# Cooperative purchasing of pacemakers by Dutch hospitals: What are the determinants, cost-savings and perceived non-monetary benefits?

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## Summary

Cooperative purchasing is increasingly seen as a valuable mechanism in the health and care sector in holding down health spending by leveraging the combined volumes of hospitals in the purchase of medical products as well as optimizing purchasing activities especially in hospitals. Little is known, however, about the actual extent of cost-savings that cooperative purchasing generates for participants and the related motivation of hospitals to engage in cooperative purchasing via a group purchasing arrangement. This paper seeks to explore the actual cost-savings and related determinants and consequences of hospitals' decision to purchase pacemakers through cooperative purchasing in the Netherlands. To evaluate the magnitude of cost-savings, data on individual and collective prices for 21 hospitals in the Netherlands was analyzed. To investigate related determinants and consequences, 16 key informant interviews were carried out. Based on our data, for hospitals that signed an individual contract based on a framework agreement with *Intrakoop*, they saved on average 31% on the price of pacemakers.

## Introduction

In an age of increasingly constrained health care budgets and towards sustainability in health care spending, cooperative purchasing presents itself as a win-win tool for organizations and health and care systems. Cooperative purchasing, or the pooling of demand and requisite resources of buyers in their acquisition of goods and services, is increasingly seen as a valuable mechanism by providers in the health care sector and by public bodies responsible for managing health care budgets in holding down health spending (Ferrier et al., 2011; Sorenson et al., 2011). By leveraging the combined volumes of participants to the cooperative purchasing arrangement, a group purchasing organization (GPO) is able to eke out more favorable prices than would be possible with individual purchasing of pharmaceuticals, surgical instrument, medical equipment etc. (Sorenson et al., 2011; Choi and Han, 2007). In addition to price reduction, cost savings also derive from lower management costs, increased

flexibility of inventories and lower logistic costs (Tella and Virolainen, 2005). The reduction in administrative diseconomies of dealing with a large number and variety of suppliers and purchasing workload results to simplified procedures and optimized purchasing activities (Wicks, 2002; Racca, 2011).

However, little is known about the actual extent of cost-savings that cooperative purchasing generates for participants. Research on cost-savings is either based on quantity discount schedules (e.g. Schotanus and Telgen, 2007) or based on respondents' perceptions and/or reports without studying actual cost data (e.g. Hendrick, 1997). Research based on actual spend data might provide us with a better and more reliable indication of actual cost-savings. In addition, since cost-saving is not likely to be the only motivation for buyers it is critical to investigate what other factors come into play in the purchasing decision of individual buyers. Previous research has shown that cooperative purchasing likewise offers indirect and non-monetary benefits such as higher quality and learning from members within a cooperative purchasing arrangement (Schotanus and Telgen, 2007). For health care providers, product innovations and security of supply are significant considerations as is competence and trust in cooperative purchasing relationships (Quayle, 2002; Nollet and Beaulieu, 2005). Studying such additional motivations would enrich actual data on cost-savings and makes it possible to place the data into context.

This paper sought to explore the determinants of hospitals' decision to purchase medical devices through cooperative purchasing in the Netherlands. The specific research questions were:

- What is the magnitude of cost-savings resulting from cooperative purchasing of pacemakers via *Intrakoop* based on actual spend data?
- What non-monetary benefits and other factors are associated with the decision of hospital purchasers to buy pacemakers collectively?

The case of the Netherlands is particularly interesting in that cooperative purchasing has much potential for growth where the value of medical goods purchased via a GPO is 10% compared to the US and Germany at 50% and 80%, respectively (Qiaohai and Schwarz, 2011). As such, the findings of the study should be interesting for the Dutch stakeholders of cooperative purchasing as well as the wider international cooperative purchasing community. The rest of this paper is structured as follows. First, the literature review sets out the context of the study and the research questions. The methodology and the findings of the case study are subsequently presented, and discussed in the light of the literature. Finally, conclusions of the case study are presented, along with the implications for policy, practice, and future research.

