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National Occupational Health Service Policies and Programs for Workers in Small-Scale Industries in China

Over the 14 years since economic reform began, and the restructuring of the economy to encourage international trade, a large number of township enterprises have been developed and put into operation in the Peoples Republic of China. From 1978 to 1991, the number of enterprises has increased 11.5 times; the number of employees has increased 2.4 times; the fixed assets have increased 13.7 times; and the value of the total output has increased 22.5 times. In this article, a report is given on a sample survey in 30 counties in 1990, which showed that 82.69% of rural industrial enterprises had at least one type of occupational hazard in their work environments. Workers engaged in at least one type of hazardous working environment accounted for 33.91% of the blue-collar workers. Physical examinations were performed for seven types of occupational diseases: silicosis, coal worker's pneumoconiosis, asbestosis, chronic lead poisoning, benzene analogs poisoning, chronic chromium poisoning, and noise-induced hearing loss. The total detectable rate of the seven types of occupational diseases was 4.4% among those workers. In addition, 11% had illnesses suspected of being (though not proven to be) caused by occupational exposures. Most township enterprises do not provide basic occupational health services. The coverage of five routine occupational health service activities provided for township enterprises were very limited, from 1.4 to 36%.

Keywords: China, exposure evaluation, industrial hygiene, policies and programs, small-scale industries, township enterprises

The classification of large-, medium-, or small-scale industries in China is made according to their comprehensive productive capacities (e.g., the output of steel per year for steel plants). In 1991, of all 420,000 independent state-run or city collective-run industrial enterprises, the medium-sized industrial enterprises accounted for 2% and the small ones for 97%.⁽¹⁾ Various rural industrial enterprises, known as township enterprises, were not included in the above statistics. The output value of medium- and small-scale industrial enterprises accounted for 69% of the national industrial output value, and they employed 78% of the employees of the total urban industrial labor forces.⁽¹⁾

Over the 14 years since economic reform began, and the restructuring of the economy to encourage international trade, the Peoples Republic

of China (PRC) has been very successful in developing township enterprises. The township enterprises have rapidly become widespread in all regions of the PRC. China's township enterprises are the enterprises run by farmers. They include collectively owned enterprises, cooperative enterprises jointly run by farmers with share capital, individual or private enterprises run by individual farmers, and the recently emerged consortiums with a multiownership economic system in which farmers take part as major partners.

It is important to note that the term "farmer" denotes a person born in a rural area who does not have an urban residence card. A farmer may not necessarily ever have worked on a farm. The urban residence registration system soon will be eliminated.⁽²⁾

From 1979 to 1991 the number of enterprises

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TABLE I. Development of China's Township Enterprises*

	1978	1991
Number of enterprises (million)	1.52	19
Number of employees (million)	28	96
Fixed assets (billion yuan)	23	338
Total output value (billion yuan)	50	1160

*Note: The "yuan" is the "dollar" of the PRC. For the purposes of the calculations in this article, 1 dollar = approximately 6 yuan.

has increased by 12 times; the number of employees has increased by 2.4 times; the value of fixed assets has increased 14 times; and the total value of the output has increased by 23 times⁽³⁾ (Table I). The industrial output value from township enterprises surpassed 1 trillion yuan in 1992 and thus accounted for 31% of the total value of national industrial production.⁽⁴⁾

In 1992, township enterprises paid the state (central government) treasury 50 billion yuan in taxes. These enterprises earned US \$20 billion from exports, which is nearly one-third of the country's total exports. At present, one of every five rural laborers works in township enterprises, and 50% of the total surplus rural labor force has been absorbed by township enterprises.⁽³⁾ The importance of this statistic cannot be overestimated, since this surplus labor force might otherwise not contribute to the growth and stability of the PRC. It was expected that by the year 2000, two-thirds of farmers' average net income would come from rural enterprises, compared with about one-third at the time of this writing. It has been predicted that more than 140 million surplus farm laborers, or some 30% of the estimated rural labor force, will be absorbed by township industries. No doubt these township enterprises have become an important component of the national economy, and the main body of the China's small-scale enterprises.

To further encourage faster growth of rural industry in China's central and western areas (for example, Shaanxi, Henan, Hunan, Sichuan, Gansu, Ningxia, Xinjiang), the central governmental State Council established new policies and measures (detailed operation guides) in early 1993.

