

**Status and Prevention and
Control strategy of Endemic
Arsenism in China**

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Content

Background

Characteristics of Endemic Arsenism

Status of Endemic Arsenism

Introduction of a national survey on arsenism in China

Problems faced in Endemic Arsenism

Strategy of prevention and control

I. Background

Endemic arsenism is usually caused by excess arsenic intake from high arsenic drinking water, high arsenic air and high arsenic foods for a long time. The endemic arsenism was firstly found in Xinjiang in China in 1983 , it was identified as a new endemic disease by our government in 1992,and has been listed into the national prevention and control plan of priority disease .

Up to now, the population exposed to arsenic has exceeded 2 million and the patients diagnosed has been up to 20,000. China is a new large arsenism country followed India and Bengal. Endemic arsenism in China is one of very important health problems faced in this century .

II. Characteristics of endemic arsenism in China

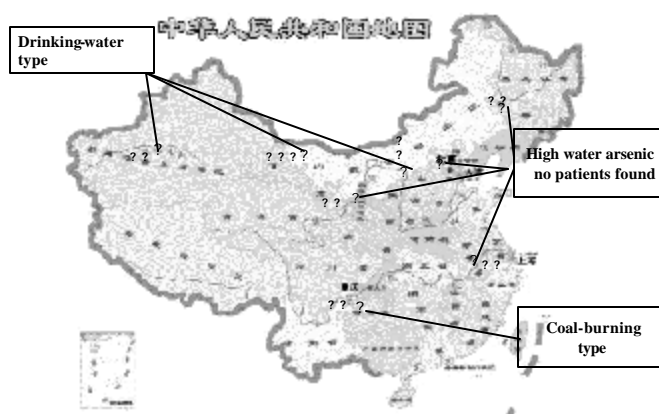
Widely distributed and has a expanding trend

Located in some poor and underdevelopment areas of Midwest in China

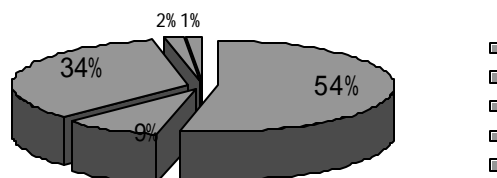
Multiple types such as drinking-water type, coal-burning type and others were involved

High arsenic and high fluoride simultaneously existed in some areas

III. Status of endemic arsenism in China



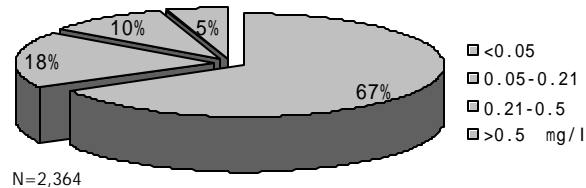
Distribution of arsenic concentration in drinking water in Inner Mongolia



N=303

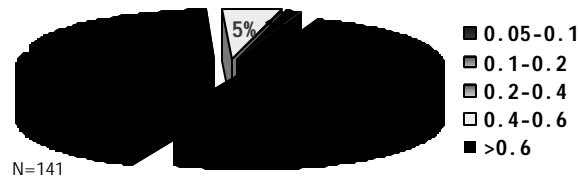
The arsenic concentrations of 46% wells exceeded the national standard for drinking water among 303 wells investigated, they mainly were 0.1-0.5 mg/l which accounted for 34%.

Distribution of Arsenic concentration in drinking water in Shanxi Province



The arsenic concentrations of 33% wells exceeded the national standard for drinking water among 2,364 wells investigated.

Distribution of arsenic concentration in drinking water in one village in Xinjiang



The arsenic concentrations of 141 wells investigated in one village all exceeded the national standard for drinking water and mainly were 0.05-0.2mg/L, which accounted for 74%.

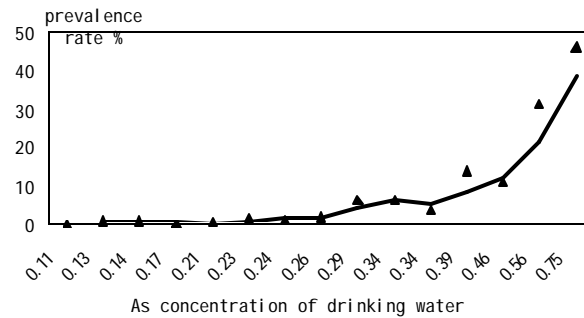
Comparison of endemic arsenism in three high water arsenic regions

