Announcements

The 31st World Population Day — July 11, 2020

World Population Day (WPD) was established by the United Nations (UN) in 1989 and celebrated annually on July 11 (*1*). The aim of celebrating WPD is to overcome urgent and important population issues and to raise the awareness of the public. While many countries face challenges of rapid population growth, other countries such as China are experiencing a reduction in population size and facing the challenges of a falling proportion of working-age population, population ageing, urbanization, and population migration (*2*). Compared with 2017, China's total number of births has decreased by 2.58 million in 2019 (*3*), and the total population is projected to decrease by 31.4 million (2.2%) between 2019 and 2050 (*2*). Moreover, China is currently the only country in the world with an elderly population of more than 200 million, and the migrant population has reached 236 million in 2019 (*4*). The above population issues are closely interrelated with the 2030 Sustainable Development Goals (SDGs) put forth by the UN. Therefore, in order to achieve the world blueprint of sustainable development, we must understand and overcome these population issues.

The theme of the coming 31st WPD in 2020 will be "Putting the brakes on COVID-19: how to safeguard the health and rights of women and girls now" (*5*). This theme aims to raise awareness about the sexual and reproductive health needs and vulnerabilities of women and girls during the pandemic and to explore how to maintain the momentum towards achieving the SDGs by 2030.

doi: 10.46234/ccdcw2020.139

Submitted: July 05, 2020; Accepted: July 06, 2020

REFERENCES

1. United Nations. World population day 11 July. https://www.un.org/en/events/populationday/.[2020-06-12].
2. United Nations. World Population Prospects 2019: Highlights.17 Jun2019https://www.un.org/development/desa/publications/world-population-prospects-2019-highlights.html.[2020-06-12].
3. National Bureau of Statistics. The total population growth slows down and the level of urbanization continues to rise. http://www.stats.gov.cn/tjsj/sjjd/202001/t20200119_1723861.html.[2020-06-12]. (In Chinese).
4. National Bureau of Statistics. National data. http://data.stats.gov.cn/easyquery.htm?cn=C01.[2020-06-12]. (In Chinese).
5. UnitedNationsPopulationFund.Worldpopulationday.https://www.unfpa.org/events/world-population-day.[2020-07-04].

Preplanned Studies

Utilization Rate of Healthcare Service of the Elderly with Disabilities — China, 1987–2014

Chao Guo[1,2]; Jinghua Chang[2]; Xiaoying Zheng[1,2,#]; Linhong Wang[3,#]

Summary

What is already known about this topic?

In the context of rapid population ageing and over represented disabilities among the elderly, healthcare services for the elderly persons with disabilities are one of the most urgent and important population and public health issues. Previous studies indicated that the weighted prevalence rate of lifetime healthcare service use was 36.6% (95% CI: 35.6–37.5) among persons with disabilities aged 60 years and above in 2006.

What is added by this report?

We found that the lifetime utilization rate of auxiliary aids among elderly with disabilities increased significantly from 4.96% in 1987 to 9.07% in 2006 (p_{trend}<0.001), and the utilization rate of healthcare service in the last 12 months increased significantly from 18.6% in 2007 to 56.9% in 2014 (p_{trend}<0.001) among total elderly with disabilities.

What are the implications for public health practice?

The arduous achievement indicated the success of social, economic, and medical reforms as well as health equity improvement of China. However, more sound policies and action are needed to further reduce the unmet needs in healthcare services.

As the nation with the largest population, China has also been the country with the fastest aging speed. Providing healthcare services for the elderly persons with disabilities is one of the most urgent and important population and public health issues and also presents a major challenge for the government. Using data from the first and second China National Sample Survey on Disability (CNSSD) in 1987 and 2006, respectively, as well as the consecutive follow-up investigations once a year from 2007 to 2014, we investigated the healthcare service utilization among

China's elderly with disabilities from 1987 to 2014. Significant increases in the use of healthcare service were found, but the utilization rate in China was still lower than some high-income countries. These findings may provide information for further action and policymaking on healthcare service for the elderly, especially those living with disabilities.

