

Research Article

Building a Performance Management System for Hospitals Based on Diagnosis-Related Group (DRG) Payment

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With the deepening of the national medical and health system reform, various supporting reform measures are being promoted. The reform of medical insurance payment methods is an important part of the process, and payment through diagnosis-related groups (DRGs) will gradually become the main way for medical insurance to pay medical institutions. According to the analysis of the impact of DRG payment on hospital performance management, this research examines the construction and implementation of the internal performance management system (IPMS) based on DRG payment in hospitals. The IPMS based on DRG payment includes four elements: organizational management system, assessment system, communication and feedback system, and information support system. In addition, this study explores how IPMS can be implemented in hospitals, including the preparation before implementation, key points to be grasped during implementation, and considerations to be focused on.

1. Introduction

The payment system based on diagnosis-related groups (DRGs) is a popular tool for financing inpatient care. DRGs were born in the US in the late 1960s and have since been introduced in Europe, Australia, and some Asian countries, where they have been localized, resulting in several localized versions of DRGs [1–4]. This kind of system clusters similar patients based on the related data, and the hospital is responsible for paying a constant price for patients treated in the DRGs [5, 6]. The payment system based on DRGs separates the hospital's profits from its underlying cost base, thus moving a significant amount of financial risk from the system level to the hospital level; in other words, the hospitals have to deal with the uncertain financial results related to the provision of healthcare services [7].

Although there are many versions of DRGs, the principles are basically the same between different versions of DRGs and the differences are mainly in the details of case grouping and the coding system. Scholars in China have been interested in DRGs since the late 1980s, and the Beijing version of DRGs (BJ-DRGs), completed in 2008, was the first

complete localized version of DRGs in China. Jian et al. applied a total of 1.3 million inpatient records from 154 hospitals in Beijing in 2008 to explore the performance of DRG systems [8]. Qiao et al. analyzed the factors associated with the influence of DRG-based stroke patients on in-hospital costs in Jiaozuo, Henan province, and offered theoretical instructions for healthcare payment and healthcare resource allocation [9]. Wang et al. adopted multiple linear regression analysis to examine the correlation between the total medical costs of inpatients and the age, gender, length of stay, region, and economic level of the hospital, thus better researching DRG payment systems [10]. In recent years, China has continued to promote the implementation of DRG payment at the national level. In 2017, the government began to promote the piloting of DRG payment nationwide. In 2019, the National Health Insurance Administration (NHA) and others officially identified 30 cities as pilot cities for DRG payment and at the same time released the technical specifications for the national piloting of DRG payment and the grouping scheme; in 2020, NHA released the DRG payment piloting scheme (1.1). In 2020, NHA published the disease diagnosis-related grouping (CDS-DRG) subgrouping plan

(version 1.0), which provides for 376 DRGs. The CHS-DRG marked the completion of the top-level design of the national pilot of DRG payment in China and the beginning of the actual payment stage of DRG payment.

The differences in social and health systems in different countries have led to significant differences in the approaches to hospital performance management. The US has a highly market-based healthcare system with a complex and diverse structure, corresponding to a wide range of health insurance forms. Due to the constraints of the healthcare market and health insurance, hospital performance management is predominantly customer oriented. Also, the US healthcare system is considered to be the most expensive but least effective in the world compared to other countries and the main drivers of healthcare costs are institutionalized medical practices and reimbursement policies, technology-related costs, and consumer behavior [11]. The UK is a typical country with a National Health Service, with particular attention being paid to controlling provider-induced cost inflation. After all, healthcare and related policies are the government's duty in the UK [12]. As a result, performance evaluation of hospitals in the UK focuses on both quality and efficiency. Singapore has a typical dual health service system, meaning that both public and private providers play an important role. This has brought Singapore's healthcare system to the same level as other advanced countries [13]. Hospital performance is first and foremost concerned with how much patients benefit and is evaluated in terms of quality of service, consumption of care, the efficiency of service, and safety of care.

Various management tools and methods have been applied in the performance management of public hospitals, mainly including the balanced scorecard [14–16], key indicators [17, 18], management by objectives [19, 20], 360-degree appraisal [21], and the point counting method. However, they are often focused on the specific application of management methods, mainly on the assessment and evaluation of performance indicators. The results of these assessments are mainly used for the distribution of hospital bonuses, but no systematic research has been carried out on the internal performance management system of public hospitals, which has not played a significant role in promoting the overall development of hospitals. At the same time, as DRG payment is still in the process of being fully promoted in the country, research on the impact of DRG payment on the internal performance management system of public hospitals is not yet detailed and in depth.

