THE WALTER H. SHORENSTEIN
ASIA-PACIFIC RESEARCH CENTER

SHORENSTEIN
APARC
STANFORD

ASIA HEALTH POLICY PROGRAM

FREEMAN SPOGLI INSTITUTE
FOR INTERNATIONAL STUDIES

Stanford University
Walter H. Shorenstein Asia-Pacific Research Center
Asia Health Policy Program

Working paper series
on health and demographic change in the Asia-Pacific

The Imbalance between Patient Needs and the Limited Competence of Top-Level Health Providers in Urban China: An Empirical Study

Based on a 2008 National Household Survey

Qunhong Shen, Visiting researcher, AHPP at APARC, Stanford University.
Liyang Tang, Department of Economics, School of Economics and Management, Tsinghua University, Beijing, China.
Yilin Feng, Division of Urban Household Survey, Department of Urban Surveys, National Bureau of Statistics of China, Beijing, China.
Jenny Tang, School of Public Policy and Management, Tsinghua University, Beijing, China.

Asia Health Policy Program working paper #19

November 2010

http://asiahealthpolicy.stanford.edu

For information, contact: Karen N. Eggleston (翁笙和)
Walter H. Shorenstein Asia-Pacific Research Center
Freeman Spogli Institute for International Studies
Stanford University
616 Serra St., Encina Hall E311
Stanford, CA 94305-6055
(650) 723-9072; Fax (650) 723-6530
karene@stanford.edu

STANFORD UNIVERSITY
ENCINA HALL, E301
STANFORD, CA 94305-6055

T 650.725.9741
F 650.723.6530

The Imbalance between Patient Needs and the Limited Competence of Top-Level Health Providers in Urban China: An Empirical Study Based on a 2008 National Household Survey

Qunhong Shen[1*], Liyang Tang[2], Yilin Feng[3], Jenny Tang[4]

[1]Visiting researcher, AHPP at APARC, Stanford University.

[2]Department of Economics, School of Economics and Management, Tsinghua University, Beijing, China.

[3]Division of Urban Household Survey, Department of Urban Surveys, National Bureau of Statistics of China, Beijing, China.

[4]School of Public Policy and Management, Tsinghua University, Beijing, China.

*Corresponding author. Associate Professor, School of Public Policy and Management, Tsinghua University, Beijing, China.

E-mail: shenqh@mail.tsinghua.edu.cn

Tel: +86-10-62797178

Objective: To show the pattern of patient satisfaction with top-level delivery organizations (Level 2 and Level 3 hospitals), and using neo-institutionalism approach to explain the relatively low satisfaction and to explore the limitations with top providers, focusing on how to improve the competence of Level 2 and Level 3 hospitals at both the individual hospital level and the whole delivery system level.
Data Sources/Study Setting: The household survey by the National Bureau of Statistics in China in 2008; China Health Statistics Yearbooks.
Data Collection/Extraction Methods: The analysis uses a 2008 sample medical experiences of 5,036 residents from 17 provinces collected in a household survey by the National Bureau of Statistics in China. The linear regression model, the structural difference regression model, and the ordered probit model are used in our framework.
Principal Findings: The imbalance between the needs of patients and the limited competence of top-level providers, and the conflict between the business expansion and the limited competence of those providers are deeply and widely influenced by patterns of patient needs, the top providers' expansion, and the institutional environment.
Conclusions: In order to effectively respond to patient needs, top and lower level providers need to set their own individual priorities. The government needs to improve institutional arrangements to respond to patient needs with the development of a fair and appropriate reimbursement and compensation pricing mechanism, and with further evaluation of top level providers' advanced and limited health services.
Key Words: Patient satisfaction, patient needs, limited competence, top-level health provider

Introduction

The increasing importance of patient satisfaction is a common trend for the global health delivery system. This development is one of the consequences of wider social movements toward consumerism (Sitzia and Wood 1997) and also is the result of the new public management (Christoffer 2002).

The Chinese central government, based on the ideology of socialism and a desire for social legitimacy, appeals to the health care delivery system to provide high-quality public health benefits at low prices and in ways that is easily accessible. Since 2007, the Chinese government has made an unprecedented commitment to improve and expand the quality and breadth of health care through a reform scheme anchored by a new national basic health care service system that will cover every citizen in China by 2020 (Ministry of Health 2008; China National Health Economics Institute 2007). In 2009 this commitment was re-proposed and drew further attention. Driven by the 'Health Care System Reform Coordinating Small Group and Health Care Reform Coordinating Council', this aggressive 2020 goal that was adjusted in 2009 sits atop the four major pillars of the draft scheme including improving hospital quality and efficiency through enhanced management oversight and improving basic medical services.

To overcome a health care problem such as "*Kan bing gui"* and "*Kan bing nan*" ("Medical treatment is expensive and difficult to access"), which is especially serious in Level 2 and Level 3 hospitals (see Figure 3 in the Appendix), the relevant government agencies have focused on how to improve patient satisfaction with providers. In 2005, the Ministry of Health began an annual nationwide hospital management review in order to push delivery organizations to improve patient satisfaction. For example, some local governments established a connection between financial input and the performance of providers which includes patient satisfaction and ratings (Wang et al. 2010). At the same time, the central and local governments have increased financial investments in the hospitals, leading to expectations of higher quality expectation for patients, making this as one of the pressures that top-level providers are facing. Furthermore, based on indicators that include the utilization rate, daily visits per doctor, and daily inpatients per doctor (see Figure 1 in the Appendix), more and more patients selected top hospitals as their primary health providers, even when their disease were not serious or complex[1]. The utilization rate has risen to 80.1 percent for Level 2 hospitals and 100.5 percent for Level 3 hospitals in 2008, while these top-level health providers don't have improved the patient satisfaction rate (see Figure 4 in the Appendix). At the same time, the utilization of Level 1 hospitals and CHC (Community Health Centers) has remained low (see Figure 1 in the Appendix).

Because of these two pressures, the top-level providers are facing serious challenges: how to overcome the imbalance between the needs of the patient and the limited capability of the provider. In fact, in recent years, Level 3 hospitals have continued to invest in buildings, equipment, and additional facilities to expand their capacity (see Figure 5 in the Appendix). To some degree, while physical capacity has expanded very quickly, human resources, especially the number of senior medical professionals, has not increased concurrently to keep pace with the rate of expansion

(see Figure 1 in the Appendix).[2] Therefore, organizational competence has lagged behind demand, business expansion, and physical capacity for the top-level providers.

Globally, the gap between patient demand and insufficient health resources is a common issue that providers could overcome by setting priorities among the competing goals (such as clinical versus academic, and local versus systemic) (Gibson, Martin, and Singer 2004) and by planning strategically at the micro level (Pierskallaa and Brailerb 1994). Some common solutions at the macro level are to increase the professional staff, re-train existing doctors, and enforce the incentive arrangement. The latter solution includes compensation reforms in insurance programs and developing managed health organizations in order to increase the productivity of individual professionals and delivery organizations (Laing and Shiroyama 1995).

The imbalance of medical supply and demand in developing countries is partly due to the discrepancy between the services provided and the patient demand (Harpham and Tanner 1995). Empirical tests showed strong inequalities in the geographical distribution of the health workforce in sample developing countries, with the highest densities of human resources for health found usually in the capital areas (Gupta et al. 2003).

In reality, the imbalance of supply and demand is not a matter of absolute quantity, but a matter of structure. Institutional imbalances in the health workforce occur when some health care facilities are understaffed, but issues also occur when they have too many staff because of prestige, working conditions, ability to generate additional income, or other situation-specific factors (Geyndt 1999). Usually, this imbalance is further aggravated by the insufficient spending on cost-effective health activities, the internal inefficiency of public medical programs, and inequality in the distribution of benefits from health services due in part to the efforts of governments in developing countries to cover the full costs of health care for everyone from public revenues (Akin, Birdsall, and Ferranti 1987). Other causes of institutional imbalances in the health workforce include market failure, stakeholders, regulations, time lag, and potential market power in developing countries (Zurn et al. 2004).

The institutional imbalance in China is caused by long-term historical reasons. During a prior redistributive economy (Liu et al. 1999), the top-level providers, which were the main health providers to the upper social groups, had substantial advantages because the government had invested heavily in their facilities and their human resources. When they commercialized based on makeup policy which is created by Chinese central government, they received higher compensation rates than the lower providers. The top-level providers have monopoly positions due to their technical advantages and governmental protectionism mainly because of the admittance management of medical services and the scoring rules of hospitals. At the same time, the lack of financial investment, insurance compensation, qualified human resources and patient trust meant that the lower providers continued to only provide weak competition. So this imbalance is also a systematic problem that is caused by the institutional environment. The imbalance is shaped by the strategic priorities and behaviors of top providers and is enforced by the distorted structure of the delivery system. So we argue that this imbalance is caused both by the patient needs[3] and the

limited competence of top health providers, and not mainly by the limited capacity of top hospitals, which could be overcome partially by a concentrated investment in the building capacities of Level 3 hospitals. In fact, with the large investments in facilities of the Level 3 hospitals (see Figure 5 in the Appendix), the complaints had not subsided and patient satisfaction had not increased significantly. So this paper will explore why top-level providers have not matched the patient needs when they expanded their businesses to respond to treatment of general diseases prior to the 2008 Chinese health system reform. When we consider the priorities of top health providers, at least two questions arise: what important factors led to the willingness of top-level hospitals to enlarge towards the relatively lower end of health services, and what were the consequences of this kind of expansion, especially with the relative limitation of competence in the top-level providers, both for the development of core competence and patient satisfaction?

After reviewing the literatures on hospital competence and the institutional environment for competence development, this paper shows the pattern of patient satisfaction with top delivery organizations-Level 2 and Level 3 hospitals, and further explores the weakness of top providers. Then we try to explain the relatively lower satisfaction with top providers from a neo-institutionalism approach. The conclusion focuses on how to improve the competence of Level 2 and Level 3 hospitals at both the individual hospital level and at the level of the whole delivery system.

Data Collection Methods

Combined with our household survey of patients, information on hospital priorities were collected through the national-level statistics books (Ministry of Health 2006–2009a). To obtain data about patients' satisfaction with their providers, we collaborated with the National Bureau of Statistics to collect the data in 2008 through a household survey, which included a sample of 5,036 residents from 17 provinces and municipalities in China. In this paper we focused on the medical treatment experience with five kinds of delivery organizations: Community Health Center (CHC); Level 1, Level 2, and Level 3 hospitals; and non-public-ownership providers, including private clinics and non-public ownership hospitals.

