

# Has the New Rural Cooperative Medical System Improved the Health of Rural Residents?

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## Abstract

**In recent years, the enthusiasm of farmers to participate in the new rural cooperative medical system has been increasing. However, there are great differences between scholars on the improvement effect of the new rural cooperative medical system on farmers' health. This paper reexamines the performance of the new rural cooperative medical system using the Chinese Longitudinal Healthy Longevity Survey (CLHLS) data in 2005 and 2008. The results show that the new rural cooperative medical system has a positive impact on the improvement of farmers' health, and at the same time, it also has a specific role in improving farmers' mental health.**

## Keywords

**New rural cooperative medical system; Physical health; Mental health.**

## 1. INTRODUCTION

NCMS, short for New rural cooperative medical system, is a medical mutual aid system for rural residents, led and organized by the government, and funded through individual contributions, collective support and government subsidies. With the goal of improving the overall quality of medical services in rural areas, enhancing the accessibility of medical services for rural residents and improving the health level of rural residents, NCMS has received a positive response from farmers since its launch in 2003, with the participation rate rising from 75.2% in 2004 to 98.9% in 2014, and its mass base has been expanding. The funding rate also started from 30 yuan per capita at the beginning of the pilot project and reached the current 100 yuan per capita. NCMS has made remarkable achievements in ensuring farmers' access to basic health rights, alleviating farmers' poverty due to illness and returning to poverty due to illness. It is highly recognized and widely supported by domestic farmers, and has become an important hand for the government to improve people's livelihood and a key indicator for official performance assessment. Expanding medical insurance coverage and continuously increasing funding to improve residents' overall health condition has been the focus of China's medical insurance system reform in recent years. NCMS has become a dominant system of medical security in rural areas of China. However, the expansion of the coverage of the NCMS and the improvement of financing standards do not necessarily mean that the health level of rural residents has been improved. In the process of implementation, due to various factors, it

remains to be empirically studied how effective the implementation of the new rural cooperative is.

Since the NCMS was put forward in 2002, it has attracted much attention from the academic community. In just over a decade, domestic scholars have conducted fruitful research on the impact of the NCMS on farmers' health. The following will discuss the system design, implementation effect and existing problems of the NCMS. First, it is about the design of the NCMS. Some scholars have studied the value orientation of the NCMS from the macro level. For example, Yuan Hui (2010) and Li Hua (2011) respectively believed that the value orientation of the design of the NCMS should be the pursuit of fair services and "focusing on overall planning for serious diseases". Some scholars are concerned about the limited funding of NCMS and propose system improvements for NCMS financing [1][2], such as Xiang Chunling (2006) and Yang Hongyan (2010), who propose to introduce public welfare organizations and commercial insurance into the framework of NCMS to optimize the investment portfolio [3][4]. At the same time, Dai Zhiming (2007) believed that the promotion of the NCMS could be effectively promoted by implementing the cumulative payment system linked to the farmers' cumulative insurance years. Others put forward corresponding promotion models and management systems from the perspective of regional economic level and urban-rural differences [5]. For example, Jiao Keyuan and Li Kui (2010) think that less developed regions are more suitable for promoting the "overall planning of hospitalization +large outpatient compensation" model [6]. In contrast, Jiang Cuizhen and Wu Wenwen (2013) believed that the NCMS cost control system should implement differentiated management, county level medical care should pay attention to cost control, and township medical care should highlight service level and medical quality [7]. At present, there is a large amount of literature at home and abroad concerning the evaluation of the implementation effect of the NCMS in China, for example, Zhai Jingfeng (2005)[8], Yu Xiaoyuan (2007)[9], Wang Minghui et al. (2008)[10], and Guo Chunyan et al. (2009)[11] have described and analyzed the operation of the NCMS system in Henan Province, Shanxi Province, Hebei Province, and Ningbo City, Zhejiang Province, respectively, to explore the effectiveness of the system and its problems. Taking the peasant households in Linyi City, Shandong Province as an example, through the analysis of the population ratio and gap rate of the construction of catastrophic medical expenditure (CMP), it is concluded that the NCMS has reduced the proportion of the population with catastrophic medical expenditure, but has not reduced its severity. By analyzing the ratio of poverty due to illness among poor households in five pilot counties (cities) of Zhejiang Province in 2005, it was concluded that the NCMS was generally operating well and had alleviated the phenomenon of poverty due to illness to a certain extent, etc. In general, most of these studies focused on qualitative descriptions or general statistical analyses.

