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Financial inducement for improving the efficacy of immunization

An insurance scheme in Hebei Province, China, obliges the individuals responsible for carrying out immunization to contribute a proportion of the compensation payable to vaccinees in whom the target diseases develop.

China’s Hebei Province covers an area of 190,000 km² around Beijing and has 56 million inhabitants, 8.24 million of them being under seven years old; 85% of the people belong to agricultural communities, where, in 1986, the per capita annual income was 407.6 yuan (approximately US$ 110).

Since 1974 an immunization programme has been operating in the province, mainly to control measles and poliomyelitis, and the incidences of these diseases have decreased markedly. An important factor in the success of the programme has been the effectiveness of the health system at the grass roots. In 1980 the system of agricultural management and production teams was replaced by a family-based contract system. This gave rise to problems in the health field, among them that of paying village doctors for vaccinations, something that had been provided for under the previous system. Moreover, the grass-roots health organizations in the rural areas became unstable; consequently, the vaccination programme suffered and there was a resurgence of the target communicable diseases in some areas. The health sectors of counties and townships therefore dispatched health workers to carry out vaccination at the grass-roots level, and it was recommended that the village doctors should receive vaccination service charges in as many areas as possible; the state continued to supply vaccine gratis. Efforts were made to devise a satisfactory method for the payment of the village doctors giving a vaccination service, to strengthen the rural grass-roots organizations, and to develop the immunization programme.

Insurance against failed immunization

In 1984 an insurance scheme relating to child immunization was introduced in Wuji County and Linzhang County. It not only solved the problem of payment for village doctors but also produced other advantages as described below. Under the scheme, the payments received by those carrying out the
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service became linked to its efficacy. At present the scheme exists in different forms in Wuji County, Linzhang County, Zunhua County, and Xingtai City.

In Wuji County there are some 400,000 people, of whom roughly 50,000 are under seven years old. The per capita annual income in the agricultural population is about US$ 135. In the rural areas a cold

chain has been set up. The insurance scheme has been operating since July 1984. All children aged up to two years who do not have any serious disease can participate, the charge being about $ 2.0 for those up to a year old and fractionally less for those aged between one and two years; they are covered until seven years old. If an insured child contracts one of the five target diseases, compensation is granted at ca. $ 8.5 for measles and pertussis, $ 29 for tetanus, $ 43 for diphtheria, and $ 57 for poliomyelitis. If any of the diseases causes death the compensation is ca. $ 85. Of the children in the specified age group, 84% have participated in the scheme; about $ 39,000 have been collected in insurance contributions, of which 36% has been used for compensation, management training, and reward, and 64% distributed to the township health centres, which in turn allocated a large amount to the village doctors who carried out the immunization programme and to the resupply of vaccination equipment. In this county the annual professional income of a village doctor ranges from about $ 86 to $ 286; a village

doctor responsible for immunization generally receives an additional amount of ca. $ 37 yearly. The county health and anti-epidemic centre pays 80% of compensation, the township health centres pay 15%, and the remaining 5% comes from the village doctors. During the first year 31 cases received compensation totalling about $ 600 (1.5% of the contributions). Except for one instance of measles, all the cases were of pertussis. All children under seven years old are eligible to participate in the scheme, the major advantages of which are that the contributions are collected only once and that the procedures are simple and convenient.

In Linzhang County there are approximately 430,000 people, 81,540 of them under seven years old. In 1985, per capita annual income in the agricultural community was ca. $ 86. A cold chain has been established. Since October 1984, 96.9% of the children under seven years old have participated in the county’s scheme. Charges of ca. $ 0.30, 0.45, 0.30 and 0.45 were paid on behalf of children aged one, two, four and seven years respectively. The totals of the annual contributions were in the approximate range $ 17,000 to $ 19,000 from 1984 to 1986; 65% of the contributions went to the village doctors, 30% to the township health centres, and 5% to the county health and anti-epidemic station. The basic annual income of a village doctor is around $ 85, to which ca. $ 39 may be added if immunization is carried out. An anti-epidemic doctor in a township health centre who is responsible for immunization can receive the same additional amount. The county health and anti-epidemic station holds approximately $ 850. The amount of compensation in cases of measles and pertussis is ca. $ 3, while for poliomyelitis and diphtheria it is ca. $ 29; 60% is paid by the township health centres and 40% by the village doctors. In 1986, 21 cases of measles
and 27 of pertussis received compensation totalling ca. $ 140; (0.79% of the contributions). In 1986, ca. $ 1430 were taken from the fund to provide new vaccination equipment, and ca. $ 860 were used to purchase cold chain equipment. The agricultural workers paid only a very small amount each time but the procedures were too complicated. The scheme has largely been changed to conform to that in Wuji County, described above.