Based on our understanding of the study and its results, we built the framework of the study and did regression analysis on the data. In this paper, linear regression model, the structural difference regression model, and the ordered probit model (see the Appendix for details) are employed to explain the relationships among variables.

For a sample distribution we selected overall satisfaction with the delivery organization as the basic indicator for various delivery organizations (Table 1).[4]

<Insert Table 1: Descriptive statistics of overall satisfaction and health organization distribution>

Principal Findings: Patterns of Patient Perceptions of the Provider's Role, Needs, and Usage of Service

The Patient's Belief in "*Yi Yao Yang Yi*"

The patient's perception of a hospital's role will influence the patient's concern, preference, and usage of the delivery organization, as well as medical adherences during their clinical visit. In our survey, the question was asked: what do you think is the main reason for high drug price in China? From their answers we found that most patients selected "supporting hospitals through drug sales" ("*yi yao yang yi*") [5] (Eggleston, Zhang, and Zeckhauser 2010; see Table 1 in the Appendix) which reflects the strained relationship between patients and health delivery organizations in the difference between the perceived expected role of hospitals by patients and their actual roles.

Table 1 in the Appendix shows that, among the patients of Level 2 and Level 3 hospitals, 43.46 per cent of respondents believe that *yi yao yang yi* was the main reason for higher drug costs. The perception of *yi yao yang yi* is viewed as patient's feedback suggesting that there are incentive issues with the health delivery organizations. The high percentage of patients who make this assumption also influences the institutional environment in which patients and providers interact.

The Pattern of Patient Needs

The patient's general preference (Table 2) and core concerns (Table 3) are two major aspects of patient needs. In this subsection we will explore the needs pattern of patients who chose various delivery organizations based on preference and core concerns.

< Insert Table 2: Descriptive statistics of general preference>

< Insert Table 3: Descriptive statistics of core concern>

When considering the correlation between choice of delivery organization[6] and general preference (including preference for service attitude, preference for technical quality, preference for price, and preference for facilities and environment),[7] we found that patients of higher-level delivery organizations are more likely to prefer technical quality, facilities and environment, and are less likely to favor service attitude and price, than patients of relatively lower delivery organizations (see Table 2 in the Appendix).

For the correlation between the patient's choice of delivery organization and concern (including concern about overall competences of delivery organization, concern about the quality, concern about the qualifications of the doctor, concern about the service attitude, and concern about the price, here concern about overall competences of delivery organization contains concern about quality, concern about the doctor's qualifications, and concern about service attitude),[8] we found that patients who chose higher-level delivery organizations are more concerned about overall competences of the delivery organization, the quality, and the doctor's qualifications, while less concerned about the price (see Table 3 in the Appendix). In other words,

apart from the degree of severity of their diseases, the patients of top-level hospitals are often concerned about quality, including technical competence, than patients of lower-level hospitals.[9]

The Pattern of Health Service Usage

The usage of hospitals can reflect more information about patient needs, so in this paper we employ the usage of health services in recent medical experiences and the routine usage of various services as indicators of patient needs.

We find that Level 2 and Level 3 hospitals are regularly overused by patients with only minor diseases. Our survey data on the recent important medical experiences shows that Level 2 and Level 3 hospitals are overused by patients with only general and common diseases or with preliminary or medium-stage non-emergency diseases, compared with patients with serious diseases (see Figure 2 in the Appendix). This phenomenon is caused mainly by patient distrust of lower-level hospitals even for common sickness, based on their routine experience.

Explanation of the Gap between Patient Needs and Limited Competence

Explanation of the Framework in the Institutional Approach

According to the "new institutionalism" (Powell and DiMaggio 1991), the strategy and behavior of individual organizations have been impacted by the whole institutional environment in the specific organization field (Ruef 2000; Scott et al. 2000) (Figure 1).

< Insert Figure 1: Explanation framework in institutional approach>

The Conflict between Expansion and Limited Competence of Top Providers

The context of an institutional environment acutely impacts priorities, strategic planning, business development (Scott et al. 2000), and even pushes the individual hospital to go in an unforeseen direction. This is one side of organizational growth. Another side, the core competence, which accumulates over the long term as the organization interacts with its institutional environment, has a negative influence on organizational change, so that sometimes the core competence is called 'core rigidity'. In China, there is a conflict between business expansion and limited competence, which is usually misapprehended as the imbalance between the expansion demand and the capacity. In our study, this is a radical kind of conflict that is inherent within the Chinese delivery system, especially during the transitional period.

One major cause of the limited competence of top-level providers is the decline of quality as a result of excessive expansion. From Figure 5 in the Appendix we discovered that from 2004 to 2008 central and provincial Level 3 hospitals pursued income and expenditure, in which both the total drug income and expenditure and the total medical income and expenditure were very significant. The internal push for expansion was the scale of economy for medical service provision, since in China

higher-level hospitals can expand to include the services of lower-level hospitals but lower-level hospitals cannot expand their services to include those of higher-level hospitals (Ministry of Health 2009).

However, along with expansion, core rigidity (Barton 1992) still influenced the direction of organizational attention (March and Olsen 1975), affecting the strategic allocation of resources. This has impact on the behavior and mindset of the individual medical professional, who has not developed a response model to the sharply increasing scale of patients or to a service scope that included common diseases with outdated technology. Faced with the conflict and competing goals, the scarce resources, especially human resources, were misallocated, bringing out the uncertain atmosphere and the disorder, thus decreasing the overall quality and reliability of the health services (D'Aunno, Succi, and Alexander 2000).[10]

Consequences of the Imbalance between Patient Needs and Competence of Top Providers: Relationship between Needs and Satisfaction

With regression analysis, we found that lower patient satisfaction with higher-level hospitals is caused by the limited competence of top providers. The conflict between the needs of the patients and limitation of competence of top-level providers can be clearly seen from correlations between patient choice of delivery organization, general preference/core concern and overall satisfaction[11] (see Table 4 and Table 5 in the Appendix).

There are correlations between choice of delivery organization, general preference, and overall satisfaction.[12] We found that if patients put a high value on price and they have a higher choice of delivery organization, their overall satisfaction was lower than the average level. But if they preferred facilities and environment, their overall satisfaction was higher than the average level. For patients with preferences for service attitude and technical quality, there was no significant difference in overall satisfaction relative to the average level. This finding is different from international common evidence that higher quality of higher-level hospitals usually results in greater patient satisfaction (Yoshitake, Arasaki, and Kanagawa 2000) and is one aspect of the imbalance between the patient needs' side, represented by general preference, and limited competence of top-level providers, represented by overall satisfaction pattern with top-level providers.

For the correlation between the choice of delivery organization, the concern, and overall satisfaction,[13] we found that for patients who chose higher-level delivery organizations, their overall satisfaction was higher than the average level only if it was about overall competences of the delivery organization. For patients with other kinds of concerns, there was no significant difference in overall satisfaction relative to the average level. This finding means that there is another aspect of the gap between the patient needs, represented by core concern, and limited competence of top-level providers, represented by overall satisfaction with top-level providers.

The Pattern of Satisfaction among Various Dimensions

In this subsection we explore the structural differences of correlations between dimensions[14] and total satisfaction among various health organizations to find which problems are the most serious when the top-level providers face the imbalance between patient needs and hospital competence (see Table 6 in the Appendix).

From the significance of a benchmark coefficient, we find that all dimensions are usually positively correlated with the overall satisfaction. From the structural difference regression analysis that focuses on the structural differences among health organizations, we find that the overall satisfaction of Level 2 and Level 3 hospital users is higher than average for the same level of satisfaction with being respected in interaction, satisfaction with clarity of explanations in interaction, and satisfaction with the waiting time. These results also mean that patients of Level 2 and Level 3 hospitals expressed greater concern about interpersonal interaction. Combined with the findings of Shen and Tang (2010), which found that patients who have greater trust in physicians and in the provider organization are less satisfied with the waiting time and with a lower quality of interpersonal interaction, we conclude that for Level 2 and Level 3 providers, the quality of interpersonal interaction was their weakness and that there is a serious gap between what patient needs and that aspect in Level 2 and Level 3 hospitals.

The Impact of Usage Patterns on Patient Satisfaction

Since a patient's usage of health service and related hospital choice are indicators that reflect both the patient's needs and perceptions of the quality of some providers, the relationships between the routine usage or evaluation of the hospital[15] and overall satisfaction with the hospital is considered to show the consequences of the imbalance between patient needs and the provider's competence.

In fact, patient rehabilitation levels are far below patients' high expectations of Level 2 and Level 3 hospitals, especially for minor or general diseases. Evidence from our survey data shows that only for serious diseases are patient rehabilitation levels after treatment at Level 2 and Level 3 hospitals significantly higher than those after treatment at lower-level hospitals. For minor or general diseases, Level 2 and Level 3 hospitals do not have such an advantage (see Figure 2 in the Appendix). This situation creates a large aspect of patient dissatisfaction with Level 2 and Level 3 hospitals when they have minor diseases: from regression results[16] (Table 7 in the Appendix) we found that if patients routinely choose higher-level health organizations during a minor disease, and if the severity of their disease is also normal or not serious, their overall satisfaction is lower. If, however, the severity of their disease is serious, their routine choice of health organization does not correlate with their overall satisfaction.

Discussion and Conclusion

Discussion: The Institutional Influence on the Patient Perception of Providers' Role and Quality

In this subsection we show how patient perception of *yi yao yang yi* directly

impacts patients' overall satisfaction with delivery organizations (see Table 8 in the Appendix).[17] From the significance of the *yi yao yang yi* benchmark coefficient of the belief dummy, we found that patients who believed in *yi yao yang yi* showed lower overall satisfaction than patients who did not believe in *yi yao yang yi*. From the significance of the *yi yao yang yi* belief dummy's structural difference coefficient, we could find that only patients at Level 3 hospitals had lower overall satisfaction than the average level of patients who believed in *yi yao yang yi*. In other words, a belief in *yi yao yang yi* had an impact on patient satisfaction with providers, especially with the Level 3 hospitals, and patients perceived that goal setting of hospitals had negatively influenced their perceptions of the delivery organizations. Some potential conflicts between the goal setting and patient expectations, and patients' lack of trust in physicians' motivation for treatment could explain the negative influence. Compared with patient satisfaction with other providers, patient satisfaction with Level 3 hospitals was more easily influenced by a belief in *yi yao yang yi*.

