

# The Value of Stock Keeping Unit (SKU) Reduction and Standardization Initiatives Within a Hospital System

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## INTRODUCTION

- Hospitals allocate up to 40% of their operating budget to maintain supplies and materials.<sup>1</sup>
- The average hospital may own up to 35,000 stock-keeping units (SKUs) of inventory, and carry 6,000 to 8,000 SKUs in-house at any one time.<sup>1</sup>
- Reducing unnecessary supply chain costs can create significant opportunity for hospitals to realize financial cost-savings.<sup>2</sup> Such cost reductions may be achieved through the limitation of product waste, use of cost-effective products, and standardization to lower cost products.<sup>3</sup>
- In addition to financial benefits, SKU reduction and product standardization initiatives are considered to offer value from operational (e.g., workflow efficiency) and clinical (e.g., increased knowledge transfer) perspectives.<sup>4, 5</sup>
- Cardinal Health Orleans, Dr. M. Duffy, reported that "improving the performance of the healthcare supply chain will be a core element of reducing cost of healthcare in the United States."<sup>6</sup>
- Strategies and value drivers for SKU reduction and standardization initiatives likely vary across hospitals. To date, there is no published evidence in the literature that comprehensively reports and consolidates hospital experiences on this topic.

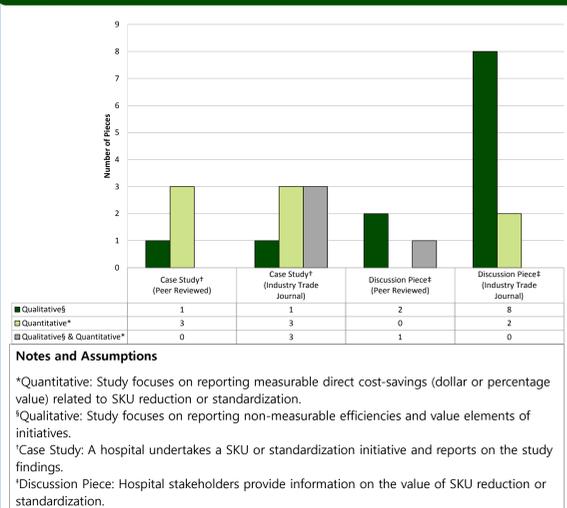
## OBJECTIVE

- The objective of this research was to conduct a literature review to identify, interpret, and summarize studies that report on the quantitative or qualitative value of SKU reduction and product standardization within the hospital setting.

## METHODS

- A literature search was conducted in PubMed, publically available hospital trade journals (e.g., Healthcare Value Analysis Magazine, Healthcare Purchasing News, Journal of Healthcare Contracting, OR Manager) and using grey online literature materials up to December 2015.
- Searches were conducted using the terms "SKU reduction, product standardization, product efficiencies" in combination with "value, measurement, or quantification."
- Literature quantifying the value of SKU reduction or qualitatively discussing the general perspectives of hospital managers on the value and impact of SKU reduction was reviewed.
- The types of articles identified were typically observational in nature. In general, peer-reviewed or hospital trade journal published case studies were retrieved, as well as discussion pieces concerning the value of SKU reduction or standardization. A total of 24 unique studies were identified (see Figure 1).
- The value of SKU reduction or standardization was reported as direct, quantitative, cost-savings or indirect qualitative value, such as improved efficiency, for a hospital.

Figure 1. Materials identified through literature review according to study type and types of outcomes (quantitative vs. qualitative) reported.



## RESULTS

### Studies Reporting Quantitative Results:

- Twelve studies quantified direct cost-savings or percent reductions in costs observed with SKU reduction or product standardization initiatives (see Table 1).
- Annual cost-savings from several of these initiatives were reported to range from \$15,000 to \$828,500 (see Figure 2).
- The wide range of cost-savings observed across studies may be partially attributed to differences in study design and methods variables, including:
  - Type of procedure evaluated
  - Whether one or more than one procedure type was evaluated
  - Type of supply or medical device and its acquisition cost
  - Frequency of use of the supply in the hospital
  - Methods used to calculate direct cost-savings
- Standardization to a lower cost product through economies of scale was the primary factor enabling direct hospital cost-savings.
- When standardizing to a whole portfolio of products from one vendor, the cost-savings achieved appeared to be greater than standardization with one lower cost product.
  - For example, standardization to Davol Hernia Mesh products was predicted to result in a cost savings of over 1.5 million in three years at Thomas Jefferson University Hospital.<sup>7</sup>

Figure 2. Direct cost-savings (in thousands) observed from SKU reduction and product standardization, by study, over a 12 month period.



## RESULTS CONTINUED

Table 1. Results of studies reporting quantitative data regarding SKU reduction and product standardization initiatives.

