NOTE FOR THE RECORD

Film on Selective Primary Health Care,
Experience in Mali

On the advice of Mr. B. Gerin, Dr. Philippe J. Stoeckel* came to discuss the possibility of filming (on videotape), a community-based health care system in the province of Kobokani (?) in Mali, West Africa. In this province, UNICEF and the Association for the Promotion of Preventive Medicine (APMP) are running a community-based health care programme with a strong emphasis on EPI, diarrhoea control and supplementary feeding. The project includes a systamatic community education component. The approach is based on APMP's experience in India, Brazil, Senegal and Upper Volta.

During his discussion with Mr. Grant, Dr. Mahler, Dr. Kenneth Warren, the Director of Health Sciences, Rockefeller Foundation, Mr. Robert McNamara and Dr. Salk, it was agreed that the organizations's experience could be consolidated and expanded in other countries under the general description of "selective primary health care". A mechanism and plans to do this will be developed in a meeting to be held in Bellagio, Italy, in March 1984. Dr. Stoeckel wants to visually document processes of starting and running a selective primary health care programme based on the newly-approved project in Mali to: 1) become an advocacy tool; 2) show at the Bellagio meeting; and 3) training aid. He was asking whether this film could be a joint production with UNICEF.

I informed him that if it is agreed that UNICEF produce this film with his organization, we have the Regional Information Officer and the Regional PSC Officer in Abidjan plus the Information and PSC Officer in Dakar who could participate in this project.

It was agreed that funding for this project couldn't be ascertained until APMP has had time to clearly specify the objectives and target group(s).

It was also agreed that Dr. Stoeckel prepare a two to three-page protocol on this video documentation project which should be discussed with UNICEF and government staff in Mali and submitted to the Regional Director in Abidjan with copies to New York. He says that the total cost would be around US$10,000.

R.R.N. Tuluhungwa
Chief, PSC Service
New York
31 October 1983

cc: Mr. B. Collins, Regional Director, UNICEF-Abidjan
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SPECIAL ARTICLE

SELECTIVE PRIMARY HEALTH CARE

An Interim Strategy for Disease Control in Developing Countries

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Abstract Priorities among the infectious diseases affecting the three billion people in the less developed world have been based on prevalence, morbidity, mortality and feasibility of control. With these priorities in mind a program of selective primary health care is compared with other approaches and suggested as the most cost-effective form of medical intervention in the least developed countries. A flexible program delivered by either fixed or mobile units might include measles and diphtheria–pertussis–tetanus vaccination, treatment for febrile malaria and oral rehydration for diarrhea in children, and tetanus toxoid and encouragement of breast feeding in mothers. Other interventions might be added on the basis of regional needs and new developments. For major diseases for which control measures are inadequate, research is an inexpensive approach on the basis of cost per infected person per year. (N Engl J Med 301:967-974, 1979)

THE three billion people of the less developed world suffer from a plethora of infectious diseases. Because these infections tend to flourish at the poverty level, they are important indicators of a vast state of collective ill health. The concomitant disability has an adverse effect on agricultural and industrial development, and the infant and child mortality inhibits attempts to control population growth.

What can be done to help alleviate a nearly unbroken cycle of exposure, disability and death? The best solution, of course, is comprehensive primary health care, defined at the World Health Organization conference held at Alma Ata in 1978 as

> the attainment by all peoples of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life. Primary health care includes at least: education concerning prevailing health problems and the methods of preventing and controlling them; promotion of food supply and proper nutrition, an adequate supply of safe water and basic sanitation; maternal and child health care, including family planning; immunization against the major infectious diseases; prevention and control of locally endemic diseases; appropriate treatment of common diseases and injuries; and provision of essential drugs.[1]

The goal set at Alma Ata is above reproach, yet its very scope makes it unattainable because of the cost and numbers of trained personnel required. Indeed, the World Bank has estimated that it would cost billions of dollars to provide minimal, basic (not comprehensive) health services by the year 2000 to all the poor in developing countries. The bank's president, Robert McNamara, offered this somber prognosis in his annual report in 1978:

> Even if the projected — and optimistic — growth rates in the developing world are achieved, some 600 million individuals at the end of the century will remain trapped in absolute poverty. Absolute poverty is a condition of life so characterized by malnutrition, illiteracy, disease, high infant mortality and low life expectancy as to be beneath any reasonable definition of human decency.[2]

How then, in an age of diminishing resources, can the health and well-being of those "trapped at the bottom of the scale" be improved before the year 2000? A valid approach to this overwhelming problem can be based on the realization that the state of collective ill health in many of the less developed countries is not a single problem. Traditional indicators, such as infant mortality or life expectancy, do not permit a grasp of the issues involved, since they are actually composites of many different health problems and disorders. Each of the many diseases endemic to the less developed countries (Table 1) has its own unique cause and its own complex societal and scientific facets; there may be several points in the process for which interventions could be considered.[3-5]

Thus, a rationally conceived, best-data-based, selective attack on the most severe public-health problems facing a region might maximize improvement of health and medical care in less developed countries. In the discussion that follows, we try to show the rationale and need for instituting selective primary health care directed at preventing or treating the few diseases that are responsible for the greatest mortality and morbidity in less developed areas and for which interventions of proved efficacy exist.