## Methods

We adopted a case study approach to be able to intensively research the monetary and non-monetary benefits and determinants of cooperative purchasing (Dubois and Araujo, 2007). The case study method was used as it supports deeper and more detailed investigation of a topic – in this case cooperative purchasing, by way of combining a variety of evidence from different sources such as documents and interviews. Pacemaker was chosen as the representative medical device given its relative complexity which would imply that purchasing decisions will be more deliberative within the organization – in this case the hospital, and that while the potential cost-savings could be substantial, non-monetary consideration will also come into play in the purchasing arrangement chosen (Hospital Materials Management, 2004; Sweesy et al., 2006). Meanwhile, the representative GPO for

this study is *Intrakoop* which is by far the largest GPO for the health and care industry in the Netherlands. It began to offer medical products starting with pacemakers in 2012.

*Intrakoop* is a non-profit cooperative. Approximately 580 health care facilities with more than 7000 sites are members of *Intrakoop*, including hospitals and nursing homes. In 2013, 51 hospitals and two diagnostic centers participated in the procurement of *Intrakoop* of suture, jaw implants, blood collection systems and interventional radiology. At present, the *Intrakoop* group purchasing categories for health care include: blood collection systems, diagnostics, pharmaceutical care, medical and technical gases, hygiene products, intervention radiology and cardiology, jaw implants, medical wholesale, orthopedic trauma material, care resources and pacemakers and leads. For the collective purchase of pacemakers and leads, *Intrakoop* offers hospitals individual subscription which specifies, among other terms, the duration of contact (in years). The subscription is final and conditions apply from the moment a hospital signs an individual contract.

*Document analyses*

The price for pacemakers is specified in the framework agreements of *Intrakoop*. Within this agreement hospitals have their individual price conditions. The hospital can select discount categories according to their particular circumstances. The discount categories are based on three different factors: market share (i.e. a certain percentage of all pacemakers bought by the hospital comes from the supplier), the amount of pacemakers (i.e. a certain amount of pacemakers is bought from the supplier) and/or contract term (i.e. the duration of the contract). Different conditions for hospitals implies that the price of pacemakers will be different for each hospital.

To evaluate the magnitude of cost-savings, data from *Intrakoop* was analyzed. Of the 89 hospitals in the Netherlands 21 hospitals were included in the study as they made an individual subscription via *Intrakoop*. From these hospitals the three types of most purchased pacemakers were selected to mimimize disparities resulting from choice of pacemakers. The cost savings were analyzed based on the actual savings by hospitals that elected to purchase pacemakers and leads via *Intrakoop*. We sought to verify the (level of) cost-savings gained in the purchase of pacemakers via *Intrakoop* with the individual hospitals during the key informant interviews.

*Interviews*

Key informant interviews with *Intrakoop* and hospitals with and without contracts with *Intrakoop* in the purchase of pacemakers were also carried out to investigate the determinants of their hospitals contractual arrangement with *Intrakoop* – or absence thereof, for the purchase of pacemakers. The interviews also sought to explore hospital purchasers' attitudes to cooperative purchasing and to get an impression about the future of cooperative purchasing in the Netherlands. To guide the interviews, an open question questionnaire was developed based on a review of academic and professional literature and policy documents. Respondents were purposely drawn from the list of all hospitals that signed a contract with *Intrakoop* as of 2012 as well as hospitals who chose not to sign a contract with *Intrakoop* for the purchase of pacemakers. Each interview was recorded and transcribed verbatim by a third-party professional transcriber. Two researchers (SK and PC) individually read and analyzed the transcriptions and met on two occasions to triangulate their respective analysis.

## Results

In 2012, 21 of the 89 hospitals made an individual subscription with *Intrakoop*, with the total spending on pacemakers amounting to € 3.067.289 (current prices). In 2013 the total number of hospitals with a contract increased to 26 subscriptions with total spend amounting to € 5.735.036 (current prices).

