

THE RURAL PUBLIC HEALTH EXPERIMENT IN TING HSIEN, CHINA¹

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INTRODUCTION

THIS year a short statement, instead of a full report, is issued for three reasons. First, the year of 1934 was largely devoted to extension of methods that had been worked out in previous years. Very few attempts were made to initiate new activities. Second, the principles and methods of approach underlying the activities of the Department in past years have been discussed at some length in previous reports and to date not enough time has elapsed to justify final conclusions. Finally, a statement of essential facts with graphic illustrations seems to be sufficient to keep our friends informed of the progress of the Department.

The significance of the Ting Hsien experiment, particularly from the standpoint of applying medical knowledge within the socio-economic reach of the population, is recognized by the leading medical schools in the country. In the year 1934, fourteen third-year medical students of the Peiping Union Medical College, eleven fourth-year medical students of the Hsiang-Ya (Hunan-Yale) Medical College, and two internes of the Shanghai Medical College spent in Ting Hsien three days, three weeks, and four weeks respectively. Of three Peiping Union Medical College fourth-year students who selected Ting Hsien for their regular clerkship training, one has joined the field of public health and another is contemplating doing so.

¹ With minor editorial changes, this is the fifth annual report of the Department of Public Health of Ting Hsien, published in Tingshsien, Hopei, China, March, 1935, by the Chinese National Association of the Mass Education Movement under the title, "Statement of Progress in 1934." This report was not available in the United States until November, 1935.

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The National Conference on Rural Reconstruction held October 10, 1934, at Ting Hsien was attended by 150 delegates from governmental and private institutions from all parts of the country. A special section of rural health was created and the Department of Public Health of the Ting Hsien experiment was unanimously voted to lead in discussions. The methods of approach in the field of rural health and the underlying principles which have been systematically evolved at Ting Hsien were subject to consideration from different points of view, and, as a result, in general were accepted.

ORGANIZATION

The experience of the last three years has brought out the validity of the present organization which is built upon the village Alumni Associations.³ With the rapid increase in the number of these Associations more requests are being received for initiation of health activities (Fig. 1). Those villages which have had health workers for two years have realized the value of these workers, and the latter have become a part of the every-day necessity of village life. At present there are eighty village health workers in the Hsien.

Over the village health workers are now eight stations in the subdistricts. Three stations, including one in the City of Tinghsien and two in the surrounding subdistricts of the City, are staffed each with a physician, a nurse, and a dresser. In each of the other five stations there is only a physician and a dresser. All the physicians, except one from the Peiping National Medical College, are graduates of the Hopei Provincial Medical College at Paotingfu, a town fifty miles from the City of Tinghsien. In spite of the fact that the training of these physicians is inadequate for the responsibilities of a subdistrict health station, their

³ Composed of alumni of the so-called "People's Schools," which have been established in the villages by the Chinese National Association of the Mass Education Movement.