ESTABLISHING PRIORITIES FOR HEALTH CARE

Faced with the vast number of health problems of mankind, one immediately becomes aware that all of them cannot be attacked simultaneously. In many regions priorities for instituting control measures must be assigned, and measures that use the limited human and financial resources available most effectively and efficiently must be chosen. Health planning for the developing world thus requires two essential steps: selection of diseases for control and evaluation of different levels of medical intervention from the most comprehensive to the most selective.

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Selecting Diseases for Control

In selecting the health problems that should receive the highest priorities for prevention and treatment, four factors should be assessed for each disease: prevalence, morbidity, mortality and feasibility of control (including efficacy and cost).

Table 2 incorporates these factors into an analysis of three representative illnesses of the less developed world. The newly discovered Lassa fever was associated with a 30 to 66 per cent mortality rate in the few limited outbreaks recorded in Nigeria, Liberia and Sierra Leone. Those who survived recovered fully after an illness lasting seven to 21 days. Although this fatality rate seems to suggest giving Lassa fever high priority in a major health program, the prevalence of overt disease appears to be low. Furthermore, the only treatment available is injections of serum from patients who have recovered. Since its mode of transmission is unknown and there is no vaccine, Lassa fever is impossible to control at present.[6] Therefore, concentration on preventing Lassa fever would be neither efficient nor efficacious.

Ascaris, the giant intestinal roundworm, causes the most prevalent infection of man, with one billion cases throughout the world.[7] Yet disability appears to be minor and death relatively rare.[3,4] Treatment, however, requires periodic chemotherapy for an indefinite period.[3,4,8] Control may ultimately require massive, long-term improvements in sanitary and agricultural practices to reduce reinfection. In view of the difficulty of eliminating exposure to the roundworm and the low morbidity associated with the infection, ascariasis deserves less attention than its ubiquity seems to suggest.

Malaria is associated with a far smaller mortality rate than that of Lassa fever and a far lower prevalence that that of ascariasis. Yet its mode of transmission is well known, and it produces much recurring illness and death; about one million children in Africa alone die annually from malaria.[9] What also distinguishes malaria from Lassa fever and ascariasis is that it can be controlled through regular mosquito-spraying programs or chemoprophylaxis.[3,9] Of these three infections, then, malaria would be assigned the highest priority for prevention in the most effective approach to reducing morbidity and mortality.

By means of the process outlined above for Lassa fever, ascariasis and malaria, the major infections endemic to the developing world (Table 1) were evaluated and assigned high (I), medium (II) or low (III) priorities. Within categories exact rank is not of major importance, and rank may change or items may be added or deleted, depending on the geographic area under consideration. For instance, schistosomiasis, to which a high priority was assigned, does not occur in many areas of the developing world. Our re-

Table 1. Prevalence, Mortality and Morbidity of the Major Infectious Diseases of Africa, Asia and Latin America, 1977-1978.*

Infection	Infections (Thousands/Yr)	Deaths (Thousands/Yr)	Disease (Thousands of cases/Yr)	Average No. of Days of Life Lost (per Case)	Relative Personal Disability†
Diarrheas	3–5,000,000	5–10,000	3–5,000,000	3–5	2
Respiratory infections		4–5000		5–7	2–3
Malaria	800,000	1200	150,000	3–5	2
Measles	85,000	900	80,000	10–14	2
Schistosomiasis	200,000	500–1000	20,000	600–1000	3–4
Whooping cough	70,000	250–450	20,000	21–28	2
Tuberculosis	1,000,000	400	7000	200–400	3
Neonatal tetanus	120–180	100–150	120–180	7–10	1
Diphtheria	40,000	50–60	700–900	7–10	3
Hookworm	7–900,000	50–60	1500	100	4
South American trypanosomiasis	12,000	60	1200	600	2
Onchocerciasis					
Skin disease	30,000	Low	2–5000	3000	3
River blindness		20–50	200–500	3000	1–2
Meningitis	150	30	150	7–10	1
Amebiasis	400,000	30	1500	7–10	3
Ascariasis	800,000–1,000,000	20	1000	7–10	3
Poliomyelitis	80,000	10–20	2000	3000+	2
Typhoid	1000	25	500	14–28	2
Leishmaniasis	12,000	5	12,000	100–200	3
African trypanosomiasis	1000	5	10	150	1
Leprosy		Very low	12,000	500–3000	2–3
Trichuriasis	500,000	Low	100	7–10	3
Filariasis	250,000	Low	2–3000	1000	3
Giardiasis	200,000	Very low	500	5–7	3
Dengue	3–4000	0.1	1–2000	5–7	2
Malnutrition	5–800,000	2000			

*Based on estimates from the World Health Organization and its Special Programme for Research and Training in Tropical Diseases, confirmed or modified by extrapolations from published epidemiologic studies performed in well defined populations (see references). Figures do not always match those officially reported, because under-reporting is great.

†1 denotes bedridden, 2 able to function on own to some extent, 3 ambulatory, & 4 minor.

