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Original Paper

From Price to Value: How Procurement Practices Reshape Competition in Medical Device Markets

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Abstract

Procurement affects both the prices paid for medical devices and the conditions under which suppliers compete. Broader value-based assessment may reward clinical performance and life-cycle savings but may also raise bidding costs and favor incumbents. This conceptual study examines that tension through a focused, non-systematic review of economic theory, peer-reviewed studies, and public procurement documents. It develops four conditional propositions on aggregation, verifiable quality, contractual governance, and evidence-related entry barriers. The framework separates static purchasing efficiency from dynamic market contestability, including supplier entry, switching, and innovation. Evidence from U.S. group purchasing, Canadian tenders, Dutch purchaser interviews, UK experiments, and European procurement frameworks is compared according to the claims each design can support. Available evidence identifies specific expenditure and decision-process effects but does not establish a universal causal impact of value-based procurement on long-run competition. The paper argues for independently verifiable criteria, proportionate evidence requirements, workable contract exit, and continuing opportunities for qualified suppliers. Price-based awards may remain suitable where products are genuinely comparable and downstream differences are small.

Keywords

medical devices, value-based procurement, market competition, group purchasing, transaction costs

1. Introduction

Medical devices are central to the delivery of modern healthcare. They range from relatively standardized disposable supplies to complex implantable products, diagnostic systems, and equipment that requires extensive clinical training. Hospitals and other providers must secure reliable access to these technologies while controlling expenditures and protecting patients. A purchasing decision can therefore have consequences far beyond the invoice. The selected device may influence procedure time,

complication management, maintenance requirements, supply continuity, and the ability of clinicians to deliver care. In markets with many competing products, the way buyers define and measure these consequences helps determine which manufacturers succeed.

The conventional economic logic of procurement is straightforward: aggregate demand, specify the product, invite competing bids, and obtain favorable prices. Such practices may reduce transaction costs and improve purchasing discipline. However, the lowest acquisition price is not necessarily the lowest cost of using a medical device. A product that requires additional training, creates frequent interruptions, or performs poorly in a particular clinical pathway may impose costs that are not visible at the time of purchase. Porter defines healthcare value in relation to outcomes achieved and the costs of producing them [1]. Applied carefully to medical devices, this perspective shifts attention from a single transaction toward the consequences of use across the relevant care process.

Value-based procurement has emerged as a response to this gap. Rather than treating price as the only or dominant criterion, it asks buyers to compare outcomes, quality, service, and costs using explicit measures. Rahmani et al. describe this approach as a framework that brings together information, stakeholder collaboration, and the evaluation of alternatives [2]. Yet recognizing the importance of value does not solve the practical problem of measuring it. Device outcomes may depend on clinician skill, patient complexity, and the hospital environment. Evidence may be incomplete or supplied by interested manufacturers. Purchasing staff may be rewarded for immediate savings even when clinical teams prefer products with broader benefits.

Existing studies approach this problem from different angles and do not support a simple price-versus-value hierarchy. Miller et al. document that Canadian tenders frequently use quality criteria but apply incomplete concepts of total cost [3]. Matinheikki et al. show experimentally that a buyer's cost-saving incentives and contractual risk allocation can affect the selection of higher-value devices [4]. Lin and Wang identify supply-expenditure savings associated with increased U.S. GPO scale [5], whereas Tip et al. find that purchasers face organizational and capability barriers to broader evaluation [6]. These findings concern different outcomes: a reduction in expenditure, a decision in an experiment, the content of tender documents, and reported implementation constraints. Treating them as interchangeable evidence of improved market competition would be misleading. Price-transparency research adds a further distinction: hospitals can obtain better negotiated prices without changing product-quality criteria [7]. Meanwhile, international reviews document heterogeneous device-purchasing processes rather than a universally validated value-based model [8].

This paper examines when broader procurement evaluation can improve device selection without insulating incumbent suppliers from future rivalry. Its specific contribution is to connect four procurement design levers to two outcomes that existing studies often assess separately: short-run purchasing efficiency and longer-run market contestability. The framework does not presume that a shift from price to value strengthens competition. Instead, it predicts that evidence demands, contract terms, and aggregated buyer power can improve assessment or immediate savings while increasing

entry or switching costs under identifiable conditions. The four propositions specify those conditions and observable implications; they remain untested predictions rather than empirical findings of this article.

2. Literature Review and Research Questions

2.1 Procurement as an Economic Institution

Procurement arrangements influence market outcomes because they determine who makes decisions, what information is required, and how contracts distribute risk. Transaction-cost economics provides one way to understand this role. Williamson explains that contractual governance matters when transactions involve uncertainty, specific investments, and the possibility of opportunistic behavior [9]. Medical devices often display these characteristics. Equipment may require compatible consumables and specialized training; clinical staff develop experience with particular systems; and switching suppliers may interrupt work. A low unit price cannot fully represent the cost of changing products or negotiating and enforcing a contract.

Information asymmetry provides a second foundation. Akerlof's analysis of quality uncertainty shows how imperfect information may weaken incentives to supply higher-quality goods [10]. In medical devices, manufacturers usually know more about design, testing, and production processes than purchasing organizations. Clinicians possess practical information about usability, while purchasing departments possess financial and contract information. Patients, whose outcomes are most important, are rarely direct participants in negotiations. The challenge is therefore not simply that buyers lack information, but that relevant knowledge is divided among several actors with different objectives.

