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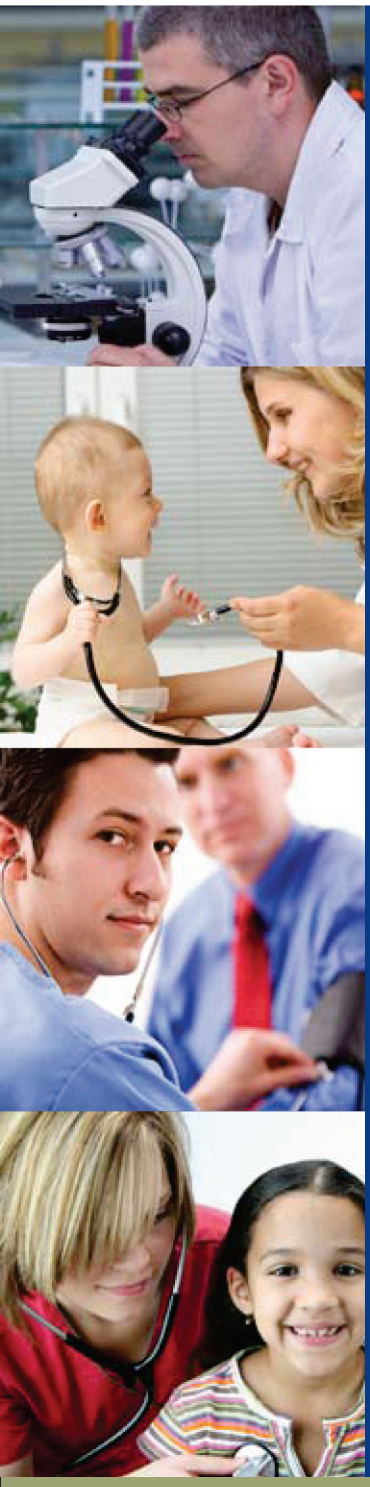

A COMPETITIVE PROCESS FOR PROCURING HEALTH SERVICES:
A Review of Principles with an Application to Cataract Services

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ABSTRACT

Government agencies employ a variety of mechanisms for securing goods and services from the private sector. These include posting prices, reimbursing for costs, and soliciting competitive bids. Procurement of healthcare services offers several unique challenges. The supplier can influence the quantity of services provided. It is often difficult to even specify in advance exactly what services are to be purchased. Lastly, quality is difficult to measure. Healthcare purchasers have deployed a variety of payment mechanisms to cope with these challenges. We apply the theory of procurement to the case of cataract surgery. We recommend implementing a system that combines a gatekeeper with competitive bidding among operating physicians who must perform all necessary services, including treatment for complications, within a global fee. We conclude by discussing the strengths and limitations of this proposal.

EXECUTIVE SUMMARY

Government agencies employ a variety of mechanisms for securing goods and services from the private sector. These include posting prices, reimbursing for costs, and soliciting competitive bids.

The choice of procurement scheme depends on a variety of factors, such as the presence of competing suppliers, the extent to which productive efficiency varies across providers, the degree of product differentiation, asymmetry of information between buyer and seller, and the importance of a fair and transparent procurement mechanism.

Procurement of health care services offers several unique challenges: the supplier can influence the quantity of services provided, it is often difficult even to specify in advance exactly what services are to be purchased, and quality is difficult to measure.

Health care purchasers have deployed a variety of payment mechanisms, each with its own strengths and weaknesses. Ideally, the choice of mechanism should be tailored to the characteristics of the service being purchased. Characteristics to consider include whether providers can influence demand for the service, whether it is difficult to adjust payments for patient severity, whether there is substantial variation in quality, and whether it is easy to measure and reward high quality.

The example of cataract surgery offers an excellent opportunity to explore new methods for procurement: the product is well defined, costs do not depend on patient characteristics, and it is easy to measure quality. Demand, however, is easily induced. We recommend implementing a system that combines a gatekeeper with competitive bidding among operating physicians who must perform all necessary services, including treatment for complications, within a global fee. This should allow Alberta Health Services to secure high-quality services at low prices while keeping to a global budget cap. Competitive bidding is not without risks, however, and Alberta Health Services might need to consider several modifications to traditional bidding schemes.

INTRODUCTION

In Alberta, the body responsible for managing the provision of health care services to residents of the province is Alberta Health Services, which is also tasked with the challenge of ensuring access to high-quality care while keeping to a limited budget. In this report, we evaluate alternative approaches to procuring health care services. We begin by outlining general concepts applicable to different procurement methods, and proceed to a detailed description of methods tailored to health care settings. After considering empirical evidence of the effectiveness of these methods, we summarize our analysis by presenting a mapping of specific service characteristics to optimal procurement elements. We conclude with a detailed proposal for services of the particular example of cataract surgery.

METHODS OF PROCUREMENT

Methods of procurement come in a number of generic forms, many of which apply to health care. There are however, several features particular to health care finance and delivery, which we consider later in the paper.

One of the most commonly used procurement methods is *posted prices*, whereby the buyer announces a price and the first supplier willing to sell at that price closes the transaction (see, for example, Milgrom 1989; Rothkopf and Harstad 1994). Posted prices are widely used in transactions of inexpensive and standardized items. For commodity products, such as gold, electricity, or memory chips, this price can be the "spot price" if a spot market exists.

Another procurement method is *cost-based pricing*, which allows the supplier to set the transaction price based on the supplier's cost. In this method, the supplier is paid a fraction of its cost (often 100%) plus a fee to allow for a profit (see Laffont and Tirole 1994). Cost-based pricing is commonly used in regulated industries such as utilities as a way to limit the profits of "natural monopolies" (this is sometimes called "rate-of-return regulation").

Sole-sourced contracts with a single supplier (or a set of suppliers) are often used for non-standard products that are to be purchased over a long period of time. In this method, price is determined through bilateral negotiations for a period of time that is specified in the contract. Such contracts are often written to assure that neither party exploits the relationship-specific investments that are often inherent in the production of non-standard products. One major limitation of this method — whenever the sales person is not the owner — is that contracts give the procurement agent an opportunity to take kickbacks from the supplier or otherwise act in ways that do not coincide with the interests of the purchaser.

Competitive bidding (or auction), on the other hand, is more transparent and less vulnerable to behind-the-scene agreements. When goods are standardized, competitive bidding can generate prices that would prevail in a competitive market — that is, prices approximate average costs, with minimal economic profits for sellers (see Laffont and Tirole 1994, chap. 7). Competitive bidding can also work well when goods are not standardized or when market prices are highly unstable (see Milgrom 1989; Wang 1993). For example, the purchaser can submit a request for proposals that specifies exact bid requirements, thereby standardizing what would otherwise be differentiated products. Alternatively, the seller could score each point of differentiation on a numeric scale, effectively converting the characteristics of each product into a single number. This again facilitates simple comparisons across bids in a way that promotes competition. One common bidding structure is the "second-price" auction, in which the lowest bidder wins the contract but is paid the bid price of the second-lowest bidder. Second-price auctions encourage bidders to reveal truthfully through their bids their costs of production.[1] The mechanism can be modified to an "Nth price" auction in which there are N – 1 winners, each paid the Nth-lowest bid price. We exploit this property in our proposal for procuring cataract surgery.

[1] For a general summary of this and other auction forms, see Milgrom (1989).