Table 2. An Approach to the Establishment of Priorities for Disease Control, Based on Prevalence, Mortality, Morbidity and Feasibility of Control of Three Representative Infections.

Infection	Prevalence	Mortality	Morbidity	Feasibility of Control	Priority
Lassa fever	Unknown (thought to be low)	High (30–66%)	Moderate (bedridden 7–21 days)	Extremely poor at present	Low: prevalence low, feasibility of control poor
Ascariasis	Extremely high (thought to affect 1 billion people)	Extremely low (approximately 0.001%)	Low (minor disability & often asymptomatic)	Poor (continuous drug treatment required)	Low: mortality & morbidity low, feasibility of control poor
Malaria	High (more than 300 million infected annually)	Low (approximately 0.1%)	High (severe, many complications, often recurrent)	Good (chemoprophylaxis available; regular spraying programs for vectors practical)	High: prevalence high, morbidity high, feasibility of control good

sults and rationale for the proposed hierarchy are listed in Table 3.

Group I contains the infections causing the greatest amount of most readily preventable illness and death: diarrheal diseases, malaria, measles, whooping cough, schistosomiasis and neonatal tetanus. With the exception of schistosomiasis, all the infections receiving highest priority for health-care planning affect young children more than adults.[10-14] Together with respiratory infections and malnutrition, they account for most of the morbidity and mortality among infants and young children.[11,15-17] Members of this age group (five years old or less) have a death rate many times greater than that of their counterparts in Western countries — accounting for 40 to 60 per cent of all mortality in most less developed countries.[11,17-19] If infant and child deaths from these infections are reduced, a large decline in the overall death rate will result. Such a situation would be an optimal outcome of a selective disease-control program.

Groups II and III contain health problems that are either less important or more difficult to control. Respiratory infections, a major cause of disability and death, are not listed in Group I because of the difficulties involved in preventing and managing them. A wide variety of viruses and bacteria are associated with pulmonary infections, and no specific causative agent has been found in most patients.[16,20] As in the industrialized world, where pneumonia is frequently the terminal episode in elderly patients weakened by cancer or cardiovascular disease, lower-respiratory-tract infections affect children in developing countries who are already afflicted with chronic malnutrition and parasitic infections.[16] Pneumococcal and influenza vaccines prevent only a small percentage of cases, and influenza immunization must be given almost yearly because the virus changes antigenically. When penicillin injections were given to all children with clinical signs of pneumonia in the Narangwal Project in India, the mortality rate decreased by 50 per cent,[21] but this method must be evaluated more extensively before it can be regarded as a major improvement in prevention of respiratory disease.

A medium or low priority was assigned if control measures were inadequate. For example, there is no acceptable therapy for chronic Chagas' disease.[3,4] Only toxic drugs and procedures of unknown efficacy, such as nodulectomy, are available for treatment of onchocerciasis.[3,4] Leprosy and tuberculosis require years of drug therapy and even longer follow-up

Table 3. Priorities for Disease Control in the Developing World, Based on Prevalence, Mortality, Morbidity and Feasibility of Control.

Priority Group	Reasons for Assignment to This Category
I High	High prevalence, high mortality or high morbidity, effective control
Diarrheal diseases	
Measles	
Malaria	
Whooping cough	
Schistosomiasis	
Neonatal tetanus	
II Medium	
Respiratory infections	High prevalence, high mortality, no effective control
Poliomyelitis	High prevalence, low mortality, effective control
Tuberculosis	High prevalence, high mortality, control difficult
Onchocerciasis	Medium prevalence, high morbidity, low mortality, control difficult
Meningitis	Medium prevalence, high mortality, control difficult
Typhoid	Medium prevalence, high mortality, control difficult
Hookworm	High prevalence, low mortality, control difficult
Malnutrition	High prevalence, high morbidity, control complex
III Low	
South American trypanosomiasis (Chagas' disease)	Control difficult
African trypanosomiasis	Low prevalence, control difficult
Leprosy	Control difficult
Ascariasis	Low mortality, low morbidity, control difficult
Diphtheria	Low mortality, low morbidity
Amebiasis	Control difficult
Leishmaniasis	Control difficult
Giardiasis	Control difficult
Filariasis	Control difficult
Dengue	Control difficult

periods to ensure cure.[4,22,23] Instead of attempting immediate, large-scale treatment programs for these infections, the most efficient approach may be to invest in research and development of less costly and more efficacious means of prevention and therapy. To reiterate, the most important factor in establishing priorities for endemic infections, even when evaluating diseases with high case rates, is a knowledge of which diseases contribute most to the burden of illness in an area and which are reasonably controllable.

Evaluating and Selecting Medical Interventions

Once diseases are selected for prevention and treatment, the next step is to devise intervention programs of reasonable cost and practicability. The interventions relevant to the world's developing areas that are considered below are comprehensive primary health care (which includes general development as well as all systems of disease control), basic primary health care, multiple disease-control measures (e.g., insecticides, water supplies), selective primary health care, and research. Below is a discussion of each approach, with emphasis on the relative cost involved in undertaking and maintaining these programs and on the benefits that have accrued.