Hospital decisions also involve internal bargaining. Montgomery and Schneller show that hospitals have used product formularies, payment caps, and clinician engagement to manage physician preference items, such as orthopedic implants [11]. These products make procurement particularly complex because a clinically preferred item may be more expensive, and clinicians may resist standardization that appears to restrict professional judgment. The lesson is that a procurement rule changes behavior within the hospital as well as between the hospital and its suppliers. Any analysis of competition must account for this internal decision process.

2.2 Evidence on Purchasing Scale and Price Competition

Group purchasing organizations (GPOs) combine hospital demand and negotiate contracts with suppliers. Evidence from the United States offers an unusually direct estimate of the purchasing-scale channel. Using hospital-level panel analyses and an additional merger-based event study, Lin and Wang report that a one-standard-deviation increase in GPO scale is associated with a 2.7% reduction in average hospital supply expenses per adjusted discharge, equivalent to approximately $48 per discharge in their estimates [5]. The authors found no evidence of compromised care quality in the outcomes they studied. This is evidence about hospital supply spending, however, not a product-level estimate of medical device quality, market entry, or the welfare effect of every GPO contract. Separately, Grennan

and Swanson find that information about peer hospitals' purchasing prices reduced negotiated input prices, especially in selected higher-priced purchasing relationships [7]. This is evidence about bargaining information, not a clinical comparison of devices.

Aggregation may simultaneously raise supplier access costs. A large contract can spread fixed selling costs over greater volume, but broad qualification demands or portfolio requirements may be easier for established firms to meet. The U.S. Government Accountability Office (GAO) reported that the five GPOs in its 2014 review mostly used dual- or multi-source contracts, while expert views differed on vendor-funded administrative fees and possible innovation effects [12]. The report explicitly noted limited empirical evidence regarding the effect of fee arrangements. Thus, concentration concerns should be investigated through actual award structures and entry outcomes, not inferred from purchasing scale alone. A formal model by Hu and Schwarz likewise finds a potential trade-off: GPOs can intensify manufacturers' price competition while weakening incentives for incremental product innovation under the modeled conditions [13].

2.3 Value-based Procurement and Clinical Evidence

Value-based procurement extends the evaluation of products beyond the initial purchase price. In practice, this may involve expected patient outcomes, total costs of care, staff workload, technical support, and continuity of supply. However, broader criteria introduce measurement difficulties. A clinical outcome may not be attributable solely to a device, and different suppliers may report evidence using different endpoints. If a procurement committee cannot compare outcomes on common terms, an apparently sophisticated value score may conceal subjective preferences rather than improve decisions.

The strongest evidence that purchasing organizations can face opposing incentives is experimental rather than market-wide. Matinheikki et al. conducted three UK-based vignette samples, involving 599 managers, 279 medical professionals, and 449 purchasing managers, and varied cost-saving incentives, risk-sharing contracts, and the strength of clinical evidence [4]. Their design identifies how manipulated decision conditions influence stated choices; it does not demonstrate that the same contracts improved realized patient outcomes after implementation. In parallel, interviews with 20 Dutch hospital purchasers indicate that skills, resources, internal priorities, and collaboration shape the feasibility of value-based procurement [6]. Taken together, these studies explain why an attractive evaluation principle may fail during routine purchasing.

The competition-specific evidence is more mixed than a simple progression from price to value suggests. Cangelosi et al. find a limited literature connecting health technology assessment to purchasing practice [14]. A systematic review by Hinrichs-Krapels et al. identifies heterogeneous hospital processes for high-cost devices, with limited studies demonstrating cost savings [8]. Askfors and Fornstedt show, through a Swedish medical-device innovation case, how negotiation between clinical and managerial actors influences tender requirements and innovation adoption [15]. These studies expose a missing link: procurement studies often document scoring and selection, but rarely follow supplier entry, subsequent contracts, and independently measured patient outcomes together.

2.4 Literature Synthesis and the Unresolved Competition Question

The literature addresses different points in the procurement chain. U.S. GPO research estimates hospital expenditure effects [5]; Canadian tender documents describe the criteria used to evaluate bids [3]; UK experiments identify stated device-selection responses [4]; and Dutch purchaser interviews describe implementation barriers [6]. Broader public procurement studies indicate that regulatory quality and contract lot size may affect smaller firms' participation [16], although those estimates are not medical-device-specific. The unresolved question is not whether buyers can include nonprice criteria. It is whether the resulting decisions preserve credible future rivalry while rewarding independently demonstrable clinical value. The gap is especially important because savings in a current contract cannot, by themselves, establish effects on later entry or innovation.

2.5 Research Questions

The synthesis motivates three questions. RQ1: Under what conditions do demand aggregation and tender design lower costs without reducing future supplier contestability? RQ2: When do clinical evidence and life-cycle criteria reward genuine differentiation rather than raise fixed bidding costs? RQ3: How can contracts and procurement governance preserve credible alternatives, monitor delivered value, and accommodate innovation? These questions distinguish immediate purchasing outcomes from longer-run competition and clinical welfare.

