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THE VILLAGE HEALTH WORKER TEAM IN THE SAHEL

**A Manual for Planning, Implementation
and Evaluation**

by

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ABBREVIATIONS AND EXPLANATIONS OF TERMS

A	:	animateur/animatrice (community organizer)
AR	:	animation rurale (sensitization and organization of rural communities)
D	:	dispensary
D & T	:	diagnosis and treatment
DPT	:	diphtheria/pertussis/tetanus immunization
Dr	:	driver
EAR	:	equipe d'animation rurale: rural sensitization team, often designed for a variety of tasks such as alphabetization, community development, agriculture and health
FU	:	functional unit of a village health workers' program in terms of: <ul style="list-style-type: none">- geography (distances)- demography (population and villages within catchment area)- manpower requirements (government officials)- fixed centers (for training, referral, and supervision)- costs
H	:	hospital
HC	:	health center
I or N	:	infirmier(e) or nurse
LDCs	:	less(er) developed countries
MC	:	medecin chef; head of a HC, either a doctor or a senior nurse (infirmier d'Etat)
MCH	:	maternal and child health
MOH or MSP	:	Ministry of (Public) Health or Ministere de la Sante Publique
MSP or MOH	:	Ministere de la Sante Publique or Ministry of Public Health
N	:	nurse
OMS or WHO	:	Organisation Mondiale de la Sante or World Health Organization
Ph	:	pharmacist

Pharmap(p)ro : Ministry of Public Health drug distribution network.

PHC : primary health care

PNA : Pharmacie nationale d'approvisionnement

PP : Pharmacie Populaire, a state enterprise drug distribution network

RDO : rural development office

SF : sage femme (midwife)

SGE : Service (de la lutte contre les) Grandes Endemies.

TB : tuberculosis

TBA : traditional birth attendant = local midwife (accoucheuse locale/traditionnelle - preferred as the female VHW)

TST : training/supervisory team

TT : tetanus toxoid

VHWT : village health worker team: composed of at least one male VHW (secouriste) and one local midwife (accoucheuse locale/traditionnelle)

WHO or OMS : World Health Organization or Organisation Mondiale de la Sante

Political administration synonyms and explanations for Francophone Sahelian countries are given on Table 2-1.

PREFACE

"Health for All by the Year 2000" has become a universal goal of health policies since the declaration of Alma-Ata in 1978. Primary health care in its widest definition of preventive and curative ambulatory care is seen as the best means to bring modern health care to the majority of the population. In the least developed countries in areas such as the Sahel region, programs that utilize the village health worker (VHW) are being regarded as the most important, if not the only possible vehicle, for improving the health status of the rural poor within the constraints of the extremely limited resources.

Although relevant literature is abundant, there have been to our knowledge few if any attempts to address in detail all the implications of such programs' costs, logistics, manpower and absorptive requirements at the national level. A common argument for not doing this is that such attempts will fail simply because we lack a consistent standard by which to compare the diversity of the programs even within the same country.

The approach in this manual is to construct a model that adheres as closely as possible to the realities of existing programs in the Sahel, indicates all possible variables, breaks down global services into the smallest possible service units and projects them onto a national level. Thus, as in a jigsaw puzzle, pieces can be assembled to create a global picture. By taking actual Sahelian baseline cost data, we were able to establish line item budgets at various program levels.

We suggest that an effective way to use the book would be to read Chapter 1, the Checklist of Issues (Annex A), and the Summary of Planning/Implementation/Evaluation Steps (Annex B), then follow the references to specific subjects in the main text. Thus, one can become familiar with the major points being raised and then pursue areas of particular interest.

We are well aware that the tremendous complexity and relatively high resource requirements that we predict will be somewhat of a shock to believers in the simplicity and affordability of VHW programs. We nevertheless hope that this book will enable planners, implementors and evaluators at all levels to make VHW programs more realistic and therefore more successful.

The purpose of this book is to assist in the effort to accomplish our ultimate goal of improving the health status of the rural and urban poor.

Note: Production and dissemination of this document has been made possible by AID contract DSPE-C-0053. Opinions, findings, and recommendations are the author's and do not necessarily reflect those of AID or APHA.

It should be remembered that price and dosage figures are quickly outdated and should thus be considered as illustrative only. Readers should always refer to the most recent drug listings and dispensing guides for actual ordering and prescribing.

ACKNOWLEDGEMENT

This manual is based mainly upon field experience, personal contacts and evaluations of VHW programs over a period of eight years in Zaire, the Yemen Arab Republic, Arghanistan, Chad and the Sahel Region in general. Many people and organizations have contributed to the work.

My special thanks to the Sahel Development Planning Regional Office/USAID, Bamako, whose staff spared no effort or encouragement in completion of the task. Special mention must be made of Shirley Ann Furst, our main editor, who, over a period of several months, undertook the painstaking task of correcting and streamlining the profusion of ideas.

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P.K.

Chapter 1: VILLAGE HEALTH WORKER SCHEMES: EXPECTATIONS VS. EXPERIENCE

Volumes have been written to convince the planner that village health worker schemes are practical by almost every measure and that, of all possibilities, they can best deliver the desired services to the lowest income groups at a tolerable price. This paper is intended to examine this promise, to candidly expose the warts but, above all, to provide for both the planner and the implementer detailed and laboriously extracted practical guidelines which will make the VHW project achieve its vision, if that is possible. The author does not assume that VHWTs are workable or justifiable. First, the alleged merits of the strategy and the discouraging roadblocks and difficulties which have been encountered are examined. The author analyzes the years of experience of a multitude of practitioners in order to provide a "handbook" to guide the planner and the field worker.

This document provides information and guidelines to assist in the planning, implementation and evaluation of a VHW program. A series of chapters and annexes cover selected problem areas. Generally, the issues were selected because information is not available anywhere else, and these areas have been found to be the weakest links in most VHW programs. The issue discussions are intended to be used as a point of reference when working with specific programs. Rarely would circumstances exactly fit the examples given, but they should serve as a comparative standard and a base from which to start planning or to evaluate the local circumstances.

Expectation - Access: The VHWT is to provide basic, primary health care (PHC) for the majority of the rural population who currently do not have basic modern medicine available. The goal, in the Sahel, is complete coverage by the year 2000.

Experience: This is really an ambitious promise which, as we shall see, will require enormous resources and effort if delivered services are to be substantive and are to reach widely dispersed rural residents, since the VHWT is intended to provide not only basic medicine but to also be the first link in a chain leading to central, sophisticated, quality care.

Expectation - Low Cost and Therefore Affordable: The theory posits that the VHWT, once established, will provide substantial services at minimum cost to government, since the users will pay for the most costly benefits, while many additional benefits will be instructional (e.g., in hygiene and sanitation) and essentially cost-free.

Experience: Experience has demonstrated that government costs for initial sensitization, training, drugs and supervision of VHWs are formidable. Minimal annual average per capita operating cost, net of infrastructure and equipment costs, is \$1.00 in 1978 prices in one Sahelian country, even assuming patient payment, at cost, for expendibles. In that country current Ministry of Health (MOH) expenditures average \$2.50 per capita annually for services which extend to not more than 20 percent of the population. Throughout the Sahel, per capita amounts range from \$1.25 to \$5.30 with \$2.50 being the average. Thus, to provide VHW coverage to all the people would imply, at a minimum, increasing MOH annual budgets by one-third, if the necessary supportive

infrastructure and capital equipment were ready at hand, which is not the case. When infrastructure, such as referral centers and drug supply networks do not exist, the requisite expenditure is multiplied while the time requirements are extended by years. Infrastructural, equipment and maintenance costs for additional units can be expected to rise sharply as services are extended into less accessible regions. This may price an expanded VHWT program out of reach for most Sahelian countries.

The costs of minimal care, drugs and services which would make the VHW's presence meaningful may not be affordable to many poor in rural areas. For example, minimal malaria suppressants for a family of six for one year costs approximately 40.00US\$, well in excess of many families' total money budget for all purchases. At best, the cost of drugs would compete seriously with other basic needs for the villagers' limited disposable incomes.

Expectation - Simplicity with Effectiveness: The VHWT addresses the large proportion of health problems which require simple and easily administered procedures that can be handled at the local level by a minimally trained member of the community.

Experience: The proposition as an ideal may be sound, but one must realistically acknowledge its limitations and not encourage expectations which cannot be met and thus lead to disenchantment and rejection. Only a limited variety of services can be expected of the VHW in the best circumstances of training, supervision and funding. Within the profound complexity of endemic diseases, poor nutrition, wretched sanitation and a complex cultural and economic milieu, we should have realistic expectations of the VHWs' abilities. Moreover, it should be remembered that the incorrect use of potent medicine and unauthorized injections can lead to adverse side effects such as chloroquine resistance, hepatitis and tetanus.

Once the limits are understood, the VHWT scheme can be useful. It is then warranted in terms of costs and benefits, even if only on a small scale, when incorporated in the context of a health services delivery system which includes complementary inputs from personnel such as traditional midwives, and effective referral, support, and supervision to regularly upgrade VHW skills.

Expectation - A Supplement to Professional Health Personnel: The VHW was conceived partially to relieve pressure upon scarce, highly trained health personnel.

Experience: This the functional VHW can do. However, central and referral personnel and systems must be expected to receive additional demands for services, as VHWs are installed in areas formerly not reached by any formal delivery system. Additionally, services extant at the time of initiation of VHW schemes will invariably be called upon to provide supervision, training and logistical support. Overall available health personnel are typically already or will soon be overextended. Expansion of services through VHWs will increase demand for these personnel; this must be provided for in advance and can be very costly.

Expectation - The VHWT is Self-Sufficient: After the establishment of the VHWT and provision of drug kits, equipment, and instruction, the service can be self-perpetuating.

Experience: To a large extent this end can be realized if a competent channel of resupply is available; prices paid to the VHWT by the villagers are adequate to cover costs (but not higher than other sources of the same materials); incentives sufficient to retain the VHW at his post are identified and provided; and substantial financial and infrastructural resources are available to central and referral services so that minimal continuing support such as supervision, retraining and referral facilities will continue.

Expectation - Filtering: By intercepting minor complaints at the community level, the VHW will reduce attendance at central clinics, dispensaries and hospitals.

Experience: This will be most marked when the VHW is established within the catchment area of a functioning referral center. As noted above, referrals from outside the normal area are going to increase attendance, which might be accommodated if VHWS within the area are also functioning as effective filters.

Expectation - Distribution of Benefits: The VHW can serve to rapidly disperse minimal health services to areas that are difficult to reach or not currently served by health agencies.

Experience: Unfortunately, implementation of a VHWT system invariably entails increased resource expenditure by the health authorities already plagued by budgetary shortages, unless already inadequate central services are to be even further downgraded. There is no cost-free way to create and maintain a VHW service. It is difficult to induce central professional health personnel to go to remote areas to set up and maintain the VHW. Furthermore, as services are dispersed, unit costs inevitably rise. In the end, in the VHW program, villagers are obliged to pay for services while frequently similar benefits are free to urbanites at more central units.

Expectation - Socioeconomic Benefits: A VHWT system can help increase overall production in the rural areas if the potential for productive activity exists.

Experience: Although this contention is thought to be true, associated costs already identified, other social and economic consequences, such as more rapid population growth, and effects on traditional cultures, must also be considered. Also, conditions of unemployment and illiteracy will not allow a substantial increase in production even to a healthier population.

Expectation - Political Benefits: The VHWT can be used as a concrete demonstration of governmental concern for all people and thus be supportive of incumbent institutions.

Experience: The obverse is that VHWT schemes must be sensitively implemented and that they require significant planning and resource commitment initially and recurrently. If they are not carefully conceived and executed, with full support at all levels, resultant failures can backfire upon governmental aspirations.

Expectation: VHW, The Preferred Mechanism: Among the known possibilities for broadest delivery of essential health services of high impact, the VHW is one of the most feasible and most promising as a result of the virtues already cited.

Experience: As we have seen, there are formidable obstacles to implementation as well as dangers and associated resource costs. Moreover, (1) there have not yet been significant, large-scale successes; (2) planners have not been able to adequately compare relative costs and benefits of all alternatives; (3) it is not clear whether VHW programs are a host-government priority or simply an opportunistic response to donor concerns, i.e., that the authorities will ultimately commit their own financial resources and personnel; and (4) because of difficulty in measurement and absence of basic health data, it may never be possible to know the actual impact of seemingly "successful" VHWS upon morbidity and mortality of the community as a whole.

Conclusion: Having identified many of the major potential problems and indicated some important areas of the collective ignorance, one can feel somewhat prepared to undertake a VHWT project with fewer illusions and therefore greater promise of success. This we propose to outline in the following guidelines for successful implementation.

Chapter 2: THE GEOGRAPHICAL FUNCTIONAL UNIT OF A VHWT PROGRAM

Because the VHW approach requires initial sensitization of the village and then continual supervision, and a referral system to fixed centers with re-supply of drugs and equipment, a realistic attempt must be made to select villages within a certain radius.

Village selection criteria depend on several variables:

- existing planned health service infrastructure; type and quality standard of health care
- staffing pattern and availability of personnel time
- distance, time and communication between those health services, pharmaceutical resupply centers and the chosen villages
- seasonal road conditions and modes of transport
- the population catchment area: expected number of people served by different service units.

Existing In-Country Divisions

All Francophone Sahelian countries have a remarkably similar, although differently named politico-administrative and corresponding health services structure:

Table 2-1: Administrative and Medical Levels and Personnel

<u>Administrative Level: Personnel</u>	<u>Key Medical Facilities: Personnel</u>
1) <u>Prefecture</u> (Chad), <u>department</u> (Niger, Upper Volta), or <u>region</u> (Mauritania, Mali, Senegal): <u>prefet</u> or <u>Gouverneur</u>	1) <u>Hospital regional/departemental</u> : <u>medecin-chef de prefecture</u> , <u>directeur departemental de sante</u> , etc.
2) <u>Sous-prefecture</u> (Chad, Upper Volta), <u>arrondissement</u> (Niger), <u>cercle</u> (Mali) <u>Department</u> (Mauritania, Senegal): <u>prefet</u> , <u>sous-prefet</u> , or <u>commandant de cercle</u>	2) <u>Centre medical</u> , <u>centre de sante or infirmerie</u> : <u>medecin-chef/ infirmier d'etat</u>
3) <u>Arrondissement</u> (Chad, Mauritania, Mali, Upper Volta, Senegal) or <u>canton</u> (Niger): <u>sous-prefet</u> or <u>chef d'arrondissement/canton</u>	3) <u>Dispensaire or poste de sante</u> , (not all: <u>maternite</u>): <u>infirmier(e)</u> , <u>sage femme</u> , or <u>matrone</u>

4) Not all: Canton (Chad, Niger) or communaute rurale (Senegal): chef de canton or president du conseil rurale

4) Not all: Poste de sante: infirmier(e)

5) Village (sedentary) or campement (nomadic): chef de village/campement

5) Not all: Equipe de sante: secouriste, matrone ou accoucheuse locale

In-Country Divisions:

Each country is divided into:

- 1) Prefectures or their equivalents: each one has a regional hospital (some of the poorer, sparsely populated provinces have only a health center with several physicians, nurses, midwives).

Each prefecture is divided into:

- 2) Sous-prefectures or their equivalents: each one has a health center and may have one physician or more often one infirmier d'Etat (then sometimes called an infirmerie instead of a centre medical) and one to three other nurses, including one midwife (sage femme).

Each sous-prefecture is divided into:

- 3) Arrondissements or their equivalents: each one has several dispensaries (between two and eight, average of six), each staffed by an infirmier (brevete premiere cycle) and one, or more often several, maternities and/or P.M.I.'s. Each may be staffed by a sage femme, but more often it is by a matrone.

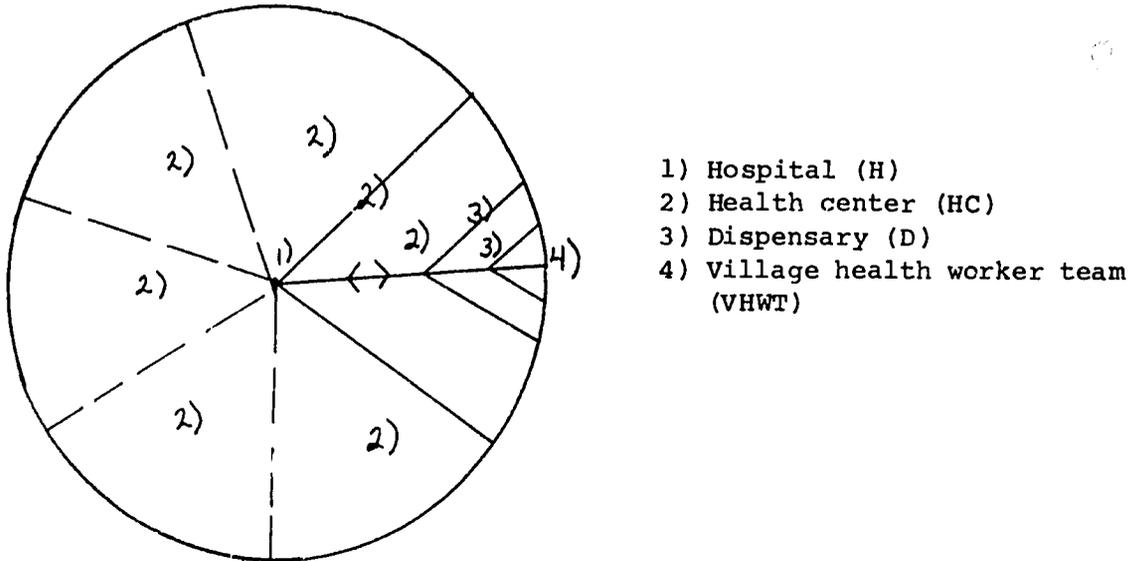
In some countries the arrondissements are then subdivided into:

- 4) Cantons or their equivalents: each one has a dispensaire or poste de sante, staffed by an infirmier (brevete). Each arrondissement or canton is divided into numerous villages. Great regional variations exist, but arrondissements (level three) have an average of 30-70 villages.

In addition to these fixed centers, there are mobile units: each country is divided into secteurs, which often do not correspond with the boundaries of prefectures), but are of a similar size. Each mobile unit operates out of a base, usually located at the provincial capital. Their administration is somewhat independent (again varying from country to country) from the public health structure. Each secteur is divided into several sous-secteurs. Their tasks are usually immunization (usually BCG, smallpox in countries still under surveillance, measles, yellow fever and more recently TT and DPT), TB and leprosy diagnosis and treatment and sometimes supervision and resupply of the rural dispensaries.

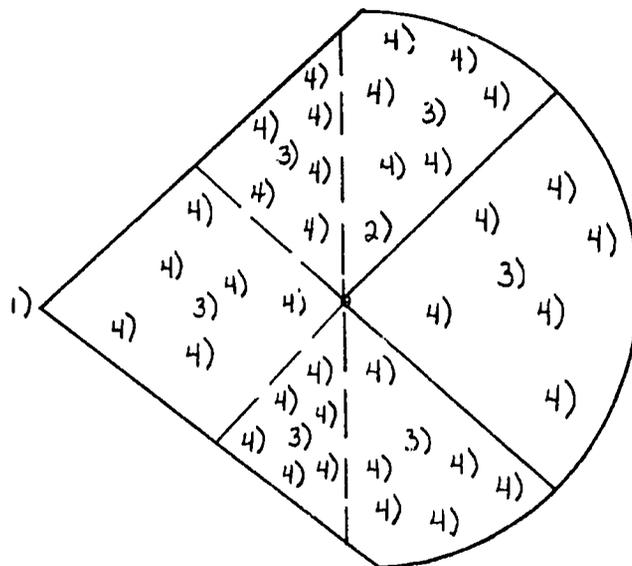
Figure 2-1: The Functional Units of an Integrated VHW System

(A) The Prefecture/Department/Region Level



Although the referral link with the regional hospital is a highly desirable goal, poor communication systems and poor absorptive capacities of most hospitals present numerous obstacles. A more realistic approach is from the sous-prefecture level downward.

(B) The Sous-Prefecture/Arrondissement/
Cercle/Department Level:



The smallest functional unit of the VHWT should not be at the arrondissement level (D/health post surrounded by VHWs), but preferably at the sous-prefecture level, i.e., HCs surrounded by Ds which in turn are surrounded by VHWTs. This is important because of the low level of health care available at the D level. The HC may also have a low level of care, but has more staff and potential to upgrade than the D.

The support potential of the functional unit to the VHWT may bear grave consequences not only for the quantitative absorptive capacity of each level (i.e., how many VHWTs can be trained, supervised and retrained, how many people can be referred), but also for the qualitative absorptive capacity (how much time should be spent on training, supervision, and retraining in order to achieve that level of health care; what level of health care should be available to the people referred).

Because of the variables which may enter, the following suggestions will be subject to great local variations. However, as a guideline they may be useful:

Guidelines for Defining Functional Units:

Numbers of VHWT within the functional unit:

- 1 HC serving 3-8 Ds (optimally 6)
- 1 D serving 5-10 VHWTs (optimally 6)

Thus one HC can serve between 15 and 80 VHWTs, but ideally one HC is in charge of six Ds and 36 VHWTs, assuming the above-cited staff pattern.

Distance: the distance between the HC and a D may vary from 10-50 km (optimally 35 km)

- between a D and VHWT from 5-30 km (optimally 15 km)
- and from HC to the VHWT from 10-80 km (optimally 50 km)

Population catchment area: the catchment area can be defined in two ways:

- by radius of distance from the base site (HC, D, VHWT), or
- by time of transportation depending mainly on the mode of transport, but also on road conditions

To simplify, we assume that:

- all patients walk to obtain services
- HC personnel drive landrovers
- D personnel have mobilettes or horses

- the VHWT stays in the village and uses public transport (car, horse, mobilettes, bicycles) for resupply of drugs only

"Daily" served population catchment area:

HC: 10 km radius (5 hours one way walking time)

minimum	maximum	optimum
3,000	30,000	25,000

(Optimum is too high for the Sahel: more likely around 10,000 population)

D: 5 km radius (2-1/2 hours one way walking time)

minimum	maximum	optimum
500	5,000	2,500

(Optimum again rare in the Sahel)

VHWT: The village territory (which can be up to 10 km in distance to the most remote quarters).

minimum	maximum	optimum
200	1,000	500

Definition of population catchment area with regards to VHWT sensitization, training, supervision and drug resupply:

HC: Within a radius of between 15 km (minimum) and 80 km (maximum), optimally 50 km; a population of between:

	minimum	maximum	optimum
1 HC, plus	3,000	30,000	25,000
6 Ds, plus	3,000	30,000	15,000
36 VHWTs	<u>7,200</u>	<u>36,000</u>	<u>18,000</u>
Total	13,200	96,000	58,000

D: Within a radius of between 5 km (minimum) and 30 km (maximum), optimally 15 km; a population of between:

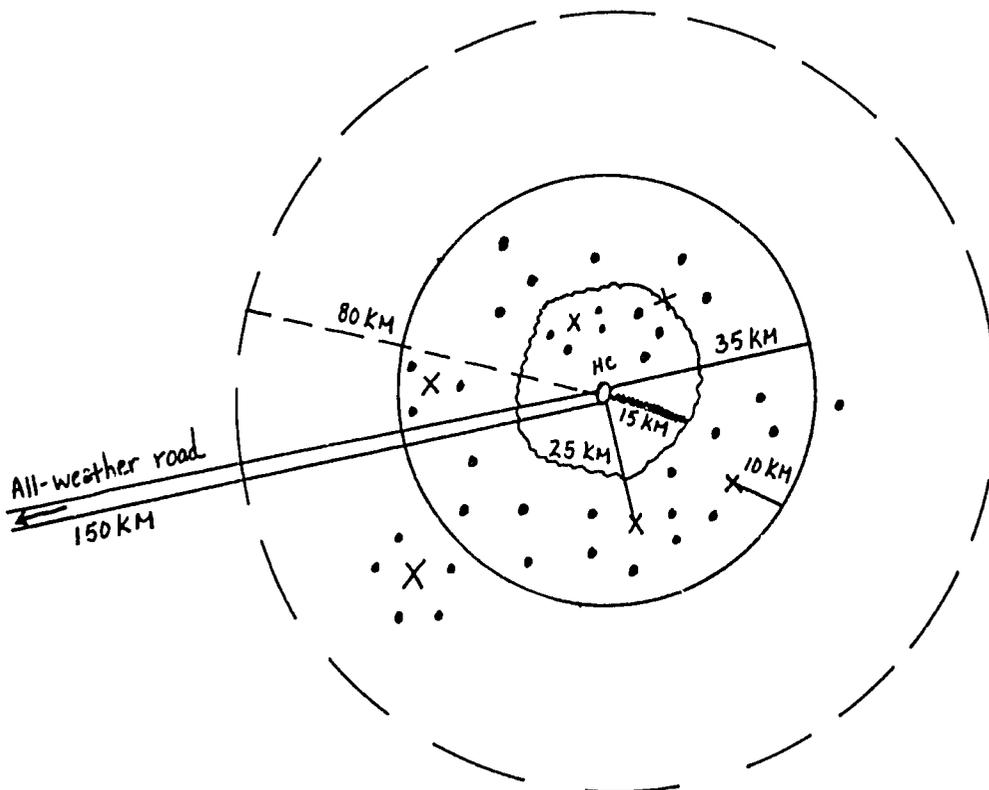
	minimum	maximum	optimum
1 D plus	500	5,000	2,500
6 VHWTs	<u>1,200</u>	<u>6,000</u>	<u>3,000</u>
Total	1,700	11,000	5,500

For resupply of drugs for the VHWT, ideally the distance between VHWT and the next resupply center should not exceed 50 km, which is also our ideal HC-VHWT distance. Thus, for the maximum radius of 85 km, an additional one to two resupply centers would be required.