Region	Population Investigated	patients	Prevalence rate (%)
Inner Mongolia	15,147	2,808	18.54
Shanxi	51,278	5,897	11.50
Xinjiang	50,760	2,561	5.04



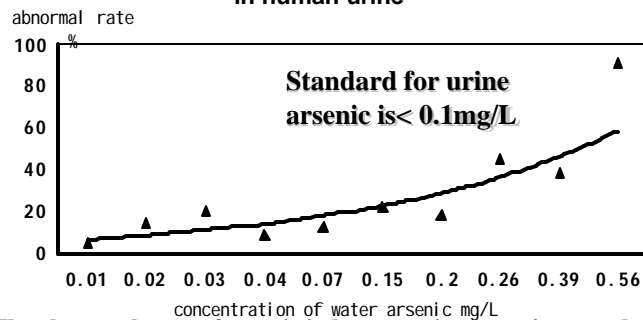
Pumped-handle well

The relationship between arsenic concentrations of drinking water and prevalence rates of arsenism in Xinjiang



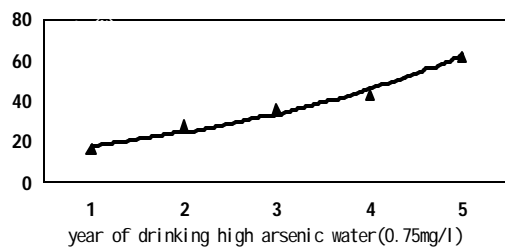
The prevalence rates of arsenism in residents were increased with the increasing of the arsenic concentrations of drinking water.

The relationship between arsenic concentrations of drinking water and abnormal rates of arsenic in human urine



The abnormal rates of arsenic in human urine were increased with the increasing of the arsenic concentration in drinking water.

The relationship between years of drinking high arsenic water and the prevalence rates of endemic arsenism in Xinjiang



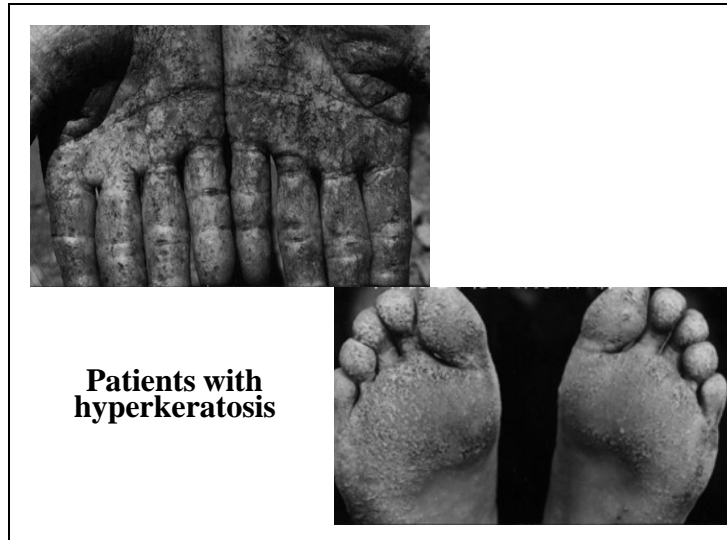
The longer high arsenic water drunk ,the higher prevalence rate of the endemic arsenism occurred.