3. Research Design and Analytical Framework

3.1 Research Method and Scope

This article uses a focused, non-systematic conceptual review rather than a systematic evidence synthesis. Sources were considered for their theoretical relevance to bargaining, information, contract governance, and market entry; preference was given to peer-reviewed studies with identifiable research designs and outcomes, supplemented by government reports and legal or administrative documents relevant to procurement rules. Countervailing findings and limits on generalization are discussed alongside favorable findings. Source selection was purposive, not exhaustive: no preregistered protocol, reproducible database search log, duplicate screening, formal risk-of-bias assessment, or meta-analysis was undertaken. Consequently, the paper develops testable propositions and evidence distinctions but cannot claim to estimate the average international effect of value-based procurement.

The synthesis separates evidence by what it can support. Quantitative observational studies can identify context-specific associations or, subject to their identification assumptions, causal effects; experiments using simulated choices identify responses within those decisions, not realized patient outcomes. Tender-document analyses and purchaser interviews describe criteria and organizational constraints, but do not measure long-run market effects. Laws and guidance establish permissible or recommended practices, not their observed consequences. The U.S., Canadian, Dutch, UK, and EU material is deliberately heterogeneous and is used for analytical comparison rather than pooling. No original manufacturer, tender, or patient-level dataset was collected or analyzed for this study.

The term procurement practice refers to the rules and procedures used to search for suppliers, define requirements, compare offers, award contracts, and monitor delivery. Price-oriented procurement emphasizes purchase price and readily verifiable technical minimums. Value-oriented procurement uses a broader set of clinical, operational, and economic criteria. Group purchasing describes demand aggregation and may be combined with either approach. These categories are analytical simplifications rather than mutually exclusive systems. A GPO contract can include performance standards, and a value-based tender can still place substantial weight on price.

Competition is defined more broadly than the number of bids in a single award. Its observable dimensions include net prices for clinically comparable products, the number and independence of qualified bidders, entry and exit between tender rounds, feasible supplier switching, and the market's capacity to reward independently verified innovations. Static purchasing efficiency is therefore assessed separately from dynamic contestability. Procurement may increase immediate buyer bargaining power while weakening future alternatives, or may create higher upfront evaluation costs while improving the selection of clinically valuable products. The propositions below express these conditional relationships rather than presuming that one purchasing model is always superior.

3.2 Framework and Propositions

The framework treats procurement as a market-design choice with two dependent outcomes: static efficiency (net purchasing expenditure relative to delivered clinical and service performance) and dynamic contestability (independent supplier participation, entry, switching, and the reward for useful innovation across repeated procurements). Four channels operate between the rules and those outcomes. Demand aggregation changes bargaining leverage; quality criteria change the signal-to-noise ratio of product information; contractual governance changes coordination and switching costs; and qualification standards change the fixed cost of access. Their effects depend on product comparability, availability of independent evidence, purchaser capability, contract openness, and the distribution of compliance costs across suppliers. Figure 1 depicts the pathways; Table 1 summarizes the mechanisms and corresponding risks.

<table>
<tr><td colspan="4">PROCUREMENT PRACTICES AND TENDER DESIGN</td></tr>
<tr><td colspan="4">↓</td></tr>
<tr><td>Demand aggregation and bargaining power</td><td>Independent clinical quality assessment</td><td>Contract governance and switching costs</td><td>Evidence requirements and supplier access</td></tr>
<tr><td colspan="4">↓ Moderators: device comparability • evidence reliability • buyer capability • contract openness • proportionality ↓</td></tr>
<tr><td colspan="2">STATIC PURCHASING EFFICIENCY
Net prices • total costs • delivery performance</td><td colspan="2">DYNAMIC MARKET CONTESTABILITY
Qualified entry • supplier switching • innovation</td></tr>
</table>

Figure 1. Conceptual Pathways from Procurement Practices to Market Competition

Table 1. Analytical Framework Linking Procurement Practices to Market Competition

Procurement feature	Competitive channel	Condition for benefit	Potential downside
Aggregated purchasing	Price rivalry and bargaining [p. 1]	Comparable offers and credible supplier alternatives	Long contracts can narrow future choice
Evidence-weighted tender	Information and quality signaling [p. 2]	Shared endpoints and independent validation	Subjective scores may privilege incumbents
Service and outcome contract	Coordination and switching costs [p. 3]	Auditable metrics and workable exit terms	Monitoring burden and technological lock-in
Evidence qualification rules	Innovation and entry costs [p. 4]	Proportionate proof with accessible reassessment	High fixed compliance costs for entrants

Proposition 1 (aggregation and contestability). Holding product comparability and hospital demand broadly constant, greater demand aggregation will be associated with lower net purchasing expenditure where multiple independent suppliers remain qualified. This expenditure advantage is less likely to coexist with long-run contestability when exclusivity, contract breadth, or restrictive renewal rules reduce independent bidding and switching in subsequent tender rounds. The observable outcomes are net prices, independent bidder counts, renewal concentration, and actual supplier changes.

Proposition 2 (quality signaling). Greater weight on clinical and life-cycle value will be associated with stronger selection of demonstrably higher-performing devices when outcomes are measured with common, independently verifiable endpoints. Where measures are subjective, incomparable, or controlled mainly by suppliers, additional scoring complexity will be less likely to predict realized clinical or operational value. Relevant measures include evidence quality, award-score differences, validated performance, and realized total cost of use.

