

REDUCING ARTHROPLASTY COSTS VIA VENDOR CONTRACTS

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OBJECTIVE: To describe a method of reducing the costs of implants in hip and knee arthroplasty.

DESIGN: Implant costs were compared before and after the implementation of a 2-year contract with implant vendors, providing increased volume for decreased implant cost. An additional 20% of arthroplasties could be done outside the contract for research or special purposes.

SETTING: A regional health authority involving 2 acute care hospitals.

METHOD: Costs were obtained for 942 hip and knee arthroplasties performed in 1993/94 and compared with costs of 1656 hip and knee arthroplasties performed in 1996/97.

OUTCOME MEASURES: Implant cost and number of joint arthroplasty procedures performed.

RESULTS: A 40% decrease in the cost per implant for primary knee arthroplasty and an 18% decrease in the cost per implant for primary hip arthroplasty were achieved. A rebate, calculated as a percentage of volume used, was received from the vendor to support general orthopedic research and education. A new contract for 3 years has recently been signed with 3 vendors designated as primary vendors for 80% of the volume.

CONCLUSION: The vendor-contract economic strategy effectively reduced the cost of hip and knee arthroplasty and may be useful at other centres looking for cost reduction methods that maintain adequate patient care and support clinical research and education.

OBJECTIF : Décrire une façon de réduire les coûts des implants servant à des arthroplasties de la hanche et du genou.

CONCEPTION : On a comparé les coûts des implants avant et après la signature d'un contrat de deux ans conclu avec des fournisseurs d'implants, qui prévoyait une augmentation des volumes et une réduction du coût des implants. Une partie supplémentaire de 20 % des arthroplasties pouvaient être réalisées en dehors du contrat pour les besoins de la recherche ou pour des fins spéciales.

CONTEXTE : Administration régionale de la santé comportant deux hôpitaux de soins actifs.

MÉTHODE : On a obtenu les coûts de 942 arthroplasties de la hanche et du genou réalisées en 1993–1994 et on les a comparés à ceux de 1656 arthroplasties de la hanche et du genou réalisées en 1996–1997.

MESURES DE RÉSULTATS : Le coût des implants et le nombre d'arthroplasties réalisées.

RÉSULTATS : Le coût des implants servant à une arthroplastie primaire a diminué de 40 % dans le cas du genou et de 18 % dans celui de la hanche. On a reçu du fournisseur un remboursement calculé en pourcentage du volume utilisé, qui a servi à appuyer la recherche et l'éducation en orthopédie générale. Un nouveau contrat de trois ans portant sur 80 % du volume a été signé récemment avec trois fournisseurs désignés comme fournisseurs principaux.

CONCLUSION : La stratégie économique du contrat d'achat réduit efficacement le coût des arthroplasties de la hanche et du genou et pourrait servir dans d'autres établissements qui recherchent des moyens de réduire les coûts tout en maintenant un niveau adéquat de soins aux patients et en appuyant la recherche et l'éducation cliniques.

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Alberta's health care system was catapulted into extensive restructuring as a result of significantly reduced spending in 1994 due to the mission of the Alberta government to eliminate the provincial deficit. The government stated that cost reduction was to be done "without affecting the standard of patient care." Several initiatives were attempted to reduce costs. One innovative method was tried in the Capital Health Region in Edmonton: preferred vendor agreements with arthroplasty implant suppliers were introduced in 1995. Not only were implant costs and surgical waiting lists reduced, research and education resources were augmented substantially by the process. Because of these savings and a small increase in the budget for prostheses, a significant increase in the number of arthroplasties performed was possible.

A review of the current Canadian and American health care economic literature lists preferred vendor agreements as one option to reduce costs in various hospital departments.¹⁻³ Other options include capital-asset management, contract management, outsourcing and joint ventures.^{1,2,4} One article from the United States described a 4-point strategy involving a competitive bidding system to reduce implant costs.⁵ Published concerns regarding the high costs of orthopedic implants can be found dating back to 1983.⁶ Recent Canadian and US editorials and articles are concerned with both the method and ethics of cost containment.⁷⁻¹¹

BACKGROUND

Before 1994, all hospitals in Edmonton had separate purchasing departments, with implant inventory being purchased as required by surgeon preference. Allowing surgeons to choose implants as desired was an expensive purchasing system, so a bidding process for implant costs was initiated by hospi-

tals individually. This bidding process produced a minimum of 5% to a maximum of 10% savings in implant costs.