This section of our analysis relies on reported results from individual studies conducted in various parts of the world. In addition, we have examined estimates of cost and effectiveness in terms of expected deaths averted by each intervention for a model area in Africa. The model area is an agricultural, rural portion of Sub-Saharan tropical Africa with a population of about 500,000 (100,000 are five years old or less). For reference purposes, the average figures for Sub-Saharan Africa will be used: the birth rate is 46 per thousand total population, the crude death rate 19 per thousand total population, and the infant mortality rate 147 per thousand live births.[24,25]

Comprehensive versus Basic Primary Health Care

Comprehensive primary health care for everyone is the best available means of conquering global disease, the humane and noble goal declared at Alma Ata. As defined by the World Health Organization, this system encompasses development of all segments of the economy, ready and universal access to curative care, prevention of endemic disease, proper sanitation and safe water supplies, immunization, nutrition, health education, maternal and child care and family planning. Since resources available for health programs are usually limited, the provision of comprehensive primary health care to everyone in the near future remains unlikely.

Basic primary health-care systems are far more circumscribed in their goals, which are to provide health workers and establish clinics for treating all illnesses within a population. Nevertheless, this approach is far from inexpensive. The World Bank has estimated that the cost of furnishing basic health services to all the poor in developing countries by the year 2000 will be $5.4 to $9.3 billion (in 1975 prices).[26] This investment, which includes only initial capital investment and training costs, would provide one community health worker or auxiliary nurse-midwife for every 1500 to 2000 people and one health facility for every 8000 to 12,000 people or every 10 km^2, whichever is greater. In the model area in Africa, the World Bank estimated that supplying the minimum care offered by building one health post with one vehicle per 10,000 people and training 125 auxiliary nurse-midwives and 250 community health workers would cost $2,500,000, or $5 per capita. To this figure must be added the recurrent costs of salaries, drugs, supplies and maintenance. Other costs not included are for training facilities, continuing education, expansion of referral services and development of communication, transportation and administrative networks to supply and manage the health facilities. Furthermore, the effectiveness of this model program for averting deaths or applying such preventive measures as education in sanitation and nutrition has not been clearly established.

The pilot projects for providing basic health-care services that have been evaluated vary in their effectiveness in improving the general level of health care. For example, an outside evaluation of primary health service in Ghana revealed that a third to half the population of the districts lived outside the effective reach of health units providing primary care. Only about one fifth of the births were supervised by trained midwives; only one fifth of the children under the age of five years had been seen in a child-health clinic, and two thirds of the population lacked environmental sanitation services. Furthermore, the services were often of poor quality, notably in the crucial area of child care.[27,28]

The cost and effectiveness of several experimental programs providing primary health care in localized areas have been compared in Imesi, Nigeria[29]; Etimesgut, Turkey[30,31]; Narangwal, India[21]; Jamkhed, India[32,33]; Guatemalan villages[34]; Hanover, Jamaica[35-37]; and Kavar, Iran.[38] The estimated cost per capita varied widely among the programs, particularly because they were initiated at different times over the past 15 to 20 years and furnished different services to their communities. In general, however, the cost per capita ranged between 1 and 2 per cent of the national per capita income of the particular country. The cost for infant deaths averted were difficult to compare because of the paucity of control groups and inconsistency of the population groups monitored. Figures ranged from $144 to $20,000, with a median of $700. The only precise calculations for the costs per infant death averted ($144) or child death averted ($988 per one to three-year-old child) were for a medical-care and nutrition-supplementation project in Narangwal, India.[21] The estimates were much higher for deaths averted by nutrition supplements.

Under some circumstances, programs of basic primary health care have been successful, but the cost

and the degree of improvement in community health have varied markedly enough that refinements in the approach are still needed.

Multiple Disease-Control Measures

These interventions, which include vector control, water and sanitation programs and nutrition supplementation, are more specific and easily managed than primary health-care programs, and they control many similarly transmitted diseases simultaneously. They can decrease mortality and morbidity and have served as interim strategies for health care in less developed countries.

Vector Control

Vector control is directed at managing the insects and mollusks that carry human disease. This approach has the advantage of being comparatively inexpensive, but it must be continued indefinitely and may be ephemeral since the vectors tend to become resistant. The examples below reveal some of the complexities of maintaining vector control.

The control of malaria transmission through insecticides has been highly effective. In the tropical regions and savannas of Africa, twice-yearly spraying has decreased the crude death rate by approximately 40 per cent and infant mortality by 50 per cent.[39-41] The World Health Organization has estimated that the average cost for house-to-house spraying with chlorophenothane (DDT) is $2 per capita annually.[9] Therefore, the cost per adult and infant death averted is $250, and the cost per infant death averted is $600. Unfortunately, eradication of malaria with insecticides is becoming more difficult to accomplish. Because mosquitoes can be expected to become resistant to DDT within a few years, other, much more expensive pesticides must be substituted; the use of propoxur or fenetrithion will raise the cost of the chemicals five to 10 times.[9] Furthermore, there is no way of knowing how long these insecticides will remain toxic to the mosquitoes. Among the mosquitoes in which widespread resistance to insecticides has developed are *Culex pipiens fatigans*, the major vector of urban filariasis, and *Aedes aegypti*, the vector of yellow fever and dengue.[5]