Proposition 3 (contract governance). Relative to otherwise comparable purchasing arrangements, service-oriented or performance-linked contracts will be associated with better delivered value when service obligations, outcome baselines, and exit or switching rights are clearly specified and enforceable. Where monitoring is costly or technical dependencies impede exit, any coordination gains may be offset by renegotiation costs and supplier lock-in. Empirical indicators include service-level attainment, contract amendments, monitoring expense, and transition costs at renewal.

Proposition 4 (evidence costs and entry). More rigorous evidence requirements can strengthen competition on verified quality, but the relationship with supplier entry is conditional: where fixed compliance costs account for a higher share of expected contract revenue for smaller or new suppliers,

otherwise qualified entrants will be less likely to participate. Proportionate requirements, staged qualification, and transparent reassessment opportunities should attenuate that disadvantage without removing necessary safety standards. Suitable measures include bid preparation costs, qualification and award rates by firm size, and the subsequent entry of clinically credible alternatives. These four propositions remain untested in this paper; no causal coefficients are estimated.

4. Procurement Practices and Their Economic Mechanisms

4.1 Price-oriented Purchasing and Standardized Competition

Price-oriented procurement offers important advantages. Clear specifications and comparable bids can make spending easier to audit and reduce discretion. For standardized gloves, syringes, or other products with well-established requirements, a well-designed competitive tender may produce lower acquisition costs without sacrificing clinically relevant quality. Price pressure may also encourage manufacturers to improve production efficiency and streamline distribution. In these categories, elaborate scoring systems could raise administrative costs without corresponding gains in patient outcomes. The economically relevant goal is not to abandon low-price purchasing but to determine when price is an adequate proxy for the total costs and benefits of the item.

However, price-focused methods can become misleading when technical comparability is assumed rather than demonstrated. Two devices may meet minimum specifications but differ in ease of use, reliability, compatibility, required accessories, or post-purchase support. A tender that ignores these features may reward an offer with a low headline price and high downstream expense. A further difficulty is the choice of a reference product. If the specification reproduces an incumbent device's exact characteristics without a clinical justification, competition can be narrowed even before bids are evaluated. The quality of tender design therefore matters as much as the nominal number of bidders.

Procurement rules also influence market entry. Small manufacturers may be able to quote competitive prices yet struggle to meet costly documentation requirements or supply large volumes within short periods. Conversely, weak qualification requirements may expose buyers to delivery problems. An economically sound purchasing process balances competitive access with credible standards for safety and supply. Research on public medical equipment procurement finds that bid participation and the quality of technical specifications influence competition and prices, highlighting the importance of procurement design rather than price comparison alone [17].

4.2 Group Purchasing, Bargaining Power, and Supplier Access

Group purchasing changes competition by combining demand and reducing the need for each hospital to negotiate separately. Hospitals can benefit from specialized purchasing expertise, standard contracts, and potentially lower prices. Manufacturers may receive more predictable volumes and lower selling costs. This arrangement is particularly attractive when several hospitals purchase similar products, because the same contract can be used repeatedly. The U.S. evidence reported by Lin and Wang supports the possibility of meaningful aggregate savings from GPO scale [5].

The risks require evidence rather than presumption. GAO's 2014 review found that all five reviewed large GPOs reported mostly dual- or multi-source contracts and reported no bundling of unrelated products, yet the agency also documented continuing debate over contracting practices [12]. A strong competition assessment should therefore investigate the duration and renewal of contracts, the number of independent suppliers that can meet them, actual switching, and whether specialized entrants have realistic routes to bid. These variables distinguish a theoretically possible lock-in mechanism from evidence that lock-in has occurred.

The financing of GPO services creates another governance issue. When intermediaries receive administrative fees from vendors, transparency over the fee structure and the intermediary's incentives becomes relevant. U.S. oversight reports describe both the services GPOs provide and the continuing debate over fee arrangements [12][18]. An effective response is not to assume misconduct from the existence of fees. It is to require clear disclosures and to measure performance against prices, supply reliability, supplier access, and member value. Lower hospital expenditures and an open supplier market are related goals, but they are not identical.

4.3 Value-oriented Purchasing and Total Economic Value

Value-oriented purchasing reframes a device as part of a clinical and operational process. A hospital might ask how a product affects procedure duration, use of operating-room resources, staff training, revision procedures, patient recovery, or maintenance over time. These dimensions should be selected for relevance, rather than added indiscriminately. A broad list of poorly specified indicators can make a tender less transparent. For a complex device, the better approach is to define the care pathway, identify the outcomes the technology can plausibly influence, and compare the associated costs using a common time horizon.

The European Union's public procurement framework permits award criteria reflecting price or cost, including life-cycle costing and the best price-quality ratio, within the applicable legal conditions [19]. In June 2026, the United Kingdom's Department of Health and Social Care issued national guidance for value-based procurement of medical technology, identifying non-financial domains that include patient outcomes, productivity, staff safety, environmental considerations, and supply resilience [20]. Such frameworks demonstrate how procurement institutions can make room for value beyond acquisition price. They do not demonstrate, by themselves, that every value-based contract has achieved better clinical or economic results.