The two CNSSDs were conducted to understand the prevalence, causes, and severity of various disabilities in the household population in the of mainland China. Nationally representative samples were derived by multistage, stratified random cluster sampling with probability proportional to size. The follow-up surveys aimed to investigate the living conditions, environment, and healthcare of people with disabilities in a sub-sample of those living with disabilities that were randomly selected from the second CNSSD. Standardized quality control systems including interviewer training and crosschecking of returned responses, and consistent approaches were conducted during the CNSSDs and the follow-up survey operations. More details about the surveys can be found in our previous work (*1*–*2*). For the purposes of this study, only survey respondents at and above 65 years-of-age were considered. A flowchart about the derivation of study samples was presented in a Supplementary File (Supplementary Figure S1 available in http://weekly.chinacdc.cn/).

In the surveys, disabilities referred to one or more abnormalities in anatomical structure or the loss of a particular organ or function, either physical or psychological, that affected a person's ability to carry out a normal activity and to participate fully in study, work, and community and social life (*1*). Healthcare service use in the surveys was self-reported by the respondents. In the two CNSSDs, the lifetime healthcare service use was investigated. In the 1987 survey, only the information of auxiliary aids use was investigated; in the 2006 survey, information of the rehabilitation therapy and training services use was available. In the follow-up surveys, healthcare service use was focused on the use during the past 12 months, and the health services widely involved rehabilitation therapy and training, auxiliary aids, medical diagnosis and needs assessment, psychological counseling, home service, day care and nursing, follow-up and evaluation service, rehabilitation knowledge education and so on.

In the 1987 and 2006 surveys, we constructed sample weights using standard weighting procedures allowing for complex sampling design to estimate the population weighted numbers and prevalence with 95% confidence intervals (CIs) of disability among the elderly. Population numbers and rate of healthcare service use in the utilization of healthcare service among the elderly with disabilities were calculated where appropriate. A chi-square test was used to determine the difference in utilization of healthcare service by age, sex, and residence. Wald tests of linear trend were used to determine differences in the utilization of rehabilitation services over the time series. STATA 13 (STATA Corp, College Station, TX, USA) was used for data analysis above. Annual percent change (APC) and average annual percent change (AAPC) with 95% CIs were calculated by Joinpoint Regression models with Joinpoint software (Depuy Orthopaedics Inc, IN, USA) among total elderly with disabilities and sub-population by age, sex, and residence. Details of the AAPC calculation method were shown in the supplementary file. A two-sided *p*-value of less than 0.05 was identified as statistically significant in all statistics of the present study.

In 1987, it was estimated that a weighted number of 16.87 million elderly were living with disability, accounting for 27.64% (95% CI: 27.34%–27.94%) of the total elderly aged 65 years old and above according to the first CNSSD, and the weighted number and proportion increased to 38.26 million and 29.42% (95% CI: 29.23%–29.61%) according to the second CNSSD, respectively. Considering the age structure of the elderly in the 2010 population census, the age-standardized prevalence of disability among elderly in 1987 and 2006 was 30.24% and 30.14%, respectively.

Table 1 presented the lifetime healthcare service use among the elderly with disabilities in 1987 and 2006. The utilization rate of auxiliary aids increased significantly from 4.96% in 1987 to 9.07% in 2006 (p_{trend}<0.001). The stratified analyses showed that the growth of auxiliary aids use was significant in the sub-population by age, sex, and residence (all p_{trend}<0.001). In addition, the utilization rate of auxiliary aids in 1987 was lower in older elderly aged 80 years old and above (3.57%), female elderly (4.00%), and rural elderly (4.96%); however, the difference between age group was not found in 2006 (all p_{trend}>0.05).

As shown in Table 2, the utilization rate of healthcare services during the last 12 months in elderly with disabilities increased significantly from 18.6% in 2007 to 56.9% in 2014 (p_{trend}<0.001), with a significant AAPC of 17.7% (95% CI: 9.3%–26.8%). The growth was also found in the sub-population by age, sex, and residence (all p_{trend}<0.001). A joinpoint was found in 2012 in the stratified analyses by sex and residence, i.e. the APC increased significantly during

TABLE 1. The lifetime healthcare service use of elderly with disabilities in China, 1987–2006.

