2014 Ackoff Fellowship Application
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The effect of limited and tiered provider networks on utilization, quality, and cost of care

Background and goals of the proposed research

Background: This research studies the effect of health insurance plans with tiered provider networks on the health care market. In a limited network, insurers only pay for care sought by their patients from among a limited list of providers. Tiered networks are a subset of limited networks, in which patients also face differential out-of-pocket costs for care sought from providers in different groups. Since the early 2000s, limited- and tiered-network health insurance plans have become increasingly common, as insurers and employers look for mechanisms to minimize their costs (Fronstin 2003; Thomas, Nalli and Coburn 2007). Market penetration of such plan designs is slated to continue to increase on the new health insurance exchanges set up under the Affordable Care Act ( McKinsey 2014).

Proponents of tiered networks contend that tiering can be used to reduce health care costs and/or improve quality of care. According to these arguments, tiering allows insurers to negotiate lower rates with providers and steer patients towards high-quality providers by assigning them to low cost-sharing tiers (Mays, Claxton and Strunk 2003; Sinaiko 2012). Moreover, in the case of tiered-network plans with substantial patient cost-sharing in unfavorable tiers, these plans may attenuate patient moral hazard by exposing patients to a larger share of the marginal cost of care (Mays, Claxton and Strunk 2003). Detractors argue that tiers are determined primarily on the basis of price, and can therefore adversely affect quality of care for patients (AMA 2006). To my knowledge, the proposed project is the first to examine the effects of tiered networks empirically.

Project goals and theoretical motivation: This research will estimate the effects of tiered provider networks on the quality and cost of health care. The outcomes of interest are health care quality adjustments by providers, the shifting of patients to more efficient providers, cost of care for consumers, and overall health care costs. In theory, when an insurer can threaten to reduce a provider’s business by excluding the provider from its network or assigning the provider to an unfavorable tier, the insurer improves its bargaining position vis-à-vis the provider. This allows the insurer to incentivize quality improvement by the provider and/or negotiate lower prices. However, no study to date has looked at whether tiered networks have actually led providers to improve quality or reduce prices. Furthermore, this project would be the first to examine market-wide shifts of patients to efficient providers as a result of insurance plan design, rather than looking at isolated programs.

Planned methodology

Empirical framework: This research will estimate the effects of limited- and tiered-network plans on consumers’ insurance choice, health insurance premiums, prices paid to providers, health care quality adjustments by providers, and overall health care costs. The first step is to estimate a model of patient demand for the inclusion of providers in particular network tiers. Relevant provider and patient characteristics are taken from the literature (e.g. Town and Vistnes 2001), and include distance, diagnosis, provider specialty, and provider quality metrics. The second step is to estimate insurer profits from a given plan structure, which will take as inputs the demand model and an economic model of strategic interactions in the market. A key component of this model is the bargaining game between insurers and providers over price.
Data: The empirical context for this project is the state of Massachusetts, starting in 2009. Data for the project will come from three main sources. First, I have hand-collected a unique dataset of Massachusetts hospitals’ longitudinal tier assignments by the state’s three largest private health insurers. Second, data on insurer and provider characteristics such as enrollment, average premiums, quality measures, and hospital service offerings has been collected from various sources: CMS’s Hospital Compare tool, the National Association for Insurance Commissioners, and the Massachusetts Center for Health Information and Analysis (CHIA). The third and final source of data is CHIA’s All Payer Claims Database, which includes all private medical claims from Massachusetts from 2009 to 2012. This is a proprietary data source which charges a fee for data extracts; I am requesting Ackoff Fellowship funding to help defray the cost of the data extract and the cost of storing it on a secure server. This research uses sensitive health care data, and is therefore governed by federal Human Subjects Research regulations. Penn’s Institutional Review Board (IRB) has reviewed the proposal and declared it exempt under Category 4 on May 27, 2014.

Preliminary results: Using the data on provider tier assignments and insurer and provider characteristics, I have carried out a number of preliminary analyses. These analyses have shown that although all Massachusetts insurers nominally use price and quality measures to determine provider tiers, there is variation both over time and across insurers in final tier assignments. All insurers put high-priced providers in the least favorable tier, more or less irrespective of quality; however, placement in the top tier requires providers to meet some quality benchmarks in addition to being lower-priced. This suggests that any steering of patients to higher-quality providers is not uniform across insurance plans. In addition, there is suggestive evidence of insurers selecting the quality metrics which vary least across providers for use in their tiering formulas. If this finding holds up in the full analysis, it will provide cause for skepticism about tiered plans’ ability to raise quality of care.

Reasons for seeking funding

The funds will be used to pay for data acquisition for the All Payer Claims Database from CHIA and for housing the sensitive patient data on a secure server. The data includes all private medical claims in Massachusetts from 2009 to 2012. The full cost of the data extract for academic researchers is $12,500. CHIA is currently reviewing my request for a 50% student discount, which would reduce the acquisition cost to $6,250 if granted. The majority of discount requests made by PhD students are approved.

Although these data costs are nontrivial, Massachusetts remains the best setting for studying limited and tiered networks, since all three of its largest insurers (Blue Cross Blue Shield, Harvard Pilgrim, and Tufts), representing nearly 80% of the market, have tiered-network products. In other states, it is typical for only one or two smaller insurers to offer tiered-network plans. The Massachusetts claims data also include several important variables, such as transaction prices between insurers and health care providers, that are not commonly found in other medical claims data.

Since medical claims data are governed by federal HIPAA privacy rules, there are stringent security requirements for storing the data. The data will therefore need to be housed on the Health Services Research Data Center (HSRDC), which is administered by Penn’s Leonard Davis Institute of Health Economics and the School of Medicine. The HSRDC administrators have provided a cost estimate of $2,100 for data storage for this project.
Explanation of Budget

Use of funds and justification

If granted, Ackoff Fellowship funds will be used to pay for data acquisition of the All Payer Claims Database from the Massachusetts Center for Health Information and Analysis (CHIA). The full cost of the data extract for academic researchers is $12,500. CHIA is currently reviewing my request for a 50% student discount, which would reduce the acquisition cost to $6,250. The majority of discount requests made by PhD students are approved. The other main cost of the project is the storage of the sensitive patient data on the high-security HSRDC server according to the security policies outlined in the Data Use Agreement with CHIA. The HSRDC administrators have provided a cost estimate of $2,100 for data storage for this project.

Anticipated expenses

<table>
<thead>
<tr>
<th>Data acquisition from CHIA (partial subsidy)</th>
<th>$1,900</th>
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<tr>
<td>Data storage at HSRDC</td>
<td>$2,100</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$4,000</strong></td>
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Alternative sources of funding

There is currently no grant or departmental funding for this project. The Department of Health Care Management funds $500 of student travel and registration for domestic conferences (occasionally up to $1,000, with preference given to students presenting their own work). However, the department is not able to support the full direct research costs associated with this project. The department has committed to providing partial support towards the costs of the data acquisition if I am able to secure external funding for the bulk of the cost. The HSRDC has a partial subsidy for graduate student data storage of up to 500GB; this subsidy has already been taken into account in the cost estimates above. The raw files of the Massachusetts claims data are approximately 2.1TB in total.

I plan to apply for external funding for other costs related to this project through the Agency for Healthcare Research and Quality’s dissertation grant program and the Leonard Davis Institute of Health Economics Small Grants Program. Both of these sources have deadlines in November and would not begin funding a project until spring 2015, which would delay my data acquisition and potentially my dissertation completion. Thus, funding from the Ackoff Fellowship would be instrumental in staying on track for my 2016 graduation timeline.
References