Meanwhile, in recent years, some studies have also assessed the effects of NCMS implementation by constructing models and measurement methods. A typical example is that, taking 10 counties that have implemented the NCMS in the 2003 national health service survey and 5 other counties that have not as samples, through the combination of double difference method and tendency score matching method (PSM), it is believed that the NCMS has improved the utilization rate of inpatient and outpatient services in general, and the utilization rate of medical services of wealthy families has increased faster. Some scholars also used the data from the China Health and Nutrition Survey (CHNS), and used three methods: ordinary least squares, probit model, and instrumental variable method, founding that the NCMS significantly increased the use of health services by the insured, but did not increase the use of formal medical services, and the health status of the insured did not improve significantly.

To this end, this paper attempts to revisit the performance of NCMS. The health performance is defined as the role of the NCMS in improving the health level of the participants. The remaining sections of this paper are organized as follows: the second section briefly describes

the data sources and descriptive statistics of this paper; the third section describes the model setting and empirical analysis of this paper; the fourth section presents the estimation results and discussion; and finally, it is brief conclusions and policy recommendations.

## 2. DATA SOURCES AND DESCRIPTIVE STATISTICS

### 2.1. Data Introduction

This article uses the most recent data from the Chinese Longitudinal Healthy Longevity Survey (CLHLS). It covers a wide range of information on respondents' demographic characteristics, cognitive abilities, and lifestyles. We construct a balanced panel data using a sample of rural elderly who survived both surveys in 2005 and 2008. In order to separate the effect of the NCMS from that of other types of medical insurance, we further define the participant group as individuals who "did not have any insurance in 2005, but only joined the 'cooperative medical system' medical insurance from 2005 to 2008"; while the control group is an individual who has no medical insurance from 2005 to 2008. Therefore, the sample did not include individuals who joined the NCMS before 2005 and those who joined other medical insurance. After the above limitation, our analysis objects include 3361 elderly respondents, including 2197 in the experimental group and 1164 in the control group.

The main explanatory variable in this paper is "whether or not to join the NCMS", and "join" is assigned a value of 1, otherwise 0. The explanatory variables are indicators of health status, including:

(1) ADL impairment (ability of daily life), which is a measure of the elderly's ability to care for themselves in daily life, including six abilities such as bathing, eating, dressing, going to the toilet, controlling urination and defecation, and indoor mobility. This is an inverse indicator. An elderly person who can perform these six activities by himself/herself is defined as "ADL intact" (ADL=0); an elderly person who has to rely on others for at least one activity is defined as "ADL impaired" (ADL=1).

(2) Self-rated health, which is based on the answer to the questionnaire "How do you feel about your own health now? We combined "very good" and "good" into "good self-rated health" (assigned a value of 1), "fair", "bad" and "very bad" into "poor self-rated health" (assigned a value of 0). "bad" and "very bad" were grouped together as "poor self-rated health" (assigned as 0), and "unable to answer" is regarded as a missing value.

(3) Cognitive function (mini-mental state examination, MMSE), which was constructed on the basis of the internationally used mini-mental state examination (MMSE), with appropriate modifications to the scale according to Chinese cultural traditions. The MMSE is scored on a scale of 0-30.

(4) The number of serious illnesses in the past two years.

(5) Number of days in bed due to illness in the past two years.

(6) Number of illnesses at the time of interview, etc.