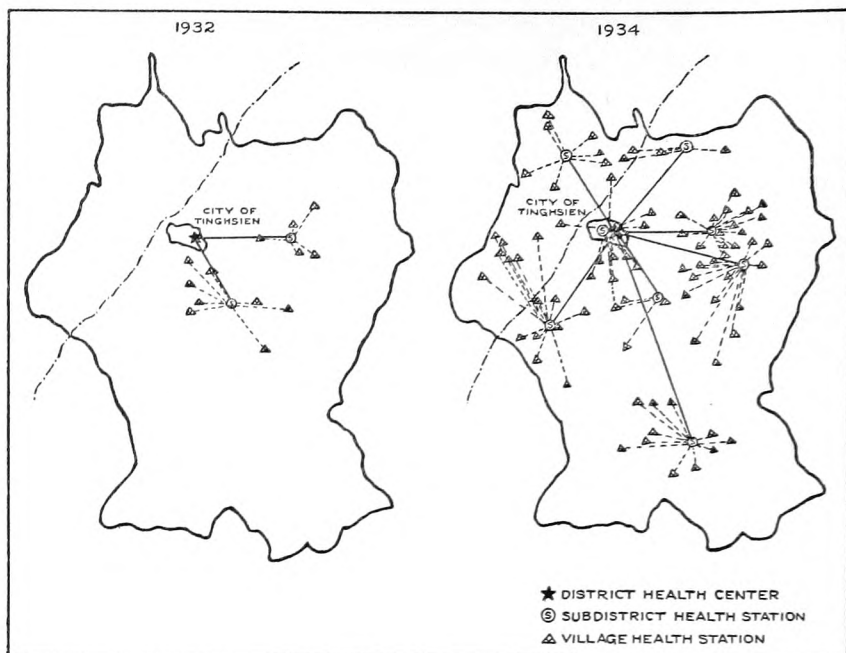


Fig. 1. Comparison of the extent to which local health services were available to residents of Ting Hsien in 1932 and 1934.

youthful minds have proved sufficiently flexible to permit the development of new attitudes and habits. Close connections between the subdistrict stations and the District Health Center are maintained by means of regular telephone service, visits to the stations by members of the Center, occasional shifting of physicians from stations to Center and, most important of all, by regular conference of all physicians of the Department every week-end.

The amount of work in the District Health Center naturally grows with the expansion of subdistrict and village stations. The hospital, the laboratory, and the central supply have proved their value in assisting workers in the field. Experiments in health education methods of "Integrated Village Schools," in teaching farmers to use birth control measures and in immunization against diphtheria with alum precipitate toxoid were carried on by the

members of the Center. In addition to coordinating and strengthening the activities in the subdistrict and village health stations, the District Health Center may in the near future become an important center for the intensive training of rural medical officers.

The following tabulation summarizes the duties and responsibilities of each of the three administrative units:

District (through Health Center)

- Administration
- Health education
- Birth control
- Anti-narcotic work
- Sanitation and control of communicable diseases
- School health supervision
- District hospital
- District laboratory
- Training of physicians, nurses, and dressers
- Training of midwives

Subdistrict (through Health Station)

- Supervision of health workers
- Popular health education
- School health
- Supervision of village "midwives"
- Preventive vaccinations
- Daily clinic (general)

Village (through Health Worker)

- Popular health education
- Reporting of births and deaths
- Smallpox vaccination
- Reconstruction of drinking wells
- First aid (free service)
- Veterinary guidance

VITAL STATISTICS

Aside from the City of Tinghsien, in which an inspector is employed to collect birth and death statistics from various sources, for the Hsien as a whole we still depend upon the village health

workers for statistical information. The eighty villages, with a population of about 120,000, have all begun to report births and deaths, but as most of them started late in the year they are not included in the present analysis. On the other hand, in the experimental area where reporting has been done for more than three years the information has become fairly reliable, and as the information has been obtained by the same persons in the same places for this period it may be worth comparing. As shown in Table 1, the crude death rate for the registration area has decreased during the past three years. One explanation of the greater decline in the death rate in the City, shown in the third part of the table, may be the relatively greater accessibility of health services in the City. The death rates in 1933 and 1934 by specific causes, are shown in Figure 2. It will be noted, that in general the fall of specific death rates occurs in the controllable causes of mortality, while for two consecutive years smallpox has been an insignificant cause of mortality.

Table 1. Crude death rates in the registration area of Ting Hsien, 1932-1934, and birth and death rates in Tingsien City and in a sample village, 1933 and 1934.

	Per Cent
<i>Crude Death Rates in Registration Area¹</i>	
1932	31.6
1933	27.2
1934	22.6
<i>Birth Rates²</i>	
Tingsien City, 1933	42.1
Sample Village, 1933	35.7
Tingsien City, 1934	41.5
Sample Village, 1934	32.4
<i>Death Rates²</i>	
Tingsien City, 1933	32.3
Sample Village, 1933	21.6
Tingsien City, 1934	25.8
Sample Village, 1934	18.8

¹ Population 22,400.

² Population of combined areas 13,800.

