

A Self-Reporting Approach to Healthcare Time and Motion Studies for Budget IMPACT Models in Routine Cataract Surgery

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PURPOSE

This study aimed to develop a robust time and motion study to gather inputs for a budget impact model (BIM) using primary data collection from a large number of facilities.

The BIM was designed to estimate the economic impacts of custom surgical packs in cataract surgery in United States (U.S.) hospitals and ambulatory surgical centers (ASCs).

Custom packs are a set of disposables and sterile surgical supplies strategically arranged within a package to facilitate surgery preparation.

Alcon Custom Pak® was specifically explored in the model due to its comprehensive surgical supply coverage and customization for each surgeon. This maximized the flexibility and applicability of the model.

METHODS

A self-reported time and motion study assessed the time spent on each task throughout the entire cataract surgical supply life cycle from negotiating prices to surgery room preparation.

A two-pronged approach was used for data collection: 1) online survey and 2) surgical timings.

- The survey was conducted among surgical technicians (“surgical techs”) and supply chain managers assessing current cataract surgery practices including operating room, materials management, and accounting tasks.
- Additionally, several vit-ret surgeries were timed by each surgical tech; use of supplies* from Alcon’s Custom Pak® and other sources were recorded for each procedure.
 - The date, scheduled start time, actual start time, start of surgery preparation, end of surgery preparation, and end of surgery were recorded for each procedure, as was the number of items sourced from Custom Pak® and the number of items not taken from Custom Pak®. Surgical timing and supply data were used to verify consistency in the other self-reported data.

Using these inputs, a BIM was developed to estimate time spent and labor costs across three facility departments for a representative hospital or ASC specified by mean typical reported data assuming no surgical pack usage.

- Mean time spent for tasks for each supply category was used to calculate total time expenditures with and without surgical pack use.
- Per procedure and per year total direct time expenditures were calculated at the facility level and separately for the accounting, materials management, and operating room departments.

*Supply categories: Back table cover, bowls, BSS 15 mL (balanced salt solution), BSS/BSS Plus 500 mL (balanced salt solution), cannulas, cups, cystitomes, drapes, eye shields, FMS (Fluid Management System) Phaco Cassette, gloves, gowns, I/A handpiece, irrigation sleeves, knives, needles, phaco tips, sponges, syringes, trays, and viscoelastic.

RESULTS

The survey was completed by 56 surgical technicians and 23 supply chain managers across the US. Surgical techs also timed 290 cataract surgeries (140 hospital and 150 ASC). See **Table 1** for the respondent characteristics.

Table 1: Characteristics of the study sample

Cataract Surgery Respondent Characteristics	Total (n=79)	Hospital (n=46)	ASC (n=33)
Role	n (%)	n (%)	n (%)
Surgical Technicians	56 (71)	27 (59)	29 (88)
Supply Chain Managers	23 (29)	19 (41)	4 (12)
Age (years; mean ± SD)	44.1 ± 9.8	46.5 ± 9.7	40.7 ± 9.1
Time in current role (years; mean ± SD)	12.3 ± 7.0	12.9 ± 6.3	11.4 ± 7.9
Facility Type	n (%)	n (%)	n (%)
Hospital	46 (58)	46 (100)	0 (0)
Ambulatory Surgical Center*	33 (42)	0 (0)	33 (100)
Custom-Pak Usage	n (%)	n (%)	n (%)
Alcon Custom-Pak® Users	50 (63)	27 (59)	23 (70)
Alcon Custom-Pak® Non-Users	29 (37)	19 (41)	10 (30)
Number of cataract/anterior segment procedures/surgeries performed at facility in a typical month (mean ± SD)	122.2 ± 109.1	101.2 ± 112.2	151.4 ± 98.9

SD; Standard Deviation
*Includes both Ambulatory Surgical Centers and Eye Surgical Centers

Individually sourcing cataract surgical supply items incurs labor time ranging from 0.85 to 3.81 minutes and a cost of \$8.65 to \$46.07 in the hospital setting. In ASCs, individual sourcing results in labor time of 0.61 to 2.20 and a cost of \$4.66 to \$19.43.

Table 2: Per item labor time (in minutes) and cost (in July 2019 USD) for individually sourcing surgical supply items, per surgery

