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[title] A Novel Value-Based Procurement Agreement to Improve Outcomes for Knee Replacement Patients

[highlight] Early results of an initiative at Vejle Hospital in the Region of Southern Denmark show promise, with clinically reported data showing reductions in readmissions 30 days after discharge, as well as some improved Patient-Reported Outcome Measures (PROMs) one year after surgery.

[summary/abstract]

Summary

The fundamental goal of value-based health care is to improve patient outcomes and reduce the cost of achieving these outcomes. New types of agreements have been introduced to improve how organizations collaborate in the health care value chain to improve outcomes for patients. Whereas most of the attention has been on how the payers of care should pay hospitals, clinics, and other care facilities to improve value for patients, this paper focuses on the payment of hospital suppliers. The authors illustrate how Vejle Hospital in the Region of Southern Denmark has been able to create a new relationship with its supplier of primary total knee replacement implants to improve patient outcomes without affecting the regional budget. Primary total knee replacement implants are a strategic product for the region as they are expensive to procure, and improving patient outcomes of primary total knee replacement is a regional priority. The agreement focuses only on primary total knee replacement patients to increase the control the supplier has on the final outcomes of its products. (The supplier could be the device manufacturer or a dealer of such products.) The authors provide details on the execution of this contract, which compensates suppliers based on the outcomes patients achieve. In this agreement, patient-reported outcome measures (PROMs), including functional lift and proxies for patient satisfaction, and clinically reported outcome measures (CROMs), including length of stay, readmission, and revision rates, define whether the supplier receives a 17% bonus or a 17% penalty on the final price of the product; that ranges from

approximately 694 EUR (- 17% price) to 978 EUR (+ 17% price). The authors use outcome aggregate data to illustrate how the agreement has affected the quality of care. Overall, a preliminary analysis of the initial stages of the implementation of this contract (from September 1, 2018 to December 31, 2021) suggests that this new type of agreement has a positive impact on key patient outcomes. A PROMs questionnaire was shared via email with every patient one year after the procedure. When compared with the baseline (from January 1, 2013 to December 31, 2015), device-related readmission rates had a statistically significant decrease, declining from 14 of 577 (2.4%) to 8 of 645 (1.2%) in 2021, and patients reported outcomes that serve as a proxy for overall satisfaction one year after surgery, with a statistically significant increase, rising from 163 of 170 (96%) to 455 of 469 (97%).

Key Takeaways

- Value-based contracts to compensate suppliers for the outcomes patients achieve do not necessarily require an increase in the procurement budget.
- This novel approach to contracting/procurement provides new upside (and downside) risk and enhances the collaboration between suppliers and surgeons.
- The implementation of this new type of contract requires the evaluation of patient outcomes, which can be beneficial for other aspects of health care delivery.
- Targeting procedures for which data are already available reduces the obstacles to implementation, contributing to a successful completion of the overall process.
- Clinical engagement is an essential prerequisite to ensuring the success of the initiative from the initial steps of the process, because collaboration and trust between supplier and clinicians is critical to create a relationship that will lead to improved outcomes.

The Challenge

The Region of Southern Denmark is responsible for managing the funds it receives from the national government (about 80%) and the local municipalities (about 20%), and with this fixed sum, it is motivated to control costs through procurement efforts. The Region of Southern Denmark procurement team is responsible for negotiating and contracting for all hospitals in the region.

In 2017, health care leaders from the Department of Orthopedic Surgery at Vejle Hospital met with category managers from the Strategic Procurement Department in the Region of Southern Denmark with the goal of improving the value delivered to patients undergoing primary total knee replacement. In pursuit of their objective, they sought to establish a new relationship with their suppliers of primary total knee replacement implants, aligning with the central tenet of value-based health care, which is aimed at enhancing patient outcomes while reducing the cost of care.[1] To achieve this aim, it is necessary to improve how all the parties in the health care value chain collaborate with each other.[2]

The interest of the hospital to include outcomes in the agreement has grown from an increasing number of joint initiatives with the suppliers in Research & Development of primary total knee replacement implants. As a public hospital, Vejle Hospital is subject to European Union (EU) procurement rules, the interpretation of which in Denmark has led to tenders for orthopedic surgical implant systems. Feedback from suppliers on the first tenders for orthopedic surgical implant systems in 2011 highlighted the interest for a new tender model that would reward those suppliers for the outcomes that patients achieve.

