move of medicines from "prescription only" to "pharmacy only"; supervision at point of sale; and remuneration to move towards paying for services provided and not just on the number of prescriptions dispensed.

## **Hospital pharmacy**

Clinical pharmacy was strongly supported and recommended for development, as were professional cooperation, medication history taking to be undertaken by pharmacists and research involvement.

## **Undergraduate education**

Traditional subject areas (pharmaceutical chemistry, pharmaceutics and pharmacology) seem inhibitory to the development of new ideas. A science base is needed, and practical laboratory work is essential. Social and behavioural sciences are to be introduced, as well as pathology, therapeutics and communication skills. Law and ethics moved to the pre-registration year. Relevance to practice is to be ensured through the involvement of practitioners. Regrouping of subject matter should be done under new titles

## **Pre-registration training**

Pre-registration training should be considered as part of the undergraduate course, and be divided between hospital and community pharmacy. A test of competence should be given towards the end of the pre-registration year with emphasis on practical work and oral skills. It should not be assumed that all candidates will be successful.

## **Continuing education**

The need for CPD was accepted; coordination is needed, voluntary in nature. The assessment of practice should be introduced as a requirement for continued registration. Taught Master's courses to continue and to include some research. Hospital and industrial pharmacists are encouraged to undertake higher degree studies.

## **The role of the RPSGB**

The role of the Royal Pharmaceutical Society of Great Britain is seen as crucial in facilitating the changes proposed.

## **Outcomes of the Nuffield proposals**

### **Original pack dispensing**

Original pack dispensing is developing very slowly.

### **Information technology**

All pharmacies have computers for label production, and payment is provided for keeping patient medication records. The lack of a requirement to register with one pharmacy limits this area.

### **General practitioner-pharmacist links**

In the October 1996 government paper "Choice and Opportunity Pharmacy Care: The Future", it is stated that community pharmacists should facilitate better use

of prescribed medicines, treat minor ailments, provide health promotion and provide advice on medicines to primary health care teams.

### **Responding to symptoms**

Providing advice is accepted by the public as part of the role of a pharmacist; counter staff should therefore be formally trained and follow protocols.

### **Patients with special needs**

This has developed particularly in aiding compliance with medicine regimes: for example, baby foods, foods for special diets and travel medicines.

### **Domicillary services**

Linked to above. IV antibiotics, peritoneal dialysis, nutrition, cytotoxic agents. Residential homes have high level of pharmacy input.

### **Health education**

Provision of health material such as leaflets.

### **Re-regulation of medicines**

Re-regulation of medicines from POM (prescription-only medicines) to P (pharmacy only sales) has accelerated. There has been no change from GSL (general sales list medicine) to P.

### **Supervision**

This issue is unresolved.

### **Remuneration**

A change has occurred in the basis of remuneration: pharmacies receive a practice allowance which represents a substantial proportion of their NHS income.

### **Hospital pharmacy**

The 1988 NHS circular "Health Services Management - the way forward" described the achievement of better patient care and financial savings through the more cost-effective use of medicines and improved use of pharmaceutical expertise obtained through the implementation of a clinical pharmacy service.

Another report, "Clinical pharmacy in the hospital pharmaceutical service: A framework for practice" was produced in Scotland in 1996 to enable pharmacists to focus on key areas, such as the provision of advice to medical and nursing staff, formulary management and developing individual patient care plans, and tackling problems of transfer from secondary to primary care.

### **Undergraduate courses**

Many changes have taken place to increase patient-oriented teaching, e.g. regrouping of subject material; communication skills; written, interpersonal presentations; introduction of new materials, teaching methods and assessments,

and practitioners as teachers. Law and ethics were not moved to the pre-registration year.

### **Pre-registration training**

Major overhaul of subject material; more structured programme of study, pre-registration examinations have taken place in July and October each year, with about 10% failure rate at first attempt. This attempts to be a test of competence to practice. The split between hospital/community pharmacy has not been accepted but may be in the future.

### **Continuing education**

The Royal Pharmaceutical Society of Great Britain (RPSGB) has taken a lead in coordinating the production of a core syllabus and also through papers in the *Pharmaceutical Journal*. The College of Pharmacy Practice requires members to undertake CPD. RPSGB recommends a minimum of 20 hours per year. Centres for pharmacy post-registration education have been established in Cardiff (Wales), Manchester (England) and Glasgow (Scotland) and provide instruction on RPSGB core syllabus. Courses are free to pharmacists in national health services. There is more research, a wide range of courses and facilities and an *International Journal of Practice*. PhDs are now undertaken in pharmacy practice.

### **RPSGB**

The RPSGB has supported many of the recommended changes as can be seen above, and launched the "Pharmacy in a New Age" constitution in October 1995. All members of the profession have had the opportunity to contribute their views to the Council of the RPSGB: "Pharmacy in a new age: The new horizon" published by the RPSGB September 1996.