*Cost savings*

To measure the savings that 16 participating *Intrakoop* members made with cooperative purchasing in 2012 (as five hospitals did not share the same pacemakers selected for the study), an analysis was performed on these hospitals with an individual subscription which is presented in Table 1. None of the 16 contracts signed with *Intrakoop* was from an academic hospital. For hospitals who signed a collective contract, they saved on average 31% on the price of pacemakers. The average price savings for general 30% and for teaching hospitals was 34% with a minimum of 7% and a maximum saving of 60%.

Table 1. Actual Savings of Members Hospitals of Intrakoop in the Purchase of Pacemakers through Intrakoop, by Type of Hospital (n = 16), 2012

| **Type of hospital** | **Actual mean savings per unit (in €)** | **Average savings (in %)** |
|---|---|---|
| General hospital | 1340,8 | 30% |
| Teaching hospital | 1323,9 | 34% |

*Determinants and perceived non-monetary benefits*

In order to deepen our understanding about the determinants and non-monetary benefits of cooperative purchasing, we conducted 16 interviews of which 14 were interviews with purchasers from various hospitals from different provinces throughout the Netherlands. The interviews were arranged with the responsible hospital purchaser by phone or email and were carried out by SK between October 2014 and January 2015. The profile of the hospitals that these purchasers represented is presented in Table 2.

Table 2. Profile of Hospitals Visited for Key Informant Interviews

| **Type of hospital** | **Region[1]** | **Contract with Intrakoop for pacemakers** | **Number of pacemakers utilized (2013)[2]** |
|---|---|---|---|
| General | East | No | ≥100-200 |
| Teaching | South | No | >200 |
| General | South | No | ≥100-200 |
| General | South | Yes | <100 |
| Teaching | West | Yes | ≥100-200 |
| General | West | Yes | ≥100-200 |
| General | West | Yes | ≥100-200 |
| General | North | No | ≥100-200 |
| Teaching | East | Yes | ≥100-200 |
| General | West | Yes | <100 |
| General | South | Yes | <100 |
| General | East | Yes | >200 |
| General | South | Yes | ≥100-200 |
| Teaching | West | No | >200 |

[1]Based on First level NUTS of the European Union: Region NL1 (North Netherlands), Region NL2 (East Netherlands), Region NL3 (West Netherlands), Region NL4 (South Netherlands); [2]Source: Ziekenhuis Top 100.

There is universal acknowledgement among the respondents of the contribution of cooperative purchasing towards lower prices for medical devices, in general, and of pacemakers, specifically. By pulling together participants' individual volume, the group is able to negotiate prices, which according to one respondent, are competitive to large(r) hospitals prices. Consequently, hospitals are able to reduce their prices for materials. In addition to the direct benefit which shows up on the balance sheets of hospitals, a number of respondents pointed out the indirect benefits of cooperative purchasing in terms of optimizing the process of purchasing, on the one hand, and, knowledge-sharing, on the other hand. However, there are different perceptions about time savings with cooperative purchasing. Purchasing through *Intrakoop* was experienced as time saving, while cooperative purchasing between hospitals was experienced as more time consuming in the startup phase of that cooperative purchasing arrangement.

By taking part in a cooperative purchasing arrangement, hospital purchasers optimize buying for (particular) products and negotiating their prices. Whereas the volume of pacemakers that they purchase is smaller compared to academic or teaching hospitals, small hospitals' purchasing departments face a comparable product range. Given the lower headcount in small hospitals' purchasing departments, streamlining purchasing can contribute to productivity gains. Similarly, cooperative purchasing can help enhance hospitals' purchasing departments knowledge about developments in the market. According to one respondent, hospital purchasers learn from each other by being-up-to-date with relevant and important market developments for medical devices. This aspect of cooperative purchasing was mentioned by purchasers from small (i.e. general) and medium-size (i.e. teaching) hospitals alike.