Reference	Design	General Findings
<b>Peer-Reviewed Case Studies</b>		
Avansino et al. <sup>8</sup> (USA)	<ul style="list-style-type: none"> <li>Standardization of laparoscopic appendectomies</li> <li>Implemented a standardized preference card</li> <li>Data on supply costs, operative time, intra-operative complications, and length of stay were collected on 101 consecutive patients</li> <li>Compared with a historical cohort of 145 patients</li> </ul>	<ul style="list-style-type: none"> <li>Resulted in a 20% average reduction in supply costs per case</li> <li>Estimated an annual cost-savings of over \$41,000</li> </ul>
Hartmann et al. <sup>9</sup> (Germany)	<ul style="list-style-type: none"> <li>Standardization for wound care (University Hospital Jena)</li> <li>Hydroactive wound dressings were standardized</li> <li>Cost-savings were reported</li> </ul>	<ul style="list-style-type: none"> <li>Resulted in a 10.3% reduction in average expenses per case for hydroactive wound applications</li> </ul>
Kashlan et al. <sup>10</sup> (USA)	<ul style="list-style-type: none"> <li>Standardization of contrast medium used in neurointerventional procedures at a single hospital (University of Michigan)</li> <li>Isovue<sup>®</sup>, an economical option, set as the preferred contrast medium in hospital's policy</li> <li>Compared the average cost of contrast agents used six months prior to policy change, six months following policy change and most recent six months</li> </ul>	<ul style="list-style-type: none"> <li>Resulted in cost-savings of \$137 per procedure and total savings of \$62,924 over a six month period</li> </ul>
<b>Industry Trade Journal Case Studies</b>		
Russel, J. <sup>11</sup> (USA)	<ul style="list-style-type: none"> <li>Surgical trauma ICU team employee standardized blood tubing used at a single VCUHS hospital to a more economical blood tubing substitute for surgical trauma ICU procedures<sup>11</sup></li> </ul>	<ul style="list-style-type: none"> <li>Resulted in annual savings of \$15,000<sup>11</sup></li> </ul>
Hesson, D. <sup>12</sup> (USA)	<ul style="list-style-type: none"> <li>Clarian Health Partners health systems (i.e., Methodist, Indiana University, and Riley hospitals; n= 1,300) partnered with a single supplier, Medline Inc., to standardize custom procedure trays, reduce inventory levels, and reduce product acquisition costs for all surgical procedures<sup>12</sup></li> <li>Product categories examined included: surgical packs and gloves, exam gloves, surgical drapes and gowns, general medical and surgical items and OR general products<sup>12</sup></li> </ul>	<ul style="list-style-type: none"> <li>Resulted in annual savings of over \$828,500 on \$8.6 million in supplies<sup>12</sup></li> </ul>
McNees et al. <sup>13</sup> (USA)	<ul style="list-style-type: none"> <li>Detailed the process of standardization of advanced wound care supplies and processes for all wound care procedures at the North Mississippi Medical centre<sup>13</sup></li> </ul>	<ul style="list-style-type: none"> <li>Resulted in annual savings of \$300,000<sup>13</sup></li> <li>Improved efficiency and practice standards, and reduced product education time, as well as reduced product waste, with fewer recall opportunities<sup>13</sup></li> </ul>
Cardinal Health <sup>6</sup> (USA)	<ul style="list-style-type: none"> <li>Standardized the supply chain process by standardizing medical supplies in all storerooms at BJC Healthcare (13 hospitals) in St. Louis, Missouri<sup>6</sup></li> </ul>	<ul style="list-style-type: none"> <li>Resulted in a 25% reduction of the lines ordered for targeted areas and annual savings of \$200,000<sup>6</sup></li> <li>Achieved improved satisfaction and efficiency<sup>6</sup></li> </ul>
Dmyterko, K. <sup>14</sup> (USA)	<ul style="list-style-type: none"> <li>Staff at five catheterization laboratories, an EP laboratory, and an interventional radiology suite implemented the Clinical Supply Solution system to manage inventory and product use<sup>14</sup></li> </ul>	<ul style="list-style-type: none"> <li>Savings of \$557,000 in inventory was observed in after six months following implementation of the Clinical Supply Solution system<sup>14</sup></li> </ul>
Miller & Bourque <sup>7</sup> (USA)	<ul style="list-style-type: none"> <li>Standardization of hernia mesh products with a single vendor at TJU hospital (n=950)<sup>7</sup></li> <li>Used multidisciplinary team to implement process<sup>7</sup></li> </ul>	<ul style="list-style-type: none"> <li>In the first year, TJU saved \$600,000<sup>7</sup></li> <li>TJU is on track to save over 1.5 million in three years<sup>7</sup></li> <li>Clinical outcomes maintained after the switch<sup>7</sup></li> </ul>
<b>Discussion Pieces</b>		
Park & Dickerson <sup>2</sup> (USA)	<ul style="list-style-type: none"> <li>Review of literature on supply management in anesthesiology<sup>2</sup></li> <li>Investigated supply management in the OR<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>Indicated that excess product supply generates a cost when wasted or expired<sup>2</sup></li> </ul>
Ebel et al. <sup>15</sup> (NR)	<ul style="list-style-type: none"> <li>Reviewed literature on inventory management in a catheterization laboratory<sup>15</sup></li> </ul>	<ul style="list-style-type: none"> <li>Estimated that 20% of inventory assets at hospitals are discarded due to product expiration<sup>15</sup></li> </ul>
Roark, D. <sup>16</sup> (NR)	<ul style="list-style-type: none"> <li>Supply chain management team at a healthcare facility standardized "big-ticket" products, including endomechanicals, rental equipment, and infusion pumps<sup>16</sup></li> </ul>	<ul style="list-style-type: none"> <li>An average IDN with a \$500 million annual supply budget can achieve annual savings of \$12.5 to \$30 million<sup>16</sup></li> <li>\$60 million saved in supply, food, and drug purchases<sup>16</sup></li> </ul>