These actions can be described as follows:⁽⁵⁾

- Speedy action should be taken to accelerate the growth of rural industry in central and west China.
- Light industry and the service sector at the county level should be developed mainly as rural enterprises.
- Local governments can adopt industrial policies in line with regional conditions so as to create a favorable climate for tapping local resources and promoting rural industry.
- Provision of 5 billion yuan (US \$862 million) in special loans should be made each year between 1993–2000, in addition to regular bank credits.
- No limitation will be set on what to develop by rural industries in these regions, on condition that they produce marketable quality products and do not bring harm to the environment and resources.

OCCUPATIONAL HEALTH PROBLEMS AND THE HEALTH SERVICE NEEDS OF TOWNSHIP INDUSTRIES

Small-scale industrial enterprises in urban areas that are run by the state or by collectives are similar to large industries as regards the potential for and nature of occupational health problems

TABLE II. The 30 Counties (or Districts) Involved in this Study

Province	County
Beijing:	Tongxian, Shunyi
Tianjin:	Kaiqing, Xijiao
Liaoning:	Shenyang-yuhong, Dalian-Jinzhou
Shanxi:	Yuci, Pingding
Jiangsu:	Wujin, Kunshan, Jiangyin
Zhejiang:	Xiaoshan, Jinhua
Shandong:	Tengzhou, Weihai-uancui, Zibo-zhangdian
Henan:	Xinzheng, Yancheng
Hubei:	Honghu, Wuxue
Hunan:	Changsha, Hengnan
Guangdong:	Fanyu, Bao'an
Sichuan:	Jiajiang, Mianzhu, Neijiang-shizhongqu
Guizhou:	Zunyi
Shaanxi:	Boaji
Gansu:	Jiuquan

and management of those problems. Therefore, the next section of this article focuses on the rapidly expanding rural industries.

Because of rapid economic reform and industrialization in rural areas, the occupational risks of township industries tend to be far more severe than in urban areas. To evaluate the occupational risks and occupational health service needs of rural industries, a joint study was carried out in 1990–1991 by the Ministry of Public Health and the Ministry of Agriculture.⁽⁶⁾

This study covered 30 sample counties selected from 15 provinces (Table II and Figure 1). Included in the study were the following.

- An industrial hygiene survey using interviews and questionnaires as the primary tools was performed for all industrial enterprises run by townships and villages in the 30 counties. In addition, this type of industrial hygiene survey also was performed at small workshops owned by individual or cooperative families in 8 townships in 4 of the 30 counties.
- A total of 29,246 enterprises were investigated, of which 28,909 were run by townships and villages (Table III). Thus, the survey evaluated 3.1% of the total number of township-run and village-run enterprises in the entire PRC.
- In 60 townships of 30 counties (generally, 2 for each county), workplace area environmental monitoring was performed. In addition, physical examinations including chest X-rays, biological monitoring, and audiometry were conducted for workers exposed to eight occupational hazards: lead, benzene analogs, mercury, chromium, silica dust, coal dust, asbestos dust, and noise. The workers suffering from occupational diseases were diagnosed according to Diagnostic Criteria and Principles of Management of Occupational Diseases issued by the Ministry of Public Health.⁽⁷⁾
- A survey was performed using a questionnaire and interview method to measure the attitudes toward, and intentions to correct, occupational health problems. Thirty employers and 100 employees in every sample county were included in the survey. These employers and employees were those whose workplaces had the eight occupational risks mentioned above.
- A survey was performed to assess the availability and quality of local occupational health services, and the possibility of a disparity between available and required services. The ultimate goal of the survey was to identify possible approaches to providing improved occupational health services for rural industries. This survey was performed in all 30 counties using questionnaires sent to all county Health and Epidemic Prevention Stations and township health

TABLE III. Ten Leading Township Industrial Sectors Having Most Workers Exposed to Hazards

Industrial Sectors	Enterprises (1)	Enterprises with Occup Risks (2)	Employees (3)	Exposed Workers (4)	Fraction of Column (%)	
					(2)/(1)	(4)/(3)
Textile	1777	1537	246,277	110,392	86	45
Production of construction materials	3944	3830	303,450	107,014	97	35
Equipment and machine production	3532	3088	227,049	72,651	87	32
Plastic manufacture	2361	2051	226,229	49,049	87	22
Chemical industry	1553	1473	86,716	37,506	95	43
Metal processing	2164	1836	127,812	35,765	85	28
Construction material mining and processing	768	695	52,118	27,515	90	53
Coal mining and processing	218	217	22,671	16,834	100	53
Electrical machinery manufacture	925	733	72,677	13,614	79	19
Electronic communication equipment manufacture	548	414	82,554	12,406	76	15
Sum (A)	17,790	15,874	1,447,553	482,746	89	33
All sectors (B)	29,246	24,183	2,108,994	607,922	83	29
(A)/(B) (%)	61	66	69	79	—	—

centers. The content of the survey included available health manpower, number of persons involved in occupational health, budget for occupational health from the county government, and availability of equipment for occupational health services.