HEALTH EDUCATION

The importance of health education in a rural community cannot be over-emphasized. As in the past, this was carried on through various channels:

PRINCIPAL CAUSES OF DEATH, 1933 AND 1934 *

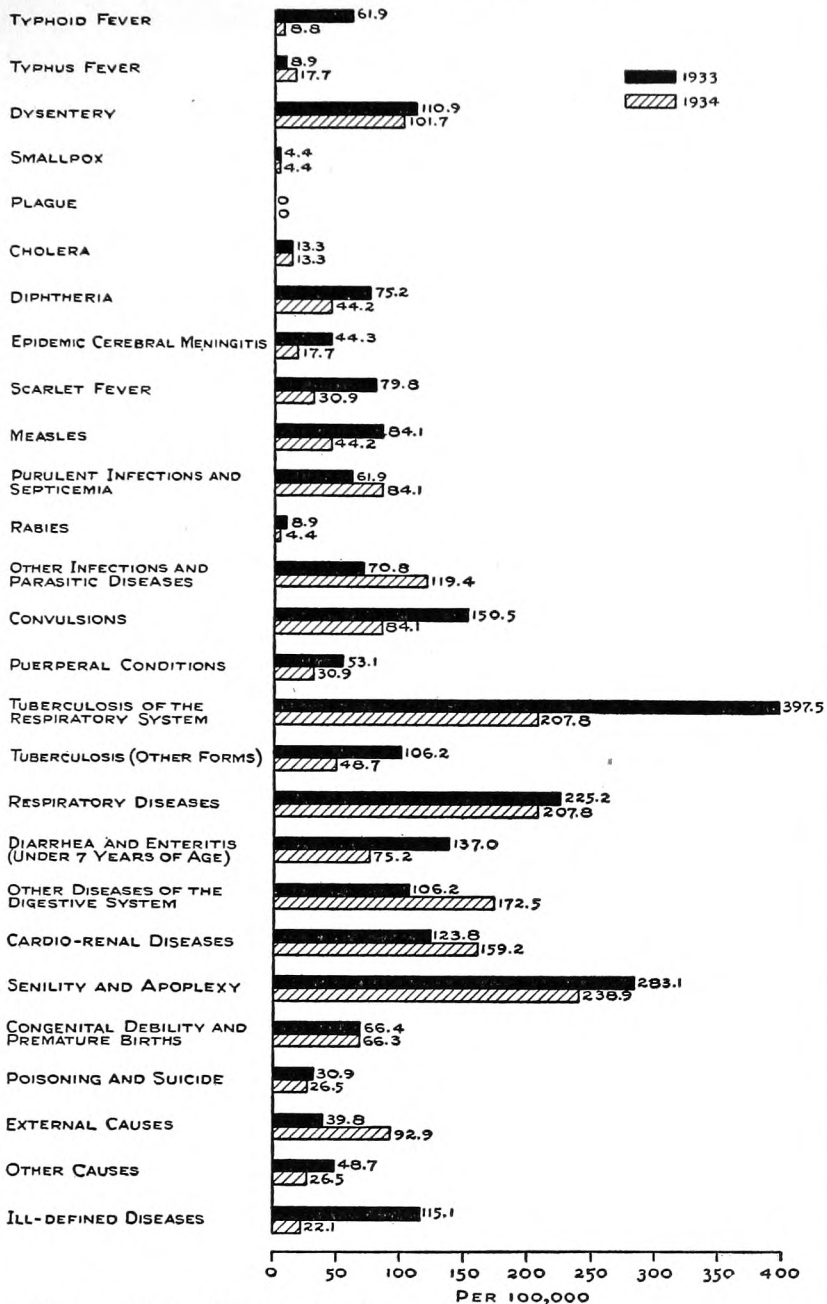


Fig. 2. Deaths from twenty-seven specific causes in the registration area of Ting Hsien, per 100,000 population, 1933 and 1934.