## **Pharmacy in a new age: the new horizon**

The overwhelming view expressed by members of the RPSGB was that the profession must develop and progress. Four main areas were highlighted in which pharmacy should make a major contribution to health outcomes.

### **The management of prescribed medications**

The contribution of the pharmacist was seen to be in providing help at every stage in the process, from drug development through to providing medicines, information and support; making sure patients get the service they need, safely efficiently and conveniently and that they get maximum clinical benefit from their medicines.

### **The management of chronic conditions**

Pharmacists can offer a better quality of life to patients with these conditions by supplying the medicines and advice that meets their needs, by helping to develop locally agreed upon shared protocols, by ensuring that patients are taking or using prescribed medicines properly and by helping to improve the

outcomes of treatment (asthma, hypertension, rheumatoid arthritis, diabetes, "hospital at home").

### **The management of common ailments**

Pharmacists are able to provide patients with reassurance and advice, with or without the recommendation of non-prescription medicines, and can refer them to other professionals if necessary.

### **The promotion and support of healthy lifestyles**

Pharmacists can help people to protect their own health, through health screening, advice on healthy living and other services (nutrition, smoking cessation, AIDS, drug abuse).

## **Conclusion**

There are many similarities in the above distillation of the thoughts on the profession in 1996 and the changes recommended by the Nuffield Report. This indicates that the majority of pharmacists are committed to actively developing their roles, particularly in relation to accepting responsibility for the health care outcomes of patients to whom they provide concurrent advice on the effective use of medicines. In addition, pharmacists also show a commitment to improving the ability to provide advice on other health related issues.

Pharmacists also play an increasingly valuable role contributing to the effective working of the health care team within the community as well as in the hospital. Education and training must continue adapting to provide the knowledge and skills, and encourage the attitudes necessary for pharmacists to enable them to confidently undertake these expanding roles.

## **Annex 4: Objectives of the undergraduate teaching unit on essential drugs, Aberdeen**

*The Robert Gordon University, Aberdeen*

### **Essential drugs concept and rational drug use**

#### **Aim**

To provide students with an understanding of the issues surrounding the essential drugs concept and rational use of drugs.

#### **Objectives**

On completion of this course you will be able to:

##### *Health care and drugs:*

- define the term "health care"
- state the eight elements of primary health care
- define the term "essential drugs"
- describe the role of drugs in the provision of health care.

##### *Traditional medicine and attitudes to health:*

- define the term "traditional medicine"
- suggest two areas of resource which traditional medicine can contribute to national health care
- identify two contrasts between the approach of "traditional" and "scientific" medical practice
- name two concerns often expressed by health professionals about traditional medicines
- list three steps which can be taken to assist the integration of traditional practices into the health care system.

##### *The world drug situation:*

- select a statement describing the state of the world's drug consumption
- describe general trends in world drug consumption and distribution
- identify and select statements describing the availability of drugs in less developed countries
- identify the priority areas for WHO action.

##### *The rational use of drugs:*

- define the "rational use of drugs"
- state four aspects of drug supply which influence the rational use of drugs
- list eight factors which influence prescribing behaviour

- list seven factors which can be taken to encourage rational prescribing by doctors and other health personnel
- propose four ways to improve patient compliance in the rational use of drugs (prescription and self-medication)
- indicate pharmacists' own professional responsibility in contributing to rational use
- name two groups of drugs where rational prescribing can result in significant "savings"
- state and select the factors identified by ABC analysis
- identify the uses of the VEN analysis system
- define vital, essential and non-essential drugs.

*Health economics and pharmacoeconomics:*

- define the key economic concepts of opportunity cost and marginal analysis
- name and define four types of economic evaluation and describe their role in the evaluation of drugs
- explain need and demand for health care
- explain the problems associated with the measurement and evaluation of health care output
- describe the problem of setting health care priorities within a limited budget.

*The essential drugs concept and drug lists:*

- state the principles of the essential drugs concept
- identify three factors which stimulated the development of the essential drugs concept
- list the two primary objectives of an essential drugs programme
- give reasons for the selection of drugs
- list the criteria used in the selection of drugs
- explain the reason for the use of any of the criteria
- state the objections raised to drug selection policies
- state the two major bases for the selection of essential drugs
- compare and contrast the principles and objectives of an essential drugs programme with a hospital pharmacy programme.

*National drug policies:*

- identify at least four problems indicating the need for a national drug policy
- state two major overall objectives of a national drug policy
- list at least six goals influencing a national drug policy
- identify three areas of activity covered by a national drug policy
- name three common constraints on policy implementation in developing countries.

*The role of the pharmacist:*

- list the various roles of a pharmacist
- identify the problems associated with developing the pharmacist's role in a developing country
- choose priority areas and activities for pharmacists where there is a shortage of qualified manpower
- state areas of the pharmacist's contribution to primary health care.

