

21-year trend of new leprosy cases in Guangdong, China: An analysis of surveillance data from 2000 to 2020

Sir,

Leprosy is an infectious disease caused by *Mycobacterium leprae*. Guangdong Province was at one time, the centre of a severe leprosy epidemic and still has the largest migrant population in China. On December 31, 2020, the total number of leprosy patients was 96,000 in Guangdong. After 70 years of hard work, the incidence of leprosy has been declining year by year over the past 21 years, but the disability of leprosy patients is still a public health problem. We analyze here the epidemiological trends and characteristics of new leprosy cases in Guangdong Province between the years 2000 to 2020 (obtained from the leprosy management information system in China (LEPMIS)).

During this 21-year period, a total of 2043 patients, including 1344 males and 699 females, were diagnosed with leprosy. Sixty cases (2.99%) were children (≤ 14 years old). Permanent residents and temporary residents accounted for 78.02% (1594 cases) and 21.98% (449 cases), respectively. The mean age at diagnosis was 42.91 ± 17.86 years, and the average time delay in the diagnosis was 2.67 ± 3.58 years. Multibacillary type accounted for 63.53% (1298 cases). There were 376 cases (18.40%) of grade 2 disability [Table 1]. Although the annual number of new cases decreased from 99 cases in the year 2000 to 47 cases in 2020 (average annual percent change = -3.3 , 95% CI = $-5.8 - -0.6$, $P = 0.018$ [Figure 1], the proportion of multibacillary type in new cases increased from 44.4 to 70.2%, along with an increase in grade

2 disability from 16.2 to 29.8%. Moreover, the number of new cases varied among different cities in Guangdong province.

Over 50% (233 cases) of temporary residential cases were originally from highly epidemic areas of China, such as Hunan (67 cases), Guizhou (57 cases), Sichuan (44 cases), Jiangxi (35 cases) and Guangxi province (30 cases) [Figure 2a]. Four cases were from abroad (three from Indonesia and one from Mali). The following eight cities accounted for 67.89% of the total new cases in Guangzhou province: Zhanjiang, Guangzhou, Shenzhen, Jieyang, Maoming, Shantou, Foshan and Dongguan [Figure 2b].

The present study demonstrates a constant decline in new leprosy cases over the last 21 years, which is in agreement with the findings of others.¹ The decreased incidence of leprosy is primarily ascribed to the implementation of the advanced strategy of leprosy prevention and control. Particularly, early detection and prompt treatment with multi-drug therapy, the basic strategy of leprosy control, has resulted in a significant reduction in the incidence of leprosy in Guangdong. The “National leprosy Prevention and Control Program in China 2006–2010” effectively controlled and basically eliminated leprosy in China. Later on, the strategies 2016–2020 and 2021–2030 continued to focus on disrupting of the transmission chain and detection of active cases in both high and low-burden settings. The recommendations included promotion of equity and social justice, emphasising the inclusion of persons affected by leprosy, reducing stigma and discrimination, building partnerships and coalitions of stakeholders and endorsing increased ownership by the country. All these preventive approaches led to a sharp decline in the incidence of leprosy by the year 2009, as shown. Improvement in the information systems also contributed to the decreased incidence of leprosy. For example, switching the leprosy reporting method from paper-based report to internet-based report, Leprosy Management Information System in China (LEPMIS), and the utility of an app for all medical institutions to monitor suspected leprosy symptoms, make leprosy prevention and control more standardised and accurate.

Although the incidence of leprosy has decreased year by year, Guangdong still has about 50 new leprosy cases per

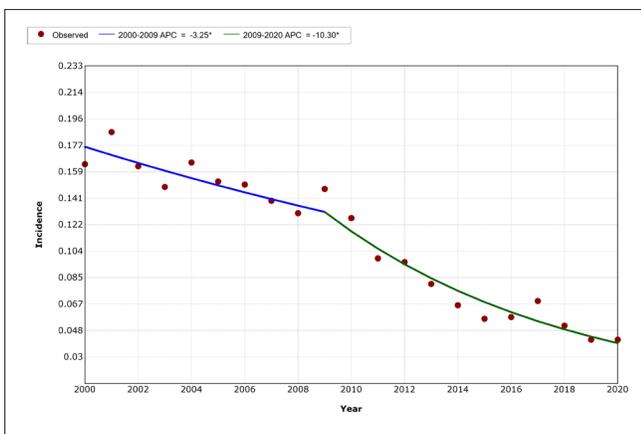


Figure 1: Trends of the incidence of leprosy over the last 21 years in Guangdong

How to cite this article: Wang X, Lin X, Zhao P, Chen L, Zheng D, Yang B. 21-year trend of new leprosy cases in Guangdong, China: An analysis of surveillance data from 2000 to 2020. *Indian J Dermatol Venereol Leprol* 2023;89:894-6.