Whereas respondents have noted that cooperative purchasing is particularly suited for and benefits small hospitals in particular, a number of respondents pointed out that cooperative purchasing will not be the sole approach that their hospitals will employ. The reasons for pursuing a multi-pronged approach to purchasing including individual purchasing include the restrictions on product choice, avoidance of the risk of unravelling of commitment of members in a cooperative purchasing arrangement and the significance of non-monetary factors in the decision to purchase medical products. One respondent mentioned that their contract with *Intrakoop* was not renewed because the specific pacemaker they require was not on the product list. Consequently, cooperative purchasing is constrained by the heterogeneity and complexity of medical products.

While lower prices are a draw to hospitals, they are mindful of overall costs as well as intricacies of medicine. A specific product, a few respondents argued, may be cheaper but may end up costing more when the specialist does not want to use it or has to be trained to use it. Since specialists are accustomed to particular ways of doing things they are locked in their use of particular medical products. Part of the reason for this is the relationship between the end-user and supplier which has been forged during the medical training of specialists is sustained up until the present. Changing medical products, as such, is akin to a paradigm shift for end users. Other barriers stated by respondents for cooperative purchasing through a GPO are losing control and cognitive trust in the GPO partner for offering competitive market prices. Meanwhile, it was also mentioned that there are suppliers who resist working with GPO contracts and are willing to offer better conditions directly to hospitals.

Several respondents were optimistic about the prospect for cooperative purchasing with the increasing emphasis on costs of doing business. Nonetheless, there are different perceptions among respondents. Some see cooperative purchasing being pursued by hospitals more among themselves rather than with a GPO such as *Intrakoop;* others see *Intrakoop* as a useful arrangement for purchasing more standard, less complex products than products such as pacemakers. The advantage of a cooperative purchasing arrangement among hospitals, according to the respondents, is that hospitals' end-users, are better and actively engaged. This is facilitated by the technical knowledge members have and need in dealing with medical products like pacemakers. Moreover, they feel that such an arrangement will result to better prices considering that a few respondents mentioned not renewing contacts with *Intrakoop* because (the contracted) prices were not competitive enough.

Other factors why hospitals do not renew are organizational developments like mergers and increased regional cooperation among hospitals. At the same time that there were a few respondents who felt that there were still large price margins in the prices for pacemakers between *Intrakoop* and other purchasing arrangements, the majority of the respondents noted the decrease in price of pacemakers in previous years. Respondents who had signed contacts with *Intrakoop* attributed the development to the entry of *Intrakoop* in the market for pacemakers. Other contract holders saw the impact of *Intrakoop* as evolving with large potential. A few respondents were either uncertain about the contribution of *Intrakoop* to the drop in prices for pacemakers or of the opinion that the impact of *Intrakoop* was minor.

**Discussion and conclusion**

This study in the Netherlands among 21 hospitals showed the magnitude of financial savings and the non-monetary considerations of hospitals in engaging in cooperative purchasing in health care. The average saving for hospitals that signed a contract for the purchase of

pacemakers with *Intrakoop* is 31%. Our findings compare favorably with the findings of Cleverly and Nutt (1984) where hospital savings were in the range of 12%-26% and higher when compared to Schneller (2009) and Nollet and Beaulieu (2003; 2005) at 10%-15%. General and teaching hospitals chose to course their purchase of pacemakers via *Intrakoop*. We explain this favourable difference due to the specific and complex product type (i.e. pacemakers) and the hospital types involved (i.e. smaller hospitals). Because of the specific and complex nature of pacemakers, higher price savings can be realized by more professional procurement of the product. For more general, simple and/or standard products and services, the price savings of cooperative purchasing are likely to be more in the range found in earlier studies.

In addition to such a direct benefit, our study found that cooperative purchasing is also valued for its indirect benefits in terms of optimizing the process of purchasing, on the one hand, and, knowledge-sharing, on the other hand. In fact, for some hospitals, non-monetary considerations trumped financial savings in their decision to purchase pacemakers collectively with *Intrakoop* or some other GPO or by themselves. This is, of course, not surprising considering the nature of pacemakers as a medical product and the decision-making process concerning the choice of pacemakers (Hospital Materials Management, 2004; Sweesy et al., 2006). There were no academic hospitals that elected to purchase their pacemakers via *Intrakoop*. Rather, general and teaching hospitals chose to course their purchase of pacemakers via *Intrakoop*.