The Goal

The Region of Southern Denmark procurement team had three main goals. The first was to improve outcomes for patients undergoing primary total knee replacement. The second was to incentivize

suppliers for the outcomes patients achieve. The third was to stay within the budget requirements of the previous tender.

The Execution

Vejle Hospital is where the development of this new type of agreement took place. This hospital is in the Region of Southern Denmark (one of five Danish regions) and has a population of 1.2 million. In Denmark, regions are responsible for procuring strategic hospital goods and services, such as primary total knee replacement implants, and have a budget of approximately EUR 5.5 billion, collectively. The orthopedics ward at Vejle Hospital performs more than 2,000 hip and knee replacement procedures every year.

The Region of Southern Denmark makes up approximately 21% of the total population of Denmark. The proportion of total knee arthroplasties performed in the region is in line with the region's proportion of the total population (about 20%). Vejle hospital , in the municipality of Vejle, is part of one of four main hospital units in the region and accounts for 8% of all total knee arthroplasties in Denmark (Table 1).

[title] Table 1. Number of Primary Total Knee Replacements in Denmark, in the Region of Southern Denmark and at Vejle Hospital from April 1,2021 to March, 31, 2022

Geographical Region	**Primary Total Knee Replacements, N (%)**
Denmark	5,669 (100%)
Region of Southern Denmark	1,136 (20%)

Vejle Hospital, in Vejle municipality	429 (8%)

Source: The authors

The procurement team decided to focus on knee replacements because the contract was being renewed. Another reason for choosing knee replacement was because the primary total knee replacement implants were considered a strategic product, as per the Kraljic procurement matrix (Figure 1).

[title] **Figure 1. The Kraljic Procurement Matrix as Currently Used at Vejle Hospital**

[caption] A primary total knee replacement implant is considered a strategic product as it contributes significantly to health care expenditures and, at the same time, it is complex to procure. As such, it would fall within the quadrant at the upper right of the matrix.

Note: Current as of April 2024.Source: The authors, based on Cousins P, Lamming R, Lawson B, Squire B. Strategic Supply Management: Principles, Theories and Practice. Germany; Prentice Hall Financial Times, 2008

One of the most common matrices that procurement departments across the world use to classify products and services is based on the work of Cousins et al.[3] Non-critical items are goods and services that have a low cost and a low risk and complexity of supply. For example, paper for office printers tends to have a low impact on budgets, and tends to be easy to procure and would be placed in the lower left quadrant. Volume items are expensive but still easy to procure. In a hospital,

an example of a volume item can be respiratory products. Bottleneck items have a low impact on budget but are difficult to procure. As an example, personal protective equipment during the Covid-19 crisis was a cheap item that was difficult to procure. A primary total knee replacement implant is a strategic product as it contributes significantly to health care expenditures and, at the same time, it is complex to procure. The complexity is due to the risk of procuring a high-cost product that is not certain to have satisfactory patient outcomes. Up to one in five patients is dissatisfied after primary total knee replacement.[4] Identifying a supplier that can provide superior products and services, and improve patient outcomes, is a priority. Whereas there is a lack of evidence on which supplier to choose,[5,6] a hospital can minimize its risk of overpaying for a product that does not lead to better outcomes by offering higher rewards in exchange for positive patient outcomes, and penalties for poor patient outcomes. Consistent with the aim of minimizing risk, Vejle Hospital decided to offer a new type of contract to reward better performance and penalize poorer patient outcomes. Primary total knee replacement implant suppliers were eager to experiment with this new type of approach that was going to replace the previous agreement, and six suppliers participated in the technical dialogue with the procurement team in advance of the tendering process, after which three suppliers eventually submitted bids. One risk of this type of agreement is potential lower returns. The suppliers that chose not to bid were dealers and not manufacturers. One possible hypothesis that explains the interest of the primary total knee replacement implant suppliers is the opportunity to introduce more innovative products, leading to better patient outcomes. Innovation can be stifled when price competition dominates, as companies focus mainly on reducing costs. Shifting the competitive environment from price competition to value competition has the potential to enhance the adoption of innovation in health care, to achieve both better outcomes and lower costs. Two of the three largest suppliers that submitted a bid offered their newest implant systems in the tender. The historical patient outcomes delivered by the surgeons at the orthopedic surgery department at Vejle hospital were publicly available via the Danish Knee Arthroplasty Register (DKAR). The publicly available historical patient outcomes informed the suppliers on the surgical quality and hospital

