

# Community Hemodialysis in China: Opportunities and Challenges

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## INTRODUCTION

At present in China, hospital-based dialysis facilities are fully occupied, while the number of community hemodialysis (HD) centers is growing. In December 2016, the National Health and Family Planning Commission of China (NHFPC) set up “the regulations for the basic standard and the management of hemodialysis center,”<sup>[1]</sup> which are the unified principles of the nation, as the mark of the policy released for independent HD centers. This benefits the standardization of the development of independent HD centers and the safety of patients. In the meanwhile, it makes a standard, transparent, and fair market for building independent HD centers under the capital operation, which can benefit for the development of community HD in China. In this review, we describe the trend of dialysis worldwide, followed by the current picture of disease burden caused by end-stage renal diseases (ESRDs) in China, as well as the opportunities and challenges for the development of community HD.

## DIALYSIS WORLDWIDE

### Epidemiology of chronic kidney disease and end-stage renal disease

Chronic kidney disease (CKD) has become a major public health concern worldwide.<sup>[2]</sup> Especially for CKD patients who have progressed into ESRD, the risk of all-cause mortality and cardiovascular events significantly increased when compared with individuals with normal kidney function.<sup>[3-6]</sup>

Patients with ESRD require renal replacement therapy (RRT), including HD, peritoneal dialysis (PD), or kidney

transplantation. Now, the number of patients with ESRD is increasing. According to the USRDS annual report<sup>[7]</sup> of 2014, the highest prevalence of treated ESRD patients in 2014 was reported in Taiwan (China), Japan, and the USA, reaching to 3219, 2505, and 2076 per million population (PMP), respectively. Moreover, ESRD consumes significant medical resources. For example, in the USA, 7.23% of medicare expenditure was spent on ESRD patients, with a prevalence of 0.68% in the USA population.<sup>[7]</sup>

### Dialysis modalities

In the majority of countries, HD is utilized for more than 80% of dialysis patients. In the USA, HD was used in 90.1% of dialysis patients (including 88.0% in-center HD and 1.8% home HD). The incidence of HD in 2014 in the USA is 10.6 PMP/year, in which diabetes patients accounted for 44%.

In 2014, countries/regions with PD in a large percentage were Hong Kong (China) (72%), the Jalisco region of Mexico (47%), New Zealand (31%), Thailand (30%), and Colombia (29%). Among children younger than 9 years, and whose weights are <20 kg, the most common initial ESRD modality is PD.

Home dialysis in incident dialysis patients has increased significantly in the recent years, mainly including PD, standard home HD, nocturnal home HD, daily home HD, and nocturnal in-center HD.

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In the USA, cost on a patient basis in 2014 was \$87,638/year in HD patients, higher than PD patients (\$73,612/year).

### Home hemodialysis worldwide

Patients with home HD have more independence and higher quality of life. In 2014, percentage of home HD therapy in dialysis patients was 18.3% in New Zealand, 9.4% in Australia, and 3.0–6.0% of dialysis patients in Canada, Denmark, Finland, the Netherlands, Sweden, the United Kingdom, and Scotland. In other countries, home HD was either not applied or was applied no more than 3% of dialysis patients. Home HD accounts for only 2% in the USA and almost 1% in Hong Kong (China). Due to not being covered by insurance and the limitation of remote monitoring, home HD is not applied yet in the mainland of China.

### Community dialysis center

In the USA, there are only 4% of patients in hospital-based dialysis centers, which are mainly in charge of short-period dialysis in emergency, critical, and hospitalized patients. Nonhospital-based dialysis centers in community are not far away from the residence place of most ESRD patients, which are very convenient for the life and work of dialysis patients and are beneficial for patients to return to society and family. On the contrary, hospital-based dialysis centers treated more proportion of PD patients than national average. In the view of management model, community dialysis centers are set up by investors. Medical practitioners are in charge of the management of patients. Medical management companies are responsible for the quality of dialysis centers. Linked-dialysis centers benefit from the integrated industry chains.