During restructuring of the health care system, individual hospital boards were disbanded and replaced with 17 health region boards province wide. The Capital Health Authority encompassing a population of approximately 723 000 and a referral base of 1.2 million changed from 5 acute-care hospitals to 2 high-intensity or referral hospitals for major surgery and 3 low-intensity community health centres for day surgery and overnight stays only.

As part of the restructuring, a single Material Management Department (MMD) was formed. MMD (purchasing) representatives from the hospitals currently doing major surgery, were brought together to explore the possibility of standardizing contracts within the Capital Health Authority region. The focus of this group was to identify the commodities that constituted the top 20 expenditures, regionally. As 1 of those 20 commodities, orthopedic implants (specifically hip and knee prostheses) represented an annual expenditure in 1993/94 of \$2.9 million over all of the region's hospitals. The original 3-year plan was to reduce health care spending by 17.3% (\$167.1 million). To meet that target, beds and operating rooms were also closed, and patient care, support services and administrative services were dramatically reduced.

METHOD

Standardized contracts were deemed to be feasible, so a committee consisting of 4 arthroplasty surgeons, 2 orthopedic surgical nurses and 1 representative of MMD (purchasing), developed an action plan for the competitive bidding process. From the action plan data were collected across the region on costs, implants used, expenses, and the number of hip and knee arthroplasties performed. The

purchasing personnel developed both technical and service criteria lists that an implant vendor must meet. The 4 surgeons (peer chosen and 1 per site), as site representatives of the 27 Capital Health Authority (Edmonton) region orthopedic surgeons, developed a clinical criteria list. The bidders were requested to identify any benefits they would provide, such as research support, sponsorship of orthopedic surgery residents, educational funding, consignment inventories and instrumentation sets. These were defined as "value-added benefits." The technical, service and clinical criteria plus the value-added benefits were amalgamated into a request for proposal. A formal request for proposal was released on Dec. 12, 1994, to 11 prequalified vendors. The contract was for primary arthroplasty implants for hips and knees within the Capital Health Region.

Evaluation

Bids were evaluated by spreadsheet on the variables of price, service, scientific merit, personal interviews with users, site visits and the value-added benefits provided. After clarification of the bids from the vendors as required, a short list of 6 vendors was drawn up. These 6 vendors were then asked to submit trial data and results for their implants. A period of approximately 8 weeks was taken for clinical review and recommendation by the surgeons using the products of the short-listed vendors. Inservices and "saw bones" sessions were also completed on these products by the operating room nursing staff and surgeons. The recommendation for the award of the contract was based on the above points plus clinical acceptance after the trial period.

Contract

Eighty percent of the 27-month contract was awarded to 2 primary ven-

dors and 3 secondary “specific application” vendors. The remaining 20% of the contract was awarded to vendors supplying implants to be used for research or special purposes such as new system trials. The negotiation and signing of the contracts, including a service and new technology escape clause, were the final finite steps in awarding the contract. Once awarded, the components of the contract — inventory, vendor performance and accounts — were monitored to ensure that the contract directives were fulfilled. Revision implants were excluded from the contract. Savings of \$960 000 in implant costs after the contract was implemented were anticipated over the 27-month term.

RESULTS

The actual cost of each knee implant decreased an average of \$994 or 40% when compared with the pre-contract cost. The actual cost of each hip implant decreased an average of \$465 or 18% when contract implants were used (Table I). Although some of the implant vendors supplied other products to the regional hospitals, the vendor contracts were for the implants only. No bundling of items occurred, and the implant contract did not have any impact on the cost of other non-implant products. The prosthetic implant budget is managed separately from the remainder of the surgical suite budget and is responsible only for the cost of the implants. The budget for prosthetic implants was not reduced from pre-contract levels in anticipation of substantial cost savings expected from the preferred vendor contracts. Due to long waiting lists, an additional \$1.1 million was authorized for the global arthroplasty budget, permitting 31% more hip and knee arthroplasties to be performed (Table II). The extra funding was used for implants as well as beds, nursing and surgical suite time required for the additional procedures.