The Chinese New Year Exhibit. In a period of five days over 19,000 people attended the exhibit in the District Health Center. In addition to different devices for health teaching, every quarter of the Center was open to the public. The visitors were struck by the general cleanliness of the building and by the disinfection by boiling of the clothes of patients. Eleven thousand pamphlets on control of smallpox and diphtheria were distributed. Five hundred illustrated booklets on maternal welfare were given out and explanations given to the illiterate women who attended the exhibit.

Colored Posters. Last year every village health worker was given a set of colored posters. Each was held responsible for explaining the pictures to the People's School Alumni and students in his own village. In this way it was found that over 8,000 young adults studied the posters during the year. Today these posters hang on the wall of the work place of every village health worker.

Improvement of Selected Drinking Wells and Latrines. As a means to stimulate the population in sanitary consciousness, forty-seven drinking wells in the homes of village health workers and in a number of primary schools were reconstructed according to approved designs. Seventy-three pit latrines in the primary and normal schools were also remodelled. In general, the Health Department is responsible for only one-third of the expenses incurred.

Cleanliness in School Children. The improvement of general cleanliness among the school children is obvious to every observer. A public bath room was constructed in the District Health Center the latter part of the year. In two months, 1770 free baths were given. Children marched two or three miles to take a bath at the Health Center. The children enjoyed the showers from the kerosene tin boxes so much that each time after bathing they asked their teacher when they could come back!

Health Teaching. In comparison with previous years the attendance of school children at health classes increased greatly during

	1932	1933	1934
<i>Preventive and Curative Services</i>			
Smallpox vaccinations	1,020	3,401	9,148
First-aid treatments by village workers	4,109	22,418	68,624
Treatments given in schools for trachoma	26,435	48,575	95,580
Treatments given in schools for tinea of the scalp	3,444	7,073	26,162
<i>Attendance at Clinics and Health Classes</i>			
At clinics in subdistrict health stations	22,126	26,764	41,929
At health classes in schools	19,819	14,731	49,349
<i>Hospitalization</i>			
Number of patients	224	418	515
Number of patient-days of care	2,771	6,162	7,755

Table 2. Number of specified health services given residents of Ting Hsien, 1932-1934.

the year. This is shown in Table 2. Popular lectures on different aspects of personal and community hygiene were given at twenty-three Spring Fairs held in various parts of the Hsien. It is estimated that not less than 20,000 people listened to these talks which were illustrated with colored posters.

CONTROL OF COMMUNICABLE DISEASES

Smallpox is still the disease to control. In spite of its epidemic form in the surrounding hsien for the last two years, the District of Ting Hsien has remained more or less free from the disease. The increasing use of anti-smallpox vaccination by the population is also shown in Table 2. In the three-year period, 1932-1934, a total of 31,785 vaccinations has been given. The effectiveness of our technique was tested each year and for the year of 1934 it was found to be 93.1 per cent. In other words, out of 1,175 primary vaccinations there were 1,094 "takes."

A word may be said on the control of communicable diseases in general. The control of epidemics, provided it is carried out on a sufficiently extensive scale, does more to impress the people with the effectiveness of scientific medicine than bedside treatments do. Methods of control must fulfill the following conditions:

They must be cheap. Each vaccination against smallpox in Ting Hsien now costs only 2.5 cents.

They must be extremely simple and, under present conditions in China, safe enough to run the risk of having them undertaken by lay workers.

They must be over 95 per cent effective. Any method which is less effective will fail.

They must not produce apparent constitutional reactions. Local reactions are not objectionable and are, in some cases, welcome. But the public will not forgive marked constitutional reactions.

On the basis of these criteria, we have concentrated our attention on smallpox and have recently begun to extend alum-precipitated diphtheria toxoid. From the difficulties in fulfilling all of the conditions mentioned, one can realize the limitations in the control of many diseases by vaccination. The control of gastro-intestinal diseases through improved sanitation, for instance, can hardly be replaced by specific vaccination, although the latter is generally the first thing thought of in economically difficult conditions. In other words, eradication of important causes of mortality in rural China must take time and patience, and it is ridiculous to attempt to control many diseases at one time under present socio-economic conditions.