The Institutional Arrangement Impacting Conflict between Expansion and Competence

In China, the top suppliers of urban health delivery systems interact with other key providers such as government agencies, insurance, patients and their employers, whereas the power of medical professional association is still very weak (Bloom, Kanjilal, and Peters 2008).

Both the central and local governments regulate the scope and price of health services and the insurance agencies[18], especially in government-sponsored medical insurance and decide which kind of health services to cover. This includes the types and reimbursement percentage of drugs and how much Level 3 hospitals receive. Under the government's regulation Level 2 and Level 3 hospitals must not only balance the per-capita inpatient clearing fee among both higher and lower inpatient clearing fees[19], but also balance the per-capita inpatient days as well. When Level 2 and Level 3 hospitals exceed their standards of per-capita inpatient clearing fees and per-capita inpatient days, they face the severe penalties from the government, so these hospitals have strong incentives to expand their services to patients whose illness is deemed common and easily cured in order to lower per-capita inpatient clearing fees and per-capita inpatient days.

For most Level 3 hospitals, the government almost always decides, or at least influence, the selection, recruitment, promotion, and performance evaluation of the top managers. For example, the principle of the party being in charge of personnel is applied to both the health administrative agency and the organization department[20] of the political party. So the top managers always follow the performance standard of controlling medical costs, overcoming the difficulties in accessing delivery systems in order to express their short-term political commitment to this kind of government goal-setting.

In the Chinese urban delivery system, on one hand, patients have little power over the hospitals: first, the patient rating outcome is seldom in the performance

assessment for local governments; second, patient perceptions of hospital quality have an insignificant impact on the insurance purchase decision; third, patients lack regular communication channels to express their dissatisfaction, sometimes they can express their complaints by applying for an audience with the higher authorities, but they seldom take legal action to solve the conflict between them and the providers (Liu 2006); fourth, when patients are dissatisfied with their individual provider, they can only change providers if there are other competitive Level 3 hospitals in the local health market, otherwise, patients have no choice but to stay at the same hospital; fifth, compared with other Asian countries, such as India (Bhat 1996), the consumers' health care associations are extremely underdeveloped. On the other hand, patients can influence hospital choices of others' and themselves' to a certain extent: first, when patients feel that the expenses are higher than what they expected, they sometimes purchase medicine from other providers or drugstores at lower price after the initial visit at relatively higher-level providers (Sanitary Information Statistics Center of Ministry of Health 2005); second, patients like to talk to other patients about their satisfaction with various delivery organizations (Wang, Chen, and Hu 2007).

For the reasons described, patient power in most Level 3 hospitals is by far weaker than the influence of government, including both the health administrative agency and the insurance agency. The business expansions of top providers are necessary responses in this kind of organization field, although these priority settings will face serious capacity constraint lapses of core competence and which will cause the real benefits of individual patients.

Impact of the Institutional Arrangement on the Delivery System

The institutional environment has not only impacted individual providers but also influenced the structure and the distortion of the systematic delivery system, which has had some negative consequences on the imbalance between patient needs and the limited competence of providers. Though the focus of this paper is not structures of delivery systems, we must mention the structure and resource allocation in the whole delivery system. Because of the general undervaluing of health services, a makeup policy based on the service fees, the strict access regulation of health services (especially for the relatively lower providers to advance towards providing higher value-added health services), and a lack of compensation, combined with the long-term shortage of financial investment, technical competence does not win the trust of the patient. Then the lower providers, such as Level 1 hospitals and CHC, are diseconomies of scale in terms of sustaining qualified medical professionals. So within the delivery system there exists an obvious distortion, in which top providers continue to expand their scope to the general or minor diseases and face the large imbalance between the patient needs and limited competence, while the lower providers struggle to survive and provide basic health services. As a result, more and more patients select top providers to treat their minor diseases, paradoxically, they do not trust in physician's motivation, and are not satisfied with top providers. This distortion is the consequence of the unsuitable policy supply and the lack of an appropriate incentives system.

Conclusion and Policy Application

From patient satisfaction patterns and their influencing factors we can observe that there is an imbalance between patient needs and the competence of top providers in urban China. First, we discovered that a high percentage of patients assume that the hospital pursues higher makeup thus creating the high costs of prescription drugs. Second, we observed that respondents who desire higher quality of services and technical competence often select higher-level providers. Third, we found that the top providers are overused by patients who have no serious diseases or medical emergencies. Fourth, patient satisfaction levels in terms of waiting time and quality of interaction indicate that patients are relatively less satisfied with Level 2 and Level 3 hospitals. Facing the pattern of patient needs, the top providers have expanded their businesses in the institutional environment where the regulation policy, health service pricing, governance of insurance have induced hospitals to expand business towards the more general and minor diseases and to compete with the lower providers for the lower value-added business. Since the top providers have not developed new competence to respond to the new demand and to patient needs, there is a serious imbalance between the expansion and the inadequate competence. Although the physical facilities improved quickly with the increased investment, this imbalance is not easy to transform into a new field or a new model. Furthermore, the imbalance between patient needs and limited competence, and the conflict between the business expansion and the limited competence at the top-provider level, are deeply and broadly influenced by the institutional environment, which has been complex and in multiple transitions. So if we want to overcome this imbalance, it is not enough to only balance and plan the capacity to match patient demand, but one also needs to understand the distortion of the whole delivery system such as finding out the fundamental institutional factors, and correcting the negative influence by using proper and efficient policy supply. We must also provide incentives for the top providers to supply advanced health services and to keep their attention on the complex and more serious diseases, and not on minor and common diseases. Because only when lower providers have enough resources and market scope to sustain their technical competence, they can provide qualified and satisfying basic services that attract patients with minor and general diseases.[21] In order for these things to occur, a fair and appropriate pricing mechanism to rightly evaluate the advanced and sparse health services are particularly critical such as a fair reimbursement and payment mechanism for the services that patients desire. With these institutional arrangements, both top providers and lower ones can set their own priorities in terms of developing their own core competence, thus effectively responding to dynamic patient needs.

Limitation and Further Research

Because we do not have detailed information about expansion at the individual hospital level, the evidence for the imbalance between patient needs and limited competence is not robust, and the research depends more on the tendencies and patterns of the top providers with indirect data from patients. In future studies, we can

collect the data directly from the individual providers and do the correlations analysis with their patients' perceptions on the basis of quality and satisfaction.

Acknowledgments

The authors would like to express their profound gratitude to Karen Eggleston and Xueguang Zhou at Stanford University, both of whom offered many thoughtful comments and suggestions during the development of this working paper. The authors are grateful to Barbara Milligan for her careful editing. Thanks also go to Zhongwen Zhang, who always provides helpful assistance.

Funding

This project was sponsored by the National Natural Science Foundation Committee (NSFC 70672008 and NSFC 70833002) and the Center for Industrial Development and Environmental Governance (CIDEG) project. The School of Public Policy and Management at Tsinghua University sponsored the data collection in cooperation with the National Bureau of Statistics in China.

Endnotes

1. According to our national health survey, 55.34 percent of total respondents selected Level 2 and Level 3 hospitals, while 51.24 percent of patients selected Level 2 and Level 3 hospitals as their providers in the general disease status.
2. Daily visits and inpatients per doctor in Level 3 hospitals continued to increase from 2005 to 2008 because the growth rate of senior medical professionals has lagged behind the growth rate of total patients and inpatients in Level 3 hospitals.
3. In this paper we prefer to use the term *need*, not *demand*, because *need* can include both patient concern and preference, which reflect the psychosocial content.
4. This sample distribution is organized according to the individual patient's socioeconomic status, general demography, and disease status.
5. The belief in *yi yao yang yi* refers to the perception of the role and goal setting of a public hospital. In China the central government has imposed a price-control regulation policy on professional health services that permits providers to charge patients to cover not only the medical services that they render, but also to complement their regular income with the income from drugs, medical supplements, and medical examinations. The term *yi yao yang yi* literally means that public hospitals have a strong profit motive to over-prescribe drugs and to perform too many medical examinations. Eggleston, Zhang, and Zeckhauser (2010) and Eggleston et al. (2008) provided detailed information about this policy and its impact. The belief in *yi yao yang yi* refers to whether the respondents believed that the main reason for the higher drug costs in public hospitals was that the hospitals were receiving some compensation with makeup. For the *yi yao yang yi* belief dummy, we gave a choice of high drug price (because of the hospital's pursuit of economic interests) a value of 1 (the group is 44.48 percent of the whole sample), and other choices a value of 0.

6. We gave the choice of CHC a value of 1, the choice of a Level 1 hospital a value of 2, the choice of a Level 2 hospital a value of 3, and the choice of a Level 3 hospital a value of 4.
7. We used the choice of delivery organization as an independent variable, used general preference dummies as dependent variables, and controlled age dummy, medical expense and reimbursement instrumental variable (last year) to do an ordered probit model analysis.
8. We used the choice of delivery organization as an independent variable, used core concern dummies as dependent variables, and controlled age dummy, medical expense and reimbursement instrumental variable (last year), severity-of-disease dummy and stage-of-disease dummy to do ordered probit model analysis.
9. Combining the data analysis on the hospital choice and the reasons for that choice, we found that patients of top-level providers selected the higher hospitals because they did not trust the technical competence of the lower providers, although they could access that kind of delivery organization at a lower cost and with greater convenience.
10. In some cases, some senior physicians wanted to complete research jobs and left the interns and the training physicians take charge of more of the clinical responsibilities when the hospitals were facing the conflict between the clinical business and academic priorities.
11. Patients' personal characteristics, including both general demographic information and SES (socioeconomic status), are used to explain the patterns and changes that take place from the expectations prior to service to self-reported recovery and final satisfaction (Young, Meterko, and Desai 2000, Linder-Pelz 1982). So here in our regression models, the control of individual SES and some demographic indicators are needed.
12. We used the choice of delivery organization and constructed instrumental variable choice of delivery organization * general preference dummy as independent variables, used overall satisfaction as a dependent variable, and controlled age dummy, medical expense and reimbursement instrumental variable (last year) to do regression analysis.
13. We used the choice of delivery organization and constructed instrumental variable choice of delivery organization * core concern dummy as independent variables, used overall satisfaction as a dependent variable, and controlled age dummy, medical expense and reimbursement instrumental variable (last year), severity-of-disease dummy and stage-of-disease dummy to do regression analysis.
14. We referred to five kinds of dimensions, including satisfaction with being respected in interaction, satisfaction with the clarity of explanations in interactions, satisfaction with the waiting time, satisfaction with the facilities and environment, and satisfaction with the convenience of bill checking. For all of them, we gave "completely unsatisfied" a value of 1, "relatively unsatisfied" a value of 2, "basically satisfied" a value of 3, "relatively satisfied" a value of 4, and "completely satisfied" a value of 5.
15. For the choice of health organization, we gave CHC a value of 1, Level 1 hospital a value of 2, Level 2 hospital a value of 3, and Level 3 hospital a value of 4. For usage of CHC at ordinary times, we gave common disease or sudden disease diagnosis a value of 3, chronic treatment a value of 2, other kinds of usage a value of 1, and no usage of CHC a value of 0. From descriptive statistics, we found that for patients with routine usage of CHC, their overall satisfaction with a CHC of

this medical treatment (with a mean of 3.78) are higher than for patients without routine usage of CHC (with a mean of 3.63).