*Drug supply:*

- name two general methods used for estimating drug quantities
- indicate the potential use of quantification
- list the measures which can be taken to ensure quality at the time of procurement
- list the problems of donated supplies and possible solutions
- list five indicators of an effective distribution system
- name three systems used in supply and their potential uses
- describe the responsibility of the pharmaceutical services in the supply of drugs
- identify the problems of maintaining quality after dispensing and issue to a patient
- indicate the principles of the ration kit system
- describe the top-up system of supply and its potential uses
- discuss the problems associated with drug supplies during disasters and epidemics.

## **Annex 5: The pharmacy curriculum in Harare**

*Professor Ossy M.J. Kasilo, Dr Farai W. Chinyanganya and Dr Lameck Chagonda*

### **First year**

#### **Dispensing and compounding**

Dispensing, including compounding, takes up about 25% of the first year programme. Dispensing practices can influence rational drug use through counselling and provision of unbiased drug information. Pharmaceutical care relies on how well a pharmacist communicates with patients during dispensing encounters. Compounding is necessary, especially in developing countries with limited budgets for finished product importation.

#### **Pharmacognosy**

Pharmacognosy is still a major subject. Over 80% of the population in Zimbabwe consults the traditional medical practitioner in the first instance. There is a great potential for discovery of medicines from the rich flora and fauna. About 30% of cases of poisoning admitted at hospitals are due to traditional medicine ("muti") poisoning. A pharmacist has a role to play as a research and development scientist and as a source of poisoning management information.

### **Second year**

#### **Business acumen**

Management skills are needed for the efficient practice of pharmacy. Courses in business management are taught together with business administration students in the Faculty of Commerce.

#### **Essential drugs concept**

To ensure essential drugs safety, efficacy, quality, availability and affordability (SEQAAA), the pharmacist must believe in the essential drugs concept. A course covering the drug logistic circle (selection, procurement, storage and distribution) and rational drug use with special emphasis on the role of the pharmacist in promoting rational drug use is taught in the second through to third year. Honorary lecturers are appointed from ZEDAP.

### **Ethics and professionalism**

Pharmacists must be ethical and professional. Courses in forensic pharmacy (law and ethics) are taught by honorary lecturers from the profession.

### **Health systems research**

Pharmacy is a dynamic profession often lacking evidence to justify introducing progressive changes in its practice. To equip pharmacists with research capability, which in turn will provide evidence for change, courses in health systems research and biostatistics are being introduced this year.

### **Field rural assignment**

The majority of Zimbabwe's population is rural based and most health facilities are government operated. Most professionals, including pharmacists, work in urban and private sector positions. An early introduction to rural health care may encourage pharmacists to work in these underserved areas. Community medicine, taught together with medical students, is didactic and focuses on public health and environmental issues. This is followed by a two-week rural assignment on interaction with the rural health care team, political administration, community, teachers, chiefs and traditional healers. The primary health care system is studied and students investigate health related problems, identify causative factors, formulate interventions and make recommendations to on-site authorities. Students submit written reports assessed alongside oral presentations back to the Department of Pharmacy. Plans are underway to integrate pharmacy, medical, nursing, occupational and rehabilitation students in these assignment groups to enhance a team spirit. Other field assignments are to the pharmaceutical industry and retail pharmacies.

#### *Objectives of field rural assignments are:*

1. to expose students to the health care system in rural areas based on the government's new health policies;
2. to allow students to explore the role of the pharmacist in the rural setting;
3. to help students appreciate potential problems encountered by the health care personnel in the area;
4. to invite students to observe health-related community projects in the area;
5. to encourage students to contribute to research projects aimed at promoting primary health care and to identify possible interventions and solutions to problems in the rural health care service.

## **Third year**

### **Six week orientation**

Final year students have a six week orientation course prior to actually starting their third (final) year of the Bachelor of Pharmacy (Honours) Degree Programme. Students are exposed to different units and institutions where clinical rounds and field assignments will be carried out; they also receive introductory lectures in pathology, paediatrics, medicine, clinical pharmacy, and medical terminology. A course and examination on first aid is also done. Students also visit and receive lectures from the family planning clinic, the

psychiatry units of two teaching central hospitals, the Nestlé company, blood transfusion unit, representatives from the pharmaceutical industry, retail pharmacies, etc. In this way students are exposed to most sectors of pharmacy practice during their third year.

### **Clinical pharmacy**

Clinical pharmacy is currently comprised of the essential drugs concept and rational drug use, drug and therapeutics information, therapeutics and toxicology. Part of the third year is devoted to clinical pharmacy education: grooming a pharmacist as an expert in all drug issues and a source of unbiased health and medicines information.

Specialist courses include: drug information, toxicology, OTC medication, clinical pharmacology and therapeutics. The experimental portion is a research project and ward rounds.