Relational contracting involves less formal contracting mechanisms that rely on both quantitative and qualitative information that is often shaped by experience. Contracting that begins with one of the more formal mechanisms listed above may transform into relational contracting over time. This is especially likely if there are substantial advantages to the incumbent supplier in subsequent rounds of contracting, perhaps as a result of sunk investments in specific assets.[2] As such advantages mount, this could turn what had been a competitive procurement market into one with, effectively, a single dominant seller.[3] In such a case, maximizing static efficiency (selecting a single supplier and realizing efficiencies from sunk investment in specific assets) might come at the expense of long-run efficiency (which might be reduced when alternative suppliers become unviable). In procurement auctions with multiple suppliers and auctions that are repeated at relatively short intervals (say, annually), winning in the current period is less likely to entrench the winning bidders and, similarly, losing in a given round is less likely to render losing bidders unviable.

ASSESSING PROCUREMENT METHODS

In assessing their potential strengths and weaknesses, we compare the various procurement methods along two sets of dimensions: their contribution to the ultimate goal of procurement — a fair process that generates low costs and high quality — and the characteristics of the production and procurement process.

Costs and Quality

A primary goal of procurement is to obtain the highest-quality product or service at the lowest price. The posted-price method might be sufficient when goods are standardized and a benchmark price exists (as in the case of commodities sold in open markets).[4] In other settings, it might be important for the buyer to use competitive bidding to get the best deal. Cost-based pricing, however, is thought to be particularly ineffective at promoting competition, and is usually restricted to regulated monopolies such as utilities. Indeed, it is widely held that the so-called medical arms race in which U.S. hospitals competed for doctors and patients by adding costly duplicative technology resulted from cost-plus pricing for hospitals (see Robinson and Luft 1985). The reason for the poor performance of cost-based contracts is that they generate higher returns for less efficient firms and so actually discourage efficiency.

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[2] Specific assets are assets that have higher value when used in conjunction with a particular transaction but less value when deployed elsewhere. Firms that make sunk investments in specific assets obtain greater value by continuing their ongoing relationship than by turning back to the market. See, generally, Williamson (1971); Klein, Crawford, and Alchian (1978); and Riordan and Williamson (1985). See specific applications in Monteverde and Teece (1982); Muris, Scheffman, and Spiller (1992); and Shephard (1993).

[3] Williamson (1976) identifies this as one of the "dynamic costs" of procurement via repeated auctions.

[4] In this case, the posted-price method performs better than those such as competitive bidding, where it might be costly to announce bidding rules and to request and score proposals.

Fairness

It is important in public procurement to treat potential suppliers with fairness. It is especially important to establish objective procurement criteria when the buying agent cannot be completely trusted (see Rothkopf and Harstad 1994). On this dimension, competitive bidding scores high because it treats potential suppliers treated equally and because the bidding process reduces the discretion of the buying agent. Often, however, the winning supplier obtains an advantage that effectively eliminates competition in later rounds of bidding. Subsequent procurement then relies on relational contracting, and the buyer and supplier end up negotiating over the terms of the contract and the division of the rents. To the extent that such negotiations involve information that is not readily available to taxpayers, this outcome could facilitate favouritism or corruption.[5]

In some cases, "fairness" is taken to imply that suppliers do not earn "excess" profits, however they might be defined. If fairness, so-defined, is the priority, cost-based pricing might be desirable. If fairness means that the purchaser has paid no more for the product than other purchasers have, then posted prices based on other observed transactions might be preferred. Fairness, however, generally does not equate to efficiency.

Product Differentiation

Buyers frequently prefer certain suppliers based on location, reputation, or other points of differentiation.[6] It is sometimes possible to score non-price dimensions and continue to use competitive bidding (see Fox 1974; Che 1993), but this method is often not practical as there could be too many dimensions to score properly. Moreover, critical dimensions can be hard to measure, and scoring only those dimensions that are readily measurable might lead to giving them more weight in choosing a supplier, an especially problematic issue when fairness is a concern.

In short, all procurement methods have pros and cons when the product is differentiated, and no single method stands out. In posted prices and contracts, it is usually at the purchasing agent's discretion to ascertain the dollar value of the difference in non-price attributes. Hence, in such cases, the agent's trustworthiness is crucial.

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[5] See Lambert-Mogiliansky and Sonin (2006); Lambert-Mogiliansky and Kosenok (2009); and Hyytinen, Lundberg, and Toivanen (2007).

[6] The following quote from a former IBM purchasing officer confirms this: "There is nothing that a company buys that I can think of where only the price is important. There is a price, quality, delivering, and technology issue in everything. So the purest use of auctions where the lowest bidder gets the business no matter what is terrible" (ISM 2002).

Cost Uncertainty

It is often difficult — with respect to high-technology projects with research and development costs, for example — for the supplier to predict the final cost of production at the time of procurement. In such cases, since cost-based pricing eliminates the risk of unforeseen costs for the supplier, this method is often used to guarantee the supplier a profit. Posted prices, in contrast, are risky for the supplier due to cost uncertainty, and are not preferred in such procurements (see Laffont and Tirole 1994). Competitive bidding also might not work well whenever there is uncertainty about the final cost of production: the supplier with the best offer might tend to underestimate, and so to underprice, the true cost of production — an example of the so-called winner's curse (see Milgrom and Weber 1982). This drawback of competitive bidding might be of concern to the purchaser if the long-term viability of suppliers is an important strategic objective.

Asymmetric Information

In procuring non-standardized products, the buyer cannot be completely informed about the supplier's cost. For instance, a provincial transportation department would not know the supplier's cost of materials for highway construction. In such cases, cost-based pricing provides the supplier with little incentive to be cost efficient. Even worse, the supplier might inflate reported costs to increase the payment from the buyer. Posted prices, in contrast, avoid this problem because suppliers have to minimize their cost to obtain maximal gains. At the same time, if quality cannot be measured easily, posted prices might force suppliers to reduce the quality of their product in order to lower cost (see Laffont and Tirole 1994).

Repeat Purchases

Buyers that often purchase the same goods with regular frequency typically enter into contracts with suppliers to build long-term relationships. Among the advantages of long-term contracts are that they

- insure both parties against price fluctuations;
- facilitate relationship-specific investments;
- provide an incentive for the supplier to become more efficient in production (this matters especially if the product is not standardized); and
- enable parties to better manage each other's needs, strengths, and work styles through frequent contract renegotiation (see Laffont and Tirole 1988; Hirao 1993).

Methods that are commonly used for one-time purchases, on the other hand, typically lack these advantages.

If competitive bidding is used for a good or service that will be purchased in the future and there are sunk investments or a learning curve, then the supplier with a winning offer is likely to have a considerable advantage during subsequent purchase decisions (this is sometimes referred to as "lock in"). This advantage effectively could make the winner a monopolist, ultimately resulting in bilateral negotiations between the buyer and the winner instead of competitive bidding for future repeated purchases.[7]

If the purchaser is a monopsonist — that is, it is a dominant purchaser of the good or service in question — it might be difficult to compel suppliers to make relationship-specific investments that would have little value outside the trading relationship. The reason is that, after making these investments, the buyer could "hold up" the sellers in future contract periods by refusing to pay prices that cover the *sunk* costs of the investments (Klein, Crawford, and Alchian 1978), while the sellers would have little choice but to go along. In this case, it is critical that the purchaser establish a reputation for paying fair prices that cover all reasonable costs, including sunk costs, or else vendors will refuse to make efficient investments.

WHAT MAKES HEALTH CARE DIFFERENT?

Because most theoretical models of procurement were developed with applications such as military equipment in mind, they do not account for several crucial characteristics of health care services. In order to understand why "health care is different," it is helpful to briefly describe the health care value chain.

Typically, a patient's first encounter with health care services is with a primary care physician or other provider of primary care, who is sometimes referred to as the "gatekeeper." The physician makes an initial diagnosis and is often able to recommend a treatment that will resolve the problem. If the problem requires specialized care, the gatekeeper will refer the patient to a specialist physician who will further diagnose the ailment. The specialist may then recommend that the patient receive treatment at a hospital or other advanced care facility such as an ambulatory surgery centre. Subsequent to treatment, the patient may require therapy or other follow-up services. If the condition is chronic, the patient may require additional treatments.