■ The survey also served as a means to gather related demographic information.

RESULTS AND DISCUSSION

Classification of Hazards

In all 29,246 enterprises, 83% had at least one of the occupational hazards in their work environments. The definitions of “occupational hazard” and “hazardous work environment” were made in accordance with the *Guideline of Occupational Health Service and Inspection* issued by the Ministry of Public Health.⁽⁸⁾ There were

607,922 workers engaged in work areas or job classifications where hazards existed, accounting for 29% of the total number of 2,108,994 employees and 34% of the total blue-collar workers (Table III).

The 10 leading industrial sectors with the most workers exposed to hazards were (1) textile industry; (2) production of construction materials; (3) equipment and machine production; (4) plastic manufacture; (5) chemical industry; (6) metal processing; (7) construction material mining and processing; (8) coal mining and processing; (9) electrical machinery manufacture; and (10) electronic communication equipment manufacture.

These sectors made up 79% of the 607,922 exposed workers (Table III).

The distribution of workers exposed to occupational hazards in different regions shows that the more developed the regions were, the lower the proportions of workers who were directly exposed to hazards (Table IV).

Environmental Monitoring and Physical Examination for Exposed Workers

Seven types of occupational hazards were monitored at 5197 work sites (mercury was not found in the areas that were sampled). The

TABLE IV. Distribution of Workers Exposed to Occupational Risks in Different Regions

Regions	Enterprises (1)	Employees (2)	Exposed Workers (3)	(3)/(2) ^A (%)
Coastal ^B	25,031	1,877,358	495,980	26
Middle ^C	3826	212,495	101,276	48
Western ^D	389	19,141	10,666	56
Total	29,246	2,018,994	607,922	29

^AFraction of column.

^BLiaoning, Beijing, Tianjing, Shandong, Jiangsu, Zhejiang, Guangdong.

^CShanxi, Shanxi, Henan, Hubei, Hunan, Sichuan.

^DGansu, Guizhou.

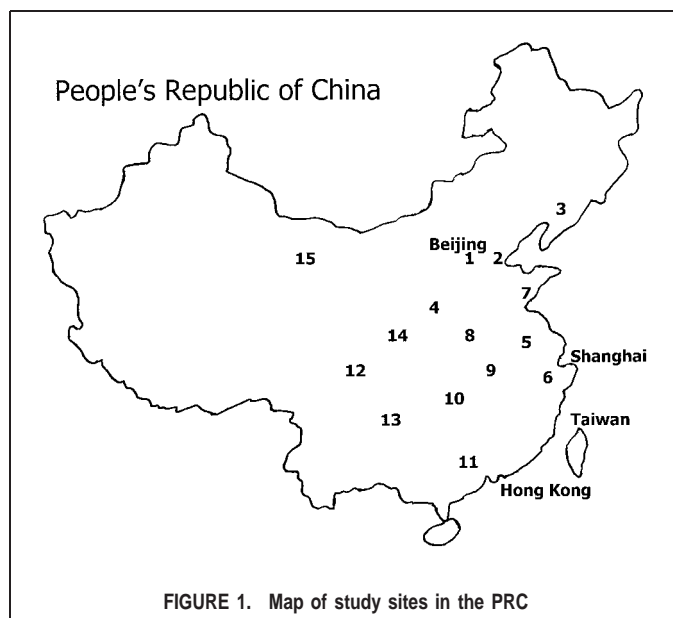


FIGURE 1. Map of study sites in the PRC

TABLE V. Compliance Rates of Six Hazards in Work Sites

Hazards ^A	Enterprises	Work Sites	Work Sites in	Compliance Rate (%) ^B
		Monitored	Compliance	
Lead	177	250	184	74
Benzene analogs	542	793	677	85
Chromium	56	64	61	95
Silica dust	589	1338	98	7.3
Coal dust	68	140	40	29
Asbestos dust	6	12	0	0.0
	1438	2597	1060	41

^AMercury was not found in sample areas.