At the end of 2014 in the USA, 6757 dialysis units take care of 460,675 dialysis patients. Fresenius and DaVita, the two largest dialysis organizations, are in charge of 69% of patients in 65% units, who are still keeping the largest growth. Dialysis Clinic Inc. (DCI), hospital-based, independent, and all other providers are in charge of 3%, 4%, 12%, and 12% of patients, respectively. Every year, the USRDS will release the quality evaluation of these dialysis providers. For example, the standard mortality rates for Fresenius, DaVita, DCI, hospital-based, independent, and all other providers are 1.02, 0.98, 0.92, 0.94, 1.03, and 1.02, respectively. The standard hospitalization rates are 1.03, 0.96, 0.93, 0.93, 0.99, and 1.01, respectively. The percentage of arteriovenous fistula is the highest in Fresenius and DaVita (62%), while the percentage of catheter is highest in hospital-based dialysis centers (38%). In addition to nursing dialysis centers, from October 2014, the USRDS had set up the star ratings for all dialysis centers to provide patients with official sources for information on the quality of health-care providers.

## DIALYSIS IN CHINA

### Disease burden of end-stage renal disease

According to the national survey in 2010, the prevalence of CKD in China was 10.8%.<sup>[8]</sup> The number will be still rising driven by the increased prevalence of aging, diabetes,

hypertension, and obesity in China, leading to a high incidence of ESRD. According to the China National Hemodialysis and Peritoneal Dialysis Registry, there were 243,863 and 37,942 patients receiving HD and PD, respectively, in 2012. It is believed that the figure largely underestimates the actual prevalence of ESRD patients in China (anticipated ESRD patients as 20,000,000). In fact, a study showed that the dialysis rate in China in 2010 was only 15%, which was far lower than 75%, the rate in Europe and the USA.<sup>[8]</sup>

Besides, the treatment for ESRD patients in China is also resource consuming. The cost for a patient receiving HD was about \$16,625/year, much higher than per capita income in China.<sup>[9]</sup> Along with the broadening of coverage and decrease in the self-pay percentage by medical insurance in China, the number of patients receiving RRT has been rising rapidly in the recent years. For example, the prevalence of maintenance HD substantially increased from 33.2 PMP in 1999 to 237.3 PMP in 2010.<sup>[10]</sup>

### Hemodialysis in China

The most recent registry data<sup>[11]</sup> showed that, in 2015, there were 61,790 incident HD patients, with the leading underlying causes for kidney failure as glomerular nephritis (45.8%), diabetes (21.2%), and hypertension (9.0%). In 2015, 13,839 HD patients died. Until December 2015, there were 385,055 prevalence HD patients, accounting for 86% of dialysis patients. As there is an increase of patients with old age, hypertension, and diabetes, more widely covering of social medical insurance, it is estimated that the number of HD patients will continuously increase. At present, hospital-based HD centers are full occupied with patients in China. The possible solution may include encouraging PD, home HD, and community HD.

### Peritoneal dialysis in China

PD is the main form of home dialysis in the USA and China.<sup>[7,11]</sup> Until December 2015, there were 62,589 prevalence PD patients, accounting only for 14% of dialysis patients according to the registry data in China. The main difficulties in promoting PD in China are listed as follows:

1. Peritonitis in PD patients due to less favorable surrounding environment, unhealthy personal health habits, and nonstandard operation from patients.
2. Policy bottleneck and technique bottleneck in the development of PD.
3. Compared with HD as therapy cost, fluid for PD is managed as drug cost, which is regulated lower than 45% (drug/total) in Chinese hospitals now. New policy of fluid as consumer for PD is not applied by local hospitals properly.
4. A new policy of zero benefit from drug selling in public hospitals has been taken into effect in China. Costs of consumables will also be decreased. Hospitals will have fewer stimuli to apply PD because of little benefits.

### Current community dialysis centers in China

In China, independent dialysis centers, set up by companies, began as the local linked dialysis centers. Then some

centers, like Weigao and Bethune foundation blood dialysis centers, were transformed into experimental dialysis centers under the permission of the government. And at last, experimental independent dialysis centers have been set up in Hebei, Shandong, Beijing, Chongqing, Guangdong, Jiangxi Provinces, etc., which made a new beginning for community dialysis centers in China. Now, there are more than 100 independent dialysis centers. In Beijing, almost 25% of HD patients were treated in community dialysis centers. From the data of 57 experimental independent dialysis centers (100% private owned) in five provinces, including Shandong, Hebei, Jiangxi, etc., the average costs for 247,000 dialysis sections at the end of May 2016 reduced by 17.3%.<sup>[12]</sup>