quality the surgeons at the orthopedic surgery department at Vejle hospital could deliver. The quality indicators on patient outcomes used in DKAR also gave the suppliers the possibility to see how their own products performed on these quality indicators compared to their competitors at the different orthopedic surgery department in Denmark. To reduce a supplier's risk associated with future change of staff at Vejle Hospital, this value-based procurement model does not include knee replacements performed by surgeons who have performed fewer than 25 knee replacements with the supplier's knee implant system. To reduce supplier's risk associated with infection levels at Vejle Hospital, this value-based procurement model excludes revisions due to infections above the average infection level in the DKAR.

The standard framework for public procurement in Denmark was able to be applied to this novel procurement agreement; the three-phase approach consists of a phase before, during, and after the tender (Figure 2).

[title] Figure 2. Three-Phase Framework for Public Procurement in Denmark

The framework for public procurement in Denmark that has supported this novel procurement agreement consists of a phase before, a phase during, and a phase after the tender. The arrows indicate it is possible to go back to the previous step if needed within Phase 1 as details of the tender are defined. At the end of Phase 3, a built-in renewal option is included.Source: The authors

In the first phase, the procurement team works to understand the demand for a product or service and its supply. A dialogue with the suppliers follows to collect information on how they see the development of the market for that product or service, and to explore the key aspects to focus on.

The user groups in the next step of the process consist of physicians, nurses, and other health care professionals from the hospital, and provide feedback on the minimum requirements a product or service should have. The consultation step with the user groups is another opportunity for suppliers to provide written feedback on what the procurement team should consider to achieve the best possible results. During the first phase participants may go back to an earlier step to revisit or refine until they reach a decision on the details of the tender. The second phase is the tender process, which results in selecting the supplier that will provide the product or service. The third and final phase includes the implementation of the tender agreement and represents one of the original elements of this new initiative: the new type of contract. Whereas in most tenders the role of the supplier is to deliver the product or service, in this new procurement initiative, the supplier works with the hospital to create value for the patients.

The agreement provides incentives for both clinically and patient-reported outcomes. The outcomes included in the contract are the length of stay, readmission and revision rates, patient health status related to mobility, self-care, usual activities (including work), pain/discomfort, and anxiety/depression as a proxy for satisfaction, and functional lift (Table 2).

[title] Table 2. Patient Outcomes Included in the Agreement

Outcome	Type of Instrument to Collect Outcome Information	Comment
Length of stay	CROM	

Readmission rates within 30 days of surgery	CROM	
Revision rates within 2 years of surgery	CROM	
Overall patient satisfaction (based on experience with health status factors)	PROM	EQ-5D-5L questionnaire; 5 severity levels (no problems to extreme problems) to assess today's mobility, self-care, usual activities (including work), pain/discomfort, and anxiety/depression; 5 = worst health to 1 = best health; 1 year after surgery
Functional lift	PROM	Oxford Knee Score (to assess 5 severity levels over past 4 weeks associated with 12 separate conditions of pain or function)

Abbreviations: CROM = clinically reported outcome measure; PROM = patient-reported outcome measure

Source: The authors

The PROMs (Patient-Reported Outcome Measures) questionnaires are answered by the patients 3 months before surgery and at one year after surgery. Patient satisfaction is measured with a proxy, the EQ-5D-5L questionnaire, which is a patient-reported measure of pain, function, and anxiety/depression; and we measure functional lift with the Oxford Knee Score, in which the patient

assesses function and pain after surgery. The superior performance in outcomes is rewarded based on the average results achieved in the three years between January 1, 2013 and December 31, 2015. The reward reflects the percentage improvement over the baseline. For example, a 5% increase in the proportion of patients who are very satisfied one year after surgery is rewarded with a 0.5% increase in prices. Penalties reflect results that are below this baseline. Every percentage decrease in outcome performance leads to a percentage decrease in price. Performance can produce an increase or decrease of up to 17% of the total amount a supplier receives for its products. The supplier has to cover the cost of revisions when the number of these surgical procedures exceeds specific threshold values. Outcomes such as decreasing length of stay, readmission, and revision rates have a direct impact on costs, as they decrease the number and the amount of resources the hospital needs to treat the patient. Patient satisfaction and functional lift may decrease total costs, as patients who do not achieve good results in terms of these outcomes are more likely to need other services and support from the health and social system.