Prospective patients are placed on each hospital’s computerized surgical booking/waiting list in the Capital Health Region by the surgeon’s office immediately after the patient has seen the surgeon and been recommended for surgery. They remain on this list unless removed for any of the following reasons: they have had their operation, they cancel their surgery or they are unfit for their operation. On request, the booking office provides statistics on how long each patient has been or was on the list, as tabulated by the number of days from when each patient was placed on the list until the day the patient is removed from the list and how many patients are waiting for surgery, past or present.

In January 1996, 4 months into the contract, there were 938 patients on the joint arthroplasty surgical waiting list in the Capital Health Region. These patients waited an average of 183 days for the operation. One year later, with the same number of surgeons and hospitals participating and other major factors unchanged, there were 517 patients on the waiting list and the wait time to operation had been reduced to 117 days.

With one exception, all implant vendors involved in the contract had provided implants to the involved hospitals and been used by the surgeons before the contract. The surgical time increased slightly and briefly due to the learning curve associated with the new implant; however, it soon returned to its previous level. A regional caremap, which strictly regulates hospital length of stay was in place before the contract was imple-

mented. The mean (and standard deviation) length of stay immediately before the contract for primary hip arthroplasty was 7.3 (3.7) days and remained the same (7.3 [4.0] days) during the first year of the contract. The comparable times for primary knee arthroplasty were 7.8 (3.1) days, decreasing to 7.4 (4.0) days during the first year of the contract. A random chart review of 10% of the primary hip and knee arthroplasty patients from the periods before and during the contract were reviewed by an unbiased health professional to determine if in-hospital complications had increased or changed significantly as a result of the implementation of the contract. There was a slight decrease in complications from the period before the contract to during the contract (Table III). The presence of short-term (up to 1 year postoperatively) revisions was also determined during the chart review through readmissions and plaster room visits. There were no statistical differences between the 2 cohorts (Table IV).

Orthopedic research and education received \$200 000 over the 27-month contract period from the value-added benefits program. A committee consisting of orthopedic surgeons and clinical personnel working in orthopedic research set up an orthopedic research group and designed a formal process to independently review projects requesting financial support. A portion of the value-added benefits income was directed into an education and travel account to fund orthopedic residents wishing to present their research at orthopedic meetings. The

Table I

Average Cost in Canadian Dollars of Hip and Knee Arthroplasty

Year	Hip	Knee
1993/94	2593	2515
1996/97	2128	1521

Table II

Number of Hip and Knee Arthroplasties*

Year	Hip	Knee
1993/94	602	540
1996/97	777	879

*Primary arthroplasty surgery completed.

orthopedic nursing education fund also received approximately \$34 000 over the term of the contract.

DISCUSSION

Although the preferred vendor contract resulted in significant cost savings, the advantages and disadvantages of such an agreement must be weighed carefully before implementing the process. Ensuring that all personnel affected by the decision are involved in the process from the start is critical to the acceptance of a major change in operational status. From the choice of vendors to prequalify to the product evaluation period, all surgeons must be committed to the process and be willing to change. To encourage input from all team members, it must be made clear from the outset that the status quo is not an acceptable option.

The tendering process must be fair and open to all contenders, with an adequate trial period to allow for the evaluation of new components and education of all affected personnel. Research involving regular monitored postoperative follow-up is essential when introducing new components to ensure quality outcomes. Long-term follow-up of new components should also be considered to ensure that short-term cost-effectiveness has not led to increased revision rates as a result of decreased component quality.

Research and education funds augmented from the value-added benefits stimulated participation in clinical tri-

als involving the new technology funded by the agreement plus trials completely unrelated to the contract.

