AUXILIARIES AND PRIMARY MEDICAL CARE*

N. R. E. FENDALL, M.D.

Professor of Tropical Community Health
The Liverpool School of Tropical Medicine
Liverpool, England

IF I were asked to compose an epitaph on medicine throughout the 20th century it would read "Brilliant in its scientific discoveries, superb in its technological breakthrough, but woefully inept in its application of knowledge to those most in need." Medicine will be judged not on its vast and rapid accumulation of knowledge per se, but on its trusteeship of that knowledge. How has it applied knowledge to the benefit of humanity? Jenner discovered the technique of smallpox vaccination two centuries ago, yet still we accept 40 to 50 thousand cases of smallpox a year. The sulphones, a cheap and simple remedy, have been known for a quarter of a century, but we still acknowledge 12 million lepers—of whom only 2 million are receiving treatment. Wallace Fox, writing on realistic tuberculosis policies for developing countries, noted that despite striking progress in the chemotherapy of that disease, little benefit had accrued to the developing countries. He cited two reasons for this lack of progress: a shortage of medical resources and little attempt to adapt present knowledge to their specific problems.

It is also due to a failure to comprehend and appreciate the fundamental problems and requirements of developing countries and disadvantaged peoples. The outstanding requirement is the application of yesterday's knowledge to today's needs. Europe has passed through a public health phase in the last 150 years; during this period knowledge was gained and applied gradually over a period of time. We are now experienced; and all that remains is the problem of translating what is current common knowledge and routine medical and health practice to the other two thirds of the world: the "implementation gap" must be closed. The parameters within which we have to work are equally clear.

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TABLE I. MEDICAL SCHOOLS, 1970 TO 1971

Region	*Population (Ms.)*	*Medical schools*	*Population per school (Ms.)*
Latin America	291	157	1.8
Africa	354	41	8.6
Asia (including China)	2,104	282*	7.5
Underdeveloped world	2,749	480	5.7
North America	229	123	1.8
Europe	466	219	2.1
USSR	245	83	3.0
Oceania	20	12†	1.7
Industrial world	960	437	2.2
World	3,709	917	4.0

*China, 41 schools, pop. 773 mills.; Japan (industrial), 46 schools, 105 mills.
†Includes 1 Fiji, 1 Papua.

They are slender financial resources, a paucity of trained manpower at all levels, and a high level of illiteracy, an excessive and tragically wasteful fertility pattern, a conservative and strongly traditional society with its roots embedded in the soil, a predominantly rural population subsisting on primitive peasant-farming practices, a common epidemiological pattern of diseases consisting of communicable diseases, both infectious and vector-borne, and a pervasive substratum of undernutrition and malnutrition.

The disease picture, in contrast to that of the industrialised countries, falls most heavily on the young, resulting in an extravagantly wasteful and tragic child morbidity and mortality: a mortality which ensures that one of two or three babies conceived will perish before the age of five. This is a production-line loss that no industry can or would afford. Why do we continue to accept it for the human production line? What we should be striving for is stabilization of both production and wastage (fertility and mortality) at a lower rate.

Much of the time lag between the discovery of knowledge and its extensive application lies in the reluctance and inability to admit that lesser-trained persons can carry out routine tasks in medicine. Yet such lesser-trained persons must be selected, appropriately trained, and utilized if we are to achieve a total outreach of medical and health care within the parameters of the financial and manpower resources of the disadvantaged peoples of this earth.

TABLE II. APPROXIMATE POPULATION PER HEALTH PROFESSIONAL

	Physicians	*Nurses*	*Midwives*†	*Dentists*
World*	2,500	1,000	6,700	5,700
Latin America	1,800	3,700	18,000	5,000
Africa	10,000	12,500	6,000	81,000
Asia	5,900	8,200	7,000	17,000
North America	780	300	See below‡	590
Europe	850	330	3,700	3,080

*Excludes the Republic of China and USSR.

†There is frequently "double reporting" of nurses and midwives since many are dual qualified.

‡*Maternity Care in the World* (Pergammon Press) quotes 550 professional nurse-midwives in the U.S.A., of whom 92 were in active practice, and of Canada states: "Few practising as such."

Sources: a) *Maternity Care in the World,* Elmsford, N. Y., Pergammon, 1966; b) PAHO, Facts on health progress, 1968; c) WHO, Various documents.

APPLICATION OF KNOWLEDGE

The factors of shortages of trained manpower and its maldistribution have been sufficiently highlighted to warrant but passing reference.