The evidence burden becomes central once purchasing criteria extend beyond price. For example, a claimed improvement in clinical outcomes must be supported by data relevant to the intended use. A reduction in operating time should distinguish the device's contribution from differences in staff skill and hospital workflow. A maintenance advantage should specify expected service intervals and the costs of downtime. Value assessment thus depends on a structured comparison of incremental benefits and incremental costs, with uncertainty explicitly reported. Without such discipline, suppliers may compete on marketing narratives rather than verifiable performance.

4.4 Contracts, Risk Sharing, and Life-cycle Costs

A procurement contract can do more than state prices and quantities. It may allocate responsibility for training, maintenance, consumables, technical updates, delivery reliability, and performance monitoring. These terms influence the total cost of ownership and may change the effective ranking of bids. For technically complex products, negotiating a suitable service agreement can be economically significant. For routine products, simple terms may be more efficient. The contract should reflect the uncertainty and specificity of the transaction rather than pursue complexity for its own sake.

Risk-sharing contracts are sometimes proposed to align supplier payments with realized outcomes or use-related performance. Matinheikki et al. report that risk-sharing arrangements can support selection of value-adding medical devices in their experimental setting [4]. Yet performance-linked contracts also face practical limitations. Clinical outcomes may be influenced by patient characteristics and clinician behavior; measurement can be expensive; and disputes can arise over whether a device caused the observed result. Contracts should therefore favor a small number of auditable metrics that suppliers and buyers can plausibly influence. A poorly measured outcome-based arrangement can raise administrative costs without improving care.

Life-cycle comparisons further require attention to timing. A device with a higher purchase price may reduce later maintenance or procedure-related costs, while a cheaper product may be economical when its performance is equivalent and its use is simple. Discounting, expected utilization, replacement cycles, and uncertainty can all change the result. Accordingly, value-based procurement should complement, not replace, budget discipline. It should make the meaning of cost more accurate and the comparison among alternatives more explicit.

5. How Procurement Reshapes Competition in Medical Device Markets

5.1 The Shift from Unit-price Competition to Multidimensional Rivalry

The first competitive effect is a change in what suppliers are asked to demonstrate. Under price-heavy procurement, manufacturers have strong incentives to minimize quoted prices after meeting mandatory requirements. Under broader value assessment, they may need to demonstrate performance, clinical compatibility, training quality, and life-cycle cost. This change can create room for product differentiation. It also raises the cost of preparing bids and generating evidence. The net effect on competition therefore depends on whether higher-value suppliers can credibly distinguish themselves without being overwhelmed by administrative requirements.

Competition within a tender differs from competition for future contracts. Price-only tenders may produce strong immediate bidding but narrow future alternatives if awards repeatedly favor a few suppliers. Value-based tenders can reward innovation, yet also favor incumbents with established evidence and service networks. Well-designed procurement should assess clinically meaningful results while preserving reasonable opportunities for qualified new suppliers.

5.2 Information, Clinical Evidence, and Credible Differentiation

A core function of clinical evidence is to reduce uncertainty about quality that cannot be fully observed before purchase. Akerlof's quality-uncertainty framework implies that imperfect information may weaken incentives to offer superior goods [10], while signaling theory helps explain why suppliers invest in observable indicators [21]. Yet procurement evidence is not valuable simply because it is expensive. The relevant signal must be independently scrutinizable, clinically relevant, and comparable across alternatives. This distinction matters in medical devices, where performance may vary with operator experience and patient mix: a technical advantage in a controlled trial need not translate into the same advantage in every hospital.

Evidence can become an economic competitive asset. A manufacturer that documents fewer complications, improved usability, or lower resource use may justify a higher price when these benefits are real and material. However, purchasers should assess the magnitude of the benefit and whether it applies to their patients and workflows. A hospital with a different case mix may not realize the same improvement. The quality of measurement therefore shapes the extent to which evidence-based differentiation is socially beneficial rather than a costly advertising contest.

Research on physician preference items demonstrates why procurement cannot rely solely on purchasing departments or clinicians in isolation. Burns et al. found that orthopedic surgeons' stated preferences were strongly linked to implant technology and sales or service characteristics, while reported cost considerations were less prominent [22]. The implication is not that clinical preferences should always prevail. It is that technology, service, and costs are evaluated by different decision-makers who need a common evidence framework. Multidisciplinary review can reduce the likelihood that one actor's incentives dominate the final purchasing decision.

5.3 Innovation Incentives and the Risk of Incumbent Advantage

Procurement criteria shape the returns to innovation. If a clinically meaningful improvement receives no recognition, manufacturers may lack incentive to develop it. Value-sensitive tenders can reward measurable gains, but novelty alone does not justify a premium. A Swedish medical-device case describes how tender specifications influence innovation adoption [15]. Saastamoinen et al. link SMEs' networks with innovation in wider public procurement, but their cross-sector findings are not causal estimates for medical devices [23]. Collaborative, outcome-oriented procurement is discussed as a possible enabling condition [24].

