Preplanned Studies

Towards a Leprosy-Free Country — China, 2011–2018

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Summary

What is already known about this topic?

Leprosy is a chronic infectious disease that is endemic in several countries. Control of leprosy has had targets set by World Health Organization's (WHO) Global Strategy 2016–2020 and by China through a national leprosy-control plan (2011–2020).

What is added by this report?

Data from the Leprosy Management Information System in China was analyzed and showed a national prevalence of 0.178 per 100,000 and detection rate of 0.037 per 100,000 residents in 2018. In addition, all the main targets for 2020 have been met by 2018 except for the proportion of counties or cities to reach a prevalence of less than 1/100,000 and the proportion of children cases with grade 2 disability (G2D).

What are the implications for public health practice?

There are still challenges remaining to close the gaps between current progress and the targets set forth by the WHO and China. However, lessons learned in China in developing and implementing the national program may be invaluable for future plans to achieve and sustain elimination of leprosy at global and country level.

Leprosy is a chronic infectious disease caused by *Mycobacterium leprae*, which essentially affects the peripheral nervous system but also involves the skin, eyes and sometimes certain other tissues. This disease is usually endemic in tropical countries, especially in developing countries. Historically in China, the endemicity of leprosy was much higher along the coast and in the Yangtze Valley. In 1950, the leprosy control program was initiated and organized by the Chinese Ministry of Health (MOH, now the National Health Commission), which implemented vertical programs from national to county levels. Repeated mass or general surveys were conducted in the 1950s, 1960s, and 1970s in most areas of the country to detect most of new and historical cases in the country for treatment with monotherapy of dapsone (*1*). The introduction of multidrug therapy (MDT) to leprosy programs in China in the mid-1980s resulted in a significant reduction in the prevalence of the disease.

Based on the definition of WHO for elimination of leprosy as a public health problem (a prevalence of less than 1 case per 100,000 residents), China had eliminated this disease at the national level in 1981 and at the provincial level in 1992 (*1*). Nonetheless, this disease continued to be disproportionally detected in some areas with 1.2% of counties or cities not having reached this WHO criteria as of 2010 and resulting in a significant proportion of their patients to be disabled. To address these issues, the MOH published a national leprosy-control plan (2011–2020) to specially aim at controlling leprosy and its harms through public health investment directly allocated for leprosy control (*2*). The program aims to improve along three axes: the total number of leprosy patients; the percentage of counties or cities with a prevalence lower than 1/100,000; and the proportion of newly detected cases with grade 2 disabilities (G2D).

The Leprosy Management Information System in China (LEPMIS) is an updated version of the original National Leprosy Recording and Reporting System (*3*) that was initiated in 1990 to collect individual data on all leprosy patients reported from all counties or cities in Mainland China for establishing a national computerized database. Data from the database are analyzed regularly by the National Center for Leprosy Control and reported at annual national leprosy meetings in China and shared with the WHO. Diagnosis of leprosy was based on clinical, bacteriological, and sometimes histopathological profiles. When calculating for prevalence, patients who were not clinically cured were considered clinically active, while case detection rate was defined as the number of newly detected cases divided by population. The newly detected patients with WHO grade 2 (visible) deformities or damages were defined as "disabled" for the calculation of the disability proportion and rate of new cases.

Data from LEPMIS indicated that both the prevalence or the case detection rate of leprosy

significant declined between 2010 and 2018 to reach a national prevalence of 0.178 per 100,000 and detection rate of 0.037 per 100,000 residents in 2018 (Figure 1). The number of registered cases and new cases in 2018 decreased by 58.6% and 60.6%, respectively, from that in 2010 (4–5).

The registered cases declined from 5,479 in 2011 to 2,479 in 2018 and most cases were found in Yunnan, Sichuan, Guizhou, and Guangdong. A total number of 6,602 new cases were detected from 2011 to 2018, with an average annual decline of 11.0% compared with 1,324 in 2010 (Table 1). During 2011–2018, 4,254 (64.4%) cases occurred in priority provinces of Yunnan, Guizhou, Sichuan, and Guangdong.