Admitting that such a theoretical model must ignore variations (most in the Sahel occur due to a low density population with great variations in distances and seasonal communication problems due to lack of all-weather roads), let us summarize the "model" in a comprehensive graph:

Figure 2-2: The Model of an Integrated VHW System at the Sous-Prefecture/ Arrondissement/Cercle/Department Level:

- Key:
- (1) Regional hospital, site of prefecture
 - 0 Health center (1)
 - x Dispensary (6)
 - VHW (36)
 - optimal distance: serving about 50,000 population
 - maximum " " " 100,000 population
 - ~~~~~ minimum " " " 15,000 population



Our recommendation for the functional unit of an integrated VHW, whenever feasible, is: one HC, six Ds, 36 VHWs, within an average radius of about 35 km and a total population of about 50,000 and one pharmaceutical supply center. An all-weather road should lead to the next regional hospital within a distance of 150 km, where the seat of the prefecture is usually also located. The question whether the VHW should also work within the catchment area should be left open. Our recommendation is that the VHW should work within the HC catchment, but not within the D catchment area. The decision depends very much on the size of the population within that catchment area.

Chapter 3: ACTIVITIES DESCRIPTION OF VHWTs

This book describes the village health worker team and not the community development agent. Many may argue that the foremost activity of the VHWT should be community development, i.e., organizing cooperatives; digging wells and latrines; building more efficient kitchen stoves; introducing animal traction, better food crops, vegetable gardens and mechanical mills; and repairing tools and participating in alphabetization. In other words, the VHW should generate income before he introduces non-revenue-generating health care. Although these activities are undeniably more useful in the longer run than the distribution of a few tablets, experience has shown that as soon as the VHW starts distributing medicine, he continues with rare exceptions to do nothing but that.

Whatever the strategies might be, the VHW must address at least some of the health related problems, and at a level of care which is acceptable to modern standards of medicine. The variables are so numerous that only the key issues can be mentioned here:

- literacy level of the VHWT
- drugs and equipment in the kits
- training time and quality
- community disease pattern
- felt needs of the villagers
- fee-for-services policy
- administrative tasks; recording and reporting.

Summary of Male and Female VHW Activities

This chapter describes the curative, preventive, and administrative activities of male and female VHWs in each of the two stages of VHW expansion envisioned in our model.

In stage one the typical male VHW has extremely limited D & T capabilities and is very dependent on a good referral system. The male VHW in stage two has a much wider range of effective D & T, but he must be literate/numerate and needs at least three-months' training and good supervision, all of which mean higher costs. Even in this stage, the VHW relies heavily on a functioning referral system. Probably the most difficult tasks are:

- distinguishing between minor and severe (life-threatening) problems, especially in infants
- giving and encouraging preventive care without material support, and above all

- establishing adequate administration and logistics. This task is very often neglected by planners and trainers.

The activities of the female VHW or traditional birth attendant (TBA) are of a completely different nature from those of the male VHW. The female VHWs tasks are not determined by continuing supplies of drugs, but by practical skills and knowledge. (See Chapter 5 on equipment of the VHW.)

Therefore, the administrative and logistical tasks play a minor role in contrast to their role for the male VHW. A quick and efficient referral system for complications before, during and after the delivery, however, is even more vital than for the male VHW, since it can decide the life and death of the mother.

Stage one: The typical female VHW equipped with and trained to use a midwifery kit, type one, illiterate (elderly), has assisted in at least 20 deliveries with two weeks additional training. The stage one VHW will in many cases achieve a level of performance not much different from the one before the training; better cord hygiene, some MCH education and encouragement to refer complicated deliveries are the main areas of improvement.

Stage two: The typical basically literate female VHW equipped with and trained to use a midwifery kit, type two has assisted in 50 deliveries and experienced some delivery complications and received three months' additional training. The stage two TBA, however, should be able to reduce substantially maternal, and to some extent perinatal, mortality through early recognition of delivery complications, better delivery practice, better prenatal and postnatal care and especially her better knowledge of early indications of emergency referrals. In order to achieve this, she must extend the period of prenatal and postnatal care from several hours to several weeks, a task which is time consuming and not easily accepted by the village mothers.

All female VHWs, however, need a good and rapid referral system with good obstetric surgery (Cesarean section, forceps delivery, etc.) at the referral hospital. Otherwise minimal maternal mortality rate reduction should be expected.

General Activities Description

THE MALE VHW

- Curative:
 - limited diagnosis and standard treatment (D & T)
 - referral of patients to fixed centers or to next visit of supervisors, including announcement of epidemics

- Preventive:
 - health-related community organization
 - individual health education
- Administrative:
 - recording and reporting
 - handling patient fees
 - assistance in immunization; supervision of TB and leprosy register
- Logistics:
 - stock control
 - resupply of medicines, including the ones for the female VHW

THE FEMALE VHW

- Curative:
 - delivery
 - prenatal and postnatal examination of the mother
 - referral of complications during pregnancy and delivery
 - referral of severely ill newborns, if close to a sophisticated hospital
- Preventive:
 - MCH education including child-spacing advice
- Administrative:
 - recording
 - if literate; birth and death register
 - handling of traditional remuneration

Note: Administrative and logistic activities are often left with the village committee. This may lead to confusion, mistrust and disruption of supplies. It also would require that the committee members be trained in these activities, incurring additional program expense.

The Male VHW's Curative Activities

The curative tasks listed for the male VHW in stages one and two relate primarily to the suggested drugs/equipment in his kit contents. They do not include non-drug treatments such as warm soaks, cool compresses and health education that may complement drug therapy or be used without it.

Table 3-1 The Male VHW's Diagnosis and Treatment Activities for Stage One
(requires two-weeks initial training and stage one kit,
semiliteracy)

<u>Condition</u>	<u>Drugs</u>
noncerebral malaria	chloroquine
suspected viral (flu-like) illness and/or fever; simple aches and pains	aspirin
conjunctivitis superficial foreign bodies some superficial injuries	eye ointment cotton swabs, or silver nitrate drops
uncomplicated skin conditions; abrasions, cuts mild cases of impetigo, pyoderma; rashes, first degree burns, tinea mucosa; thrush, stomatitis	soap and water or hydrogen peroxide or gentian violet or potassium permanganate or tincture of iodine, gauze sheeting, cotton wool, pair of scissors
general complaints (mainly of self during diseases); fatigue, simple cough, nervousness, sleeplessness, simple diarrhea, constipation, small children's complaints: (e.g., loss of appetite, nykturia, teething)	charcoal tablets iron tablets or vitamins or aspirin or traditional herbs or health education alone

Curative oral rehydration (oralite composition packs for severely dehydrated children) should not, in our opinion, be included in stage one because of the following complicating factors:

- danger of overhydration/hyponatremia resulting in death exists because the crucial quantitative calculation per kg of body weight in very young infants is too difficult (especially without weighing scales)

- "toxic" dehydration (meningitis, pneumonia, otitis media, septicemia) needs different treatment
- continuing vomiting needs nasogastric tube feeding
- the oralite packs are typically handed out for simple diarrhoea in adults, who don't need it
- distribution requires additional training and literacy/numeracy as well as a resupply network
- failures might harm VHWT reputation.

Stage one referrals to next D or ordering for next supervisory visit, not critically ill patients, but whose conditions exceed his D & T capability:

referral to next HC or H, all very sick looking patients (including severely dehydrated children)

- announcement of epidemics (measles, meningitis, etc.).

Note: A functioning referral system is the most crucial precondition in a VHW stage one with his extremely limited D & T capabilities. This necessitates that:

- the referral centers be within reach
- the right patients be referred at the right time
- the referral centers provide adequate facilities for D & T.

Table 3-2: The Male VHW's Diagnosis and Treatment Responsibilities for Stage Two

Training, D & T for stage one plus two to three months additional training, stage two kit contents, literacy and numeracy. For the illiterate VHW in a stage one program, most of this can be expressed in symbols; however, for stage two, this becomes a practical impossibility.

<u>Condition</u>	<u>Drugs</u>
typhoid fever	chloramphenicol or
respiratory tract infections and fever (acute/chronic bronchitis, laryngotracheitis, pneumonia)	tetracycline or ampicillin or penicillin V
severe impetigo, pyoderma, acne	
severe cellulitis (especially breast abscess)	
any severe (septicemic) infection	

<u>Condition</u>	<u>Drugs</u>
cholera	tetracycline
trachoma	oral rehydration mix
bacillary dysentery	
2nd and 3rd degree burns	
tonsillitis	penicillin V
acute sore throat	
respiratory tract infections and fever	
urinary tract infections (not gonorrhoea)	ampicillin
(haemophilus) pneumonia in infants	
otitis media in young children	
meningitis	
other respiratory tract infections (bronchial asthma, chronic bronchitis)	
ascaris	piperazine or
oxyuris	mebendazole, health education
2nd and 3rd degree burns	antibiotic ointment and
severe impetigo	antibiotic drugs
infected ulcers	(see above)
severe dehydration (almost exclusively children under 3 years old)	curative oral rehydration
objective verification and observation of febrile illnesses	thermometer

Note: Regardless of the level of D & T, as long as a single drug or dressing material is handed out, the VHW has to follow the standard treatment schedule for that drug and adjust it for different age groups.

Example:

<u>Condition</u>	<u>Treatment</u>
Headache	adult: aspirin, 3 tablets at once child: 6-12 years old, 1-1/2 tablets at once
Malaria	adult: nivaquine (100mg) 6 tablets at once and 3 tablets after 6 hours child: nivaquine (100mg) 3 tablets at once and 1/2 tablet after 6 hours infant: 1 tablet at once and 1/2 tablet after 6 hours

He should refer any patient with a condition beyond his capability or who does not show proper improvement after 24-48 hours (essentially same as stage one, only more effective).

The Male VHW's Preventive Activities

- Health-related community organization for stage one

Key: * needs materials, tools, practical demonstration in order to be effectively carried out: "Advice" alone will rarely be followed.
 - provision of safe drinking water*
 - waste disposal and general cleanliness of village*
 - disposal of human excreta (individual household latrines; communal latrines are to be discouraged since they will rarely be properly maintained)*
 - limited vector control; mosquito and fly-breeding sites, snail-clearing in schistosomiasis areas*
 - general body hygiene, especially hand-washing after defecation
 - initiating/organizing purchase and proper usage of mosquito netting*
 - prevention of accidents and elimination of danger areas for children

- Individual health education for stage one at the time of curative treatment
 - breastfeeding and weaning food for children
 - prevention of infantile dehydration
 - hygiene in food handling (covering food vessels, washing, etc.)
 - encouraging regular visits to an "under-fives" clinic where functioning
 - limited child-spacing advice, etc.
 - prevention of endemic goiter (one drop of iodine in glass of water per day).

Notes: In our opinion, development projects to improve agriculture, education, energy efficiency and family income should be the organizational responsibility of the community development agent more than of the VHW.

Child-spacing advice is a sensitive issue at the village level where child survival is poor, consumer goods incentives practically absent, and the motivation and general education very low or nonexistent.

The VHW should not be overloaded with preventive tasks in order to compensate for his severe curative limitations, because people simply will not "buy."

Malaria prevention at the Sahelian village level is controversial despite its absolute theoretical necessity. The main argument against it is that a lifetime of continuous chloroquine intake every week for every person is logistically virtually impossible. If it is not taken meticulously every week for a lifetime (during the rainy season alone is not sufficient in holoendemic areas) chloroquine can cause severe disruption of the natural resistance and an increase in fatal cerebral malaria incidence. The problem is even more aggravated in newborns and pregnant and lactating mothers, since babies might never acquire natural resistance.

The single most important intervention is probably the prevention of dehydration and death of very young children; education on continuing fluid intake and the practical demonstration of preparing a solution of one scoop of sugar and three pinches of salt in one liter of clean water. Problems such as exact quantities are usually minor provided that the solution is used as preventive measure, i.e., before children are severely dehydrated. But at that stage, mothers usually do not seek VHWT assistance unless specifically and repeatedly advised.

Prevention for stage two: Essentially the same as for stage one but with much more chance to be accepted by community members once they trust his curative abilities, plus limited food/meat inspection on slaughtering/market days: need for legislation for law enforcement and additional training.

The Male VHW's Administrative Activities

These are essentially the same for stage one and two, except that for the latter it is much more complex, i.e., more diagnostic involvement.

A daily recording and reporting notebook for consultations should be prepared during training.

Figure 3-1: Suggested Daily Recording Format

Date: 26 June 1980

<u>Diagnosis</u>	<u>Age</u>	<u>Sex</u>	<u>Type</u>	<u>Treatment Amount</u>	<u>Fees FCFA</u>	<u>First time</u>	<u>Follow-up</u>
fever	40	m	nivaquine	6	60	x	
very sick	3	f	referral to HC				x
tired	15	f	vitamin	3	1	x	
Total	8 patients					5	3

Date: 30 June 1980

wound	33	m	dressing bandage, cotton wool; iodine		150	x	
conjunctivitis	26	f	ointment applied			x	
Total:	21 patients				7	14	

Monthly reports should be prepared in the same notebook, but starting on the last page.

Figure 3-2: Suggested Monthly Recording Format

Month: June 80

<u>Number of patients</u>			<u>Type / Amount of medicine used</u>						<u>Total fees</u>
<u>First</u>	<u>Follow-up</u>	<u>Total</u>	<u>chl.</u>	<u>asp.</u>	<u>eye tubes</u>	<u>charcoal</u>	<u>bandage</u>	<u>cotton wool pack</u>	
47	82	129	300	400	1/2	278	1	1/2	7000(FCFA)

If daily recording with symbols is extremely difficult for a 100% illiterate, reliable monthly reports will be virtually impossible without basic literacy and numeracy. The charging of different fees is complicated but necessary, so basic numeracy is essential. For stage two then, good basic literacy/numeracy is a precondition.

- Handling patient fees: Flat fees are to be discouraged, if the costs for different medicines differ widely as is the case in Sahelian countries. If the patient fees are too low, for instance 5 FCFA, the

VHW will not be able to replenish the more expensive drugs, e.g., chloroquine and aspirin, even if the initial drug supply is donated. Using flat fees also discourages the VHW from giving full anti-malarial treatment (even the one-day treatment schedule), because he soon finds out that the 5 FCFA will only pay for one tablet of chloroquine or aspirin. Or, even worse, he will only hand out cheap "placebo" treatments such as charcoal or vitamins, or apply some tincture of iodine and nothing else. If, on the other hand, the flat fees are too high, e.g., 50 FCFA, people will complain when they receive only three charcoal tablets, whereas their neighbor got a full malaria treatment for the same price. They might also compare costs with the ones at the next pharmacy and discover items much cheaper there. The need to charge at least the same for each tablet and treatment as the actual replenishment costs necessitates use of fairly complicated recording system, as outlined above.

Figure 3-3: Example of Calculating Monthly Drug Revenue

The monthly total for each drug X unit costs yields the total monthly revenue.

Month: June 80

chloroquine	300 tablets @ 8 FCFA/tablet	2,400 FCFA
aspirin	400 tablets @ 8 FCFA/tablet	3,200 FCFA
eye ointment tubes	1/2 tube @ 300 FCFA/tube	150 FCFA
charcoal	278 tablets @ 3 FCFA/tablet	834 FCFA
bandage	1 roll @ 200 FCFA/roll	200 FCFA
cotton wool pack	1/2 pack @ 350 FCFA/pack	175 FCFA
	Approximate Total	7000 FCFA

Note: From the initial free drug donation he must always have enough excess money to allow a resupply in excess of what is actually used and earned.

The monthly computation is easily cross-checked by the supervisory team or village committee - provided that the daily records are properly kept. There is obviously no feasible way to insure VHWs' honesty. Records can easily be faked and drugs held for sale elsewhere.

- Assistance in immunization: an illiterate VHW can only try to convince villagers of the need for immunization and on the actual days of the campaign, assist in lining up people and other simple tasks. In our opinion, literate VHWs will find it easier to do such additional tasks as:
 - checking immunization cards and selecting eligibles
 - organizing on immunization days
 - assisting in recording and reporting

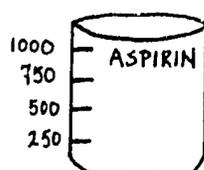
- supervising a TB and leprosy register

Logistics are similar for stages one and two, except more complicated for the latter since stage two uses more kinds of drugs.

- Stock control: its main elements are:

- recording of amount of drugs used, monthly reports and
- monthly check of remaining drugs, either by counting each tablet or by using standardized containers (the best are made of transparent glass or plastic) with quantitative marks on the outside.

Figure 3-4: Transparent Drug Container



The transparent, marked container is more useful for illiterates, but of course less accurate, especially when the size of tablets changes frequently due to different supply sources.

- recording of amount of drugs coming in (resupply): either keeping the receipts of the pharmacy or the written approval of his supervisors (at the D or HC), who usually have to give prior approval to the resupply purchase.
- important timing of necessary resupply; usually measuring drugs used in past month against drugs remaining. A major problem is that monthly drug consumption for different items can vary enormously with fluctuations that are not initially foreseeable. So far, the best method of calculation is to take the highest monthly turnover, compare it with the remaining stock and calculate/estimate the time remaining until "out of stock."

Example:

Highest monthly use of chloroquine tablets	350
Remaining stock	150
Estimated time with safety margin till "out of stock":	
less than two weeks.	

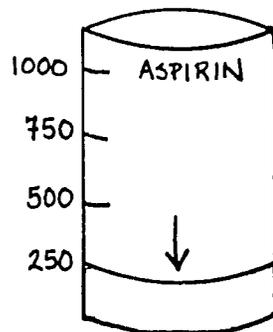
It is, of course, essential that prompt resupply be available at the next D or HC. Otherwise, lag time must be added. If, for example, the lag time (i.e., from the time of ordering until the time of arrival) is one month, this time span will be the determinant factor in calculations.

Unless a standard treatment schedule is established, taught and meticulously followed, little real impact on the individual can be expected and, most importantly, an adequate drug supply will be extremely difficult to maintain.

Another equally important precondition is a standardized treatment schedule for each drug according to different age groups, as already outlined. Any changes will make the stock control system extremely difficult. For example, if the standard treatment for malaria in adults is a one-day treatment of 900 mg chloroquine base (nine tablets of nivaquine) instead of a three-day treatment of 1500 mg (15 tablets), the monthly turnover will be completely different. The same applies to the change in drug dosage per tablet; 1500 mg of chloroquine base can either mean 15 tablets of nivaquine at 100 mg (as it is commonly used in Francophone Sahelian countries), or six tablets of resochin/aralen, chloroquine tablets at 250 mg as used in Anglophone countries.

Only after careful consideration of the above, on an individual basis for each VHW, can a simplified stock control system be introduced. This is especially true for the stage one VHW. For the stage two VHW, the stock control card (the most reliable and sophisticated method) is recommended, if the above is considered too unreliable. For each medicine, separate cards should be filled out weekly and monthly (handmade during training), sized 15 cm x 20 cm, on plain stiff paper, 13-16 per year.

Figure 3-5: "Resupply Now" Marker on Drug Container



Red line/arrow indicates the "resupply now" level.

The stock control card format can be used at fixed centers or central stores. However, it is more sophisticated and requires more training and monthly stock counting.

Figure 3-6: Stock Control Card (suggested size and format)

Year: 1980 Drug: Aspirin 300 mg											
<u>Date</u>	<u>Weekly turnover</u>			<u>Date</u>	<u>Monthly turnover</u>			<u>Date</u>	<u>In</u>	<u>Out</u>	<u>Stock</u>
	<u>In</u>	<u>Out</u>	<u>Stock</u>		<u>In</u>	<u>Out</u>	<u>Stock</u>				
1.3		60						Jan			
6.3		30						Feb	1000		
15.3		120						March		300	700
12.3		90						April			

(continues on reverse side for the rest of the year)

- Resupply of drugs: Whenever his calculations indicate the time of resupply, individually for different drugs, the VHW takes the record book with the monthly reports or the stock control cards and empty standardized containers which are included in his kit contents, rides or drives to the responsible fixed center or HC, gets the book signed by his supervisor and makes purchases using the patient fees plus the excess money from the initial drug donation. The money for transportation is either provided by the villagers or comes out of fees. This process works when:
 - the VHW has access to transportation
 - his records and computations are correct
 - resupply of drugs is readily available at the center (see Chapter 6 on drug supply systems).

The Female VHW's Curative Activities

For stage one,

- Normal deliveries only with special emphasis on proper cord-cutting, tying, cleaning, examination of the placenta
- Examination and handling of the newborn; breathing, color, movements, obvious congenital abnormalities, silver nitrate application for (gonorrhoeal) conjunctivitis
- Prenatal and postnatal examination of the mother:
 - prenatal (confined to labor period only), simple palpation, (engagement of the head, 4th Leopold manoeuvre) observation of regular contractions, possible malpresentation, rupture of membranes

- postnatal (limited to a few hours after delivery only) such as examination for post-partum bleeding, e.g., lacerations of vagina and palpation of contracting uterus
- Referral of complicated deliveries and abnormalities during late pregnancy:
 - severe bleeding at any time before or after pregnancy
 - breech and transverse lie
 - gross edema of ankle/feet
 - any prolonged labor, by 24 hours after onset of regular contractions
 - retained placenta
 - any other serious looking condition of the mother
- Referral of severely ill newborns only if a sophisticated pediatric ward in the vicinity; otherwise, no referral at all.

For stage two,

- Delivery; everything as above, only more efficient and skilled,
- Examination of the newborn as above, plus
 - full Apgar score
 - weighing
 - differentiation between caput succedaneum and cephalhematoma
 - differentiation between physiological and pathological neonatal jaundice
 - closer examination of congenital abnormalities (cleft lip/palate, talipes, Erbs paralysis, congenital dislocation of hips, abnormal fits, anus or ureteric orifice closed, descensus of scrotum, hydrocele, etc.)
 - prematurity or maturity signs
 - basic reflexes (sucking, grasp reflex)
- Prenatal and postnatal examination, possibly from 36th week onwards at weekly intervals, everything as above plus prenatal, simple case history, and early child movements
 - calculation of expected date of delivery

- palpation; all four Leopold manoeuvres and their meanings
- auscultation of fetal heart
- external measurements; umbilical circumference (100 cm at expected delivery date)
- symphysis fundus distance (34 cm at expected delivery)
- distance between the two ischial tuberosities (to fit normal size fist)
- better knowledge about malpresentation
- Postnatal, possibly up to four weeks after delivery:
 - diagnosis and treatment of soft uterus; ergometrine
 - diagnosis of endometritis and referral to male VHW, stage two
 - breast (mastitis, abscess) diagnosis and referral to VFW, stage two
- Referral of complicated deliveries and abnormalities during late pregnancy, as above plus referral for hospital delivery when:
 - malpresentation after 36 weeks of pregnancy
 - abnormal pelvic measurements
 - any severe illness of pregnant mother
 - severe anemia
 - prolapsus uteri, vesicovaginal fistula, and
- Emergency hospital referral when:
 - any prepartum hemorrhage (placenta previa)
 - premature labor (before 35th week of pregnancy)
 - any abnormal presentation during labor (breach, transverse lie, brow or face)
 - eclampsia, according to training
 - primary and secondary post-partum hemorrhage
 - ruptured membranes over 24 hours without the onset of contractions.
- Referral of severely ill newborns same as stage one.

The Female VHW's Preventive Activities

- Limited MCH education: individual education only on breastfeeding and weaning food for children, general cleanliness, advice on immunization.

Note: The female VHW's health education messages should be the same as those of the male VHW.

- For stage two, same activities plus child-spacing advice.

The Female VHW's Administrative Activities

- Recording and reporting: none, or a notebook, in which are recorded only the:
 - numbers of monthly deliveries, and
 - handling of traditional remuneration, as customary without recording.

Figure 3-7: Suggested Format for Recording Deliveries (Stage Two)

Handwritten delivery notebook, during training period.

<u>Delivery Date</u>	<u>Names of Parents</u>	<u>Place (quarter)</u>	<u>Sex of Newborn</u>	<u>Status of Newborn</u>	<u>Referrals Mother/Baby</u>
<u>Monthly Total of Deliveries</u>			<u>Monthly Total of Babies Still Alive (up to 7 days after delivery)</u>		

Figure 3-8: Suggested Format for Recording Births and Deaths

(Start birth register on first page)

<u>Date</u> (day, month, year)	<u>Names of Parents</u>	<u>Place (Quarter)</u>	<u>Sex of Newborn</u>
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(Start death register on last page)

<u>Date</u> (day, month, year)	<u>Name</u>	<u>Place (Quarter)</u>	<u>Age</u>	<u>Sex</u>
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Note: Birth and death registers are a public administration affair, so preliminary arrangements at all levels have to be done before they are introduced. Without proper recording and processing at the arrondissement level, it will be a useless exercise. Also, once

agreed upon, each household chief has to report to the village quarter chief, to the village headman and finally, to whomever does the birth/death register.

Traditional handling of remuneration: Same as above if she accepts the same traditional gifts as before the training. If she chooses community remuneration due to her substantially upgraded skills and more work, then a certain amount has to be fixed and agreed upon by her community before she is accepted for training. Otherwise, post abandonment or a standard of performance lowered to the old level will frequently be the result.

Chapter 4: SELECTION CRITERIA FOR THE VHWT

The personality of a VHW is crucial to the success or failure of a VHW program. Although his/her true personality, motivation and ability can only be known after a period of time, there are certain programmatic issues to be considered before the considerable investment in training and support is made.

Major considerations for VHWT selection:

- detailed job description and performance expectations especially related to accounting, recording, drug supply and stock control
- relevant training
- supply infrastructure
- quality and frequency of supervision
- quality of initial sensitization/community diagnosis and therefore, expectations of villagers
- fee for services policy; e.g., flat fees per contact treatment, free service, subsidies, health tax or insurance, individual drug fees
- remuneration or voluntary service
- career ladder opportunities
- political/administrative structures and influences
- referral systems, quality and access
- national/provincial government and medical establishment regulations and legislation