### **Clinical assignments and ward rounds**

Clinical assignments and ward rounds include assignment to the drug and toxicology information service (DaTIS), Medicine and Paediatrics Attachments, Pharmacokinetic dosing laboratory assignments, pharmacy assignments, and Chitunguiza (Kellogg Project) assignment.

Clinical rounds are made twice weekly at local teaching hospitals as part of a health care team comprised of physicians, nurses and hospital pharmacists.

### **Kellogg project**

The major outreach programme is the W.K. Kellogg Foundation-sponsored multi-disciplinary "triple functions project" based in a periurban municipal health area. Functions of project are:

- coordination of pharmacy services for the benefit of the community;
- community-based clinical pharmacy learning;
- community-based pharmacy research.

The objectives of this programme are to bring health care professionals to underserved areas, and to provide adequate health care to the community while empowering it to address its own health care needs.

At the end of the programme students must:

- have familiarized themselves with the role of the pharmacist in the municipal health service department, including hospital pharmacy management and supervision, manufacturing of pharmaceuticals for clinics, stock control and drug use education of the staff in the clinics;
- have been taught how to identify and carry out research projects aimed at solving drug supply and utilisation problems.

### **Drug and Toxicology Information Service (DaTIS)**

Final year students work at the Drug and Toxicology Information Service (DaTIS), a unit of the Department of Pharmacy which offers a clinical service based on modern clinical pharmacy practices. DaTIS is serviced by faculty who

provide a telephone service on a 24-hour, seven-day a week basis to health workers and the community on drug information, therapeutics and poison management information, and a database of all enquiries is maintained. DaTIS publishes a bulletin on drugs and toxicology on a quarterly basis which is internationally distributed. In order to maximize the use of limited resources, DaTIS will jointly publish with the Zimbabwe Drug Regulatory authority as from 1997.

The objective of this work experience is to expose the students to the routine activities of DaTIS. At the end of this experience, students must be familiar with:

- how to take down a request;
- how to classify a request;
- how to use literature to respond to a query *or* to solve a clinical problem;
- how to write short drug information articles to be published in the DaTIS bulletin;
- how to do library searches on specific drug information topics and ongoing research with DaTIS.

### **Medicine and paediatrics assignments**

Objectives of these assignments are:

- to do ward rounds with a medical team in the patient care areas;
- to study real patients in the wards;
- to collect all relevant information needed for a particular case;
- to study clinical illnesses;
- to evaluate whether drug use is appropriate or not.

At the end of the rounds, students are required to:

- discuss the various cases encountered: informed relevant discussion is necessary;
- answer any questions pertaining to the case;
- briefly outline patients' responses to therapy, and rationalize drug use in the management of these patients.

### **Pharmacokinetic dosing laboratory assignment**

Students are involved in pharmacokinetics, therapeutic drug monitoring and adverse drug and medicines review activities. This is often a result of requests for information from health care providers. Although applied pharmacokinetics is a relatively new subject in pharmacy, it could play an enormous role in rational drug treatment.

The objective of this assignment is to expose the student to the operation of the pharmacokinetic dosing service. At the end of this assignment, students must be able to:

- advise doctors on correct drug level sampling times;
- analyse samples for drug levels;
- interpret drug assay results using pharmacokinetic models;
- report results and follow-up on patients whose drug levels require monitoring.

## **Pharmacy assignment**

The purpose of this assignment is to provide the clinical service which a hospital pharmacist might not have time to do, but nonetheless constitutes the duties of a hospital pharmacist. At the end of the programme students must have:

- identified any problems within the pharmacy;
- attempted to solve these problems;
- assessed the stock situation;
- looked at dangerous drug registration;
- visited a special area like the theatre and intensive care unit (ICU).

## **Other field assignments are pharmaceutical industry and retail pharmacies**

### *Final year pharmacy students (honours) project*

Research projects for final year pharmacy students are compulsory, and cover at least 264 hours in pharmacoepidemiology, pharmacy practice, pharmacognosy, clinical pharmacology, pharmaceutical chemistry, public health or any other area of pharmaceutical interest. Projects are supervised by faculty members. This has become the source of most publications from these supervisors. At year end, a student defends her/his thesis before a panel of examiners. Successful defense earns one BPharm (Honours) degree instead of the ordinary BPharm degree.

### *Quality assurance*

The examination questions, marks and grading are scrutinized by two external examiners appointed from outside Zimbabwe. This has helped in maintaining recognition of the programme in many countries.

## **Fourth year**

### **Pre-registration (fourth) year**

This year is jointly coordinated by the Health Professions Council, the regulating and licensing body for health care professionals in Zimbabwe. The pre-registrant may spend 6 to 12 months working in a hospital, retail or industrial setting. The work must be under the supervision of a pharmacist who has been registered for not less than three years and the premises must be licensed for this purpose.

