Research On Hospital Performance Appraisal Management Method And System Based On Data Mining

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Abstract

Hospital performance management methods and systems based on data mining include: establishing six benchmarking dimensions;Establish benchmarking cluster: group the claims data corresponding to the benchmarking dimensions of in-patient claims including surgery process, outpatient claims including surgery process, and door slow door special claims including surgery process by operation name, insurance type, hospital level, medical institution type, and risk scoring interval of the insured to obtain the corresponding claims data of benchmarking cluster,The claim data corresponding to the benchmarking dimension of inpatient claims excluding surgery process, outpatient claims excluding surgery process, and door slow and door special claims excluding surgery process are divided into sub groups according to the selected disease group, insurance type, hospital level, medical institution type, and the risk scoring interval of the insured to obtain the claim data of the corresponding benchmarking cluster; Calculate benchmark value for each pair of benchmark cluster claims data;Comparison and summary of cost control spatial data;The hospitals and disease types with the highest priority will be compared with specific cost items.

Keywords

Data mining, hospital, performance.

1. Preface

The operation of medical insurance fund is under pressure, and the control of medical expenses has always been the key issue of medical insurance focus. As the main body of medical behavior, hospitals are also the main body of controlling medical expenses. However, it is difficult to directly compare the medical costs and medical quality between different hospitals because of different levels of hospitals, different difficulties in receiving diseases, and different diagnosis and treatment methods. Furthermore, it is impossible to determine what project, disease, and cost cause the hospital's high medical expenses.

Based on a large amount of medical insurance compensation data and medical information accumulated in the policy based medical insurance undertaken or handled by the region as a whole, combined with the strengthened analytical ability in the field of health insurance and data mining modeling ability, a set of hospital performance analysis tools was established to help the government and medical insurance staff effectively carry out hospital medical cost and medical quality control.

2. The following technical solutions solve the above technical problems

This design provides a hospital performance management method based on data mining, which is characterized by the following steps:

S1. Establishing benchmarking dimensions: the claim data is divided into six benchmarking dimension claim data corresponding to the six benchmarking dimensions according to the type of claim: inpatient, outpatient, door slow and door special, and whether or not to include the

surgery process. The six benchmarking dimensions are: inpatient claims include the surgery process benchmarking dimension, outpatient claims include the surgery process benchmarking dimension, door slow and door special claims include the surgery process benchmarking dimensionThe in-patient claims do not include the surgical process benchmarking dimension, the outpatient claims do not include the surgical process benchmarking dimension, and the door slow and door special claims do not include the surgical process benchmarking dimension; S2. Establish benchmarking cluster: the in-patient claims include the benchmarking dimension of the surgical process, the outpatient claims include the benchmarking dimension of the surgical process, and the door slow door special claims include the benchmarking dimension of the surgical processThe medical institution type and the risk scoring range of the insured are divided into sub groups to obtain the corresponding claim data of the benchmark cluster. The inpatient claims do not include the benchmarking dimension of the surgical process, the outpatient claims do not include the benchmarking dimension of the surgical process, and the door slow door special claims do not include the benchmarking dimension of the surgical process. The corresponding claim data are grouped according to the selected disease, insurance type, hospital levelThe type of medical institution and the risk scoring range of the insured are divided into sub groups to obtain the corresponding claims data of the benchmark cluster;

S3. Calculate benchmark value for each benchmark cluster claim data: the benchmark cluster claim data is sorted according to the order of claim amount from the largest to the smallest, and the top 5% and the bottom 5% of the claim amount are screened as outliers, and the average value of the remaining claim amount is calculated as the benchmark value of the benchmark cluster;

S4. Comparison and summary of cost control spatial data: select all benchmark clusters of the hospital's disease type according to the claim data of each disease type in each hospital, and calculate the difference between the average value of the claim data of each benchmark cluster of each hospital's disease type and the benchmark value of the benchmark cluster, The sum of the differences corresponding to all the benchmark clusters to which the disease belongs in the hospital is used as the overall controllable cost spatial data of the disease in the hospital;S5. Comparison of specific spending items for hospitals and diseases with the highest priority: the overall controllable cost spatial data of each hospital is sorted in descending order, and the hospitals and diseases with the highest priority are selected as the target hospitals and diseases. According to the claim data of the target hospitals and diseases, the categories of abnormal cost items are screened out.