- integration with other community development activities
- disease patterns
- disposable income of villagers and their general level of education
- priority target groups
- cooperation or competition with local healers; e.g., itinerant injectionists

All of the above are closely interlinked and should be agreed upon at the national or provincial level before any large scale VHW program is launched, since a strong government commitment at all levels is a precondition to any successful VHW program.

The "classic" selection criteria, still widely used with mixed success, follows.

For the male VHW:

- chosen by the community (or a community committee)
- mature adult
- honest
- trusted and respected by the community
- stable in the community, little travelling
- has enough time and motivation to devote to his activities and training
- able to learn and interested in medical activities

Other commonly mentioned criteria are:

- pleasant, stable character
- married (with children)
- volunteer
- part time farmer/teacher/traditional healer
- minimal functional literacy
- middle-aged
- self-reliant
- village resident (long term)

For the female VHW:

- chosen by the community (or its committee)
- mature adult
- trusted and respected by the community
- already experienced in traditional midwifery
- stable in the community, little traveling

- has enough time and motivation to devote to her activities and initial training
- able to learn and interested in MCH activities, especially related to deliveries

Other commonly mentioned criteria are:

- elderly
- self-reliant
- village resident (long term)

Whatever criteria are chosen, s/he must be competent, not only from the villagers' viewpoint, but also by objective judgment.

Recent results have shown that basic functional literacy and numeracy greatly enhances the male VHW's efficiency, especially with regards to record-keeping, accounting, referrals, logistics of drugs, correct dosages of treatment and upgrading of his skills. The same applies also to the female VHW, although to a lesser extent where her tasks are less complex. If the demands for literacy standards are too high, however, candidates are harder to find and more likely to leave for better paying jobs. Adequate remuneration in whatever form is another vital issue which will be dealt with elsewhere.

Our recommendations for ideal selection criteria are therefore:

The ideal male VHW should be:

- chosen by the villagers (or its committee), but with the help of the initial sensitization team (equipe d'animation rurale - EAR). The team should make frequent visits (at least four) and give a detailed explanation about the VHW's activities, expectations and limitations
- an adult in whom the majority of villagers (not only the obviously important "village establishment") have confidence
- someone with basic literacy in whatever language and writing is used locally and at the HC level. He must be able to do simple record-keeping, accounting, writing and reading. The understanding of symbols is not enough
- resident within one-half hour's walking distance from the villagers (not necessarily in the village itself)
- willing to accept whatever remuneration is agreed upon, or even voluntary service and without further career opportunities
- able to generate community participation by having already shown some management and motivational skills in helping his fellow villagers take initiatives
- a "jack of all trades" who can handle other nonmedical problems

- likely to remain in the community for some years; best if married with children and his own farmland or business
- a person with enough time for this additional activity, including training
- willing and able to learn, interested in medical activities.

The "ideal" person is, of course, often hard to find. The basic requirement is that the selection should not be left to the villagers alone, but should occur in close cooperation with the sensitization team, so the villagers understand what type of person to look for and why.

The ideal female VHW should be:

- chosen by the community, but with the help of a midwife (who should be part of the EAR).
- a woman in whom the other women of fertile age, but especially the very influential older women (and the men in strong Muslim societies), have confidence for delivery assistance and some MCH activities
- basic literacy if she does civil registration (birth/death register), although less important than for the male VHW. Literacy will greatly increase the female VHW's ability to upgrade her skills
- clean and orderly
- willing to accept traditional remuneration even after her training
- resident living within one-half hour's walking distance from the villagers (not necessarily in the village itself)
- a mother, or at least a person who loves children
- likely to remain in the community for some years
- a person with enough time for the initial training period and additional activity
- a person with at least some exposure to deliveries (e.g., member of a traditional midwife family) or preferably a practicing midwife
- willing and able to learn, interested in midwifery and basic MCH, resolute and self-reliant.

If a woman with past midwifery experience cannot be found, an additional training of at least 20 deliveries must be guaranteed. Access to transportation for resupplies and for emergency referrals is an essential support that needs to be guaranteed by the villagers.

Chapter 5: DRUGS AND EQUIPMENT FOR THE VHWT

Village health huts, as a location for VHW activities are strongly discouraged because they:

- are unnecessary for the VHW-level of care
- are relatively expensive to build and maintain
- require a lot of time for initial sensitization (mainly with regards to community organization and payment)
- create false hopes (e.g., a "village hospital")
- encourage the VHWT to stay there and wait for patients rather than to go to them.

The same applies to services of the local TBA. She should attend deliveries in the homes and not try to create a "village maternity." A kit with appropriate drugs and equipment is sufficient. The contents of this kit are, however, of paramount importance since they will directly determine the activities and performance of the VHW or TBA.

Drugs and Equipment for the Male VHW

A whole range of variables have to be sorted out before any list of kit contents is made. The epidemiology plays a minor part, since apart from chloroquine, every drug is so basic that it will apply to any village in the Sahel. The main problem arises when deciding the quantity, which depends mainly upon the points marked with an asterisk:

- training, motivation, literacy level, intelligence, managerial capacity of VHW
- task list, activities
- prices of drugs and treatment fees*
- treatment schedules*
- presentation of drugs (mg/tablet)*
- level of supervisory care*
- frequency and continuity of resupply*
- village epidemiology, mainly with regards to malaria, eye infections and wounds
- population size*
- efficacy of referral system
- felt needs of the villagers

Table 5-1 suggests the initial qualitative and quantitative kit contents in a Sahelian village of 500 where malaria is endemic and an initial supply period of three months is envisaged. The list is divided according to the VHW training and performance and devised in two stages. Stage one occurs after an initial two weeks' training when the VHW has learned simple diagnosis and treatment and accounting/bookkeeping. Stage two comes after a certain field period (six months to one year) when the VHW has effectively accomplished stage one and is deemed capable of progressing to stage two. When initial training and especially supervisory training is intense, the two stages can be fused into one, provided the trainees are functionally literate.

Prices are inserted as of UNIPAC 80, excluding transportation costs; local, Mali, Pharmacie Populaire 80.

Table 5-1: Stage One - Kit for the Male VHW

Key: * Necessity depends upon local incidence of malaria and ascariasis

Item: Generic Name, Presentation, <u>Quantity per Unit</u>	Quantity for first <u>three months</u>	Total Price US\$	
		<u>UNICEF</u>	<u>Local</u>
1)* Chloroquine, 100mg tablets	1000 tablets	7.67	37.50
2) Aspirin, 300 (or 500)mg tablets	1000 tablets	1.84	37.50
3) Ophthalmic eye ointment, 1%, 5g tube or silver nitrate drops, 2%, 30ml	10g	0.20	1.50
	60ml	2.46	2.50
4) Tincture of iodine, 2%, 100ml or gentian violet, 25g powder or potassium permanganate or hydrogen peroxide, 30%, 500ml	100ml	3.48	0.84
	25g	1.13	?
	50 tablets		0.84
	500ml	1.07	?
5) "Placebo" tablets: charcoal activated tablets/1000 or ferrous sulphate 300mg tablets/1000 or vitamin tablets or local/herbal medicine	2000 tablets	-	14.00
	2000 tablets	2.54	133.75
	2000 tablets	2.80	0.50
		(vit.C)	(vit.B)
		-	?
6) Gauze (non-sterile) 1m width, or cotton cloth nonsterile, 1.15 width	6 meters	0.72	11.25
	6 meters	5.00	12.00
7) Cotton wool (absorbent), nonsterile	500g	1.07	3.30
8) Pair of scissors	1	2.75	5.00
9) Notebook	1	.21	2.00
10) Ballpoint pen (attached to kit)	2	.12	2.00
11) Plastic bottles with lidcap, 60ml	6	.54	2.00
12) Plastic sheeting, sturdy, 1 x 1m	1	.38	2.90
13) Plastic bags, sturdy, with rubber band	5	1.00	1.25
14) Plastic cups with lid, 250ml	2	1.60	1.00
15) Soap bar	1	.10	.25
16) Soap box	1	.24	1.25
17) Brush, stiff, nylon	1	.36	3.00
18) Towel, cloth	1	-	5.00
19) Wooden case: 1 x 0.3 x 0.5m with lock		-	35.00
Approximate Sub-Total		\$65.00	\$170.00

Table 5-2: Stage Two - Kit for the Male VHW

20) Chloramphenicol 250mg caps or tetracycline 250mg tablets	500 500	8.04 6.80	50.00 218.75
21)*Piperazine 500mg tablets or mebendazole 500mg tablets	1000 1000	4.10 -	- 393.75
22) Penicillin V, 250mg tablets and/or ampicillin, 500mg tablets	500 500	9.25 20.45	125.00 64.25
23) Antiseptic/antibiotic skin ointment, 3%, 20g tube	1	.25	1.48
24) Adhesive tape, 2" x 5 yds, and/or bandaids	1	.83	1.15
25) Thermometer, oral, centigrade	2	.64	7.26
26) Oral rehydration salts, powder, pack for 1 litre of water	20	1.40	?
Approximate Sub-Total		\$ 46.00	\$ 862.00
Approximate Total		\$110.00	\$1030.00

Although the above UNICEF prices include transportations costs, they still show the tremendous difference in costs between UNICEF and local prices, a difference of approximately 900 US\$ for stages one and two per initial kit donation. For example, aspirin is about 15 times more expensive and tetracycline more than 30 times as much. Countries without local cotton industries will have to pay exorbitant prices for dressing materials. Using alcohol as cleansing fluid is not recommended because it is too expensive, can contain tetanus spores and has no advantage over soap and water. In our opinion, cheaper drugs are a key to providing health care to the majority of the rural poor in LDCs.

Drugs and Equipment of the TBA

The midwifery kit contents have to be even more carefully selected since they have to serve a dually defined task. In addition to assistance in normal deliveries, there must be capability to deal with at least some of the pre-, peri- and postnatal complications of both mother and newborn. The dilemma lies, of course, in the latter, i.e., what type of complications can an older, essentially illiterate woman effectively handle at the village level with two weeks' training? That conflict is also reflected in the various UNICEF midwifery kits, none of which seems perfectly suitable.

Since the TBA will and should exclusively perform home deliveries (as opposed to "village maternity" deliveries), a substantial proportion of necessary items to perform a "clean" delivery must be contributed by the pregnant mother. Since these items are at least as important as the midwifery kit contents, they will be mentioned separately. It must be part of the TBA's duty to instruct the mother and/or the assisting relative to get the "delivery room" ready when the labor starts.

Absolutely essential preparations/items at home:

- thorough cleaning of the room and furniture, if any
- two buckets of fresh water, soap and towel
- plentiful clean cotton cloths, several clean bedsheets and at least 10 towel-size clean cloths
- drinking water and glass or cup
- chair or floor padding for the TBA and a separate clean place for the newborn.

The woman should deliver where she normally sleeps, in her traditional delivery position, in a clean bed if normally used, otherwise on a clean mat covered with a clean bedsheet on the cleaned floor. The supine position for delivery is fine if traditionally used. But the squatting position is equally or more acceptable according to recent findings.

An assistant to the TBA is almost essential (usually a close female relative). Otherwise, the room should be quiet and empty.

The midwifery kit contents are more complicated and vary in correspondence with the TBA's knowledge and skill. Instead of different stages, as for the male VHW, we follow a substantially modified UNICEF example.

Midwifery Kit Type One: This kit is appropriate for an illiterate woman who has received two-weeks' training, and who has already assisted in a minimum of 20 home deliveries. In this situation, TBA activities are restricted to manual delivery assistance, cord-tying and cord-cutting. No cord-cleaning, cord-clamping or eye-cleansing are involved. Provided that perinatal infections for both mother and baby can be avoided by clean hands, cloths, scissors and a clean environment, more than 90% of all the deliveries will be without complications. In fact, not even a kit is necessary. Absolutely essential are:

- A pair of straight surgical scissors (140 mm length) 1
(If scissors totally unavailable, 10 or more sterile razor blades may be used.)
- String, strong, non-tearable, preferably reinforced 4 meters
cotton bands for cord ties

and of course, the items mentioned above under "preparations/items at home."

A significant problem with the UNICEF kit contents is the lack of cord-tying materials. These are particularly necessary as they are often hard to get, especially outside the provincial capitals.

Table 5-3: Optional Items for a TBA

● Sheeting (1.5 X 2 meters), strong plastic	1
● Bar soap	1
● Box soap	1
● Hand brush, nylon bristles	1
● Forceps, haemostat straight Rochesterpeon (160mm) SS	1 ++
● Gauze, nonsterile, (1m width) or cotton cloth for bandage/gauze pads	3 meters +
● Scissors, for bandage cutting	1 +
● Bottle, dropping or with stopper, glass, one empty and one filled with 2% silver nitrate drops	2 +
● Cotton, absorbent, nonsterile	500g +
● Plastic bags (110 X 25mm) with rubber bands for cotton and gauze bandage/pads storage	5
● Bottle, narrow mouth with screwcap, 100ml, one empty and one filled with benzalconium chloride, diluted or, if not available with tincture of iodine, 2% for cord- cleaning	2 +
● Basin, kidney (825ml) SS	1
● Bowl, sponge, nesting closely	2
● Bottle, narrow mouth with screwcap, plastic 100ml, one empty and one filled with alcohol for flaming the cord-cutting scissors	2 +
● Box of matches	1 +
● Case to use as midwife kit with lid, aluminum	1

Key: + local sources/not included in the UNIPAC kit mentioned below
 ++ UNIPAC number 0727500; 2.41 US\$

Everything else UNIPAC catalogue, 80; code # 9900601, 18.12 US\$.

Total price for items listed above, approximately 60 US\$, (local prices; Mali, 80).

Midwifery Kit Type Two: for a (semi-)literate woman, who has already assisted in a minimum of 50 home deliveries, has received training for at least 10 delivery complications and received a cumulative practical training of at least three months for upgrading skills. In addition to all the 18 items of the midwifery kit type one and in addition to the preparations/items at home:

- scales, spring baby pocket, 7 kgs dual grad 1
- fetal stethoscope, wooden, pinard monaural 1 ++
- ergometrine maleate tablets 0.2mg 10
- ballpoint pen (attached to kit) 2 +
- notebook for birth/death register 1 +

Optional:

- bedpan, adult size, stainless steel 1 ++
(A very useful item, at least in most Francophone Sahelian hospital maternity wards. Women lie and deliver virtually on the bedpan, where all the urine, feces, blood and placenta are collected. Although somewhat impractical at the village level, it is certainly the cleanest method.)

Key: + local sources/not included in the UNIPAC kit mentioned below
++ UNIPAC number 0686500; 1.14 US\$, and number 0222000; 13.15 US\$

Everything else UNIPAC catalogue 80, code # 9902001; price 39.32 US\$.

All items, kit types one and two, important though optional (except bedpan).

Total price for kit types one and two approximately 90 US\$.

Cost summary of VHW kits and contents (including 50% for transportation costs):

For the male VHW (secouriste):

Stage One: between 90\$ (UNICEF drugs) and 170\$ (local drug purchase, Mali)

Stage Two: between 150\$ (UNICEF) and 105\$ (local)

For the female VHW (TBA):

Midwifery kit type one: approximately 70 US\$ (UNICEF items and local purchase in Mali)

Midwifery kit type two: approximately 110 US\$ (UNICEF items and local purchase in Mali)

Thus, the kit and contents for a VHWT can range between approximately 160\$ and 1160\$ depending upon the items and sources of purchase. Any cost differences must be adjusted for in the line item budget which only accounts for 100\$ to be spent on the initial kits and drug donation for a VHWT (see Chapter 8).

Chapter 6: THE DRUG SUPPLY SYSTEM FOR THE VHWT

Research on LDCs' drug supply systems is amazingly young and incomplete despite its obvious importance. This may be due in part to the immense complexity of the issue and the powerful interest groups involved. Also, solutions often lie beyond the LDCs' spheres of influence and are interwoven with international trade. Since an exhaustive analysis of that issue is far beyond the scope of our book, we will concentrate on some of the most important aspects relevant to the Sahelian VHWT program.

We have elsewhere described the drug supply system at the village level up to the point of resupply either at the next fixed public health center (HC or D) or on the private market. This chapter will describe the drug supply system from the VHWT resupply center up to the host country boundaries, thus excluding the international drug source.

Existing Supply Systems

Principally, we have two drug supply systems in the Sahel:

- The national, (state-owned) which supplies the public health sector (H, HC, D, state-owned pharmacies), called Pharmacie (Nationale) d'Approvisionnement (PNA or Pharmappro) for Chad, Mali, Senegal, Mauritania, Gambia and Upper Volta, or Office National des Produits Pharmaceutiques et Chimiques (ONPPC) for Niger.
- The (semi-)private one, which supplies the private sector (owned by individuals or state enterprises) called Pharmacie Populaire (PP) in all Sahelian countries.

Supplies include pharmaceuticals (e.g., drugs, syrups, suppositories, injectables, infusions, dressing materials, syringes, needles) laboratory reagents (but not equipment), vaccines and sera (including snakebite sera), x-ray films and infant feeding products (e.g., powdered milk, canned baby food, fortified cereals). The last, in terms of money volume, often far exceeds the rest.

The problems and the differences arise from the ways these two channels are linked to each other. In some countries (e.g., Chad and Niger) the PNA/Pharmappro acts as a monopoly, i.e., every drug whether imported or locally produced is channeled through its offices. Thus, the private sector, individually-owned drugstores cannot order directly, without prior approval from the PNA or ONPPC, from any outside source.

Also, the government through the PNA puts a fixed price on at least some of the essential drugs, especially the ones designed for the VHWT, which are often subsidized by the government. Apart from that, the private sector has quite a free hand in pricing (although unified throughout the national territory), ordering from any outside sources, storage, distribution, (usually through their own network) and personnel.

Other countries, (e.g., Mali and Senegal) have a parallel system, where the private sector orders directly from any outside source, finances, distributes and sells through their own networks. Private pharmacists are not responsible to the MOH but to other ministries (e.g., Ministère de la Tutelle in Mali). The only control the government exerts is through customs, (usually much higher than for the PNA), heavy tax revenues (e.g., about 90% of the PP profits have to be returned to the Malian Government), and by annually reviewed price-fixing (usually through an index system).

Flow chart of the PNA monopoly system on the example of the ONPPC in Niger:

- national channel for all incoming and outgoing orders
- does not order drugs without advance payment by its clients (the MOH included)
- can refuse orders (generally for lack of payment)
- handles all MOH orders, but independent from MOH
- fixes annual prices (national price list)
- controls patent/licensing of pharmacies
- is a state enterprise with its own budget, revenues, taxation and customs duties, but is allowed some profits
- physically stores and administers all drugs (except for private pharmacies and some foreign donors)
- stores and distributes drugs for all private pharmacies throughout the country
- can issue a national standard drug list in generic names and standard prescription manuals (not done yet in the Sahel)
- can produce some locally-manufactured drugs (mostly from imported raw materials)
- can repackage bulk imports
- exerts quality control on all drugs imported, donated, or locally produced.

Figure 6-1: Flow of Ordering Drugs (per six months and exceptionally when out of stock)

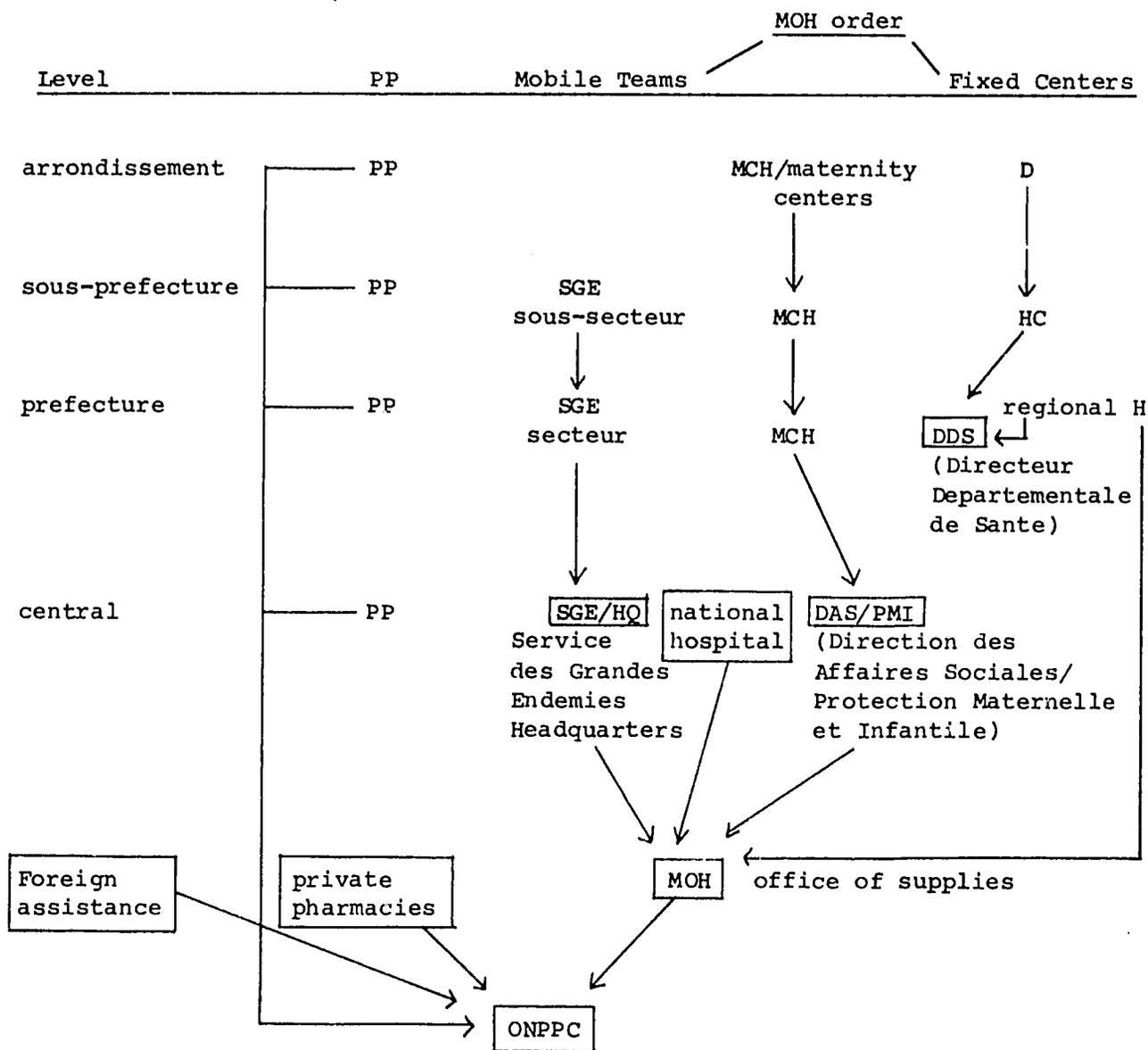
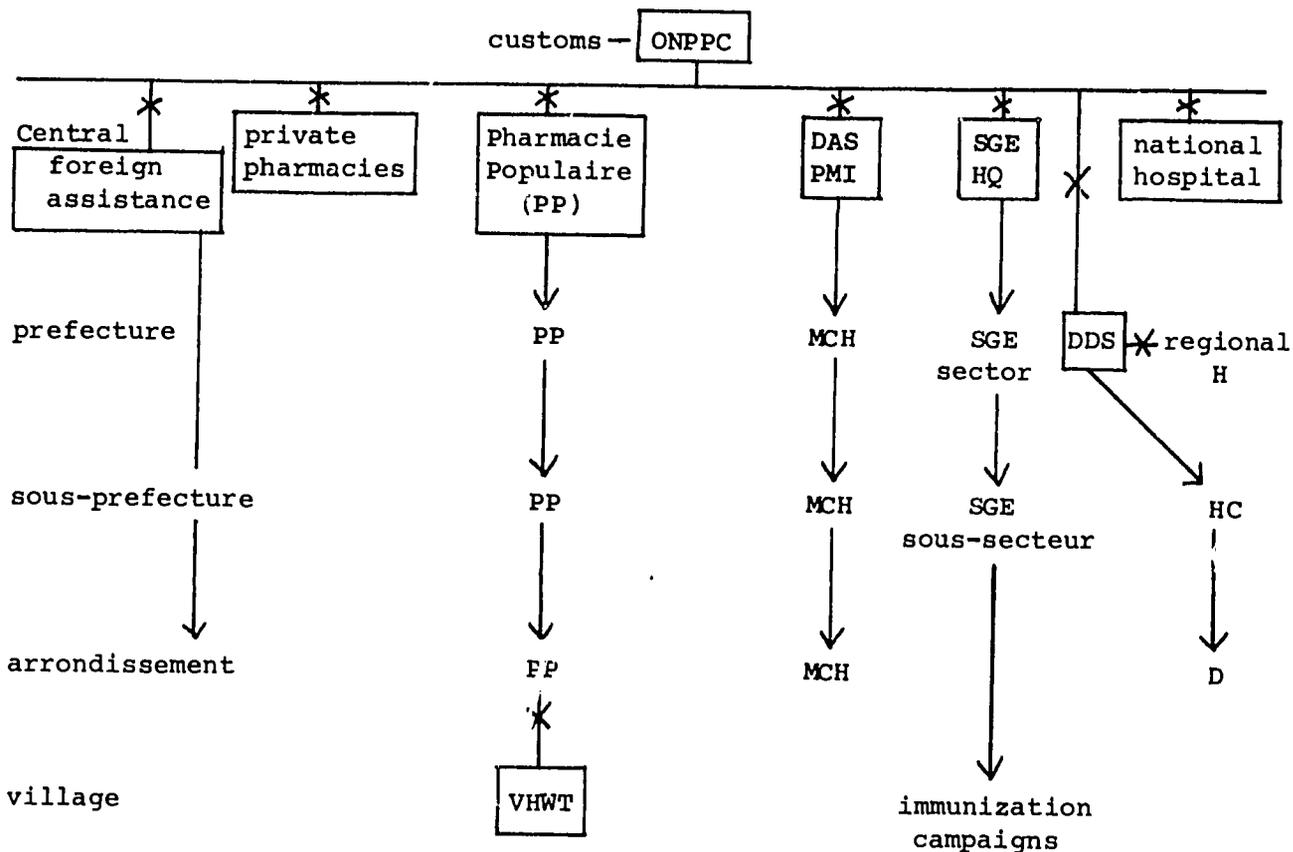


Figure 6-2: Distribution of Drugs

Key: ↓ - the upper level provides resupply transportation, e.g., ONPPC to the PP

* - the lower level provides its own resupply transportation, e.g., the VHWT from the PP, the DDS from the ONPPC.



Notes: The VHWT resupplies from the nearest PP, not the MOH fixed centers (HC, D). With a rapid, frequent ordering system (often by telex) directly to the ONPPC and an independent distribution system (ONPPC-owned trucks supply PPs on a regular basis, and in shortages, the PP comes directly to the ONPPC), the PP network enables the VHWT to resupply themselves as freely as any other PP client with cash payment. The only control the MOH exerts on the VHWT drug supply is through its medecin chef at the HC or, exceptionally, through the nurse at the D (when distances from the village to the HC are too great). Prior to the purchase at the PP, the VHW seeks approval for the written drug-order list together with the monthly recording book. That allows for supervision, recording/filing and qualitative/quantitative control of the VHWT without the impediments of time and bureaucracy. Thus, the VHWT spends maximally half a day for resupply instead of the weeks entailed when everything is handled by the MOH in the capital city.

The drugs handled by the VHWT have a fixed (and sometimes subsidized) price reviewed annually by the ONPPC and valid throughout the national territory. Thus, the system is centralized with regards to planning, standard lists, ordering and control, but at the same time decentralized in delivery and distribution. In fact, it resembles the United Kingdom's Monopolies Commission which served as a model for many countries with state-controlled social services.

The parallel system differs mainly in that the Pharmacies Populaires, private pharmacies and foreign assistance are independent from the PNA monopoly.

Advantages and Disadvantages of the Two Systems:

The PNA monopoly has, at least in theory, the enormous advantage of standardization and unification, which could effectively reduce duplication and waste and therefore costs. The introduction of generic names of a limited standard drug list of approximately 250 essential items would enable it to do better drug bidding on the world market and therefore bring more drugs for the same costs into the country. Other substantial advantages of this system include unified price policies, effective drug bidding, reduction of the influence of "detail men" on drug prescription habits and decisions over the patent/licensing systems. All of these factors enable the PNA monopoly to reach more people with more affordable drugs through substantially cheaper sources, government subsidies or in some cases fully subsidized free drugs. In fact, most of our recommendations for improved drug-supply and utilization systems can be achieved more easily with a monopoly system.

The biggest disadvantage is that practically everything and everybody depends upon the proper functioning and efficiency of the PNA monopoly since it "controls the tap" of the flow in both directions. If it functions poorly, there will simply not be enough drugs of the right kind in the country, even in the private sector.

Examples and reasons for PNA ineffectiveness:

- heavy indebtedness and lack of cash for advance payment, a spiral which very often starts because the MOH, an important client, is unable to pay for the drugs it orders (especially in times of crisis), but using its governmental power under the weight of its responsibility for its citizens, forces the PNA to supply the drugs, promising to pay later. This process of accumulating debts continues until the external suppliers stop their shipments (refusal of future loans). The country then has to approach friendly governments for grants or, as in most cases, loans, often to buy even more expensive drugs.

- lack of adequate storage and distribution systems; a centralized system, which stores practically all drugs prior to peripheral distribution needs obviously a vast storage area, at least five large trucks and several light "pick-ups," metal containers, an adequate fuel supply and proper maintenance of the vehicles. The necessity of peripheral warehouses is a priority only when there are no or

inadequate storage facilities at the H, HC, D level, or most importantly, when there is no six-month or annual quantitative standard supply list, preferably for each center separately. Otherwise, the peripheral warehouses will need substantial budgets (investment and recurrent) and might become another bureaucratic bottleneck to further peripheral drug deliveries.

- lack of competent management: competitive bidding, ordering at the right time, stock controls, distribution, financial procurements, quality control, customs clearances, national and international relationships and contracts, printing and distribution of drug lists, constantly changing policies, prices, demands, unforeseen shortages and delays in payments are formidable tasks that require expert managerial personnel at the top level of the PNA.
- lack of a national drug policy: even the best organized PNA will be unable to organize timely and adequate supplies unless the periphery (drug prescribers, pharmacists and consumers) has an efficient drug utilization system. Some of the required elements are generic-name, standard drug lists; standard prescription systems, unified stock-control cards (input, output, balance principle); flexible and at the same time standardized quantitative drug orders; and decentralized supply and distribution networks. If controls are not effective in keeping the stock secure, and if fees for services are not introduced in the public health sector, even several-fold increases in drug budgets and drug volumes will not substantially change present situations. In this case, the monopolization might even aggravate the "shortage syndrome," especially in rural areas.

The parallel system has the advantage of ensuring adequate supplies at least to the cash-earning sector of the populations, who are served by the PP and privately owned pharmacies. Being entirely commercially oriented and relatively free of political and administrative influences and restrictions, they seek to expand their services down to the arrondissement levels and even further. Governments benefit from PP too through heavy taxation. In some countries the PP might be the single most profitable state enterprise, heavily subsidizing other state owned firms. Security is maintained through a more rigorous stock control system. Prompt delivery, even in cases of unforeseen shortages, can be achieved by their own communications and transport system. In times of severe drug shortages in the public health sector, the MOH/PNA has the PP as a reserve source provided that it has funds to pay for the drugs.

The major disadvantage, however, is the risk that the public health sector and the PNA will become a "stepchild," if the PNA suffers from such problems as severe financial constraints; limited investment funds for expansion of storage, distribution services and peripheral vending posts; poor management; inadequate stock control; uncontrolled dissemination of free drugs at the periphery due to overprescriptions; lack of control systems; possible theft and sale through the black market channels or "private practice;" and preference given to health centers closer to the central warehouse (first come, first served principle). For one of the necessary reforms mentioned later on to be effectively carried out, they must apply equally to both PNA and the PP. Otherwise, a familiar picture emerges in which the public sector

drug supply grows continually worse and the private sector thrives. Public health facilities are then increasingly disrespected and underutilized even if services are equal or superior in quality to the private sector. Public health personnel become demoralized and develop a parallel system of their own private practice.

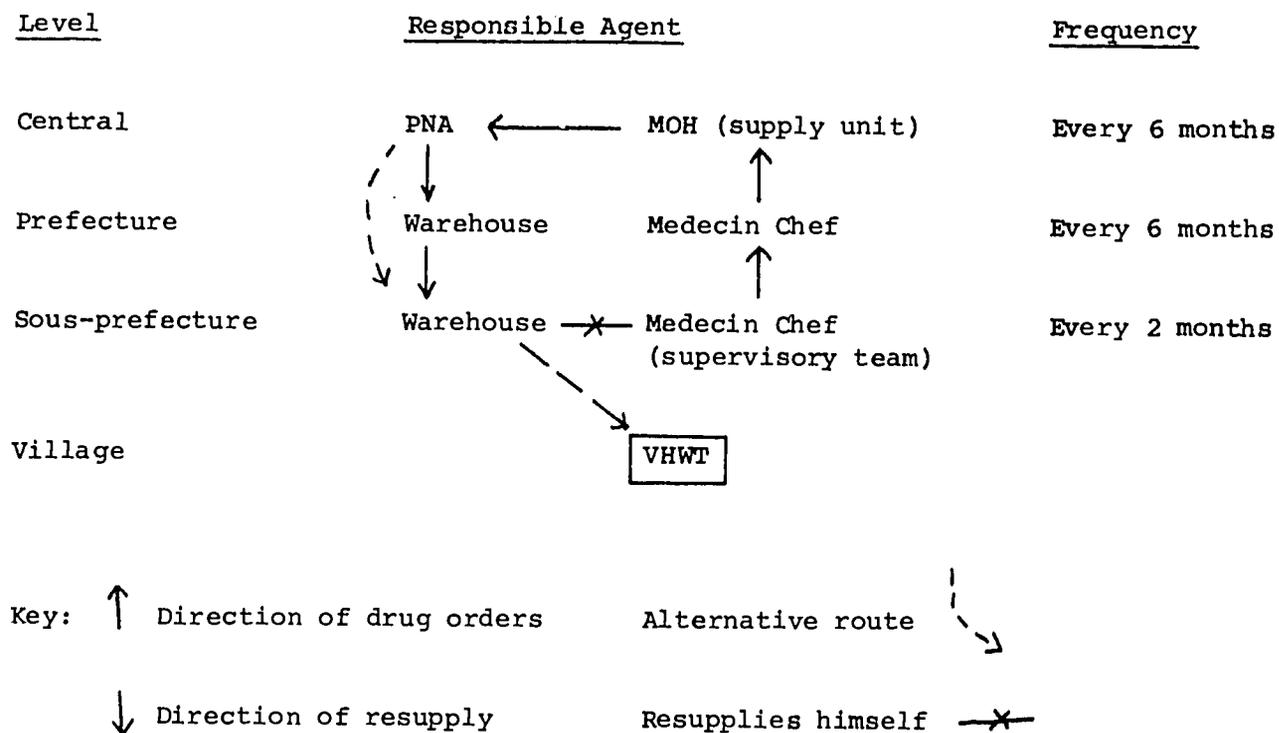
