

## Comparative Analysis of Graded Diagnosis(2015-2017) in China

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**Abstract: Objective:** To compare the implementation of grading diagnosis in Chinese "Health Statistics 2016" and "Health Statistics 2018", in order to understand the implementation of the first stage of grading diagnosis, and provide scientific basis to improve the grading diagnosis in future. **Methods:** Adopt Descriptive analysis method, with 2015 as the base period and 2017 as the current period, and analyze the implementation of the graded diagnosis at this stage. **Results:** The number of primary health care institutions, beds, equipment and health personnel increased year by year, but the average annual growth rate was lower than that of hospitals, and the service capacity was much lower than that of hospitals. **Conclusion:** The overall strength of primary health care institutions is continuously enhanced, and the implementation of the graded diagnosis has certain achievement. However, the utilization efficiency and overall benefits of medical resources are still insufficient. The "soft power" should be enhanced and policy system of health institutions should be further improved.

### 1. Introduction

In 2014, the number of people who had medical treatment in China was 7.6 billion, and the number of discharged people more than 200 million. In tertiary hospitals, it increased from 13% (2009) to 18% (2014), but the number of treatment in primary health care institutions dropped from 62% to 57%, and the number of discharged patients dropped from 32% to 20%. The distribution of medical treatment and the allocation of medical resources were unreasonable. In 2015, the State Council issued the "Guidance on promoting the construction of graded diagnosis", and proposed two objectives. The first phase, that is, by 2017, the construction of Primary medical personnel has been strengthened, especially general practitioners. The utilization efficiency of medical resources and the overall benefits have been further improved, the proportion of diagnosis and treatment in primary health care institutions has increased significantly, and the order of medical treatment has become more reasonable. Graded diagnosis is an important goal of the medical system reform, which helps to standardize medical treatment order and effectively solve the problem of unreasonable allocation of medical resources and low patient satisfaction<sup>[1]</sup>. The purpose of this study is to compare the implementation of graded diagnosis in Chinese "Health Statistics 2016" and "Health Statistical 2018", to understand the implementation effect of the first stage, and to provide a scientific basis for further improving the graded diagnosis.

### 2. Data and Methods

#### 2.1. Data Source

The number of staff beds and patient in various medical and health institutions in "Chinese Health Statistics 2016" and "Chinese Health Statistical 2018", issued by the National Health Commission.

## 2.2. Research Methods

Used Excel software, enter the data related to the graded diagnosis in the two editions of the “Health Statistics”, and compared them in some aspects.

## 3. Analysis Results

### 3.1. Basic Situation Comparison

The total number of medical institutions has changed little from 2015 to 2017, and the number of primary health care institutions is close to saturation, with an average annual growth rate of 0.66%. As of 2017, it accounted for 94.56% of the medical institutions. Although the increase in the number of hospitals is greater than that of primary health care institutions, it is mainly manifested in primary and secondary hospitals, and the expansion of tertiary hospitals is not obvious. In 2017, the number of beds in medical institutions reached 7,840,300, with hospitals accounting for 77.08% and primary medical institutions accounting for 19.25%. Although they have increased in 2015, the average growth rate of hospital beds (7.15%) is greater than that of primary medical institutions (4%), and third-grade hospital has the largest increase, the first-level hospital has a negative growth. In terms of the medical devices, both hospitals and primary health care institutions have increased, with an average growth rate of around 11.5%. For only equipment of more than one million yuan, primary medical institutions have increased significantly. In terms of health personnel in primary health care institutions, there has been a decrease in rural doctors and health workers, and a large increase in registered nurses, technicians, and managers, with an average annual growth rate of more than 9%. Despite the health care ratio has increased slightly in 2015-2017, the health care ratio (1:0.6) in primary medical institutions is still much lower than 1:1.4 in hospital. The number of general practitioners has grown rapidly, with an average growth rate of 15.85%, particularly in hospital, with a growth rate of 42.55% in 2017. The number of general practitioners in primary medical institutions has grown steadily (13.5%), but it accounts for 77.1% of the total number of general practitioners.