In step S5, the average age, average cost, average medical insurance expenditure, average length of stay and average risk score of the target hospital's claims are calculated according to the claim data of the target hospital and the target disease, and the same indicators are calculated for the same level of the target hospital and other hospitals in the same city with the same disease, and compared according to drugs, materials, diagnosisThe expenditure of the target hospital is subdivided into four categories. Under each expenditure type, the average expenditure of each claim on this category and the frequency of this category are compared respectively, and compared with the cost structure of the same level of hospitals with the same disease type to screen out the categories of abnormal expense items.

Step S5 is followed by: comparison of expenditure details of priority hospitals and disease types: after comparing the average expenditure in each expenditure category between the target hospital and hospitals of the same level, further analyze the average expenditure of specific projects in the areas where the target disease expenditure of the target hospital is significantly higher than that of hospitals of the same level with the same disease type,To determine whether the target hospital has problems such as unreasonable use of items.

3. Hospital performance management system based on data mining

A benchmarking dimension creation module: used to divide the claim data into six benchmarking dimension claim data corresponding to the six benchmarking dimensions according to the type of claim: inpatient, outpatient, door slow door and whether or not to include the surgery process. The six benchmarking dimensions are: inpatient claims include the surgery process benchmarking dimension, outpatient claims include the surgery process benchmarking dimension, door slow door and special claims include the surgery process benchmarking dimension. The in-patient claims do not include the surgical process benchmarking dimension, the outpatient claims do not include the surgical process benchmarking dimension, and the door slow and door special claims do not include the surgical process benchmarking dimension;

A benchmarking cluster building module: the in-patient claims including the surgery process benchmarking dimension, the outpatient claims including the surgery process benchmarking dimension, and the door slow door special claims including the surgery process benchmarking dimension corresponding to the benchmarking dimension claim data according to the surgery name, insurance type, hospital levelThe medical institution type and the risk scoring range of the insured are divided into sub groups to obtain the corresponding claim data of the benchmark cluster. The inpatient claims do not include the benchmarking dimension of the surgical process, the outpatient claims do not include the benchmarking dimension of the surgical process, and the door slow door special claims do not include the benchmarking dimension of the surgical process. The corresponding claim data are grouped according to the selected disease, insurance type, hospital levelThe type of medical institution and the risk scoring range of the insured are divided into sub groups to obtain the corresponding claims data of the benchmark cluster;

- Benchmark value calculation module: used to calculate benchmark values for each pair of benchmark cluster claims data. The benchmark cluster claims data are sorted according to the order of claims amount from large to small. The claims data of the top 5% and the bottom 5% of the claims amount are screened as outliers, and the average value of the remaining claims amount is calculated as the benchmark value of the benchmark cluster;

One control fee space comparison summary module: used to select all benchmark clusters of the hospital's disease type according to the claim data of each hospital's disease type, calculate the difference between the average value of the claim data of each benchmark cluster of each hospital's disease type and the benchmark value of the benchmark cluster, The sum of the differences corresponding to all the benchmark clusters to which the disease belongs in the hospital is used as the overall controllable cost spatial data of the disease in the hospital;

A specific cost comparison module: it is used to sort the overall controllable cost spatial data of each disease type in each hospital in order from large to small, select the hospitals and disease types with the highest priority as the target hospitals and disease types, and screen out the abnormal cost item categories according to the claim data of the target hospitals.

The specific cost comparison module is used to calculate the average age, average cost, average medical insurance expenditure, average length of stay and average risk score of the target hospital's claims according to the claim data of the target hospital's target disease types, and to compare the same indicators of the target hospital's other hospitals in the same city at the same level with the same disease types, and according to drugs, materials, diagnosisThe cost of treating the target disease of the target hospital is subdivided into four categories. Under each cost type, the average cost of each claim in this category and the frequency of this category are compared, and compared with the cost structure of the same disease in hospitals of the same level to screen out the categories of abnormal cost items.

The system also includes a detailed cost comparison module. The detailed cost comparison module is used to further analyze the average cost of specific projects in areas where the target hospital's cost is significantly higher than that of hospitals of the same level after comparing the average cost of each cost category between the target hospital and the target disease category of hospitals of the same level, to determine whether the target hospital has problems such as unreasonable use of projects.

On the basis of conforming to the common sense in the art, the above optimal conditions can be arbitrarily combined to obtain better examples of the design.