The private sector then advances out of control. All kinds of drugs, useful, useless and even dangerous ones are sold, often without prescription. This "over the counter" practice without adequate training of the pharmacists and with a largely uninformed, uneducated, illiterate clientele is potentially responsible for causing drug resistance (chloroquine and antibiotics) and the spreading of diseases through contaminated needles (tetanus, hepatitis). Powerful detail men (drug company representatives) influence the prescription habits by advocating certain brand names. Brand name advertising shapes patient demands - and builds illusions of modern panaceas. Overprescribing becomes the very symbol of high quality care and access to modern cure. In fact, the demand for injections has penetrated into the remotest villages, often served by itinerant injectionists using non-sterile needles and syringes and any kind of ampoules they can find. Small, distinctive packages and bottles designed for easy recognition by illiterates are commonly found in the living rooms of the most distant huts. This in turn creates, even among highly trained professionals, suspicion and disregard of the tablets from the bulk containers offered at public health services as being of an "inferior quality, free of charge, for the poor only." VHW programs are particularly vulnerable to the adverse effects of uncontrolled private drug market and often lose initial credibility by offering a few unwrapped tablets only instead of the desired injection or fancy package.

The result of all that is high drug costs for the consumers, depletion of precious foreign exchange (all Sahelian countries except Senegal and Niger are 100% importers of drugs) and an ever-increasing unequal distribution of health services between the ones who can afford it and the others who cannot.

The strengthening or creation of a drug supply infrastructure prior to implementing large-scale VHWT programs is imperative, since the VHWT generates demands for increased drug supplies - directly through offering his/her own drugs and indirectly by opening access to a chain of health services from the bottom up. The VHWT drug supply must be handled within the context of the national drug supply policy, and not outside of it. Hopes that isolated examples of a successful VHWT drug supply system, in most cases due to cheaper external drug sources and the provisions of their own transportation systems, will convince the government/MOH to change its drug policy, are usually not fulfilled. The drug flow dries up upon termination of the project with a government unable or unwilling to fulfill newly created demands.

The VHWT drug supply system: There are two principal possibilities. These are regulated routine resupply (once every three months) by the supervisory teams (i.e., passive supply), and unregulated or active supply.

Figure 6-3: Passive Drug Supply

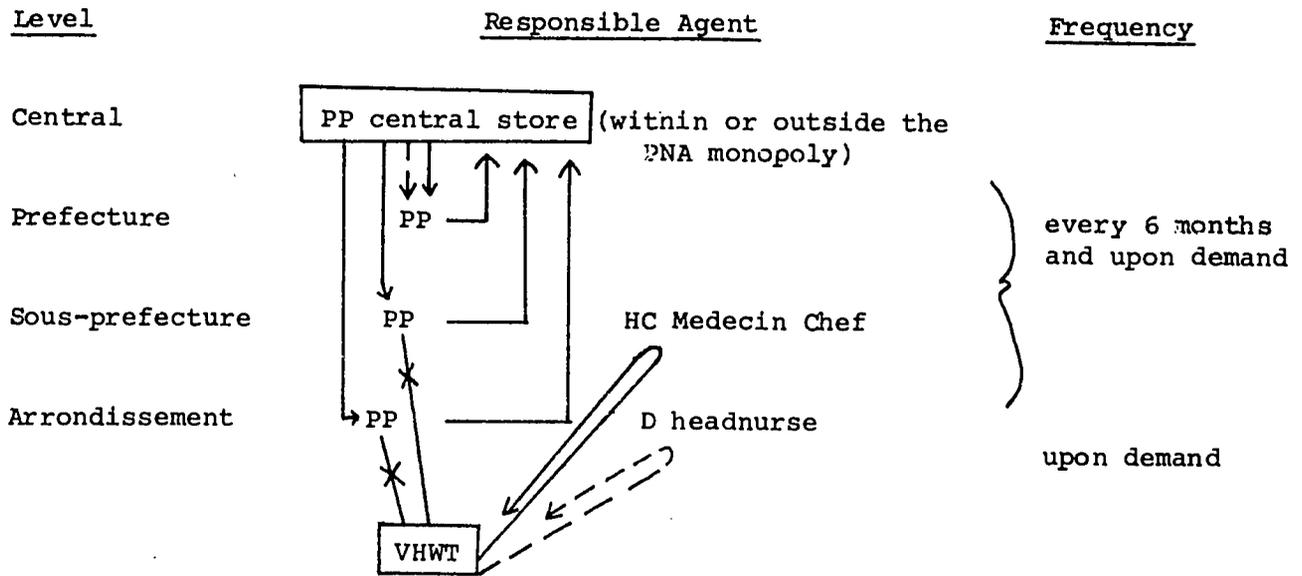


Although the passive supply system is more convenient during the life of a project and certainly easier and more quickly established, its disadvantages are obvious. If the supervisory team does not arrive at the right moment with an adequate amount of the right drugs, the system fails. It also pushes the problems of resupply only a bit further up and away from the VHWT, without solving them. If the supervisory team has no regular supplies at the provincial warehouse, the system fails also. The most important argument against it, however, is its full dependency on the public health system and its bottlenecks, especially at the central level. If the rest of the public health system has inadequate drugs, the VHWT will also suffer. If other public health drugs are free, while VHWT drugs are not, or if one side runs out of drugs and the other one does not, it will be difficult to control trafficking.

The costs of the warehouses also will have to be carried by the MOH. The advantages are that fewer pharmacies/warehouses will be required; if passive supply by the supervisory team at the sous-prefecture level can be guaranteed, only one warehouse/pharmacy per functional unit is required. Thus, for a country like Mali, "only" 126 warehouses/pharmacies at an estimated 1,300,000 US\$ construction cost and 500,000\$ in annual recurrent costs are projected as minimum figures (see Chapter 9).

The alternative is the unregulated resupply, whenever stock depletion is near or has already occurred, secured by the VHWT itself. This is active supply.

Figure 6-4: Active Drug Supply



Key: Direction of drug orders The VHWT needs official clearance of drug order

Direction of resupply

Alternatives

Resupplies himself

PP: can be a pharmacie populaire or a cooperative with a drugstore

The advantages of active supply are obvious. The VHWT has direct access to resupply at any time and with minimal involvement of the MOH bureaucracy. After obtaining a signature from the HC medecin chef or the D headnurse for approval of the VHWT order list, the VHW can resupply at the nearest drugstore with cash payment like any other client.

Note: The important thing for the VHWT is that the nearest drugstore is well supplied with VHWT drugs. It does not matter very much whether it is a PP branch, a cooperative with drug storage, any other (semi-) private enterprise, or an MOH warehouse. However, with regards to price policies, the PP within the PNA monopoly is preferable since the end consumer price is likely to be lower. Government subsidies, exceptional outside sources such as UNICEF and local manufacturing, low profit margin, lower taxation and customs exemption can be some reasons for this.

The major difference between a PH warehouse (Figure 6-2) and a PP/cooperative drugstore (Figure 6-3) operation is that in many instances the PP is better able to assure regular resupply by taking its own initiatives and resources. The only disadvantage might be that more buildings are required to

facilitate physical access to the VHWT. Whether each arrondissement should have its own pharmacy depends very much on the population density and distance. Assuming that it does, a country like Mali with 281 arrondissements each serving 20-40 villages with a total average population of 22,500 people would thus need 281 pharmacies. Taking per unit prices this would amount to 14,000,000 US\$ in construction costs and 1,124,000 US\$ in annual recurrent costs (all prices in uninflated dollars). These costs of course could not be carried by the present MOH budget (Chapter 9), but only by a gradually expanding (semi-) private enterprise such as the PP or cooperatives. Once established, however, it would provide a permanent drug supply infrastructure which works elsewhere too, contrary to the "experimental" nature of warehouse depots.

The active supply system thus seems to have far more advantages than the passive one. However, the choice between the two seems to depend mainly on what supply system is already in place and how well it works. Duplication of distribution networks such as public health warehouses and PP or cooperatives at the sous-prefecture level for the VHWT supply should be avoided.

Drug Supply Policy at the National Level

The issue is far more complicated than the physical setup of a distribution network, since it often requires changes in legislation, detailed professional knowledge, and unanimous acceptance and adherence of all parties involved. Bearing in mind the complexity of a national drug policy, we will merely point out some of the most important issues relevant to a VHWT program.

Medical (best done by a central supply unit either in the MOH or the PNA monopoly or both):

- Essential generic drug list
- Standard prescription manual
- Standard quantitative drug lists for all public health services
- Revision of medical and nursing schools' training curriculum
- Use of oral rehydration, especially in pediatric wards

Commercial/pharmaceutical (at the PNA monopoly and/or PP with feedback mechanisms to the MOH supply unit):

- Effective drug bidding on the international market
- Bulk procurement of essential drugs from cheap, high quality firms (UNICEF)
- Quality and safety control for outdated or discredited drugs
- Central warehouse administration
- Logistics of in-country distribution

- Annual drug budgeting
- Annual price list
- Accounting and marketing

Physical (at the PNA monopoly and/or PP):

- Proper storage and shelving
- Local packaging and repackaging plant
- Local manufacturing of some technically feasible and commercially profitable items; e.g., dressing materials, tablets, and herbal medicines

Legislative (responsible government authorities):

- Authorization act for the VHWT to diagnose, treat, store and distribute drugs
- Classification and legislation of traditional medicine
- Authorization for local healers using traditional medicine, but legal prohibition of unauthorized persons using modern medicine (e.g., merchants, and itinerant injectionists)
- Review of the patent/licensing system in favor of cheaper drug sources
- Legalization of the essential generic drug list and the use of generic names in prescriptions, orders and marketing
- Price setting; profit margin, price index, taxation, customs duty
- Legislation of either the PNA monopoly or the parallel system
- Authorization acts for expansion of the supply network, either through warehouses or the PP/cooperatives
- Legislative control of the advertising practices of pharmaceutical firms and detail men (truth in advertising)
- Continual monitoring to control drug prices and any black marketing with appropriate penalties
- Fees-for-services policy, especially for large urban areas, after having established its administration system
- Legislation of controlled drugs
- Regulations governing the payment for drugs purchased to include the public health sector.

Most of the above issues are important. All of them require in-depth knowledge of the existing system and substantial skilled manpower and finances to resolve the problems. They can be solved, as seen in Sri Lanka, Ethiopia and British Guyana.

Chapter 7: TIME REQUIREMENTS OF GOVERNMENT PERSONNEL

This chapter discusses time requirements of government personnel for initial sensitization, training, supervision and retraining at the sous-refecture/health center level. Numerous factors influence these time requirements:

- type of VHWT activities
- level of health care offered by VHWT
- choice of activities for each category of official health personnel
- length and frequency of sensitization, training, supervision, retraining
- travel time and distances
- number of working days/year
- turnover of personnel

Based upon the model as outlined above - 1 HC, 6Ds, 36 VHWTs within a radius of 50km - and assuming 250 working days/year, we suggest the following timetable and manpower utilization for a VHWT program within the fundamental unit (see Table 7-1).

Table 7-1 assumes all health personnel (including the VHWTs), once trained, remain for many years at their posts. Otherwise each new person has to be trained, if possible by the one who is leaving; which means that at least two weeks time for overlap should be allowed.

Our hypothetical model of a functional VHWT program will have the following requirement of official personnel in order to carry out all the above tasks in the first year:

- 1 team for sensitization of villagers, employed 72 percent of their time, consisting of one A, one I or SF (or both on an alternating basis), and a Dr.

They could sensitize up to 50 villages per year, but 40 villages seems to be more realistic, since time must be allowed for planning, report writing and follow-up visits to more "difficult" villages.

Table 7-1: Manpower Utilization for a VHWT Program

Tasks	Frequency/duration	Number of Persons/ Category	Person Days/ Year	% of Total Time Manpower Utilization
Key: MC - medecin chef I - infirmier/e Dr - driver A - agent animateur SF - sage femme				
<u>Sensitization of Villagers:</u>	5 trips/1 day to each village for 36 villages	3 { -A -I or SF -D	540	72% for each
<u>Training:</u>				
a) VHWT	14 days per course for 4 VHWT at a time (8 persons) for 36 VHWT and 2 days round trip	2 { - MC or I - SF 1 - Dr	252 18	50% for each 7% for Dr
(If the HC and D staff are not already trained to give VHWT training and supervision, additional time will be required.)				
b) HC staff training	21 day course to HC training staff once	Trainers: 2 { - MC - SF 1 - Dr	42 2	17% for each 1% for each
		Trainees: 2 { - MC or I - SF	42	17% for each
c) D staff training	14 day course to D staff once, combined with the HC training course for 6 Ds	Trainees: 1 - I	84	6% for each
<u>Supervision</u>				
a) at the HC level	1 trip/1 day/month to each D for 6 Ds 2 trips/1 day/year to each VHWT for 36 VHWT	2 { - I or SF - Dr 3 { - I - SF - Dr	72 216	29% for each 29% for each
b) at the D level	1 trip/1 day/month to each VHWT for 6 VHWT/D	1 - I	72	29%
<u>Retraining of VHWT every 3 years</u>	Training 14 days per course for 4 VHWT at a time (8 persons) for 36 and 2 days' round trip	2 { - MC or I - SF 1 - Dr	252	50% for each 7% for Dr

Perhaps, an existing service d'animation rurale, can carry out these tasks in conjunction with others (e.g., alphabetization and agriculture). Where it does not exist, it has to be created and not left to HC personnel alone (although their part-time participation is highly desirable).

- 1 team for training and supervision at the HC level, more than full-time employed (108%), consisting of one I, one SF (or matronne), and a Dr who is employed 65% of his time.

If that training/supervision team is not initially trained it will take another 17% of their annual/first year time. That means that within the first year, two VHWT training sessions will have to be delayed until the next year.

- 1 I at the D level can only handle a maximum of 6 VHWTs and that takes one-third of his time, i.e., the D is closed 1-1/2 days a week. For anything more than 6 VHWTs/D a second I has to be employed. He can handle about 20 VHWTs on a full-time basis.
- The "trainer of trainers", the team that initially instructs the permanent training/supervisory team should be at the regional hospital/prefecture level and should cover several sous-prefectures. Since about 19% of their time per sous-prefecture is required, they could theoretically cover an entire prefecture usually consisting of six-seven sous-prefectures (or their analogues). The staffing pattern would be one MC, one SF, and one Dr, all employed full time. It is questionable that personnel from this level should also have a supervisory function for the entire department since this would require a second team.

Table 7-2: Essential Personnel Infrastructure for VHWT Program

- 1) 1 team for sensitization (equipe d'animation rurale-EAR) at the sous-prefecture level
- 2) 1 team for training and supervision at the sous-prefecture level
- 3) 1 team for initial training of the trainers at the prefecture level
- 4) 1 I for supervision at the D level

Unresolved problem areas:

- The EAR does not exist in all regions. Where it does, lack of funds often renders it non-operational. Also, these teams do not always include health professionals. Thus, on one or two trips, health personnel must join the team to explain the health part of the program properly. Ideally, the VHWT should be part of an integrated village development program that includes alphabetization and agriculture.

- The training and supervisory team usually does not exist as an entity. These tasks are often performed by the HC staff. In that case, one HC staffed by three health professionals and one Dr can only handle 18 VHWTs in one year, and that takes 50% of their time if preparation and evaluation of courses are included.
- If neither an EAR (actively involved in VHWT programs) nor a team for training and supervision exists, the HC infirmier and the SF will have to carry out all tasks and can only manage maximally 10 VHWTs in one year, having only 50% of their time for their original assignment at the HC. This exhibits the extreme limitation of VHWTs due to the time factor of health professionals. It means that the ratio of government officials (including the Dr) versus VHWTs is as low as 1:4 (one government official for every four VHWTs).
- Obviously not all VHWTs will be selected, trained and supervised the first year. But since our number of 36 VHWTs is rather small - although realistic in terms of feasibility - enough flexibility is allowed for staging. Any large-scale attempt, e.g., "100 villages per year", however, will run into great difficulties of personnel timing.
- How long the monthly or three-month supervision continue and how often a VHWT should be trained depends upon the level-of-care objective. If the sole activity of the VHWT consists of distributing a few tablets and attending routine deliveries, a three-monthly supervision by the dispensary staff might be sufficient. If continuous upgrading of skills is desired, there is a three-monthly minimum requirement. Most important is the supervision during the first three months and especially the first month. Most VHW attrition can be attributed to a lack of initial supervision rather than standardized monthly supervision. We suggest that during the first year supervision occur as follows:

1st month: twice every fortnight during the first month
 2nd - 6th month: monthly
 7th - 12th month: every 2 months

Total during first year: 10 times

After first year: every 3 months

Retraining: every 4th year (after 3 years).

Due to the many varied problems facing the VHW, especially with regards to logistics and politics (appreciation/trust by his fellow villagers) this can at best serve as a suggestion. Proper supervision is one of the unsolved issues of a VHWT program. It requires a lot of time, money, and even personal sacrifice on behalf of the official health personnel, often with little financial and professional reward. Supervision should ideally be a constant upgrading of skills and encouragement for the VHWT and not a mere statistical

- What happens after the VHW program has reached the absorptive capacity of the supervisory personnel's time? As pointed out above, the time requirement for a VHWT program is high, and the numbers of VHWTs which can be handled properly by existing health personnel is extremely limited (in some cases only 10 VHWTs). Any expansion beyond that point will require additional government personnel and later on additional HCs and Ds, i.e., considerable additional costs for:
 - . a second I for each D
 - . a separate training/supervisory team for each HC later or followed by:
 - . a second EAR
 - . additional Ds and HCs with all the supportive services required for them (transport and maintenance costs).

The only alternatives are a lower level of care, or limiting the VHWTs' population coverage.

Chapter 8: GOVERNMENT/MOH LINE ITEM BUDGETS FOR VHWT PROGRAMS

This chapter examines line item budgets at the prefecture and sous-prefecture level (excluding villagers' contributions, HC and D capital and recurrent costs and drug supply networks). Line item budgets, especially relating to recurrent costs, are one of the most difficult but also most important issues. Major problems arise with the common bureaucratic/ administrative rigidity of disallowing the accumulation of unspent money in an amortization fund (e.g., depreciation fund of a vehicle for the purchase of a new one after three years) or by allocating a lump sum which ignores the activities to be carried out (e.g., gasoline for the HC car, regardless of the mileage used for supervision, medical care and evacuation).

Numerous variables influence the construction of a line item budget.

- level of care; VHWT performance standard, standard of training and supervision
- choice of activities for each category of personnel
- personnel time involvement
 - duration of training
 - length and frequency of retraining
 - sensitization, supervision
- travel distances
- salaries and per diem for different categories of health personnel
- fuel costs
- choice of vehicles (fuel consumption, durability) and quality of vehicle maintenance/repair
- choice of initial donation of drugs and equipment
- source/price/target arrival date of commodities (vehicles, equipment, drugs, training material, office supplies)
- contributions of villagers to VHWT program expenses

For illustrative purposes we establish line items for one fairly representative country in the Sahel (Niger). Individual country budgeting will need figure adjustments and the addition or omission of some line items. First, some baseline budgetary data have to be established. See Table 8-1.

Table 8-1: Basic Budgetary Data

Annual salary schemes (average): in FCFA (one US\$ = 200 FCFA, 1 January 80)

Medecin chef	960,000
Agent animateur/rice	360,000
Infirmier/e	"
Sage femme	"
Driver	240,000

Per Diem (prime de déplacement)

Medecin chef	1,000
Agent animateur/rice	500
Infirmier/e	500
Sage femme	500
Driver	300
Single VHWT member during training	500 FCFA

Gasoline

- 25 litres/100km for a landrover, 5 liters/100km for a mobilette
- 150 FCFA/litre, mix for mobilette 100 FCFA/litre.

Vehicle maintenance

- four-wheel drive landrover; 100 FCFA amortization per 1km, which means that every 50,000km the vehicle should be renewed and well maintained in the meanwhile.
- for mobilettes; 10 FCFA amortization/km, after every 30,000km the mobilette should be renewed.

VHW kits

- for securiste; locally made, 5,000 FCFA
- for TBA; UNICEF, 4,000 FCFA.

Initial drug donation for the securiste and TBA; 15,000 FCFA

Training materials per HC; 30,000 FCFA

Training manuals and stationery for the VHWT members; 1,500 FCFA

With the baseline data described in Table 8-1, and assuming the service units and time requirements as outlined in the previous chapters, we arrive at the annual costs of a VHWT program at the prefecture/sous-prefecture level:

Table 8-2: Annual Sensitization Costs of a VHWT Program

Key: MC - medecin chef
 A - animateur/rice
 I - infirmier/e
 SF - sage femme
 Dr - driver

Sensitization of 36 villages, five-day trip for each village at an average distance of 50km, one A, one I, one Dr as personnel.

Salaries

- A (72% of time)	260,000
- I (")	260,000
- Dr (")	<u>173,000</u>
	693,000

Per diem, 180 days

- A	90,000
- I	90,000
- Dr	<u>54,000</u>
	234,000

Gasoline, 180 trips

of 100km = 18,000km
 25l @ 100km = 4,500 liters 675,000

Vehicle maintenance

for 18,000km 1,800,000

Other expenses

(stationery, etc) 5,000

Total: 3,407,000

This means that the sensitization costs per village are approximately 94,640 FCFA, which is higher than the 62,000 FCFA actually found in Niger. The major reason for this is an underestimation of vehicle maintenance costs, estimated at 40 FCFA/km for Niger, 78.

Table 8-3: Annual Training Costs of a VHWT Program

Training of 36 VHWTs of nine training sessions (four VHWTs at a time) lasting 14 days plus two-day round trips.

Salaries

- MC	(50% of time)	480,000
- SF	(50% of time)	180,000
- Dr	(7% of time)	<u>16,800</u>
		676,800

Per Diem

- Dr	18 days	5,400
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Gasoline

9 trips @ 200 km = 180km = 450 liters	67,500
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Vehicle maintenance

for 1,800 km	180,000
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Per diem for VHWT members

for 72 persons (36 secouristes, 36 SFs), for 14 days = 1,008 P/days	504,000
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VHWT kits

36 locally made, for secouristes	180,000
36 UNICEF kits, for TBAs	<u>144,000</u>
	324,000

<u>Initial drug donation</u> for 36 VHWT	540,000
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Training material (simple charts)

once only, and only for the HC	50,000
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Training manuals and stationery

for 72 persons (36 secouristes, 36 SFs)	<u>108,000</u>
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Total: 2,455,700

This would bring the initial training session per VHWT to approximately 68,213 FCFA, somewhat lower than the Niger evaluation showed (78,000 FCFA), because the annual number of newly trained VHWT was lower (10 VHWT/year). Costs will be considerably higher if the initial training of the HC and D team are to be included.

Table 8-4: Costs of Initial Training of Health Center and Dispensary Staff

Training of 1 HC staff (1 MC and 1 SF) for 3 weeks and 6 Ds' staff (1 I) for 2 weeks:

<u>Salaries</u>	<u>Trainers</u>	
- MC	(17% of time)	163,000
- SF	(")	61,200
- Dr	(1% of time)	2,400
		<u>226,600</u>
	<u>Trainees at HC</u>	
- MC	(17% of time)	163,200
- SF	(")	61,200
		<u>224,400</u>
	<u>Trainees at D</u>	
- for 6 I @ 14 days (6% of time for each)		<u>129,600</u>
	Subtotal:	<u>580,600</u>
<u>Per diem</u>	<u>Trainers</u>	
- MC	21 days	21,000
- SF	21 days	10,500
- D	2 days	600
		<u>32,100</u>
	<u>D/I</u>	
	for 6I: 14 days	<u>42,000</u>
	Subtotal:	<u>74,100</u>
<u>Gasoline</u>		
1 trip at 400km (including D/I expenses) = 100l		15,000
<u>Vehicle maintenance</u> for 400km landrover and 6 D mobilettes		40,000
<u>Training material</u> (simple flip charts) once only		49,200
<u>Training manuals</u> and stationery for 10 persons		<u>15,000</u>
	Grand Total:	<u>773,900</u>

Whether the HC and D personnel's training should come under capital investment or recurrent costs depends upon staff turnover. Expenses will be pushed up by 21,500 FCFA with a new total of 89,713 FCFA per VHWT.

Table 8-5: Annual Supervision Costs of a VHWT Program

Supervision of 6 Ds, 1 day trip/month to each D by the HC staff:

Salaries

- I or SF	(29% of time)	104,400
- Dr	(")	<u>69,600</u>
		174,000

Per diem 72 days/year

- I or SF	36,000
- Dr	<u>21,000</u>
	57,600

Gasoline 12 trips @ 70km = 840km = 210l 31,500

Vehicle maintenance for 840km 84,600

Office stationery 3,000

Subtotal: 350,700

Supervision of 36 VHWT by the HC staff, 2 day trips/year to each VHWT:

Salaries

- I	(29% of time)	104,400
- SF	(")	104,400
- Dr	(")	<u>69,600</u>
		278,400

Per diem 72 days/year

- I	36,000
- SF	36,000
- Dr	<u>21,600</u>
	93,600

Gasoline 72 trips @ 100km = 7,200km = 1,800 liters 270,000

Vehicle maintenance for 1,800km 180,000

Stationery 10,000

Subtotal: 832,000

Table 8-5 cont'd

Supervision of 36 VHWT by the 6 D staff, 1 day trip/month for each VHWT:

<u>Salaries</u>		
- 6 I	(29% of time for each I)	626,400
<u>Per Diem</u>	72 days for each of the 6 I	216,000
<u>Gasoline</u>	72 trips or 30km for each of the 6 I = 12,960km = 648 liters mix.	64,800
<u>Vehicle maintenance</u>	for 12,960km	129,600
<u>Stationery</u>		<u>10,000</u>
	Total	1,046,800
	Grand total for all supervision	2,229,500
	Grand total for supervision excluding D's	1,878,800

It is arguable whether the D supervision should be included in the VHWT supervision cost, since it is only marginally connected with the program; if not, the supervision cost per VHWT/year is 52,188 FCFA; if included, 61,930. Both are considerably higher costs than the 32,000 FCFA evaluation in Niger, but in Niger we calculated too little for gasoline and vehicle maintenance.

Retraining of 36 VHWTs every 3 years. (See above: training of 36 VHWTs.)

The only costs to be deducted are the VHWT kits and the initial drug donation. Even the training materials and manuals should be different (upgraded) to provide better knowledge and health care.

Total costs for 36 VHWTs/9 sessions/year are 1,591,100 or 44,214 FCFA per single VHWT. There is disagreement over including health personnel salaries in a cost estimate. We believe they should be included since a major portion of work time is spent on the VHWT activities.

Table 8-6: Summary of Costs

	<u>for 36 VHWT</u>		<u>for 1 VHWT</u>	
	Health personnel salaries			
	<u>Included</u>	<u>Excluded</u>	<u>Included</u>	<u>Excluded</u>
Sensitization	3,407,000	2,714,000	94,640	75,389
Training	2,455,700	1,778,900	68,214	49,414
with initial HC and D staff training included:				
Supervision	2,229,500	1,150,700	61,930	31,963
without D supervision:				
	1,878,800	1,704,800	52,188	47,355
Retraining (every 3 years)	1,591,100	914,300	44,197	25,397

Vehicle Purchase: if vehicles must be provided. The purchase of a new vehicle every three years assumed to be covered by the maintenance fund, which is included in the above cost but the initial vehicle purchase costs are:

1	landrover station wagon 109	3,075,000
6	mobilettes	900,000
		<u>3,975,000</u>

Table 8-7: Annual Costs Per VHWT Over Five Years

Annual costs over a five year period per single VHWT: Capital and recurrent costs; FCFA, health personnel salary

<u>Year</u>	<u>Activity</u>	<u>Included</u>	<u>Excluded</u>
1	Sensitization Training, initial drug/kit donation Supervision Vehicle purchase (landrover and mobilettes)	380,092	308,666
2	Supervision	61,930	31,963

Year	Activity	Included	Excluded
3	Supervision	61,930	31,963
4	Supervision, retraining renewal of vehicles out of maintenance fund	106,127	74,811
5	Supervision	61,930	31,963
Total:		672,009	479,366

Table 8-8: Annual Costs per VHW Over Five Years

Health personnel salaries $\frac{672,009}{5} = 134,402$ FCFA = 672 US\$
included: 5

Health personnel salaries $\frac{479,366}{5} = 95,873$ FCFA = 479 US\$
excluded: 5

Exchange rate: January 80: 1 US\$ = 200 FCFA.

The figures are higher than the Niger costs (78,000 FCFA = 390 US\$ per VHWT) since vehicle purchase, higher vehicle maintenance and gasoline costs and the training of the trainers are included in our estimate. Thus, the minimum annual average cost per VHWT is approximately 700 US\$. This figure can be taken as a yardstick measure for calculations of the host country/MOH absorptive capacity.

If one takes an average of 700 people per village served by a VHWT, then the annual average per capita cost for a VHWT is approximately 1 US\$. However, this figure is much less accurate than the 700 US\$, since it depends entirely upon the population of the village. Per capita costs for 350 villagers would already be 2 US\$, for 1000 villagers it would be 0.70 US\$.

Distinction between capital investment and recurrent costs is difficult since recruitment, sensitization, training and retraining are ongoing processes throughout the country over many years. However, when we regard initial sensitization, training, kit and initial drug donation, vehicle purchase as capital investment, and supervision and retraining as recurrent costs, the single VHWT cost estimates over a five-year period will be distributed as follows:

<u>Capital investment</u>	318,000 FCFA = 1590 US\$ or 47%
5-year recurrent costs	<u>354,000 FCFA = 1770 US\$ or 53%</u>
Total 5-year costs	672,000 FCFA = 3360 US\$ or 100%

Annual recurrent costs will be approximately:

84,000 FCFA = 420 US\$ or 10% of the 5 year total or 53% of the average annual total costs.