The use of this model was considered a trial to evaluate the potential of value-based procurement. The choice of the 17% threshold for penalties and rewards was made in agreement with the potential suppliers to decrease the risk of excessive penalties or rewards. The choice of the outcomes in the contract was driven by two main factors. The first was whether the outcomes were already being collected. Relying on outcomes that are already being collected decreases the number of new tasks that need completing to implement the contract. The second factor was the choice of outcomes that suppliers can substantially affect with their product. The Hawthorne effect may explain improvements in performance during experiments. In this case, however, because it was unnecessary to collect new data, the impact of the Hawthorne effect was reduced. The CROMs used in the value-based procurement model at Vejle Hospital had been collected and reported to the Danish Knee Arthroplasty Register (DKAR) since 2000. The PROMs had also been collected at Vejle

Hospital, but had not been reported to the DKAR prior to the implementation. Rigorous measures and regular audits that ensure data accuracy, consistency, and adherence to standards are incorporated into the data collection process.

While we retained revisions rates within 2 years of surgery, we excluded the average patient revision rates after 5 postoperative years, even though these two CROMs were collected and reported to the DKAR. There was a general consensus that the suppliers would have not been able to affect them substantially with their product.

Drafting and signing this new type of agreement took more time than previous tendering initiatives. Clinical engagement was essential for the success of the project. Three key factors contributed to engaging the clinicians. First, there was uncertainty surrounding the future of knee alloplasty at Vejle Hospital. Second, everyone in the project understood the value of clinical expertise, and clinicians were aware of it. Third, clinicians were involved in defining the new agreement from the beginning of the project and were able to contribute to shape it. There was no need to change how the clinicians were paid to support this initiative. Training sessions were delivered to clinicians to provide further details on the products available, their use, and on how the supplier could support the clinical staff in the improvement of patient outcomes. The clinicians were able to select only the implants that were included in the contract.

The procurement process started in the first quarter of 2017, and the contract was signed in the second quarter of 2018. Pre-tender dialogue activities required more time than the drafting of the contract (Figure 3).

[title] Figure 3. Timeline from the Initial Discussions to the Calculation of First Outcomes

[caption] This figure identifies key milestones (triangles) in developing the new value-based contract model and illustrates when the steps of the procurement process were initiated and when completed (horizontal bars).

Source: The authors

These pre-tender dialogues do add more time to the process than with traditional agreements; in this case, adding more than 3 months. The implementation of the model after the signing of the contract is another step that needs to be completed; in this case, adding about 18 weeks. Whereas in traditional contracts the implementation of the agreement involves only the delivery of a product or service, in value-based agreements, the hospital and the supplier need to set up a system to measure and use outcomes to improve performance. If this system is already available (such as relying on data already collected at reported to the DKAR), it may still need to be updated to meet the clauses of the contract. Clearly, these activities require time and resources to be completed; renewals would generally be less time-consuming.

The Team

The buyer and the supplier need to create an *ad hoc* team during the tendering process. Southern Denmark created — with the support of the hospital leadership — a multidisciplinary team of about 15 members, with clinicians and nurses from the Vejle Hospital's orthopedics ward, procurement managers, and legal support staff. These profiles reflect the need to include not only the input of frontline health care workers, but also input from procurement and legal experts. The suppliers included in their team of about N members general and country managers, marketing executives, and finance, legal, and compliance experts. Similarly, this team includes a diverse set of skills. The

presence of general managers to support the local managers highlights the relevance of this initiative for the whole supplying organization.

At a later stage in the tendering process, Southern Denmark created a user group of between 10 and 12 participants to receive 360-degree feedback on the products and services being procured. These user groups engage everyone who is going to use the product. For example, in this procurement initiative, there was a user group for those sterilizing primary total knee replacement implants.