Demanding evidence can also shape competition. Incumbents may already have multicenter datasets, regulatory teams, and service networks, while entrants face substantial fixed costs before selling any product. Common definitions and proportionate requirements can reduce avoidable costs without weakening necessary clinical protection. Excluding an unproven device is not inherently anticompetitive when risks are material; the issue is whether proof requirements are justified by the product and its claims. European procurement research associates better rules and suitable lot sizes

with SME participation [16], suggesting a plausible mechanism rather than a demonstrated medical-device effect.

Evidence stringency may have a non-linear relationship with contestability. Weak proof requirements may obscure quality; moderate, comparable requirements may reward innovation; excessive customized evidence may impose prohibitive costs on entrants. Proposition 4 frames this trade-off. Its testing would require data on qualification costs, participation, clinical evidence, and subsequent outcomes; this paper does not estimate a turning point.

5.4 Distribution Channels, Services, and Switching Costs

The market for a medical device often includes a package of distribution and support services. Technical representatives may assist training and implementation; distributors may manage stock and delivery; manufacturers may provide repairs, software updates, or replacement components. These services can lower the total burden on hospitals. They can also create dependence when they are tightly linked to one supplier's equipment. A purchasing decision therefore influences not only price competition among products but also competition among service ecosystems. Interviews with U.S. health systems and device manufacturers identify weak information sharing and physician-supplier alliances as barriers to collaborative purchasing [25].

For manufacturers, this changes the meaning of marketing. Promotional claims have limited value when purchasers demand documented performance and transparent service levels. More durable competitive advantages may come from reliable delivery, relevant training, usable evidence, and responsiveness to clinical needs. Such services should be evaluated against explicit operational outcomes rather than against the intensity of supplier contact. Excessive reliance on personal relationships can weaken fair comparison; ignoring useful supplier support can reduce clinical efficiency. Procurement criteria should distinguish necessary technical assistance from influence that is unrelated to patient value.

Switching costs require special attention. A hospital may need to retrain clinicians, change inventories, replace accessories, or modify software when moving between suppliers. Long-term relationships can reduce repeated contracting costs, but buyers should preserve access to performance data, service records, and transition plans. Where technically feasible, interoperability and standard interfaces can improve future contestability. Contracts that conceal lifetime ownership costs may appear attractive initially while making future competitive bidding less meaningful.

5.5 Competition, Concentration, and Distribution of Benefits

The final competitive mechanism concerns who captures the economic benefits of procurement efficiency. Lower acquisition costs may improve hospital budgets, but the impact on patients and payers depends on market structure, reimbursement, and how hospitals use savings. Lin and Wang find that some savings associated with larger GPOs were passed through to downstream consumers through lower hospital prices, but only in highly competitive hospital markets [5]. This finding connects

procurement competition upstream with competition and welfare downstream. It does not establish a fall in each patient's out-of-pocket spending or imply that all supply savings were passed through.

Competition must be assessed over repeated contracts. A lower price today may coexist with fewer credible bidders at renewal, while a long supplier relationship may be efficient when switching is costly. Useful indicators include independent qualified bidders, entry and exit, award concentration, comparable prices, and verified service outcomes. A decline in bidder numbers alone cannot distinguish unnecessary exclusion from justified safety screening.

Table 2. Competitive Benefits, Risks, and Safeguards in Medical Device Procurement

Competition dimension	Possible benefit	Main limitation or risk	Procurement safeguard
Price	Lower acquisition cost and clearer comparison	Downstream costs may be ignored	Separate purchase price from total cost
Quality and evidence	Higher reward for proven performance	Incomparable or supplier-controlled evidence	Common endpoints and independent review
Innovation	Demand for clinically useful advances	Fixed evidence costs and incumbent advantage	Proportionate proof and planned reassessment
Services and channels	Reliable training, maintenance and delivery	Dependence and avoidable switching cost	Service-level metrics and exit provisions
Market access	Competition among qualified suppliers	Exclusivity and restrictive specifications	Transparent criteria and justified multi-sourcing

Table 2 summarizes the trade-off among cost, verified quality, supply resilience, and access. Transparent price rivalry may suit standardized products; measurable clinical differences may justify broader criteria. In both cases, purchasers should evaluate delivered outcomes after award rather than assume that a complex scoring system creates value.

6. International Evidence and Implications

6.1 United States: Group Purchasing and Physician Preference Items

The United States provides the clearest expenditure estimate among the sources reviewed. Lin and Wang's analysis of GPO scale associates a one-standard-deviation increase in scale with a 2.7% reduction in average hospital supply expenses per adjusted discharge [5]. Their event-study analysis provides a complementary empirical check, but the reported estimate remains a result for U.S. hospital

spending under the study's assumptions; it is not a measured effect of value-based tenders. Earlier GAO investigations document GPO service functions, contract practices, and the debate over vendor administrative fees [12][18]. Notably, GAO reported widespread dual- or multi-source contracting among the five large GPOs it reviewed in 2014 [12]. The evidence supports savings from aggregation while leaving product-level innovation, entry, and fee-related welfare effects less settled. Additional U.S. studies show why price mechanisms should not be conflated. Grennan and Swanson document reductions in negotiated prices after peer-price information became available [7]. Litan, Singer, and Birkenbach report discounts in an observational sample of hospital capital-equipment aftermarket transactions [26]; selection and other explanations limit causal interpretation. Neither study establishes a general improvement in long-run device supplier entry.