Table I[2] illustrates the worldwide distribution of medical schools, and Table II[3] the manpower situation. Suffice it to say that in the developed world one physician graduates for every 350 babies born, while in the underdeveloped world the ratio is 1:3,500 or more: and that to provide one physician to every 770 persons would mean another three and one-half million physicians immediately. This would cost some $87.5 billion dollars at $25,000 per physician. All countries would like to have a physician-manned health service; but one must be able to pay for such a service not only in terms of the educational costs of physicians, but in terms of affording the social and working environments of the physicians. Maldistribution is caused by our inability to provide the physician with the support he needs: institutions, facilities, and allied health personnel—to enable him to function adequately. One cannot expect an elegantly trained person to function in an inelegant social and work environment. To do so is to utilize the engineer (of medicine) as the plumber.

PRIMARY MEDICAL CARE

The overwhelming quantitative demand in developing countries is for care of ambulant sickness. The demand, coming from an unsophisti-

TABLE III. JAMAICA: PRIMARY MEDICAL CARE

Affliction	*Clinic*			
	Jacks River	*Little London*	*Sligoville*	*Lincoln*
Tropical ulcer	17	124	9	4
Worms	10	33	21	6
Upper respiratory infections	6	60	2	7
Minor lacerations	2	—	8	6
Infected lacerations	1	6	5	1
Gonorrhea	2	2	6	3
Burns	—	—	1	1
Skin diseases	7	2	6	6
Rheumatism	2	—	—	—
Abscesses	1	—	—	—
Gastroenteritis	1	—	1	8
Hypertension	1	1	4	1
Dental disease	1	—	—	—
Diabetes	1	—	—	—
Yaws	3	—	—	—
Common infectious diseases	—	8	4	—
Malnutrition	—	1	2	1
Constipation	—	11	—	4
Headaches	—	5	—	—
Others (including injections and reattendances	3	38	7	18
Total cases	58	291	76	66

The above figures represent attendances at a specific general outpatient clinic held at a dispensary or health center during one half-day session. Each patient received between one and two minutes' attention.

cated community, is at a very simple level. Knowledge of modern medicine is just beginning to penetrate to these communities. The major demand comes from the rural areas of these developing countries. By far the greater part of the population—70% or more—is born, lives, works, and dies in rural areas.

Though urban conglomerations are growing faster than rural populations and migration to the towns is overrapid, the rural populations are not diminishing but still increasing. By the turn of the century there will be more rural people, not less. So that we cannot take the sanguine view of presuming that the drift to the towns in developing countries will solve the dilemma. It will not; it increases the urban problems disproportionately, the comparative rural urban growth rates being 1.7 and 4.6% per annum respectively.[4] But if primary medical care is difficult to provide for the impoverished urban community it is immeasurably more difficult to service rural areas adequately. Such areas are almost devoid of both public and private medical care facilities. Even in the United States statistics show that large segments of rural America

TABLE IV. JAMAICAN MEDICAL GLOSSARY

Belly operatin' Belly runnin'	(Diarrhea)
Pitch and toss Pick y' nose Not eatin' Say for 'em belly Gettin' magre	(Worms)
Belly bottom pain Pain in waist Strain back Burn 'em when 'em pea Corruption come down pipe Buck his toe Catch a strain Spoil m'self Catch 'em dose	(Pelvic inflammatory pain) (Gonorrhea)
Pressure	(Hypertension)
Cold m' shoulder, hip, etc. Stiff up	(Rheumatism)
Col' in mole hole	(Cold, coryza)
Don' go out free Caustic	(Constipation)
Messin' in stomach Singin' in stomach	(Asthma)
Hort lif' up	(Palpitation)
Throw up	(Vomit)
Lame foot	(Ulcer, abrasion, injury to foot)
Rash	(Infectious disease)
To sound you	(Examine)
Sore on 'em private Sore on 'em tea pot Sore on 'em taileg	(Chancre)

do not get adequate health care, and that the quality of the care they do get is less than that provided in the urban areas. Rural people in general are said to have a greater need for health care because the income levels of farm families is lower than that of the urban incomes. Chronic illness is said to be of greater incidence, there is a lower level of education, and the hospitals are generally smaller and less well-equipped and are more difficult of access. It is said also that in the United States a smaller proportion of rural residents have health insurance coverage.[5]