Table 1 Basic situation comparison

| entry   | 2015    | 2016    | 2017    | Average growth rate |
|---|---------|---------|---------|---------------------|
| Number of various medical institutions  |         |         |         |                     |
| total   | 983528  | 983394  | 986649  | 0.16%               |
| hospital  | 27587   | 29140   | 31056   | 6.10%               |
| Primary medical institution   | 920770  | 926518  | 933024  | 0.66%               |
| Number of beds in various medical institutions (10000)                            |         |         |         |                     |
| total   | 701.52  | 741.05  | 794.03  | 6.39%               |
| hospital  | 533.06  | 568.89  | 612.05  | 7.15%               |
| Primary medical institution   | 141.38  | 144.19  | 152.85  | 4%                  |
| The number of Medical equipment(above 10,000 yuan) in hospitals                   | 4081774 | 4601414 | 5105212 | 11.84%              |
| The number of Medical equipment(above 10,000 yuan) in Primary medical institution | 579740  | 640344  | 719543  | 11.41%              |
| Number of hospital staff  |         |         |         |                     |
| total   | 6132793 | 6542137 | 6976524 | 6.66%               |
| Health technician   | 5071151 | 5415066 | 5784712 | 6.80%               |
| Number of Primary medical institution staff                                       |         |         |         |                     |
| total   | 3603162 | 3682561 | 3826234 | 3.05%               |
| Health technician   | 2257701 | 2354430 | 2505174 | 5.34%               |
| Number of general practitioners   |         |         |         |                     |
| total   | 188649  | 209083  | 252717  | 15.85%              |
| hospital  | 31382   | 34654   | 49400   | 26.49%              |
| Community Health Service Center (station)   | 73288   | 78337   | 83933   | 7.02%               |
| Township hospital   | 80975   | 92791   | 110900  | 17.05%              |

### 3.2. Service Utilization

From 2015 to 2017, the proportion of patient in the primary care clinics decreased gradually, which was 56.44%, 55.05%, and 54.12%, respectively. The number of patient in hospital increased year by year (40.08%, 41.22%, 42.02%),but the trend is not obvious. In 2016, the number of patient in hospital increased by 6.03%, compared with 5.18% in 2017. Although it was larger than 0.57% and 1.43% of primary health institutions, it showed a decreasing trend, while the growth rate of primary medical institutions showed an increasing trend. Among them, the growth rate of tertiary hospitals decreased from 8.69% to 6.06%, which is more obvious.In 2017, the growth rate of hospital inpatients decreased by 1 percentage point compared with 2017, the tertiary hospitals decreased by 3 percentage points, and the primary health institutions increased by 3 percentage points. Compared with 2015, the utilization rate of hospital beds increased slightly by 0.2% in 2017, among which the primary health institutions increased by 1.2%, and the first, second and third grade hospitals all had different degrees of decline, and First-class hospitals have the largest decline (1.3%).

Table 2 Service utilization

| entry   | 2015     | 2016     | 2017     | Average growth rate |
|---|----------|----------|----------|---------------------|
| Number of patient in various medical institutions (10,000 person-times) |          |          |          |                     |
| Total   | 769342.5 | 793170   | 818311   | 3.13%               |
| hospital  | 308364.1 | 326955.9 | 343892.1 | 5.60%               |
| Primary medical institution   | 434192.7 | 436663.3 | 442891.6 | 1%                  |
| Number of admissions in various medical institutions (10,000 )          |          |          |          |                     |
| Total   | 21053    | 22728    | 24436    | 7.74%               |
| hospital  | 16087    | 17528    | 18915    | 8.44%               |
| Primary medical institution   | 4036     | 4165     | 4450     | 5.02%               |
| Bed use rate  |          |          |          |                     |
| Total   | 79.5%    | 79.8%    | 79.70%   | 0.10%               |
| hospital  | 85.4%    | 85.3%    | 85%      | -0.20%              |
| Primary medical institution   | 59.1%    | 59.7%    | 60.30%   | 0.60%               |

### 3.3. Medical Income

The average annual growth rate of primary medical institutions' total income is 12.3%, which is higher than that of whole medical institutions (11.88%) and hospitals (11.93%). The annual growth rate of financial subsidy income and medical income is higher than that of whole medical institutions and hospitals. Moreover, from 2015 to 2017, the growth rate of primary medical institutions in terms of total income, financial subsidy income and medical income showed an increasing trend, and medical income increased most obviously. The growth rate of hospitals in these three areas showed a decreasing trend, and the growth rate gradually slowed down. However, from 2015 to 2017, the hospital's medical income in medical institutions accounted for 84.7%, 85%, and 84.8%, respectively. The primary medical institutions were 10.9%, 10.7%, and 10.9%. The hospital is the main source of total medical income.

Table 3 Medical income

| entry                                  | 2015      | 2016      | 2017      | Average growth rate |
|--|-----------|-----------|-----------|---------------------|
| Medical institution income(10,000yuan) |           |           |           |                     |
| Total revenue                          | 295378771 | 331661168 | 369753203 | 11.88%              |
| -Financial subsidy income              | 43213074  | 48485663  | 54322510  | 12.12%              |
| -Medical income                        | 241440339 | 270998597 | 301531640 | 11.75%              |
| Hospital income(10,000yuan)            |           |           |           |                     |
| Total revenue                          | 228788642 | 257843221 | 286598900 | 11.93%              |
| -Financial subsidy income              | 18776496  | 21384621  | 23695348  | 12.35%              |

|  |           |           |           |        |
|--|-----------|-----------|-----------|--------|
| -Medical income                                | 204503271 | 230236088 | 255700357 | 11.82% |
| Primary medical institution income(10,000yuan) |           |           |           |        |
| Total revenue                                  | 43488537  | 48293753  | 54839695  | 12.30% |
| -Financial subsidy income                      | 13973640  | 15768012  | 17844180  | 13%    |
| -Medical income                                | 26203614  | 28886213  | 32833233  | 11.95% |