Even in this highly stylized example, we see a number of ways in which health care services differ from the goods and services in generic models of procurement.[8]

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[7] Investing today for a rent tomorrow is a well-known and well-studied phenomenon in economics. For an application in patent races, see Tirole (1995). Firms that procure rather than self-produce important inputs that feature such "lock in," often "second source" — that is, purchase some inputs from a potentially less efficient source — in order to avoid this problem.

[8] We do not mean to suggest that all of the characteristics described here are unique to health care, but they are especially relevant to health care and often missing in other procurement situations.

The Purchaser Does Not Dictate the Quantity

In a typical procurement situation, the purchaser knows the value of the good in question and is able to determine how much of the good it wants to purchase at any given price — as an economist would put it, the purchaser knows the demand curve. This is not the case in health care, however, for two reasons. First, the unpredictability of the incidence of ill health means that the purchaser (that is, the provincial government) cannot know in advance how many hip replacements, say, or cataract surgeries the population will require. The purchaser could limit the number of surgeries it is prepared to purchase, but this necessarily entails the risk that incidence will exceed the limit. Rationing would result.

Second, information is asymmetric in the sense that sellers (that is, the physicians) have better information than the purchaser does about the value of health care services. It is extremely difficult for a government to know whether a particular patient requires a hip replacement or which hip prosthesis is optimal — indeed, patients themselves are hard pressed to know their own medical needs, which is why they delegate authority to primary care physicians. In complex cases, these physicians in turn must rely on specialists. This asymmetry of information between health care purchasers and providers creates the potential for conflicts of interest. Since health care providers not only diagnose ailments but also prescribe and perform treatments, they can influence the quantity of care they deliver and may alter quantity in response to financial incentives. For example, if sellers are paid on a fee-for-service basis where the fees exceed their marginal costs of production, they might recommend tests and procedures of questionable value. This is known as the problem of "supplier-induced demand" (see Evans 1974). While this may be of minor concern when the service being induced is, say, a follow-up visit for a patient with a minor ailment, it can be a major concern if the service is an MRI or surgery. Health services researchers have found unambiguous evidence that patients receive more medical services, at a higher cost, when providers are paid on a fee-for-service basis as opposed to a fixed salary or similar arrangement that separates compensation from service intensity (see, for example, McGuire 2000). The evidence is ambiguous, however, on whether suppliers induce demand to make up for lost income after, say, a reduction in payment rates or an increase in competition.

It Is Difficult to Specify the "Product" with Precision

In a typical procurement situation, the purchaser specifies the characteristics of the product, and suppliers compete to sell the specified product. In the case of health care services, however, the characteristics of the product are difficult to specify in advance and, more important, can vary substantially from one patient to the next.

Consider hip replacement surgery. Although this seems like a well-defined product, there is, in fact, considerable variation in the surgery process from one patient to the next. Due to idiosyncratic differences among patients, two patients requiring hip replacement surgery might need very different surgery and recovery times, choices of prosthetic hip, medications, physical and occupational therapy, and so forth, leading to very different costs for the two hip replacements. Moreover, it would be impractical, if not impossible, to try to specify, via

contract, how each patient should be treated. Simply put, "sicker" patients are more costly to treat, and it is difficult for the payer reliably to discern sicker patients from more routine patients and to contract for the appropriate care for each patient.

Another important implication of patient heterogeneity, given that some providers are more skilled than others, is the desire to sort difficult cases from easier ones. Ideally, the procurement system should encourage the most skilled providers to handle the most difficult cases.

Quality Is Difficult to Monitor

In a typical procurement situation, it is usually possible for the purchaser to measure quality, either at the time of purchase or after the fact, and warrantees could even be included in the contract. Health care quality, in contrast, is exceptionally difficult to evaluate. Patients might be unable to determine whether they have received adequate care. Purchasers could attempt to measure quality using a range of potential outcome measures, but only some measures are found in existing data systems and any outcomes would have to be severity adjusted. Moreover, because of the complexity of the value chain, including the important role of patient health behaviours, it is often difficult to ascribe blame for poor outcomes. Attaching financial incentives to particular quality metrics also might have the undesirable consequence of encouraging providers to treat patients or perform particular procedures because they are likely to generate higher *measured* quality, even if these are not the optimal medical decisions. Such incentives also might result in a reduction in unmeasured quality.

Patient Decisions Are Subject to Moral Hazard

In most public procurement situations, the government purchases a good, such as defence, and does not charge user fees. Health care services are private goods, however, and the decision to consume health services ultimately falls on the individual patient. The RAND National Health Insurance Experiment found that patients who receive free health care consume substantially more health services than those who make co-payments, yet, with few exceptions (primarily, diabetes management), they do not appear to enjoy better health outcomes (see Newhouse et al. 1996). The availability of free care (that is, insured care), however, can contribute to the phenomenon known as "moral hazard," which can arise in two ways. First, the presence of insurance might lead individuals to behave in ways that increase the risk that an adverse health event will occur. Second, insured individuals might increase their consumption of medical services, conditioned on an adverse health event's occurring. It is generally believed that moral hazard in health care is primarily of the second variety (see Pauly 1968); it seems unlikely that individuals who have insurance coverage for cataract surgery, for example, would engage in activities that would increase the need for surgery, but they might be more willing to undergo the surgery if someone else is paying.[9] Insurance also discourages patients from taking an active role in monitoring the efficiency of their physician-agents: if patients are not responsible for most of the costs of care, they do not act as a check on demand inducement.

[9] There is, in fact, surprisingly little research on the extent of moral hazard and health behaviour.

METHODS OF PROCUREMENT TAILORED TO HEALTH CARE

How do the defining features of the health care process affect the procurement process? In this section, we consider alternative payment mechanisms.

Fee-for-Service Payment

Traditionally, health care services have been purchased on a fee-for-service basis. This has two distinct advantages: physicians are compensated for all necessary effort, and those who treat sicker patients receive higher reimbursement. This method also has several important disadvantages. First, fee-for-service payment encourages overuse of health care service by inducing increased demand. Second, insurance allow providers to increase prices well above costs without fear of losing business. High profit margins, in turn, encourage entry that further drives up costs. Therefore, payers (that is, governments) often do not allow providers to set their own prices but instead impose or negotiate fee schedules. Third, fee-for-service payment does little to assure quality — if anything, it mutes incentives for quality because providers are paid to fix the problems that arise from poor care delivery.

Cost-based Reimbursement

Beginning in the 1950s, Blue Cross plans in the United States began to reimburse hospitals on a cost basis, mimicking a strategy often used in utility regulation. Other insurers followed suit — Alberta Health Services, for example, currently reimburses orthopaedic surgery providers on that basis. Yet cost-based reimbursement in health care has all the familiar problems of cost-based reimbursement in traditional procurement, including arbitrary allocation of certain fixed or overhead components of cost. Moreover, to the extent that payments exceed variable costs, the reimbursement approach induces increased demand for services. Finally, cost-based reimbursement ensures the survival of the *least efficient* producers and encourages producers to compete by offering expensive new technologies, regardless of whether demand exists to use them efficiently. Health economists thus criticize cost-based reimbursement as a strategy that drives cost inflation (see Dranove 2001).