## OPPORTUNITIES AND CHALLENGES FACED BY CHINA TO ALLOCATE DIALYSIS RESOURCES

### Encouragement by policy for community dialysis

Good news for community dialysis came in China in the recent years. In 2012, dialysis has been covered by social insurance not only for patients in town, but also for rural population through Rural Residence Critical Illness Insurance Program. And in some cities, like Chengdu, patients who are under dialysis only pay for ¥1200 RMB/year by themselves if the level of dialysis center is not Grade A hospital. It is anticipated that the growth of increasing number of dialysis patients will continue.

“Key Tasks for Deepening the Reform of Health System in 2014”<sup>[13]</sup> just activated social capital to invest in medical institutions like HD centers. In 2014, the NHFPC issued “Exposure Draft Regarding the Independence of the Management Regulations and Basic Standards of Hemodialysis Center.” In December 2016, it was officially released,<sup>[1]</sup> which sets up the national standard for independent dialysis centers and opens the industry access.

Most recently, the Central Committee of the Communist Party of China and the State Council released blueprint guide of “Healthy China 2030,” in which they encourage the development of new types of health service sectors, including HD centers.

In the view of size for independent dialysis centers, the basic requirement is to possess at least ten dialysis machines, which indicates miniaturization and community oriented. It is anticipated that ESRD patients can regularly receive therapy in community dialysis centers in the upcoming 3–5 years in China. Generally, community dialysis centers are set up within 3–5 km as radius, for the convenience of life and work for dialysis patients and helping patients to return to society and family. The location and the number of profit or nonprofit dialysis centers may depend on the regulations. On the contrary, linked for-profit large dialysis centers will not only manage on a large scale in numbers, but also through standard management and service concept, modernized information technique, intelligent management information system to realize collectivization development,

and networked control in linked dialysis centers in various regions, resulting in the reduction of cost, increase in efficiency, and the realization of economies of scale.

In the meanwhile, there should be a general hospital (Grade B level and above) within 10 km, for the purpose of consultation for acute complications for dialysis patients. In addition, there should be a Grade A general hospital in the same area with a consultative for chronic complications and two-way referral. These linked hospitals will benefit for the control of risk factors of death of patients with maintenance HD.<sup>[14,15]</sup>

## Preconditions for community dialysis in China

### Space cost

Community dialysis centers could be newly financially contributed by companies, or built in original hospitals, or rebuilt from the original dialysis centers.

### Dialysis devices and consumables

At present, the prices of dialysis devices and consumers are decreasing gradually in China. Moreover, some companies have started selling dialysis consumables and drugs to centers in the manner of postpay, with dialysis machine for free use. Needles, tubing, dialysate, and other low-technology content products are now produced domestically. Domestically produced dialyzers are used in more centers. It is anticipated that costs on dialysis devices and consumables will further decrease.

### Laboratory examinations

For independent dialysis centers, laboratory examinations could be done either by themselves or by other consultative centers. This will further reduce the cost for companies that newly enter the field of HD.<sup>[16]</sup> An independent laboratory examination center is beginning to set up in China national wide, according to the new policy released by the NHFPC.<sup>[17]</sup>

### Personnel cost

At present, specialist training projects on dialysis doctors and nurses have been launched almost in every province. Senior practitioners can have multi-sited license and can work in independent dialysis centers as part-time work. Under the government supervision, conjoined medical collaborators led by Grade A hospitals provide quality guidance for independent dialysis centers.

Linked CKD and dialysis centers built by doctor groups, such as Care-Renal, include self-acquisition and cooperation on joint shareholding. Doctor groups also invest on new techniques in renal diseases and dialysis. Doctor groups might be a beneficial supplement for community dialysis managers.

## SUMMARY

Now, it is time for setting up community dialysis centers widely in China. Experimental independent dialysis centers are running smoothly. Conjoined medical collaborators and supervision from the government provide quality guidance for independent dialysis centers. Collectivization development and networked control in independent dialysis

centers will bring benefit for dialysis patients, with the advantages of full use of community medical sources, reduced cost on dialysis, and unified control quality.

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