Physician preference items reveal another institutional constraint on price competition. Montgomery and Schneller describe formularies, price caps, and clinician participation as alternative ways to coordinate purchasing [11]. Burns et al. report that surgeons place substantial importance on implant technology and sales or service support [22], although their study measures stated preferences rather than purchasing outcomes. These findings explain why the same tender design may function differently for routine disposables and technically complex implants. The purchasing department may control contract terms while clinicians control adoption in practice; only a decision process that integrates both can make quality criteria operational.

An economic implication for manufacturers is that winning a low-price contract is not the only route to market relevance. Suppliers of complex devices need to communicate value to multiple stakeholders: purchasers require comparable costs, clinicians require safety and usability, and hospital managers require operational reliability. Yet these audiences should be addressed through consistent evidence rather than incompatible claims. When value assessment becomes more formal, suppliers may benefit from clearer documentation of product performance and transparent service commitments, even if their acquisition prices are not the lowest.

6.2 Canada and the Netherlands: Decision Criteria and Organizational Barriers

Miller et al. reviewed Canadian tender documents and found that GPOs appeared as buyers in 54 of 97 requests for proposals; 83 of 97 referred to total cost, although the term was applied inconsistently [3]. These are concrete observations about the language and structure of tenders, not evidence that the selected devices produced better outcomes. A further result, that many contracts anticipated one winning supplier, indicates why market access and renewal conditions deserve scrutiny. The study therefore contributes evidence on *what buyers score*, while leaving the economic consequences of those scores for subsequent contracts open.

The Netherlands offers a contrasting view of implementation. Tip et al. conducted semi-structured interviews with 20 hospital purchasers and identified organizational priorities, limited capacity, and coordination challenges affecting value-based procurement [6]. The interviews help explain why credible clinical scoring requires more than a published framework. Their qualitative design cannot

quantify an average price or clinical effect, however. Combined with the Canadian findings, the implication is precise: written quality weights and stated aspirations are insufficient substitutes for reliable data, skilled evaluation teams, and post-award performance measurement.

One comparison across these settings is especially useful. Canada documents the formal content of purchasing decisions; the Netherlands documents the practical capacity required to implement such decisions. Neither directly establishes how competition changed after an award. This distinction is consequential for future research because a hospital can score bids on multiple dimensions yet fail to monitor whether the chosen supplier achieves the predicted savings or clinical improvement. Expenditure data, contract award records, and clinical outcomes would need to be linked to identify that effect.

6.3 United Kingdom and Europe: Formalizing Value Criteria

In the European Union, Article 67 of Directive 2014/24/EU allows awards based on price or cost and, where relevant, the best price-quality ratio; Article 68 sets out an approach to life-cycle costing [19]. The legal framework therefore permits broader evaluation, including after-sales service and operational or environmental aspects. It does not, by itself, establish that hospitals employ common clinical endpoints or that the average value of purchased technologies has risen. Sorenson et al. separately discuss the challenges of integrating health technology assessment into European healthcare decisions [27]. Legal possibility, organizational practice, and measured market outcomes are distinct levels of evidence.

The UK's Department of Health and Social Care published national value-based procurement guidance for medical technology on 11 June 2026 [20]. It identifies five value domains—social value, efficiency, patient and staff, supply chain, and purpose—and treats whole-life cost as a separate component. In the published guidance, value domains together receive a minimum weighting of 60%, including at least 10% for social value, while whole-life cost receives no more than 40%. These are recommendations within the stated framework for NHS buyers, not measured post-adoption effects. The guidance also asks buyers to keep evidence requests proportionate to the procurement and to consider the burden on smaller suppliers [20]. This makes the UK example useful for examining both Proposition 2 and Proposition 4, though prospective evaluation remains necessary.

The UK also supplies decision-level experimental evidence. Matinheikki et al. use vignette-based interventions to assess how cost-saving incentives, risk-sharing contracts, and clinical evidence affect decisions about premium-priced value-adding devices [4]. Because participants responded to constructed scenarios, their estimates concern purchasing preferences under experimentally specified conditions, not subsequent device performance. An international wound-care review by Seechoonparsad et al. further argues that staff time and treatment pathways can matter alongside acquisition prices [28]. That article is an industry-linked perspective and is best used to generate product-specific questions, not as an independent causal evaluation of procurement reform.

6.4 Comparative Evidence and Limits of Inference

The cited sources address different dimensions rather than a single common outcome. U.S. studies estimate hospital spending or negotiated-price effects; Canadian documents reveal tender criteria; Dutch interviews describe organizational barriers; UK experiments examine hypothetical purchasing decisions; and UK/EU texts specify guidance or legal possibilities. Swedish qualitative research discusses procurement requirements and medical-device innovation [15], while cross-sector SME studies suggest access mechanisms [16][23]. Some cited reviews have authors with medical-device industry affiliations [14][28]. Such affiliations do not invalidate their findings, but the claims warrant assessment against study design, disclosed interests, and independent corroboration. None of these sources, considered together, establishes a general causal effect of value-based procurement on medical-device concentration, long-run entry, innovation, or patient welfare. Table 3 therefore identifies the limits of each source as explicitly as its positive findings.