### 2.2. Descriptive Statistics

Table 1 shows the descriptive statistics of the participant group and the control group. The first two columns and the last two columns respectively describe the characteristics of the participating group compared with the control group before and after joining the NCMS in 2005 and 2008. It can be seen that there was no significant difference between the participant group and the control group in terms of health and medical service utilization before joining the NCMS in 2005. In contrast, in 2008, after joining the NCMS, although the health of the elderly in the two groups tended to deteriorate with age, the participating group showed obvious advantages in some variables. Compared to the control group, the participant group had a significantly

lower proportion of impaired ADLs (values of 0.18 and 0.14 for both groups, respectively, p-value < 0.01), enhanced cognitive function (20.71 and 22.23, respectively, p-value < 0.01), and fewer days in bed due to illness in the last two years (11.67 and 7.09, respectively, p-value < 0.05). The p values here are obtained by t test for two differences between the individual variables for the given years.

**Table 1.** Descriptive statistics

Variables	2005		2008	
	Participant group	Control group	Participant group	Control group
ADL impairment (No=0)	0.11	0.11	0.14***	0.18
Self-rated health (bad=0)	0.52	0.51	0.43	0.46
Cognitive function	23.91	23.48	22.23***	20.71
The number of serious illnesses in the past two years	0.21	0.24	0.32	0.32
Number of days in bed due to illness in the past two years	8.76	8.13	7.09**	11.67
Number of illnesses at the time of interview	0.99	1.04	1.00	8.06

Among them, \*\*\*, \*\* and \* represent significant levels of 1%, 5% and 10% respectively

### 3. MODEL SETTINGS

In order to effectively estimate the impact of the NCMS on farmers' health, we must take into account the problem of adverse selection. Since whether or not to join the NCMS is a result of farmers' voluntary choice, farmers with poor health are more inclined to participate in the NCMS because they expect their future medical expenditure to be large, which may underestimate the impact of the new rural cooperative medical system on farmers' health. Therefore, we used a fixed effect model.

Fixed effect model:

Some missing variables, such as the unobservable heterogeneity of individuals, families and regions, will affect the participation willingness of participants and the explained variables that we pay attention to, leading to estimation errors; the fixed effect model can control the problem of missing variables that do not change with time to a certain extent. We set the fixed effect model as:

$$y_{ist} = \alpha_0 + \alpha_1 NCMS_{ist} + X_{ist} \beta + \delta_s + \lambda_t + c_i + \varepsilon_{ist}$$

Among them,  $y_{ist}$  is the explanatory variable of individual  $i$  at time point  $t$  in province  $s$ , which represents the health status of the participant.  $NCMS_{ist}$  represents the binary variable of "whether or not to join" the NCMS of individual  $i$  at time point  $t$  in province  $s$ . If it is added, it is taken as 1, and if it is not, it is taken as 0.  $X_{ist}$  are other control variables, including visible characteristics such as gender, age, occupation, education, marriage, log income, number of surviving children, and adequacy of living resources.  $\delta_s$  is a province fixed effect,  $\lambda_t$  is a dummy variable for the survey year,  $c_i$  is an unobservable individual fixed effect, and the nuisance term  $\varepsilon_{ist}$  contains other unobservable factors that change with "individual", "province", and "time" all change. Clearly, province- and individual-level heterogeneity  $\delta_s$  and  $c_i$  can be removed by the fixed effect model.

## 4. ESTIMATION RESULTS AND DISCUSSION

### 4.1. Estimated Results

Table 2 shows the estimated results of the impact of the NCMS on farmers' health. The estimation results of the least squares and fixed effects models are given in column 23, respectively, and these two results are broadly consistent in their conclusions, although they differ slightly in value. As seen in Table 2, in terms of health performance, the NCMS significantly reduced the probability of impaired ADLs among the participants. Compared to the control group, the FE of ADL impairment among enrollees decreased by 5.6% and was significant at the 1% level. There was also some improvement in cognitive function (MMSE) in the participants, with scores 0.69-1.04 points higher than in the non-participants. Considering that the mean MMSE of the control group in 2008 was 20.71, the improvement of cognitive function brought about by this was roughly 3.3% - 4.8%; in contrast, the number of days spent in bed due to illness was reduced by 5-7 days for the participants. Both of these indicators were significant at the 5% level. Therefore, the impact of the NCMS on the health of the participants is very significant. Interestingly, the self-rated health of the participants did not improve significantly, and the sign of the FE estimate was opposite to that expected and not significant. This indicates that the subjective indicator of "self-rated health" is closely related to the objective health status of individuals, but there are still differences. For example, the promotion of the NCMS and the increase in routine medical checkups may have led farmers to detect some previously unknown conditions, which in turn may have reduced their self-rated health.