## **Annex 6: BPharm course on essential drugs, Harare**

*Professor Ossy M.J. Kasilo, School of Pharmacy, Harare*

### **Course objectives**

- To increase awareness among students of the Zimbabwe national drug policy and the essential drugs concept.
- To create awareness among students of the activities of the Zimbabwe Essential Drugs Action Programme (ZEDAP).
- To sensitize students to the concept of essential drugs and to ensure that these principles become the basis for therapeutics and for future good dispensing practices.
- To increase students' awareness of materials/methods intended for drug education of:
  - a) physicians: effective prescribing practices and patient counselling;
  - b) pharmacists: effective drug procurement, handling, dispensing and patient counselling;
  - c) patients: compliance and rational drug use.

### **Need for and objectives of a formulated national drug policy (1 hour)**

The need for a formulated national drug policy is discussed: i.e. the objectives of a formulated national drug policy and the national drug policy in the context of a national health policy.

### **The Zimbabwe National Drug Policy and elements of a national drug policy (3 hours)**

#### **Drug availability**

Therapeutic needs, selection, estimation of quantities needed, drug procurement, local drug production, drug distribution, stock management and storage, quality assurance and the WHO Certification Scheme, and drug regulation are identified.

#### **Rational drug use**

The rational drug use aspect focuses on training, drug information, prescribing and dispensing, drug and therapeutic committees, research and development,

monitoring and evaluation, national and international cooperation, human resources development and national pharmacy services administration, and controlling the abuse of alcohol, drugs and allied substances.

### **Selection of essential drugs for chosen disease conditions (4 hours)**

Essential drugs lists for the different levels of the health care system, i.e. teaching hospitals, districts and primary health care, are formulated.

### **Drug supply and management system and ZEDAP experience (4 hours)**

This focuses on typical public drug supply systems: national, regional, international levels; planning (health, economic and national development goals) and selection; quantification (past consumption methodology, demand morbidity methodology); local drug production versus imported drugs; financing (sources of finance, cost recovery); procurement; storage, transport and distribution; prescription and rational use of drugs; monitoring and management of information systems; inventory management; and routine follow-up. Group work highlighting problems encountered in drug supply and management systems and possible solutions is also addressed.

### **Stock control and management, pharmacy administration, book keeping and financing (4 hours)**

### **Guidelines for drug donations (2 hours)**

Study designs are available for pharmacoepidemiology studies/research methods (2 hours).

An overview of the scientific method, types of errors that can be made in performing a study, criteria for causal nature of an association, epidemiological study designs and sample size considerations for pharmacoepidemiologic studies is given.

### **How to investigate drug use in health facilities (WHO drug use indicators) (4 hours)**

Prescribing indicators, patient care indicators, health facility indicators; ZEDAP and its surveys on rational drug use are discussed.

### **Drug utilisation studies and prescribing behaviour (2 hours)**

Objectives of drug utilisation studies and definitions; their consequences (medical, social and economic); some basic elements to consider when

performing drug utilisation studies; factors influencing drug utilisation; drug use in special populations: paediatrics, pregnant women and breast-feeding mothers, geriatrics, renal, diabetic, hypertensives; examples of protocols on how to conduct drug utilisation studies and examples of drug utilisation studies in Zimbabwe.

### **Prescribing practices (2 hours)**

**Irrational prescribing:** reasons for irrational prescribing practices and types of irrational drug prescribing are covered.

**Rational prescribing:** subjects covered are: training and supervising health care workers; objectives of drug information; functions of hospital and/or regional drug committees; limitations on prescribing and dispensing; cost sensitization; and group work highlighting the various types of irrational prescribing.

### **Effective dispensing (2 hours)**

Subjects include: understanding a drug request (origin, validity, information on patient), therapeutic appropriateness, economic considerations; patient communication and counselling; drug retrieval; preparation; processing; dispensing to patients; record keeping; and role play: communicating with the patient and counselling.

### **Communicating with patient, patient education in effective drug use (2 hours)**

**Compliance:** factors affecting compliance, measures for evaluating compliance and consequences of non-compliance are addressed.

### **Patient education, communication and medication compliance (IEC)**

Factors promoting compliance; strategies for patient education in better compliance; community education on safe and rational drug use; and role play: patient compliance, are discussed.

### **Legislative activities (1 hour)**

Subjects addressed are: objectives of drug-related legislation; drug regulatory control (drug importation, manufacture, distribution, quality control, drug registration).

### **Areas of cooperation between physician and pharmacists (1 hour)**

Subjects addressed are: primary drug-related professional functions to physicians; primary professional functions of pharmacists; other services/ functions provided by pharmacists.

### **Constraints in assessing and implementing national drug policies in developing countries (1 hour)**

Subjects addressed are: social, political and economic aspects of a national drug policy; policies, administration and management; practice and services; monitoring and research.

### **Evaluation of the course (1 hour)**

This consists of group discussion and comments.