2. Research Implications

The medical insurance DRG payment refers to the grouping of cases based on clinical diagnosis, treatment modalities, and individual characteristics of the cases. The medical insurance agency predetermines the payment criteria based on the case grouping, and the actual payment is settled according to the number of cases provided by the medical institution according to the criteria of the grouping. Commonly used indicators for evaluating the performance of healthcare services based on DRGs include three dimen-

sions: capacity, efficiency, and safety, of which three indicators, namely, the number of DRG groups, total weights, and hospital and department case mix index (CMI), can be used to evaluate the service capacity of healthcare institutions. The DRGs can be used to evaluate the efficiency of a health facility, and the safety of a health facility can be evaluated by the low-risk group mortality or low- and medium-risk group mortality. The ultimate goal of DRG payment is to achieve a win-win situation for health insurance, medical institutions, and patients, in which government health insurance funds are not overspent and are managed and operated more effectively; medical institutions are more rational in their treatment behavior, medical expenses are reasonably compensated, and medical technology is effectively improved; and patients are able to enjoy better medical services, further reducing the actual medical burden on patients, while the patient billing process will be more convenient and efficient.

DRGs have changed the patient payment model and will have a significant impact on the organization and management of hospital performance, the choice of evaluation indicators, costing methods, quality of care, communication and feedback, and the development of information technology. Hospitals must focus on improving their management and medical service capabilities, improving the quality of their medical services, further improving the level of hospital treatment and services, correcting irregular treatment behavior of medical staff, reducing unreasonable treatment and services, and improving their management and treatment service capabilities. As China's medical insurance system continues to be optimized and improved, medical insurance patients have become a major component of public hospital patients, so changes to the medical insurance payment method have also become an important factor affecting the internal operation and management of public hospitals. It is worthwhile to study how the internal performance management of hospitals can adapt to the impact of the health insurance payment reform on hospitals. This paper examines the construction and implementation of an internal performance management system in public hospitals in the context of DRG payment, with a view to improving the overall operational efficiency and management level of public hospitals, which has important theoretical and practical implications for internal hospital management.

3. Building the IPMS for Public Hospitals Based on DRG Payment

3.1. Overview of IPMS. IPMS is a set of concepts, principles, procedures, and methods to systematically manage the performance of a hospital at all levels in order to achieve its vision or mission, according to its stage of development, context, and environment, and guided by the overall strategic objectives of the hospital. As shown in Figure 1, IPMS can be divided into four components: organizational management, assessment, communication and feedback, and information support, while the process of performance management is a PDCA continuous improvement process

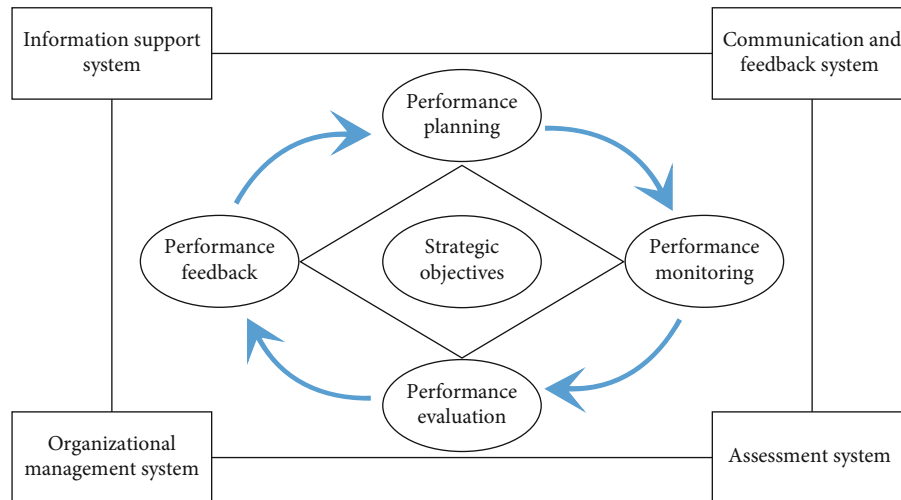


FIGURE 1: Framework of IPMS.

consisting of performance planning, performance monitoring, performance evaluation, and performance feedback.

3.2. Constructing the Organizational Management System. The multidisciplinary treatment model is a treatment model in which specialists from various fields in the hospital conduct a comprehensive consultation on a specific case, integrating their opinions and forming the best treatment plan. Performance management in hospitals is a systematic project that requires the participation of multiple departments throughout the hospital. As shown in Figure 2, this system consists of a performance management leadership team composed of personnel from various departments, including finance, personnel, medical, health insurance, information, medical records, and nursing, with a performance management office and, if required, an expert advisory group, which brings together the various management functions of the hospital and provides multidepartmental collaboration to solve problems in performance management.