Prospective Payment

As an alternative to cost-based reimbursement, payers have adopted a variety of methods loosely described as "prospective payment." In 1970, the state of New York began paying hospitals a fixed fee for each inpatient day, and several other states quickly followed suit. In 1983, the U.S. federal government introduced its own prospective payment system for Medicare, paying a fixed fee for each inpatient stay, with the fee varying according to the patient's condition, or diagnosis-related group (DRG). The fee was based on national cost averages, thereby creating what Andrei Shleifer (1985) dubbed "yardstick competition." In principle, hospitals could prosper only by bringing their costs below the national average (the

yardstick). It was hoped that, by competing in this way, hospitals would invest in ways to become more efficient, reducing costs to their most efficient levels. Yardstick competition in the Medicare program did lower inpatient hospital costs, but not entirely by improving efficiency. To varying degrees, hospitals substituted outpatient and home care for inpatient care, so that patients were discharged "quicker but sicker." Hospitals also manipulated diagnostic coding so as to place patients in more remunerative DRGs.[10] Due to high variation in patients' medical needs within DRGs, some hospitals might have turned away sicker patients whose costs were expected to exceed the reimbursement.

The success of prospective payment clearly depends on the balance among

- variation in hospital efficiency;
- the ability of hospitals to increase efficiency in response to financial incentives;
- whether there are substitutes in the production process not captured by the prospective payment;
- whether it is costly to monitor and punish substitution done solely to increase profits; and
- the ability to precisely define the relevant service categories.

The U.S. Medicare system has taken many steps to address the latter, most recently by increasing the number of DRGs by more than half and, despite some "gaming" by providers (for example, by manipulating diagnostic codes), the DRG-based system of prospective payment is considered to be successful. Most private health insurers in the United States have followed Medicare's lead, reimbursing hospitals on either a per diem or a DRG basis.

Gatekeepers, Capitation, and Global Payments

During the 1980s, Health Maintenance Organizations (HMOs) in the United States grew rapidly. Although not as popular as they once were, HMOs still hold about a 25 percent market share. In a typical HMO, patients select primary care physicians to serve as their gatekeepers. Primary care physicians provide all routine and preventive care, and patients cannot receive specialist or hospital care without their gatekeepers' approval. The HMO holds primary care physicians financially accountable for their gatekeeping through various mechanisms, including "capitation," under which primary care physicians are paid a monthly fee for each assigned patient (a "per member per month" fee), and are then financially responsible for a predetermined set of services, such as office visits, diagnostic tests, prescription drugs, and specialist referrals. Under "global capitation," primary care physicians are financially responsible for all medical expenses. However, this system places too much risk on primary care physicians and creates a financial incentive for them to reduce care. After initial efforts in the 1980s, the system was quickly abandoned.

[10] A number of studies have documented "upcoding" under Medicare's prospective payment system; see, for example, Carter, Newhouse, and Relles (1990); Silverman and Skinner (2004); and Dafny (2005).

The benefit of capitation is that the primary care physician has an incentive both to keep patients healthy and to monitor the costs of services covered under the capitation agreement. Capitation also has several limitations. One is that there is a necessary tradeoff between comprehensiveness of service coverage and the risk that primary care physicians must bear. Because the capitation agreement does not usually cover all services, primary care physicians have an incentive to substitute away from covered services and prescribe uncovered services that are often more expensive. Perhaps the most difficult problem facing primary care physicians under capitation, however, is that they lack the information to identify the most cost-effective specialists and the ability to change specialists' behaviour.

One way to increase the inclusiveness of services covered under capitation is to increase the range of providers covered by the capitation agreement. During the late 1980s, U.S. hospitals created physician/hospital organizations (PHOs) — financial partnerships between hospitals and some of their medical staff, including primary care physicians and specialists. PHOs accepted global capitation from insurers, but, although they could bear the financial risk more easily, they faced the same basic problem as did primary care physicians in that they had an incentive to shift care to providers, such as long-term care facilities, that were not included in the PHO and, more important, they could not readily identify and incentivize cost-effective physicians.

The 1990s saw the emergence of integrated delivery systems (IDSs) in which hospitals, physician groups, and other modes of care are placed under a single umbrella. IDSs also accept global capitation but, like primary care physicians and PHOs, have had difficulty delivering cost-effective care.

Gatekeeper primary care physicians, PHOs, and IDSs share one additional shortcoming. By accepting capitation and the financial risk associated with their patients' medical costs, they essentially take on the role of insurance companies, but they lack the medical underwriting capability required to price their services appropriately — indeed, many IDSs suffered significant losses in the late 1990s when they aggressively pursued prepaid contracts without adequate medical underwriting.

A variant of capitation is "episode of illness payment." Here, the payer defines an episode of illness and pays a fee that is supposed to cover all treatment during the episode. In addition to the obvious problem of defining the onset and end of the episode, however, this variant suffers from the familiar difficulty of providing the right information and incentives within the organization that receives the payment.

A SPECIAL WORD ABOUT GATEKEEPERS

Gatekeepers are third-party intermediaries who mediate the patient's relationship with specialty providers. In a sense, purchasers are themselves gatekeepers. They can steer patients to specialists and decide which services are justified. Insurers in the United States do this to some extent when they assemble networks of providers and determine the structure of benefits. This raises a two-part question: can physicians do the job better than purchasers, and how can the incentives of the two be aligned?

In general, purchasers have expertise in administering benefits and paying claims. It would be impossible, or at least extremely costly, for purchasers also to gain and deploy medical expertise on a patient-by-patient and even episode-by-episode basis. The specialist who treats a given patient is likely to know whether that patient's illness is complex, but will has a strong financial incentive to categorize cases as complex, whether they are or not, especially if the cost of services required to justify the complex diagnosis is not too great. The gatekeeper's role in this setting is to determine, on behalf of the purchaser, whether or not the patient's illness is complex. The requisite expertise from a gatekeeper is thus medical, rather than financial. Is a visit to a specialist necessary? If so, what specialist? Is the specialist's proposed course of treatment medically appropriate and consistent with the purchaser's objectives and obligations?

Building this expertise is not the key challenge for the purchaser, however; rather, it is to construct financial incentives that induce the gatekeeper to apply that expertise consistent with the purchaser's objectives. To that end, a number of issues need to be considered.

- When the total number of procedures is set, the gatekeeper might be required to perform triage; otherwise, each provider will want to perform more procedures on their patients, leaving fewer procedures available for patients of other providers.
- In principle, one could pay the gatekeeper a flat salary, as this would generate no incentive to either induce demand or undertreat the patient. However, the purchaser would have to be mindful of the type of doctor who would accept such employment and whether such a doctor would be a good gatekeeper.
- A gatekeeper who is paid a flat salary also has little financial incentive to do a good job. But tying financial incentives to the gatekeeper's performance might invite undesirable gaming behaviour.
- When gatekeepers perform triage, they necessarily conflict with specialists who provide treatment: will gatekeepers have the right information or the ability to gain the right information, to determine what is medically appropriate? This might be a minor concern for some procedures, but when diagnosis is complex and there are several treatment options, gatekeepers might be hard pressed to make the right decisions.

Pay-for-Performance

In the past several decades, payers and providers alike have become acutely aware that the quality of care is often inadequate and that existing payment systems do little to promote it — and, by capping reimbursement, might actually impede quality improvement (see Brook 1991; Brook, McGlynn, and Shekelle 2000). Health care report cards attempt to address this problem by identifying the best and worst providers and letting market forces run their course, but report cards have several shortcomings, and most insurers now provide at least some direct financial incentives to improve quality through pay-for-performance programs. Such programs are limited, however, by several factors. For one, insurers thus far have committed only a small percent of reimbursement, usually 5-to-10%, to pay-for-performance. For another, insurers can pay only for what they can objectively measure, and they usually limit themselves to a small number of measures, which can be an incentive for providers to shirk on unmeasured aspects

of care (see, for example, Mullen, Frank, and Rosenthal 2009). Moreover, notably absent from pay-for-performance are key outcome measures. There are effectively no warrantees in health care: providers are not on the hook to deliver a particular outcome or to refund payments if this outcome is not achieved. This is due partly to difficulties in defining outcomes and identifying who is responsible for a shortcoming; partly to a lack of innovation by health care payers; and partly to a cultural reverence for physicians and the services they provide.