Hurdles

The pre-tender dialogue is an opportunity for the buyer to explain the risks of this type of agreement to the suppliers, and to achieve a common understanding on its potential. Financial penalties, like the 17% penalty for not meeting performance parameters, may seem harsh. However, businesses may consider that these penalties are imposed only after evaluating performance parameters, some of which may be assessed up to two years after surgery. The net present value of money could also reduce the actual costs for the supplier, making it a manageable future business risk. Therefore, it is essential to assess both short-term opportunities and long-term risks to fully comprehend the program's financial implications and its effects on suppliers. As trust is a key factor in the success of long-term agreements, transparency regarding risks is essential. Suppliers tend to have business models that do not account for risk sharing and primary total knee replacement implants tend to account for an important part of their revenues. Whereas some small and medium enterprises are trying to disrupt the marketplace and are leading the transition to value, others have not been exposed to the concepts of value-based health care and are likely to have traditional business models that do not consider the sharing of risk. Starting the pre-tender dialogue as soon as possible, and ensuring enough time for discussions with the suppliers, can help them to identify new business models that account for risk sharing and improvement of outcomes

The Execution Section illustrates the need for clinical engagement, and how Vejle Hospital achieved it. Transparency of outcomes can be uncomfortable for some clinicians. There are a multitude of factors affecting outcome performance, including a patient's risk profile. An inappropriate use of outcomes to evaluate performance can become a concern for some clinicians. Clinical engagement supporting a new culture that focuses on improvement and collaboration is key to overcoming the possible opposition to transparency on patient outcomes. In the implementation step, and across all project phases, the buy-in of the clinicians is essential. The clinicians are those who will use the product, and will interact with the supplier during the delivery of care. As this new agreement makes the hospital enter a partnership with the supplier, it is essential that the two parties enjoy working together. This experience shows that when both the supplier and the clinicians are supporting the initiative, and are willing to overcome the possible obstacles together, the likelihood of the project failing decreases considerably. The aim is to improve patient outcomes. The information to improve patient outcomes is made available to the suppliers. Product specialists from the supplier obtain real-time outcomes data. If aggregated patient outcomes indicate the need for further training of surgeons or other operational personnel, the chief physician will use these data to plan the necessary training with the supplier.

Metrics

The number of procedures under the new model was 577 in 2019, 601 in 2020, and 645 in 2021. The baseline reflects the average performance of Vejle Hospital in the three years between January 1, 2013 and December 31, 2015 . The data shows a significant (95% confidence interval [CI], -0.046 to -0.020; $P< 0.05$) decrease in hospital readmissions relative to the baseline (Appendix, Table A1).

[title] Table A1. Regression Analysis of Patients' Outcomes in Comparison with the Baseline

Patient outcomes	Coefficient	Standard error	p-value	95% CI
Average patient length of stay (hours)	-2.667	(3.14)	0.486	[-8.821; 3.487]
Average patient readmission rate 30 days after discharge	-0.033	(0.0067)	0.038	[-0.046; -0.020]
Average patient revision rate after second postoperative year*	–	–	–	–
Overall experience: Score of 1 on a scale of 1 to 5,** one year after surgery*	–	–	–	–
Overall experience: Score of 1 to 3 on a scale of 1 to 5,** one year after surgery*	0.120	(0.012)	0.009	[0.096; 0.144]
Functional lift: Score is between 39 and 48 on a scale of 0 to 48,# one year after surgery	-0.073	(0.029)	0.128	[-0.130; -0.016]
Functional lift: Score is between 19 and 48 on a scale of 0 to 48,# one year after surgery	0.123	(0.024)	0.036	[0.076; 0.170]

* Shows no variation between the variables

** On the EQ-5D-5L range of 1 to 5, 1 = best possible health experience/status, 5 = worst possible health experience/status

On the Oxford Knee Score range of 0 to 48, where 0 = worst possible health experience/status, 48 = best possible health experience/status

Note: Baseline Data relies on data of 1,991 (575 + 699 + 717) primary knee surgeries collected between 01 01 2013 and 12 31 2015; Post-intervention relies on outcomes data of 1,823 primary knee surgeries and 1,111 patient questionnaires collected between 01 01 2019 and 12 31 2021 (response rate 81.1%).