Among the elderly in rural China, NCMS can significantly improve the health status of the participants, enable farmers to obtain the right to medical treatment and the ability to resist major disease risks, and maintain and improve the health level of the participating farmers.

**Table 2.** Regression results

	OLS	FE
ADL impairment (No=0)	-0.054***	-0.056***
Self-rated health (bad=0)	-0.039*	-0.031
Cognitive function	1.067***	1.043**
The number of serious illnesses in the past two years	-0.008	0.011
Number of days in bed due to illness in the past two years	-5.119*	-7.227**
Number of illnesses at the time of interview	0.206	0.281**

Among them, \*\*\*, \*\* and \* represent significant levels of 1%, 5% and 10% respectively

### 4.2. Discussion and Possible Explanation

The impact of the NCMS on farmers' health is not only limited to physiological aspects, but also may have a certain impact on farmers' mental health. According to Maslow's Hierarchy of Needs theory, after human beings have satisfied their physiological needs from substances necessary for survival such as water and food, they gradually move from lower to higher levels to pursue security needs for personal safety, life stability and protection from pain and disease, and social needs for emotional care and pursuit of life values. On this basis, human beings pursue higher levels of respect needs such as reputation, status and personal achievements, and finally reach the stage where creativity and potential can be fully exerted to meet their self-realization needs. According to its theory, human needs ascend step by step from low to high, and only when the lower level needs are satisfied, the higher level needs can play a motivating

role. After the rural residents get sick, their psychology becomes vulnerable and they are prone to pessimism, coupled with the fear of "poverty due to illness" and "poverty due to illness", patients with major illnesses and serious illnesses usually choose to give up medical treatment or do not receive necessary medical care for fear of dragging down their families, and then develop the idea that they have no value and meaning in life, or even think of living lightly, not to mention their social needs. The NCMS is designed to improve the health of individuals and the quality of life of residents, which can significantly reduce the cost of treating illnesses among farmers and effectively increase the level of personal welfare effects, thereby improving their physical health and sense of happiness.

Before the NCMS policy was introduced, the professional level of rural medical personnel was low, the cure time of rural residents was long, and they could not enjoy the reduction and subsidy of medical fees, which caused the overall high cost of visiting a doctor. At this time, only the basic physiological needs of farmers could be met. After the implementation of the NCMS Policy, the basic medical facilities in rural areas have been improved and the level of medical personnel has been raised, so the time cost of curing diseases has been reduced, and farmers can enjoy medical fee reductions and subsidies, which significantly reduces the cost of seeing a doctor. Therefore, the physical and psychological conditions of rural residents have been greatly improved. The substitution effect and income effect brought by NCMS policy of medical relief and subsidies have improved the physical health level of rural residents. At the same time, the income effect is greater than the substitution effect, which will improve the mental health of farmers.

According to the above theoretical analysis, the NCMS is indeed feasible for the improvement of physical and mental health of rural residents, but its specific mechanism of action deserves detailed analysis. Firstly, in terms of improving physical health and preventing diseases, the NCMS has improved the quality of rural medical services, reduced the cost of medical care for farmers, and ensured their physical health. There are two reasons: First, the measures such as the upgrading of rural medical infrastructure and professional skills training of medical personnel carried out by the NCMS have improved the quality of rural public health care and the cure rate of farmers' diseases. Second, NCMS has reduced the cost of disease treatment for farmers through the medical reimbursement system, improved the enthusiasm of the participants in disease diagnosis and treatment, and completely reversed the malpractice that "a minor illness is incurable, but a series one is difficult to cure". Second, in terms of improving psychological health, after joining the new rural cooperative, rural residents' concern about the lack of treatment for diseases has been reduced, and psychological depression has been effectively released. The reasons are as follows: First, NCMS has effectively improved the rural medical security environment, and farmers' trust and acceptance of public health care. Second, NCMS has significantly reduced the medical costs of major illnesses for participants and the risk of poverty for families due to illness, alleviating the economic pressure on individuals (families). Third, NCMS has changed the tradition of rural society to pay for its own medical expenses, greatly alleviating farmers' fear of returning to poverty due to illness.