One promising approach that combines elements of a warrantee with global capitation features a prospective rate for a surgical intervention that includes a reasonable amount for treatment of surgical complications.[11] In other words, the surgeon is paid a fixed fee and is responsible for the costs of any subsequent care associated with complications from the original surgery. The add-on fee could be based on the complication rates of superior-quality providers as well as indicators of patients' risk factors. This warrantee would force all providers to internalize the costs of complications, reward surgeons with low complication rates, and discourage low-quality providers from performing risky procedures

Patient Cost-sharing

The RAND National Health Insurance Experiment demonstrated that, in the United States, spending on patients who received free health care was about 30 percent higher than that on patients who made substantial out-of-pocket payments, yet the patients with free care fared little better on a variety of health status indicators. This finding immediately led to a ratcheting up of co-payments and deductibles. In the past few years, in an effort to limit moral hazard, insurance plans known as consumer-directed health plans have featured substantial deductibles of $2,000 or more. It is well known that cost sharing is more effective when demand is elastic — that is, when consumers are very sensitive to price — as is more likely to be the case for non-emergency and, especially, elective procedures. Insurers, however, have given less consideration to the fact that the severely ill patients who account for the bulk of health care spending quickly exhaust their deductibles, which suggests that consumer-directed health plans will have limited effectiveness.[12]

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[11] This idea was developed by Dr. Michael Pine, a pioneer in the report card movement.

[12] In the United States, health care spending is highly concentrated, with just 5% of the population accounting for nearly half of all health care expenditures and 20% of the population accounting for 80% of spending (see Henry J. Kaiser Family Foundation, "Kaiser Slides"; accessed online at http://facts.kff.org/chart.aspx?ch=822). The vast majority of this spending is minimally affected by cost sharing even under high deductible plans — these patients almost surely will pay their deductibles and exceed their out-of-pocket maximums and ultimately face a very low marginal payment for health care.

EMPIRICAL EVIDENCE OF THE EFFECTIVENESS OF DIFFERENT PAYMENT RULES

There has been considerable research on health care payment strategies. In this section, we summarize this literature.

Pay-for-Performance

While pay-for-performance has been widely discussed in recent years, there is as yet no clear consensus on the efficacy of such programs, much less on what the characteristics of an effective program might be. For example, in a comprehensive report, Sorbero et al. (2006) summarize 15 peer-reviewed publications on pay-for-performance programs but cannot find a systematic relationship between features of such plans and the efficacy of pay-for-performance. Additionally, most of these 15 programs were not similar to current pay-for-performance programs: typically, the programs reviewed in the report were smaller, of very short duration, and offered relatively small rewards for performance. The authors also informally evaluate a number of ongoing private programs by holding discussions with participants, but find no consensus on the best way to design a pay-for-performance program due, in part, to differences in the goals of individual sponsors, types of insurance products, and how health care providers were organized within a geographic market.

More recent research also shows that more questions than answers exist about the efficacy of pay-for performance. For example, in a study of two years of data on California's pay-for-performance program, Robinson, Williams, and Yanagihara report that "the requisite claims data often are incomplete or poorly coded and that even large physician groups have too few patients experiencing most types of episodes to permit statistically valid measurement for public reporting and incentive payment" (2009). Further, Epstein (2007), Lindenauer et al. (2007), and Young et al. (2007) all report very modest effects on quality of various pay-for-performance programs, while the Institute of Medicine notes that "[m]ore than 100 reward and incentive payment programs have been launched in the private health care sector. Most of these efforts have not yet been fully evaluated" (2007).

In 2005, the Centers for Medicare and Medicaid Services (CMS) began a number of pay-for-performance demonstration projects in the United States. In April 2009, the CMS reported a seventeen percentage point improvement in quality among hospitals participating in its Hospital Quality Incentive Demonstration program and smaller but positive improvements among participants in its Physician Group Practice demonstration (Centers for Medicare and Medicaid Services 2009). While these results are promising, participation in these studies is voluntary, at least one study questions the validity of CMS's metrics (Bhattacharyya et al. 2009), and, in September 2009, the CMS extended the demonstration program to "test the effectiveness of new incentive models" (Premier Inc. 2009).

Global Payments

For reasons described above, true global capitation, in which primary care physicians receive a set monthly fee per each patient under their care and are responsible for all medical expenses of their patients, is now very rare. There is, however, a spectrum of arrangements ranging from global capitation to pure fee-for-service reimbursement. The available evidence indicates that moving in the direction of global payments does provide strong incentives to reduce the use of health care services.

For example, Cromwell, Dayhoff, and Thumaian (1997) analyze the effects on U.S. Medicare spending and hospitals' costs of the Medicare Participating Heart Bypass Center Demonstration, in which hospitals and physicians were paid a single negotiated global payment for all inpatient care associated with heart bypass surgeries. They estimate that the demonstration led to the equivalent of a 14% discount relative to projected Medicare expenditures. During the demonstration, each of the four hospitals in the survey shortened its average length of stay, and in three of the hospitals, average total costs fell in absolute terms by 2.0% to 23.4%. The authors attribute some of the savings to improvements in physician practice patterns and patient protocols. They further report that all of the savings were achieved with no reduction in quality, as measured by mortality rates of participants.

Prospective Payment

Under prospective payment, reimbursement is based on the clinical status of the patient at the time that care begins, rather than on the services actually rendered. The introduction in the early 1980s of prospective payment into the U.S. Medicare system for inpatient care is widely believed to have led to a reduction in the inpatient component of Medicare spending. White (2008, 794) reports that "[t]he annual rate of excess growth [growth beyond that attributable to general economic growth and changes in beneficiaries' age composition] fell from 5.6 percent during 1975-1983, to 2.1 percent during 1983-1997, to only 0.5 percent during 1997-2005." He concludes that the introduction of prospective payment is the most likely explanation for the reduction in Medicare spending growth that began in 1983.

Murray (2009) provides an overview of Maryland's all-payer hospital payment system, which is similar to Medicare's hospital prospective payment system but with some unique features.[13] Under that system, the cost of a hospital admission in that state went from 26% above the national average in 1976 to 2% below the national average in 2007. During this period, Maryland experienced the second-lowest rate of cost increase per admission of any state and consistently had the lowest markup of charges over cost. Nonetheless, while Maryland's prospective payment system has been effective at reducing costs per admission, the same does not appear to have been true for hospital admissions or overall hospital volume. During the 2001-2007 period, admissions grew at an annual average rate of 2.7%, compared with an average annual national rate of 1%.

[13] Since 1971, health care costs in Maryland have been regulated by the Health Services Cost Review Commission, which establishes service-specific rates for all inpatient, hospital-based outpatient, and emergency services at hospitals in the state.

Capitation and Fee-for-Service

Gaynor and Mark (2002) survey empirical studies of the impact of contractual arrangements between a physician and an insurer on health care use and find that capitation tends to decrease use, while fee-for-service arrangements tend to increase it. Among the studies they survey, Hillman, Pauly, and Kerstein (1989) find that patients in HMOs that paid primary care physicians on a capitation basis had lower rates of hospitalization than did patients in HMOs with a fee-for-service system. In another study, Murray et al. (1992) look at the number of tests and total charges over a 12-month period for 165 patients who were diagnosed as hypertensive and treated at two primary care outpatient clinics in the United States. They find that physicians ordered one-third fewer tests for capitation patients than for fee-for-service patients, while the total charges for medical care for capitation patients were half the total charges for fee-for-service patients. In a third study in the Gaynor and Mark survey, Ferrall, Gregory, and Tholl (1998) analyze the labour supply of Canadian physicians and find that fee-for-service payment arrangements lead physicians to spend 11 more hours per week seeing patients and 1-to-2 more total hours worked per week.