KEY: EP= Electrophysiology; GPO= General Purchasing Organization; ICU= Intensive Care Unit; IDN= Integrated Delivery Network; NR= Not Reported; OR= Operating Room; TJU= Thomas Jefferson University; USA= United States of America; VCUHS= Virginia Commonwealth University Health System.

### Studies Reporting Qualitative Results:

- Twelve studies qualitatively reported on the value and efficiencies of SKU reduction or product standardization initiatives (see Figure 1).
- SKU reduction and product standardization results in improved efficiency, which can be classified as improved workflow, reduced storage needs, improved contracting and inventory management, and increased physician familiarity and comfort with products (see Figure 3).
- There were inconsistencies reported across studies as to whether clinical outcomes changed as a result of SKU reduction or standardization initiatives.
  - One study reported significant improvements,<sup>13</sup> while two studies reported no change.<sup>8,10</sup>

Figure 3. SKU Reduction and Product Standardization Qualitative Value Summary<sup>2,5,6,8,10,13,17-24</sup>

<b>Workflow</b>	<ul style="list-style-type: none"> <li>Decrease time to find needed products (e.g., surgery)</li> <li>Improved workflow may lead to lower labour costs</li> <li>Decrease time to handle and prepare products</li> <li>Help to accommodate growing surgery volume and technology changes</li> </ul>
<b>Storage Needs</b>	<ul style="list-style-type: none"> <li>Stocking excess material increases storage costs</li> <li>Costs to maintain stock in storage can range from 15% to 40% of annual product cost</li> <li>One Canadian standardization initiative reported over 40,000 square space of hospital freed, presumably creating cost savings and improving efficiency</li> </ul>
<b>Clinician Product Familiarity and Comfort</b>	<ul style="list-style-type: none"> <li>Standardized product use increases the transferability of knowledge and skills</li> <li>Training with a single supplier decreases product education time</li> </ul>
<b>Contracting and Inventory Management</b>	<ul style="list-style-type: none"> <li>Standardizing to a single vendor can reduce contract management time and associated costs</li> <li>Additionally, standardization to single vendor can create efficiencies with product ordering (e.g., lower shipping fees) and product management (e.g., reduce waste, reduce stock-outs)</li> </ul>
<b>Patient Outcomes and Quality of Care</b>	<ul style="list-style-type: none"> <li>The Ontario Hospital Association reported that product standardization promotes common approaches and processes, reduces opportunity for error, and increases patient-centered outcomes</li> <li>One U.S. study reported significantly improved clinical outcomes (i.e., wound healing) after standardization, as well as increased patients and physician satisfaction scores</li> <li>Two additional studies did not report a relationship between standardization and quality of care</li> </ul>

- Many studies reported on the additional qualitative value and efficiencies observed with SKU reduction.<sup>2,6,13,17,18,23,24</sup>
- Quantifying the value of improved efficiency is less obvious than calculating direct cost-savings.
- No materials reviewed disclosed or described any methods used for quantifying cost-savings associating with improved efficiency.

## CONCLUSIONS

- We identified several studies that reported financial cost-savings or operational efficiencies associated with SKU reduction and product standardization, within hospitals across a wide variety of procedures and product types.
- Standardization of product classes (or portfolio of products) resulted in the greatest savings.
- Most of the available literature are case reports or anecdotal examples from industry or trade publications, with limited or no discussion of methods for quantifying cost-savings.
- Therefore, this area of research would benefit from developing specific costing methods to more comprehensively quantify the full value of SKU reduction and product standardization.

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