^BThe compliance rate for noise was 33%; see text for details.

health status of exposed workers was checked in 1972 enterprises in 60 townships.

The total compliance rate of work sites in which there was one of the six types of hazards (not including noise) was 41% (Table V). In this study a standard operating procedure (SOP) was defined for air sampling methodology, sampling strategies, and treatment of data for determination of compliance with Chinese MACs. The SOP called for three area air samples at representative hazardous work areas. If the mean result obtained when using this SOP was greater than the Chinese national occupational health standard (MAC), then the area was deemed to be out of compliance. It is understood that these results may not reflect the actual compliance under all conditions of work practices and meteorology. However, given the extensive nature of this survey, and limitations of resources, these results are considered to be real indicators of potential hazard, even if they may not be quantitative measures of personal exposure.

Of the work sites where the hazards existed, at 40% the concentration of the hazards was 10 times above the Chinese MAC. The compliance rates for three species of dust were all very low: 7% for silica dust, 29% for coal dust, and 0.00% for asbestos. In comparison, chromium, benzene analogs, and lead had higher compliance rates (Table V). (Benzene analogs are benzene, toluene, and xylene, each of which was compared individually with the Chinese MAC.)

The work sites with noise pollution (measured at the work station) above 90 dB(A) were 43% of the total. Those above 95 dB(A) were 23% of the total. The compliance rate for noise pollution was only 33%. (The standard issued by the Ministry of Public Health and the Ministry of Labor jointly is 85 dB(A) for newly established industrial premises and 90 dB(A) for older facilities.)

Physical examinations showed that the total detectable rate of occupational diseases caused by the seven different types of exposures previously listed was 4.4%. In addition, 11% of workers had illnesses for which the workplace was the suspected, but not proven, cause (Table VI).

Distribution and Utilization of Occupational Health Service Resources Health Organization and Manpower

In China, preventive health services in rural areas are provided by county-level health and epidemic prevention stations (HEPS), township health centers, and village clinics. These stations, centers, and clinics constitute a network that covers all rural areas. The county HEPS is the primary preventive center for medical service, supervision, and technical assistance in each county.

A small group of people in HEPS is responsible for occupational health services for each county's industries. These people accounted for 11.6% of total professional public health workers in the HEPS in the 30 counties in this study. However, because of rapid industrialization in rural areas, most township enterprises cannot actually get the basic occupational health service.

It is important to note that in the PRC most occupational health services are provided by the organizations such as Institutes of Occupational Health and by HEPS at various levels, which are affiliated with and financed by governments. In most cases the township enterprises do not have their own occupational health manpower. Now, the Chinese governmental system is changing from a centrally planned economic system to a socialist market system. (In a socialist market system, there are interconnected elements of government planning with socialist outcomes, and market-driven, nongovernmental industries.) Because of this change, and due to governmental budget restrictions, the dependence of township enterprises on "free" occupational health manpower will probably have to change.

In this study, five routine occupational health services and supervision activities carried out by county HEPS were chosen as the indicators of the adequacy of occupational health resources. From Table VII, it can be seen that the coverage occupational health services provided for township enterprises was very limited, from 1.4 to 36%.

The five occupational health services are as follows.

(1) Preventive Occupational Health Inspection: The concept of the preventive occupational health inspection has been a central policy in the PRC. Prior to start-up of a new industrial enterprise, the facility must pass an initial inspection for occupational health

TABLE VI. Rates of Occupational Diseases

Hazards	Persons Checked	Normal		Patient		S.I. ^A	
		No.	%	No.	%	No.	%
Silicosis	6268	6010	96	75	1.2	183	2.9
Coal workers pneumoconiosis	1653	1582	96	18	1.1	53	3.2
Asbestosis	87	66	76	3	3.5	18	21
Chronic lead poisoning	1085	800	74	45	4.2	240	22
Benzene analog poisoning ^P	3071	2916	95	16	0.52	139	4.5
Chronic chromium poisoning	330	293	89	37	11	—	—
Noise-induced hearing loss	6453	4289	66	633 ^B	9.8	1531 ^C	24
Total	18,947	15,956	84	827	4.4	2164	11

^ASuspected illness.

^BHearing impairment in sound frequency.

^CHearing impairment in high frequency.

^PBenzene, toluene and xylene, measured separately.