Dusheiko et al. (2006) examine the effect of giving primary care physicians in England a budget to purchase certain types of elective secondary care procedures for their patients, charging them for care their patients receive, and allowing them to keep the surplus — a scheme known as "fundholding," essentially a form of capitation system. The authors find that the abolition of fundholding increased ex-fundholders' admission rates for elective secondary care procedures by 3.5-to-5.1%.

Glazier et al. (2009) evaluate patterns of medical care under two reimbursement models — a capitation model (adjusted for age and sex) and an enhanced fee-for-service model — that were introduced as part of the reform of primary care in Ontario in the 2001-2003 period. Their analysis shows that the two models were comparable in terms of both physician and patient demographic characteristics and continuity of care, but capitation practices had fewer sick patients, provided less after-hours care, had higher rates of use of emergency department services, and enrolled fewer new patients. Exemptions from evening and weekend clinics for groups providing hospital-based services might have contributed to reduced after-hours care and higher rates of emergency department visits.

OPTIMAL PROCUREMENT OF HEALTH CARE SERVICES

Our review of procurement theory and evidence suggests that optimal procurement strategies depend on the characteristics of the health care services being purchased. In this section, we pull this information together to provide a mapping from specific characteristics of health care services into specific procurement strategies. While we offer examples of services that possess each characteristic, our judgment is best augmented with that of medical professionals. Our findings are summarized in Table 1. Below, we elaborate on some of the characteristics included in the table.

Table 1. Mapping of Health Service Characteristics and Optimal Procurement Elements
(Y = Procurement method is appropriate for this feature; N = inappropriate)

Features		Gatekeeper	Surgeon Payment Mode				Co-pay
				Capitation / Global Fee			
			FFS / 2 part	Posted price (Yardstick)	Price determined by bidding	Cost	
Provider-related	High induceability	Y	N		Y*	N	
	High incentive to select healthy patients	Y	Y	N	N	Y	
	Efficiency varies		N	Y	Y	N	
	Quality varies						Y**
	High fixed costs					Y	
	Outcome easy to measure / ensure			Y	Y	Y	
Patient-related	High elasticity of demand	Y	N	Y	Y		Y
	Chronic condition	Y				Y	N

* *Assumes that the total volume across all providers is determined by the procuring agent.*

** *If co-payment can be lower for higher-quality procedures, this might be optimal.*

High "Induceability"

It might be easier for physicians to induce demand for some services (for example, cataract repair) or to influence patients to select more costly options (such as the choice of hip implant). To the extent that fees exceed *incremental* costs, fee-for-service reimbursement should be avoided because the positive margins create a strong financial incentive for physicians to provide more care than is medically necessary. For the same reason, cost-based reimbursement is also likely to be susceptible to inducement because payments usually are based on total allocated costs, which typically exceed incremental costs by a substantial amount.

There are several ways to sever the incentive to induce demand. One way is for the purchaser to require third-party review. Another way is for a gatekeeper to play several roles, by selecting the surgical provider based on previous information about practice patterns or by having "veto power" over the procedure. This, however, requires putting in place well-structured incentives for gatekeepers — in effect, such incentives are a substitute for more complete information on the part of the payer. Finally, surgical providers could be paid on a capitation basis, although it might be difficult to assign a specific population to each surgeon for the purposes of computing the capitation payment.

As an alternative to severing inducement incentives, the purchaser could limit the number of procedures it will pay for, thereby forcing providers to perform triage. For this latter approach to function reasonably well, one of two conditions must hold: (i) all patients must, in expectation, have roughly equal profitability (in which case, it might be reasonable to presume that physicians would ignore financial considerations and simply triage on the basis of medical need); or (ii) the profitability of patients must be roughly proportional to their medical need (in which case, triage on the basis of profitability and on the basis of medical need are equivalent). Under either scenario, the policy challenge is to identify the appropriate total number of procedures, which involves identifying the point at which the marginal benefit of an additional procedure is below the marginal cost of producing that procedure.

Any method that relies on triage must address the allocation of patients and timing. To illustrate these issues, suppose the payer wishes to limit the number of procedures to 3,000 per year. This raises several interesting questions. Should the cap be subdivided among all eligible providers — say, 300 procedures annually for each of ten providers? Such a cap would restrict patients' choice of provider, but without it each provider would have an incentive to do as many procedures as possible before the aggregate cap was reached. Another issue is that it is unlikely that exactly 250 appropriate cases would be presented each month. If the triage methodology allowed for more than 250 procedures in the early months, it might be difficult for the payer to refuse coverage if monthly demand for the procedure continued to exceed 250 as the year went on. One possible solution would be to shorten the contract period to, say, one month, so as to assure that all patients throughout the year had reasonable access to the service, but this would imply that access for any one patient would be tied to overall incidence in the population during that month.

High Variation in Patients' Medical Needs

Many payment models pay a fee for a particular procedure or diagnosis. Sometimes that procedure is well defined and there is little variation in the underlying medical process — vaccinations are a good example, cataract surgery might be another. In other cases, the patient's medical needs are less well defined — for example, caesarean section patients might have a host of complicating conditions that affect the course of treatment and resulting medical costs.

Capitation can be problematic when there is high variation in patients' needs because it discourages providers from incurring all the costs necessary to treat their patients. Capitation also might discourage some providers from treating the most severely ill patients, causing some patients to be "dumped" on providers of last resort (see Dranove 1987). Fee-for-service or cost-based reimbursement is more appropriate here, as the reimbursement rate is positively correlated with patients' needs. The problem, again, is that, if fee-for-service reimbursement makes all patients profitable regardless of medical need, the result will be an inducement of demand. A possible solution is to use gatekeepers if (1) they can better observe patient needs than can the payer and (2) the payer can design a set of proper incentives for the gatekeeper.

Perhaps the best way to deal with high variation in medical needs while keeping the incentives of a capitation system is to narrow the payment categories. The United States recently did this when it increased the Medicare program's number of DRGs from around 550 to around 900. This approach is not always feasible, of course, and requires higher levels of documentation and a greater administrative burden. In addition, research has shown that the availability of multiple codes for the same diagnosis leads to "upcoding" into the code associated with the higher reimbursement.[14]

Where the equipment or skill required to provide appropriate care varies across patients with the same general condition (for example, if some patients who need hip replacement are particularly complex to treat), an effective payment system should create an incentive for the more skilled or capital-intensive providers to treat patients with complex needs. As patients might not be able to assess their own complexity reliably, appropriate matching is facilitated by payments that make it profitable for high-end providers to treat complex patients but unprofitable for other providers to do so. One approach to ensuring that such patients are profitable is, again, to again narrow the payment categories and attach higher payments to the more complex categories. This might not ensure appropriate matching, however, so gatekeepers could play an important role even under a narrower set of payment categories.

High Variation in Productive Efficiency

Some sellers are more efficient than others, especially for complex cases and chronic care. For their part, purchasers want to reward and encourage efficiency. Fee-for-service payment and, especially, prospective payment and capitation reward efficiency, but cost-based reimbursement does not — in fact, it can reward inefficiency. Here, however, gatekeepers are unlikely to be good evaluators of efficiency.