Thus, even if all the capital costs will be paid by outside donors until all villages are covered by a VHWT, it still would leave a minimum of 106 FCFA = 0.53 US\$ as annual per capita recurrent costs. High inflation rate for transportation costs (vehicles, fuel) in such a heavily vehicle-orientated program will almost certainly push up minimal recurrent costs within ten years towards 200 FCFA or 1 US\$. It should be stressed again that these estimates exclude all other infrastructure costs such as:

- Rural development offices
- HC and D
- Drug supply networks
- Expenses borne by the villagers:
 - costs of medication/ fees for services
 - VHWT remuneration
 - expenditures for a health hut or community development activities
 - transportation cost for drug resupply and referrals.

It also assumes the stage one male VHW and female VHWS, not stage two, (see Chapter 3) which cost about 30 percent more.

Despite the numerous variables these figures have been confirmed by actual cost evaluations (Niger 79, Mali 80) which, if adjusted to the line item budgets are usually much higher. Cost estimates far lower than ours are often either incomplete in their line item budgets or differ in activities (e.g., supervision is less frequent, per diem not paid).

Chapter 9: NATIONAL CAPACITIES OF COUNTRIES TO ABSORB VHWT PROGRAMS

Prior to any large-scale implementation of a VHWT program, the following major baseline data should be established:

- (1) Government/MOH total VHWT costs, manpower and fixed center requirements at the sous-prefecture (or functional unit) and the national aggregate level.
- (2) Overall government/MOH analysis; finances, manpower fixed center networks.
- (3) Costs to be borne by the villagers.
- (4) Disposable income of the villagers which can be spent on VHWT care.

The absorptive capacity can then be calculated by comparing (1) with (2) and (3) with (4).

Note: Recurrent cost studies are of limited use since they give answers to points one and three only. Other infrastructure requirements for a successful implementation and maintenance of the program such as adequate quality care at the referral centers, drug supply networks, skills and managerial capacities at all levels, communication and transportation, repair and maintenance facilities (especially for vehicles) favorable economic, politico-administrative aspects (such as decentralization) and motivation are not included despite their fundamental importance.

VHWT Costs, Manpower and Fixed Centers Requirements

For calculating for each country's direct VHWT costs at the sous-prefecture and the national aggregate levels:

-
- Direct start-up costs: total number of villages/VHWT X single average VHWT start-up costs, plus
 - Annual recurrent cost: total number of villages/VHWT X single average VHWT annual recurrent costs.
-

• The methodology of calculating direct start-up (capital investment) and annual recurrent costs are outlined in Chapter 8. Each country and each sous-prefecture or functional unit will have its own variables and therefore, its own costs. The following national calculations are based on the assumptions that:

- each village has a VHWT
- average VHWT costs are in uninflated dollars and unadjusted for population growth or shifts; that means that total VHWT coverage is projected for tomorrow, which is of course unrealistic

- only the VHWT stage one is accounted for
- single average VHWT costs are as outlined in Chapter 8 with their own variables and baseline data.

Table 9-1: Direct VHWT Costs

<u>Country</u>	<u>Numbers of VHWT</u>		<u>Costs in US\$: ³ (1 US\$ = 200 FCFA)</u>			
	<u>SP¹</u>	<u>N²</u>	<u>Start-up Costs ³</u>		<u>Annual Recurrent Costs ⁴</u>	
			<u>SP</u>	<u>N</u>	<u>SP</u>	<u>N</u>
Chad	288	15,000	398,880	20,775,000	108,000	5,625,000
Mali	245	10,300	339,325	14,265,000	91,875	3,826,500
Niger	237	9,000	328,245	12,465,000	88,875	3,375,000
Senegal	448	13,000	620,480	18,005,000	168,000	4,875,000
Upper Volta	159	7,000 ⁵	220,215	9,695,000	59,625	2,625,000
Mauritania	32	570	44,320	789,450	12,000	213,750
Gambia	22	1,000	30,470	1,385,000	8,250	375,000
Cape Verde	Unknown					

- Key:
1. Average number of villages per sous-prefecture, derived from dividing the country's total number of villages by the number of sous-prefectures in each country as taken from the literature
 2. Total number of villages taken from the literature
 3. Single average VHWT startup costs; 1,385 US\$ (see also Chapter 8) for initial sensitization, training, kit and initial drug donation, vehicles (salaries excluded)
 4. Single average VHWT annual recurrent costs; 375 US\$ comprising supervision (already during the first year) and retraining every fourth year (salaries excluded)
 5. Only the number of villages with a population of 700 and more.

Comments: The single VHWT cost estimates and the numbers of VHWTs are the major variables. Costs will vary tremendously for each country. In Mauritania with its sparse population density, costs will be much higher than, for instance, in Upper Volta. Chad might choose to cover with VHWTs only those villages with a population of 700 and above. One country might choose the more sophisticated VHWT stage two program, whose costs are much higher. Despite the numerous variables, we still believe that our VHWT unit cost estimates are minimal estimates and that therefore its nationwide projection has its merits as a guideline.

For calculating costs of additional personnel entirely assigned to VHWT activities at the sous-prefecture and national levels:

- Capital investment (training costs): total number of personnel for each category X single average personnel training costs for each category, plus
- Annual recurrent costs (salaries): total number of personnel for each category X single average annual salary for each category

The numerous variables for personnel requirement estimates are outlined in Chapter 7, but are also based upon the definition of a functional unit in Chapter 2. Combining the two, we arrive at the following definition:

Each functional unit with one HC or 8 Ds for a maximum of 80 VHWTs (the optimum would be 36 VHWTs) requires 17 full-time government officials (see Table 9-2).

If this concept is accepted, the numbers of VHWTs divided by 80 VHWTs gives the numbers of functional units for each sous-prefecture. For the country as a whole another layer has to be added, namely the training of the trainers/supervisory teams operating out of the prefecture level. Each of these teams can handle more functional units requiring five full-time government officials per team (see Table 9-3). The total numbers then of functional units in a country divided by nine functional units gives the numbers of training of the trainers/supervisory teams for each country.

Table 9-2: Manpower Requirements and Costs Per Single Functional Unit

<u>Number and Category of Personnel</u>	Costs in US\$: (1 US\$ = 200 FCFA)	
	<u>Capital Investment¹ (training costs)</u>	<u>Annual Recurrent Costs² (annual salaries)</u>
1 Medecin chef	15,000	4,800
1 TBA	11,250	1,800
10 Nurse	3,750 X 10 = 37,500	1,800 X 10 = 18,000
1 Animateur/rice	3,750	1,800
1 Pharmacist	7,500	1,800
1 Secretary	2,000	1,500
2 Drivers	-	1,200 X 2 = 2,400
17 Total	77,000	32,100

Table 9-3: Manpower Requirements and Costs Per Single Training of the Trainers/Supervisory Team

<u>Number and Category of Personnel</u>	Costs in US\$: (1 US\$ = 200 FCFA)	
	<u>Capital Investment¹</u> (training costs)	<u>Annual Recurrent costs²</u> annual salaries)
1 Medecin chef	15,000	4,800
1 Midwife	11,250	1,800
1 Nurse	3,750	1,800
1 Secretary	2,000	1,500
1 Driver	-	1,200
5 Total	32,000	11,100

Key: 1 Unit prices are based on actual training costs in Niger, 1980; for the medecin chef the three years' training of an infirmier d'Etat was calculated at 1,000,000 FCFA per year; for the midwife at three years training, 750,000 FCFA per year; for junior nurses and community workers one year training of 750,000 FCFA per year; and for pharmacists, two years training of 750,000 FCFA per year.

2 Annual salary scheme per category of health personnel; Niger, 1978 (see Chapter 8).

Table 9-4: Country Specific Total Manpower Requirements and Cost Estimates in uninflated dollars and regardless of population shift or growth, taking into account each country's specific number of functional units derived from the numbers of villages

Country	Number/ Villages	Number of FU ¹	TST ²	Number of Personnel ³								Cost in US\$ (1 US\$ = 200 FCFA)	
				MC	TBA	N	A	Ph	S	Dr	Total	Ca. Investment (training) ⁴	An. Recurrent costs ⁵ (salaries)
Chad	15,000	187	21	208	208	1891	187	187	208	395	3284	15,071,000	6,235,800
Mali	10,300	129	14	143	143	1304	129	129	143	272	2263	10,381,000	4,296,300
Niger	9,000	112	12	124	124	1132	112	112	124	236	1964	9,008,000	3,728,400
Senegal	13,000	162	18	180	180	1632	116	162	180	342	2792	13,050,000	5,384,000
Upper Volta	7,000	88	10	98	98	890	88	88	98	186	1546	7,096,000	2,935,800
Mauritania	570	7	1	8	8	71	7	7	8	15	124	550,100	235,800
Gambia	1,000	13	2	15	15	132	13	13	15	28	246	1,065,000	439,500

Key: 1 Number of FU (functional units): $\frac{\text{total number of villages}}{80}$

2 Number of TST (training/supervisory teams): $\frac{\text{total number of FU}}{9}$

3 Number of personnel for each category:

- number of FUs X personnel for each category (see Table 9-2)
- plus, number of TSTs X personnel for each category (see Table 9-3)

4 Capital investment: total training costs per FU \$77,000 (see Table 9-2) X numbers of FUs plus total training costs per TST \$32,000 (see Table 9-3) X numbers of TST.

5 Annual recurrent costs: total salary costs per FU \$32,100 (see Table 2) X number of FUs plus total salary costs per TST \$11,100 (see Table 9-3) X number of TSTs.

S - securiste (male VHW)

Government officials function in addition to the existing health personnel. Exorbitant as these numbers may seem, they are on the conservative side since they exclude such cost factors as vacation, sick leave, attrition and retraining. They also take 80 VHWT within a functional unit and not our recommended 36 (see Chapters 2 and 7).

Upper Volta calculated in its 10-year PHC plan an increase of 5,393 government officials until 1990, Niger an additional 1,900 midlevel personnel until 1983 and the only increase in coverage from approximately 20% to 45%. The VHWT/government official ratio is thus somewhat less than 5:1, where in our more detailed analysis in Chapter 7, it was calculated as 4:1.

For calculating indirect costs, (infrastructural costs that are necessary but not exclusively spent on VHWT activities): Exact indirect cost estimates are extremely difficult to compute, because too many variables and unknown factors are involved. We therefore limit ourselves to estimates of required fixed centers only, which provide the necessary referral, training and supervisory infrastructure. We also exclude the costs for national and regional hospitals.

The calculating formula for each country:

- Capital investment = total number of fixed centers for each category X single average costs for construction and furnishing for new buildings and/or redecoration and repair for defunct existing ones for each category, plus
 - Annual recurrent costs: total number of fixed centers for each category X single average recurrent costs for each category.
-

Based on the assumptions in Chapters 2 and 9, each functional unit will have 1 HC, 8 Ds, and 1 pharmacy for 80 VHWTs serving 32,000 people living in 80 villages. Its total population/catchment area is 50,000 people. Rather than taking the 80 VHWTs as a yardstick for the numbers of FUs for each country as above in direct personnel requirement and its costs, we use the 50,000 population as a means of calculating total country-specific FUs. This is justifiable since their main function for VHWT support is diagnosis and treatment of sick patients and providing the physical base for training and supervision. It is therefore less tied to the numbers of VHWTs than the calculation of VHWT personnel.

On the national level, one rural development office is added to each sous-prefecture, or one for every three FUs, whichever is less.

Table 9-5: Fixed Center Requirements and Costs Per Single Functional Unit

Costs in US\$ (1 US\$ = 200 FCFA)

Number and Category	Capital Investment ¹	Annual Recurrent Costs ²
1 Health center	400,000	30,000
8 Dispensaries	8 x 100,000 = 800,000	8 x 7,000 = 56,000
1 Pharmacy	50,000	4,000
Total	1,250,000	90,000

Additionally for each sous-prefecture:

1 Rural development office	100,000	15,000
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Key: 1 Comprised of one medical equipment (UNICEF purchase mainly), concrete base construction and tin roofing, furniture, equipment, water (electricity/generator only for the HC), staff housing.

2 Comprised of salaries (approximately 65%), drugs (UNICEF purchase only), maintenance/repair/refurbishing for buildings, equipment, furniture, vehicles, stationery costs, etc.

Notes: Capital expenditure estimates are rather conservative compared to actual construction costs alone in Niger 1980 (100,000 US\$ for a rural D), Gambia 1980 (200,000 US\$ for divisional headquarters) and Mali 1977 (350,000 US\$ for the construction of an 80 bed HC).

Recurrent costs are based upon salary assumptions in Chapter 8, Annexes C and D, and estimates from Niger, Upper Volta, Chad and Mali. But rather than taking actual expenditures from various reports which are based on un(under)utilized services, we tried to "construct" one suitable to a minimum efficacy level. Thus, our estimates are higher than those actually reported. However, if drug sources are other than UNICEF (which is usually the case), HC recurrent costs will be approximately 50,000 US\$ and for a D approximately 10,000 US\$ (UN cost estimates, Mali 77).

Table 9-6: Country-Specific Fixed Center Requirements and Cost Estimates (in uninflated dollars and regardless of population shift or growth and exclusive of hospitals).

Cost in US\$ (1 US\$ = 200 FCFA)

Country	Total Population		Number of Fixed Centers ³					Capital Investment	Annual Recurrent Costs
	X 1,000 ¹	FU ¹	SP ²	HC	D	RDO ²	Ph	X 1,000 ⁴	X 1,000 ⁵
Chad	4,300	86	52	86	688	29	86	110,500	8,175
Mali	6,300	126	42	126	1008	42	126	161,700	11,775
Niger	5,000	100	38	100	800	33	100	128,300	9,495
Senegal	5,300	106	29	106	842	29	106	135,400	9,975
Upper Volta	6,300	126	44	126	1008	42	126	161,700	11,775
Mauritania	1,300	26	18	26	208	9	26	33,500	2,475
Gambia	600	12	49	12	96	4	12	15,500	1,140

Key: 1 Number of FU : $\frac{\text{total population}}{50,000}$

2 Number of sous-prefectures from the literature and rural development offices (RDOs), calculated accordingly

3 Number of fixed centers for each category: number of FUs x fixed centers per category (see Table 9-5) plus total numbers of RDOs

4 Capital investment: number of FUs X 1,250,000 US\$, plus
number of RDOs 100,000 US\$ (see Table 9-5)
(figures rounded off)

5 Annual recurrent costs: number of FUs X 90,000 US\$, plus
number of RDOs X 15,000 US\$ (see Table 9-5)
(figures rounded off)

This is intended as illustrative only, especially for capital expenditures, since projections are made as if no fixed centers exist. Thus for each country-specific calculation, the numbers of existing fixed centers must be subtracted. Annual recurrent costs, however, apply to the total of existing and planned fixed centers.

Summary of Resource Calculation Methodologies for VHWT Program and Country Specific Applications

- Direct VHWT cost projections are computed by constructing a line item budget (similar to Chapter 8) by taking all the country-specific variables into account. If the VHWT program is fairly standardized, then single average costs have to be multiplied by the number of VHWTs. We believe that (provided all the activities are carried out similar to the outline of Chapter 8, the average of 1385 US\$ for single VHWT start-up costs and the 375 US\$ for single VHWT annual recurrent costs are realistic figures, which, in the absence of cost estimates, can be used for planning and evaluation purposes. The few cost evaluations in the Sahel have shown that they are minimal figures.

The calculating formula:

Start-up costs: 1385 US\$ X number of new VHWTs

- plus -

Annual recurrent costs: 375 US\$ X number of existing VHWTs

- Direct personnel costs are already more difficult to compute since the problem of the FU and several training/ supervisory levels enter into manpower projections, which in turn depend on the timing of activities as outlined in Chapter 7. Also the "staging" of the program makes manpower calculations extremely difficult. Seventeen government officials will be quite busy sensitizing 36 villages and training and supervising 36 VHWTs during the first year. Since additional manpower will not be acquired overnight due to a two to three-year training period, manpower requirements should be projected for a whole prefecture or even for the whole country. For this purpose our calculating formula may be useful.

It gives an estimate of total capital investment and annual recurrent costs. We believe that our figures for training costs and salaries are quite representative for the Sahel (with the exception of Mali, where actual costs are lower).

First: $\frac{\text{total number of VHWTs}}{80} = \text{number of FUs}$

$\frac{\text{number of FUs}}{3} = \text{number of training of the trainers/ supervisory teams (TSTs)}$

Then: number of FUs X 17 government personnel, training costs, (categorized as in Table 9-2 and 9-3), plus
number of FUs X 17 GP annual salaries, plus
number of TSTs X 5 GP training costs, plus
number of TSTs X 5 GP annual salaries,

- Indirect (infrastructure) cost computations are even more complex. The required number of fixed centers per FU have to be balanced with manpower requirements and distances; for example, a second person in each D employed full-time for VHWT activities, can handle up to 20 VHWTs. Therefore, only half of the number of Ds are required instead of one person handling 10 VHWTs. But then the HC staff cannot handle 160 VHWTs instead of the 80. VHWTs beyond a distance of 25 km from a D and beyond 50 km from a HC will be difficult to supervise on a regular basis. Therefore, each FU, each sous-prefecture, each prefecture will have their own calculations depending on activity time schedules (Chapter 7), distances and population density (Chapter 2).

The following gives a rough estimate of resource requirements using our methodology:

First: $\frac{\text{total population}}{50,000} = \text{number of FUs}$

number of sous-prefectures or $\frac{\text{number of FUs}}{3}$,
 whichever is less = number of RDOs, which are mainly responsible for initial sensitization

Then: number of FUs X (LHC, 8Ds, 1 pharmacy) X construction, equipment, etc., costs = capital investment, plus

number of FUs X (LHC, 8Ds, 1 pharmacy) X maintenance costs including salaries and depreciation = annual recurrent costs, plus

number of RDOs X capital investment, plus

number of RDOs X recurrent costs

Note: Many infrastructure items were excluded, some of them vitally important, such as training schools for nurses and doctors, garages and repair workshops. Inflation should also be added, since all our projections are in uninflated dollars, i.e., if established tomorrow, inflation rate for construction and transportation costs ranges between 10-30% a year, which means that by the year 2000 investment and recurrent costs could have risen by 200-600%. Again, we see these cost estimates are highly conservative.

Table 9-7: Summary of Country-Specific Cost Estimates for a National VHWT Program

(as a combination of Table 9-1, Table 9-4, and Table 9-6 in rounded figures)

Country	Cost in US\$ (1US\$ = 200 FCFA)						Annual per Capital Recurrent Costs
	Capital Investment (X 1,000)			Annual Recurrent Costs (X 1000)			
	Direct (Table 9-1)	Personnel (Table 9-4)	Infra. ¹ (Table 9-6)	Direct (Table 9-1)	Personnel (Table 9-4)	Infra. (Table 9-6)	
Chad	21,000	15,000	82,500	5,600	6,200	8,200	4.70
Mali	14,000	10,500	106,200	3,800	4,300	11,800	3.20
Niger	12,500	9,000	97,200	3,400	3,700	9,500	3.30
Senegal	18,000	13,000	79,000	5,000	5,400	10,000	3.24
Upper Volta	9,500	7,000	115,400	2,600	3,000	11,800	2.8
Mauritania	800	600	25,100	200	350	2,500	2.31
Gambia	1,500	1,000	5,300	400	450	1,100	3.33

Key: Investment costs for HCs and Ds (see Table 9-5) X numbers of existing HCs and Ds, (see Table 9-9) deduced from total investment costs (see Table 9-6) = "remaining" infrastructure investment costs, all figures rounded.

Again, when we compare it with Sahelian five and 10 year PHC plans, these estimates are very conservative, but, we believe, realistic: Niger envisages for the period of 1979-1983 a six-fold increase from 11,200,000 US\$ annually to 66,000,000 US\$ with an additional capital investment of 100,000,000 US\$ - only to increase its population coverage from 20-45%. Upper Volta's projections are similar: a 5.5-fold annual budget increase from the present nine million to 50 million US\$. Both arrive at a figure of 10 US\$ per capita for public health expenditures.

Note: If the MOH intends to supply drugs free of charge to the villagers at the current Malian drug prices, then an additional 2 US\$ (for VHW stage one drugs) to 10 US\$ (for VHW stages one and two drugs) must be added to the annual MOH per capita expenditure.

Table 9-8: Annual MOH Financial And Manpower Budget Estimates

Exchange rate 1980: 1 US\$ = 200 FCFA or 400 FM or 45 Ouguiya or 1.7 Dalasi.

<u>Country/Year</u>		<u>Total 000\$</u>	<u>Per Capita \$</u>	<u>% of Total Govt. Expen- diture</u>	<u>% of Persnl. vs. Mainten- ance Costs</u>	<u>Number of Villages</u>	<u>Total Population in Thousands</u>	<u>Number of</u>	
								<u>Prefectures</u>	<u>Sous- Prefectures</u>
Chad	78	5,387	1.25	7.1	70/30	15,000	4,300	14	52
Mali	78	9,520	1.52	6.19	55/45	10,300	6,300	7	42
Niger	78	11,000	2.20	7.8	49/51	9,000	5,000	7	38
Senegal	76	21,890	4.13	6.5	75/25	13,000	5,300	8	29
Upper Volta	78	9,028	1.41	7.3	88/12	7,000*	6,300	10	44
Mauri- tania	76	5,270	3.42	2.7	53/47	570	1,300	13	18
Gambia	78	3,009	5.30	7.2	70/30	1,000	600	6 (Division)	49 (District)
Cape Verde	76	925	3.08	4	?	?	300	?	?

Sources: 1. Chad: Annuaire statistiques 77; Le Budget de la Sante 78. 2. Mali: Profil de Pays 78. 3. Niger: Plan Quinquennal 79-83. 4. Senegal: Profil du Senegal 1976. 5. Upper Volta: Document de programmation sanitaire nationale 1980-90, Haute Volta. 6. Mauritania: Profil de la Republique Islamique de Mauritanie, 1976, Contribution a l'Elaboration d'un Plan National de Sante, 1979. 7. Gambia: A Review of the Health Sector in the Gambia, 1979; The Gambia Primary Healthcare Action Plan, 1980-1985. 8. Cape Verde: Apercu sur la situation aux Iles du Cap Vert decoulant de la poursuite de la secheresse, 1976.

Key: * = Only the number of villages with a population of more than 700; if all villages are included, the total is probably closer to 10,000 villages.

Note: The 1979 US per capita health expenditure was approximately 1,000 US \$.

Table 9-9: Existing Infrastructure of Sahelian Countries: Fixed Centers and Personnel

Country	MOH Fixed Centers				National Personnel: Estimates for 1976/1977/1978							VHWT	Others	Total
	Hs	HCs	Ds	Others ¹	Doctors	Midwives	Infirmiere d'Etat	Lower Grade Nurses	Pharma- cists	Sanitary Tech- nicians ²				
Chad	4	40	120	96	36	26	679	248	5	41	-	100	1135	
Mali	10	42	287	370	180	268	575	1415	18	82	-	325	2863	
Niger	7	38	159	67	29	88	337	745	7	-	1500	151	1375	
Senegal	9	34	428	122	307	329	2563		37	?	-	2448	5684	
Upper Volta	4	76	159	169	41	165	338	882	11	-	-	188	1625	
Mauri- tania	11	14	28	13	23	20	222	317	6	-	-	1513	2101	
Gambia	2	10	62	131	28	174		140	2	55 (health inspector)	-	35	408	
Cape Verde	no information													

Key: 1. Includes: Maternities, social centers, dental centers, other specialized institutions, private clinics (but not mobile teams)

2. Includes: Dentists, lab. technicians, rural matrones (but not the unsalaried TEAs, etc.)

Note: The total number of health personnel is not comparable for the various countries, since in some cases (Mauritania, for example) all salaried MOH personnel (cleaners, cooks, wardens, watchmen) are indicated, but for most of the other countries only health professionals are counted.

Important issues in a MOH budget analysis:

- Correctness and reliability of data: Large differences in the literature, especially for per capita figures (e.g., Mauritania ranges between 3.42 and 8.22 US\$, Upper Volta between 0.75 and 2.98 US\$, Senegal between 2.98 and 4.13 US\$, etc.). Several documents should be compared and the most reliable one chosen. Any per capita figure should be viewed with caution (see also Table 9-8).
- Detailed foreign assistance analysis: although Niger received only an additional 25% assistance for its MOH budget, 66% of the VHW costs were sponsored by donors. Most of foreign aid goes into technical assistance and capital investments that often generate large recurrent costs, which donors frequently do not continue to support.
- Budgetary trends and inflation: (Chad in 1978 had virtually the same MOH budget as in 1967, but Niger has had an annual rise of 20% in real terms for five years, Mali's MOH budget faces a steady decline in its percentage of the total national expenditure: 1975, 11%; 1978, 7.3%; 1979, 5.6%.
- Comparative analysis with the trends of GNP, external debts and national expenditures: Niger tripled its GNP during the last 10 years, but most other Sahelian countries are approaching a zero growth rate and increasing balance of trade deficits.
- Detailed analysis of how the MOH money is spent:

Percentage breakdowns and trends (e.g., a common trend in all Sahelian countries is the steady rise in salary expenditure versus a steady decline in maintenance costs; annual investment was virtually nil in Chad and Mali in 1980):

- salaries
- training/scholarships
- maintenance costs
- annual investments
- drug expenditures
- preventive vs. curative care
- administrative costs

-- Analysis of drug expenditures is even more difficult due to interconnections between the private and public drug sectors. Inflation often outpaces any increase in drug expenditures. Drug expenditures' annual growth in Mali is an estimated 5%, whereas inflation for the relatively stable UNICEF prices is 15% annually).

- Detailed analysis of the urban/rural MOH budget distribution and its limitations: One of the major arguments for the promotion of VHW programs is unequal distribution. Chad in 1978 spent at least 35% of its total budget for its single national hospital. Although the total personnel/maintenance cost ratio for Mali was 55:45, outside

the capital it averaged 93:7. Total maintenance costs (building repairs, transportation, equipment, drugs) for the entire Malian territory's fixed centers outside Bamako was 300,600 US\$ in 1978 despite a capital city/rural ratio of 75:25. That means that operating expenses remain in the capital and personnel are sent out without functional support.

- Allocation and actual disbursement, i.e., funds actually spent for maintenance of vehicles, may be much less than the allocation planned in the budget.
- Adjustment for income status by a regression analysis (at a very low 1.80 US\$, Mali in 1977 had the highest per capita health expenditure in Africa when adjusted for income status.)
- Manpower analysis and trends, including urban/rural breakdown, categories, and trainees and projected trainees: Medical schools in Senegal, Mali and Niger might fill initial manpower gaps and sometimes even reduce costs by replacing expensive foreign personnel, but after several training cycles the number of fixed centers cannot absorb any more of its annual manpower output.
- Population coverage: The often cited 20% of the population receiving health care versus 80% not receiving health care might not always be true. In Mali about 55% of the population might benefit from MOH services: 33% in the urban and sous-prefecture (hospitals and HCs) sector and another 23% at the arrondissement level, served (at least theoretically) by Ds, maternities, private cooperatives which also sell drugs, and the Pharmacie Populaire (see Chapter 6).
- Possible waste: The biggest area of waste occurs usually in the drug sector. Cheap and effective oral rehydration fluid in pediatric wards could replace 95% of the extremely expensive and often inefficient infusion bottles. Overprescribing, the use of brand names vs. generic names, expensive external sources due to ineffective drug bidding, and lack of bulk quantity import are further examples (see Chapter 6).
- The qualitative assessment of the MOH services, especially the referral system, deserves scrutiny. Types of diagnostic, curative, and lifesaving intervention performance of the HCs, Ds and maternities; equipment; drugs and vaccines; transportation; qualified manpower; water and electricity; construction and storage facilities are some of the areas to examine. This qualitative assessment might well be the most important and most neglected issue.

The Limits of the Absorptive Capacity

When comparing Table 9-7 with Table 9-8 we may safely assume, despite the precautions mentioned above, that for a countrywide VHWT program starting immediately:

- none of the Sahelian MOH could afford all the costs
- some MOH could not even afford all the direct annual recurrent costs and maybe all would need substantial modifications in their MOH budget (distribution) to absorb all the recurrent costs
- no Sahelian MOH could afford VHW stage two drugs free of charge for all.

There is, however, an initial stage which allows existing services to absorb a certain number of VHWTs without additional manpower and infrastructure costs. Within these limits, then, only the direct VHWT costs have to be paid.

The following calculations are based on the assumptions outlined in Annex A and Chapter 9. It is assumed that some personnel have spare time available and capabilities in transport, skills and motivation for additional tasks. Obviously all these assumptions must be verified on an individual basis before a new VHWT program is launched. The often-cited spare time of idle personnel in fixed centers reflects lack of community appreciation rather than an absence of health problems. This lack may in turn reflect such factors as chronic drug shortages, poor performance and motivation of the personnel, and long distances. It might well be that, by improving the standard of a HC, more people will receive better services than with several additional VHWTs.