TABLE VII. Occupational Health and Safety Coverage Provided to Township Industries by Their Counties

Items	Enterprises	Enterprises Covered by OHS ^a	%
Preventive OH ^b inspection	7716	106	1.4
General industrial hygiene walk-through	55,461	19,767	36
Workplace hazard monitoring	55,461	2164	3.9
Worker's physical examination	55,461	1494	2.7
Help to set up OH record keeping	55,461	16,050	29

^aOHS = occupational health services.
^bOH = occupational health.

and safety purposes. The results of this preventive inspection may be given as suggestions or as requirements.

(2) General Industrial Hygiene Walk-Through: This is the “recognition” phase of industrial hygiene, which does not include quantitative evaluation through sampling. This also includes the giving of advice by the hygienist on subjects such as ventilation, monitoring, and related issues.

(3) Workplace Hazard Monitoring: This is the quantitative “evaluation” phase of industrial hygiene and includes the taking of process and air samples.

(4) Worker’s Physical Examination: This includes routine clinical examinations and special tests such as biological sampling.

(5) Help in Setting Up the Occupational Health Record Keeping System: This includes results of environmental monitoring, health examination, and record keeping of occupational diseases, all of which are performed under the jurisdiction of the Ministry of Public Health. It is important to note that all record keeping for accidents and injuries is performed under the jurisdiction of the Ministry of Labor.

This limited health coverage for the township enterprises is especially the case for those services that need complicated health technology or highly trained occupational health professionals. For example, the delivery of services was low for preventive occupational health inspections, physical examination of workers exposed to hazards, and workplace monitoring.

Coverage was limited mainly because occupational health resources were inadequate. There were only 235 persons with responsibilities related to occupational health services in the HEPS of 30 counties. Among them, 153 persons worked full time on occupational health, and 82 persons were part time. Moreover, these 235 persons worked mostly for bigger industries, which were

primarily state-run industries located in the county seats. In addition, in 1989, the average length of experience for occupational health personnel working for the county HEPS and assigned to township industries was only 78 days.

Counting both the state-run and township enterprises, these 235 occupational health workers serviced the needs of 170,613 enterprises with 3,204,576 employees in 30 counties. Thus, the average numbers of enterprises and employees per full-time occupational health worker were 1115 and 20,945, respectively.

In 1989, at the township level, there were 895 township health centers in 30 counties, and 1736 staff whose work was related to preventive, maternal, and child health care. Of these, 993 staff have been to some small or large extent involved in occupational health services for township enterprises. However, most of these health care workers have received no formal or professional training in occupational health. This is a real argument for the increase of resources for training of occupational health professionals.

Financial Support for Health Services

In 1989 the health costs of county governments accounted for 3.1% of the total county government expenditures. The total expenditures for both disease prevention and health inspection accounted for only 8.4% of the total county governmental health expenditures. The fraction of that spent on purely occupational health services was even smaller. Thus, it can be seen that financial resources allocated to prevention and health inspection is very limited.

On the basis of inflation-adjusted income, using 1985 as the basis for calculation for the period 1985–1989, the total value of production of the farmers in the 30 counties increased 63%, and their per capita income increased 25%. In contrast, governmental health expenditures increased 14%, and the funds for prevention and health inspection increased 0.26% in the same period. Thus, the governmental budgets for county HEPS can cover the salaries of only the existing personnel and certain minimum routine internal maintenance items (Table VIII).

Instruments Used for Occupational Health Work

In this survey, 13 specific items of equipment used for workplace monitoring and physical examination were used as indicators to evaluate the disparity between the available and required equipment. The required equipment was evaluated using as a guideline the *Standard Equipment for Occupational Health for HEPS*, promulgated by the Ministry of Public Health. ⁽⁸⁾ The survey showed that for some items adequate equipment was available, whereas for others, there was a very short supply. The average availability of equipment for all 13 categories in 28 of the 30 counties was only for 24% of the requirement defined in the standard (Table IX).

TABLE VIII. Economic Indicators and Governmental Health Input in 28 Counties in 1989

	Gross National Product	Final Accounting of Expenditures (million yuan)	Income Per Capita ^a	Health Expenditure	DPHI ^b Expenditures
1989	31,158 (million Yuan)	2695	869	80	6.7
Compared with 1985 (%) ^c	63	46	26	15	0.26
1985–1989 average increase annually (%)	13	10	5.9	3.5	0.07

^aJust for rural population.