[caption] The data shows a statistically significant decrease in average patient readmission rate 30 days after discharge ($p<0.05$). There was a statistically significant improvement in overall experience ($p<0.05$).

Source: The authors

The average readmission rate within one month after hospital discharge in 2019 was less than half that when the contract started (Table 3).

[title] **Table 3**. **Results of the Implementation of the Agreement for Primary Knee Replacement (Clinically Reported Outcome Measures)**

Clinically Reported Outcome Measures	**Baseline**	**Year 2019 (N=577)**	**Year 2020 (N=601)**	**Year 2021 (N=645)**
Average patient length of stay (hours)	51.6	46.8	48.0	52.0
	percent	*number (percent)*		
Average patient readmission rate 30 days after discharge	5.0	14 (2.4)	9 (1.5)	8 (1.2)
Average patient revision rate after second postoperative year	2.0	N/A	N/A	8 (1.4)

Note: N/A = not applicable

Source: The authors

Whereas 14 of 577 patients were readmitted in 2019 (2.4%), only 8 of 645 (1.2%) were readmitted in 2021. Data on revision rates after two years of surgery show that patients are less likely to require another procedure. Whereas hospitalization time was below the baseline of 51.6 hours in 2019 (46.8 hours) and 2020 (48 hours), it was above the baseline in 2021 at 52 hours, even though this variation is not statistically significant (Appendix, Table A1).

However, the percentage of patients who reported functional lift scores one year after surgery of between 39 and 48 (very satisfied patients) on a range of 0 to 48 decreased compared with the 65% baseline (Table 4).

[title] Table 4. Patient-Reported Outcome Measures, Under Value-Based Tender

Patient-Reported Outcome Measures	Baseline	Year 2019	Year 2020	Year 2021
		N=170	N=472	N=469
	percent	*number (percent)*		
Overall experience: Score of 1 on a scale of 1 to 5,* one year after surgery	65	112 (66)	312 (66)	310 (66)
Overall experience: Score of 1 to 3 on a scale of 1 to 5,* one year after surgery	85	163 (96)	463 (98)	455 (97)
Functional lift: Score is between 39 and 48 on a scale of 0 to 48,** one year after surgery	65	102 (60)	260 (55)	272 (58)
Functional lift: Score is between 19 and 48 on a scale of 0 to 48,** one year after surgery	85	162 (95)	467 (99)	460 (98)

* On the EQ-5D-5L range of 1 to 5, 1 = best possible health experience/status, 5 = worst possible health experience/status

** On the Oxford Knee Score range of 0 to 48, where 0 = worst possible health experience/status, 48 = best possible health experience/status

Source: The authors

[caption] optional

Another metric seems to compensate for this result. Further analysis of these PROMs shows that there was a statistically significant increase in the percentage of patients who reported positive functional lift scores of between 19 and 48 on a scale of 0 to 48 when we compared this metric with the baseline (95% confidence interval [CI], 0.076 to 0.170; P<0.05).

Whereas the baseline is 85%, 163 out of 170 EQ-5D-5L questionnaires in 2019 (96%), 463 out of 472 questionnaires in 2020 (98%), and 455 out of 469 in 2021 (97%), indicated that patients were overall satisfied or more than satisfied on their health experience scores (score of 1 to 3 on a scale of 1 to 5). Note that these findings should be considered with caution due to only aggregate information possessed for a restricted timeframe.

Next steps

Vejle Hospital is planning to continue sourcing its primary total knee replacement implants with this agreement. After moree than 5 years in operation, the results of this project suggest that it has led to an improvement in outcomes. This project aligns with the goal of Southern Denmark to improve the value delivered to patients. At the same time, this project has not required changes to the regional budget. The strong commitment of the clinical and management teams provides further evidence to suggest that this project is not losing its momentum.