16. We used the routine choice of health organizations as an independent variable, the choice of overall satisfaction as a dependent variable, and controlled stage-of-disease dummy to do regression analysis.
17. We used the *yi yao yang yi* belief dummy as an independent variable, used overall satisfaction as a dependent variable, and controlled age dummy, medical expense and reimbursement instrumental variable (last year), severity-of-disease dummy and stage-of-disease dummy to do structural difference regression analysis.
18. From our 2008 survey data, the percentage of people covered by government health insurance among all people is 77.54 percent, and the percentage of medical expenses covered by government health insurance among total medical expenses covered by any kind of health insurance is 83.49 percent.
19. From internal documents: standards of per-capita inpatient clearing fees and per-capita inpatient days for regional designated medical institutions in 2006.
20. In China, this department is a CP's agency, which in charge of appointment of the top managers for the government-ownership institutes, such as public hospitals, public school and so on.
21. According to our analysis, for a sample whose choice of health organization is CHC this time, if their satisfaction with CHC at ordinary times is higher, their overall satisfaction with CHC this time is higher. But there is no significant correlation between usage level of CHC and overall satisfaction with CHC this time.

References

Akin, J. S., N. Birdsall, and D.M.D. Ferranti. 1987. Financing Health Services in Developing Countries: An Agenda for Reform, Volume 34. World Bank.

Barton, D. L. 1992. Core Capabilities and Core Rigidities: A Paradox in Managing New Product Development. Strategic Management Journal 13: 111–125.

Bhat, D. R. 1996. Regulating the Private Health Care Sector: The Case of the Indian Consumer Protection Act. Health Policy and Planning 11: 265–279.

Bloom, G., B. Kanjilal, and D. H. Peters. 2008. Regulating Health Care Markets in China and India: Regulatory Approaches Based on Functioning Local Institutions Seem to Work Best in Both Countries. Health Affairs 27(4): 952–963.

China National Health Economics Institute. 2007. China National Health Account Report. Beijing: China National Health Economics Institute.

Christoffer, G. P. 2002. New Public Management Reforms of the Danish and Swedish Welfare States: The Role of Different Social Democratic Responses. Governance: An International Journal of Policy, Administration, and Institutions 15(2): 271–294.

D'Aunno, T., M. Succi, and J. A. Alexander. 2000. The Role of Institutional and Market Forces in Divergent Organizational Change. Administrative Science Quarterly 45(4): 679–703.

Eggleston, K., L. Ling, Q. Meng, M. Lindelow, and A. Wagstaff. 2008. Health Service Delivery in China: A Literature Review. Health Economics 17: 149–165.

Eggleston, K., R. Zhang, R. J. Zeckhauser. 2010. The Global Challenge of Antimicrobial Resistance: Insights from Economic Analysis. International Journal of Environmental Research and Public Health 7: 3141–49.

Geyndt, W. D. 1999. Health Workforce Development: A Global View. In *NIS/US Health Workforce Planning* 2000: 26–48.

Gibson, J. L., D. K. Martin, and P. A. Singer. 2004. Setting Priorities in Health Care Organizations: Criteria, Processes, and Parameters of Success. BMC Health Services Research 4: 25–33.

Greene, W. H. 2000. Econometric Analysis. 4th ed. Upper Saddle River, NJ: Prentice Hall.

Gupta, N., P. Zurn, K. Diallo, and M.R.D. Poz. 2003. Uses of Population Census Data for Monitoring Geographical Imbalance in the Health Workforce: Snapshots from Three Developing Countries. International Journal for Equity in Health 2:11.

Harpham, T., and M. Tanner. 1995. Urban Health in Developing Countries: Progress and Prospects. Earthscan.

Laing, A. W., and C. Shiroyama. 1995. Managing Capacity and Demand in a Resource Constrained Environment: Lessons for the NHS. Journal of Management in Medicine 9(5): 51–67.

Linder-Pelz, S. 1982. Toward a Theory of Patient Satisfaction. Social Science & Medicine 16: 577–82.

Liu, P. 2006. Cooperative Medical-Care System and Political Legitimacy: A Case Study of Health and Politics. Journal of Central China Normal University (Social Sciences Edition) 2: 24–31.

Liu, Y. L., W. C. Hsiao, and K. Eggleston. 1999. Equity in health and health care: the Chinese experience. Social Science and Medicine 49:1349–1356.

March, J. G., and J. P. Olsen. 1975. The Uncertainty of the Past: Organizational Learning under Ambiguity. European Journal of Political Research 3(2): 147–171.

Ministry of Health. 2006. China Health Statistical Yearbook 2006. Beijing: Peking Union Medical College Press.

Ministry of Health. 2007. China Health Statistical Yearbook 2007. Beijing: Peking Union Medical College Press.

Ministry of Health. 2008. China Health Statistical Yearbook 2008. Beijing: Peking Union Medical College Press.

Ministry of Health. 2009a. China Health Statistical Yearbook 2009. Beijing: Peking Union Medical College Press.

Pierskallaa, W. P., and D. J. Brailerb. 1994. Chapter 13 Applications of Operations Research in Health Care Delivery. Handbooks in Operations Research and Management Science 6: 469–505.

Powell, W. W., and P. J. DiMaggio (ed.). 1991. The New Institutionalism in Organizational Analysis. Chicago: University of Chicago Press.

Ruef, M. 2000. The Emergence of Organizational Forms: A Community Ecology Approach. American Journal of Sociology 106(3): 658–714.

Sanitary Information Statistics Center of Ministry of Health. 2005. Abstract of the Report on the 3rd National Health Service Investigation and Analysis. Chinese Hospital 9(1): 3–11.

Scott, W. R., M. Ruef, P. J. Mendel, and C. A. Caronna. 2000. Institutional Change and Healthcare Organizations: From Professional Dominance to Managed Care. Chicago: University of Chicago Press.

Shen, Q., and L. Tang. 2010. Patient Preferences, Concerns, and Satisfaction with Providers before the Chinese Urban Health System Reform: A Social Groups Analysis. Working paper at APARC, Stanford University.

Sitzia, J., and N. Wood. 1997. Patient Satisfaction: A Review of Issues and Concepts. Social Science & Medicine 45(12): 1829–1843.

Wang, F., J. Chen, and L. Hu. 2007. The Analysis of the Buzz on the Patients' Satisfaction. Chinese Hospital 11(12): 18–19.

Wang, Y., K. Eggleston, Z. Yu, and Q. Zhang. 2010. Contracting with Private Providers for Primary Care Services: Evidence from Urban China. Working paper.

Yoshitake, K., Y. Arasaki, and S. Kanagawa. 2000. International Cooperation in Hospital Improvement Projects in Developing Countries—A Study of Basic Principles. Technology and Development 13: 55–62.

Young, G. J., M. Meterko, and K. R. Desai. 2000. Patient Satisfaction with Hospital Care: Effects of Demographic and Institutional Characteristics. Medical Care 38: 325–34.

Zurn, P., M.R.D. Poz, B. Stilwell, and O. Adams. 2004. Imbalance in the Health Workforce. Human Resources for Health 2: 13.

Figure 1. Explanation Framework in Institutional Approach

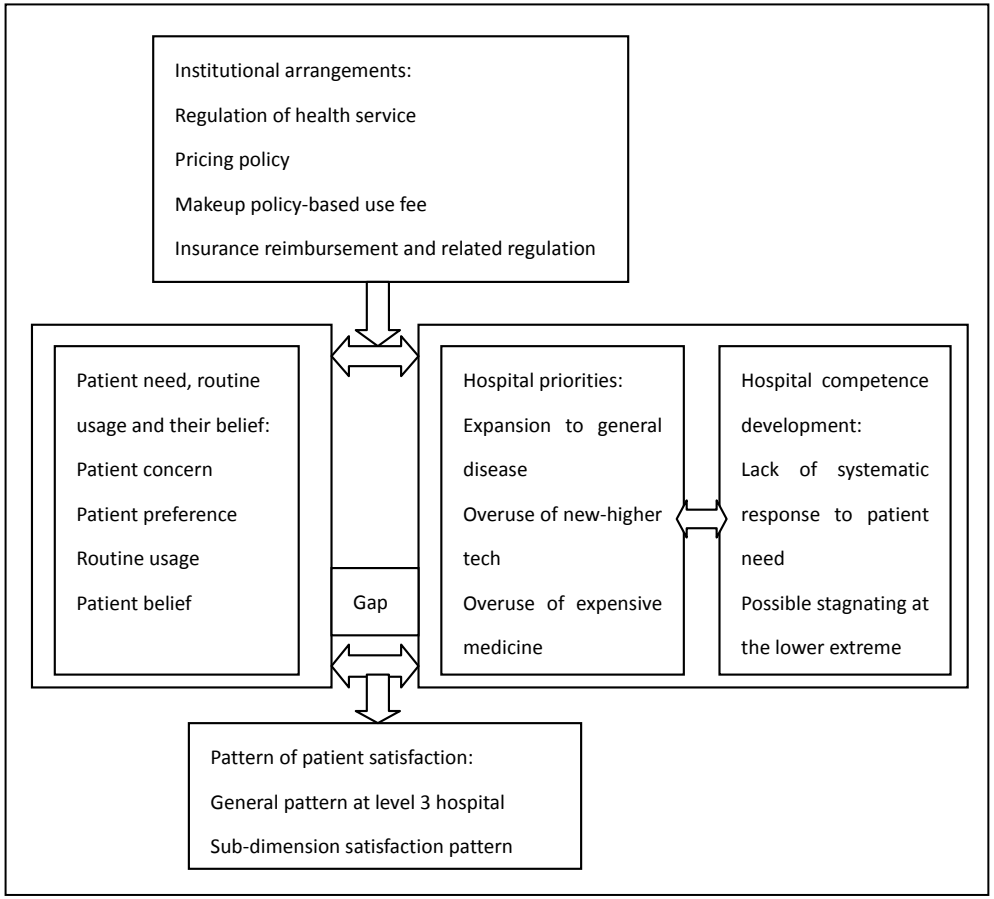


Table 1. Descriptive Statistics of General Satisfaction and Health Organization Distribution