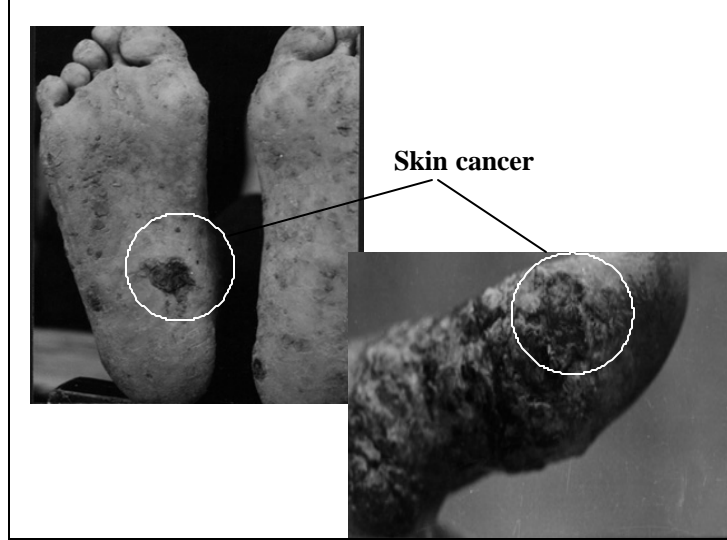
Patients with pigmentation

Patients with pigmentation



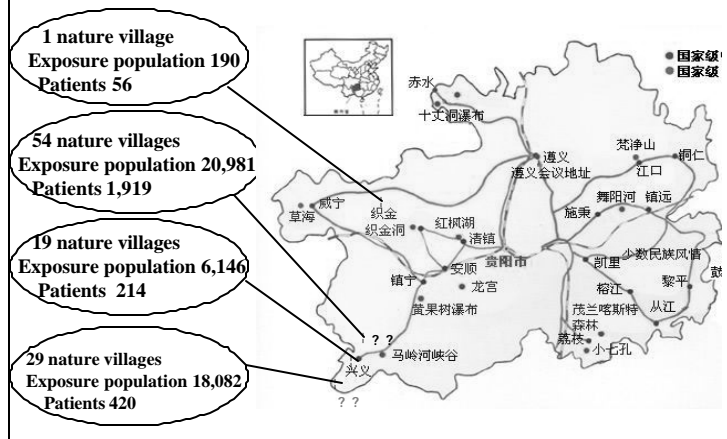


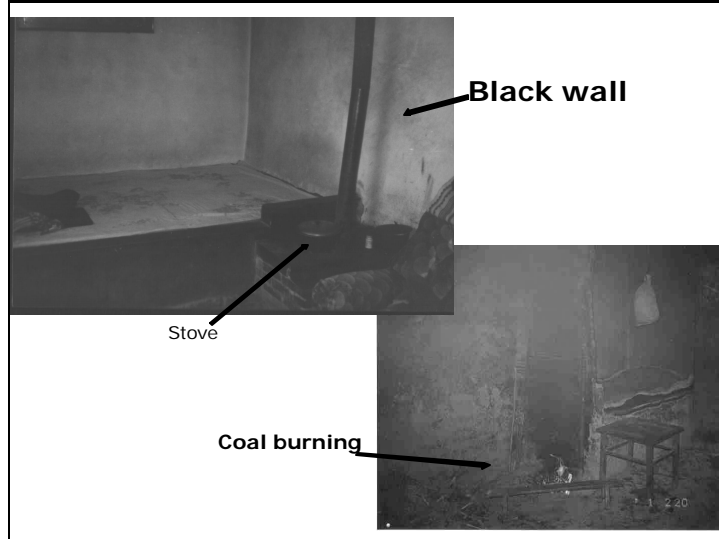
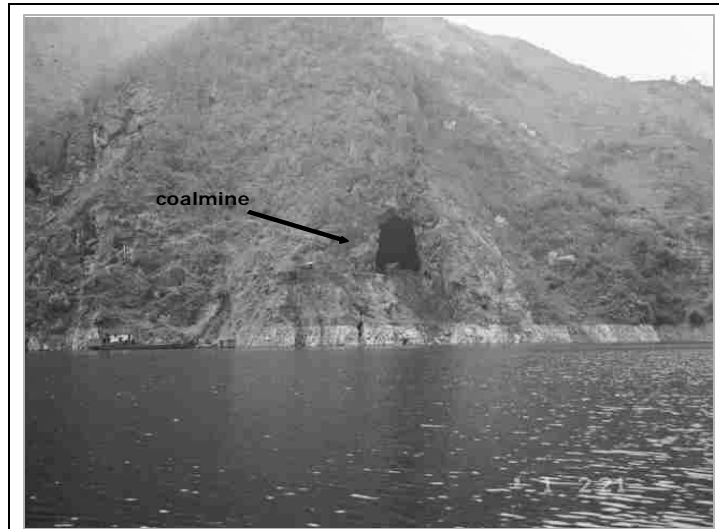
Patients with hyperkeratosis