Two other vector-control programs illustrate the prolonged maintenance required by this type of health intervention. Onchocerciasis, a potentially blinding helminth infection affecting 30 million people in Africa, is being managed in the Volta River Basin through a 20-year larvicide operation to control the blackfly vector. The program is estimated to cost $18 per capita for the entire 20-year period or $.90 per capita per year.[26] Disability will be prevented, and economic activity in the area may increase if the program is successful, but continuous, indefinite applications of insecticide will be necessary. Since 1965, St. Lucia has had a program to control the snail-transmitted helminth infection schistosomiasis through molluscicides. An annual cost per capita of about $3.70 and good results have been reported: the prevalence of the infection has decreased from 45 to 35 per cent in adults and from 21 to 4 per cent in children. Despite these heartening figures, eradication of the vector cannot be considered on the horizon. Schistosomiasis is a long-term, chronic infection and the death rate will not begin to decline until many years after continuous mollusk control.

Water and Sanitation Programs

Proper sanitation and clean water make a substantial difference in the amount of disease in an area, but the financial investment involved is enormous. The success of such projects also depends on rigorous maintenance and alteration of engrained cultural habits.

With the installation of community water supplies and sanitation in developing areas, deaths from typhoid can be expected to decrease 60 to 80 per cent,[43] deaths from cholera 0 to 70 per cent,[43-48] from other diarrheas 0 to 5 per cent,[48-51] from ascaris and other intestinal helminths 0 to 50 per cent[8,10,52-54] and from schistosomiasis 50 per cent[42,52] (after 15 to 20 years). The World Bank has estimated that the cost of providing community water supplies and sanitation to all those in need by the year 2000 will be $135 to $260 billion.[26,55] Construction of a rural community standpipe costs $20 to $26 per capita, and rural sanitation costs $4 to $5 per capita. In urban areas the costs are $31 and $23, respectively. In our model area of Sub-Saharan Africa the initial investment would be $12 to $15 million. If amortization and annual maintenance costs are only 10 per cent of this sum, the annual cost per deaths averted will be $2400 to $2900, and the cost per infant and child deaths averted will be $3600 to $4300.

What must be realized is that the above sums are largely for public standpipes, which are not highly effective in reducing morbidity and mortality from water-related diseases. It is well documented that connections inside the house are necessary to encourage the hygienic use of water.[56] For example, shigella-caused diarrheas decreased 5 per cent with outside house connections but fell 50 per cent when sanitation and washing facilities were available within the home.[51]

All these estimates depend on exclusive use of protected sanitation and water supplies, without continuing use of environmental sources. In Bangladesh, for example, there was no reduction in cholera in areas supplied with tube wells, primarily because of the use of contaminated surface water as well as the protected water supply.[47] In St. Lucia, contact with surface water could not be discouraged until household water supplies and then swimming pools and laundry units were installed, and an intensive health-education campaign was instituted.[42] In other words, changing peoples' habits in excretion and water usage takes more than introducing an adequate, dependable and convenient new source. Realistically speaking, a

pervasive and effective health-education campaign[57,58] is required.

Nutrition Supplementation

Nutrition programs have been advocated as among the most efficient means of decreasing morbidity and mortality in children, but supplementation alone has had no notable effect. Malnutrition is an underlying or associated factor in many deaths from infections in children; in a group of Latin American children, it was associated in 50 per cent of the cases.[59] Poor nutrition may also increase susceptibility to disease or predispose an infected child to more severe illness.[60-62] Conversely, infection may be a prominent cause of poor nutrition[61,63-66] since less food is ingested and absorbed by a sick child. Therefore, if infections could be controlled it is probable that the nutritional status of children would improve greatly. There have been some situations, however, in which malnutrition has been reported to protect against certain infections, e.g., the Sahel famine was thought to suppress malaria, and iron deficiency was reported to protect against bacterial infections.[67-70]

In view of these findings, it is not surprising that few nutrition-supplementation programs alone have effected a major decrease in the death rate. The Narangwal Project is one of these few, but even in that program the cost per death averted in infants was $213. In children one to three years old the cost was $3000 — 1.5 to three times higher than the cost of medical care alone.[21]

Selective Primary Health Care

The selective approach to controlling endemic disease in the developing countries is potentially the most cost-effective type of medical intervention. On the basis of high morbidity and mortality and of feasibility of control, a circumscribed number of diseases are selected for prevention in a clearly defined population. Since few programs based on this selective model of prevention and treatment have been attempted, the following approach is proposed. The principal recipients of care would be children up to three years old and women in the childbearing years. The care provided would be measles and diphtheria–pertussis–tetanus (DPT) vaccination for children over six months old, tetanus toxoid to all women of childbearing age, encouragement of long-term breast feeding, provision of chloroquine for episodes of fever in children under three years old in areas where malaria is prevalent and, finally, oral rehydration packets and instruction.