Group	Elderly with disabilities (n)		Lifetime healthcare service use				
			Auxiliary aids (n, %)			Rehabilitation therapy (n, %)	Any healthcare service (n, %)
	1987	2006	1987	2006	p_{trend}	2006	2006
Total	24,682	72,401	1,224 (4.96)	6,570 (9.07)	<0.001	27,254 (37.64)	28,300 (39.09)
Age (years)							
65–79	19,245	53,345	1,030 (5.35)	4,803 (9.00)	<0.001	20,583 (38.58)	21,297 (39.92)
≥80	5,437	19,056	194 (3.57)	1,767 (9.27)	<0.001	6,671 (35.01)	7,003 (36.75)
p			<0.001	0.267		<0.001	<0.001
Sex							
Male	10,617	33,548	662 (6.24)	3,313 (9.88)	<0.001	12,547 (37.40)	13,115 (39.09)
Female	14,065	38,853	562 (4.00)	3,257 (8.38)	<0.001	14,707 (37.85)	15,185 (39.08)
p			<0.001	<0.001		0.210	0.978
Residence							
Urban	7,053	21,828	543 (7.70)	3,255 (14.91)	<0.001	11,030 (50.53)	11,414 (52.29)
Rural	17,629	50,573	681 (4.96)	3,315 (6.55)	<0.001	16,224 (32.08)	16,886 (33.39)
p			<0.001	<0.001		<0.001	<0.001

Note: Participants were categorized by age (young elderly aged 65–79 years or super elderly aged 80 years and above), sex (male or female), and residence (rural areas or urban areas).

2007 to 2012 and maintained a relatively stable level after 2012 without significant APC (Supplementary Table S1, available in http://weekly.chinacdc.cn/). Higher AAPCs were found in elderly aged 65–79 years old (18.0), female elderly (19.2), and rural elderly (23.1) when compared with their counterparts but not significant (all $p>0.05$).

DISCUSSION

Based on two large, representative population-based cross-sectional surveys covering all provincial-level administrative divisions (PLADs) of China, we found the number of the elderly with disabilities was rising in China. Since there was no significant change in the age-standardized prevalence between 1987 and 2006, the increase of number of the elderly with disabilities may be mainly caused by population aging. According to the latest statistics, there were 166.58 million elderly aged 65 years old and above in China in 2018, accounting for 11.9% of the total population (*3*–*4*). Therefore, the size of elderly with disabilities increased along with the number of the total elderly. Currently, the living population in the world was an estimated 7.8 billion in 2020, among which 9.3% were elderly aged 65 years and above (*5*). Global ageing had a major influence on the trend of global disability prevalence, which increased from 10% in the 1970s to 15% in the 2010s and continued to rise (*6*). By the 31st World Population Day, we need to focus on the wellbeing and healthcare services for the 725.4 million elderly (*3*), especially the elderly with disabilities in the ageing world.

This study found increases in healthcare service use among the elderly with disabilities for the first time. This is an important supplement to our previous research that reported that the weighted prevalence rate of lifetime healthcare service use among persons with disabilities aged 60 years old or more in 2006 (*7*). The increases found in this study were also consistent with previous studies in younger population including children and adolescents (*8*). These findings indicated the major progress China had achieved in providing healthcare for the elderly with disabilities in recent decades, especially after the reform and opening up. This achievement can be attributed to multi-sectoral efforts including increased access to medical resources and the improvement of medical insurance coverage following more than ten years of medical reform in China.

Additionally, the gap between different sub-populations in healthcare service use is narrowing. Specifically, the shortcomings in auxiliary aids use among the older elderly in 1987 were not found in 2006, and the average annual rise was higher in rural areas compared with urban areas but the rise was not significant. However, a gap in health service use remained between urban and rural areas, which may be caused by the low level of access to health resources in

TABLE 2. The healthcare service use during the last 12 months of elderly with disabilities in China, 2007–2014.