MEDICAL RELIEF

Medical relief is generally expensive, and it is difficult to measure results. The tremendous increase in the number of treatments given in the last three years is undoubtedly indicative that the community accepts them and is actually responsible for reducing the cost per treatment. About 50 per cent of the total budget of the Department is devoted to treatment of diseases, both general and specific, which include the chief causes of morbidity such as trachoma and tinea of scalp. In 1934, there were altogether 193,332 treatments given by nurses and non-medical men, 41,929 treatments by physicians, and 7,755 patient days of hospitalization. The

per unit cost of each type of treatment may be estimated as follows:

“Non-medical” treatment: 1 cent per treatment

Physician’s treatment: 10 cents per treatment

Hospital treatment: \$1.50 a day

On the basis of fifteen days per patient, the average cost of one patient in the hospital is around \$23.00. Experience shows that this cost cannot be reduced very much if professional standards are to be adequately maintained.

The availability of medical service to the community may be further illustrated by the types of treatment received by the deceased in the City of Tingsien before death. In 1932, 81.4 per cent were treated by the old-fashioned methods and but 4.5 per cent received modern medical care. In 1933, the percentage receiving modern medical care had grown to 27.8 per cent, with 48.4

	Trachoma	Tinea of Scalp
1932		
Spring	53.6	17.3
Autumn	28.5	4.4
1933		
Spring	56.9	7.2
Autumn	24.5	4.1
1934		
Spring	45.4	7.2
Autumn	26.8	2.8

per cent receiving the old-fashioned type of service; while in 1934, 35.8 per cent received modern care and 39.8 per cent the old-fashioned type.

The effectiveness of treatments given by non-medical men in the schools may be shown by the decline of the chief causes of morbidity each year.

MATERNITY AND CHILD WELFARE

No other phase of health protection is more dependent upon the general progress of society than maternity and child welfare. Before people begin to appreciate the importance of mothers and children in relation to the welfare of the nation and before the community is rich and intelligent enough to seek technical assistance, it is difficult to expect rapid growth of maternity and child health activities.

Attempts have been made in Ting Hsien to train old "midwives" in the villages during the past four years. Out of the forty trained by members of the District Health Center not more than three are today working honestly without special supervision. One of the three is extraordinarily earnest and she alone delivered forty-five births in the year. In general, supervision of "midwives" in scattered villages is so hard that one may say it is impractical, and midwives working honestly without special supervision are rare exceptions to the rule.

Young women who are related to old midwives present an attractive channel of approach. But their training must be thorough and requires considerable material for practice. Of the four young women who were trained last year, one delivered thirteen babies during the year, the rest only one or two. Time is too short to draw conclusions.

The trained midwife in the District Health Center delivered forty-six babies at a cost of about \$5.00⁴ per baby. Antenatal and postnatal clinics were carried on as usual.

Since the autumn of 1934, home visits were started in three large villages to teach people how to use birth control devices. Quinine suppository was found to be most convenient for the farmers. Of about 800 families approached, 125 were considered as in need of birth control. Thirty-four of the families consented to use birth control methods and eighteen have kept on using them for the last three months. Very careful records are being kept to find out possible answers to many problems regarding the future of birth control work in the rural communities of the district.

In conclusion, our work in maternity and child health is still in its "trial and error" period. It is hoped that this period will soon pass.

⁴ All cost figures are based on Mexican dollars. On the day this article was released for publication, the Mexican dollar was quoted in Shanghai at thirty cents in United States currency.