3.3. Constructing the Assessment System

3.3.1. Workload Assessment. Departmental workload can be calculated based on DRG case weights, which can be shared between the physician and nursing groups. However, the input parameters in this study are not fixed [22]. The detailed calculation formula is shown as follows:

$$WA = \sum_{i=1}^n CW_i \times CN_i, \quad (1)$$

where WA refers to the workload assessment, CW_i refers to the i th DRG case weight, and CN_i refers to the number of the i th DRG case.

3.3.2. Operational Assessment. The DRG patient groups in the assessment department can be assessed separately for physician and nursing groups, with separate target values

for physician and nursing groups based on the controllability of costs for the physician and nursing groups.

The physician and nursing groups calculate the controllable costs of physicians and nursing care for each DRG group based on clinical pathways and historical data and set physician and nursing care cost targets for each DRG group in conjunction with health insurance payments.

$$OAS_i = \frac{CTV_i}{CC_i}, \quad (2)$$

where OAS_i refers to the operational assessment score for the i th DRG case, CTV_i refers to the cost target value for the i th DRG case, and CC_i refers to the current cost for the i th DRG case.

$$OAS = \sum_{i=1}^n \frac{OAS_i \times CN_i}{TN_i}, \quad (3)$$

where OAS refers to the operational assessment score and TN_i refers to the total number of DRG cases.

3.3.3. KPI Assessment. The KPI indicators are set based on the objectives of hospital performance management, taking into account the quality of medical services, safety of medical services, and operational efficiency and effectiveness. The physician and nursing groups are assessed separately. The detailed assessment indicators and weights are shown in Table 1. The selection of KPI indicators and the weighting of each indicator can be adjusted regularly according to the needs of hospital management and development.

3.4. Constructing the Communication and Feedback System. The targets of communication in performance management include both external and internal communication, with external communication mainly referring to hospital business-related authorities (e.g., health insurance and price departments) and internal communication referring to all departments and staff within the hospital. The medical

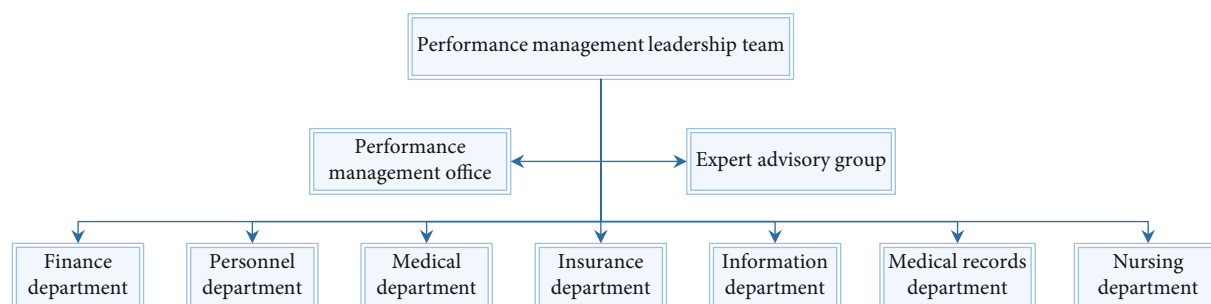


FIGURE 2: Organizational structure of IPMS.

TABLE 1: KPI indicators and weights.

Dimension	KPI indicators for physician groups	Weight	KPI indicators for nursing groups	Weight
Finance	Bed occupancy rate (10%)	20%	Bed occupancy rate (20%)	20%
	Cost consumption index (10%)			
Customer	Patient satisfaction (10%)	10%	Patient satisfaction (10%)	10%
	Time consumption index (10%)		Time consumption index (10%)	
Internal processes	Mortality in the low and medium risk group (10%)	40%	Mortality in the low and medium risk group (10%)	40%
	Incidence of hospital admissions (5%)		Incidence of hospital admissions (10%)	
	Case quality (5%)		Other quality of care and safety (10%)	
	Quality and safety of other care (10%)			
Learn and growth	Number of DRG groups (5%)	30%	Number of DRG groups (10%)	40%
	CMI value (10%)		CMI value (10%)	
	Out-of-region patient rates (5%)		Chinese medicine nursing technology (10%)	
	Percentage of TCM medical services (5%)		Scientific research capacity (10%)	
	Scientific research capacity (5%)			

insurance department is the policy maker for DRG payment. Hospitals need to keep the medical insurance department informed of the policies related to DRG payment and provide feedback on any problems in the implementation of DRG payment. Under the DRG payment model, hospitals also need to work with the pricing department to improve the reasonableness of their fees and charges.