Group	Total	Age (years)		Sex		Residence	
		65–79	≥80	Male	Female	Urban	Rural
2007							
EWD, n	9,871	7,191	2,680	4,543	5,328	2,685	7,186
HSU, n (%)	1,832 (18.6)	1,356 (18.9)	476 (17.8)	853 (18.8)	979 (18.4)	810 (30.2)	1,022 (14.2)
2008							
EWD, n	9,211	6,580	2,631	4,255	4,956	2,514	6,697
HSU, n (%)	2,095 (22.7)	1,495 (22.7)	600 (22.8)	963 (22.6)	1,132 (22.8)	926 (36.8)	1,169 (17.5)
2009							
EWD, n	15,515	10,829	4,686	7,193	8,322	3,957	11,558
HSU, n (%)	3,462 (22.3)	2,417 (22.3)	1,045 (22.3)	1,639 (22.8)	1,823 (21.9)	1,410 (35.6)	2,052 (17.8)
2010							
EWD, n	14,474	9,907	4,567	6,696	7,778	3,685	10,789
HSU, n (%)	5,382 (37.2)	3,673 (37.1)	1,709 (37.4)	2,483 (37.1)	2,899 (37.3)	1,775 (48.2)	3,607 (33.4)
2011							
EWD, n	12,869	8,541	4,328	5,979	6,890	3,225	9,644
HSU, n (%)	6,091 (47.3)	3,979 (46.6)	2,112 (48.8)	2,810 (47.0)	3,281 (47.6)	1,833 (56.8)	4,258 (44.2)
2012							
EWD, n	11,979	7,873	4,106	5,568	6,411	3,237	8,742
HSU, n (%)	6,685 (55.8)	4,381 (55.6)	2,304 (56.1)	3,104 (55.7)	3,581 (55.9)	2,057 (63.5)	4,628 (52.9)
2013							
EWD, n	11,261	7,191	4,070	5,215	6,046	2,991	8,270
HSU, n (%)	6,647 (59.0)	4,271 (59.4)	2,376 (58.4)	3,092 (59.3)	3,555 (58.8)	1,950 (65.2)	4,697 (56.8)
2014							
EWD, n	10,439	6,624	3,815	4,848	5,591	2,716	7,723
HSU, n (%)	5,935 (56.9)	3,727 (56.3)	2,208 (57.9)	2,745 (56.6)	3,190 (57.1)	1,738 (64)	4,197 (54.3)
p_{trend}	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Abbreviation: EWD=elderly with disabilities; HSU=healthcare service use.

rural areas as well as health behaviors differences (*9*). More effort and strategies should be taken to improve the health resources, staffing, and education in rural areas.

There were still unmet needs for elderly with disabilities in healthcare service use and the total utilization rate was still lower than some high-income countries according to previous studies (*10*). The implementation of rehabilitation-related policies at the grass-roots level should be strengthened, better rehabilitation programs specialized for the elderly should be designed in rehabilitation institutions, and more residential/community-care should also be carried out for elderly with disabilities to improve their utilization.

This study was subject to several limitations. First, the healthcare service use was self-reported by the participants, so the results may be underestimated because of possible recall bias. Second, underestimates may also be caused by cases lost to follow up each year. Third, the elderly living in institutions such as hospitals were not represented in this community-based survey. In addition, the surveys could not cover all types of healthcare services, and we did not calculate the utilization by different types of disability, which should be explored in future studies.

In conclusion, this study showed increases with high AAPC of nationwide healthcare service use among the elderly with disabilities in China. However, more sound policies and actions are needed to in the new era to further to further narrow the gap in the healthcare service use among elderly with disabilities between China and high-income countries.

Acknowledgements: We thank all the medical workers, investigators, and all relevant staff in the two CNSSDs and follow-up surveys.

Funding: This work was funded by National Social Science Foundation of China (No. 18CRK005).

Conflict of interests: The authors declare no competing interests.

doi: 10.46234/ccdcw2020.140

[#] Corresponding authors: Xiaoying Zheng, xzheng@pku.edu.cn; Linhong Wang, linhong@chinawch.org.cn.