		Overall satisfaction with the hospital									
		Completely satisfied		Relatively satisfied		Basically satisfied		Unsatisfied		Total	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Age	[18-30)	36	3.93%	604	66.01%	153	16.72%	122	13.33%	915	100.00%
	[31-45)	40	4.66%	573	66.78%	148	17.25%	97	11.30%	858	100.00%
	[46-55)	47	5.70%	582	70.63%	123	14.93%	72	8.74%	824	100.00%
	[56-	68	7.47%	627	68.90%	139	15.27%	76	8.35%	910	100.00%
Severity of disease	Not serious	52	5.19%	705	70.43%	157	15.68%	87	8.69%	1001	100.00%
	General	79	4.38%	1238	68.59%	316	17.51%	172	9.53%	1805	100.00%
	Serious	54	9.94%	358	65.93%	56	10.31%	75	13.82%	543	100.00%
	Unknown	6	3.80%	85	53.80%	34	21.52%	33	20.89%	158	100.00%
Stage of disease	Emergency with serious condition	42	7.64%	373	67.82%	63	11.45%	72	13.09%	550	100.00%
	Nonemergency with initial-stage disease	100	4.81%	1421	68.35%	364	17.51%	194	9.33%	2079	100.00%
	Nonemergency with medium-stage disease	27	5.07%	356	66.79%	79	14.82%	71	13.32%	533	100.00%
	Nonemergency with late-stage but stable disease	21	6.16%	236	69.21%	55	16.13%	29	8.50%	341	100.00%

Table 1. Descriptive Statistics of General Satisfaction and Health Organization Distribution (Continued)

		The distribution of health organization											
		CHC		Level 1 hospital		Level 2 hospital		Level 3 hospital		Private and other		Total	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Age	[18-30)	171	19.17%	114	12.78%	225	25.22%	245	27.47%	137	15.36%	892	100.00%
	[31-45)	153	18.82%	97	11.93%	223	27.43%	224	27.55%	116	14.27%	813	100.00%
	[46-55)	151	18.97%	111	13.94%	232	29.15%	208	26.13%	94	11.81%	796	100.00%
	[56-	145	16.38%	121	13.67%	256	28.93%	261	29.49%	102	11.53%	885	100.00%
Severity of disease	Not serious	230	24.29%	135	14.26%	208	21.96%	205	21.65%	169	17.85%	947	100.00%
	General	344	19.66%	206	11.77%	523	29.89%	446	25.49%	231	13.20%	1750	100.00%
	Serious	34	6.31%	74	13.73%	159	29.50%	239	44.34%	33	6.12%	539	100.00%
	Unknown	12	8.00%	28	18.67%	46	30.67%	48	32.00%	16	10.67%	150	100.00%
Stage of the disease	Emergency with serious condition	49	8.99%	81	14.86%	166	30.46%	219	40.18%	30	5.50%	545	100.00%
	Non-emergency with initial stage disease	438	21.93%	267	13.37%	528	26.44%	459	22.98%	305	15.27%	1997	100.00%
	Non-emergency with medium stage disease	66	12.55%	58	11.03%	170	32.32%	163	30.99%	69	13.12%	526	100.00%
	Non-emergency with late stage but stable disease	67	21.34%	35	11.15%	71	22.61%	97	30.89%	44	14.01%	314	100.00%

Table 2. Descriptive Statistics of General Preference

	CHC		Level 1 hospital		Level 2 hospital		Level 3 hospital		Private and other	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Preference of service attitude	310	20.42%	199	19.63%	442	19.71%	419	18.41%	207	19.20%
Preference of technical quality	511	33.66%	339	33.43%	790	35.24%	801	35.19%	362	33.58%
Preference of price	455	29.97%	288	28.40%	628	28.01%	633	27.81%	333	30.89%
Preference of facilities and environment	242	15.94%	188	18.54%	382	17.04%	423	18.59%	176	16.33%
Total	1518	100.00%	1014	100.00%	2242	100.00%	2276	100.00%	1078	100.00%

Table 3. Descriptive Statistics of Core Concern

	CHC		Level 1 hospital		Level 2 hospital		Level 3 hospital		Private and other	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Concern about overall competences of delivery organization	75	57.69%	194	90.65%	353	93.39%	480	97.17%	149	64.50%
Concern about institution's quality	22	16.92%	120	56.07%	195	51.59%	312	63.16%	32	13.85%
Concern about institution's doctor	46	35.38%	67	31.31%	140	37.04%	152	30.77%	108	46.75%
Concern about institution's service	7	5.38%	7	3.27%	18	4.76%	16	3.24%	9	3.90%
Concern about institution's price	55	42.31%	20	9.35%	25	6.61%	14	2.83%	82	35.50%
Total	130	100.00%	214	100.00%	378	100.00%	494	100.00%	231	100.00%

Appendix

The Structural Difference Model

Following the notation in Wooldridge (2002) and Greene (2000), structural difference analysis is used to verify the equality or inequality of coefficients in separate subsamples. Data were examined prior to modeling to ensure that they met assumptions for the technique. Then the form of our general structural difference model is as follows:

$$Y = X\beta + \varepsilon = \beta_0 + \begin{pmatrix} X_{1`} \\ ... \\ X_n \end{pmatrix} \beta + \varepsilon \tag{1}$$

Here, X_i can be a sub-vector (for one sample) or sub-matrix (for a subgroup of the sample). We want to test whether there is a structural difference among β for a different X_i. We introduce structural difference coefficients β_i for X_i. Then the previous model can be rewritten as

$$\begin{aligned} Y = X\beta + \varepsilon &= \beta_0 + \begin{pmatrix} X_{1`} * (\beta_{benchmark} + \beta_1) \\ ... \\ X_n * (\beta_{benchmark} + \beta_n) \end{pmatrix} + \varepsilon \\ &= \beta_0 + \begin{pmatrix} X_{1`} \\ ... \\ X_n \end{pmatrix} \beta_{benchmark} + \sum_{i=1}^{n} \begin{pmatrix} 0 \\ X_i \\ 0 \end{pmatrix} \beta_i + \varepsilon \end{aligned} \tag{2}$$

So we only have to test whether $\beta_i, i = 1, 2, ..., n$ is significant, and if it is significant, whether it is positive or negative. If β_i is significantly positive, there is a significant positive structural difference of β_i for X_i relative to $\beta_{benchmark}$ for the whole sample. If β_i is significantly negative, there is a significant negative structural difference of β_i for X_i relative to $\beta_{benchmark}$ for the whole sample. If β_i is insignificant, there is no structural difference of β_i for X_i relative to $\beta_{benchmark}$ for the whole sample.

Models of different correlations were estimated using Stata, version 11.0. We employed t-test to study the significance of the structural difference coefficient β_i.

The Ordered Probit Model

Ordered probit is a generalization of the popular probit analysis of the case of more than two outcomes of an ordinal-dependent variable. Since the latent evaluation score y_{it} is a linear function of our independent variables written as a vector x_{it}, and $y_{it} = x_{it} * b + \varepsilon_{it}$, where b is a vector of coefficients and ε_{it} is assumed to follow a standard normal distribution. Using an ordered probit model with one cutoff point as an example: defining p as the cutoff points of all y_{it}, we have a discrete effect for $y_{it} \le p$ and $y_{it} > p$. Following the notation in Wooldridge (2002), the ordered probit model is expressed as

$$\Pr ob(y_{it} = 0 \left| x_{it}) = \Phi(p - x_{it} * b\right) \tag{3}$$

$$\Pr ob(y_{it} = 1 \left| x_{it}) = 1 - \Phi(p - x_{it} * b\right) \tag{4}$$

where Φ is the cumulative standard normal distribution function.

The marginal effect of x_{it} on the probability of binary can be calculated according to this formula, following Wooldridge (2002, 506):

$$\partial \Pr ob(y_{it} = 0 \left| x_{it}) / \partial x_{it} = -b * \Phi(p - x_{it} * b\right) \tag{5}$$

$$\partial \Pr ob(y_{it} = 1 \left| x_{it}) / \partial x_{it} = b * \Phi(p - x_{it} * b\right) \tag{6}$$

where Φ is the standard normal density function, and based on (5) and (6) we can estimate the vector of coefficient b.