## **Annex 7: Annotated bibliography of reference materials useful for undergraduate pharmacy education**

### **General**

Essential Drugs Monitor. Geneva, World Health Organization, Action Programme on Essential Drugs (DAP). Published twice yearly.

This is a periodical which covers drug information, national drug policies and essential drugs programmes world-wide. Regular features include rational use of drugs, supply, operational research and public education, together with reviews of relevant publications. The Monitor is aimed at policy-makers, prescribers, health educators, administrators, researchers and all organizations working in the pharmaceutical sector. It is free of charge.

### **The role of the pharmacist**

World Health Organization, 1994. The role of the pharmacist in the health care system. Report of a WHO Consultative Group. New Delhi, India, 13 to 16 December 1988. WHO/Pharm/94.569.

World Health Organization, 1994. The role of the pharmacist: quality pharmaceutical services - benefits for governments and the public. Report of a WHO Meeting, Tokyo, Japan, 31 August to 3 September 1993. WHO/Pharm/94.569.

These are reports on two global WHO consultative group meetings on the role of the pharmacist in the health care system. The documents provide information for those wishing to review the contributions of pharmacists to the acquisition, control, distribution and rational use of drugs, and other health-related functions of pharmacists; delineate the body of knowledge and expertise upon which the contribution of pharmacists to health care is based; formulate proposals regarding necessary developments in undergraduate, postgraduate and continuing education for pharmacists, and in the training of supportive staff; develop proposals regarding action that is necessary to optimize the use of pharmacists in health care systems; and formulate arrangements for monitoring the above developments and action.

World Health Organization, 1989. The role and functions of the community and hospital pharmacist in the health care systems in Europe. Report of a WHO working group and recommendations of a meeting convened by WHO's Regional Office for Europe, Madrid, Spain, 29 November to 1 December 1988. Groningen, Netherlands: STYX Publications.

International Pharmaceutical Federation (FIP). Statement of Principle on Self-care including self-medication - The professional role of the pharmacist. Statement adopted by the Council of the International Pharmaceutical Federation at its Council Meeting in Jerusalem, 1 September 1996.

## Dispensing and good pharmacy practice

World Health Organization, 1996. Good pharmacy practice in community and hospital pharmacy settings. WHO/Pharm/DAP/96.1.

This document is endorsed by both WHO and FIP and is intended to encourage national pharmaceutical organizations to focus the attention of pharmacists in the community and hospital pharmacy sector on developing the elements of the service they provide to meet changing circumstances. However, since the conditions of practice vary widely from country to country the national pharmaceutical organizations in individual countries are best able to decide what can be achieved and within what time scale.

Mbwasi RO, Bosman FC, Mbassa RJ, Tibajuka R, Ndomondo-Sigonda, Senya SS, Seils D, Steinhausen KF, Kiula M. Good Dispensing Manual. Prepared by Pharmaceuticals and Supplies Unit, Ministry of Health, Tanzania. First edition, 1996.

This manual is the first of its kind to be produced in mainland Tanzania. It is aimed at improving the dispensing practice of various health workers handling drugs at primary and secondary levels of care. The manual is designed to be used for individual study with self assessment exercises found at the end of each chapter. It can be used for training activities such as workshops or meetings within districts. It is however better complemented by the drug use information manual for dispensaries and health centres.

## Drug selection and supply management

World Health Organization. The use of essential drugs. Model list of essential drugs (Ninth List). Seventh report of the WHO Expert Committee. Geneva: World Health Organization, 1997. Technical Report Series No. 867.

This report presents the recommendations of the WHO Expert Committee responsible for updating and revising the model list of essential drugs. The first part provides guidance for those wishing to establish national essential drugs programmes and includes discussions on quality assurance, post-registration drug studies, educational activities, research and development, and antiviral drugs. In the light of increasing antimicrobial resistance, particular attention is drawn to the use of reserve antimicrobials.

Quick J, Rankin JR, Laing RO, O'Connor RW, Hogerzeil HV, Dukes MNG, Garnet A (Eds). Managing drug supply, the selection, procurement, distribution and use of pharmaceuticals. Second edition, revised and expanded. Management Sciences for Health in collaboration with WHO. Connecticut, USA, Kumarian Press, 1997.

This is the most comprehensive textbook dealing with all aspects of the selection of essential drugs, procurement, distribution and use of pharmaceuticals so far. The manual is intended for policy-makers, health managers, health workers of all levels of the health care system and those involved in training in academia. The manual focuses on the management of essential drugs and the problems faced by policy-makers and managers operating with scarce resources. However, the tools and ideas discussed are based on those used in the most developed countries. This manual is very useful in developing the skills needed for improving the management of drug supply and the rational use of drugs.

## **Guidelines for drug procurement**

FIP Guidelines for drug procurement. Adopted by the FIP Bureau during its meeting on 5 March 1992.