Performance management is a continuous improvement process, and communication and feedback are very important throughout the whole process of performance management in hospitals. Before performance management is carried out, a series of presentations should be made within the hospital, such as the purpose and meaning of applying DGR-related indicators to performance management and the policies related to DRG payment. Performance targets should be set and refined through staff participation and communication, such as the weighting of DRG cases, DRG group costs, and the setting of KPI indicators. During the performance appraisal process, communication with hospital staff is required to identify any problems that may arise during the performance appraisal process, such as whether DRG cases are correctly grouped and coded and whether DRG case costs exceed the standard. Once the performance appraisal results are finalized, they should be analyzed and fed back to the

appraisee in a timely manner, so that further efforts and improvements can be made, for example, the number of DRG groups in the main hospital team, the total weight of cases, and the ranking of CMI values.

3.5. Constructing the Information Support System. The establishment and implementation of performance management systems in hospitals cannot be separated from the support of information technology, and by improving the level of information technology construction, the efficiency and effectiveness of hospital performance management can be improved. Only by establishing a comprehensive performance management information system based on DRG payment, meeting the needs of integrated management of performance management before, during, and after the event and achieving a high degree of integration of business and finance, can performance management objectives be achieved in a timely and efficient manner.

The IPMS based on DRG payment needs to be composed of several submodules to achieve its objectives. As shown in Figure 3, this system includes DRG management, health insurance monitoring, performance evaluation, cost accounting, bonus accounting, and intelligent analysis systems and the data between each submodule system should be able to share and interoperate.

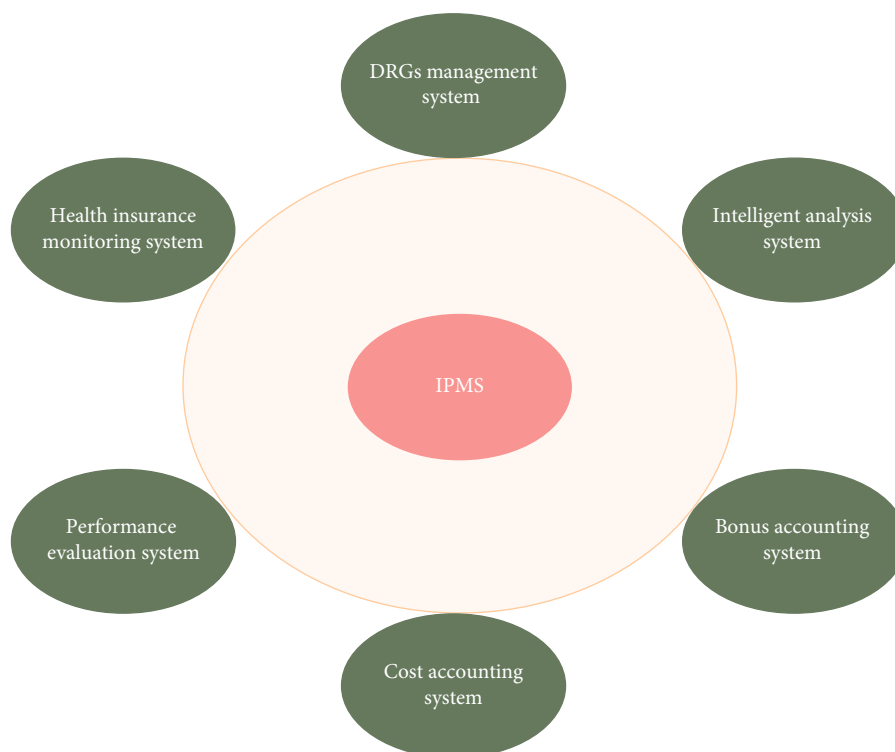


FIGURE 3: Submodule systems in IPMS.