If even 50 per cent of the children and their mothers and 50 per cent of the pregnant women in a community were contacted, deaths from measles would be expected to decrease at least 50 per cent,[71,72] deaths from whooping cough 30 per cent,[73] from neonatal tetanus 45 per cent,[74] from diarrhea 25 to 30 per cent[75,76] and from malaria 25 per cent.[9] Oral rehydration has been used successfully in hospitals,[77,78] in outpatient clinics[79] and recently in the home[75,76] to treat diarrheas of numerous causes.

These services could be provided by fixed units or by mobile teams visiting once every four to six months in areas where resources were more limited. Mobile units have been successfully used in immunization programs for smallpox and measles,[80,81] in treatment services directed against African trypanosomiasis and meningitis[82] and in provision of child care in rural areas.[83-85]

The cost of fixed units would be similar to that of basic primary health care, although efficiency should be much greater. Cost estimates for a mobile health unit used in the model area in Africa for malaria control and water and sanitation programs were based on an extensive study of the Botswana health services by Gish and Walker.[85] They estimated $1.26 as the cost per patient contact in 1974, on a sample 306-km trip that reached 753 patients; the estimated cost per infant and child death averted was $200 to $250. Medications accounted for 30 to 50 per cent of this cost, but this figure could be decreased with contributions of drugs from abroad or their manufacture within the country.

Whether the system is fixed or mobile, flexibility is necessary. The care package can be modified at any time according to the patterns of mortality and morbidity in the area served. Chemotherapy for intestinal helminths, treatment of schistosomiasis and supplementation with new vaccines or treatments as they become available are all types of selective primary health care that could be added or subtracted to this core of basic preventive care. It is important, however, for the service to concentrate on a minimum number of severe problems that affect large numbers of people and for which interventions of established efficacy can be provided at low cost.

Research

For a number of prevalent infections, treatment or preventive measures are expensive, difficult to administer, toxic or ineffective. These infections, which include Chagas' disease, African trypanosomiasis, leprosy and tuberculosis, may better be dealt with through an investment in research. In terms of the potential benefits, the cost of research is low. Indeed, the total amount now being spent on research in all tropical diseases is approximately $60 million, exceedingly small in relation to the number of people infected. As Table 4 shows, expenditures for research on some of the major diseases in the developing world have by far the lowest per-capita cost of all medical interventions discussed.[86]

The estimated cost for the research and development leading to the pneumococcal vaccine licensed in the United States in 1978 was $3 to $4 million (Austrian R: personal communication). Death and disability in developing countries would be reduced by heat-stable vaccines for measles, malaria, leprosy and rotavirus and *Escherichia coli*-induced diarrheas,

Table 4. Research Funding for Major Diseases of the Developing World, 1978.

Infection	Amount of Funding ($)	Cost/Infected Person/Yr ($)
Malaria	15,000,000	0.02
Schistosomiasis	7,000,000	0.04
Filariasis	2,000,000	0.01
Trypanosomiasis	5,000,000	0.38
Leishmaniasis	1,200,000	0.10
Leprosy	2,000,000	0.16

by improved chemotherapy for leprosy, tuberculosis, American and African trypanosomiasis, onchocerciasis and filariasis and by depot drugs for malaria and intestinal helminths.

Conclusions

Until comprehensive primary health care can be made available to all, services aimed at the few most important diseases (selective primary health care) may be the most effective means of improving the health of the greatest number of people. The crucial point is how to measure the effectiveness of medical interventions. In all the foregoing calculations, we based our analysis of cost effectiveness on changes in mortality or deaths averted. We did not measure the illness and disability that would be prevented. No other benefits for which intervention may have been responsible were measured because they are much more difficult to quantify. The inadequacy of available data makes it impossible to measure distinct and undeniable secondary benefits. For example, water supplies close by would save time for the women who carry water, and increased amounts could irrigate a home garden.

Accordingly, Table 5 summarizes the estimated costs per capita and per death averted for the various health interventions considered. The per capita costs are calculated in terms of the entire infant, child and adult population of the area covered by the service. As the table suggests, selective primary health care may be a cost-effective interim intervention for many less developed areas.

Table 5. Estimated Annual Costs of Different Systems of Health Intervention.

Intervention	Per Capita Cost ($)	Cost per Infant and/or Child Death Averted* ($)
Basic primary health care†		
Range	0.40–7.50	144–20,000 (I)
Median	2.00	700
Mosquito control for malaria	2.00	600 (I)
Onchocerciasis control program	0.90	Few infant & child deaths
Mollusk control for schistosomiasis	3.70	Few infant & child deaths
Community water supplies & sanitation	30–54	3600–4300 (I,C)
Narangwal nutrition supplementation	1.75	213 (I) 3000 (C)
Selective primary health care‡	0.25	200–250 (I,C)

*I denotes infant & C child. †Delivered by village health workers.
‡In this case, delivered by mobile units.