^bDisease prevention and health inspection.

^cTaking the prices in 1985 as fixed prices.

TABLE IX. Routine Instruments for Occupational Health Monitoring (28 Counties, 1990)

Items	No. of Instruments	No. of Instruments Required by Standards	%
Air samplers	80	140	57
Personal samplers	45	1120	4.0
Dust samplers	87	224	39
Detectors for noise	38	28	136
Detectors for vibration	2	56	3.6
Detectors for heat radiation	31	28	111
Spectrophotometers (Type 721)	38	28	136
Spectrophotometers (Type 751)	10	28	36
Mercury meters	20	28	71
Gas chromatographs	22	28	79
Weighing balances (1/10000g)	31	28	55
Electrocardiographs	25	28	89
Lung function test devices	7	28	25
Total	436	1820	24

However, the specific qualifications of the instrument user were not evaluated in this study.

Occupational Health and Safety Management in Township Enterprises

Of the 29,246 enterprises studied in this effort, 8.7% have set up some kind of organization to deal with the subject of occupational health. In 61% of these enterprises, staff, most of whom were part time, were assigned responsibility for occupational health. Although this was not specifically studied, it appears that some of these responsible workers dealt with occupational health issues at a level of effort in accordance with the requirements of the local public health authorities at the HEPS. However, these occupational safety and health organizations and staff were mainly present in the larger township enterprises. Results obtained during this survey indicate that these larger township enterprises with more than 300 employees made up only 4% of the total.

During this study, it was found that of 1780 enterprises with hazardous working conditions, only 42% had any kind of ventilation equipment. Of that number who had this equipment, the self-reported rate of use of the ventilation equipment was 87%, and the self-reported rate of maintenance was 81%. There may be a difference between the actual and the self-reported rates. The adequacy of the equipment for the task was not investigated in this study.

Very few enterprises had health clinics for their workers. Medical insurance was not paid by 60% of the employers. No compensation of any kind was given to workers with occupational injuries or illnesses in 11% of the enterprises. Only a very small fraction of employers fully cover their employees' medical expenses and compensate the occupational injuries and diseases at the level provided by state-run enterprises.

POLICIES AND PROGRAMS

National Occupational Health Policies and Programs for Township Industries

The government of the PRC has been paying attention to the potential environmental and occupational health problems from township industries since the beginning of rural industrialization

in 1970s. The majority of progress has taken place since the early 1980s, when government activities in this area increased.

Legislation

Public health and worker health protection are governed and administered by the Ministry of Public Health, National Environmental Protection Agency, Ministry of Labor, and the Ministry of Agriculture. A *Circular on Strengthening Occupational Diseases Control in Township Enterprises* was jointly issued by the Ministry of Public Health and Ministry of Agriculture in 1985. In 1986 the National Conference on Environmental Protection and Occupational Health for Township Enterprises was held jointly by the Ministry of Public Health, National Environmental Protection Agency, and Ministry of Agriculture. In 1987 a *Regulation on Occupational Health of Township Enterprises* was jointly promulgated by the Ministry of Public Health and the Ministry of Agriculture.⁽⁹⁾ Also in 1987, the State Council issued the *Regulation on Pneumoconiosis Control*.⁽¹⁰⁾

The responsibilities of rural enterprises for controlling pollution and for improving the protection of the health of workers have been clearly stipulated in these regulations. A very important principle translates to English as: Who has caused the environmental pollution or health damages to employees must be responsible for the pollution control and occupational illness compensation. Every township enterprise with occupational hazards must set up regular work site monitoring schedules. In addition, they must establish medical surveillance programs and submit occupational health records for inspection by local public health authorities.

Any person or organization wanting to construct a new industrial facility, or expand or change an existing industrial facility or production process, must receive a preventive occupational health inspection by public health authorities if that facility has actual or potential hazards. This inspection includes reviewing the project design and giving an acceptance check before the industrial enterprise is put into operation. To strengthen this process, new legislation, the Occupational Disease Control Act, is being drafted by the Ministry of Public Health. This act will be submitted for approval to the Standing Committee of the National People's Congress. (The Standing Committee is the executive committee that acts in the name of the Congress when the Congress is not in session.) This will represent the occupational health legislation of primary importance and will supersede all prior legislation.