4. Specific implementation

This embodiment provides a hospital performance management method based on data mining, which includes the following steps:

Step 101. Establish benchmarking dimensions: divide the claim data into six corresponding benchmarking dimension claim data according to the type of claim: inpatient, outpatient, door slow and door special, and whether or not to include the surgery process. The six benchmarking dimensions are: inpatient claims include the surgery process benchmarking dimension, outpatient claims include the surgery process benchmarking dimension, door slow and door special claims include the surgery process benchmarking dimension, door slow and door special claims include the surgery process benchmarking dimension.

Step 102. Establish benchmarking cluster: according to the operation name, insurance type, hospital levelThe medical institution type and the risk scoring range of the insured are divided into sub groups to obtain the corresponding claim data of the benchmark cluster. The inpatient claims do not include the benchmarking dimension of the surgical process, the outpatient claims do not include the benchmarking dimension of the surgical process, and the door slow door special claims do not include the benchmarking dimension of the surgical process. The corresponding claim data are grouped according to the selected disease, insurance type, hospital levelThe type of medical institution and the risk scoring interval of the insured are divided into sub groups to obtain the claim data of the corresponding benchmark cluster.

Step 103. Calculate the benchmark value for each benchmark cluster claim data: the benchmark cluster claim data is sorted according to the order of the claim amount from the largest to the smallest, the top 5% and the bottom 5% of the claim amount are screened as outliers, and the average value of the remaining claim amount is calculated as the benchmark value of the benchmark cluster.

If the benchmarking dimension is inpatient claims, including surgical process benchmarking dimension, the hospital level benchmarking cluster is a tertiary hospital, and the specific operation is appendectomy, and the patient's identity category is employee, then its benchmarking claims cluster includes all surgical inpatient claims in the tertiary hospital in the city, the main operation is appendectomy, and the identity is employee; In this cluster, after removing the top 5% and bottom 5% claims as outliers, benchmark (defined as average) is calculated according to demand. This benchmark is directly related to the benchmark dimension under various claims.

Step 104. Comparison and summary of cost control spatial data: select all benchmark clusters of the hospital's disease type according to the claim data of each disease type in each hospital, and calculate the difference between the average value of the claim data of each benchmark cluster of each hospital's disease type and the benchmark value of the benchmark cluster. The sum of the differences corresponding to all the benchmark clusters to which the disease belongs in the hospital is used as the overall controllable cost spatial data of the disease in the hospital;

The goal of the clinical controllable space model is to use the medical insurance claim data to systematically identify the hospitals and departments with waste behavior, and summarize the specific areas where the cost exceeds. Specifically, at the claim level, the model finds the claim clusters that can be benchmarking in each dimension, compares the cost and composition of each claim record in a cluster with the average value of the cluster, and obtains the difference between the average value and the average value of the cluster. Further, all claim records of each hospital disease combination are summarized, and the sum of the difference between each claim cost and its cluster average value is calculated as the total cost control space of the hospital disease combination. The total cost control space calculated in this way will be used as the basis for priority ranking of interview hospitals.

Step 105. Compare the specific cost items of the hospitals and disease types with the highest priority: sort the overall controllable cost spatial data of each disease type in each hospital in the order of largest to smallest, select the hospitals and disease types with the highest priority as the target hospitals and disease types, and screen out the abnormal cost item categories according to the claim data of the target hospitals and disease types.

Specifically, in step 105, the average age, average cost, average medical insurance expenditure, average length of stay and average risk score of the target disease of the target hospital for claim settlement are calculated according to the claim data of the target disease of the target hospital, and the same indicators are calculated for other diseases of the same level in the target hospital and the same urban hospitals, and compared according to drugs, materials, diagnosisThe expenditure of the target hospital is subdivided into four categories. Under each expenditure type, the average expenditure of each claim on this category and the frequency of this category are compared respectively, and compared with the cost structure of the same level of hospitals with the same disease type to screen out the categories of abnormal expense items.

Step 106. Comparison of expenditure details of hospitals with high priority and disease types: after comparing the average expenditure in each expenditure category between the target hospital and hospitals of the same level for the same disease type, further analyze the average expenditure of specific projects in areas where the target hospital's expenditure is significantly higher than that of hospitals of the same level for the same disease type, To determine whether the target hospital has problems such as unreasonable use of items. Through further comparison with hospitals of the same level, the specific drug names, inspection item names, materials used, etc. with unreasonable costs are locked.