4. Implementation of IPMS for Public Hospitals Based on DRG Payment

4.1. Preliminary Preparation for Implementation

4.1.1. Strengthening the Management of the First Page of a Patient Case. The core principle of DRGs is case grouping, and the first page of the hospital case is the key, which includes the primary diagnosis, surgery, operation, and secondary diagnosis. All of this data comes from the first page of the case, so whether the first page of the case is completed completely and accurately is directly related to whether the case can be entered into the grouping and whether the grouping is correct. Whether the relationship between the main diagnosis of the case and the chief complaint and medical history is reasonable, the relationship between the surgical operation and the main diagnosis, the logical relationship between the secondary diagnosis, the corresponding comorbidities and complications, etc., will all be the basis for whether the case is correctly grouped. Hospitals need to further strengthen the training related to the completion of the first page of the case, guide the medical staff of clinical departments to fill in the first page of the case correctly, and establish a corresponding management system and reward and punishment system.

4.1.2. Strengthening Clinical Pathway Management. Regardless of whether it is single-patient payment or DRG payment, clinical pathways are critical. Specifically, the final classification of DRG cases into which group is determined by the clinical medical behavior and the front page of the

case is only a reflection of the clinical medical behavior. Hospitals need to strengthen their understanding of the importance of clinical pathways by leveraging the restraining effect of DRG payment on medical behavior and thus strengthen the management of clinical pathways. At the same time, by strengthening the management of clinical pathways to regulate the treatment and service behaviors of hospital medical staff, it is a very effective means to control the unreasonable increase of medical costs and improve the quality and efficiency of hospital medical services.

4.1.3. Strengthening Cost Management for Disease Types. DRGs are a prepayment-based payment system, which is completely different from the item-based postpayment system. As it stands now, many of the items that can generate profits for hospitals will become costs that hospitals will have to bear. Under the DRG payment model, there is a need to shift from the existing departmental costing to more refined and accurate patient costing, as well as to strengthen the management of the departmental drug and consumable secondary pool and to establish target costs and fixed cost standards for each DRG group in the department.

4.2. Key Points for Implementation

4.2.1. Enhancing the Integration of DRGs with Performance Management

(1) Achieving Performance Management Goals. The realization of the hospital's overall strategic goal is not only the main starting point of the hospital's IPMS but also the main target task that the hospital's IPMS needs to achieve.

Without the overall strategy of the hospital as a guide, the IMPS of the hospital will have no support and direction. Therefore, the combination of DRGs and IPMS is conducive to better realize the strategic goals and performance management goals of the hospital.

By incorporating DRG-related indicators into the hospital performance management system, the overall strength of the hospital and talents can be evaluated more objectively, saving daily operating costs and thus enhancing the hospital's ability to develop in a sustainable manner. For example, raising the DRG overall competency index will promote a balanced development of talents; raising the CMI value of each department will increase the influence of the hospital in the industry and at the same time promote the cultivation and growth of the talent team; assessing the weighting of DRG cases and the level of cost control of disease types will motivate hospital staff and save operational costs, etc.

(2) Reinforcing Performance Organization Management. Organizational management is the basis for achieving the hospital's performance management objectives. At present, however, hospital management is generally not sufficiently aware of the impact of DRG payments on the hospital, believing that DRG payments are a matter of the quality of the first page of the case and are only a matter for the case department. As a result, they only put the work related to DRGs in the case room and do not fully understand the impact of DRGs on the internal management of the hospital.

At the health insurance level, DRGs are just a payment method, but from the perspective of internal hospital operations, DRGs are more of a management tool. The core of DRGs is the change in pricing mechanism, which poses a new challenge to the internal operation and management of hospitals, and this is the key to the impact of DRGs on the internal operation and management of hospitals. This is the key to the impact of DRGs on internal operations management. Therefore, hospitals need to pay close attention to this and make full use of DRG-related management tools so that they can play a greater and more significant role in internal operations management, especially internal performance management.

4.2.2. Using DRG Indicators for Performance Evaluation. This section uses data from four surgical departments in a hospital: urology, gastroenterology, hepatobiliary, and cardiothoracic, as an example, to analyze how to evaluate departmental performance using DRG-related indicators, including departmental workload performance, operational performance, and KPI performance evaluation.

(1) Workload Performance Evaluation. The workload performance of the four surgical departments of urology, gastroenterology, hepatobiliary, and cardiothoracic was evaluated using two methods: medical service performance points, and DRG case weights, and compared.

TABLE 2: Performance points and case weights of surgical departments.

No.	Department	Performance point		DRG case weight	
		Total points	Rank	Total weight	Rank
1	Urology	1,394,255	3	1,428	3
2	Gastroenterology	1,928,976	1	1,145	4
3	Hepatobiliary	1,098,267	4	1,769	2
4	Cardiothoracic	1,562,787	2	1,974	1
Total		5,984,285		6,316	

According to the results shown in Table 2, the workload performance calculated by the two methods was compared and the ranking of all three departments changed, except for urology, where the ranking changed from 1st to 4th, cardiothoracic surgery from 2nd to 1st, and hepatobiliary surgery from 4th to 2nd.