Other Figures and Tables as References

<Figure 1 in Appendix: General Description of Delivery Organization>
<Figure 2 in Appendix: Description of Patient's some Properties in different Level Delivery Organization>
<Figure 3 in Appendix: Description of expenditure in different level delivery organization>
<Figure 4 in Appendix: Description of patient's satisfaction in different level delivery organization>
<Figure 5 in Appendix: Description of central and provincial level 3 hospitals' expansion>
<Table 1 in Appendix: Descriptive statistics of *Yi yao yang yi* belief>
<Table 2 in Appendix: The results of regression between choice of delivery organization and general preference>
<Table 3 in Appendix: The results of regression between choice of delivery organization and core concern>
<Table 4 in Appendix: The results of regression between choice of delivery organization-general preference and overall satisfaction>
<Table 5 in Appendix: The results of regression between choice of delivery organization-core concern and overall satisfaction>
<Table 6 in Appendix: The results of structural difference regression between dimensions and overall satisfaction>
<Table 7 in Appendix: The results of regression between routine choice of health organization and overall satisfaction>
<Table 8 in Appendix: The results of structural difference regression between *Yi yao yang yi* belief and overall satisfaction>

Figure 1 in Appendix. General Descriptions of Delivery Organizations

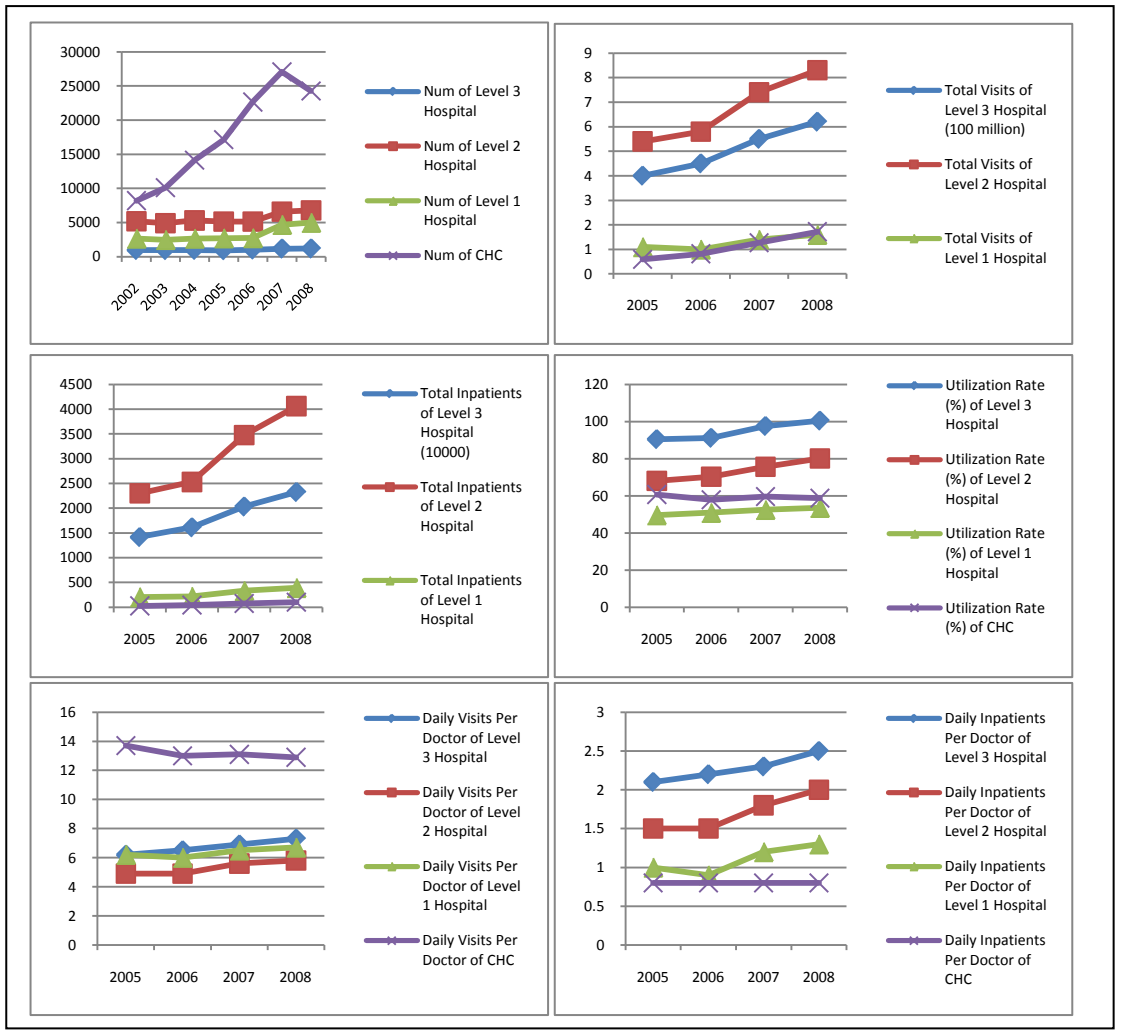
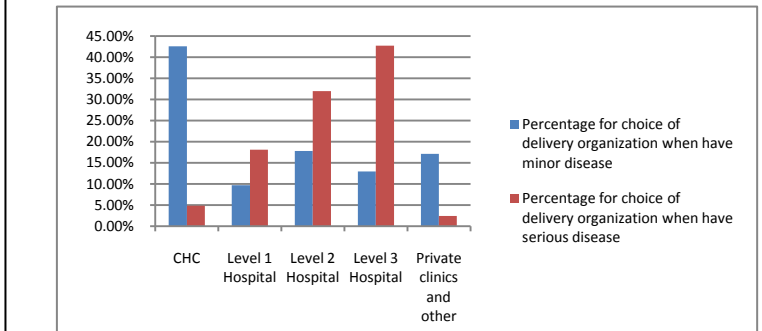
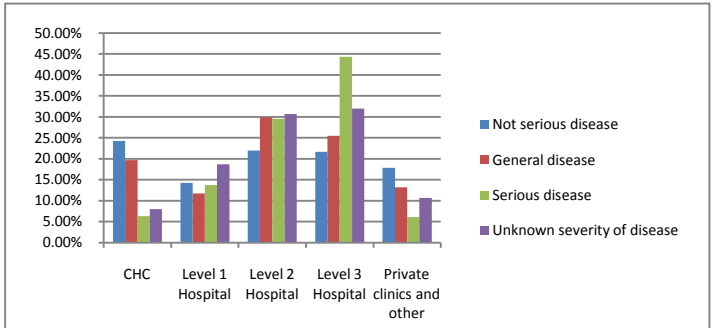
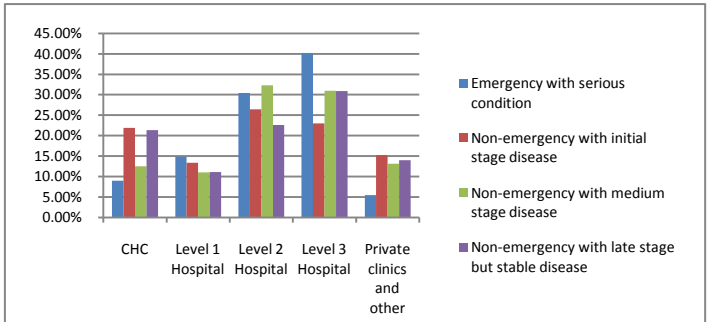
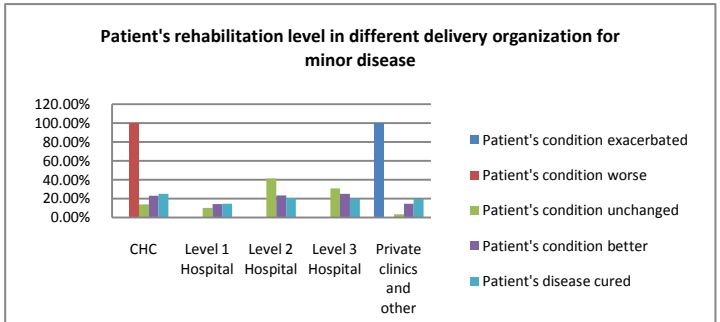


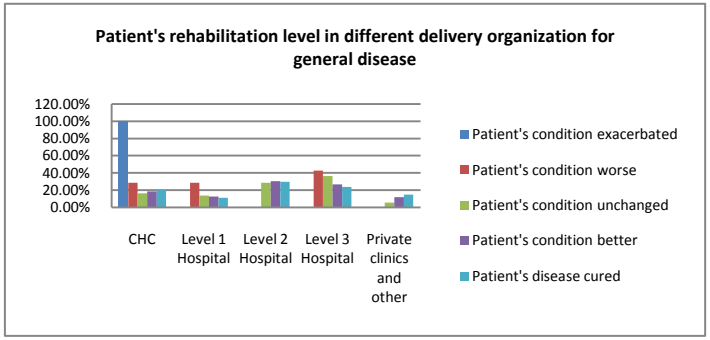
Figure 2 in Appendix. Descriptions of Patients' Properties in Various Delivery Organizations











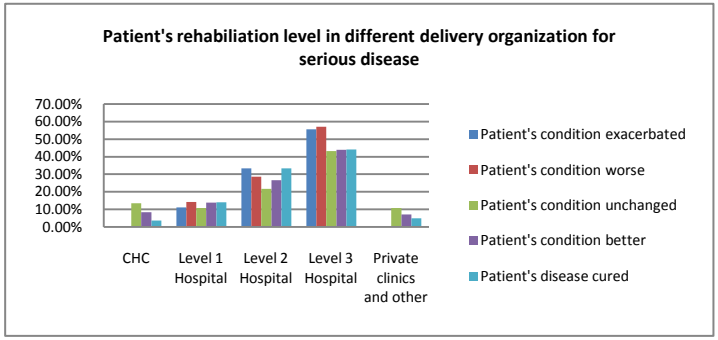


Figure 3 in Appendix. Descriptions of Expenditure in Various Delivery Organizations