As Burns and Lee (2008) noted, the more homogenous the medical product and the greater the influence of physician preferences, the easier it is to agree on the product-price mix and price levels. In the case of pacemakers, end-users may have different preferences for which the price factor may or may not be a significant factor or even a consideration at all. Indeed, the cardiac rhythm management device selection guideline in the US underscores, the physician deserves complete freedom to choose of any device judged best for his or her patient. At the same time, however, the same guideline underscored that such a freedom "also requires the physician to be clinically knowledgeable and fiscally responsible in order to be effective" (Swessy et al., 2006).

Whereas cooperative purchasing is particularly suited for and benefits small(er) hospitals and will likely increase in the coming years, cooperative purchasing is not expected to become the sole approach that hospitals in the Netherlands will employ. The reasons for pursuing a multi-pronged approach to purchasing include the restrictions on product choice, risk of unravelling of commitment of members and the limited significance of (absolute) price savings to hospitals as other factors than price savings are perceived as important as well.

A specific challenge we found for cooperative purchasing of medical products, that has not been discussed in academic literature before, is dealing with supplier lock-in situations because of the medical training of specialists. We recommend to pay especially attention to these stakeholders when starting new cooperative arrangements for medical products considering their dual role as either enablers and hindrance to innovation (Carrera and Lambooij, 2015). With regards to cooperative purchasing, a GPO such as *Intrakoop* will face greater competition from hospitals given the perceived benefit of cooperative purchasing among hospitals. According to respondents, the advantage of a cooperative purchasing arrangement among hospitals is that their end-users are better and actively engaged in the process of purchasing and can leverage their end-users' relations with suppliers to achieve competitive prices if not more.

Whether the benefits of cooperative purchasing among hospitals would be different and/or bigger in magnitude is an area of further research. Other areas of further research would be price differentials for large teaching hospitals which, by the virtue of their volume, are able to negotiate lower prices. This can shed light on the impact on prices of volume. Similarly, the perspective of the supplier(s) would be helpful since their involvement in a cooperative purchasing arrangement is crucial for the success of such an arrangement (Hendrick, 1997; Schotanus and Telgen, 2007). We have sought to interview suppliers of pacemakers but they declined to participate in this research. The input of the supplier, nonetheless, is not crucial given the objectives of this study. Finally, the perspective of GPOs in the Netherlands as a collective on collective purchasing in the Netherlands should be helpful given their stake and the particular challenges they face in expanding their services in the health sector.

The decrease in price of pacemakers in the Netherlands in previous years is also a potentially interesting subject for further research. This possible side-effect of cooperative purchasing arrangements (i.e. a general price decrease) in non-optimal markets has not been studied before as far as we know it. Although we could not prove that these side-effects actually took place due to the initiatives of *Intrakoop*, we did find indications – alluded to by interviewees – that this could have happened. Such research could be done by comparing price levels in different countries in different sectors before and after the introduction of cooperative purchasing arrangements and by comparing these price levels to countries where there are no or limited purchasing arrangements.

The findings of this study should contribute to our understanding of cooperative purchasing in general and by hospitals of pacemakers and leads via *Intrakoop*, specifically. One of the strengths of this study lies in the availability of quantitative data for the cost savings analyses based on actual spend data and not on perceptions, estimations or self-reports of respondents. Another strength of this study is the availability of qualitative data from different types of hospitals all over the country which helped to complement the analysis on cost-savings from cooperative purchasing. Therefore, it was possible to cover the perspectives of members and non-members of a GPO such as *Intrakoop* alike. A key limitation of the study is the cross-sectional nature of data which does not permit insight into monetary and non-monetary impact over-time. However, as this is a case study, the qualitative data collected offer deeper insight behind the cost-savings analysis at the same time that the determinants and non-monetary benefits should be stable over a period of time. A follow-on research that will carry forward the results of this study could shed light on changes in the magnitude of cost-savings and consideration of various factors by hospitals in their purchase of medical devices.

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