COST

Sufficient time has passed for the Department to report its per unit cost of organization and activities:

Village Health Station

Average annual remuneration	\$ 6.00
Average cost of drugs and vaccine per worker	10.00
Posters and others	.50
Total cost per worker per annum	16.50

Subdistrict Health Station

Average salary per station	\$600.00
Drugs and other supplies	150.00
Wage of attendant	120.00
Miscellaneous	100.00
Total cost per subdistrict station per year	970.00

District Health Center with a hospital of 45 beds

Salaries	\$12,000.00
Drugs and supplies	2,000.00
Coal, light, and water	2,400.00
Wages	1,600.00
Food for patients	2,000.00
Miscellaneous	1,000.00
Total cost of District Health Center	21,000.00

The per capita cost to the general population may be calculated in the following manner:

For village work—\$16.50 per 1,000 people	1.65 cents
For subdistrict health station—\$970.00 per 30,000	3.23 cents
For District Health Center—\$21,000 per 500,000	4.20 cents
Per capita cost per annum	9.08 cents

DISCUSSION

So far as experimentation in methods of applying medical knowledge in rural China is concerned, it now seems clear that the three parts of a hsien health protection system, *i.e.*, the village health station, the subdistrict health station, and the District

Health Center, are essential. Consideration of the relative importance of these units reveals that the subdistrict health physicians are the key persons of the system. The value of the District Health Center and of the village health workers may be maintained and enhanced provided the subdistrict health stations are functioning efficiently and economically. Without adequate subdistrict stations, the village health workers, because of lack of close supervision and constant encouragement, may lose their interest and confidence, and the District Health Center, because of the difficulties of transportation, will be accessible to only a very small proportion of the population. Consequently, considerable attention was given this year to the study of the subdistrict health stations.

An analysis of the addresses of 10,000 patients who attended the clinics of subdistrict health stations for treatment shows that with the exception of the subdistrict station in the City of Tingshien, 90 per cent of the patients came from an average distance of 8 to 9 *li*.⁵ The station in the City draws patients from a radius of 15 *li* (five miles). In an area which has a diameter of about 15 *li* there are generally twenty-five to thirty villages with a population of about 25,000. A physician in the station of such an area will be able to supervise about fifteen village health workers, conduct a daily clinic for diagnosis and treatment, carry on health education in the community, and lastly give preventive vaccinations. If the schools in the area are included for organized health work, the addition of a trained nurse is necessary. On account of economic difficulties and of inadequate training on the part of the physicians, the proper and full utilization of a nurse by the physician in the station is no easy task. Subdistrict health stations without well-trained nurses probably will be the most popular type of organization in the near future, and this means that the physicians will be the only individuals to depend upon. Thus the question of training physicians to staff subdistrict health stations will be very

⁵ One *li* is approximately one-third of a mile.

serious if one wishes to extend a general system of health protection for the country as a whole.

At present, no single medical school in the country is assuming the responsibility of producing physicians for subdistrict stations. The leading medical schools in the country have become so highly technical and specialized that their training cannot be considered as giving the essential minimum for "a practitioner of general medicine in terms of public health." The provincial medical schools, inadequately equipped and staffed at present, must be the logical sources of general physicians in this generation. Unless these provincial medical schools take an interest in the training of needed personnel, there will be no hope of developing rural health work in this country. But, unfortunately, this line of practical thinking is quite a departure from the traditional ways of conducting higher education, and a change of mind toward realities may take a long time.

Therefore, this year special effort was made to develop the best possible relationship between provincial medical schools and the Department. Both the Hunan-Yale Medical College, the provincial medical school of Hunan, and the Paotingfu Medical College, the provincial school of Hopei, reacted very favorably. As one of the results, all the physicians of the subdistrict stations that were established in 1934 were recruited from the Hopei Provincial School.

In view of the obvious inadequacy in the training of the provincial medical graduates, the Department was obliged to offer opportunities in rural health for supplementary training. Observations in Hunan, Shantung, and Kiangsi, where rural health work has been started, bring out the urgency of such training. It seems clear that the Department must try to meet this special need if it has any wish to extend the scheme that has been worked out in the Ting Hsien experiment.

As a matter of fact, many institutions are asking the Depart-

ment to supply them with trained personnel, especially physicians to take charge of subdistrict health stations. If the Department continues to be unable to make positive answers, the experience gained so far in methods of approach will be sterile. One may therefore take the present occasion to call the attention of the readers to the fact from now on the Department will be primarily concerned with the training of medical personnel, supplementary in nature for the time being.