[1] Institute of Population Research, Peking University, Beijing, China; [2] APEC Health Science Academy (HeSAY), Peking University, Beijing, China; [3] National Center for Chronic and Non-communicable Disease Control and Prevention, Chinese Center for Disease Control and Prevention, Beijing, China.

Submitted: June 19, 2020; Accepted: July 05, 2020

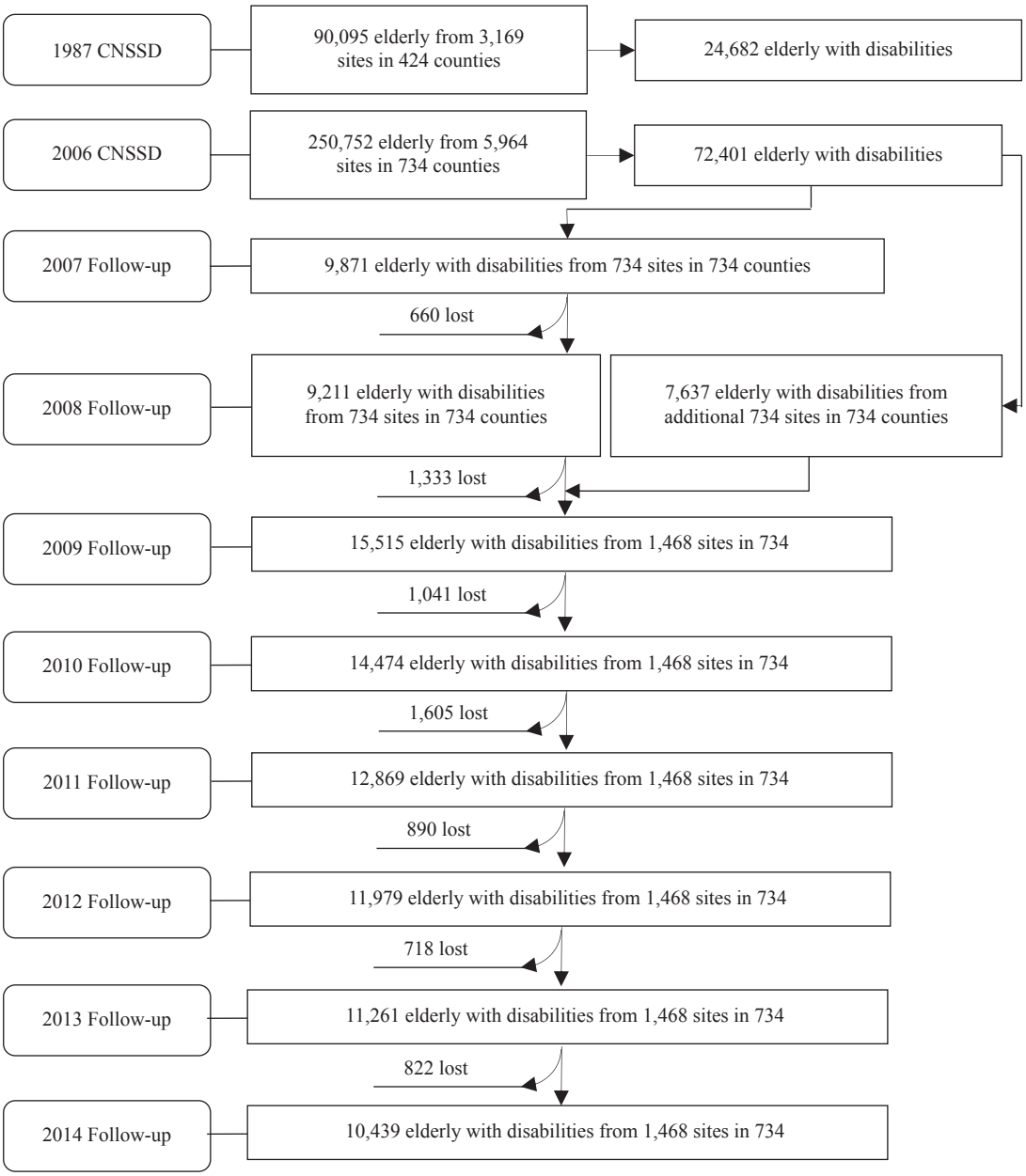
REFERENCES

1. Zheng XY, Chen G, Song XM, Liu JF, Yan LJ, Du W, et al. Twenty-year trends in the prevalence of disability in China. Bull World Health Organ 2011;89(11):788 – 97. http://dx.doi.org/10.2471/BLT.11.089730.
2. Guo C, Luo YN, Tang XX, Ding RX, Song XM, Zheng XY. Poverty and youth disability in China: results from a large, nationwide, population-based survey. PLoS One 2019;14(4):e0215851. http://dx.doi.org/10.1371/journal.pone.0215851.
3. National Bureau of Statistics of China. China statistical yearbook - 2019. Beijing: China Statistics Press. 2019. http://www.stats.gov.cn/tjsj/ndsj/2019/indexch.htm. (In Chinese). [2020-06-10].
4. Office of the Second China National Sample Survey on Disability. Documentation of the Second China National Sample Survey on Disability. Beijing (China): China Statistics Press. 2007. http://www.stats.gov.cn/tjzs/tjsj/tjcb/tjzl/200710/t20071015_44692.html. (In Chinese). [2020-06-10].
5. United Nations Department of Economic and Social Affairs Population Division. World population prospects 2019. https://population.un.org/wpp/. [2020-06-20].
6. WHO. World report on disability. Geneva (Switzerland): World Health Organization. 2001. https://www.who.int/publications/i/item/world-report-on-disability.[2020-06-10]
7. Guo C, Du W, Hu CH, Zheng XY. Prevalence and factors associated with healthcare service use among Chinese elderly with disabilities. J PublicHealth2016;38(3):e345 – 51.http://dx.doi.org/10.1093/pubmed/fdv120.
8. He P, Guo C, Luo YN, Wen X, Salas JMI, Chen G, et al. Trends in rehabilitation services use in Chinese children and adolescents with intellectual disabilities: 2007-2013. Arch Phys Med Rehabil 2017;98(12):2408 – 15. http://dx.doi.org/10.1016/j.apmr.2017.05.007.