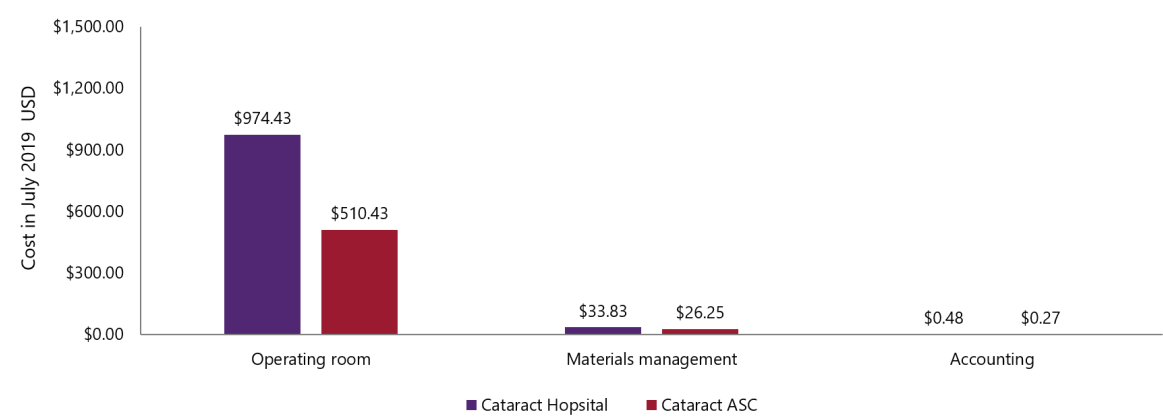
Department	Minimum across individual items*	Maximum across individual items*	Minimum across individual items*	Maximum across individual items*
Hospital	Time (minutes)		Cost (in July 2019 USD)	
Within Department				
Operating Room	0.64	3.54	\$8.48	\$45.81
Materials Management	0.04	1.00	\$0.06	\$0.66
Accounting	0.01	0.22	\$0.00	\$0.10
Total Across Departments	0.85	3.81	\$8.65	\$46.07
ASC	Minutes		Cost (in July 2019 USD)	
Within Department				
Operating Room	0.54	2.07	\$4.55	\$19.15
Materials Management	0.04	0.47	\$0.10	\$0.40
Accounting	0.01	0.07	\$0.00	\$0.04
Total Across Departments	0.61	2.20	\$4.66	\$19.43

*Only one individual item is used per surgery for most categories of surgical supplies. In cases where multiple items of the same supply category are used in a single surgery, these values reflect total time/cost for all items used in a single surgery (e.g. multiple sponges in a single surgery).

RESULTS, CONTINUED

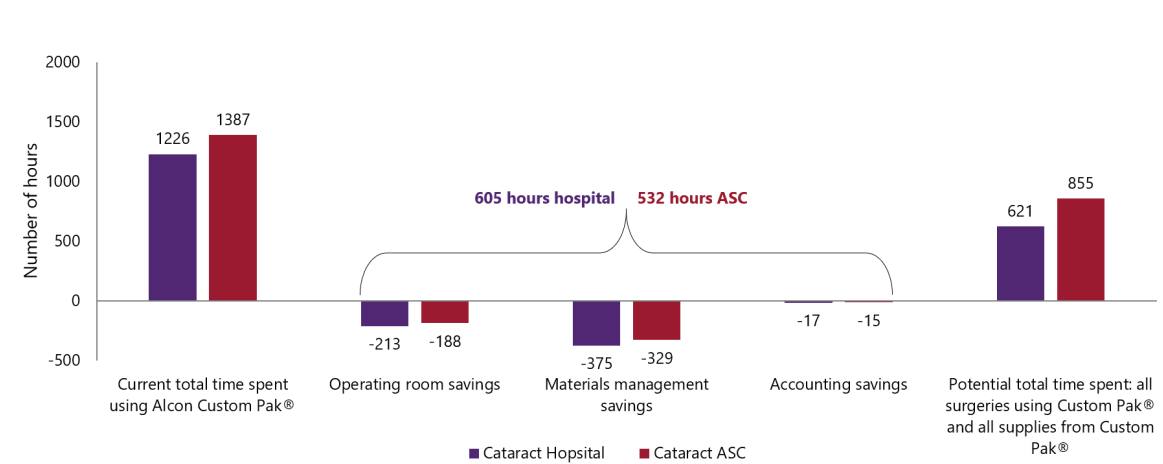
The representative hospital completed 1,062 cataract surgeries annually. 1,751 procedures were completed per year by the representative ASC. Average labor costs per surgery for individually sourcing surgical supplies (no Alcon Custom Pak® use) is shown in **Figure 1**.

Figure 1: Per surgery labor cost for individually sourcing surgical supply items



Sourcing all surgical supplies from Custom Pak in all cataract surgeries (“full utilization”) saves over 600 hours annually in the hospital setting and over 500 hours in an ASC setting* (**Figure 2**), translating to a total savings of USD \$322,391 in the hospital setting and USD \$223,093 in ASCs.

Figure 2: Full Custom Pak® (100%) utilization time savings by department



*Operating room savings + material management savings + accounting savings

Current total time spent using Alcon Custom Pak® = time spent across all three departments

Potential total time spent using Custom Pak® for all surgeries and all supplies = current total time minus time saved across all three departments

DISCUSSION AND CONCLUSIONS

Conducting a self-reported time and motion study by surgical facility via an online survey instrument and by surgery using timing exercises enabled us to quantify and calculate the economic impact of custom surgical pack use versus sourcing surgical items individually.

A wide range of U.S. geographic areas were covered using this approach, allowing for greater generalizability than a typical time and motion study.

This BIM is the most detailed accounting of the life cycle of cataract surgical supplies to date. It captures all tasks in that life cycle from price negotiation and ordering to pulling and preparing supplies for surgery.

By focusing on Alcon Custom Pak®, we can provide data on impacts across a comprehensive list of surgical supplies used in cataract surgeries.

Although the potential cost savings are based on US information, the time-based efficiency gained from streamlining the process can be generalized to other countries assuming the tasks involved in managing and preparing cataract surgeries and the process for completing those tasks are similar across countries.

These calculations enable analysis of potential cost and time savings for cataract surgeries with and without the Alcon Custom Pak®.