One HC and four to six Ds can handle between 10 (initial sensitization included) and 36 VHWTs (initial sensitization excluded) already during the first year, and the supervision and retraining of 36 VHWTs in any subsequent year without additional personnel or infrastructure, provided that the direct VHWT costs (start-up and maintenance costs) are funded. Due to the fixed costs (for transportation mainly), the single VHWT costs will only be similar to our estimates (1385\$, 375\$), once the number of 36 VHWTs per FU is reached: for fewer than that, VHWT unit costs will be much higher.

So each country's initial absorptive capacity will be determined mainly by:

- numbers of HCs, Ds, and spare time of its personnel
- initial sensitization teams and
- available funds for direct VHWT costs.

The following figures are illustrative in nature only (e.g., Mauritania with its vast distances will certainly not be able to cover 88% of its villages with the above cited costs and without additional manpower):

Table 9-10: National Absorptive Capacities

Country	Existing Number of VHWTs % of total VHWTs			Costs in US\$			
	HC	w/o AR	w/AR	startup	costs		annual recurrent
				w/o AR	w/AR	w/o	w/AR
Chad	40	400/3	1440/10	554	1995	150	540
Mali	42	420/4	1512/15	582	2095	158	567
Niger	38	380/4	1368/15	526	1895	143	513
Senegal	34	340/3	1224/9	471	1695	128	459
Upper Volta	76	760/11	2736/39	1053	3790	285	1026
Mauritania	14	140/24	504/88	194	700	53	189
Gambia	10	100/10	360/36	138	500	38	135

Within the limits of the absorptive capacity of existing services, direct VHWT costs represent a relatively small percentage of the MOH budget. First-year direct costs for 100 VHWTs are approximately 180,000 US\$ (start-up and supervision). When projected against total MOH budgets, this amounts to Chad, 3.3%; Mali, 1.9%; Niger, 1.6%; Senegal, 0.8%; Upper Volta, 2%; Mauritania, 3.4%; Gambia, 6% of the MOH budgets as cited in Table 9-8. But beyond the initial absorptive capacity, large additional resources will be immediately required.

Possible Sources of Additional Funds

Rather than being self-supporting, the VHWTs generate the need for additional government resources. This leaves the questions of where and how financing should originate.

Principally there are four possibilities:

- Increase the MOH budget
- Reallocate the existing health budget (transfer of funds, elimination of waste) and decentralize (budgetary allocations to the provincial levels)
- Charge consumers (fees for services, health insurance plans, drug taxation)
- Receive external funding (capital investment, recurrent costs).

GOVERNMENT SOURCES

Within the limits of the existing health services' absorptive capacity, the required increase of the MOH budget is relatively small: for each 100 VHWTs, provided that they are properly allocated to three to 10 HCs and their Ds (see above), the increase in the percentage of total government expenditures would be approximately 0.2% (180,000 US\$ divided by the total government expenditures, calculated from Table 9-8 X 100). That means with an annual rise of one percent in government expenditures and a steady percentage of MOH budget, the VHWT costs are easily absorbed. Beyond that limit, dramatic, and for most Sahelian countries unacceptable, increases will be necessary.

Table 9-11: Projected Estimates of MOH Budget Allocations for a Nationwide VHWT Program (as percentage of total government expenditures; in uninflated dollars, regardless of population growth and shift and comparing costs (Table 9-7) with budgets (Table 9-8). (MOH budget as % of total government expenditure)

<u>Country</u>	<u>Total Investment Costs (% of govt. expenditures)</u>	<u>Total Annual Recurrent Costs (% of govt. expenditures)</u>	<u>Present MOH budget (% of govt. expenditures)</u>
Chad	156	26	7.1%
Mali	85	13	6.19
Niger	84	12	7.8
Senegal	33	6	6.5
Upper Volta	106	14	7.3
Mauritania	14	2	2.7
Gambia	19	4	4.0

Although the expansion of VHWTs will occur gradually over the years, at its end point (say the year 2000), when all villages are covered with a VHWT, annual recurrent costs alone will require for some countries about 20% (and more due to inflation) of their present government expenditure or a 20% rise in expenditures in real terms (net of inflation), which in turn will depend mainly on their GNP. Therefore, the conclusion for countries with less than one percent annual growth rate seems to be to stay within the limits of their existing health service absorptive capacity and at the same time try to increase their MOH budget accordingly.

Transfer of funds from existing services (prior to in-depth analysis of possible improvements) is the most frequent and can be the most harmful action since it only aggravates an already severe "shortage syndrome." There is, on the other hand, always room for better utilization of services and elimination of waste (e.g., oral rehydration instead of intravenous infusion; locally-produced dressing material; community participation in construction and repair; bulk purchase of cheaper drugs and local repackaging; better storage and distribution systems; standard generic essential drug lists; simple pre-

scription manuals; cheap routine drugs instead of expensive, often useless, injections; standardized equipment per service unit; maintenance and repair of vehicles and equipment). It seems that despite its complexity and long start-up period, this might be the most important area of conserving. Budgetary allocations and transfer of authorities to the prefecture and possibly the sous-prefecture level can be one of the most effective methods to tackle the problems of resupply, regularities of personnel salaries, and some necessary repairs (especially vehicle), but this must follow overall political/administrative lines of actual decentralization and community participation from the village up. Otherwise, there is the risk that just another administrative bottleneck might be created at a lower level (as it may be in Senegal at the department/sous-prefecture level).

Fees-for-services policies are in dispute (though we feel them to be necessary) for four main reasons:

- equity: if the cash-poor villager has to pay for medicine, why should the salaried urban civil servant get it free? If the villagers can get free medical care at the not too distant dispensary, why should they buy it from the VHW?
- theft and sale of drugs: as long as there are drugs free of charge at the public centers (Hs, HCs, Ds) and heavily priced drugs at the Pharmacie Populaire or open market, there will be theft and black market sale of the free public health drugs; even the most stringent (and then overcomplicated/inefficient) stock-control system cannot prevent this
- increase of the MOH drug budget: however, substantially increased administrative costs have to be taken into consideration in order to ensure correct stock and distribution control
- possible decrease of drug abuse and overprescription: This can occur only when the drug prescribers (doctors, nurses, pharmacists, VHWs) are conscious of the costs and avoid unnecessary prescriptions. This awareness can only be achieved by better training and annually-reviewed price indications and their prescription manuals.

Health insurance plans might work well among the employees of commercial societies, but more often do not on a national scale. The percentage of the salaried population is too small and those salaried might be unwilling to contribute to the vast, emotionally and spiritually detached rural population. Taxation of drugs, especially the "nonessential" ones, can be difficult, too, since there is so much room for discrepancy in defining "essential" drugs. The VHWs stock one drug, with the exception of chloroquine, are not really essential for the reduction of morbidity or mortality. Should charcoal and aspirin tablets be on the essential drug list, then, and local anaesthetics, syringes, and needles, for instance, not? Even more difficult will be securing the return of the total collected tax to the MOH budget rather than losing it being used as a subsidy for indebted governmental enterprises.

Finally, foreign assistance poses problems, too. Heavy investment in nonexistent or deficient infrastructure prior to "project" financing is unpopular, mainly because it does not give immediate, large, quantifiable results (numbers of villages or population covered).

The quite substantial recurrent costs of a VHWT are most often not realized, and the idea of a self-supporting or absorbable system still prevails. Recurrent cost issues in the future will have to be regarded much more in the context of being just another annual expenditure similar to frequent repair costs for faulty machinery. Hence, these programs must be compared with alternative health projects and, in any event, must be viewed in terms of substantial long-term budgetary drain and foreign aid absorption implications.

VILLAGE SOURCES

We have dealt with projected government/MOH expenditures. The following section analyzes costs which are usually expected to be carried by the villagers.

Program costs usually borne by the villagers include:

- fees for services
- transportation costs for drug resupplies and patient referrals
- VHWT remuneration (at least for the TBA)
- erection and maintenance of a health hut, if used, (figured in this manual because not recommended)

Some programs also charge the villagers:

- costs of initial training
- tools, construction costs, for various community development schemes, e.g., wells, latrines, slaughterhouses.

For simplification, we concentrate on one item only, fees for services, which will include the VHW remuneration and transportation costs for drug resupply by simply adding 10% to the end consumer prices. The key variables are (see Chapter 7):

Price of treatment:

- flat fees vs. actual consumer costs
- sources of drug supply
- national price policy and legislation
- inclusion or exclusion of VHW remuneration and transportation costs for resupply
- type of drugs, (stages one or two)

Amount of treatment consumed:

- diagnostic/drug prescription habits of the VHWTs
- age and disease specificity
- numbers of patient contacts
- size of village population
- standard treatment schemes
- price of treatment
- disease pattern and seasonal variation
- physical and psychological access to acceptance of the VHWT drugs

- standard treatment schemes (amount of full course treatment)
- regularity of drug supply
- correctness of accounting

Actual evaluation reports from Mali, Senegal, and Niger quote annual per capita costs ranging between 0.25 US\$ and 1 US\$, all for a VHW stage one program. But since their calculations derived exclusively from dividing average monthly expenditures by numbers of population or patient contacts without the consideration of the above variables, they remain largely theoretical. The question arises: What can a villager actually buy with, say, 1 US\$ or 10 US\$ per year when paying the actual consumer prices for drugs?

Table 9-12: Treatment Cost and Affordability (see also Chapter 5)

Drug	Amount Per Single Adult Treatment	Single Adult Treatment Costs (US \$)		Number of Adult Treatments			
		Mali ¹	UNICEF ²	For 1 US \$		For 10 US \$	
<u>VHW stage one</u>				Mali	UNICEF	Mali	UNICEF
Chloroquine (100 mg)	900 mg (9 tablets)	0.37	0.15	3	6	27	66
	or 1500 mg (15 tablets)	0.62	0.25	1	4	16	59
Aspirin (500 mg)	1500 mg (3 tablets)	0.12	0.012	8	83	83	833
	or 4500 mg (9 tablets)	0.4	0.037	2	27	25	270
Ophthalmic eye ointment (1%)	1 g (single application)	0.17	0.09	6	11	59	111
	or 5 g (3-day course)	0.83	0.45	1	2	12	22
Tincture of iodine/cotton wool (or hydrogen peroxide/cotton wool)	10 ml/5 g: single application	0.12(x)	0.81(0.075)	8(x)	1(20)	83	12(200)
	or 100 ml/20 g: 3 days	1.6(x)	7.92(0.1)	-(x)	-(10)	6	1(100)
Dressing: tincture of iodine/cotton wool bandage (or hydrogen peroxide/cotton wool bandage)	Single bandage (the above amount + 1 bandage) or 3 days dressing	0.50	0.87(0.3)	2	1(3)	20	12(33)
		3.10	8.05(0.9)	-(x)	-(1)	3	1(11)
Charcoal tbs or ferrous sulphate (300 mg)	3 tbs	0.046	x	22	x	217	x
	3 tbs or 180 tbs	0.44	0.015	2	66	23	666
	(2-month course)	26.4	1.02	-	1	-	10

Table 9-12 continued

Drug	Amount Per Single Adult Treatment	Single Adult Treatment Costs (US \$)		Number of Adult Treatments			
		Mali ¹	UNICEF ²	For 1 US \$		For 10 US \$	
<u>VHW stage two</u>				Mali	UNICEF	Mali	UNICEF
Chloramphenicol (250 mg) or tetracycline (250 mg)	56 tablets (2g/day for 7 days)	5.6	1.8	-	-	2	5.5
	56 tablets for 7 days	24.5	1.52	-	-	-	6.5
Piperazine (500 mg) or mebendazole (500 mg)	8 tablets	x	0.065	x	15	x	153
	8 tablets	3.15	x	-	x	3	x
Penicillin V (250 mg) or ampicillin (500 mg)	56 tablets (2g/day for 7 days)	14	2.07	-	-	-	5
	28 tablets for 7 days	3.6	2.29	-	-	3	4
Dressing with anti-bi- otic ointment	for 1 day	0.9	0.33	1	3	11	30
	for 3 days	2.7	0.99	-	1	4	10
Oral rehydration for infants	1 pack	x	0.15	x	6	x	66
Annual adult malaria prophylaxis:							
chloroquine 100 mg	260 tablets	9.75	4.50	-	-	1	2
or pyrimethamine 25 mg	52 tablets	x	0.33	x	3	x	30

Key: (1) Actual consumer prices 1980, Mali, Pharmacie Populaire (see Chapter 5): the drug costs are in general 50% higher than consumer prices in the country of origin. For example, one tablet of chloroquine 100mg sold for 0.22 FF (= 10 FCFA) in France would be sold for 30 FM (= 15 FCFA) in any pharmacy throughout the Malian territory. The 50% increase accounts for shipment, handling charges, customs, tax, storage, and distribution costs.

(2) UNIPAC price catalogues 1980 plus additional 100%. For example, if 1,000 tablets of chloroquine 100mg are stated as 7.67 US\$, we calculated the treatment unit price on the basis of 15.34 US\$. The breakdown in percentage consists partly of official UNICEF recommendations (UNICEF, Dakar 1980), partly of our arbitrary markups, official UNIPAC prices, plus:

(10% for UNICEF contingencies, plus
(5% for UNICEF administrative costs, plus
Official (10% inflation (even for the latest price catalogue), plus
(15% surface shipment from Copenhagen warehouse,
including insurance

Subtotal: UNIPAC prices + 40% for surface shipment (or
" " + 60-85% for air shipment), plus

Arbitrary: (10% for VHW remuneration and transportation costs, plus
(50% for in-country costs: i.e., customs, taxes, storage
and distribution costs, labelling and repackaging)

Total: UNIPAC prices + 100% (for surface shipment).

x: not available at indicated source.

Although illustrative in nature, (but realistic for Mali 1980), this kind of calculation is indispensable in calculating the villagers' purchasing power for modern medicine within the present pricing policy.

When considering Malian prices, it becomes quite clear that 1 US\$ can buy only the VHW stage one adult treatment, and even that, on a very limited basis: one full three-day eradication treatment for pl. falciparum, plus nine tablets of aspirin, or two bandage dressings, or three days of ophthalmic eye ointment application. The rest is largely placebo treatment.

Five US\$ can buy a full adult course of ampicillin and a single dressing with antibiotic ointment or a one year adult chloroquine prophylaxis and a single antibiotic ointment dressing or 13 one-day malaria treatments. Ten US\$ allow a wider range of purchase such as two chloramphenicol treatments, one year of malaria prophylaxis, three full courses of ampicillin, twelve days' dressing with antibiotic ointments or four ascaris treatments.

By comparison, UNICEF prices enable, even if doubled, 2 US\$ to buy a whole range of treatments: sufficient treatment variations of all VHW stage one drugs (provided that tincture of iodine is replaced by hydrogen peroxide),

also a full tetracycline or a penicillin V course, six years of pyrimethamine malarial prophylaxis, 12 oral rehydration courses for severely dehydrated children, or 26 ascaris treatment courses.

Note: Although malaria prophylaxis is not recommended for general use in a stage one VHW program (see Chapter 3), pyrimethamine, not chloroquine, is obviously the malaria prevention drug of choice, both medically (except in pregnant women and other cases at risk for folic acid deficiency) and financially.

In conclusion, the minimum effective expenditure on VHW stages one and two drugs (for an annual average per capita adult) is 10 US\$ = 2,000 FCFA for countries with similar drug prices as Mali 1980. (With the exception of Gambia, practically all Sahelian countries fall into that category) or 2 US\$ = 400 FCFA for the double prices of UNIPAC 1980.

The TBA remuneration in stage one (see Chapter 3) usually creates no financial problems, since deliveries are a one time event every two-three years and fees are either traditional (e.g., chicken, crops) or a relatively small amount of cash between 50-200 FCFA. For the TBA in stage two, cash problems similar to the above might occur, especially when she has to spend much of her time on prenatal and postnatal care with frequent follow-up visits.

Unfortunately we have no knowledge of disposable incomes of rural Sahelians to help us judge how much money they might have to spend on VHWT care. The only estimates usually available in the literature are about farmers' incomes, (i.e., the annual output value of their crops, minus production costs, plus estimates of some nonfarming income) believed by some to be 60% of the total rural income (see Basic Needs in the Gambia, 1980, The World Bank Report No. 2656 GM).

These annual per capita rural income estimates range between 60\$ (Mali 1979) and 140\$ (Gambia 1976). Whatever the figures for disposable income might be (some believe that for a large percentage of northern Sahelians it might be zero), we can safely assume that, apart from cash-crop pocket areas, it is in the range of 10 US\$ and below. We also do not know what amount of that is required for other basic human needs such as matches, kerosene, soap, tool repairs, clothing, sugar, and tea. Given the current Malian prices for modern medicine and our calculation of a minimum of 10 US\$ (2,000 FCFA) required for a minimum mix of drugs per year (see above) it becomes quite clear that the majority of villagers will not be able to spend that amount for medical care.

The only solutions are therefore to increase cash income (which will not be discussed here) or to bring substantially cheaper drugs closer to the villagers. The present MOH budgets will not be able to supply them with 100% free drugs. Therefore cheaper, more effective drug sources and a better drug distribution and drug utilization system seem to be the only logical answers.

Chapter 10: CONCLUSION

In this book we have tried to identify major problem areas and to offer a variety of solutions on the basis of a model VHWT program that fits the Francophone Sahelian reality as closely as possible. The answers, as we have seen, are not easy.

In the difficult circumstances in which we work, flexibility must allow us to change or even abandon certain goals and to try alternative solutions rather than continuing to pursue the impossible. For example, it might well be that the whole idea of the VHW delivering some essential drugs to the villagers could be successfully replaced by a private, commercial drug supply network extended into rural areas close to the people. Certainly government-borne recurrent costs would be much less, and the opportunity to mishandle the drugs no greater. A commercial agent, for example, might be much more inclined to sell the full course of a malaria treatment than a VHW, especially if the flat fees are too low and the VHW is not being sufficiently remunerated.

The strength of this book, we believe, lies in its extensive cost analysis of line item budgets and the absorptive capacity assessment at all levels. It is around this economic concept that we assembled all the requirements. Of course, whenever one tries to break down largely unsolved and unscientific areas into ultimate details, as we sometimes have, one risks erring in those details and then multiplying the errors by projecting them onto a national level.

Therefore, this book is intended as a general guideline for planning, implementing and evaluating VHWT programs.

Annex A: CHECKLIST OF ISSUES

Checklist of issues to be resolved in planning, implementing and evaluating a VHW program:

Selection of sites and personnel

- Geographical selection of villages, definition of the functional unit:
 - distances, population, physical access to referral/supervisory centers
 - communication systems (e.g., roads, radio, telephone): seasonal variations
 - integration with existing or developing administrative/socioeconomic/health infrastructure at all levels.
- Selection criteria of the VHW committee.
- Selection criteria of male and female VHW.
- Short description of the "animation rurale":
 - organization chart
 - number/category of personnel
 - personnel selection criteria
 - frequency of visits per village
 - time spent, mode of social interactions, type of people being addressed, issues discussed.
- Non-acceptance rate: number of villages initially selected vs. number of villages which actually chose a VHW (male, female, or both) and reasons for nonparticipation.

Summary questions:

- Have the villagers been fully informed about the VHWT, its activities, selection criteria, their responsibilities/costs for the VHWT, its medical limitations, and related details?
- On what basis were the villages, the committee, and especially the VHWT, chosen?
- Was the will of the majority of the villagers followed in VHW selection?
- Were the "felt needs" of the villages respected/addressed?

Initial training (separate description for the male and female VHW)

- Site: location, appropriateness, space, performance level.
- Training personnel: number, category, VHW/PHC experience, sense of leadership, own initiative.

- Training time: duration, frequency/year, size of trainee groups, male/female differences.
- Materials: type, appropriateness.
- Subjects: activities envisaged, hourly syllabus, practical "hands on" training, diagnosis/treatment, practical demonstrations, appropriateness, training in logistics (recording, stock control, accounting, resupply).
- Exams: standard of performance, understanding and utilization of manuals, drugs, equipment, recording, logistics (resupplies).
- Attrition rate: number of potential VHW selected vs. those completing training, major reasons for dropouts.

Summary question:

- Have the VHWs received adequate and appropriate training to carry out their tasks in the field?

Activities and performance (separate descriptions for male and female VHWs)
Do the tasks performed by the VHWs coincide with project planning documents, initial explanation to villagers, and training syllabus?

- Preventive:
 - health education (group/individual)
 - routine house to house visits
 - MCH activities.
- Environmental sanitation including such elements as water/wells and waste disposal/latrines:
- Curative:
 - type of diseases diagnosed and treated: appropriateness to the local epidemiology
 - diagnostic level
 - treatment schedule followed
 - reasons for "preferred/neglected" diagnosis and treatment
 - normal and complicated deliveries: cord cutting, tying
 - hygiene
 - possible harmful under/over treatments and side effects.
- Recording system: type of records, appropriateness, accuracy.
- Administrative: financial control and drug stock control/shortage; re-supply system.

- Age/sex/ethnic/religious/socioeconomic-specific numbers of first visits, follow-up visits and total visits. Specific percentages represent "radius of action" and sex-specific priorities.
- Comparison of the above figures with corresponding figures in fixed centers, e.g., the rural dispensaries and health centers, maternities: percentage of people seen by fixed centers versus by VHWS, comparative diagnosis and treatment received.
- Patient contact curve over six-month to one year period and possible reasons for fluctuation (such as harvest, lack of seasonal communication, cash, funds).
- Cooperation or competition of local healers ("guerisseurs", itinerant injectionists, merchants) and quantitative/qualitative estimates, if possible.

Summary questions:

- What percentage of the total population within the functional unit and within his/her own catchment area is in contact with the VHW, especially six months after his/her installment?
- Do VHWS attend the vulnerable/priority groups (infants, young children, pregnant mothers, adult labor force)?
- Is there any specific reason for over/underutilization of the VHW?
- What impact on health for the individual or the community can be expected?

Acceptance, motivation and active support over a period of time (sense of program ownership and responsibility)

- Central level
 - MOH personnel
 - politicians from other ministries.
- Prefecture/regional level
 - administrative (prefet/gouverneur)
 - medical (doctors, nurses at the regional hospital).
- Sous-prefecture/cercle level
 - administrative (commandant de cercle, etc.)
 - medical (doctor, nurses at the HC).
- Arrondissement level
 - administrative (chef de canton)
 - medical (infirmier).

- Village level
 - chef de village
 - people of various groups (age, sex, ethnic, religious, socioeconomic): actual support of the VHWT
 - the VHW him/herself: motivation

Summary questions:

- Is the VHWT sufficiently motivated?
- Is the VHW program well accepted and actively supported by those concerned, at different levels, over time?

Referral system

- List of categories of patients to be referred: diagnostic, curative, follow-up.
- Number and disease categories of patients referred, especially by the female VHW (compare VHW referral statistics with referral center statistics).
- At the referral center: level of care for referred patients; diagnostic and curative standards of health post, HC, and the regional hospital for attending VHW referrals.
- Feedback mechanisms between the VHW and referral center (such as notes on diagnoses and treatments and follow-up instructions for the VHWT).
- Major reasons for poor referral systems: (distance and transport facilities, money, VHWS' poor diagnostic abilities, poor treatment at the referral level, suspicions and mistrust).

Summary questions:

- How many and what type of patients are referred?
- How many patients are not referred who should be?
- What quality of medical care is given at the referral centers?

Supplies (logistics of drugs and medical equipment for the VHWT)

- Source: foreign, national, local (village-level).
- Integration with the national supply system:
 - familiarity with/knowledge of: dosages, labelling, generic vs. brand names,
 - availability of drugs for VHWTs through government/private channels
 - licensing and import monopolies (of multinationals)
 - pricing policies.

- Financial status of pharmaceutical agencies: state-owned vs. private suppliers.
- Storage: stock control system, space, shelving, integration with national storage systems at all levels: central/national, prefecture, sous-prefecture, arrondissement, canton, village.
- Distribution and resupply:
 - frequency, ordering procedures, communications, accounting/record keeping
 - transportation to the periphery
 - integration with national distribution system at all levels (see above), including the distance between the VHWT and the next resupply center.

Summary questions:

- Does VHWT have "out of stock" problems, and, if yes, why?
- Is the national (state-owned and private) drug supply and distribution system financially and managerially capable of adequately resupplying VHWTs?
- Is the VHW supply sufficiently integrated into the national one to guarantee continuation after the end of the project?

Supervision (planned and actually carried out at all levels: MOH, region, cercle, arrondissement, village)

- Frequency of supervisory visits, especially during first three months.
- Personnel: number and category, time spent for travel and actual VHWT contact.
- Supervisory activities:
 - statistics/record keeping
 - medical (accumulated cases discussed)
 - logistics (supply)
 - community organization problem solving.
- Statistical links between attrition and frequency/quality of supervision

Summary questions:

- Is the VHW regularly and effectively supervised, especially at the beginning?
 - Is supervision being carried out at all levels as planned?
 - Does the supervision include solving problems and upgrading skills on a continuing basis?

Attrition (separate statistics for male and female VHW)

- Attrition rate of trained VHW after one, three, six, 12 months, and two years of service.
- Annual attrition vs. recruitment rates: trends in absolute VHW numbers.
- Major reasons for high attrition rates.

Summary questions:

- How high is the attrition rate, especially for males?
- What are the major reasons for an attrition rate which is higher than the recruitment?

Costs to be borne by the government (line item budgets and time requirement of government personnel)

- Baseline cost data for line item budgets:
 - annual salary schedules: medecin chef, agent animateur/rice, infirmer/e, driver.
 - per diem: for all health personnel categories and for the VHW during training
 - gasoline: price/liter and liters used/100km according to vehicle category
 - vehicle purchase: according to categories
 - vehicle maintenance: cost per km according to vehicle category
 - kits for male and female VHWS
 - initial drug donation for male and female VHWS
 - stationery
 - training materials, manuals.
- Baseline time data of activities:
 - initial sensitization of villagers
 - training
 - of the HC staff
 - of the staff
 - of the VHW m/f
 - supervision
 - at the HC level
 - at the dispensary level
 - at the village level

- retraining
 - . of the VHWT
 - . of new HC and personnel.
- Line item budgets - compilation of data based on baseline data above for a whole functional unit and for a single VHW, male or female.
- Summary of annual costs over an initial five-year period.
- Average annual recurrent costs over an initial five-year period per male or female VHW, including inflation rate.