9. Zhang B, Peng HH. Investigation on the current situation of medical treatment among the elderly in rural areas——a case study of Xin'an Town, Maoming City. Chin Prim Health Care 2019;33(1):1 – 4. http://dx.doi.org/10.3969/j.issn.1001-568X.2019.01.0001. (In Chinese).
10. Bień B, McKee KJ, Döhner H, Triantafillou J, Lamura G, Doroszkiewicz H, et al. Disabled older people's use of health and social care services and their unmet care needs in six European countries. Eur J Public Health 2013;23(6):1032 – 8. http://dx.doi.org/10.1093/eurpub/cks190.

Supplementary information of data

We obtained data from the first and second China National Sample Survey on Disability (CNSSD) in 1987 and 2006, respectively, as well as consecutive follow-up investigations once a year from 2007 to 2014.

The two CNSSDs were conducted to understand the prevalence, causes, and severity of various disabilities in the non-institutional population in the mainland of China. Nationally representative samples were derived by multistage, stratified random cluster sampling, with probability proportional to size. Finally, the survey in 1987 comprised a total of 3,169 sites from 424 counties; the survey in 2006 comprised 5,964 sites from 734 counties. The final sample sizes were 1,579,316 and 2,526,145 in the first and second CNSSDs, representing 1.5 and 1.9 per 1,000 Chinese non-institutionalized residents, respectively. For the purposes of our study, we considered only survey respondents ≥65 years-of-age, yielding a sample size of 90,095 cases in 1987 and 250,752 cases in 2006, respectively. There were 24,682 and 72,401 with disability among the elderly cases in 1987 and 2006, respectively.



SUPPLEMENTARY FIGURE S1. Flowchart of the derivation of study sample in China, 1987–2014.

SUPPLEMENTARY TABLE S1. The average annual percent change in utilization rate of healthcare service of elderly with disabilities in China, 2007–2014.