Table 3. International Evidence and the Claims Each Source Can Support

Setting and source	Evidence type	Supported finding	Not established by source
United States [5][12][7][26]	Panel/event study; price-information study; aftermarket transactions; oversight report	GPO scale associated with lower hospital supply expenses per adjusted discharge; other studies report negotiated-price or aftermarket discounts	General causal effects of value-based scoring on clinical quality, innovation, or long-run entry
Canada [3]	97 RFP tender documents	GPOs buyers in 54/97 RFPs; total cost referenced in 83/97, with inconsistent definitions	Whether awarded devices achieved superior health or competition outcomes
Netherlands [6]	20 purchaser interviews	Implementation barriers: capability, priorities, stakeholder coordination	Average price savings, causal clinical benefit, or supplier exclusion

Setting and source	Evidence type	Supported finding	Not established by source
United Kingdom [4]	Three vignette samples (n=1,327)	Cost incentives, risk-sharing, and evidence affect stated device-selection choices	Realized contract savings or subsequent patient outcomes
UK / EU [19][20]	Legal provisions + 2026 guidance	Permissible criteria and specified value-domain weighting	Whether adoption has improved prices, quality, or market access

6.5 Implications, Monitoring, and Future Tests

The comparison supports a two-stage decision approach. Purchasers should first establish clinically justified technical and safety minimums, then determine whether demonstrable differences in outcomes, workflow, maintenance, or service warrant broader value scoring. If they do, award weights and documentation requirements should be proportionate to clinical risk, product complexity, and reasonable supplier capacity. Buyers should also design periodic review and credible re-entry opportunities. These are normative recommendations derived from the framework; they are not reported as interventions that this paper has empirically tested.

Manufacturers should respond to these rules by presenting auditable value claims: defined intended use, common outcome measures, transparent comparators, and verifiable service levels. Firms should distinguish a product's acquisition price from pathway cost and should state where evidence remains uncertain. For example, a proposed reduction in procedure time should specify whether the estimate reflects the device alone or a broader workflow change. Such transparency can support genuine differentiation without assuming that a higher-priced device is necessarily higher value.

Future evaluation should specify exposures, moderators, and outcomes for each proposition. For P1, researchers could compare changes in purchasing scale with net unit prices and independent supplier participation across repeated awards, accounting for product category and initial concentration. For P2, they could test whether independently validated clinical scoring predicts realized outcomes and full life-cycle cost, adjusting for patient mix where relevant. For P3, they could relate auditable performance terms and exit provisions to service reliability, renegotiation expense, and observed switching. For P4, they could compare qualification costs as a share of expected contract revenue with participation and award rates by firm size, without treating every safety requirement as an avoidable barrier. Longitudinal tender, contract, and outcome data would be needed to distinguish these mechanisms from selection and market-wide trends.

An effective purchasing system should therefore be judged by realized outcomes rather than by the number of dimensions on its scorecard. Transparent specifications, proportionate proof, opportunities for qualified entrants, and planned contract review can reconcile cost discipline with innovation. At the same time, heavy evidence demands may be justified for high-risk devices even if they reduce bidder numbers. Good competition policy distinguishes avoidable entry barriers from necessary quality protection, and good procurement management recognizes that cost savings, safety, and market access may require explicit trade-offs.

7. Conclusion

Medical device procurement is a form of market design: it affects what buyers pay, what suppliers must prove, how service obligations are allocated, and whether qualified alternatives can challenge incumbents. The reviewed evidence identifies hospital expenditure savings associated with U.S. GPO scale and a range of organizational constraints on broader clinical-value evaluation. It does not demonstrate that increasing nonprice weights universally improves health outcomes or long-run competition.

The four propositions formalize a common trade-off between information and access. Aggregation may strengthen purchasing discipline but narrow future options; independently validated value measures may reward quality differentiation but impose costly proof obligations; service contracts may improve coordination while increasing switching costs; and evidence thresholds may protect patients while making entry disproportionately expensive for smaller suppliers. These predicted relationships depend on product risk, outcome measurability, and the ability of buyers to retain credible alternatives. For standardized products, price competition may remain the most transparent selection mechanism. For devices with consequential downstream differences, broader criteria may be justified when their value can be verified.

The international evidence comparison is deliberately limited. A spending estimate, tender-document review, purchasing-choice experiment, interview study, and government guideline answer different questions and cannot be combined as an estimate of one treatment effect. Procurement managers should therefore monitor both delivery against promised value and the continuing openness of subsequent awards. Suppliers should support their claims with comparable outcomes and transparent service commitments, rather than relying on price or promotion alone.

The study is limited by purposive literature selection, heterogeneous purchasing institutions, and the absence of original tender-level or patient-level data. It cannot establish which mechanism dominates or identify a general effect of value-based procurement on market structure. Future research should link consecutive tenders to product-level prices, independently validated patient or operational outcomes, supplier qualification costs, and actual entry or switching. Until such evidence is available, the appropriate conclusion is conditional: preserve effective price rivalry among comparable devices and

use broader value criteria when clinically relevant differences are measurable and the process remains open to qualified challengers.

Declarations

Data availability: This conceptual article generated no original dataset. The published studies, institutional documents, and legal materials discussed are identified in the References.

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