Summary questions:

- What are the initial capital and recurrent costs of a VHW team?
- How much time do the MOH and other official government personnel at all levels spend on a VHW program?
- What will be the host country's recurrent costs and personnel requirements once the foreign donation ends?

Costs to be borne by the villagers:

- Remuneration of the VHW: in cash, gifts in kind, provision of transport, or other help (individually and by the community).
- Treatment costs: flat fees, different prices for each medicine according to the type/amount of treatment or delivery.
- Fees for services versus costs for resupply:
 - prices for each type of treatment/medicine charged to the villagers
 - Pharmapro, pharmacie populaire, project price lists of drugs
 - comparison of the above.
- Comparison of VHW treatment costs vs. local healer and other treatment costs (if available).
- Capital investments: huts, tents, kits, wells, latrines, initial training.
- Cost estimates for referrals: transportation, payments at the referral point.
- Annual cost estimate of an average family of five:
 - for the VHWT treatment
 - for other "healers" (local guerisseurs, merchants, itinerant injectionists)
 - for health care at fixed centers.

Summary questions:

- What do the villagers contribute to the VHW program?
- Is it enough to cover all the expenses, even at the village level, particularly to resupply drugs?

Supportive infrastructure costs (additional capital and recurrent costs required to expand the VHW programs)

- Construction of additional health centers, "animation rurale" offices, and dispensaries: capital investment and recurrent costs.
- Expansion of drug supplies networks: capital investment and recurrent costs (see drugs and equipment, above).
- Additional personnel costs at all levels (MOH, regional hospital, animation rurale, HC and D).

MOH absorptive capacity

- MOH annual recurrent budget:
 - total, personnel salaries, investment, maintenance budget
 - percentage of GNP
 - calculated MOH per capital budget
 - trends over last 10 years: personnel costs vs. maintenance budget.
- Foreign donor health assistance:
 - total, categories of personnel, area of investment
 - percentage of MOH budget
 - trends.
- MOH personnel per category:
 - doctors, nurses, others (all categories)
 - capital/urban/rural distribution
 - annual university output: abroad; in-country
 - trends.
- MOH central planning capacity:
 - organization chart
 - category of personnel attached to it
 - planning unit: space, personnel, office supplies, secretarial assistance, office equipment (desks, filing cabinets, typewriters, calculators, in-country communications facilities)
 - budget (salaries, maintenance)
 - problems.
- Matching of line item budgets against MOH annual recurrent budget and annual five-year costs above.

Summary questions:

- Does the MOH have the planning capacity for a large scale VHW program?
- Does or will the MOH in the foreseeable future have the capacity to absorb money and personnel to maintain and expand a large scale VHW program?

Absorptive capacity at the region/cercle/arrondissement level

- Number and category of personnel at the rural sensitization service (animation rurale) including clerks and drivers, office space and office supplies. Utilization of their time.
- Number and category of personnel at the regional hospital, HC, dispensary level, including drivers and auxiliaries. Utilization of their time.
- Transport facilities at the animation rurale office, regional hospital, HC, type/condition of vehicle, gasoline supply, maintenance/repair facilities, spare parts, maintenance budget.
- Diagnostic and curative level at the regional hospital/HC (see referral system, above); a brief description of:
 - laboratory facilities
 - drug supply/utilization
 - space
 - surgical performances and capacities (Caesarean section, breech delivery, accidents, fractures, wounds)
 - dressing/injection/minor surgery
 - patient/key personnel ratio
 - general management.
- Training facilities at the HC or D level (see initial training above).
- Matching of baseline data (see costs to be borne by the government) against first three points in this section.

Summary questions:

- Is there any rural sensitization service and can/does it carry out the initial sensitization?
- Do the health personnel at the HC and D have enough time and the means (mainly transport) to train, supervise, and retrain the VHW?
- Do the referral centers (regional hospital, HC, D) have the capacity (time, space, diagnostic and curative facilities' staff) to adequately handle referrals?
- What potential capacity do all of the above have for expansion of VHW programs?

Financial and managerial absorptive capacity and drug supply networks at the village level

- Estimates of disposable income of average village family per annum, estimate of what can be/is actually spent on health care (see treatment costs), possible competition of VHW expenditures with other basic human needs.
- Matching of treatment costs against disposable income estimates.
- Access to drug supply networks: distance/transport facilities to next drug dispensary, quantitative/qualitative stocking of VHW drugs. (see also drugs and equipment, in this chapter).

Summary Questions:

- Can the villagers afford the VHWT costs?
- Do the newly introduced VHWT costs compete with other basic human needs?
- Is the drug supply network accessible to the villagers?

Summary of major problem areas

- Active and wholehearted participation of all levels of the host country health professional officials is a precondition for the success of a VHW program. This participation may be difficult to obtain because the VHW approach is:
 - often alien to or even contradicts the health establishment personnel's training and attitudes (especially the more sophisticated medical consciousness of doctors and high-level nurses)
 - depends heavily upon personal motivation, sacrifice and managerial skills
 - offers few if any career opportunities to the health establishment (contrary to the classical curative specializations in the capital cities)
 - confronts financially powerful interest groups such as pharmaceutical suppliers and dealers
 - confronts urban professionals (doctors, nurses, administrators) with the often unfamiliar and uncomfortable realities of village life
 - shows, at least in the beginning, little visible result.

More specific potential problem areas are numerous and run throughout the above cited checklist. Therefore only the most common ones are reiterated below.

- The VHW him/herself
 - lack of remuneration/career ladder/profit/support
 - poor motivation
 - wrong selection (criteria)
 - medical/financial abuse of his role

- lack of (some) drugs/supplies
 - poor performance: medical, administrative (accounting)
 - treatment fees too high, too low compared to actual drug costs
 - high attrition, absenteeism.
- The village level
 - lack of cash
 - lack of appreciation or acceptance of VHW and different expectations of his/her role
 - lack of active support to the VHWT
 - problems with huts and tents (maintenance)
 - poor patient-VHWT contact ratio, no referrals
 - too great a distance from fixed medical/administrative, drugs resupply centers
 - population too small to support VHW costs.
- The arrondissement/dispensary level
 - lack of supervision (no transport facilities, no per diem, no time, distance too great, poor roads)
 - low standard (diagnostic, curative) referral centers
 - poor supervisory, managerial, administrative performance (continuous upgrading of VHW skills).
 - high turnover of personnel
 - lack of interest in the program.
- The cercle/HC/animation rurale level
 - inadequate initial sensitization (lack of time, transport personnel, skills, interest)
 - poor initial training, especially relative to administrative/ logistic procedures, lack of manuals/understanding
 - lack of the political administrators'/health professional interest (medecin chef, infirmiers) and active program support
 - high turnover of personnel
 - poor HC standard (medical, managerial) for a referral system
 - lack of supervision (distances, transport, per diem, time, continuous upgrading of skills).
- The region/regional hospital/animation rurale level
 - lack of supervision of the cercle level (transport, per diem, distance, time, interest), high turnover personnel
 - inadequate referral standard: poor curative/lifesaving performance, no drugs or diagnostic facilities
 - lack of general interest and support (political, administrative, medical).
- The central/MOH level
 - low priority of VHW programs among existing programs
 - lack of general interest/active support

- deteriorating MOH budgets, especially for covering recurrent costs
 - poor, if any, communication to the cercle level: lack of communication system, transport, per diem
 - resistance of the health establishment and pharmaceutical interest groups
 - inadequate technical and especially managerial knowledge of the whole range of tasks
 - lack of authority, high personnel turnover
 - poor communication with related ministries (e.g., Agriculture, Planning, Finance).
- The national pharmaceutical level: Government monopolies (Senegal, Upper Volta, Mali, Pharmapro; Mauritania, Pharmarim; Niger, ONPPC; Chad, PNA) vs. (semi-) private pharmacies populaires
 - accumulated debts
 - sources, prices of pharmaceuticals
 - monopolies and licensing
 - exchange rate constraints outside the Zone Franc
 - brand names vs. generic names
 - lack of cheap VHW basic drugs/treatment (particularly cheap dressing material)
 - lack of proper storage facilities
 - breakdowns in distribution services (e.g., lack of gasoline, vehicles).
- The national political level
 - political instability
 - poor commitment to more equal distribution (bureaucrats vs. rural population)
 - little priority given to health care and health budgets.

Annex B: SUMMARY OF PLANNING/IMPLEMENTATION/EVALUATION STEPS

Let us suppose that a country has no national VHWT program, but wants to develop one. What would be the major steps, at various levels? What are the most serious and most common errors to be avoided?

1. The MOH planning unit consists of at least two top officials with sufficient office space, secretarial assistance, office supplies, printing facilities, communication, and transportation. The unit has its own budget for organizing frequent seminars, printed handouts, and field visits, to be specifically assigned for the VHWT program in all its aspects. The officials should have long and in-depth field experience, managerial skills, dedication, and access to top level officials of their own and related ministries.

The unit is to be in charge of overall planning, supervision, and evaluation of all VHWT programs and, most importantly, for developing a feedback mechanism between the field and the MOH in both directions starting at the planning stage. The planning unit is an essential precondition to a national VHWT program.

Avoid:

- proliferation of uncoordinated/uncontrolled VHWT programs by various donors
- special assignments of isolated MOH officials to one VHWT program only.

Time: six months to two years until fully operational

2. The functional unit (FU) and geographical location: Chapters 2 and 9

- determine the number of VHWTs attached to the number of fixed centers: our recommendation is 10 VHWTs for the first year if no equipe d'animation rurale (EAR) is in operation, or 36 VHWTs for the first year if an EAR exists; or 80 VHWTs maximally at any time per HC and four to eight Ds depending on staffing pattern
- determine range of distances, range of population within catchment area, communication networks, and size of village population to be initially excluded from a VHWT program
- consider mapping and geographical locations of HCs, Ds and VHWTs planned to be attached to them. Each arrondissement, sous-prefecture and prefecture will be subdivided into FU's
- calculate estimates of total population coverage.

Avoid:

- too many VHWTs attached to a HC and/or D
- unrealistic numbers of VHWTs

- using the village or arrondissement as the base of the FU ("bottom up" principle) instead of our recommended sous-prefecture in liaison with the prefecture and the MOH planning unit (decentralized "top down" principle)

3. Activities: Chapter 3

- establish separate detailed activities for the male and female VHWS. Usually no epidemiological surveys are required (except for evaluation of health impact before/after the VHWT)
- define role, if any, of village committee
- set fees for services policy carefully
- decide remuneration policy separately for the male and female VHWS
- design standard treatment schedules
- choose detailed activities for EAR, HC training/supervisory team and D supervisory nurses; i.e., logistics/administration for training and supervision
- project frequency and duration of activities for each personnel category.

Avoid:

- neglect of administrative/logistical tasks of VHWT and training/supervisory personnel
- overloading the VHWT with community development tasks
- neglect of referral sources
- flat fees too high or too low.

4. VHWT selection criteria and remuneration/career ladder: Chapter 4.

Select VHW with functional literacy and numeracy (in Arabic writing or local language) depending on activities chosen. Married or elderly men are more likely to stay with the program.

Our recommended remuneration policy: For the male VHW add 10% to the cost price for each drug, which either goes to the "caisse commune" of the village committee, which then pays the VHW a fixed salary, or is kept directly by the VHW. For the TBA, stay with the traditional remuneration or fix a flat fee per delivery in cash for the stage two TBA. Consider all the pros:

- lower attrition rate due to financial incentives
- simplicity of operation

and cons:

- profits may not always cover expenditures or reasonable salaries
- the VHW wants to become a civil servant (on the government payroll) or to be offered an opportunity for career advancement
- additional costs to already financially strained villagers
- the danger of becoming a "petit commercant," i.e., pushing the sale of drugs with the highest profit margin regardless of quality care standards
- complaints of villagers about receiving no direct benefit from a "caisse commune"
- career ladder opportunities are frequently discouraged by the national government and are not economically feasible under present circumstances.

Avoid:

- choosing male illiterates without basic numeracy and trying to replace writing/reading with too many/too complicated symbols (especially for logistical/administrative tasks);
- choosing persons with high attrition probability (students, strangers, migrant workers, "career opportunists")
- no remuneration at all or "assumed"/undefined help from fellow villagers
- career ladder promises which are unlikely to be fulfilled.

5. Manpower requirement: Chapters 7 and 9

- develop a timetable for all categories of government personnel at all levels of the FU
- decide whether initial sensitization will be done by the EAR or the HC staff
- decide frequency and duration of activities, especially training and supervision
- decide staffing pattern at the HC and D, which will influence the numbers of fixed centers required
- estimate VHWT/government officials ratio (our recommendation is 4 to 5:1)

- tabulate nationwide manpower requirements at all levels of VHWT activities, separate for each prefecture, including the training/supervisory teams
- plan staging of program and manpower projections which will be largely influenced by the absorptive capacity of the country
- calculate training institution requirements such as medical and nursing schools.

The last two points have not been dealt with in this book.

Avoid:

- neglect of EAR or HC timing for initial sensitization, which accounts for more than 60 percent of HC staff time spent on VHWT activities
- neglect of the TST at the prefecture level prior to new VHWT implementation
- neglect of plan for additional manpower requirement due to low VHWT/-government ratio
- neglect of plan for additional medical and nursing enrollment capacities.

Note: Determining time and personnel requirements are among the most crucial and difficult steps in planning.

6. VHWT drugs and equipment: Chapter 5

- Choice of drugs/equipment according to activities chosen
- decide whether to combine or choose selectively from drugs for stages one and two
- identify drug sources and determine transportation time (direct import, e.g., from UNICEF or through PNA or PP channels)

Avoid:

- village huts or health posts
- drugs which are uncommon (chloroquine 250 mg tablets), generally unavailable (penicillin V tablets) or very expensive (iron tablets) or expensive but not very useful (ganidan) in the Francophone Sahel
- failure to provide kit cases
- items which might take years to arrive (UNICEF midwifery kits)
- neglect of absolutely necessary items (cord tying bands)

- equipment not really necessary or too complicated to use especially with regards to the UNICEF midwifery kit contents (e.g., irrigators)

Note: The logistics of VHWT drugs and equipment must be carefully tied to the timing of training sessions which is often limited to two to four months a year during the dry period between rainy seasons, planting and harvesting. Complete kits must be ready for training sessions.

7. VHWT drugs within the national drug supply system: Chapter 6

- decide whether to choose the monopoly or parallel system
- decide whether to expand the PP network or construct peripheral warehouses
- decide price fixing policy
- clarify ordering procedures
- establish distribution networks
- provide standard supply lists to D and HC
- design needed changes in legislation.

Avoid: Setting up supply channels only for the life of a project and completely separated from the national supply channels without responsible expectation for continuation.

8. Training/syllabus design:

This issue has not been dealt with at all in our manual despite its importance and the numerous problems it can create, since we tried to focus more on the logistical/managerial part of the VHWT. There is also ample VHWT training literature available elsewhere, such as:

- manuals for training of the trainers, manuals on training VHWT, English/French from: Strengthening Health Delivery Services (SHDS), Dr. Saul Helfenbein, Abidjan, 1979.
- "Plan de cours: Hygieniste et matronne," French/Dutch medical assistance teams, Niamey, 1978.
- "Projet sante rurale, formation des hygienistes-secouristes et des accoucheuses," French, HIID, Bamako, 1979.

Virtually hundreds of training books, mostly in English, can be found in the annotated bibliographies: Low Cost Rural Health Care and Health Manpower Training, Volume 1-9, International Development Research Center, Ottawa, 1975-1982.

Training is necessary for three categories of personnel: The prefecture training teams, who then train the HC and D staff at the sous-prefecture and

arrondissement level, who in turn train and supervise the VHWT. Ideally, there should be a national training team who first trains all the prefecture level teams.

Three elements in training are of vital importance:

- 1) The training must fully and in great detail address the selected activities of the VHWT.
- 2) Training in logistics, administration and management, even vehicle maintenance, is vital for all target groups, especially for the one at the sous-prefecture and arrondissement level.
- 3) The VHWT must be taught to properly use his/her kit contents. The proper usage of each tablet, each cotton swab, register book and marked drug container must be fully understood.

Avoid:

- unrealistic or impractical syllabus (too many community development tasks, basic physiology)
- neglect of logistical/administrative tasks (reporting, stock control, resupply)

9. The referral system:

Again, an issue not sufficiently dealt with in this book since the functional level is essentially different from that of the VHWT. However, because of the extreme limitation of VHWT knowledge and tools (out of 147 essential primary care drugs, only 13-27 drugs are assigned to VHWT, see Chapter 5).

Annexes C and D provide a comparative standard with regards to furniture, equipment, drugs, tasks and space requirements for the Ds. Additional requirements derive mainly from faulty construction (roofing, waiting areas, storage space) and inadequate water supply (well, pump, plumbing).

It is, however, at the sous-prefecture/HC level that most problems are encountered (construction, water, electricity, furniture, equipment, drugs, vaccines, patient flow, personnel skills, kitchen, toilets, bedding, staff lodging, storage and shelving, cleanliness, transportation, staff morale). Their standard of care is very often not much different from a rural D. Already grossly inadequate for existing requirements, they are in most cases not prepared for additional VHWT tasks (training, supervision, diagnosis and treatment of referred patients, VHWT drug and equipment storage and repair). Due to their central role within the FU, they cannot and should not be bypassed. Thus the fundamental decision must be made whether new VHWT implementation should be delayed until fixed centers are prepared for it, or whether the status quo is to be accepted with a non-existent or largely inadequate referral system.

Annexes C, D, and E give some advice on HC requirements but the majority of issues are not dealt with. Obviously priorities must be set.

Avoid:

- Neglect of the upgrading of fixed centers.
- Neglect of the referral systems.

Time:

- For individual centers: months to years
- For a nationwide program: years to decades

Note: Steps two through nine must be developed by a constant feedback mechanism. That is, testing each step of this theoretical plan with the realities at each level, i.e., villagers' felt needs, arrondissement, sous-prefecture, prefecture and MOH perceptions. Health and administrative officials and villagers should be contacted through frequent field visits to discuss the plans as they progress.

10. Service units cost projections: Chapters 5, 8, and 9

This step summarizes all conclusions of steps two through nine and puts them into line item budgets, broken down into the smallest possible service units, which are then projected onto the national level.

- Establish country specific baseline cost data
- Tabulate direct VHWT line item budgets
- Project direct, personnel and infrastructure costs onto prefecture and national levels
- Tabulate VHWT treatment costs
- Decide costs to be borne by the villagers

Avoid:

- Cost estimates before all other step two through nine decisions/conclusions have been made.
- Cost estimates already "tailored" by lack of national resources down to a level below the minimal efficacy level (or below any internationally acceptable standard)

Underestimates due to hidden costs or neglect of vital services

- Cost estimates of limited and isolated service units at the village and arrondissement level without projections into total coverage and onto the sous-prefecture, prefecture and national level

- Neglect of the necessary infrastructure
- Omission of annual inflation rates and contingencies.

Summary of Steps 2-10: Their results will provide the answers in planning to questions such as: what, how, how many, how much, where, by whom should it be done, what are the required resources, where do they come from, how much it will cost, and who should pay for what.

11. The absorptive capacity: Chapter 9

Resource requirements established by steps two-10 (especially steps five and 10) are matched against available resources at the national and village levels. Due to the importance of the sous-prefecture and arrondissement level (the basis of the FU and the core of VHWT backstopping services), both need individual absorptive capacity assessments. In quantitative terms, this is best achieved by comparing the FU requirements with the existing situation individually for each chosen sous-prefecture and arrondissement. Any gaps, especially with regards to manpower, fixed centers, and transportation, must be addressed in the final planning document. Qualitative assessment will be achieved by comparing Annexes C and D plus construction of buildings and water supply with the state of the existing Ds. For HCs, conclusions reached in step nine should be taken into account.

Note: A fundamental difference in our planning approach is to try to assess on the basis of a structured VHWT model, realistically only slightly above the minimal acceptable standard, the actual requirements irrespective of available resources. The results of the absorptive capacity might then only limit the quantitative output of VHWT rather than compromise on quality standards below any commonly acceptable level of care.

12. Final planning document: This is largely a result of steps two through 11, for which Annex A provides a checklist of issues. Summary cost tables should indicate possible financing sources within the country (MOH, MO rural development, MO public works, village participation), and from foreign donors (identified and potential ones); realistic and flexible time schedule for implementation; annexes with drug and equipment lists, job descriptions, training syllabuses. The minimum time to compound all of steps two-11, to discuss and to reach an agreement with relevant government officials on the major policy issues will be in most cases one to two years from the time the MOH planning unit is fully operational. Therefore inclusion of inflation rates and contingencies for at least three to five years will be essential.

13. Ordering of imported items: As soon as supply firms and financing sources and procedures are identified, orders should be sent, since the time lag between ordering and arrival is at best (with cash in hand and via airfreight) six months, and may be three years. Since UNICEF seems to be the best and cheapest source, its ordering and financing procedure is worth mentioning. These are described in Annex F.

14. Implementation of the pilot study area: Begin implementation after thorough completion of steps two-13 and securing of target arrival dates of necessary imported items. Since our recommendation is the decentralized "top-down" approach rather than from the "bottom up", start with the MOH planning unit and the sous-prefecture pilot study level:

- Develop feedback mechanisms between the MOH and the pilot study area: field trips, printed handouts, (telephone) communication links, small seminars, contacts with local officials at all levels from the prefecture down
- Upgrade existing infrastructures (HC, D) and prepare drug distribution network
- Start training of the trainers (training/supervisory team either at the prefecture, sous-prefecture level, including the arrondissement/D nurses)
- Start initial sensitization of the villages, but only, when VHWT training can be held during same year
- Start VHWT training
- Start VHWT supervision
- Develop permanent feed-back mechanism between MOH planning unit and the villages.

15. Regular evaluation: Annex A, unless epidemiological evaluation is specifically designed into a pilot project (before-after surveys), conduct:

- Descriptive evaluation only: Develop out of Annex A (checklist of issues) a field questionnaire for all levels. Use established planning steps two through 10 (or our Chapters 2 to 9) as a comparative standard. Evaluate six months to one year after VHWT's return from training sessions.

16. Corrections and changes: As a result of evaluation, adjust initial plan as necessary.

17. Gradual nationwide expansion and maintenance

Cumulative timetable:

- A) Preparatory phase: Step 1: 1/2-2 years
Steps 2-13: 1-2 years
- B) Imported material arrival time: Step 14: 6 months - 3 years

C) Implementation: for the sous-prefecture/arrondissement pilot study:

1-3 years for creation of HC & D infrastructure

2-5 years for VHWT program

for nationwide expansion: decades for both the infrastructure
and the VHWT program

That means that from the start of planning to the point of implementation of the pilot study, expect between two and seven years, and for the nationwide expansion, between three and ten years might be required.

Annex C: FURNITURE/EQUIPMENT LIST OF A RURAL DISPENSARY IN THE SAHEL

Key: *not recommended but open for discussion.

1256000: code number indicating UNICEF as a source: UNIPAC price catalogue 80, transportation costs, excluded.

<u>Item: Furniture/Office Equipment:</u>	<u>Amount</u>	<u>Source</u>	<u>Total Price: US\$</u>
1) <u>Waiting area:</u>			
- benches, wooden (2m x 0.4m x 0.45m)	2	Local	50.00
- health education posters	-	"	<u>15.00</u>
Approximate Total			65.00 US\$
2) <u>First room: recording/diagnosing/routine drug dispensing/storage/oral rehydration</u>			
- desk with 3 drawers, wooden, large (1.5 x 0.7 x 0.75m)	1	Local	200.00
- filing boxes, wooden (0.5 x 0.5m)	2	"	15.00
- calendar	1	"	?
- box with scrap paper, mainly for drug packing, but also for referrals	1	"	5.00
- chairs, metal	2	"	30.00
- bench, wooden (1.5 x 0.3 x 0.45m)	1	"	25.00
- drug dispensing box, wooden with six compartments for routine drugs such as aspirin, chloroquine, charcoal, vitamins, iron tablets (labeled with quantity instructions)	1	"	15.00
- trash can, plastic with lid	1	"	13.00
- daily record book, monthly report forms, etc., ballpens, pencils, pencil sharpener, eraser, ruler	1	"	10.00
- cupboard, lockable with shelves, metal	1	"	200.00
- cleaning material: 2 brooms, 2 buckets, 5 cleaning cloths, scouring powder	1 set	"	25.00

<u>Item: Furniture/Office Equipment:</u>	<u>Amount</u>	<u>Source</u>	<u>Total Price: US\$</u>
- table, wooden (1.5 x 0.6 x 1m)	1	"	100.00
- rehydration box, wooden (0.5 x 0.15m)	1	"	10.00
- clipchart holder (for simple treatment manual)	2	"	5.00
- plastic sheeting, large, sturdy	2	"	10.00
- bucket with lid, plastic	1	"	<u>12.00</u>
Approximate Total			675.00 US\$

3) Second room: dressing/injections/
minor surgery/dentistry/storage room

- table, wooden, examining (2 x 1 x 0.6m)	1	"	100.00
- cupboard with shelves, lockable, metal	1	"	200.00
- shelving units, metal (or wooden), with 5 levels	2	"	350.00(50.00)