Group	APC				AAPC			
	Joinpoints	Segment	APC	95% CI	AAPC	95% CI	AAPC Diff.	95% CI
Total	0	2007−2014	17.7*	9.3–26.8	17.7*	9.3–26.8		
Age (years)							0.9	−9.1–11.0
65−79	0	2007−2014	18.0*	9.7–27.0	18.0*	9.7–27.0		
≥80	0	2007−2014	17.1*	8.3–26.6	17.1*	8.3–26.6		
Sex							−0.2	−14.7–14.3
Male	1	2007−2012	27.5*	12.0–45.2	19.0*	9.8–29.0		
		2012−2004	0.0	−27.6–38.2				
		p for segment	0.022					
Female	1	2007−2012	27.9*	10.4–48.1	19.2*	8.8–30.5		
		2012−2014	−0.1	−30.8–44.0				
		p for segment	0.032					
Residence							−11.3	−25.1–2.5
Urban	1	2007−2012	17.0*	7.5–27.3	11.8*	5.7–18.3		
		2012−2004	−0.1	−21.7–27.1				
		p for segment	0.025					
Rural	1	2007−2012	34.1*	13.5–58.4	23.1*	11.5–36.0		
		2012−2014	−0.5	−32.2–46.0				
		p for segment	0.023					

Abbreviation: APC=annual percent change; AAPC=average annual percent change; AAPC Diff.=average annual percent change difference between sub-population.
*p<0.05.

Follow-up surveys aimed to investigate the living conditions, environment, and healthcare of people with disabilities in a sub-sample of those with disability randomly selected from the second CNSSD. In 2007 and 2008, the follow-up samples included all diagnosed individuals with disability from 734 study sites which were randomly selected from the 734 counties in 2006, 1 site for each county. From 2009 to 2014, an additional site was added in each county, leading to a sample of 1,468 sites in 734 counties. The final size of elderly with disabilities that were followed up from 2007 to 2014 was 9,871, 9,211, 15,515, 14,474, 12,869, 11,979, 11,261, and 10,439, respectively.

The method of APC and AAPC calculation

Annual percent change (APC) and average annual percent change (AAPC) with 95% CIs were calculated by Joinpoint Regression models with Joinpoint software (*1*) among total elderly with disabilities and sub-population by age, sex, and residence (*2–3*).

Let u_i denote the utilization rate of healthcare service at time t_i. Assume that $\log(u_i)$ is nonlinear over the entire time interval [a, b] but follows the segmented linear regression model below:

$$\log(u_i) = \begin{cases} \beta_{1,0} + \beta_{1t_i} & if\ a \le t_i \le \tau_1 \\ \beta_{2,0} + \beta_{2t_i} & if\ \tau_1 \le t_i \le \tau_2 \\ \vdots & \\ \beta_{j+1,0} + \beta_{j+1t_i} & if\ \tau_j \le t_i \le b \end{cases} \quad (1)$$

Where j is the number of joinpoints and we have $j+1$ segments as well. The APC for the segment $(\tau_{k-1}, \tau_k]$ is defined as

$$APC = \{exp(\beta_k) - 1\} \times 100 \quad (2)$$

Denote $w_k = (\tau_k - \tau_{k-1}) / (b - a)$, $k=1, \ldots, j+1$, and the AAPC over the entire time interval [a, b] is defined as

$$AAPC = \left\{ exp\left(\sum_{k=1}^{j+1} w_k \beta_k \right) - 1 \right\} \times 100 \quad (3)$$

REFERENCES

1. National Cancer Institute. Joinpoint Trend Analysis Software. 2020. [2020-6-12]. https://surveillance.cancer.gov/joinpoint/.
2. Kim HJ, Luo J, Chen HS, Green D, Buckman D, Byrne J, et al. Improved confidence interval for average annual percent change in trend analysis. Stat Med. 2017;36:3059-74. https://onlinelibrary.wiley.com/doi/epdf/10.1002/sim.7344.
3. Clegg LX, Hankey BF, Tiwari R, Feuer EJ, Edwards BK. Estimating average annual per cent change in trend analysis. Stat Med. 2009;28:3670-82. https://onlinelibrary.wiley.com/doi/abs/10.1002/sim.3733.