These guidelines are an aid to those who are responsible for the purchase or procurement of pharmaceuticals. This document, modeled on the American Society of Hospital Pharmacists' Guidelines for selecting pharmaceutical manufacturers and distributors has been drafted during the WHO/FIP sponsored meeting of the West African Pharmaceutical Federation. Before adoption by the FIP Bureau, this draft was discussed and modified by experts from the East Caribbean Drug Service and Officers of WHO.

Management of drug purchasing, storage and distribution. Manual for developing countries. Third Revised Edition. (Reprinted from "Drugs made in Germany"). Vol. 35 No. 2 and 3: 1992.

The manual for developing countries, "Management of drug purchasing, storage and distribution" compiled by the industrial pharmacists section of the International Pharmaceutical Federation (FIP) is intended as a contribution towards the efforts of WHO to improve drug supplies in developing countries.

## **Drug donations and emergency pharmaceutical supplies**

World Health Organization. Guidelines for Drug Donations. Geneva, 1996. WHO/DAP/96.2.

In order to help both donors and recipients to maximize the potential benefits of drug donations, WHO has been working with the major relief agencies to develop donation guidelines. The document begins with a discussion on the need for guidelines, followed by the four core principles for drug donations. The guidelines are then presented along with possible exceptions to these where necessary. The document also provides some suggestions on other ways donors may help, and the final chapter contains practical advice on how to implement a policy on drug donations.

World Health Organization. The New Emergency Health Kit 98. Geneva, 1998. WHO/DAP 98.10.

After several years of study, field testing and modifications on how emergency response could be facilitated through effective emergency preparedness measures, standard lists of essential drugs and medical supplies for use in an emergency were developed by WHO. The aim was to encourage the standardization of drugs and medical supplies used in an emergency to permit a swift and effective response with supplies that meet priority health needs and to promote disaster preparedness.

The kit was developed in the early 1980s and has been adopted by many organizations and national authorities as a reliable, standardized, inexpensive, appropriate and quickly available source of the essential drugs and health equipment urgently needed in a disaster situation. Its contents are calculated to meet the needs of a population of 10,000 persons for three months.

### **Training materials useful for undergraduate pharmacy training**

De Vries TPGM, Henning RH, Hogerzeil HV and Fresle DA. Guide to good prescribing. Geneva: World Health Organization, 1994. WHO/DAP 94.11.

Although this manual was prepared for undergraduate medical students, experience has shown that it can be used for both pharmacy students as well as for practicing physicians and postgraduate students. The document provides step-wise guidance to rational prescribing and teaches skills that are not time-limited but remain valid throughout a clinical career. It demonstrates that prescribing a drug is part of a process that includes many other components. The manual explains the principles of drug selection and how to develop and become familiar with a set of drugs for regular use in practice, called P(personal)-drugs. Practical examples illustrate how to select, prescribe and monitor treatment, and how to communicate effectively with patients. The advantages and disadvantages of different sources of drug information are also described. The document also provides an excellent background teaching of pharmacology, therapeutics and drug information.

Hogerzeil HV, De Vries TPGM, Henning RH et al. Impact of a short course in pharmacotherapy for undergraduate medical students. An international multicentre study. Geneva: World Health Organization, 1995. WHO/DAP/95.1. An abridged form of the same study was published in *The Lancet*, 1995; ii: 1454-57.

This document describes how the impact of a training course using the WHO Guide to Good Prescribing was measured by three tests, taken before the training, immediately after, and after six months. After attending the course, students from the study group performed significantly better than controls in all patient problems presented. Both retention and transfer effects were maintained for at least six months after the training session.

WHO Model prescribing information series.

The preparation of model prescribing information aims to complement WHO's model list of essential drugs. These publications are in a series covering different subjects, e.g. drugs used in sexually transmitted diseases and HIV infection, drugs used in parasitic diseases, drugs used in mycobacterial diseases and drugs used in anaesthesia. The manuals usually include details on dosages, uses, contraindications and adverse effects. They are intended to provide up-to-date, independent source material for adaptation by national authorities (particularly in developing countries) who wish to produce drug formularies, data sheets and teaching materials. They can also be used by both pharmacy and medical students as drug information materials.

#### WHO Drug Information (quarterly publication).

WHO Drug Information provides an overview of topics relating to drug development and regulation that are of current relevance and importance, and includes the lists of proposed and recommended International Non-proprietary Names for pharmaceutical substances (INN). The objective of the publication is to bring issues that are of primary concern to drug regulators and pharmaceutical manufacturers to the attention of a wide audience of health professionals and policy-makers concerned with the rational use of drugs. In effect, the journal seeks to relate regulatory activity to therapeutic practice. It also aims to provide an open forum for debate. WHO Drug Information can be used as a good source of evaluated information on drugs and therapeutics for pharmacy and medical students.

Advanced training in the health professions for developing countries. Workshop proceedings held in Berlin (West) from 1 to 3 October 1987 (edited by Dirk Warning and Peter Petit). Berlin, Deutsche Stiftung for Entwicklungshilfe (DSE), 1988.