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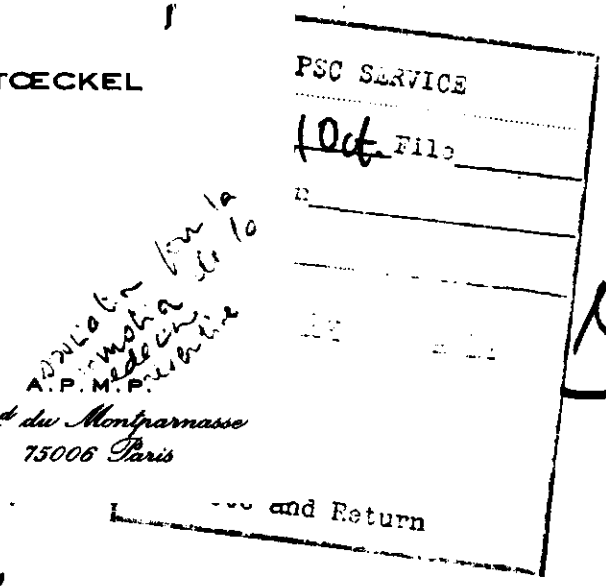

Levi

This gentleman is head of
Association for the promotion
of preventive medicine
made of International Children's Center
Pasteur Institute
Mérieux "

He is dining at Mr. Grant's
Sunday
with McNamara and Mahler.

He would be interster in doing some
PSC film with us in Mali. -

He will call you
Tuesday afternoon.

Bernard

Symposium de Bilthoven

3 et 4 Mars 1983

LA VACCINATION COMME AMORCE DE SOINS DE SANTE PRIMAIRES (S.S.P.)

PH. STOECKEL

La mise en place des soins de santé primaires (S.S.P.) pose aux pays en développement des problèmes difficiles, non seulement de ressources humaines et financières, mais aussi de méthodologie.
Si un consensus général existe autour du concept de soins de santé primaires, sa mise en oeuvre, par contre, est beaucoup plus compliquée et son achèvement plus éloigné que ne l'avaient, en général, prévu les initiateurs d'Alma-Ata.

Dans un rapport publié en Août 1982 l'Association Américaine de Santé Publique (1) analyse 52 projets de S.S.P. financés par l'US-AID et en dégage un certain nombre d'observations pertinentes. Sans en faire une revue complète, j'en dégagerai quelques unes qui nous intéressent plus particulièrement :

1/ DIFFICULTES DE FONCTIONNEMENT par insuffisance de support des projets.
Si, en général la mise en place et le démarrage des soins de santé primaires (bâtiments, recrutement et formation du personnel) se fait dans d'assez bonnes conditions, par contre le fonctionnement ultérieur souffre beaucoup d'une insuffisance de régularité dans les approvisionnements et le fonctionnement : médicaments irrégulièremen livrés, moyens de transport défaillants, supervisions irrégulière, etc...

Les causes peuvent être trouvées : de S.S.P.
- dans une trop rapide progression des projets par rapport à la capacité nationale de les administrer et de les faire fonctionner.
- dans une insuffisance des moyens financiers affectés aux S.S.P encore aggravée par la crise mondiale ;
- dans une trop grande dépendance à l'égard des produits importés comme l'essence et les véhicules ;
- du fait d'une grande irrégularité des approvisionnements en médicaments qui :
  - interrompent des traitements,
  - entament la crédibilité des agents de soins communautaires.
- du fait que les agents livrés à eux-mêmes et insuffisamment encadrés font des erreurs et perdent peu à peu la confiance de la communauté.

2/ DIFFICULTE AU NIVEAU DE LA COMMUNAUTE ELLE-MEME : Sa participation aux S.S.P. et le financement par elle-même des activités des S.S.P. sont problématiques.
La participation de la communauté a été variable ou faible d'un projet à l'autre, meilleure pour les problèmes d'eau que pour les problèmes de santé ; et en général de courte durée. Il a été difficile d'obtenir la prise en charge régulière du salaire de l'agent de santé communautaire. Une des raisons principales est le "flou" des actions sanitaires proposées et sa mauvaise perception par les membres de la communauté. Des objectifs moins nombreux, plus clairs, entraineraient sans doute une meilleure adhésion.

3/ AGENT COMMUNAUTAIRE DE S.S.P.
Il est postulé dans les S.S.P. que la grande majorité des problèmes sanitaires peuvent être traités par un agent n'ayant reçu qu'une formation brève. Ceci reste à prouver. Cependant la crédibilité de cet agent et sa capacité de mobiliser la communauté sur des objectifs sanitaires dépend très directement de sa capacité de fournir les médicaments essentiels. L'étude montre aussi que l'agent salarié de l'Etat est meilleur promoteur de médecine préventive (peut-être parce qu'il est moins dépendant de la

communauté), cependant, cette rémunération-là est également problématique.
Toutefois lorsque cet agent a été régulièrement approvisionné, supervisé et payé, il a été plus facile de vaincre la méfiance et d'obtenir des résultats surtout si, en même temps, les actions préventives sont bien choisies pour leur impact et leur compréhension par les populations.