As shown in Figure 4, the specific analysis of DRG-related indicators for the four surgical departments shows that the decrease in the ranking of the gastrointestinal surgery department is mainly due to the high-time consumption index and cost consumption index. When calculating the workload by item performance points, more items done by the patient result in higher workload points, but when calculating the workload by DRG case weights, more items become useless and the longer the patient stays, the more efficient the use of beds. Cardiothoracic surgery moved up in the rankings mainly due to a higher CMI, indicating that the original project performance points did not fully reflect the technical difficulty of the disease types admitted to the unit and the workload of the medical staff. The increase in ranking for hepatobiliary surgery is also due to a higher CMI and a lower time and cost consumption index.

(2) Operational Performance Evaluation. Based on the historical data for each DRG group, a target cost for each DRG group can be calculated. In order to better represent the change in cost for each DRG group, the average historical cost for each DRG group over the last 3 years can be taken and different weights can be assigned to each year, with more recent years being given a greater weight and more distant years being given a smaller weight.

As shown in Figure 5, there are five urology groups, and based on the results of the costing for each disease group, the historical costs for each group for the last three years from 2017–2019 can be calculated and different weights of 20%, 30%, and 50% can be assigned to each group when calculating the target cost.

After calculating the target cost for each DRG group in the department as described above, the target cost for each DRG group in the department was compared with the actual cost of the group in the current period to calculate an operational assessment score for each group. The total group score and the operational assessment score for the whole department can then be calculated based on the operational assessment score for each group and the number of cases, as shown in Table 3.

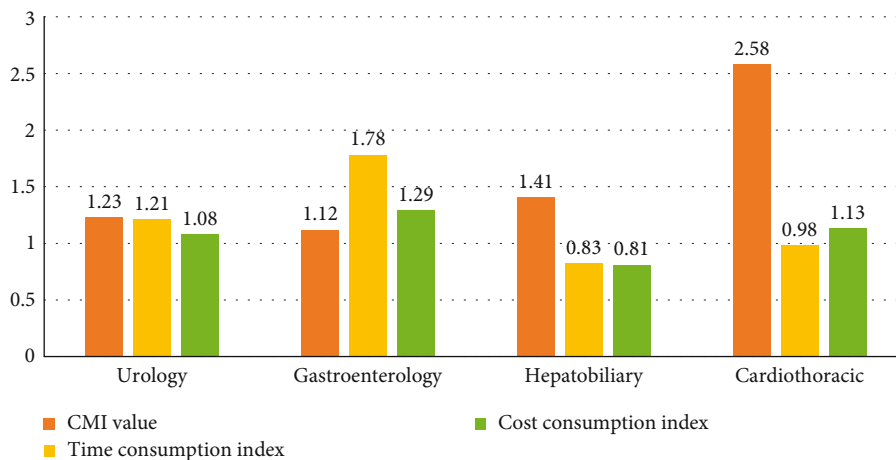


FIGURE 4: Departmental DRG-related indicator calculation results.

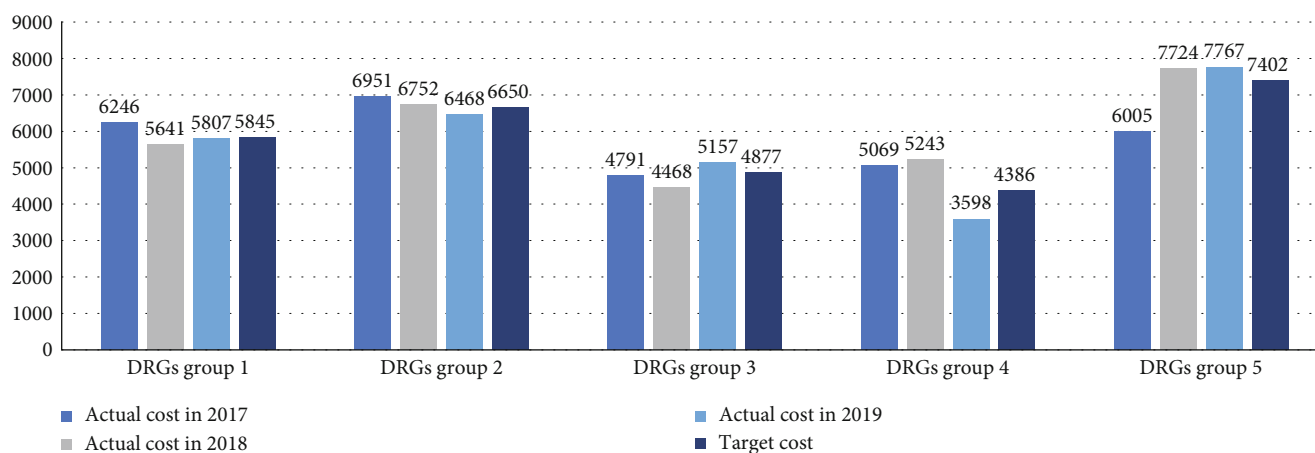


FIGURE 5: Target costs for each DRG patient group in urology (unit: Yuan).