In Zunhua County the scheme covers the period from pregnancy or marriage to the time when a child is seven years old. The charges are ca. $ 1 for a pregnant woman, the same for a child aged up to one year, and slightly less for a child aged between three and seven. There is a delivery service charge of ca. $ 1.50. The health insurance covers examinations of pregnant women, perinatal care, delivery, injection of tetanus toxoid, six antepartum examinations, four postpartum visits, management of fetuses in abnormal positions and of ante- and postpartum complications, immunization of children, examination for and prevention of rickets and nutritional anaemia, and provision of anthelminitics for children. If puerperal fever, tetanus or eclampsia occur in the puerperium, the compensation is 10 to 20 times the insurance payment; in the event of death attributable to one of these diseases, ca. $ 85 are paid; if a child suffers from measles or pertussis, ca. $ 6 are given; ca. $ 8.50 are paid in cases of tetanus, and ca. $ 28 for poliomyelitis, diphtheria and pulmonary tuberculosis; for death or disability caused by one of these diseases, ca. $ 85 and $ 28 are paid respectively. Anti-epidemic doctors in township health centres and village doctors are allocated 60% of the contributions collected; 40% goes to the county women’s and children’s health centre and the county health and anti-epidemic station. The county pays 50% of compensation, and township health centres and village doctors pay 25% each. Up to July 1987, ca. $ 35 000 had been collected as insurance contributions; compensation had been given in 298 cases, mainly of pulmonary tuberculosis and pertussis; altogether ca. $ 2400 were paid out, 6.8% of the contributions. A village doctor can receive an annual subsidy of ca. $ 23.

In Xingra City there are 730 000 people, of whom 350 000 live in urban districts. The scheme has been operating since 1986. The charge for a child under one year old is ca. $ 3 and cover lasts until the age of seven. If a child above one year joins the scheme, the charge is ca. $ 0.30 less for every year of age over one. The contributions go to district health and anti-epidemic stations (25%), neighbourhood health centres (25%), and neighbourhood doctors, directors of health centres, anti-epidemic doctors and chairpersons of neighbourhood committees (50%). The compensation paid is approximately $ 14 for measles and pertussis, $ 85 for diphtheria, $ 140 for poliomyelitis, and $ 28 for tetanus. The district health and

The initiative of vaccinators and parents is harnessed, and substantial funds are generated for the immunization programme and cold chain.

anti-epidemic stations pay 50% of compensation, the neighbourhood health centres pay 30%, and the neighbourhood doctors and chairpersons of neighbourhood committees pay 20%. The contributions amount to ca. $ 28 000 and 91% of the children in urban districts are covered. In addition to their salaries of ca. $ 37 per
month, directors of neighbourhood health centres in charge of preventive work and anti-epidemic doctors can receive additional amounts of ca. $ 50 yearly; a chairperson of a neighbourhood committee can receive an additional amount of ca. $ 6 yearly. The salary of a neighbourhood doctor is approximately $ 43 per month. In some other cities the Zunhua County scheme has been adopted. People in the cities are generally better off than agricultural workers, their educational level is higher, and each couple usually has only one child; this allows the scheme to be carried out easily, and the charges can be slightly higher. In some cities a child being registered with a nursery, kindergarten or school must have a vaccination certificate; as a result the vaccination rate is very high and it is unnecessary to put the scheme into effect.

In May 1986 the health department of Hebei Province recommended that the scheme be introduced as widely as possible in the province. By June 1987 it was operating in about two-thirds of the province’s townships and towns; 2 559 780 children (31% of those under seven years old in the province and more than 80% of the same age group in the areas covered) had been included. In Handan Prefecture the participation rate reached 95%. More than $ 2 500 000 were collected in the province as a whole.

A beneficial scheme

The scheme has the following particular merits.

- The initiative of doctors engaged directly in vaccination at township and village levels has been brought into play. If an insured child suffers from one of the target communicable diseases, the directors and anti-epidemic doctors of township health centres, as well as village doctors, must pay compensation and consequently lose income; in other words they have a material incentive to exercise care when conducting vaccination. Because of the serious reactions that occasionally occurred, some village doctors used to give inadequate doses of diphtheria-perussis-tetanus vaccine. This no longer happens since the doctors are anxious to avoid the financial penalties that may be incurred. Furthermore, in a township health centre the vigilance of doctors has improved. For example, in 1985 an anti-epidemic doctor found some measles vaccine of abnormal colour and immediately returned it to the county health and anti-epidemic station. Subsequent examination showed that the batch was unsuitable for use. This would not have happened in the past.