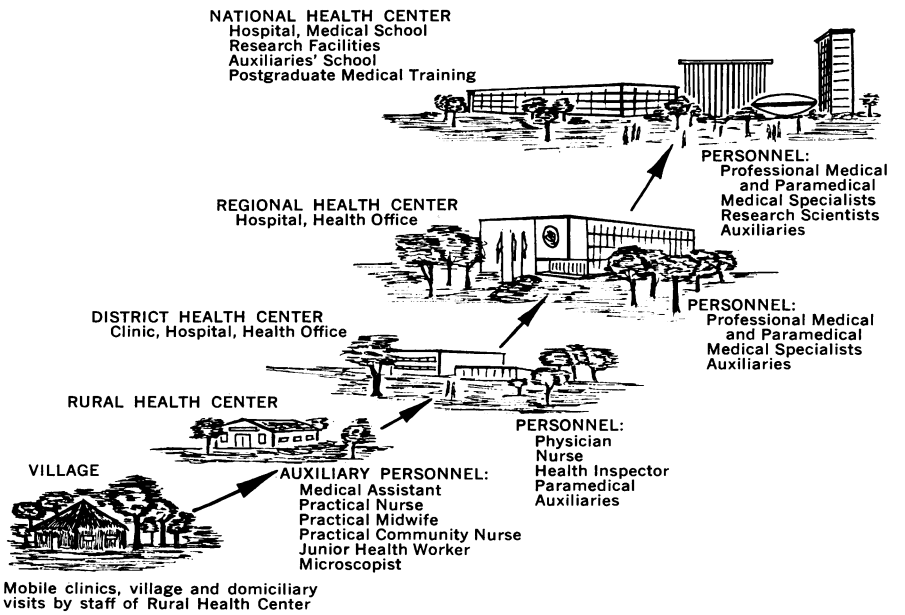
Pharmacies which supply much of the primary medical care needs of urban populations are notable for their scarcity in rural areas. At most a general store stocking a few proprietary drugs is to be found—and it does not have the benefit of a pharmacist with his knowledge of

elementary diagnosis and treatment. The overwhelming demand is for the relief of pain, for care when persons are sick, and attention to child and maternal requirements. For the major part the "wants" are in respect of simple deviations from the norm and respond to simple remedies. Table III, an analysis of rural health attendances at four outpatient clinics in Jamaica, reveals the simplicity. But in order to diagnose, one needs to be conversant with the culture and language of the people. Table IV illustrates the expressions used at one session of a rural dispensary.

These particular clinic sessions were recorded by a physician seeing the new cases; a nurse took care of the reattendances and dressings. Patients were seen at about the rate of one a minute, and I have nothing but admiration for the physician performing this type of "spot" diagnosis and treatment. But is such a procedure necessary and worthwhile? Is it the proper way to use high-level manpower? Similar situations may be seen throughout the developing world. Hospitalized care generally accounts for less than 5% of sick persons attended in developing countries. In Tanganyika (in 1965) some quarter of a million patients were admitted to hospitals but 25 million attendances at outpatients clinics were recorded: a ratio of 1:100. In Jamaica the ratio is about 1:20 in the public sectors—this discounts the considerable attendances in the private sectors. It is true, of course, that this ratio is partly a result of insufficient hospital accommodation. It has been shown that admissions rise in almost linear relation to the number of hospital beds available. But lack of hospital beds is the actual state of affairs in developing countries.

The Problem

We thus have to satisfy three fundamental criteria: an enormous quantitative demand for ambulant care, an unsophisticated level of demand, and specific traditional cultural characteristics. On the latter point, for example, in Jamaica the system of functional psychoses are said to be "interestingly patterned on social-cultural background." The Jamaican culture has been influenced by the factors of a predominantly African heritage, a slave history, poor economic circumstances, and the superimposition of modern industrialization and culture. The socially accepted customs of "the visiting father," common law marriage, and female employment opportunities have a direct bearing on family health.



Outline for medical services in developing countries. Reproduced by permission from Fendall, N. R. E.: *Auxiliaries in Health Care.* Baltimore, Johns Hopkins University Press, 1972. Published for the Josiah Macy, Jr., Foundation.

Traditional African "medicine men" survive in the form of religious practitioners of medicine known as "Obeahs," who practice their art through herbalism, witchcraft, mysticism, spells, and incantations. The adoption of Christianity without abandoning traditional African ritual is apparent in "Pokomania." The specific culture is apparent in the status symbols of overtones of color, money, and a Christian marriage. Given these criteria, although I have quoted Jamaica as my example, such criteria may be spelled out for each individual disadvantaged area.*

What is the solution of our problem of how to deliver primary medical care? I think the answer lies in shifting the emphasis from hospital development to health center growth, from high-level manpower to middle-level manpower, from professional to auxiliary health worker, and from urban to rural areas. There must, of course, be balanced

*Since writing this article the following passage appeared in the *South African Digest* for March 17, 1972:

> Family-planning the pineapple way is fortunately as rare as a multiple pine grown on a farm near Empangeni, Zululand. Zulu women on the farm say that each of the fused segments of the fruit represents the number of children the eater will have. In this case there were at least eight! Mr. Agrippa Magawaza, who found the freak of nature, said that although he didn't believe the superstition, he wasn't going to eat the multi-pine . . . just in case.

growth. I have written elsewhere on the organization of health services in developing countries, based on the referral concept and regionalization, the functions of health centers, and staffing patterns.[6-10] All of which is most neatly summed up in the accompanying figure, which first appeared in *Man-power for the World's Health.*[11]

The Solution

Once simple criteria have been developed for diagnosis, treatment, and after care, professional persons are not essential for implementation of primary care programs in disadvantaged settings.