Investigation and Evaluation on Occupational Health Problems in Township Industries

To evaluate and document the perceived weaknesses in the occupational health situations in township enterprises, the Ministry of Public Health has organized several national investigation since the 1980s. The first of the large studies was in the mid-1980s. This study covered seven provinces in the eastern part of China. The second of the large studies is reported in this article. The data provided by these studies, and the conclusions reached thereby, have been the principal foundation and background used for the development and promulgation of national policies and intervention programs.

National Occupational Health Service Pilot Project

Facing the continuing rapid development of township industries, and the growing gap between the occupational health services that can be provided and what is necessary, the Ministry of Public Health decided to conduct a further field intervention study of this problem. Therefore, in December 1992 an Expert Group for

the Field Study of Occupational Health Service Policies for Small-Scale Industries was set up in the Department of Health Inspection, Ministry of Public Health. This expert group was formed to support provinces in developing occupational health service programs and approaches to effective intervention in hazardous situations. As a first step, the expert group drafted a *Recommended National Field Study Program* for provincial governments, which includes seven principles of policy intervention.⁽¹¹⁾ The Ministry of Public Health has selected four counties (or districts) as the National Trial areas prior to nationwide implementation of the national program. These areas include the Zhangdian district in Zibo municipality, Shandong province; the Baoshan District in Shanghai municipality; Jinhua County in Zhejiang province; and Yuhong District in Shenyang municipality, Liaoning province.

As of this writing, although the evaluation in the four trial areas is proceeding, some preliminary conclusions can be drawn. Some suggestive experiences have been achieved from the trial areas. The principal preliminary conclusions can be discussed in terms of the main ideas of the seven principles of policy intervention.

Principle 1: Strengthening the supervision and inspection provided by local governments of the occupational health of small-scale industries.

More involvement of government in occupational health services is very critical. Government should recognize the importance of health protection of laborers in economic and social development. Serious occupational health problems in rural industries have been or will be an obstacle that hinders the further development of rural economics. Because of that, the functions of government in this program are mainly enforcement of state and local occupational health regulations, and exploring proper legislative approaches to further perfect occupational health legislation and regulation for rural industries.

Three conclusions can be drawn about the role of local governments. First, and perhaps most important: local government of the National Trial areas should normalize their policies, regulations, and practices so that they conform with state regulations, and thereby effectively cope with the main occupational health problems of the local small industries. The effectiveness of the oversight function (called “macro-control” in the PRC) of governments to occupational health and safety needs to be enhanced.

Second, the various governmental sectors, including Public Health, Township Enterprise Management, Labor Administration, and Environmental Protection, should clarify their functions and closely cooperate to ensure the implementation of occupational health services.

Third, local government should explore economic interventions and seek proper funding approaches to encourage enterprises to actively improve working conditions and control occupational risks.

Principle 2: Exploring how to integrate the occupational health services for rural industries with the goal “Health for All by Year 2000” in China.

Local governments should lay down the goals and indicators of occupational health service for rural industries and bring them into line with local preventive health care (PHC) planning and to ensure the workers in township enterprises get basic health service insurance.

Principle 3: Improving grassroots health organization networks to deliver occupational health services, management, and supervision to the enterprises.

As early as the 1970s, China began to build up its health service network gradually in rural areas. This is known as the three-tier

medical and preventive health care network (MPHCN). It embraces county hospitals, HEPS, township health centers, and village clinics. These grassroots health units have undertaken most PHC of rural population. However, MPHCN previously involved very little primary occupational health services for rural industries except for the efforts of county HEPS.

Further exploration is proceeding toward expanding to township enterprises the functions of MPHCN in occupational health services and supervision. The goal is to set up an occupational health organizational model that takes the county HEPS as the local occupational health professional center. In this model the health organization at the township and village levels would be the first point that township enterprises can access to basic occupational health services.

Employers have a very important responsibility to protect their own employees. They must comply with the regulations and requirements made by the government. Local public health authorities need to help the enterprises develop a self-control system for health and safety. Equally important is the requirement that these measures be integrated within the production and management system of each enterprise.

Principle 4: Exploring the enforcement and implementation of occupational health inspection and service for township enterprises.

Based on the *Guideline of Occupational Health Service and Inspection* published by the Ministry of Public Health,⁽⁸⁾ and experience from state-run enterprises, a set of occupational health working procedures for MPHCN is being implemented in the National Trial areas. These procedures, which are in line with the main occupational health problems and special needs of employees in township enterprises, are (a) setting up routine environmental monitoring schemes; (b) health surveillance for workers exposed to severe occupational risks; and (c) maintaining records of occupational diseases and environmental monitoring for all enterprises in which there are serious occupational risks.