TABLE 3: Urology operation performance assessment.

	Number of cases	Target cost (Yuan)	Actual cost (Yuan)	Appraisal score	Total score
DRG group 1	378	5,936	6,674	88.94	33,619.32
DRG group 2	336	6,745	5,324	126.69	42,567.84
DRG group 3	449	5,046	6,132	83.56	37,518.44
DRG group 4	259	4,581	5,356	82.29	21,313.11
DRG group 5	308	7,405	7,125	103.93	32,010.44
Total	1,730				167,029.15

Thus, the urology operation assessment score is $167,029.15/1730 = 96.55$. Using the same methodology as the above, the operational assessment scores for the three departments of gastroenterology, hepatobiliary surgery, and cardiothoracic surgery can be calculated as 92.76, 117.22, and 99.18, respectively.

(3) *KPI Performance Evaluation.* In the KPI appraisal system for doctors' groups constructed using the balanced scorecard (BSC) tool, the KPI appraisal scores of the doctors' groups can be calculated by assuming that all the KPI appraisal indicators of the doctors' groups except the DRG-related indicators are full scores and the DRG-related indicators are appraised according to the scoring criteria, as shown in Tables 4 and 5.

Due to the specialist nature of each department, the number of DRG groups and CMI values in the above KPI vary greatly between departments, so only the department itself can be compared before and after, mainly to assess the progress of the department. As the time consumption index and cost consumption index are industry comparable, they can

TABLE 4: Scoring criteria for DRG-related indicators.

Indicator	Scoring criteria
Number of DRG groups	The number of DRG groups in each assessment unit in the previous year as the base, plus (minus) one point for each additional (reduced) group in each assessment unit in the current assessment period, with a maximum of two points for each assessment unit in the current period
CMI value	The CMI value of each assessment unit in the previous year will be used as the base, and 1 point will be added (subtracted) for every 1% increase (decrease) in each assessment unit during the current assessment period, with a maximum of 2 points added to each assessment unit in the current period
Time consumption index	Each assessment unit will be based on 1, and 0.2 points will be deducted (added) for every 1% increase (decrease) in each assessment unit during this assessment period, with a maximum of 2 points added for each assessment unit in the current period
Cost consumption index	Each assessment unit will be based on 1, and 0.2 points will be deducted (added) for every 1% increase (decrease) in each assessment unit during this assessment period, with a maximum of 2 points added for each assessment unit in the current period
Mortality in low- and medium-risk groups	5 points deducted for each case during this assessment period

TABLE 5: KPI performance evaluation.

Dimension	KPI indicator	Urinary surgery	Gastrointestinal surgery	Hepatobiliary surgery	Cardiothoracic surgery
Finance (20%)	Bed occupancy rate (10%)	10.00	10.00	10.00	10.00
	Cost consumption index (10%)	9.40	5.20	11.20	7.70
Customer (10%)	Patient satisfaction (10%)	10.00	10.00	10.00	10.00
Internal processes (40%)	Time consumption index (10%)	6.80	6.10	10.30	9.20
	Mortality in the low- and medium-risk groups (10%)	10.00	10.00	10.00	10.00
	Incidence of hospital admissions (5%)	4.90	4.70	5.25	4.80
	Case quality (5%)	5.20	4.80	5.05	5.10
	Quality and safety of other care (10%)	10.00	10.00	10.00	10.00
Learn and growth (30%)	Number of DRG groups (5%)	6.20	5.70	5.00	4.10
	CMI value (10%)	11.80	8.20	9.90	5.60
	Out-of-region patient rates (5%)	5.00	4.48	5.00	4.80
	Percentage of TCM medical services (5%)	4.90	4.97	4.90	5.15
	Scientific research capacity (5%)	5.10	5.35	5.10	5.20
Total		99.30	89.50	101.70	84.65

be used directly to assess the department’s comparison with industry averages. Mortality in the low- and medium-risk groups is a medical safety indicator that needs to be closely controlled, so points are deducted more heavily if it occurs.