This case study suggests that other types of value-based procurement initiatives have the potential to improve value for patients. Patient value can be a starting point to forge better relationships among the organizations delivering care to patients. For example, there have been initial examples of initiatives in the pharmaceutical industry to create innovative contracts to improve access to medicines. Innovative pricing has been introduced for lung cancer patients.[7]

Where to Start

This case study provides insights for other hospitals, clinics, and care facilities that have the goal to create closer relationships with their suppliers, for example, large primary total knee replacement centers in the United States. Hospitals should prioritize medical conditions and patient groups for which they are already recording outcomes. For example, there could be medical conditions for which there is a legal requirement to collect data. The choice of using data that are already available eliminates the need to create new processes and purchase new technologies to collect patient outcomes. It reduces the likelihood of discussions with the suppliers on whether a metric is the right indicator of quality to consider for the project. Data such as the net promoter score could be an alternative proxy for satisfaction for hospitals that are not already collecting outcomes due to the ease of collection.[8]

Health care competitive tenders often prioritize cost over other factors, leading to a situation where the lowest bid may not necessarily result in the best outcomes or highest quality of service. On the other hand, value-based procurement considers factors such as performance, innovation, and quality, in addition to cost. While some other methodologies, such as combative tenders that assess net monetary benefit (NMB),[9] are useful in highlighting the benefits of outcomes, they may still lack prioritization of certain outcomes that are most valued by patients. Therefore, considering the added value from a patient perspective is important in making procurement decisions that reflect patients' needs and preferences. In addition, value-based procurement offers a platform for engaging in performance-based contracts or risk-sharing agreements with suppliers (e.g., through introducing outcome-based financial penalties).

Products to consider for value-based contracts are those that are expensive and complex to procure. A primary total knee replacement implant is an example of this type of product, as it is high cost and because there is a lack of evidence about which implant to purchase.[5,6] Clinical preference tends to be the main factor motivating the purchasing decision. Due to the extent of resources required,

value-based procurement does not appear to be appropriate for inexpensive items or items for which the procurement is straightforward. In those cases, the need for a stricter collaboration with a supplier is reduced, as the risk of making mistakes during the purchasing process is lower. Value-based health care supplier arrangements can support situations where the clinical benefit and impact on patient outcomes is unclear. Hospitals may not be willing to invest in products whose benefits for patients are uncertain. Value-based procurement offers the opportunity to reward suppliers for the actual results that patients achieve. This approach ensures that hospitals are protected against the risk of increasing their expenditure without improving patient outcomes.

Considering value-based procurement as a tool to decrease risk in the procurement process would be reductive. There is an untapped potential that has not been explored sufficiently yet. The collaboration between suppliers and hospitals opens new opportunities for improving outcomes, which relies on combining these new skill sets and knowledge around the common goal of improving outcomes. This collaboration appears to be a direct consequence of the focus of the contract on improving value for patients that aligns the interest of its two parties.

At the beginning of the initiative, the procurement team has to present the idea to the clinical team so they can decide whether they want to pursue it. This initial meeting is an opportunity to understand the product to focus on and the areas of improvement to prioritize. It is the moment to exclude those products that are not high priority and for which procurement efforts that focus mainly on price are still the most effective.

In the first phase of the tendering process, there could be instances where a supplier comes with data it has already collected that the hospital does not currently possess. This case is more similar to traditional procurement, as the hospital has to trust the supplier. Although pre-existing data can inform the choice of the supplier, the continuous use of outcome data is necessary to validate the data the supplier has provided, and to identify further opportunities for outcome improvement. This value-based procurement agreement focuses on improving patient outcomes in a long-term

relationship with a single supplier. A value-based procurement tender can ensure cooperation with suppliers that will, in part, ensure the best patient outcomes and that will, in part, offer the best cooperation terms for the continuous improvement of patient outcomes. The risk-sharing might favour the large orthopaedic implant players and might make it harder for the smaller innovative suppliers.

Engagement of the senior management and of clinicians is essential. The Strategic Procurement Department in the Region of Southern Denmark supports the transition to value-based health care and has been leading numerous initiatives to improve patient outcomes and decrease health care costs. Organizations whose management is not fully committed to value-based health care may struggle to find the momentum to launch this type of initiative and to overcome the obstacles that will emerge. Whereas the engagement of senior management is key, clinical engagement is also needed. In this project, clinicians were made part of the decision-making process from the beginning. Acknowledgment from everyone regarding the value of clinical expertise was the *conditio sine qua non* for the success of this initiative.

Appendix

Disclosures

Rodolfo Catena, Karsten Kirkegaard, Deepti Nayak, and Sonila M. Tomini have nothing to disclose.

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