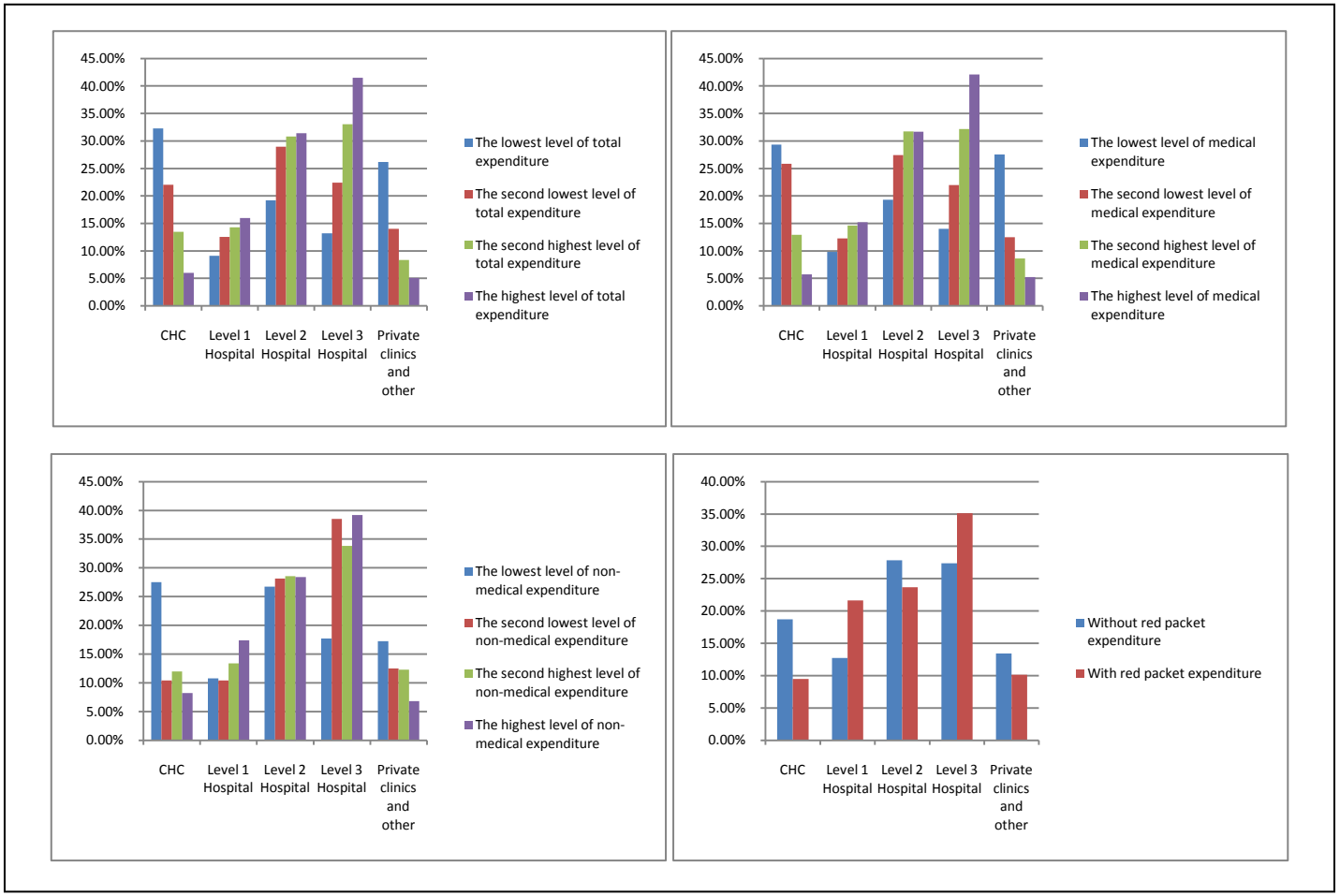


Figure 4 in Appendix. Descriptions of Patient's Satisfaction in Various Delivery Organizations

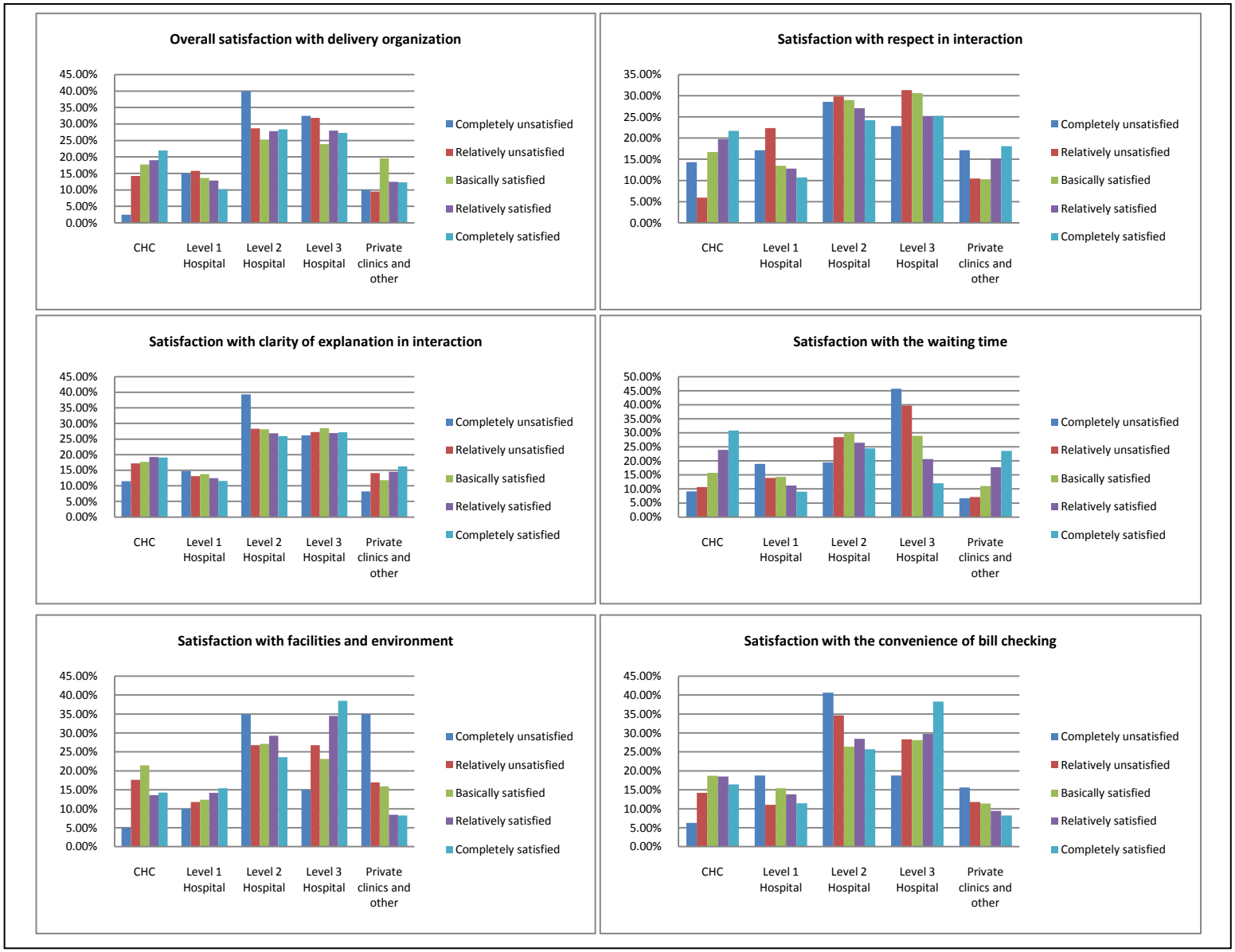


Figure 5 in Appendix. Descriptions of Central and Provincial Level 3 Hospitals' Expansion

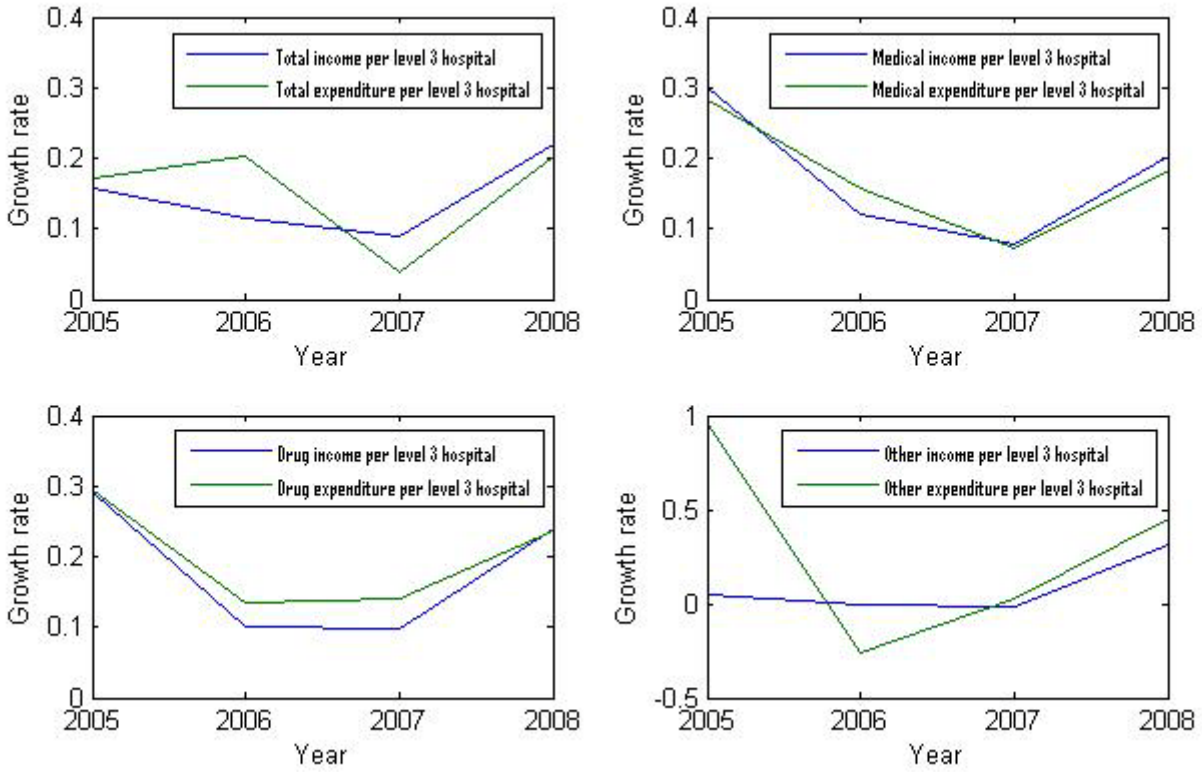


Table 1 in Appendix. Descriptive Statistics of Belief in *Yi Yao Yang Yi*

		CHC		Level 1 Hospital		Level 2 Hospital	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Yi yao yang yi	No support	359	58.00%	244	55.33%	502	53.86%
	Support	260	42.00%	197	44.67%	430	46.14%
	Total	619	100.00%	441	100.00%	932	100.00%
		Level 3 Hospital		Private and Other		Total	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Yi yao yang yi	No support	554	59.19%	233	52.01%	1892	56.04%
	Support	382	40.81%	215	47.99%	1484	43.96%
	Total	936	100.00%	448	100.00%	3376	100.00%

Table 2 in Appendix. Results of Regression between Choice of Delivery Organization and General Preference