- Parental initiative has also been brought into play. When parents decide that their children should participate in the system they have already received health education on immunization. An insured child who is not vaccinated is not entitled to financial compensation if one of the target communicable diseases occurs. This acts as an incentive to parents to ensure that their children are vaccinated.

- A proportion of the contributions goes towards the provision of vaccination
equipment and the maintenance and operation of the cold chain.

- The reporting of communicable diseases has increased. If such a disease is suspected, the parents are keen to take the affected child to see a doctor, since compensation may be payable.

- If a child suffers from one of the target communicable diseases, the parents receive a payment towards the cost of treatment.

- The scheme strengthens grass-roots health organizations in both urban and rural areas. Under the previous arrangements it was difficult to carry out immunization programmes in rural areas and the grass-roots health organizations here became unstable. This was mainly because the payment of village doctors for their preventive work was not effected in a satisfactory way. Following the introduction of the scheme, the village doctors and anti-epidemic doctors in township health centres can receive additional payment.

The scheme has made it possible to overcome the temporary difficulties in the immunization programme caused by changes in the rural economy. Government at all levels has attached great importance to immunization programmes; work in this field is advancing and the vaccination rate has steadily increased in recent years. In 1987, 36,922 children were checked by cluster sampling and, although cold chain facilities were unavailable in more than half of the areas in the province, the vaccination rates among children aged one year were: 94% for BCG vaccine, 85% for trivalent poliovaccine (3 times), 80% for diphtheria-pertussis-tetanus vaccine (3 injections), and 80% for measles vaccine; 69% of the children had received all four vaccines; the positive reaction rates for tuberculin after

### Morbidities associated with six communicable diseases in Hebei Province during 1955–73, when no immunization programme was in force, and in 1986.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Morbidity/100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1955–73 (no immunization programme)</td>
</tr>
<tr>
<td>Measles</td>
<td>450.25</td>
</tr>
<tr>
<td>Poliomyelitis</td>
<td>4.01</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>3.00</td>
</tr>
<tr>
<td>Pertussis</td>
<td>135.35</td>
</tr>
<tr>
<td>Epidemic cerebrospinal meningitis</td>
<td>37.23</td>
</tr>
<tr>
<td>Japanese encephalitis</td>
<td>8.00</td>
</tr>
</tbody>
</table>

BCG vaccination and for measles, tetanus and diphtheria were 81%, 87%, 85% and 74% respectively. The vaccination rate against Japanese encephalitis and epidemic cerebrospinal meningitis in children aged two years was 90%. The proportions of children aged two, four and seven years receiving booster doses exceeded 90%. The incidence of the targeted communicable diseases decreased greatly and morbidities were fairly low (see table).

The data on reported cases indicate that in 1986, compared with the period when there was no immunization programme, 273,000 fewer people contracted measles, polio, diphtheria, pertussis, epidemic cerebrospinal meningitis, and Japanese encephalitis, 4,200 fewer people died from these diseases, and more than 3,000 fewer were disabled by them. However, in the past a high percentage of cases went unreported, and the actual reductions were estimated to be about 1 million, 15,000, and 5,000 respectively. In 1987 the numbers of cases of communicable diseases decreased further: for example, morbidity associated with measles decreased from 16.04 per 100,000 in 1986 to 3.70 per 100,000 in the first 11 months of 1987.
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The future of the scheme

The scheme is suitable for rural areas where people can afford the small charge. The initiative of vaccinators and parents is harnessed and substantial funds are generated for the immunization programme and cold chain. However, the scheme is not suitable for all areas: it cannot be applied in some poor mountainous regions, and there would be no point in adopting it in those urban districts where a large proportion of children have already been vaccinated.

Morbidity and mortality associated with the target diseases controlled by the four basic vaccines are now fairly low. However, because the fatality rates for Japanese encephalitis and epidemic cerebrospinal meningitis are rather high, these diseases should, in future, be covered by the scheme. In Zunhua County a wider range of services is covered and the possibility therefore exists of using this model for reference when the scheme is initially carried out in areas with better economic conditions. However, in areas where the scheme has already been put into effect it should not be modified immediately, because time is needed to consolidate a new system and people may have difficulty in coping with a scheme that appears unstable.

“Community diagnosis”

Communities need to play an active role in ensuring that their needs and practices are reflected in the design and delivery of primary health care. Health workers and community members can collaborate in preparing health profiles of the community and in drawing up action plans for primary health care. This process of “community diagnosis” serves to orient health workers towards the community’s needs and to help communities learn more about their own health problems. At the same time, the community’s involvement in health services management can be enhanced when it participates in financing health worker’s salaries or rewarding them in kind, and when it has a voice in their selection. In this way, primary health workers become accountable to the community itself as well as to the health authority.