## 4. Discussion

### 4.1. The Overall Strength of Primary Health Institutions Continues to Increase

By comparing the health statistics of 2015-2017, this study found that the overall allocation of resources in primary health care institutions presented a positive development trend<sup>[2]</sup>. The total number of institutions, beds, medical equipment, health technicians, occupational (assistant) physicians and registered nurses in primary health institutions showed an increasing trend. In addition, the number of patient, hospital discharges, and the use rate of hospital beds have also improved. A series of policies to promote graded diagnosis and strengthen the construction of primary health services have enhanced the overall strength of primary medical institutions, which is conducive to the formation of a good medical treatment pattern and the promotion of the graded diagnosis.

### 4.2. Improve the “Soft Power” of Primary Health Institutions

Although the service capacity of primary health institutions has improved, there is still a big gap with hospitals. Although the number of patient and hospital admissions in primary institutions has increased in 2015-2017, the average annual growth rate is smaller than that of hospitals, especially tertiary hospitals. The factors that patients choose a hospital are mainly related to the medical level, the severity of the illness, the size of the hospital, and medical equipment<sup>[3]</sup>. Primary medical institutions' service level is insufficient. Although the number of rural doctors and health workers has been reduced, and occupational (assistant) physicians and registered nurses have been added, their academic qualifications and professional titles is disadvantage. In 2017, 41.4% of the health technicians in the Community Health Service Center were college graduates, 25.3% were secondary school graduates, and undergraduate and above only accounted for 30.8%. The academic qualifications of township hospital and village clinics are even pessimistic, with only undergraduate and above accounting for 12.4% and 8.3% respectively. In terms of professional titles, the intermediate and above titles of community health service centers, township hospital and village clinics accounted for 28.9%, 15.3% and 0.6% respectively. Secondly, the basic drugs provided by primary health care institutions cannot meet the needs of primary health services, while the pharmaceutical income accounts for more than 50% of total medical income, which also leads to the loss of some patients. Human resources for health are the most basic and active elements of health resources and a decisive resource for improving the quality of health system services<sup>[4]</sup>. Therefore, improving the “soft power” of primary health institutions is fundamental to improving their service level. First of all, we should establish a scientific and reasonable compensation mechanism and performance appraisal system, and implement the “assessment by volume” method of primary medical institutions to assess the number of first-time patients in outpatient clinics and the quantity and quality of chronic disease management, and encourage patients at the grassroots level to treat patients<sup>[5]</sup>, and provide more opportunities for further training and training. Second, increase financial input, give appropriate policies to grassroots health personnel, and attract health professionals to flow to primary health institutions; improve the physician's Multi-point practice mechanism, promote the ability of competent physicians to go to grassroots medical and health institutions, expand the accessibility of quality medical service resources, enhance the service capacity of primary health care institutions, and strengthen the trust of patients in primary health care institutions; ensure that the applicable medicines in primary care institutions are adequately equipped and reliable<sup>[6]</sup>.

### 4.3. Improve the Top-level Design of the Policy System

By 2020, it is necessary to construct a graded diagnosis model of “first diagnosis at the primary

medical institution, two-way referral, division acute disease and chronic, and linkage between the up and down”. In addition to improving the medical level and service capacity of primary health institutions, it is also necessary to constraint expansion and other behaviors in large hospital. Defining the function positioning of its diagnosis and treatment services, promoting the formation of a reasonable medical service chain in the region, creating a standardized graded medical system, and providing appropriate graded medical services<sup>[7]</sup>. Second, establish an incentive compatibility mechanism to reduce the resistance of two-way referrals. Because primary care institutions absence of competitive advantage, patients are reluctant to turn to lower-level hospitals for treatment. The higher-level medical institutions are not willing to transfer patients when they can accommodate patients, resulting in a situation of “easy to upturn, difficult to turn down”. Therefore, by establishing an incentive compatibility mechanism, lower-level and higher-level medical institutions placed in the same interest relationship, and the establishment of grassroots villages and townships is incorporated into the county hospital for unified management, mobilizing the enthusiasm of grassroots medical personnel, and in addition, rewarding the hospitals under the transfer to make up for the reduction in income it brings<sup>[8]</sup>.

## 5. Conclusions

From 2015 to 2017, graded diagnosis has achieved certain results, but there is still a great resistance to achieving a reasonable medical order. Although the overall strength of primary health institutions has been continuously enhanced, the “soft power” is still weak. The overall strength of health technicians is low and service capacity is insufficient. In the absence of a competitive advantage in primary health institution, a situation of “easy to upturn and difficult to turn down” has been formed. Therefore, the “soft power” of primary health institutions should be improved, and the top-level design of the policy should be further improved to achieve reasonable medical order.

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