Principle 5: Searching for and recommending the appropriate technology for hazard control and personal protection for township enterprises.

The Institute of Environmental Health and Hygienic Engineering, Chinese Academy of Preventive Medicine and university and provincial scientists have been engaged in evaluating appropriate hazard-control technology for small scale industry for many years in Wuxi county, Jiangsu province; Zhangdian district, Shandong province; Jinhua, Zhejiang province, and so forth. The objective is to find effective, economical, easy-to-operate, and acceptable hazard control techniques. Based on their experiences and research, the *Handbook of Occupational Hazards Control Techniques for Township Enterprises*⁽¹²⁾ and the *Handbook of Workplace Pollution Control Techniques for Small Township Constructive Material Production Industry*⁽¹³⁾ were published. The studies are still in progress and are not yet ready to disseminate widely to rural industries.

Principle 6: Implementing occupational health education programs in township industries.

As is shown by the survey, most employers and employees in township industries had no knowledge that there were national regulations in occupational health. They had little occupational health awareness, knowledge, or skills. To support MPHCN in implementing occupational health education to enterprises, the National Expert Group has developed a program to promote the right-to-know awareness of employees (hazard communication) and let them know that all occupational illnesses are preventable,

in part, by the active participation of the workers. The program includes the following.

- A series of hazard communication picture posters put up in work sites. The first seven posters have been prepared on the subjects of the prevention of lead, benzene, chromium, dusts, asbestos dust, noise, and mercury in the workplace.
- A series of folding cards and brochures for workers and employers is being prepared to inform them of governmental regulations and policies in occupational health, the responsibilities of employers and the rights of employees, basic knowledge about different work practices and their risks to health, how to prevent hazardous behavior, and methods for access to primary occupational health services.
- Evaluation has begun of the effects of this program in trial areas prior to recommending them to other areas.

Principle 7: Developing occupational health manpower, improving occupational health service working conditions of MPHNCN, especially at township and county levels. The main approach to developing manpower is to give more training to existing health workers in HEPS and township health centers, involving them more deeply in occupational health service.

Based on analyses of the professional structure and functions of health workers at county, township, and village levels of MPHNCN, a training program has been developed, which includes the following key points.

For occupational health workers in county HEPS:

- General health management theory
- Occupational health legislation and enforcement
- Concept of health promotion and skills in developing health education programs in the workplace
- Basic industrial hygienic engineering
- Guideline to implementing the field study project on occupational health services for small-scale industry

For health workers in township health centers:

- General occupational health
- Basic principles of industrial hygiene, focusing on the identification, evaluation and control of hazards in the workplace
- Management of occupational health record keeping for workers and working environments
- Approaches to integrate occupational health with primary health care

A series of national training courses has been given in the National Trial areas. A key-person training course for the four trial areas was held in Baoshan District of Shanghai in September 1993. Two other courses on occupational health education, preventive health inspection, and basic industrial hygienic engineering also were held in Shanghai in October 1993. Nearly 200 health workers from health administration and MPHNCN in the National Trial areas have been trained.

Additional training plans will be implemented at the provincial level in which the trainees will come primarily from township enterprises. These trainees will be the key persons under the supervision of health workers to improve the management of health and safety at the plant level.

At the National Field Study trial areas, the local governments have the duty to increase the health budget and the proportion of the total health budget for occupational health. Of course, these budgets must be in proportion to the development of rural industries and the local financial capacity. The basic equipment and

instruments for routine workplace monitoring and health examination should be allocated, or if none or insufficient equipment is available, should be replenished. The Ministry of Public Health has recommended an equipment standard for county HEPS in its *Guideline of Occupational Health Service and Inspection*.⁽⁸⁾ A further study to be conducted in trial areas will consider what kinds of and how much equipment should be allocated to township health centers in accordance with their role in occupational health and safety for rural industries.

It is inevitable for a developing, rapidly industrializing country to have many environmental and occupational health problems. However, it is firmly believed that most of this type of problem can be controlled by preventive interventions by government and health workers. Chinese programs in small-scale industry are just a beginning, but it is a good beginning. China has a lot of things to do and a long way to go. China wishes to further cooperate with the World Health Organization and other countries to solve common problems and contribute to human well-being.

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