In summary, NCMS improves rural basic medical conditions, reduces the time and money costs of disease treatment for enrollees, and increases motivation for disease treatment. Participants not only gain a healthy body, but also cultivate a positive mindset to face life. The improvement of physical and mental health effectively activates farmers' social attributes, enhances their interaction with the outside world, improves their social adaptability, and gives rise to a higher level of self-confidence in life, thus enabling individuals to form a positive interaction in the development of mental health, physical health and social adaptability, and significantly improving farmers' physical and mental health.

## 5. CONCLUSIONS AND POLICY RECOMMENDATIONS

Based on the above statistical results and model analysis this paper draws the following conclusions. First, NCMS promoted physical health improvement in rural residents. NCMS significantly reduced the probability of impaired ADLs and improved cognitive function (MMSE) among enrollees, while the number of days spent in bed due to illness, decreased by 5-7 days. All of the above shows that NCMS has improved farmers' health. Meanwhile NCMS is also improving farmers' mental health. According to Maslow's Hierarchy of Needs theory, only when people meet low-level needs can high-level needs play an incentive role. When people are sick, NCMS brings medical services, reimbursement rates and other welfare policies, which can reduce the burden of medical care to a certain extent, and avoid the phenomenon that people are afraid to seek medical treatment and become poor due to illness. At this time, people's psychological state can also be improved, and they can go to the highest level of needs with a certain guarantee of physical health. Moreover, NCMS has greatly improved the medical environment and medical facilities in rural areas, and the probability of people being cured after illness can also be greatly improved, which can also bring positive psychological hints to patients and full of hope for future life.

Based on the above conclusions, this paper draws the following policy recommendations: First, the reimbursement proportion adjustment mechanism should be sound. The focus of NCMS reform is to expand the coverage of diseases, moderately increase the reimbursement rate of chronic and major diseases, and reduce the medical burden of participants; simplifying NCMS reimbursement process and improving NCMS care for the elderly can make NCMS operation more efficient and convenient, and improve the efficiency and convenience of farmers' medical reimbursement. Second, support for vulnerable groups should be enhanced. The demand for medical resources of the elderly is generally more than that of the young people, and the income of the rural elderly depends partly on personal pension or personal labor remuneration for their livelihood, and part of their income depends on children and government subsidies for the elderly. Therefore, it is necessary to increase the proportion of medical compensation for the elderly and improve the utilization rate of medical services for the elderly: focus on disadvantaged groups such as families with heavy burden, participants with chronic diseases and low-income families, and develop practical medical support measures to improve the sense of access to new rural medical services for these groups. Third, the allocation of medical resources in urban and rural areas should be balanced. The financial support and policy preference for rural public health care should be increased, the supporting facilities for basic treatment equipment in rural medical institutions should be improved, and the professional skills and professional ethics of rural medical personnel should be trained to constantly improve their medical service awareness and quality. The positive impact of NCMS on the health of ordinary people is greater than that of young people and the elderly. Improving the health level of the elderly is conducive to reducing the burden on children, improving the life expectancy of our country, and improving the overall health level of the country. Therefore, it is necessary to increase attention to the health level of the elderly and improve their health level. For the elderly over 65 years old, the advance payment mechanism for medical expenses should be canceled, and the proportion calculated by the medical insurance system should be used to directly let the elderly pay the medical expenses after NCMS compensation, so as to reduce the burden of medical expenses for the elderly in rural areas, further improve the coverage of NCMS for the elderly in rural areas, guide the use of NCMS after the elderly get sick and seek medical treatment, and improve the utilization of medical resources for the elderly. Through the above measures, the satisfaction of the elderly to life can be improved, and the overall health level can be improved.

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