Cross-Category Competition in Chinese Basic Medical Insurance Drug Formulary

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OBJECTIVES: This study aimed to measure cross-category competition in Chinese basic medical insurance drug formulary, providing a basis for drug formulary adjustment decision.
METHODS: On the basis of national basic medical insurance drug formulary issued during 2017~2021 and calculation of the number of drugs in each ATC category and corresponding year-on-year change, we proposed three methods to measure cross-category competition in basic medical insurance drug formulary.
RESULTS: The changes of number of drugs in negotiated formulary, by ATC category, did not negatively associate with such changes in the counterpart category of general formulary. Approximate risk aversion index suggested potential inclusion aversion of three drug categories compared with the other ATC categories. The minimum spanning tree results showed the sustained superior influence of antineoplastic drugs under the network of cross-category elasticity.
CONCLUSIONS: The evidence of cross-category competition ushered in an important area of concern for drug formulary dynamic adjustment decision.

Background

China has established a new national dynamic adjustment mechanism of drug formulary covered by the basic medical insurance. The number of drugs in each Anatomical Therapeutic Chemical (ATC) category was changed as the result of drug formulary. In addition to the decision on including or excluding drugs within the same ATC category, may the budget constraint of medical insurance fund pressure the decision maker to consider cross-category competition is still understudied.

Objective

This study aimed to measure cross-category competition in Chinese basic medical insurance drug formulary, providing a basis for drug formulary adjustment decision.

Methods

On the basis of national basic medical insurance drug formulary issued during 2017~2021 and calculation of the number of drugs in each ATC category and corresponding year-on-year change, we proposed three methods to measure cross-category competition in Chinese drug formulary.

- The first was the measurement of tradeoffs between the number of drugs in the two parts of Western drug formulary (general formulary and negotiated formulary) according to test the correlation between the rate of change in quantity of drugs for each category in negotiated formulary and the relative weight of quantity for each category in general formulary.
- The second was the construction of approximate risk aversion index to describe cross-ATC category aversion. Limited by the discontinuity of the year data, we used the discretized formula to estimate the risk aversion index.
- The third was the minimum spanning tree method used to identify pivotally influential ATC categories.

Results

Although the total number of drugs in negotiated formulary increased from 31 drugs in 2017 to 213 drugs in 2021, such changes, by ATC category, did not negatively associate with the change of number of drugs in the counterpart category of general formulary (Fig 1).

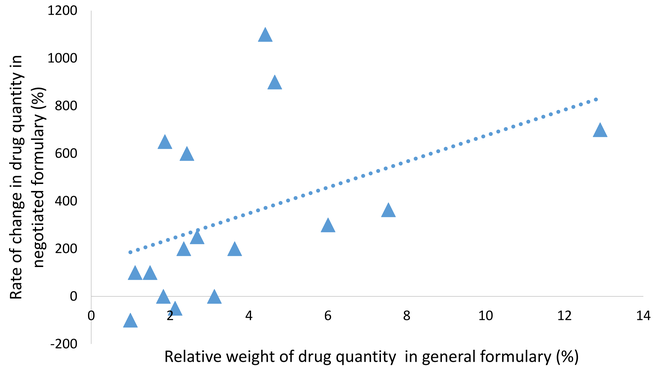

Fig 1. Correlation between the rate of change in quantity of drugs and the relative weight (r=0.46).

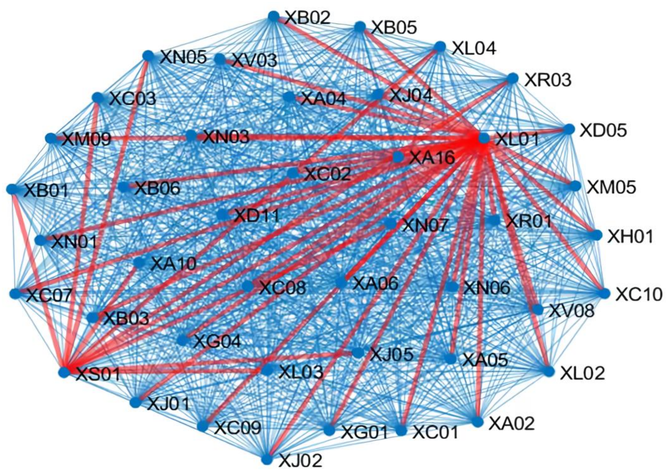

Fig 2. The minimum spanning tree of cross-category competition.

Approximate risk aversion index suggested potential inclusion aversion of endocrinotherapy drugs, contrast media drugs and systemic antiviral drugs compared with the other ATC categories (Table 1).

Table 1. Risk aversion index of ATC category.

ATC Code	ATC Category	Risk Aversion Index
XB05	BLOOD SUBSTITUTES AND PERFUSION SOLUTIONS	-2
XA06	DRUGS FOR CONSTIPATION	-1
XC03	DIURETICS	-1
XH01	PITUITARY AND HYPOTHALAMIC HORMONES AND ANALOGUES	-1
XA05	BILE AND LIVER THERAPY	-1
XA04	ANTIEMETICS AND ANTINAUSEANTS	-1
XA02	DRUGS FOR ACID RELATED DISORDERS	-1
XA10	DRUGS USED IN DIABETES	-1
XL03	IMMUNOSTIMULANTS	-1
XN03	ANTIEPILEPTICS	-1
XD05	ANTIPSORIATICS	-1
XR03	DRUGS FOR OBSTRUCTIVE AIRWAY DISEASES	-1
XC01	CARDIAC THERAPY	-1
XG04	UROLOGICALS	-1
XB01	ANTITHROMBOTIC AGENTS	-1
XL04	IMMUNOSUPPRESSANTS	-0.75
XN07	OTHER NERVOUS SYSTEM DRUGS	-0.5
XS01	OPHTHALMOLOGICALS	-0.5
XA16	OTHER ALIMENTARY TRACT AND METABOLISM PRODUCTS	-0.5
XN05	PSYCHOLEPTICS	-0.2
XJ01	ANTIBACTERIALS FOR SYSTEMIC USE	0
XB02	ANTIHEMORRHAGICS	0
XL01	ANTINEOPLASTIC AGENTS	0
XN01	ANESTHETICS	0
XJ05	ANTIVIRALS FOR SYSTEMIC USE	0.8
XV08	CONTRAST MEDIA	1
XL02	ENDOCRINE THERAPY	1

Note: The first letter of ATC code in Chinese drug formulary is “X”, representing Western drugs.

The minimum spanning tree results showed the sustained superior influence of antineoplastic drugs (XL01) under the network of cross-category elasticity (Fig 2).

Conclusions

Our study first empirically measured the cross-ATC category competition in Chinese basic medical insurance drug formulary. The evidence of cross-category competition ushered in an important area of concern for drug formulary dynamic adjustment decision.

Main References

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