Drawbacks of the contract process include exclusion of valued vendors in the region with a corresponding decrease in a surgeon's independent choice of implant. Similarly, there is a lack of implant variety for orthopedic resident training. The academic institution may be labelled as supporters of contracted vendors; however, 2 major vendors and 20% of arthroplasties out of contract help diminish this perception. Revision surgery involving non-contracted vendors requires additional preparation time for ordering components and instruments. Service from non-contracted vendors may be deficient as there is limited return to the vendor without a contract. Finally, the price is locked in for a set number of years, and this may become an issue in a competitive market environment.

The substantial funds saved through the preferred vendor contracts translated into additional arthroplasty procedures. The cost of implants was the only factor monitored although it is not the only cost associated with arthroplasty surgery. Additional funding was required for beds, nursing, rehabilitation staff and pharmaceutical costs. Zuckerman and colleagues⁵ reported on a process very similar to the one described in this article. Their results were similar. The vendor contracts instituted in their hospital realized an average cost re-

duction of 14% for hip implants and 24% for knee implants. Likewise, they showed no evidence of an increase in the number of early complications. Their concerns reflected ours: the potential disadvantage in limiting the variety of prostheses available, the potential inability to use new technology, and the satisfaction of the surgeon.

CONCLUSIONS

Cost reduction has become an universal issue in health care. The challenge faced by the health care community is maintaining standards of patient care as funding is decreased. Finding innovative methods of reducing costs, particularly of the high expenditure commodities, is one way this challenge may be met. Using preferred vendor contracts for provision of arthroplasty implants significantly reduced hip and knee arthroplasty costs in the Capital Health Region in Alberta. Patient care was maintained within the contract system, and in fact both the number of patients on surgical waiting lists and the time to surgery were reduced during the initial contract period. Although the use of vendor contracts was successful in reducing implant costs, it is only one factor and does not work in isolation. The secondary benefits of reducing patient waiting lists and time to surgery may not always be realized. Hospital administrative decisions and global budgets will determine where the contract savings are allocated. Although revision implants were not

Table III

Inhospital Complications (%)*

Complications	Hips		Knees	
	Before contract	During contract	Before contract	During contract
None	83	80	76	70
General	17	7	19	18
Local	0	13	5	12

*Includes major and minor complications.

Table IV

Short-Term Revisions (%) in the Periods Before and During the Contract*

Time	Hips	Knees†
Before contract	2.3	2.3
During contract	0.9	2.7

*Up to 12 mo after arthroplasty

†Revisions include patellar resurfacing.

part of the contract, changes by surgeons to their revision practices as a consequence of using contract prostheses resulted in a decrease of the cost of revision surgery and an increased inventory of on-site revision implants. Financial support for orthopedic research and education of all orthopedic support staff, including nurses and residents, was significantly augmented. It is anticipated that the formation of the orthopedic research group will increase both the quantity and quality of publishable orthopedic research in the Capital Health region.

The economic strategy of tendering vendor contracts can be applied to other areas in the hospital setting and institutions. This process has proven to be an effective method of reducing costs without sacrificing the standard of patient care, and in fact has allowed an enhancement of the joint arthroplasty program.

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Addendum

A second Request for Proposal was sent out by the Capital Health Authority MMD (purchasing) in December 1997 as the initial contract approached completion. A similar process was followed for this contract negotiation with the following exceptions: (1) the implant evaluation period took place before the release of the Request for Proposal, (2) the clinical acceptance criteria from the surgeons included new technologies such as ceramic-on-ceramic and metal-on-metal hip implants, and (3) vendor use information was available to determine the surgeons' preferred implants.

From the analysis of the bids received and the clinical evaluation results, the surgeons recommended *primary* vendor contracts (80%) be awarded to 3 vendors. The remaining 20% of the contract remained open to other vendors for research and special purposes. The synopsis of the bids, based on the vendors' minimum volume, indicated an additional implant cost savings to the Capital Health region of approximately \$700 000 in the first year of the contract. These savings should be sustained through each subsequent year of the contract. The funds received from the value-added benefits program should be approximately \$140 000 annually. The contract is for 3 years with an option for a fourth year following a review planned at the end of the third year to determine if conditions exist where competitive bids would still be advantageous.