Among the newly detected cases in 2011–2018, male cases totaled 4,479 with a proportion of 67.8%

and children under 15 cases totaled 141 with a proportion of 2.1%. Additionally, during this period, 11.5% of new cases were detected among people migrating from traditionally leprosy endemic areas to major cities such as Beijing, Shanghai, Guangzhou, and Shenzhen.

The number of newly detected cases with G2D was 1,508 cases during 2011–2018 and the proportion of new G2D cases had remained mostly at the level around 20.0%. The proportion of G2D slowly declined to 19.0% in 2018. The rate of new leprosy cases with G2D decrease from 0.222 per 1,000,000 residents in 2010 to 0.071 per 1,000,000 residents in 2008 at the population level. Eight cases with G2D were found among children during 2011–2018, giving a proportion of G2D of 5.7% (8/141). In 2018, one
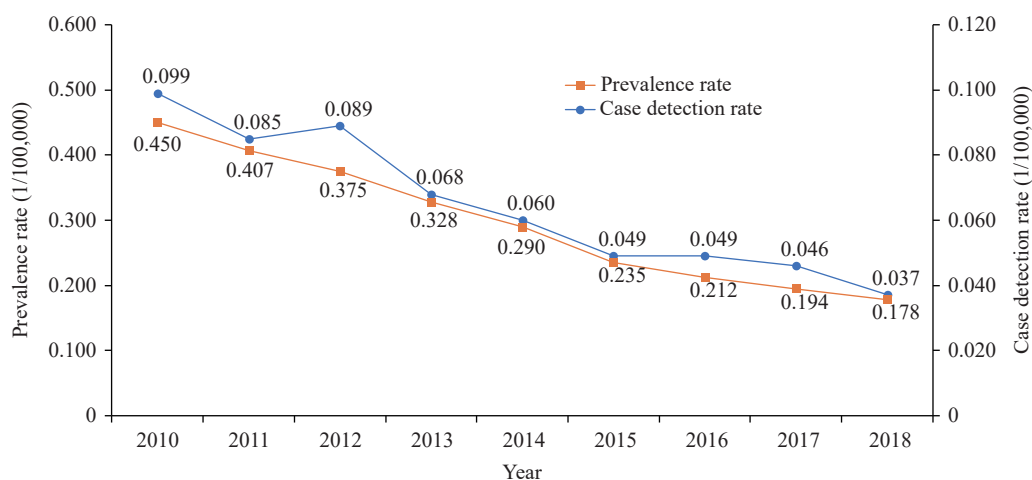

FIGURE 1. The prevalence rate and case detection rate of leprosy in China, 2010−2018.

TABLE 1. Epidemiological profiles of leprosy in China, 2011−2018[*].

Year	Registered cases	Prevalence rate (1/100,000)	Newly detected cases						
			Total	Case detection rate (1/100,000)	Male	Children under 15	Mobile cases	Cases with G2D	Grade 2 disability rate (1/1,000,000)
2011	5,479	0.407	1,144	0.085	779	29	114	309	0.229
2012	5,071	0.375	1,206	0.089	847	29	103	346	0.256
2013	4,465	0.328	924	0.068	616	14	103	188	0.138
2014	3,961	0.290	823	0.060	560	14	109	165	0.121
2015	3,230	0.235	678	0.049	474	20	89	126	0.092
2016	2,925	0.212	672	0.049	457	19	93	148	0.107
2017	2,697	0.194	634	0.046	417	9	74	127	0.091
2018	2,479	0.178	521	0.037	329	7	71	99	0.071
Total	3,788[†]	0.276[†]	6,602	0.060[†]	4,479	141	756	1,508	0.137[†]

Abbreviation: G2D=grade 2 disablity.
[*] The data from 2011 to 2015 were published in Chinese Journal of Dermatology in 2017, and in this study, the data were extended to 2011−2018.
[†] Average data.

case with G2D was found among children giving a proportion of G2D among children cases of 14.3% (1/7).