[14] When the United States instituted prospective payment under the Medicare program, roughly 40% of the DRGs belonged to a "pair" of codes that shared the same main diagnosis. Within each pair, the codes were distinguished by age restrictions and the presence of complications. In 1988, the age restrictions were eliminated and the reimbursement was raised for codes with complications. The rate of complications soared — in particular, in diagnoses where the additional reimbursement for coding complications increased the most. See Dafny (2005).

CASE STUDY: CATARACT SURGERY

In this section, we undertake a case study of cataract surgery and discuss its unique features that pertain to the procurement decision. Our findings are summarized in Table 2, which corresponds to the dimensions included in Table 1. Based on this checklist, any method for procuring cataract surgery must address the potential for overuse (through induceability and high demand elasticity) but need not address measurement difficulties that can encourage gaming or harm quality. Although cataracts can occur because of congenital conditions, disease, or trauma, our discussion focuses on age-related cataracts — more than half of all Americans ages 65 and older have cataracts.

Table 2. Key Characteristics of Cataract Surgery

Features		Cataract
Provider-related	High induceability	✓
	High incentive to select healthy patients	
	Efficiency varies	✓
	Quality varies	
	High fixed costs	✓
	Outcome easy to measure	✓
Patient-related	High elasticity of demand	✓
	Chronic condition	

Mapping Cataract Surgery to the Procedure Matrix

Although several professional organizations and insurers have developed specific guidelines for when cataract surgery is appropriate, the procedure is elective and its timing ultimately subjective. Around the world, the number of procedures has been highly sensitive to reimbursement practices. A 2004 report for the OECD finds widely varying rates of surgery even among the wealthiest countries; for example, in 2001, there were 1,375 procedures per 100,000 population in Canada, compared with 656 in the United Kingdom and 511 in Denmark (Siciliani and Hurst 2004).[15] Alberta Health Services reports that, in Calgary, the total number of procedures increased by 32% between fiscal years 2004/05 and 2006/07, reaching 10,306 in that year; subsequently, a global cap was imposed of around 8,500 per year.

Clearly, physicians are able to influence the rate of cataract surgery, which creates a high potential for inducement of demand. It is also likely that patients will display a high elasticity of demand given that vision impairment is neither painful nor life threatening. At the same time, patients are likely to be sensitive to the quality, comfort, and cost of the procedure.

[15] According to OECD data, the shares of 2007 populations over age 65 were 16.0% (United Kingdom), 15.5% (Denmark), 13.4% (Canada), and 12.6% (United States). Were Canada's population not significantly younger than that of the United Kingdom or Denmark, the disparity almost surely would be even more pronounced.

Compared to other medical services, pre- and post-operative vision quality is fairly straightforward to measure, as are post-operative complications. Facility costs are mainly fixed, and there might be significant differences in these costs across facilities. Variable costs consist of supplies and the surgeon's time. Costs vary little across patients, and complications are rare, so that physicians have little incentive to "cream skim" the healthiest patients.

The Procurement of Cataract Surgeries in Alberta

The current procurement mechanism in Alberta is characterized by a cap on the number of procedures together with separate but fixed payments to facilities and surgeons. Caps and payments are determined separately for Calgary and Edmonton. After the cap in each region is exhausted for the year (typically in September), no additional procedures are funded.

Facilities submit bids to Alberta Health Services at regular intervals, and an evaluation committee takes all bids and averages or blends them to determine the price. In all, providers bid on 14 categories of ophthalmic procedures, with overall case volumes ranging from 0-749, 750-1,500 1,501-2,500, and 2,501 and over, with various prices per volume range. Unlike the second-price auction, which encourages bidders to announce prices that correspond to their production costs, this process does nothing to encourage either truthful bidding or low bidding. There is an implied risk that Alberta Health Services might allocate more procedures to the lowest bidder(s), but in fact this has never occurred. The process might even encourage providers to inflate their bids to boost the average price.

Each surgeon maintains a waiting list, and the number of procedures the surgeon performs is determined by the chief of the Division of Opthalmology of Alberta Health Services. The allocation of procedures across facilities is accomplished through a combination of surgeon affiliations, ownership interest (surgeons who have an ownership interest in a facility are always permitted to perform procedures at that facility), and decisions by the chief of the Division of Opthalmology.

Currently, in Calgary, most cataracts are replaced in "non-hospital surgical facilities," while, in Edmonton, the vast majority (85%) are performed in hospitals. In Calgary, two of the five non-hospital surgical facilities dominate the market, with shares of 36% and 27%, respectively. In Edmonton, one inpatient facility alone performs 65% of the procedures.

RECOMMENDATIONS

In this section, we compare Alberta's current approach to the procurement of cataract procedures with recommendations we would make to Alberta Health Services. Our recommendations are guided by the distinct characteristics of cataract surgery, and we caution these options might not be appropriate for other procurement cases. As noted above, cataract surgery is characterized by minimal variation in the cost to treat any particular patient. The outcomes are easily observable and complications are rare and straightforward to verify. Perhaps the most dominant feature of the procedure is its susceptibility to demand inducement.

Our proposal recognizes the importance of restraining cost growth while providing as many procedures as the budget permits. After presenting our proposal, we offer several caveats and possible modifications.

Step 1: Identification of Surgical Candidates

Identification of surgical candidates should be performed by a licensed ophthalmologist (for a fee to be determined by Alberta Health Services). The ophthalmologist should also prepare a *standardized* report with the pertinent patient history to forward to the surgeon who is selected to perform the procedure. Any candidate deemed appropriate for surgery should be entered into a central government list, together with a categorization of urgency and the exam report.

> ***The creation of a centralized waiting list, together with a categorization of urgency, would enable Alberta Health Services to treat the most urgent cases first, while minimizing the incentive for any surgeon to overstate the urgency of a given patient in order to increase his or her own caseload. This system compares to the current approach in which rationing is implicitly performed through time on the waiting list (currently far above the stated goal of 16 weeks).***

Step 2: Selection and Payment of Qualified Surgical Providers

We propose two related alternatives for allocating patients to surgeons and determining payments: an Nth-price sealed bid auction and a sealed bid schedule.

AN NTH-PRICE SEALED BID AUCTION

In an Nth-price sealed bid auction, each licensed surgeon who wishes to participate in the program submits a bid price. This price is a global fee per cataract that includes all care related to the lens replacement (including facility and supply costs), as well as any possible complications that result (we elaborate on this under "quality warrantee" below).

All surgeons who bid below the Nth-lowest bid would be eligible to perform cataract surgeries during the contract period and would be paid the Nth-lowest bid. Alberta Health Services would choose N to ensure that a sufficient number of providers fulfills expected demand during the contract period. (This is akin to a second-price auction but recognizes the capacity constraints of individual surgeons and the value that patients place on having a choice of providers.)

After Alberta Health Services determines the eligible providers, each provider would be told whether he or she is eligible and the amount of the reimbursement. For planning purposes, eligible providers also would be informed of the number of total procedures approved for the contract period, as well as the number of eligible providers. Each provider would have to agree to serve all patients at any price greater than or equal to the bid.

The recommended approach would bundle the payments of providers and facilities, providing incentives to minimize total costs; currently, Alberta Health Services pays each separately. In addition, the current facility-bidding mechanism, in which the lowest bid determines the prevailing price that is offered to all facilities, provides little incentive for facilities to make low bids. Finally, this mechanism would allow Alberta Health Services to set a budget cap, rather than a procedure cap.