Received: February, 2022 **Accepted:** September, 2022 **Epub Ahead of Print:** March 2023 **Published:** October, 2023

DOI: 10.25259/IJDVL_178_2022 **PMID:** 37067134

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Table 1: Epidemiological Characteristics newly detected leprosy cases in Guangdong, China, 2000 to 2020

Year	Newly detected cases	Male	Female	Average age (Years)	Cases of MB	Proportion of MB (%)	Cases of children	Proportion of children (%)	Average delay time (months)	Cases with GZD	Proportion of cases with GZD (%)	Permanent residential cases			Temporary residential cases			ANOVA of average age
												Number of cases	Average age (Years)	Number of cases	Average age (Years)	Number of cases	Average age (Years)	
2000	99	61	38	41.66 ± 16.60	44	44.44	2	2.02	24.78 ± 23.32	16	16.16	90	42.58 ± 16.71	9	32.39 ± 12.78	3.025	0.053	
2001	122	82	40	43.18 ± 17.17	79	64.75	3	2.46	34.06 ± 67.49	22	18.03	107	44.19 ± 17.07	15	35.94 ± 16.67	1.988	0.141	
2002	118	82	36	41.44 ± 17.37	66	55.93	7	5.93	25.49 ± 28.99	17	14.41	106	42.16 ± 17.88	12	35.09 ± 10.43	1.317	0.272	
2003	101	65	36	43.75 ± 18.17	54	53.47	1	0.99	24.78 ± 26.03	17	16.83	92	44.12 ± 17.61	9	39.87 ± 24.09	2.944	0.057	
2004	125	76	49	43.24 ± 18.45	76	60.80	4	3.20	31.56 ± 34.58	20	16.00	111	44.70 ± 18.83	14	31.68 ± 9.14	3.287	0.041	
2005	139	98	41	40.00 ± 16.96	82	58.99	5	3.60	31.07 ± 41.31	17	12.23	128	40.25 ± 17.28	11	37.11 ± 13.02	2.273	0.107	
2006	138	91	47	41.80 ± 17.69	89	64.49	5	3.62	27.38 ± 30.10	22	15.94	121	43.36 ± 17.89	17	30.64 ± 11.44	4.032	0.02	
2007	125	80	45	43.82 ± 18.15	78	62.40	8	6.40	28.94 ± 45.86	22	17.60	105	44.52 ± 18.42	20	40.11 ± 16.60	1.152	0.319	
2008	123	79	44	43.85 ± 20.05	81	65.85	5	4.07	22.55 ± 24.65	15	12.20	101	45.53 ± 21.43	22	36.13 ± 8.61	2.11	0.126	
2009	133	85	48	42.57 ± 19.22	93	69.92	5	3.76	36.64 ± 43.37	32	24.06	114	44.02 ± 19.80	19	33.87 ± 12.45	2.348	0.1	
2010	118	80	38	40.34 ± 17.41	77	65.25	3	2.54	40.25 ± 61.35	24	20.34	85	41.02 ± 19.06	33	38.61 ± 12.25	1.189	0.308	
2011	99	70	29	41.55 ± 16.32	70	70.71	3	3.03	39.41 ± 55.03	20	20.20	62	44.08 ± 18.02	37	37.32 ± 12.04	2.075	0.131	
2012	101	64	37	42.91 ± 17.77	66	65.35	1	0.99	38.19 ± 45.28	20	19.80	72	46.67 ± 18.72	29	33.58 ± 10.62	6.202	0.003	
2013	85	54	31	45.24 ± 18.97	64	75.29	1	1.18	28.78 ± 34.03	16	18.82	57	50.41 ± 19.70	28	34.71 ± 11.98	7.625	0.001	
2014	70	49	21	44.53 ± 18.06	43	61.43	0	0.00	35.74 ± 47.27	20	28.57	46	47.86 ± 19.18	24	38.15 ± 13.93	2.77	0.07	
2015	60	38	22	45.48 ± 18.32	39	65.00	2	3.33	37.58 ± 41.49	10	16.67	38	49.49 ± 20.12	22	38.57 ± 12.26	2.86	0.066	
2016	62	45	17	43.38 ± 16.38	49	79.03	1	1.61	40.14 ± 42.06	13	20.97	36	45.62 ± 17.72	26	40.29 ± 14.06	1.658	0.199	
2017	74	45	29	46.46 ± 18.20	52	70.27	2	2.70	40.67 ± 46.79	14	18.92	40	52.22 ± 18.79	34	39.68 ± 15.08	4.818	0.011	
2018	57	42	15	45.35 ± 16.11	42	73.68	1	1.75	27.21 ± 29.33	11	19.30	28	52.75 ± 15.98	29	38.22 ± 12.85	8.136	0.001	
2019	47	28	19	48.07 ± 17.52	33	70.21	1	2.13	41.26 ± 59.52	14	29.79	27	51.58 ± 18.54	20	43.35 ± 15.23	1.844	0.17	
2020	47	30	17	46.25 ± 20.99	33	70.21	1	2.13	34.75 ± 43.57	14	29.79	28	55.15 ± 20.90	19	33.15 ± 12.89	8.155	0.001	
Total	2043	1344	699	43.08 ± 17.93	1310	64.12	61	2.99	32.19 ± 43.10	376	18.40	1594	44.81 ± 18.69	449	36.95 ± 13.26	35.638	<0.001	