There were 237 counties or cities with a prevalence rate above 1/100,000 by the end of 2010. After 8 years of implementing the leprosy program in China, by the end of 2018, there were still up to 75 counties or cities where the prevalence target of more than 1/100,000 was not achieved, accounting for 2.6% of the total number of counties or cities in the country (Table 2).

TABLE 2. Main targets proposed by China's National Program and the WHO's Global Strategy and status of these targets by 2018 in China.

Indicator	Target of National Program by 2020[*]	Target of Global Strategy by 2020[†]	Status by the end of 2018 at national level
Reduction in the number of registered cases from that in 2010	>50%	NA	58.6%
Proportion of newly diagnosed cases with grade-2 disability	<20%	NA	19.0%
Grade 2 disability rate at population	NA	<1/1,000,000	0.071/1,000,000
Grade 2 disability rate among newly detected pediatric cases	NA	0%	14.3%
Proportion of counties or cities reaching the prevalence of less than 1/100,000 (N)	>98% (2,856)	NA	97.4% (2,851)

Abbreviation: NA=Not applicable.
[*] China National Program for Eliminating Harms Due to Leprosy (2010−2020).
[†] WHO Global Leprosy Strategy 2016−2020: Accelerating towards a leprosy-free world.

DISCUSSION

A total of 208,619 new cases of leprosy were reported globally in 2018, and 23 countries were identified by the WHO as "global priority countries" as accounting for 95.6% of the global load. China was not among these 23 priority countries, and the new case detection rate in China, approximately 0.037/100,000, was comparable to that of the United States (6) and was much lower than the global average of 2.74/100,000.

By the end of 2018, 184,212 cases were registered globally as receiving MDT, with a leprosy prevalence of 0.24/10,000. This global prevalence was over 10 times higher than the rate 0.178/100,000 reported in China in 2018. In addition, the prevalence calculated in China includes patients who were not clinically cured regardless of receiving or completing MDT, so the prevalence in China would be lower if the WHO method of calculating of prevalence, i.e. cases under MDT were calculated as registered cases, was applied.

For China to take the last steps towards becoming a leprosy-free country, innovative strategies were introduced such as symptom-driven case-detection methods combined with pay-for-performance schemes to maximize early case-finding and start earlier treatments to better prevent the development of disabilities. The symptom-driven case-detection method refers to encouraging health providers to refer any patients with symptoms suspected as leprosy for further clinical evaluation and diagnosis (7–8). The pay-for-performance scheme refers to a purchase mechanism by which subsidies were provided to compensate health providers for successful referrals for patients who were ultimately diagnosed with leprosy.

By 2018, all the main targets for 2020 have been met except for the proportion of counties or cities to reach a prevalence of less than 1/100,000 and the proportion of children cases with G2D. Globally, China might be one of the first countries to propose a leprosy elimination goal defined as a prevalence of less than 1/100,000 at the county or city level, but this goal may be difficult to achieve due to uneven disease burdens, access to and distribution of health resources, and socioeconomic status across the country.

In conclusion, China has made significant progress in the fight against leprosy, but several challenges remain. Public health systems specifically established and budgets specifically allocated for leprosy control at different levels ensured the successes of effectively controlling the disease. However, sustainability of the systems and investments is a challenge. Population migration makes case detection, treatment, and follow-up more challenging, and approximately one-tenth of newly detected cases occur annually among domestic migrants with new cases also being detected in international migrants. To address this challenge, the International Forum for Leprosy Precision Prevention and Treatment was held in China in 2018 and 2019 to congregate international representatives from Belt and Road Initiative countries.

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