A SEALED BID SCHEDULE

Under a sealed bid schedule, each licensed surgeon would submit a "schedule" specifying the number of patients he or she would be willing to treat for any given price. The schedule might be flat (that is, the same price for all patients), but it also might have "steps." Prices should not decrease at any point in the schedule. For example, a physician might submit a bid of $2,000 for the first 100 patients and $2,200 for any number of patients between 101 and 200, but the physician could not submit a price below $2,000 for patients 101 through 200. Alberta Health Services would aggregate the bid schedules by identifying the least-cost way of providing any given total volume and select the price and quantity combination it desires. All surgeons would be paid the same price for all procedures, which would be set equal to the amount of the marginally excluded bid. If Alberta Health Services were to set a global budget for cataract surgery, this mechanism would ensure the maximum number of procedures within that budget, subject to the proviso that all providers would be paid uniformly.

After Alberta Health Services has determined the eligible providers, providers would be told of their eligibility and the reimbursement amount. For planning purposes, eligible providers also would be informed of the maximum number of procedures they may perform during the contract.

For example, suppose Alberta Health Services were to set a global budget of $1 million for the contract period, and three physicians then submitted the following bid schedules: physician A, $1,900 per procedure up to 600 procedures; physician B, $1,800 per procedure for the first 200 procedures and $2,000 for 500 additional procedures; and physician C, $2,200 per procedure up to 300 procedures. The reimbursement would be set by the bid price for procedure number N + 1, as follows. Two hundred procedures would be assigned to physician B (the lowest bidder) at a price of $1,900 (the lowest excluded bid). If only 200 procedures were to be financed, the total cost would equal $1,900 H 200 = $380,000.[16] However, since the global budget would exceed this amount, the allocation would proceed to offer some volume to physician A (the second-lowest bidder). As a result of including physician A in the choice set, the market price would rise to $2,000 per procedure. Given the global budget of $1 million, this would allow Alberta Health Services to purchase 500 procedures — 300 from physician A and 200 from physician B. Note that *both* physician A and physician B would receive the price of $2,000.

[16] The price would be $1,900, rather than $1,800, because this is a second-price auction in which the market price is the price of the marginal procedure. In this case, the lowest bid for the 201st procedure would be physician A's bid of $1,900.

This example highlights the efficiency incentives inherent in second-price auctions: each bidder realizes that its expected *quantity* is directly determined by its own bid, but the price it receives is determined only by *other bidders*' bids. Thus, bidders have no incentive to overbid in order to increase margins should they win. By bidding truthfully — that is, by bidding the lowest price at which it is willing to provide services — each bidder knows that it will sell all of its services at prices greater than or equal to its bid. Because second-price auctions elicit truthful bids, they also result in allocative efficiency: total quantity is maximized for any given level of expenditure.

This variant would ensure that the most efficient providers are allocated the highest number of procedures. Currently, allocation is performed by the chief of the Division of Opthalmology, and efficiency is not explicitly considered in the allocation process.

Step 3: Matching of Patients and Providers

AN NTH-PRICE SEALED BID AUCTION

In an Nth-price sealed bid auction, a patient deemed eligible for surgery would receive a list of surgeons eligible to perform surgery during the contract period. Patients would agree to contact surgeons within a month of receiving clearance, and surgeons in turn would agree to provide care within a month of the contact (although exact time periods would be determined by Alberta Health Services).

Patients would have free choice of eligible providers, which implies that each provider might perform more or less than the capped number of procedures divided by the total number of eligible providers, although the sum of all procedures would equal the cap. This would inject into the process a second level of competition — for patients among included providers — and thereby create incentives to offer patients quality and convenience.

Currently, patients on the waiting list are affiliated with the surgeon who placed them on the list, implying that the choice of surgeon must be made at the time of the initial visit. The waiting time for each patient therefore depends on whether the surgeon's allocation has been exhausted — information that the patient is unlikely to have.

A SEALED BID SCHEDULE

Under a sealed bid schedule, the same mechanism would be employed to match patients and physicians, but physicians would not be able to perform more than the number of procedures they have been explicitly allocated.

Step 4: Quality Warrantee

As is customary, physicians would have routine post-surgical follow-up consultations with patients, the cost of which would be included in the global fee. The physician also would be responsible for all costs associated with surgical complications. As a result, the best-quality physicians, measured in terms of having the fewest complications, likely would be the most successful bidders. A patient who suffered complications should have the right to be treated by a different physician if desired; in these cases, the associated reimbursements would be determined by Alberta Health Services and paid by the original surgeon.

Step 5: Additional Details and Optional Adjustments

QUALITY BONUS

To incentivize high-quality service, Alberta Health Services might wish to implement a system whereby physicians receive grades based on their complication rates (or an alternative, physician-designed ratings system). Physicians with higher grades could receive a bonus per procedure performed or their bids might be automatically lowered by the bonus amount (while they would still always receive the clearing price plus the bonus amount). Alberta Health Services might include other factors, such as patient survey results, waiting times, and adherence to promised scheduling, in determining the quality bonus. In light of the, at best, tentative state of knowledge of the efficacy of various forms of pay-for-performance, Alberta Health Services might want to experiment over time or in different geographic areas with alternative methods for incentivizing and rewarding quality.

> ***Currently, Alberta Health Services pays additional supplements to facilities that perform medical training. Our proposal would expand the set of supplements that could be paid, while maintaining the incentives of the bidding system.***

SUSTAINING COMPETITION

We assume that bidders would not conspire to fix prices. As long as there were a substantial number of potential bidders — say, five or more — price fixing would be unlikely. Even so, the province should remind bidders about the antitrust laws and discourage mergers that would combine significant numbers of existing providers.[17]

[17] To encourage further competition among providers who might be in existing medical groups, Alberta Health Services could allow each group member to submit secretly a personal bid. In this way, some, but not all, members of a group might win a contract.

We assume throughout that there would be a pool of ophthalmologists willing to participate in the auction, with sufficient capacity to meet the needs of the population. Because Alberta Health Services patients represent only about half of the business of Alberta ophthalmologists, even losing bidders might remain in the market. It is possible, however, that losing bidders would exit the market, leaving behind an insufficient number of bidders to make the system succeed. Given this scenario, Alberta Health Services might consider modifications to promote sustained competition. For example, it could *use short contract periods, such as one week (or a month)*. Patients authorized for surgery during that week would have to receive treatment from a provider who would be authorized that week. The surgery would have to occur within a set window of time, but would not have to be performed that week. This would smooth out use across all providers who bid competitively. Losing bidders would not need to exit the market, as they could always bid more competitively next time. (Non-strategic bidding at true costs might result in exits, but such exits would be optimal.) Frequent bidding has its own risks, however — for example, it might facilitate collusion (see Besanko et al. 2009). A second modification would be for Alberta Health Services to *encourage bidding from providers outside the province, combined with long contract periods.* Because entry costs for such providers might be more than trivial, they might be attracted by contract periods of perhaps a year. This would facilitate nationwide competition to serve Alberta.

TRANSITION PERIOD

To ensure the new payment system worked smoothly, and to expose physicians and facilities to the system before it took effect, perhaps a "practice round" of bidding could take place prior to full rollout. Physicians would be informed of the outcome of the bids.

CONCLUSION

Policy makers continue to wrestle with finding optimal strategies for procuring health care services. Traditional procurement methods used in other sectors of the economy might not work in health care due to a combination of unique characteristics. A range of approaches, from cost-based payments to capitation, have different strengths and weaknesses that make them appropriate for some health services but not others.

The current system of procuring cataract surgery in Alberta is particularly flawed. There are no incentives to hold down prices, no rewards for boosting quality, and waiting lists are not rationalized. Drawing on theoretical and empirical research, we propose a new approach for procuring cataract surgery that relies on independent gatekeepers to identify candidates for surgery, a competitive bidding process to set prices, and warrantees to assure quality. This proposal should lead to more efficient production, higher quality, and more effective queuing.

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