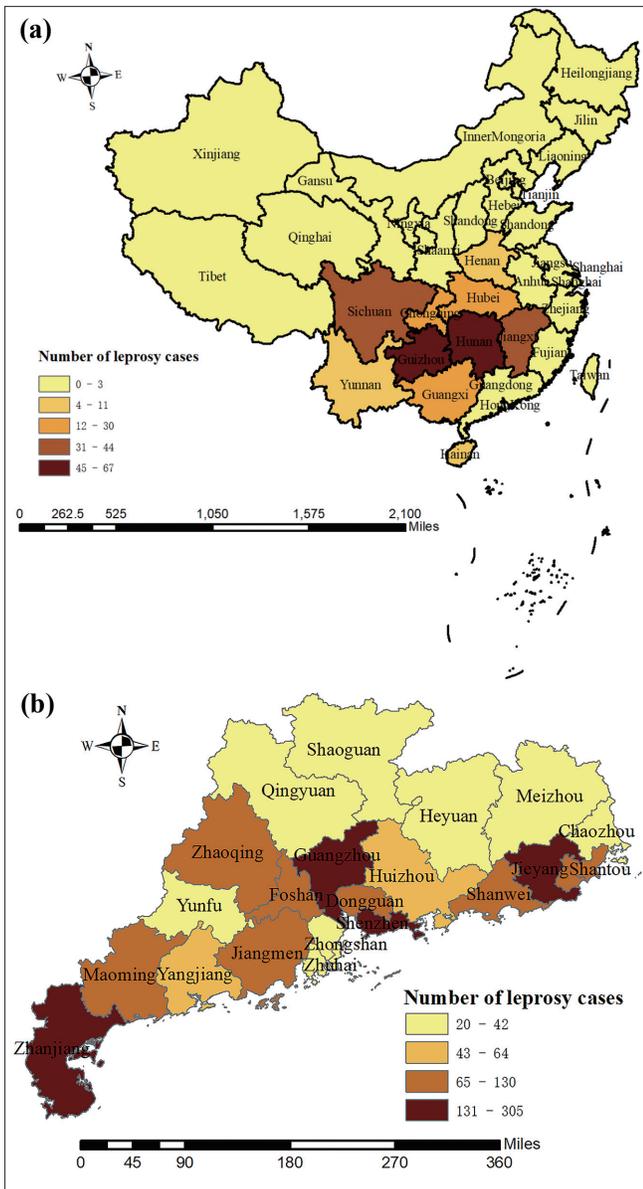


Figure 2: Distribution of leprosy cases in different regions of China. (a) Temporary residential leprosy cases in different provinces of China 2000 to 2020. (b) Distribution of leprosy cases in different regions of Guangdong 2000 to 2020

year, imposing a challenge for the prevention and control of leprosy. The present study also showed that new leprosy cases in children accounted for 2.99% of total new cases in Guangdong Province, which is lower than that in other regions.^{2,3} The new leprosy cases were mainly found in males. The factors contributing to gender differences in the incidence of new cases remain unknown. Another notable finding in the present study is the increased grade 2 disability cases, from 16.2 to 29.8%, which is much higher than that

in other provinces.^{4,5} Such a dramatic increase in grade 2 disability could be due to the increase (from 9 to 22%) in cases among temporary residents over the last 21 years. These results suggest that special attention should be paid to their healthcare.

Limitation

The study has these limitations: firstly the incidence of leprosy could have been underestimated because of under-diagnosis and under-reporting since individuals with mild symptoms may not seek medical care. Thus, these patients would not be registered in a leprosy data system. Secondly, it is not clear whether the cases among temporary residents acquired the infection prior to, or after they came to Guangdong Province.

Declaration of patient consent

Institutional Review Board (IRB) permission obtained for the study.

Financial support and sponsorship

The Dermatology Hospital, Southern Medical University.

Conflict of interest

There are no conflicts of interest.

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