This publication provides a summary of a workshop where participants emphasized the great need for further training in health management. Certain areas for training were mentioned including drug and food safety, regulation and registration including toxicity, quality control in laboratory work, health administration (within all levels), health economics including insurance systems, knowledge and experience in planning and organizing health-related projects which are not yet integrated into the regular health delivery system.

Uganda Essential Drugs Manual. Republic of Uganda, Ministry of Health. Second Edition, 1991.

This manual, just one of many, was prepared for anyone who dispenses drugs provided in the Ministry of Health Essential Drugs Kit. The manual can be adapted and used for teaching dispensers in other countries.

Fresle DA, Hurst KS, Forshaw C. Therapeutic Information: A Global Overview. Essential Drugs Lists, Formularies and Treatment Guides. Geneva: World Health Organization, 1996. WHO/DAP/95.7.

This overview of scientifically validated therapeutic information and resource organizations explains why locally produced drug and therapeutic reference information can be so influential in promoting

rational drug use. The publication gives an insight into some of the problems faced and lessons learned in the development of therapeutic information. An annotated list of national, regional and international essential drugs lists, formularies and standard treatment guidelines held in DAP's Documentation Centre is included. The publication concludes with a listing of primary health care newsletters, drug bulletins, resource organizations and services which provide information free of charge or at low cost to developing countries.

Tripathi CD and Bapna JS (Eds. 1992). Education on rational drug use. Proceedings of a continuing medical education programme on clinical pharmacology. Department of Pharmacology, Maulana Azad Medical College, New Delhi - 110002, India.

This document reports the proceedings of a workshop held in New Delhi from 2 to 4 December 1992 on a continuing medical education programme on clinical pharmacology which covered drug information, drug utilisation and health policy, adverse drug reaction monitoring, and the implementation of the essential drugs concept for rational drug use. The manual can be used and adapted for teaching pharmacy and medical students on these subjects.

Bapna JS and Shashingran CH. Manual for training of interns on the concept of essential drugs and rationalized drug use. Pondicherry, India: Clinical Pharmacology Unit, Department of Pharmacology, Jawaharlal Institute of Postgraduate Medical Education and Research, 1989.

This is a manual for training interns on the concept of essential drugs and rationalized drug use. The section on the essential drugs concept has been given in a question-and-answer form so students understand the subject better. The manual covers the essential drugs concept, drug combinations, irrational and rational prescribing, drug utilisation studies and prescribing behaviour, selection of essential drugs and patient education in effective drug use. This manual has also been used for pharmacy students and has been very useful.

World Health Organization. Public education in rational drug use: a global survey. Geneva, 1997. WHO/DAP/97.5.

Public education interventions in rational drug use are rarely published or fully documented, so experiences cannot be shared or built on. To help close this gap the Action Programme on Essential Drugs conducted a global survey of such activities and interventions. Survey methodology included a search of standard literature databases and a questionnaire completed by some 100 projects in 25 developing and 13 developed countries. This report contains the data gathered and discusses the main problems and facilitating factors encountered by those implementing projects. It concludes that public education in rational drug use needs to be much better documented, evaluated and supported, and calls for technical, financial and collaborative support to be increased.

## Research

Hardon A, Brudon P, Reeler AV. How to investigate drug use in communities. Geneva: World Health Organization, 1992. WHO/DAP/92.3.

This document provides researchers, health workers and administrators of health programmes with simple research methods to identify problems in the provision and use of drugs at community level. It also aims to encourage them to work together in developing action-oriented research projects. The guide first discusses relevant research themes, then presents a rapid assessment methodology, and then gives more field research on community drug provision and use.

World Health Organization. How to investigate drug use in health facilities; selected drug use indicators. Geneva, 1993. WHO/DAP 93.1.

This manual describes a simple standard methodology for gathering essential data on drug use patterns and prescribing behaviour in health facilities. The methodology centres on the use of 12 core indicators to gather pertinent data on the drug use situation. The manual also explains how the indicators, which measure prescribing practices, the quality of patient care and the availability of drugs, can be used as a simple tool for gathering objective, useful data quickly, easily and in a reproducible manner. Special data forms are provided for manual analysis or easy adaptation to simple spreadsheet.

Health Research Methodology. A guide for training in research methods. WHO Regional Publications - Western Pacific Education in Action Series No. 5. Manila: WHO Regional Office for the Western Pacific, 1992

This manual deals mainly with the basic concepts and principles of scientific methods, from the setting up and execution of research projects, through definition of research and selection of research objectives and design to the stage of data analysis and presentation of results. Although a number of excellent, comprehensive textbooks relating to research methods are currently available, a broadly based, introductory account, describing the step-by step construction of research protocols in health sciences does not exist. This manual can be used by both medical and pharmacy students as well as those who wish to undertake research.