Skin cancer

The distribution of coal-burning type arsenism in Guizhou province





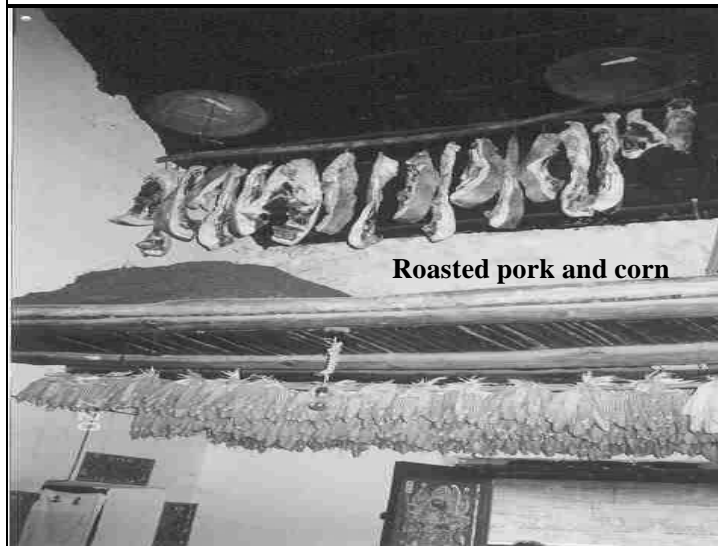
The arsenic content of coal in the arsenism counties of Guizhou province

county	Arsenic content of coal (mg/kg)
Xingyi	265 ± 352
Anlon	418 ± 530
Xingren	624 ± 852
Zhijin	2,167 ± 58

The arsenic contents in roasted corn and chili in the arsenism counties of Guizhou province

county	Arsenic contents (mg/kg)	
	corn	chili
Xingren	4.1 ± 2.8	512 ± 300
Anlong	6.7 ± 11.9	688 ± 586
Xingyi	7.0 ± 12.5	693 ± 545
Zhijin	43.6 ± 16.3	610 ± 77

The higher arsenic concentrations of coal ,the higher arsenic content in roasted food, especially in roasted chili.

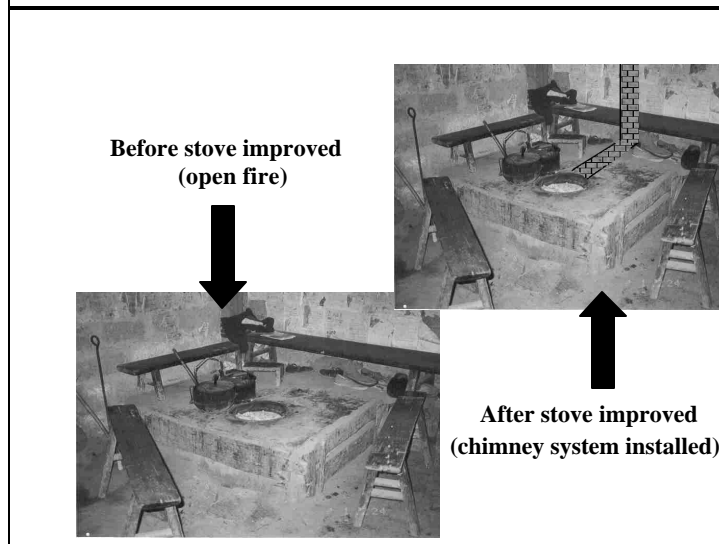


**Comparison of As contents in environmental media
between before and after stove improved in
Guizhou Province**

Items	Before stove improved(1991)	After stove improved(1998)
Coal (mg/kg)	524 ± 602	324 ± 150
Indoor air (mg/m ³)	0.26 ± 0.09	0.06 ± 0.03
Rice (mg/kg)	0.41 ± 0.26	0.26 ± 0.11
Roasted corn (mg/kg)	4.13 ± 2.76	0.56 ± 0.32
Roasted chili (mg/kg)	512 ± 300	46.43 ± 159.58
Drinking water (mg/l)	? 0.02	? 0.02
Fresh vegetables (mg/kg)	? 0.2	? 0.2

**Comparison of human exposure between before and
after stove improved in Guizhou Province**

Items	Before stove improved(1991)	After stove improved(1998)
Population investigated	8,958	20,981
Arsenic content in urine(mg/l)	0.95 ± 0.53	0.11 ± 0.01
Total intake (mg/day/person)	4.76 ± 2.24	1.12 ± 1.23
Occurrence rate of arsenism (%)	17.3 (1,548/8,958)	9.1 (1,919/20,981)