	(1)	(2)	(3)	(4)
	Preference of service attitude dummy	Preference of technical quality dummy	Preference of price dummy	Preference of facilities and environment dummy
Choice of delivery organization	-0.0377*	0.0608**	-0.0449*	0.0431*
	(-1.67)	(2.27)	(-1.90)	(1.90)
Age dummy variable	Yes	Yes	Yes	Yes
Medical expense and reimbursement instrumental variable (last year)	Yes	Yes	Yes	Yes
cut1	-0.00385	-0.740***	-0.507***	0.352***
_cons	(-0.04)	(-7.02)	(-5.41)	(3.89)
N	2519	2519	2519	2519
chi2	20.99	10.41	9.051	8.201

t statistics in parentheses, * $p < 0.10$，** $p < 0.05$，*** $p < 0.01$

Table 3 in Appendix. Results of Regression between Choice of Delivery Organization and Core Concern

	(1)	(2)	(3)	(4)	(5)
	Concern about whole institution dummy	Concern about institution's quality dummy	Concern about institution's doctor dummy	Concern about institution's service dummy	Concern about institution's price dummy
Choice of delivery organization	0.299***	0.312***	0.104***	0.0549	-0.234***
	(11.80)	(10.75)	(3.43)	(0.89)	(-5.07)
Age dummy variable	Yes	Yes	Yes	Yes	Yes
Medical expense and reimbursement instrumental variable (last year)	Yes	Yes	Yes	Yes	Yes
Severity-of-disease dummy variable	Yes	Yes	Yes	Yes	Yes
Stage-of-disease dummy variable	Yes	Yes	Yes	Yes	Yes
cut1	0.983***	1.628***	1.226***	1.915***	1.460***
_cons	(5.70)	(8.48)	(5.85)	(4.89)	(3.96)
N	2515	2515	2515	2515	2515
chi2	201.1	161.8	31.30	7.477	40.75

t statistics in parentheses, * $p < 0.10$， ** $p < 0.05$， *** $p < 0.01$

Table 4 in Appendix. Results of Regression between Choice of Delivery Organization—General Preference and General Satisfaction

	(1)	(2)	(3)	(4)
	Overall satisfaction with the hospital			
Choice of delivery organization	-0.0369**	-0.0271	-0.0132	-0.0424***
	(-2.56)	(-1.46)	(-0.86)	(-2.93)
Choice of delivery organization * Preference of service attitude dummy	0.00653			
	(0.64)			
Choice of delivery organization * Preference of technical quality dummy		-0.00787		
		(-0.55)		
Choice of delivery organization * Preference of price dummy			-0.0314***	
			(-2.87)	
Choice of delivery organization * Preference of facilities and environment dummy				0.0181*
				(1.76)
Age dummy variable	Yes	Yes	Yes	Yes
Medical expense and reimbursement instrumental variable (last year)	Yes	Yes	Yes	Yes
_cons	3.721***	3.719***	3.716***	3.722***
	(69.19)	(69.17)	(69.21)	(69.25)
N	2519	2519	2519	2519
adj. R-sq	0.006	0.006	0.009	0.007

t statistics in parentheses, * $p < 0.10$， ** $p < 0.05$， *** $p < 0.01$

Table 5 in Appendix. Results of Regression between Choice of Delivery Organization—Core Concern and General Satisfaction

	(1)	(2)	(3)	(4)	(5)
	Overall satisfaction with the hospital				
Choice of delivery organization	-0.0470***	-0.0359**	-0.0322**	-0.0294**	-0.0282**
	(-3.09)	(-2.44)	(-2.27)	(-2.10)	(-2.01)
Choice of delivery organization * Concern about whole institution dummy	0.0322***				
	(3.11)				
Choice of delivery organization * Concern about institution's quality dummy		0.0193*			
		(1.69)			
Choice of delivery organization * Concern about institution's doctor dummy			0.0238*		
			(1.65)		
Choice of delivery organization * Concern about institution's service dummy				0.0593	
				(1.49)	
Choice of delivery organization * Concern about institution's price dummy					0.0149
					(0.40)
Age dummy variable	Yes	Yes	Yes	Yes	Yes
Medical expense and reimbursement instrumental variable (last year)	Yes	Yes	Yes	Yes	Yes
Severity-of-disease dummy variable	Yes	Yes	Yes	Yes	Yes
Stage-of-disease dummy variable	Yes	Yes	Yes	Yes	Yes
_cons	3.759***	3.757***	3.797***	3.799***	3.797***
	(43.45)	(43.36)	(44.25)	(44.27)	(44.21)
N	2515	2515	2515	2515	2515
adj. R-sq	0.016	0.013	0.013	0.013	0.012

t statistics in parentheses, * $p < 0.10$， ** $p < 0.05$， *** $p < 0.01$

Table 6 in Appendix. Results of Structural Difference Regression between Dimensions and General Satisfaction

	(1)		(2)
	Overall satisfaction with the hospital		Overall satisfaction with the hospital
Satisfaction with respect in interactions	0.387***	Satisfaction with clarity of explanations in interactions	0.383***
(Benchmark)	(22.82)	(Benchmark)	(23.05)
Satisfaction with respect in interactions	0.0321***	Satisfaction with clarity of explanations in interactions	0.0384***
(Structural difference of CHC)	(3.03)	(Structural difference of CHC)	(3.52)
Satisfaction with respect in interactions	0.0165	Satisfaction with clarity of explanations in interactions	0.0146
(Structural difference of level 1 hospital)	(1.39)	(Structural difference of level 1 hospital)	(1.20)
Satisfaction with respect in interactions	0.0300***	Satisfaction with clarity of explanations in interactions	0.0294***
(Structural difference of level 2 hospital)	(3.04)	(Structural difference of level 2 hospital)	(2.92)
Satisfaction with respect in interactions	0.0275***	Satisfaction with clarity of explanations in interactions	0.0202**
(Structural difference of level 3 hospital)	(2.76)	(Structural difference of level 3 hospital)	(1.99)
Rehabilitation-level dummy variable	Yes	Rehabilitation-level dummy variable	Yes
Medical expense and reimbursement instrumental variable	Yes	Medical expense and reimbursement instrumental variable	Yes
Complaints of adverse events control variable	Yes	Complaints of adverse events control variable	Yes
_cons	1.792***	_cons	1.838***
	(10.13)		(10.50)
N	3482	N	3482
adj. R-sq	0.189	adj. R-sq	0.197

Table 6 in Appendix. Results of Structural Difference Regression between Dimensions and General Satisfaction (Continued)

	(3)		(4)
	Overall satisfaction with the hospital		Overall satisfaction with the hospital
Satisfaction with the waiting time	0.122***	Satisfaction with facilities and environment	0.337***
(Benchmark)	(8.85)	(Benchmark)	(16.20)
Satisfaction with the waiting time	0.0306***	Satisfaction with facilities and environment	0.0365***
(Structural difference of CHC)	(2.67)	(Structural difference of CHC)	(2.89)
Satisfaction with the waiting time	0.0194	Satisfaction with facilities and environment	-0.0172
(Structural difference of level 1 hospital)	(1.40)	(Structural difference of level 1 hospital)	(-1.27)
Satisfaction with the waiting time	0.0272**	Satisfaction with facilities and environment	0.00365
(Structural difference of level 2 hospital)	(2.46)	(Structural difference of level 2 hospital)	(0.32)
Satisfaction with the waiting time	0.0378***	Satisfaction with facilities and environment	-0.0129
(Structural difference of level 3 hospital)	(3.19)	(Structural difference of level 3 hospital)	(-1.13)
Rehabilitation-level dummy variable	Yes	Rehabilitation-level dummy variable	Yes
Medical expense and reimbursement instrumental variable	Yes	Medical expense and reimbursement instrumental variable	Yes
Complaints of adverse events control variable	Yes	Complaints of adverse events control variable	Yes
_cons	2.785***	_cons	2.114***
	(15.10)		(11.41)
N	3482	N	3482
adj. R-sq	0.069	adj. R-sq	0.121

Table 6 in Appendix. Results of Structural Difference Regression between Dimensions and General Satisfaction (Continued)

	(5)
	Overall satisfaction with the hospital
Satisfaction with the convenience of bill checking	0.340***
(Benchmark)	(14.83)
Satisfaction with the convenience of bill checking	0.0244
(Structural difference of CHC)	(1.54)
Satisfaction with the convenience of bill checking	0.00295
(Structural difference of level 1 hospital)	(0.17)
Satisfaction with the convenience of bill checking	0.0201
(Structural difference of level 2 hospital)	(1.36)
Satisfaction with the convenience of bill checking	0.00409
(Structural difference of level 3 hospital)	(0.28)
Rehabilitation-level dummy variable	Yes
Medical expense and reimbursement instrumental variable	Yes
Complaints of adverse events control variable	Yes
_cons	2.521***
	(10.25)
N	2084
adj. R-sq	0.170

t statistics in parentheses, * $p < 0.10$， ** $p < 0.05$， *** $p < 0.01$

Table 7 in Appendix. Results of Regression between Routine Choice of Health Organization and Overall Satisfaction

	(1)	(2)
	Overall satisfaction with the hospital	Overall satisfaction with the hospital
	Sample with severity of disease not serious or normal this time	Sample with severity of disease serious this time
Choice of medical institution for minor disease	-0.0412***	
	(-2.73)	
Choice of medical institution for serious disease		0.0700
		(1.53)
Stage-of-disease dummy variable	Yes	Yes
_cons	3.731***	3.378***
	(55.36)	(19.54)
N	1772	524
adj. R-sq	0.005	-0.000

t statistics in parentheses, * $p<0.10$，** $p<0.05$，*** $p<0.01$

Table 8 in Appendix. Results of Structural Difference Regression between *Yi Yao Yang Yi* Belief and General Satisfaction

	(1)
	Overall satisfaction with the hospital
Yi yao yang yi belief dummy	-0.111**
(Benchmark)	(-1.99)
Yi yao yang yi belief dummy	0.105
(Structural difference of CHC)	(1.43)
Yi yao yang yi belief dummy	-0.0940
(Structural difference of level 1 hospital)	(-1.18)
Yi yao yang yi belief dummy	-0.0645
(Structural difference of level 2 hospital)	(-0.98)
Yi yao yang yi belief dummy	-0.136**
(Structural difference of level 3 hospital)	(-2.03)
Age dummy variable	Yes
Medical expense and reimbursement instrumental variable (last year)	Yes
Severity-of-disease dummy variable	Yes
Stage-of-disease dummy variable	Yes
cut1	3.510***
_cons	(41.55)
N	2948
chi2	0.026

t statistics in parentheses, * $p < 0.10$， ** $p < 0.05$， *** $p < 0.01$