Ces observations basées sur l'analyse des importants projets de S.S.P. des américains confirment avec force nos propres et beaucoup plus modestes observations en Afrique de l'Ouest francophone.
Devant ces difficultés, nous sommes d'avis d'entreprendre des actions bien choisies qui non seulement ne concurrencent pas la mise en place des S.S.P. mais en facilitent l'installation et le fonctionnement, la compréhension et la crédibilité.
Ce choix a déjà été exprimé par Julia Walsh et Kenneth Warren sous le vocable de "soins de santé primaires sélectifs", "une stratégie intérimaire pour contrôle des maladies dans les pays en développement" (2)

Dans notre propos d'aujourd'hui nous voudrions montrer que les vaccinations peuvent être une bonne activité à entreprendre pour la mise en route des soins de santé primaires.

1- Les vaccinations bien conduites sont efficaces pour réduire la morbidité et la mortalité des maladies infectieuses. Cette efficacité est immédiatement perceptible pour les maladies comme la rougeole, la coqueluche, le tétanos-néo-natal. Pour d'autres comme la poliomyélite, la fièvre-jaune ou le tétanos dont l'incidence est plus faible, cette perception doit être démontrée et médiatisée. L'efficacité reconnue et donc la popularité dont jouissent les vaccinations en Afrique en font un excellent moyen de mobilisation des populations et d'adhésion aux S.S.P. . C'est une excellente porte d'entrée dans les collectivités, à la fois populaire et préventive dont le rapport coût/efficacité est excellent.

2- Les vaccinations et l 'agent de soins communautaires :

populaires, les vaccinations peuvent renforcer la crédibilité de l'agent des S.S.P. s'il est impliqué dans leur préparation, leur organisation, leur déroulement et leur suite. Il bénéficie de la popularité des vaccinations, mais, d'autre-part, ce relais local améliore largement le taux de couverture vaccinale en raison surtout de la meilleure préparation des populations, de leur information plus précise et de la garantie du "suivi" après injection des vaccins, toutes choses qui dépendent essentiellement de cet agent des S.S.P.

L'équipe de vaccinations qui vient l'aider à pratiquer celles-ci est en général dirigée par un infirmier diplômé d'état ou breveté, compétent pour évaluer la qualité du travail de l'agent des S.S.P. et pour l'encadrer et l'aider de ses conseils. Si cette équipe applique notre programme (dc. Kolda et Kaya) (3), elle vient régulièrement, deux fois par an, avant et après la saison des pluies, pour pratiquer les vaccinations, et donc aussi pour encadrer l'agent des S.S.P..

Enfin la périodicité régulière de ces visites peut conduire à utiliser l'équipe de vaccinations comme véhicule d'approvisionnemer régulier de la communauté de base en médicaments essentiels.

3- Les vaccinations facteur d'organisation (4)-(5) : les vaccinations requièrent un effort particulier et soutenu d'organisation à tous les niveaux :

- au niveau central : planification des approvisionnements en vaccins et en matériel, de la formation et du recrutement du personne gestion des stocks, programmations budgétaires;
- au niveau régional ou intermédiaire : mise en place des éléments de la chaîne de froid, surveillance des performances, stockage et distribution rationnelle des vaccins ;
- au niveau local ou périphérique : organisation du travail et surveillance des centres de vaccinations (fixes ou mobiles), surveillance du fonctionnement de la chaîne de froid jusqu'au moment où le vaccin est injecté.

... / ...

L'ensemble de cette organisation, quand même peu complexe, est assez facilement contrôlable. C'est ainsi que l'enregistrement permanent des températures extérieures et intérieures à la chaîne de froid est un très bon critère d'appréciation de la qualité du travail du personnel concerné (en même temps que le conservation des vaccins). De même, des évaluations périodiques de la couvertur vaccinale, relativement simples et rapides à faire, permettent de vérifier l'impact du programme sur la population-cible et d'en mesurer les variations.

A partir du moment où un Etat se dote d'une telle organisation il dispose des moyens de faire beaucoup plus que les vaccinations. Celles-ci, par la méthodologie qu'elles impliquent, ont servi d'architecture à l'implantation d'autres soins.

Ainsi parmi les actions sanitaires prioritaires les vaccinations bien conduites nous semblent être celles qui peuvent le mieux contribuer à l'implantation des S.S.P. .

Après une période d'implantation et de rattrapage d'une année environ pendant laquelle l'équipe a beaucoup de travail ce qui l'empêche de faire autre chose vient la phase de routine ou d'entretien pendant laquelle, la cohorte d'enfants à vacciner (ceux de 3 à 14 mois) ne représente plus plus que le tiers environ de la cohorte de démarrage.

Alors l'équipe peut entreprendre avec l'agent des S.S.P. de mettre en route d'autres éléments des S.S.P. , par exemple :
- la réhydratation orale pour la luttre contre les diarrhées,
- la chimioprophylaxie des accès de paludisme par la chloroquine,
- la promotion de l'allaitement maternel et l'éducation nutritionnelle (en particulier par la supplémentation de l'allaitement maternel par des bouillies confectionnées avec des produits locaux administrées dès l'âge de 4 mois) etc...

Ainsi en attendant la mise en place et le fonctionnement des S.S.P la réalisation d'un programme de vaccination des enfants peut, s'i est bien fait, constituer la première d'une série d'activités susceptibles d'améliorer le niveau de santé de base.

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