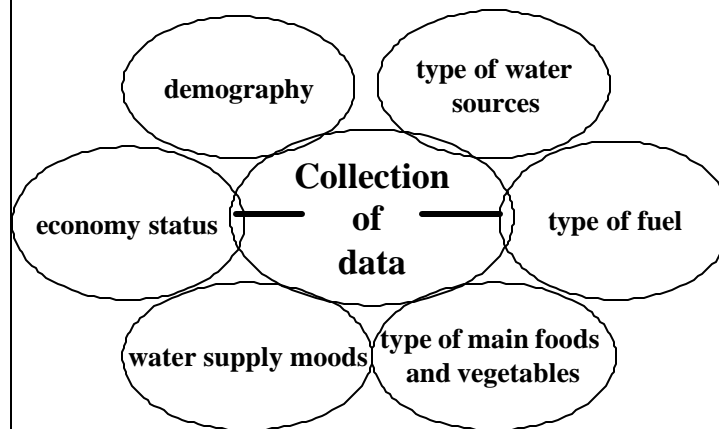
So far, only some provinces(municipalities) such as Inner Mongolia、 Shanxi 、 Xinjiang and Guizhou have been investigated on endemic arsenism , while how many population exposed to arsenic and number of endemic arsenism were still not known in the whole country. So We started to carry out a national survey on the distribution of endemic arsenism in 21 provinces in 2001.

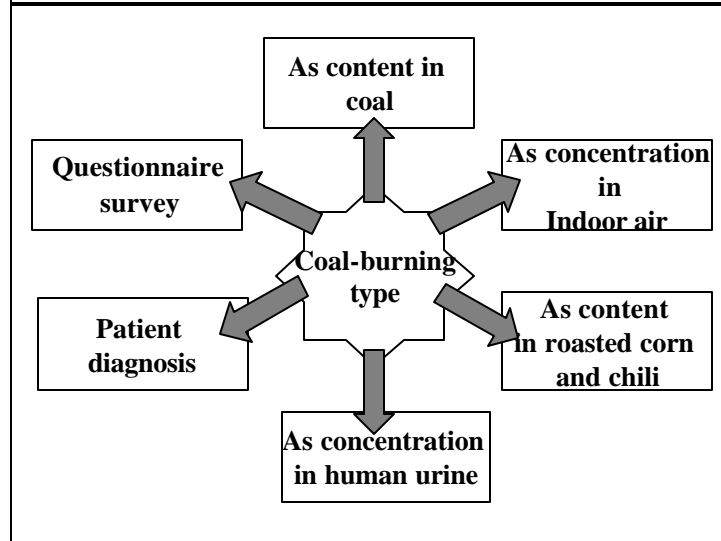
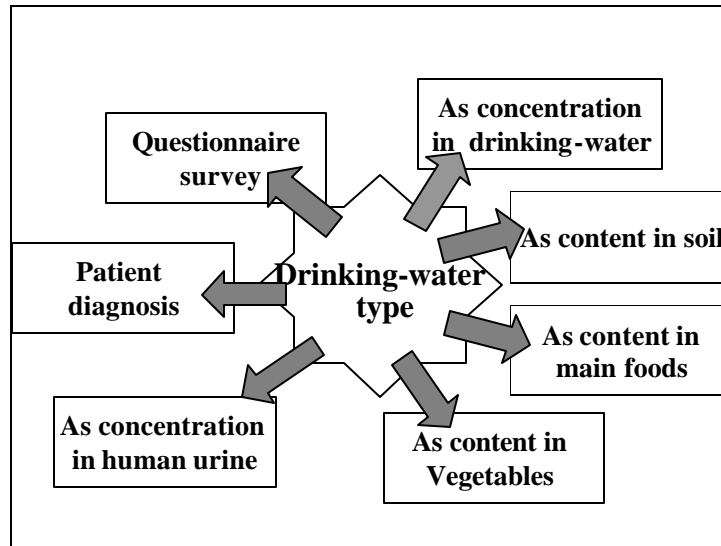
IV. A national investigation on the distribution of endemic arsenism in China

1. Selection of survey region

16 provinces and cities were chosen for investigation on drinking-water type arsenism according to historical water monitoring data and 5 provinces and cities for investigation on coal-burning type arsenism according to contents of coal arsenic.

2. Investigation contents





3. Expecting results

I. Map of distribution of drinking-water arsenism

? . Map of distribution of coal-burning arsenism

? . Map of distribution of endemic arsenism

V. Problems

- ? **Lack of low arsenic water sources**
- ? **Lack of low arsenic coal in arsenism areas**
- ? **High arsenic and high fluoride existed simultaneously**
- ? **Economic underdevelopment in arsenism areas**
- ? **The cancer morbidity will increase in the future 10 years**

VI. Strategy of prevention and control