Provided the correct medical organization is devised with adequate referral and supervision systems developed, auxiliary health personnel can be utilized to advantage. Such persons can be both "assistants" and "substitutes" for professionals—but never replacements. They both complement and supplement professional staff.

To talk in terms of utilizing other paramedical personnel to take over the functions of physicians is unrealistic when recognition is given to the fact that allied health professionals are in even shorter supply than physicians in disadvantaged areas. In India and Pakistan physicians outnumber nurses by two to one. The same holds true for Turkey, Egypt, and Kenya. Therefore nurses, though they have many of the attributes required, need their own strength increased by auxiliaries. The same holds true for pharmacists who, in many ways, are the most appropriate paramedical persons to render primary medical care in both the private and public sectors.

All the allied health professions need auxiliaries as additional pairs of hands, to help encompass the quantitative work loads.

Such persons in many ways are more competent to tend to unsophisticated communities because they offer a more understanding personal relation. They have not yet been educated away from traditional and modern cultures. They are able to relate to both the educated and uneducated.

Training

Once this has been accepted, and a systems analysis approach has determined the exact requirements, training programs may be structured.

Training is in the minimal not maximal input, in the realities of the situation, in the safe, the accepted, the feasible, and the effective. Placebo regimens are outmoded. Training is in the art of spot diagnosis rather

than differential diagnosis, treatment to a specific preordained method, not as a choice of different regimens. Referral criteria must be clearly spelled out. Repetition becomes important to establish certainty and good habits. Vocational skills must be taught with preselected tools and types of procedures.

Practice should stimulate work situations in all respects, except for selection of appropriate mundane clinical cases, adequate and informed instructors, and the time element. Practice should absorb a larger proportion of instruction than classroom theory. Audiovisual methods of learning are important at this level when understanding of the written word may still pose difficulties. Common core subjects should be taught to all types of auxiliaries together, to foster the team concept. Particular attention must be paid to well-worn precepts in medicine: the motivation of patient, health education, care and after-care, the counseling of patients, contact tracing, defaulter identification tracing and retrieval, home care and management. Above all, training must emphasize the human element and continuity of effort.

At the level of the auxiliary the careful structuring of the educational progresson ladder is vital. The attainments and potential of the student must be determined—often by a preliminary apprenticeship period, as culturally adapted aptitude tests are lacking.

Duties must be defined and functional details studied. The progression must be orderly, gradual, and logical—as seen by the student. Optimal rates of progress must be assessed by trial and error. Small classes, individual attention, instruction in practical maneuvers, and flexible training schedules are advantageous. Training must encourage not only what to do when the physician is present, but what to do when he is not available. To do less is to ensure that the ambulance becomes the hearse, and the emergency reception room the funeral parlour.

Teachers

Teaching to minimal input concepts is more arduous; it needs more self-discipline than teaching to maximal subject input. Teachers must be conversant with changes in field circumstances and service conditions, and must be vocationally adept themselves. The teacher must recognize that his responsibilities do not end at the curtilage of the school. He has a continuous educational, evaluation, and research role in the field.

Supervision

Lack of supervision or uninformed supervision by professionals is probably the greatest single cause of the failure of auxiliaries to function satisfactorily. Physicians show a predilection for performing as star actors rather than delegating and supervising others. Yet when supervision is properly performed—and it amounts to adopting the "consultant" mantle—it can be immensely rewarding, and at times humbling when the consultations take place within the restricted work environment and facilities of the auxiliary. Everyone is *entitled* to supervision.

Summary

More pairs of hands are required to close the implementation gap. These cannot be found in the ranks of the physicians or allied health professionals. A new cadre, auxiliaries, of substantially lesser learning and skills is required to supplement and complement the health teams, but not to displace professionals. Such persons must be trained for a specific area of work, to a defined limit of competency, and to use selected tools and medicines. Training must develop skilled hands and disciplined minds. Thus one may extend the application of knowledge to those peoples most in need at a cost that they can afford. Such auxiliaries, working in the dual roles of assistant and substitute, can ensure the proper utilization of scarce high-level manpower.

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