- trolleys or small tables (1 x 0.8 x 0.9m) with two levels	2	"	100.00
- metal chairs	3	"	45.00
- washstand with 2 metal bowls and soap/towel holder	1	"	40.00
- charcoal stove (iron tray with tripod) and charcoal tongs	1	"	40.00
- box for charcoal, wooden with cover	1	"	15.00
- buckets, plastic with cover	2	"	25.00
- waste container	1	"	10.00
- box for dispensary stock control cards, wooden	1	"	10.00
- jerricans, clear plastic with screw tap	2	"	25.00
- plastic sheetings, large, sturdy	3	"	15.00

<u>Item: Furniture/Office Equipment:</u>	<u>Amount</u>	<u>Source</u>	<u>Total Price: US\$</u>
- soapboxes and hand brushes	2 ea.	"	<u>5.00</u>
Approximate Total			<u>980.00 US\$</u>
Furniture Approximate Grand Total			<u>1655.00 US\$</u>

<u>Item: Medical Equipment</u>	<u>Amount</u>	<u>Source</u>	<u>Total Price: US\$</u>
1) <u>First room:</u>			
- stethoscope, binaural, Ford type	1	0686000	1.54
- flashlight with batteries	1	Local	5.00
- otoscope: Heine miniset type (not UNICEF)	1	Eng./US	30.00
- trays, cafeteria type	1	Local	2.00
- thermometers, centigrade, oral with cover	12	0481500	3.60
- bowl, 500cc, plastic or metal	5	Local	5.00
- wooden sticks or matches for swabsticks	200	"	?
- basins, 500cc, plastic or metal	3	"	6.00
- wooden tongue depressors in box or bowl (one bowl marked used, one marked clean)	500	0621000	2.39
- adult weighing scale, bathroom type	1	0139900	7.94
- infant weighing scale (10kg)	1	0145500	30.84
- oral rehydration set: 5 cups and 5 spoons, 5 ml plastic syringe, 10 l-litre bottles, 3 tins, 2 funnels	1 set	Local	16.00
- ear syringe, metal, large, Kramer type with spare tip	1	0783000	14.85
- steel kidney dish, large	1	0210000	1.49
- drinking glasses (200 ml)	5	Local	4.00

<u>Item: Medical Equipment:</u>	<u>Amount</u>	<u>Source</u>	<u>Total Price: US\$</u>
- sputum specimen cups resterilizable, 30 ml	50	0324970	1.00
- sphygmomanometer, desk type with bandage cuff*	1	0684000	29.41
- eyechart, illiterate with red/green color bars*	1	0610000	0.66
- jar for thermometer with plastic cap	2	0334200	0.60
- hemoglobinometer set, Sahli type*	1	0950000	28.88
- pipette Sahli, 0.02 ml for hemoglobinometer with mouthpiece, rubber tubing*	2	0950500	0.94
- blood lancets, disposable*	1000	0531990	8.75
- rack for test tubes, wood*	1	0968520	1.76
- test tubes, glass 150 x 25mm*	12	0980020	1.82
- brush for test tubes*	2	0923600	0.34
- hydrochloric acid, 2% with bottles*	500ml	?	
Approximate Total			205.00 US\$

<u>Item: Medical Equipment</u>	<u>Amount</u>	<u>Source</u>	<u>Total Price: US\$</u>
2) <u>Second room:</u>			
- pressure cooker, 7-litre capacity with one spare valve (without plastic ring) fuel type	1	0157000	82.55
- sterilizing drums, to fit into pressure cooker	2	0109000	51.10
- timer clock, spring wound	1	0983405	14.44
- aprons, clear vinyl	2	0305000	2.64
- kidney dishes, stainless steel (SS)	3	0210000	4.47
- dressing jars, SS permanently labelled 2.13 litres	5	0255000	25.85

<u>Item: Medical Equipment</u>	<u>Amount</u>	<u>Source</u>	<u>Total Price: US\$</u>
- tray, covered SS permanently labelled	3	0276500	15.15
- cheatle forceps, SS	2	0735400	11.56
- dissecting forceps, fine dented tips	2	0736650	2.08
- needle holders, SS, box lock	2	0743600	6.42
- pairs of scissors, surgical strength	2	0771000	2.44
- pairs of scissors, blunt tip, bandage cutting type	2	0770000	5.44
- trays, cafeteria type, plastic or metal	3	Local	6.00
- bowls, 500ml, plastic or metal	2	"	1.00
- gauze/cotton/sponge-holding forceps	1	0735000	4.50
- needle sharpener, stone, Arkansas/Carborundum type	1	4089800	4.54
- razors with 20 razor blades	2	Local	5.00
- flashlight with batteries	1	"	5.00
- set of suture needles, curved small 1/2 with cutting edge with ear	24	0759302	1.50
- boxes with lids for cotton sheeting, cotton wool, gauze pads, all nonsterile but clean		Local	4.00
- minor surgery knife handles, SS	3	0745000	1.31
- resterilizable blades to fit knife holders, SS	25	0746200	1.00
- canisters, 300ml with lid, labelled	5	0256000	7.80
- bottles, various sizes, glass, labelled with stoppers	10	Local	10.00
- syringe, glass Luer 5cc resterilizable needle	15	0784000	5.10
- needles, hypodermic, 3/4" resterilizable to fit syringes	50	0751000	1.48

<u>Item: Medical Equipment</u>	<u>Amount</u>	<u>Source</u>	<u>Total Price: US\$</u>
- instrument tray, large with lid for dental equipment	1	0276500	5.05
- drinking cups	3	Local	.60
- set of 5 tooth extracting forceps for children	1	1257600	21.86
- set of 6 tooth extracting forceps for adults	1	1256000 1257000 1257500 1250000 1252000 1254000	28.00
- arm/leg splinter, plastic or wood, non-inflatable type	2	0555765	21.58
- stretcher, for carrying patients	1	0180000	30.16
- stove, kerosene 2 burners, non-pressure, floor model*	1	2005000	<u>19.30</u>
Approximate Total			<u>409.00</u>
Equipment Approximate Grand Total			<u>614.00</u>
Furniture and Equipment Grand Total			2,269.00 US\$

The capital expenditure of a rural dispensary for equipment and furniture is expected to be approximately 2300 US\$ assuming UNICEF supplies most of the medical equipment and local prices are not excessive. Including air freight (50% of total), central storage and distribution (30%), 4000 US\$ is a more realistic figure. Any other source for the equipment might easily bring up the costs to 5000 US\$ and more.

The presumptions of our calculations are:

- 1) Space:
 - 2 medically used rooms (approx. 12 m²: 4 x 3 m)
 - 1 waiting area (approx. 20 m²)
- 2) Personnel:
 - 1 infirmier du premier cycle
 - 1 gardien/manoeuvre

3) Activities:

- registration/recording/reporting
- limited group/individual health education
- limited diagnosis
- limited treatment:
 - dressing
 - injections
 - limited minor surgery
 - oral rehydration of infants
 - simple dentistry (tooth extraction)
- patient referral
- pharmacy
- sterilization of equipment
 (supervision of VHWT not calculated)

4) Currency exchange rate: 1 US\$ = 200 FCFA

Annex D: ILLUSTRATIVE ANNUAL DRUG LIST FOR A RURAL DISPENSARY OR HEALTH POST

UNICEF ITEMS

Source: (code numbers and prices) UNIPAC, 1980
 Quantity: Category I: 5000-10,000 consultations/year
 Category II: 5000 consultations/year

Key:

- Annual inflation rate: 79/80: 15%
- *Also local purchase (variable price)
- (1) Necessity depending on incidence of ascariasis
- (2) Necessity depending on incidence of malaria
- **For illustrative purposes only. Readers should refer to most recent drug listings and dispensing guides for actual ordering and prescribing.
- Total annual drug costs for a rural dispensary of
 - o 1st category is approximately: 272 US\$ = 55,000 FCFA
 - o 2nd category is approximately: 543 US\$ = 110,000 FCFA
- If UNICEF is the source, costs of transportation excluded.

DRUGS: GENERIC NAME AND PRESENTATION	CODE NUMBER	U. PRICE US\$	QUANTITY		TOTAL AMOUNT US\$	
			Category I	Category II	Category I	Category II
Aspirin, 300 mg/1000 tablets	1506002	1.84	30	15	55.20	27.60
Penicillin-G inj., 1 mega-unit with diluent	1557980	0.09	200	100	18.00	9.00
Penicillin-G + procaine, inj., 10 ml	1559000	0.36	100	50	36.00	18.00
Penicillin V, oral, 250 mg/100 tablets	1559050	1.85	40	20	74.00	37.00
Tetracycline-HCL, 250 mg/1000 tablets	1569000	13.59	1	1/2	13.59	6.79
Sulphadimidine, 500 mg/1000 tablets	1568025	12.07	1	1/2	12.07	6.03
Piperazine, 500 mg/1000 tablets (1)	1560000	4.10	2	1	8.20	4.10
Chloroquine, 100 mg/1000 tablets (2)	1532002	7.67	15	7	115.05	53.69
Ferrous sulfate + folate 0.3g/1000 tablets	1550010	1.27	15	7	19.05	8.89
Vit. A + D, 4000 + 400 IU2/1000 tablets	1586000	1.55	3	1	4.65	1.55
Multivitamins + iron/1000 tablets	1555810	2.98	5	3	14.90	8.94
Paraffin, soft yellow/500g	1059200	1.88	4	2	7.52	3.76
Benzalkonium-Chloride conc. 50%/5 liters	1515000	14.10	1	1/2	14.10	7.05

DRUGS: GENERIC NAME AND PRESENTATION	CODE NUMBER	U. PRICE US\$	QUANTITY		TOTAL AMOUNT US\$	
			Category I	Category II	Category I	Category II
Salt, ORT powder for 1 liter, unflavored	1561105	0.07	100	50	7.00	3.50
Antibiotic, ophthalmic ointment 1%/5g	1510000	0.10	100	50	10.00	5.00
Sulfadiazine, powder/500g	1568000	7.50	2	1	15.06	7.53
Gauze, absorbent, nonsterile 1m x 100m	0521900	12.36	50m (1/2)	25m (1/4)	6.18	3.09
Bandage gauze, nonsterile, 50mm x 9m*	0512101	0.18	50	25	9.00	4.50
Cotton, absorbent, nonsterile, 450g roll*	0519600	1.07	12	6	12.84	6.42
Tape adhesive, zinc oxide, 25mm x 0.9m roll	0501000	0.15	20	10	3.00	1.50
Needle, hypo Luer/12, 0.90 x 51mm, 20g x 2"	0749500	0.40	2	1	0.80	0.40
Needle, hypo Luer/12, 0.7 x 38mm, 22g x 1.5"	0750000	0.38	2	1	1.76	0.38
Syringe, hypo Luer, glass, 2ml	0783500	0.29	10	5	2.90	1.45
Syringe, hypo Luer, glass 5ml	0784000	0.34	10	5	3.40	1.70
Gauze pad, sterile, 76 x 76mm*	0522000	0.03	100	50	3.00	1.50
Suture, cotton, white, nonsterile, 00 USP/91m	0561000	1.48	2	1	2.96	1.48
Needle, suture, 1/2 circ./pack of 6	0759302	0.75	10	5	7.50	3.75
Suture, silk black, sterile, 00 USP/760mm	0565001	0.25	20	10	5.00	2.50
Soap, toilet, 113g bar, unwrapped*	0552000	0.10	20	20	2.00	2.00
Oil of cloves for dental use, 20ml	1350000	2.00	10	5	<u>20.20</u>	<u>10.10</u>
				Total	543.28	272.21

Annex E: ILLUSTRATIVE ESSENTIAL GENERIC DRUG LIST

Key: H = hospitals
 HC = health centers headed by a physician
 I = infirmerie: health centers headed by a state registered nurse (infirmier d'etat)
 D = dispensary
 VHWT = village health worker team

CD = controlled drugs
 (E/H) = emergency drugs with subsequent hospitalization
 * = commonly used trade names in the Francophone Sahel: Vidal 1979
 ** = For illustrative purposes only. Readers are reminded that they should refer to most recent drug listings and dispensing guides for actual ordering and prescribing.
 (x) = destination depends upon equipment and personnel expertise
 (Drug) = administered mainly by hospital wards or of limited use
 O = rarely used in Francophone countries

(A) PRIMARY HEALTH/AMBULATORY CARE

Generic Name	Trade Name*	Presentation	Dosage**	DESTINATION				
				H	HC	I	D	VHWT
<u>ANALGESICS, ANTIPYRETICS, NONSTEROIDAL ANTI-INFLAMMATORY DRUGS</u>								
Acetylsalicylic acid	Aspirin, etc.	tablet	300 or 500mg	x	x	x	x	x
"	"	"	75mg	x	x	x	x	
Paracetamol ^o or ibuprofen	Doliprane Brufen	" "	500mg 500mg	x x	x x	x x	x x	
Allopurinol	Zyloric	"	100mg	x	x	(x)		
Indometacin	Indocin	capsule	25mg	x	x	(x)		
<u>ANTISPASMODIC, ANALGETIC</u>								
Butyl hyoscinebromate	Buscopan	tablet	10mg	x	x	x	(x)	
"	"	ampoule	20mg, 1ml	x	x	(x)		
<u>NARCOTIC ANALGESICS</u>								
Pethidine (E/H) (Morphine and atropine)	Dolosal	ampoule	50mg, 1ml	x	x			
		ampoule	10mg/0.6mg, 1ml	x	(x)			
Dihydrocodeine tartrate ^o	DF 118	tablet	30mg	x	x	x	(x)	

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ANTIALLERGICS, ANTIHISTAMINICS,
ANTIMIGRAINE, ANTIEMETICS

Promethazine or chlorpheniramine	Phenergan Systral	tablet "	25mg, 1mg	x x	x x	x x	
Promethazine (Egotamine + caffeine)	Phenergan Gynergen, caffeine	ampoule tablet	50mg, 1ml 1mg/10mg	x x	x x	x x	(x) (x)

ANESTHETICS, LOCAL

Lidocaine	Xylocaine or Lignocaine	vial	1%, 50ml	x	x	x	(x)
" (also antiarrhythmic)	"	"	2%, 50ml	x	x	x	
Chlorethyl		spray		x	x	x	x

ANTIPILEPTICS/HYPNOTICS/SEDATIVES

Phenobarbital	Gardenal	tablet	100mg	x	x	(x)	
"	"	"	10mg	x	x	x	x
Diazepam	Valium	"	10mg	x	x	x	
"	"	ampoule	10mg	x	x	x	(x)
(Chlorpromazine)	Largactil	tablet	50mg	x	x	x	(x)
(Phenytoin)	Dihydan	"	100mg	x	x	(x)	

ANTITUSSIVES

Codeine	Codethyline	tablet	5mg	x	x	x	(x)
" linctus		syrup	5mg/5ml	x	x	x	(x)

ANTIASTHMATIC AND ANTISHOCK DRUGS

Aminophylline	Inophylline	ampoule	250mg, 10ml	x	x	(x)		
Salbutamol ^o	Ventoline	tablet	2mg	x	x	x	(x)	
Adrenaline (E/H)		ampoule	1/1000, 1ml	x	(x)			
Epinephrine (E/H)		"	1mg, 1ml	x	(x)	(x)		

ANTACIDS

Aluminium/magnesium hydroxide ^o		tablet	500mg	x	x	x	x	
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ANTIDIARRHEAL

1 127 1	Charcoal activated	Charbon	tablet	x	x	x	x	x
	Oral rehydration fluid ^o	Oralite	powder	x	x	x	x	(x)
	- glucose							
	- sodium bicarbonate							
	- sodium chloride (salt)							
	- potassium chloride							

ANTIBIOTICS/ANTIBACTERIAL

Ampicillin or amoxicillin	Totapen, Penbritin, Penicline, etc. or Amoxil	tablet or capsule	250 or 500mg	x	x	x	x	(x)
"	"	syrup	125mg, 100ml	x	x	x	(x)	
"	"	ampoule	1g, 6ml	x	x	(x)		
Benzympenicillin	Penicillin G Diamant	vial	1 Mega IU	x	x	x	(x)	

Phenoxyethylpenicillin	Oracilline, Oспен, etc.	tablet	250mg	x	x	x	x	(x)
"	"	syrup	125mg, 100ml	x	x	x	(x)	
Procaine penicillin ^o + benzylpenicillin	Bi(peni)cilline	vial	3 Mega + 1 Mega IU	x	x	x	x	
Benzathine benzylpenicillin	Extencilline	vial	2 Mega IU, 4 Mega IU	x	x	x	(x)	
Chloramphenicol	Tifomycine, etc.	tablet	250mg	x	x	x	x	(x)
(" succinate)	"	ampoule	1g, 3ml	x	x	x		
Erythromycin	Abboticine Propiocrine	tablet	250mg	x	x	x	(x)	
"	"	syrup	125mg,	x	x	x	(x)	
Cloxacillin	Cloxyphen, Orbenin	capsule	500mg	x	x	x	(x)	
(")	"	vial	1g, 6ml	x	x	(x)		
Gentamycin	Gentalline	vial	80,000 IU, 2ml	x	x	(x)		
Tetracycline	Hexacylline, Bisolvomycine, Amphocycline, etc.	tablet	250mg	x	x	x	x	(x)

Sulphonamides

Sulphadimidine ^o		tablet	500mg	x	x	x	x	(x)
Cotrimoxazole	Bactrim, Euseprim Septrin	"	80/400mg	x	x	x	(x)	
"	"	"	40/200mg	x	x	x	(x)	

Antituberculosis

Isoniazid + Thiacetazone ^o	Diatebene	"	300 + 150mg	x	x	x	x
"	"	"	100 + 50mg	x	x	x	x
Isoniazide	Rimifon	"	100mg	x	x	x	x
Streptomycin	Panstrilline, Unicilline	vial	1g	x	x	x	x
"	"	"	5g	x	x	(x)	
(Ethambutol)	Myambutol	tablet	400mg	x	(x)		
(Rifampicine)	Rimacton	capsule	300mg	x	(x)		

Antileprosy

Diphenylsulphone	Dapsone	tablet	25mg	x	x	x	x
"	"	"	100mg	x	x	x	x
(Clofamizine) ^o	Lamprene	"	100mg	x	x	x	x

ANTIPROTOZOALAntimalarial

Chloroquine	Nivaquine (Resochine) ^o	tablet	100 (250 ^o) mg	x	x	x	x	x
Pyrimethamine ^o	Daraprim	"	25mg	x	x	x	x	(x)
Primaquine ^o	"	"	7.5mg	x	x	x	(x)	
Quinine (E/H)	Quinimax	ampoule	400mg	x	x	x	(x)	
" (E/H)	"	"	100mg	x	x	x	(x)	

Amoebiasis/Giardiasis

Diloxanide ^o	Furamide	tablet	500mg	x	x		(x)
Metronidazole	Flagyl	"	250mg	x	x	(x)	(x)
Mepacrine ^o	Atebrin	"	100mg	x	x	(x)	

ANTHELMINTICRoundworms

Piperazine ^o		tablet	500mg	x	x	x	x	(x)
Tiabendazole or mebendazole	Mintezol	"	500mg	x	x	(x)	(x)	(x)

Tapeworm

Niclosamide or dichlorophen ^o	Tredemine (Yomesan) or Antiphen	tablet	500mg	x	x	x	x
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Hookworm

(Bephenium or tetrachlorethylene) ^o	Alcopar	granules, capsule or tablet	2.5g	x	x	x	x
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Antischistosomal/Guinea-worm

Metrifonate ^o or oxamniquine ^o		tablet		x	x	x	(x)
Biltricide or niridazole	Praziquantel or Ambilhar	"	500mg	x	x	x	(x)

Antifilarial

Diethylcarbemazine	Notezine	"	50mg	x	x	(x)	
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ANTI-ANEMIC

Ferrous salt ^o	Ferograd, Ferrostrane	tablet	300mg, etc.	x	x	x	x	x
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Folic acid ^o (alone or combined with ferrous salt)	"		5mg	x	x	x	(x)
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Iron dextran ^o	Imferon	ampoule	100mg	x	x	(x)	
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ANTIHYPERTENSIVE

Hydrochlorothiazide (also diuretic) or chlorthalidone	Esidrex, Moduretic Hydromet or Hygroton	tablet	250mg, 100mg	x	x	(x)	(x)
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Guanethidine or reserpine	Ismelin or Serpasil	"	10mg	x	x	(x)	
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Propranolol (also antianginal, antithyroid) or oxprenolol (also antiarrhythmic)	Inderal, Avlo- cardyl or Trasicor	"	40mg or 80mg	x	x	(x)	
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Diazoxide or Pentolinium (E/H)	Hyperstat or Ansolsyne	ampoule	300mg, 2ml, 50mg, 10ml	x	(x)		
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ANTIANGINAL

Glyceryl trinitrate	Nitroglycerine	tablet	0.5mg	x	x	(x)	(x)
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CARDIAC GLYCOSIDES

Digoxin		tablet	0.25mg	x	(x)	(x)	
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Lanatoside C	Cedilanid	drops	1mg/1ml, 30ml	x	(x)	(x)	
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"	"	ampoule	0.4mg, 2ml	x	(x)		
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DIURETICS

Furosemide	Lasi(li)x	tablet	40mg	x	x	x	
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"	"	ampoule	10mg	x	x	(x)	
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DRESSING MATERIALS

Gauze hydrophile, non-sterile to cut into bandages and pads		bale	5/10cm x 1m 40cm x 40cm	x	x	x	x	x
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Gauze hydrophile sterile rolls and pads		roll/pad	5/10cm x 1m 40cm x 40cm	x	x	(x)		
Cotton, hyrolphile, nonsterile (local)		bag		x	x	x	x	
Cotton, hyrolphile, sterile		roll		x	x	(x)		
Cotton, sheeting, nonsterile for multi-purpose use (bandage, pad, triangular cloth, sheets, etc.)		bale		x	x	x	x	x
Plaster for locally made plaster of paris (nonsterile bandages and plaster)		bag	10cm/1m	x	x	x	(x)	
Paraffin, vaseline or oil for locally made tulle gras (nonsterile pads and heated paraffin, etc.)	Tulle gras	box	40cm x 40cm	x	x	x	x	
Adhesive tape, zinc oxide		roll	2cm x 5m	x	x			
"	roll		5cm x 5m	x	x	x	(x)	
Bandaïd	Sparadrap	strip	2.5cm wide	x	x	x	x	(x)
"	"	"	5cm wide	x	x	x	x	
Elastic bandage		roll	10/15cm	x	x	x	x	
Splinter and tourniquet: finger, arm, leg (E/H)			-	x	x	x	x	
Cord-tying bands	Ligature ombilicale	bands/strips	15cm long	x	x	x	x	x

HORMONES

Corticosteroids

Prednisolone	Hyrocortancyl	tablet	5mg	x	x	(x)		
Hydrocortisone (E/H)		vial	100mg, 5ml	x	x	(x)	(x)	
" (E/H)		"	1g, 5ml	x	x	(x)	(x)	
(Dexamethasone)	Decadron	tablet	0.5mg	x	(x)	(x)		

Oral contraceptives/female hormones

Norethisterone + ethinylestradiol	Anovlar, Planom, Minipill, etc.	tablet	0.5-1mg 0.01-0.3mg	x	x	x	x
(Norethisterone)	Milligynon, Norluten, etc.	"	0.5-1mg	x	x	(x)	
Ethinylestradiol	Adepal, etc.	"	0.01-0.03mg	x	x	(x)	

Obstetrics

Ergometrine ^o		ampoule	2mg, 1ml	x	x	x	(x)
"		tablet	0.5mg	x	x	x	(x) (x)
(Oxytocin)	Syntocinon	"	2 IU, 2ml	x	x	(x)	
Ergometrine + Oxytocine (E/H)	Syntometrine	"	0.5mg. 15 IU, 1ml	x	x	x	(x)

Thyroid hormones and antagonists

Iodine aqueous solution ^o Iodine + potassium iodide	Lugol's solution	drop	Iodine 5% + Iodide 10%	x	x	x	(x)
Thyroxine		tablet	0.1mg	x	(x)		
(Propylthiouracil or Carbimazole)		"	50mg	x	x	(x)	

IMMUNOLOGICALS: all need refrigeration

(Sera and immunoglobulins (IG))

wherever possible, the IG should be used instead of the antitoxins in spite of differences in cost

(Tetanus antitoxin and Tetanus IG)	Institut Merieux, Pasteur	ampoule	1500 IU, 1ml	x	x	(x)	
		"	2500 IU, 5ml	x			
			250 IU, 2ml	x	x	x	
Antirabies serum and rabies IG	Pasteur	"	1000 IU, 5ml	x	(x)		
			300 IU, 2ml	x	x	x	
			1500 IU/10ml				

Diphtheria antitoxine	Pasteur	"	1000 IU, 5ml 10,000 IU, 10ml	x	(x)		
Anti D immunoglobulin	Centre national de Transfusion Sanguine	"		x	x	x	
(Antisnake serum: either the polyvalent or Africa specific one, <u>not</u> the one for Europe)	Pasteur	"		x	(x)		

Vaccine for fixed centers and mobile teams

- 134 -	BCG, with diluent	UNICEF	ampoule	100 doses	for mobile teams only			
	"	"	"	20 doses, 5ml	x	x	x	(x)
	DTP	"	vial	20 doses, 10ml	x	x	x	(x)
	Polio, Sabin	"	"	100 doses, 10 ml	x	x	x	(x)
	Measles, with diluent	"	"	50 doses, 20ml	for mobile teams only			
	"	"	"	10 doses, 5ml	x	x	x	(x)
	Tetanus toxoid	"	"	20 doses, 10ml	x	x	x	(x)
	(DT)	"	"	20 doses, 10ml	for mobile teams only			
	DTP + Polio	Institut Pasteur		single dose, 0.5ml	x	x	x	(x)
	Antirabies vaccine (human diploid cell preferable to duck embryo vaccine)	"		single, dose, 1ml	x	(x)		
	Antimeningococcus <u>A + C</u> vaccine	Institut Merieux	vial	50 doses, 25ml	for mobile teams only			

Yellow fever vaccine, Dakar strain for adults	Pasteur, Dakar	"		for mobile teams only
Yellow fever vaccine, 17D Edmonton strain for children	USA	"		for mobile teams only
Cholera vaccine	Pasteur	ampoule	1-2 doses, 1ml	for international travellers (and epidemics) only
Typhoid/parathypoid vaccine	TAB Pasteur	"	single dose, 0.5ml	for mobile teams only

LAXATIVES

Senna	Pursennide	dragee	12mg	x	x	x	x
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OPHTHALMOLOGICAL PREPARATIONS

135	Tetracycline ointment	Terramycine, etc.	tube	1%, 5g	x	x	x	x	x
	Chloramphenicol ointment		"	1%, 5g	x	x	x	x	
	Silver nitrate	Argyrol	drops	2.5%, 0.5ml	x	x	x	x	x
	Sulphacetamide	Sulpha bleu	"	10%, 10ml	x	x	x	x	
	Hydrocortisone		"	1%, 10ml	x	(x)	(x)		
	(Proxymetacaine)	Keracaine	"	0.5%, 10ml	x	(x)			
	(Homatropine)		"	2%	x	(x)			
	(Pilocarpine)	Vitacarpine		1%/2%, 15ml	x	(x)			

PARENTERAL WATER/ELECTROLYTE, PH CORRECTING SOLUTIONS

Water for injection		vial	2ml, 10ml, 20ml	x	x	x	x
NaCl + Glucose	Ringer solution	infusion bottle	0.9% + 5%, 500ml	x	x	x	(x)

PLASMA EXTENDER: with infusion set and needle (E/H)

Dextran 40 or 70 or better	Macrodex	"	500ml	x	x	(x)	
Dextran + NaCl or sorbitol	Rheomacrodex	"		x	x	x	(x)

SKIN PREPARATION

Skin cleaning and disinfectant

Soap, simple		bar		x	x	x	x	x
- Potassium permanganate ^o		powder/	1:8000	x	x	x	x	x
- Tincture of iodine,		solution	diluted					
- potassium iodide or		solution	2.5%					
- gentian violet ^o								
- Hydrogen peroxide		solution	50%	x	x	x	x	
- Benzyl benzoate concentrated ^o			40%	x	x	x	x	
Cresyl cristalline	Cresylol	crystals		x	x	x	x	

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Antibacterial ointment/powder

Neomycin and bacitracin or Tetracycline or cetrimide ^o		ointment	0.5g + 50,000 IU 3%, 0.5%	x	x	x	(x)
Paraffin white, soft ^o		"		x	x	x	x
Suphonamide		powder		x	x	x	x

Scaling and astringent, antipruritic ointment

Benzoic and/or salicylic acid ^o (also antifungal)		ointment		x	x	x	x
Zinc oxyde ^o or calamine lotion ^o		lotion		x	x	x	x
Coal tar		ointment		x	x	(x)	(x)

Cortisone ointment

Hydrocortisone	"	1%, 2.5%	x	x	x	(x)
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Antifungal

Tolnaftate or miconazole	Sporiline or Daktarine	ointment	1%, 2%	x	x	x	(x)
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Griseofulvin	Fulcine	tablet	500mg	x	x	(x)
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Antiscabies, Antipediculosis

Benzyl benzoate	Ascabiol	liquid	25%	x	x	x	x
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Malathion ^o			0.5%	x	x	x	x
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SYRINGES AND NEEDLES

137 -	Syringe, hypodermic, resterilizable		2ml				
			5ml	x	x	x	x
			10ml				
			20ml	x	x	(x)	
	(Syringe, tuberculin, graduated, resterilizable)		1ml	x	x	x	
(Syringe, insuline, graduated, resterilizable)		1ml	x				
(Syringe, disposable, plastic)		2ml	x	x	x	x	
Needle hypodermic		5ml	x	x	x	x	
(Needle disposable)							

VITAMINS AND MINERALS

Caroten + ergocalciferol comb.	Vit A + D	capsule	4000+400 IU	x	x	x	x	(x)
Ascorbic acid	Vit C	tablet	500mg	x	x	x	x	(x)
Calciferol	Vit D	ampoule	600,000 IU, 2 ml	x	(x)			
(Nicotinamide)	Vit B6	tablet	500mg	x	x	x	x	(x)

(B) SECONDARY (HOSPITAL INPATIENT) HEALTH CARE: in generic names only and without detailed specification

Key: (N): for national hospital only

ANAESTHETICS

Ether anaesthetic

Halothane

Oxygen

Nitrous oxide

Thiopental sodium

Ketamine

(Bupivacaine)

Amethocaine eyedrops

ANTIALCOHOLISM

Antabuse

ANTIBIOTICS

Kanamycin

Cephalogporines

Lincomycin

Clindamycin

Colistin

Penicillin G, 10 Mega IU

Nitrofurantoin

ANTICOAGULANTS

Heparin

Phytomenadione

Protamine sulphate

Warfarine

ANTIDOTES

Naloxone or nalorphine (against morphine)

Neostigmine (against Tubacurarine, but for myasthenia gravis)

Atropine (against neostigmine and propanolol)

Pralidoxiae (against phosphates poisoning)

Desferrioxiamine (against iron poisoning)

Dimercaprol (against arsenic, copper-mercury poisoning) (N)

ANTIFUNGAL

Nystatin

Amphotericin (N)

Clotrimazole

ANTIPARKINSONSIM

Larodopa (N)

ANTIPROTOZOAL

Sodium stibogluconate

Pentamidine

Melarsoprol

Suramin (N)

CARDIOVASCULAR

Digoxin injection

Aminophylline injection

Procainamide

Quinidine

Phenytoin injection

Isoprenaline (N)

DIAGNOSTIC AGENTS

Blood grouping testsera: Anti
A, B, O, D, albumen

Tuberculin (Mantoux or PPD)

Radiocontrast media:
adipiodone meglumine
barium sulphate
iopanoic acid
meglumine amidotrizoate
sodium amidotrizoate

Metapyrone (N)

Edrophonium (N)

DIURETICS

Spirolactone

Triamterene

Mannit

ELECTROLYTES

Glucose

Dextrose

Potassium chloride

Sodium bicarbonate

Sodium lactate

FIBRINOLYTIC/ANTIFIBRINOLYTIC AGENTS

Streptokinase

Aminocaproic or tranexamic acid

HORMONES

Liothyromine

131₁, 125₁ (N)

Insulin soluble

Insulin zinc suspension, semileute
" lente

or Protamin zinc insulin

Glucagon

Hydroxyprogesterone injection

Testosterone

Human chorionic ganadotrophin (N)

IMMUNOSUPPRESSANTS (N)

Busulfan

Chlorambucil

Azathioprine

Cyclophosphamide

Methotrexate

Mercaptopurine

Vincristine

MUSCLE RELAXANTS

Tubocurarine

Suxamethonium

PLASMA/SHOCK

Human albumin

Dopamine

PSYCHOPARMACA

Amitriptyline

Chlorpromazine injection

Fluphenazine

Haloperidol

Lithium carbonate

Imipramine

RESPIRATORY STIMULANTS

Mikethamide

VITAMINS AND MINERALS

Cyanocobalamine

Vit. B compound

Calcium

Calcitonin

Phosphate

Note: Items are mentioned once only, even if applicable for several different drug categories.

Literature Sources: The Selection of Essential Drugs, WHO 1977
British National Formulary, 1978 - 1980
Dictionnaire Vidal, 1979
Physician's Desk Reference, 1980

Total number of different drugs (each drug counted once only, regardless of different presentations):

A) Primary care: 147 (including 12 vaccine and 5 sera)

B) Secondary care: 86

Total: 233

Total number of different primary care drugs for each destination:

H	142				
HC	116	(or 141, with 26 drugs open for discussion)			
I	92	(or 126, with 34 " " " ")			
D	55	(or 93, with 38 " " " ")			
VHWT	13	(or 27, with 14 " " " ")			

Total number of different primary care items (inclusive of different presentation) for each destination:

H	171	(including 12 vaccine and 5 sera)
HC	152	(or 171, with 19 items open for discussion)
I	114	(or 145, with 31 " " " ")
D	69	(or 115, with 46 " " " ")
VHWT	13	(or 27, with 14 " " " ")

The primary health care list is a revised version of Chad's essential drug list which was established in 1978 by the MOH planning unit in collaborating with WHO (Brazzaville), UNCTAD (British Guyana, Sri Lanka, Egypt) and other international organizations. The major differences from the essential drug list of WHO 77 are:

- Inclusion of dressing materials, syringes, needles, etc. due to their importance both quantitatively and qualitatively.
- Points of destination for each drug: H, HC, I, D, VHWT, mobile teams.
- Separation of primary (outpatient/ambulatory) care drugs from secondary (hospital inpatient) care drugs according to the new definition of primary health care (Alma-Ata, 1978).
- Codification, brand names commonly used in the Francophone Sahel, and detailed presentation.

It must be noted that there is no perfect model for a national essential drug list: opinions on what is essential differ widely especially in the somewhat transient area of outpatient/-hospital based care. For example, blood and oxygen can be essential lifesaving items, whereas some routine drugs (charcoal, vitamins, iron tablets) can be vital for the smooth and inexpensive running of an outpatient clinic, even if handled like a "placebo" treatment. Therefore, each country has to make its own national essential list after considering the opinions of top physicians of different specialties, pharmacists, head nurses and MOH officials. Our list may then serve as a guideline. All other nonessential drugs (which very often include "forgotten" essential drugs) should be provided as a reserve pool, best by the private sector. In no way should a country limit itself to the essential drug lists.

Annex F: UNICEF ORDERING AND FINANCING PROCEDURES

There are two basic patterns for UNICEF procurement procedures:

- A) UNICEF is both the paying donor and the procurement agent
- B) UNICEF acts as procurement agent only for another donor.

Under procedure (A), arrival time (the time between ordering and arrival of goods) can be up to three years (usually two years) for landlocked countries, where as arrival time for procedure (B) can be from three to 12 months (the latter for surface shipment).

Common Steps for (A) and (B)

- Get the latest UNIPAC Catalogue from local, regional (Dakar, Abidjan) or central (New York) UNICEF office/headquarters: catalog distribution is closely controlled.
- Following UNIPAC instructions, make separate orders for each fixed center (HC, D) and for each sous-prefecture having a VHWT program, by dividing them into appropriate categories (Annex E) and providing the name of the destination point for each category. Items for each fixed center or sous-prefecture will be separately packed and labeled in the Copenhagen warehouse, facilitating direct arrival at destination points in rural areas. (Try to avoid items not listed in the UNIPAC catalogue.)
- Add 40% to total sum for surface shipment and approximately 85% for air shipment, the latter being our recommendation.
- Prepare at least six copies.
- Submit copies to MOH and closest UNICEF office for approval any time before September 1.

For (A) - The best plan is to have order list ready for submission by July 1 and check back frequently on the progress of MOH and UNICEF approvals.

Once Order Has Initial UNICEF Office Approval

(A)

Submit to regional UNICEF officer (who frequently visits each country) by November 15. This is mainly to check whether it can be fit into the budget for the next year.

↓
If approved and signed not later than Dec. 1, regional UNICEF office submits to:

↓
N.Y. headquarters, where during annual meeting on/around April 15 it will be approved, modified, or rejected. Thus April 15 of any FY is most important deadline to be met. If approved, order is sent to:

↓
Copenhagen UNIPAC warehouse, where orders are computerized, packaged and shipped out. Original bills of lading, as well as the arrival date, are sent out to local UNICEF officer and/or to the requesting agent. UNICEF's responsibility terminates upon arrival of goods at the country's port of entry (customs, airport, seaport, national borders).

(B)

Advance payment into UNICEF bank account (often handled by UNDP country representative);

↓
Send order and bank statement directly to

↓
New York or Geneva headquarters

↓
If accepted, they send order directly at any time to:

Note: The major difference in arrival time results from deadlines to be met for (A) vs. the possibility of direct headquarters orders which can be placed and accepted anytime.

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