The percentage of the total controllable cost space of the hospital in all its claim expenses is used as the indicator to measure the controllable cost space; The percentage of the number of claims re admitted within 30 days to the total number of claims is used as a measure of medical quality; The average risk score of the inpatients in each hospital is approximately an indicator to measure the difficulty of the hospital's comprehensive work. According to the characteristics of each indicator, the early warning value of different levels is divided to form a hospital traffic light of medical cost and medical quality.

This embodiment provides a hospital performance management system based on data mining, which includes: a benchmarking dimension establishment module, a benchmarking cluster establishment module, a benchmarking value calculation module, a cost space comparison summary module, a specific cost comparison module 5 and a detailed cost comparison module. The benchmarking dimension creation module is used to divide the claim data into the corresponding benchmarking dimension claim data of six benchmarking dimensions according to the type of claim: inpatient, outpatient, door slow and special, and whether or not to include the surgery process. The six benchmarking dimensions are: inpatient claims include the surgery process benchmarking dimension, outpatient claims include the surgery process benchmarking dimension, door slow and special claims include the surgery process

benchmarking dimensionThe in-patient claims do not include the surgical process benchmarking dimension, the outpatient claims do not include the surgical process benchmarking dimension, and the gate slow gate special claims do not include the surgical process benchmarking dimension.

The benchmarking cluster creation module is used to set up the benchmarking dimension claim data corresponding to the in-patient claims including the surgery process benchmarking dimension and the door slow door special claims including the surgery process benchmarking dimension according to the surgery name, insurance type, hospital levelThe medical institution type and the risk scoring range of the insured are divided into sub groups to obtain the corresponding dimension of the surgical process, the outpatient claims do not include the benchmarking dimension of the surgical process, and the door slow door special claims do not include the benchmarking dimension of the surgical process. The corresponding claim data are grouped according to the selected disease, insurance type, hospital levelThe type of medical institution and the risk scoring interval of the insured are divided into sub groups to obtain the claim data of the benchmarking dimension of the surgical process. The corresponding claim data are grouped according to the selected disease, insurance type, hospital levelThe type of medical institution and the risk scoring interval of the insured are divided into sub groups to obtain the claim data of the corresponding the surgical process.

The benchmark value calculation module is used to calculate benchmark values for each benchmark cluster group claim data. The benchmark cluster group claim data is sorted according to the order of the claim amount from the largest to the smallest. The top 5% and bottom 5% claim data of the claim amount are screened as outliers, and the average value of the remaining claim amount is calculated as the benchmark value of the benchmark cluster group.

The fee control space comparison summary module is used to select all benchmark clusters of the hospital's disease category according to the claim data of each hospital's disease category, and calculate the difference between the average value of the claim data of each benchmark cluster of each hospital's disease category and the benchmark value of the benchmark cluster, The sum of the difference values corresponding to all the benchmark clusters to which the disease belongs in the hospital is used as the overall controllable cost spatial data of the disease in the hospital.

The specific cost comparison module is used to sort the overall controllable cost spatial data of each disease type in each hospital in order from large to small, select the hospitals and disease types with the highest priority as the target hospitals and disease types, and screen out the abnormal cost item categories according to the claim data of the target disease types in the target hospitals.

Specifically, the specific cost comparison module is used to calculate the average age, average cost, average medical insurance expenditure, average length of stay, and average risk score of the target hospital's target disease claims according to the target hospital's target disease claim data, and to compare the target hospital's other hospitals in the same level in the same city with the same disease to obtain the same indicators, and to compare the indicators according to drugs, materialsThe cost of the target hospital is divided into four categories: diagnosis and treatment. Under each cost type, the average cost of each claim in this category and the frequency of this category are compared, and compared with the cost structure of the same disease in hospitals of the same level to screen out the categories of abnormal costs.

The detailed cost comparison module is used to further analyze the average cost of specific items in the areas where the target hospital spends significantly more on the same disease than the hospitals of the same level after comparing the average cost of each expenditure category between the target hospital and hospitals of the same level, so as to judge whether the target hospital has unreasonable use of items.

5. Conclusion

This design is based on the hospital performance management method of data mining, which can quantify the cost control space of the hospital and present it in a visual way, provide a comparative analysis of the cost and expenditure details of the target hospital and other hospitals at the same level, and draw the traffic lights of the overall hospital. The front-line medical insurance personnel in this area use this tool to select priority interview objects from hospitals with large potential cost control space, and accurately identify the key points of the hospital interview.

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