4.2.3. *Applying DRG Performance Evaluation Results.* The results of hospital performance evaluations can be used in a number of ways. This section describes how the results of DRGs can be used to calculate performance bonuses, evaluate specialty development, and control healthcare costs.

(1) *Calculating Performance Bonuses.* The workload performance bonus can be calculated by the following formula:

$$WPB = TW \times UP, \tag{4}$$

where WPB refers to the workload performance bonus, TW refers to the total weight of the DRG case, and UP refers to the unit price of the DRG case.

After obtaining the value of the workload performance bonus, the actual performance bonus issued can be calculated through the following formula:

$$APB = WPB + OARP \times KPIOARP, \tag{5}$$

where APB refers to the actual performance bonus issued, OARP refers to the operational assessment rewards and penalties, and KPIOARP refers to the KPI assessment rewards and penalties. The results are shown in Table 6.

TABLE 6: Actual performance bonus issued.

Department	Actual performance bonus issued
Urinary surgery	1,165,576.89
Gastrointestinal surgery	1,146,248.24
Hepatobiliary surgery	1,789,254.98
Cardiothoracic surgery	1,452,729.66

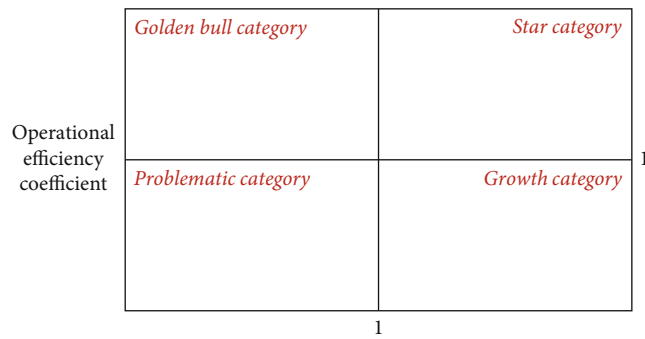


FIGURE 6: Department categories.

(2) *Evaluating Specialist Development.* Using the DRGs and other indicators such as operations, the development of each hospital specialty can be evaluated and more targeted development recommendations can be made for each specialty. As shown in Figure 6, departments can be classified into four categories: star, golden calf, problem, and growth, based on their technical difficulty and operational efficiency factors, with different development goals and directions.

The first quadrant is the star category: the CMI of the department is higher than the industry average (technical difficulty coefficient > 1), and the department has a positive income and expenditure balance (operational efficiency coefficient > 1). These departments are the leaders of the hospital's development and should be fostered and developed to become national key specialties and regional treatment centers.

The second quadrant is the Golden Bull category: the CMI of the department is lower than the industry average (technical difficulty coefficient less than 1), but the department has a positive income and expenditure balance (operational efficiency coefficient greater than 1). This type of department can bring economic benefits to the hospital but should be improved by optimizing the structure of the patient group and improving the technical level of the department.

The third quadrant is the problematic category: the CMI value is below the industry average (technical difficulty factor less than 1), and the department has a negative income and expenditure balance (operating efficiency factor less than 1). This is a serious problem, and the department must not only try to control its operating costs but also improve its medical skills.

The fourth quadrant is the growth category: the department has a CMI above the industry average (technical difficulty coefficient greater than 1), but a negative income and

expenditure balance (operating efficiency coefficient less than 1). These departments have a high level of medical technology and are influential in the industry but need to take steps to control operating costs.

5. Conclusion

In recent years, as the national health system reform has been increasing, so have the corresponding reform measures. In this context, this study constructs a performance management system within public hospitals based on DRG payment and explores the specific content of this system from four aspects: organizational management, assessment and evaluation, communication and feedback, and information support. In addition, the paper discusses how to implement an IPMS in hospitals, including the preparatory work before implementation and the key points to be grasped during the implementation process. In summary, this system will help to build a better internal performance management system in hospitals.

However, there are some limits of applying DRG performance evaluation results. For example, the scope of application is limited. To be specific, the objective of DRGs is to classify the output of healthcare services and only inpatient cases where the clinical diagnosis and treatment modality have a clear impact on the resource consumption and outcome of the patient are suitable. However, it cannot be applied to all patients in performance management, e.g., patients with the same diagnosis and treatment modalities but with very different resource consumption and treatment outcomes are not suitable for DRGs, so a combination of methods is needed for performance management within hospitals.

Data Availability

The labeled dataset used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no competing interests.

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