How to Implement a Lean Inventory Management System for a Solo Equine Practitioner

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Inventory costs are the number one component of a solo practitioner’s expenses against income. In essence, any inventory held longer than its purchase credit period must be financed through debt or through the tying up of capital that could be invested elsewhere in the practice. For most solo practitioners, decreasing their cash-to-cash cycle time is a sounder financial investment than holding cash in inventory. Implementation of a lean inventory management system will allow the solo practitioner to minimize total inventory costs and eliminate waste. Author’s address: Jorge L. Colón, DVM, PLLC, PO Box 11631, Lexington, KY 40576; e-mail: jorgecolondvm@me.com. © 2014 AAEP.

1. Introduction
The equine ambulatory solo practitioner has two types of inventory riding in his/her vehicle: that which will be used in the process of providing service and that which will be dispensed as a whole unit as part of the process of providing service. Because economies of scale cannot be applied by solo practitioners, the manageable aspect of the total cost of in-stock inventory will mostly rely on the quantity of stock desired to be had on hand to allow for the provision of service.

In my reproductive ambulatory practice, inventory costs for drugs and medical supplies have increased from 22.2% of expenses against income to 30.8% over the last 6 years. During the same time period, inventory expenses as a percent of total expenses have increased from 52.5% to 61.9%, making them the most significant expense against profits in my practice. Assuming that inventory is not the most sought after place for cash investments for most solo practitioners, we look for ways to improve cash flow that do not tie cash assets to inventory that is not actively helping to generate revenue. The following is a brief description on how to manage these significant costs by loosely following some of the teachings of the Toyota Production System1 in order to ‘go lean’ and reduce waste.

2. Total Cost of Inventory
There are three separate costs associated with the total annual inventory cost for the practice: purchase costs, ordering costs, and holding costs. Because of the inability to apply economies of scale, solo practitioners are left to deal with ever-increasing prices through their collaborative relationships with distributors and through the proper utilization of specials and promotions, while taking into account necessary cash flows and investing opportunities. Today, most distributors provide free-of-charge next-day or two-day delivery that, combined with the simplicity of ordering and receiving, make ordering costs a negligible part of the equation. Holding costs, on the other contrary, make up the part of the equation that most significantly impact the cash flow of the solo practitioner and yet are the
hardest to grasp and understand. Suffice it to say that the items purchased with an 8.3% savings through a “buy 11, get one free offer” cost more than just the dollar amount of items times price; there is a cost associated with having those items on the shelf. In addition of that, those that are not consumed during the vendor’s billing cycle and, therefore, generate no revenue for the practice while creating a cash outflow, are a drain on cash resources that significantly impact the practice’s potential profitability. The practitioner’s veterinarian mentality has not been trained to recognize the significance of the holding costs of inventory and is therefore content in not realizing the excess inventory’s impact on income.

Collaboration, in terms of loyalty to distributors and pharmaceutical representatives, is critical for the management of purchasing costs when one does not have the power of economies of scale. Loyalty to two or three vendors creates a beneficial relationship for all parties. First, favorable billing terms and superior service can be obtained because of loyalty. There’s no more efficient way to make your money work for you than by generating and collecting revenue from your supplies before payment for them is due. Second, having more than one supplier allows for maintenance of supply streams that avoid stock-out risks. It also promotes healthy competition for your business between a controlled group of vendors, which ultimately leads to improved service and reduced prices.

Ordering costs can be deemed negligible based on current delivery terms offered by distributors. Meaning that, other than the time spent in ordering and receiving, increased number of orders do not translate into increased ordering costs because we benefit from free shipping services. Ordering and receiving do not, in fact, consume any more time than what is already allotted to vehicle restocking at the end of the day. Having said this, if a significant expense is incurred every time an order is placed or received, this ordering cost will make an impact on the total annual inventory cost and must therefore be calculated. The person in charge of inventory can apply the scientific method to ideas on how to improve the system in a continuous attempt to reduce waste. Implementation of proven ideas generated by front-line workers serve to streamline the inventory management process and increase the efficiency of the system.

The inventory holding cost is the dollar value of holding one unit of inventory; its formula is defined by the cost of the item and its holding rate. It is this holding rate that is almost impossible to define or quantify and is notoriously constantly underestimated. For the drugs and medications that we use, this holding rate could easily reach 25%5 (pharmaceuticals firms use 20–30%5). In simplistic terms, the holding rate entails, amongst others, the expenses associated with physical storage, insurance, shrinkage, expiration, taxes, etc., together with the forgone opportunity of the capital strapped to an item that could provide for an investment elsewhere. As important as the former are, it is the latter, the cost of capital, that can be easily measured and managed by the practitioner. By definition, if the inventory holding period is longer than the purchase credit period, then the holding period in excess of the credit period must be financed from debt or from the stockholder’s equity sources of capital. The practice’s cost of capital will dictate what their actual holding rate should be, based on experience. Based on the practitioner’s historical knowledge of annual demand for inventory, together with the common quantity per order, the practitioner can measure the metrics of the annual inventory turnover, days of supply, and inventory holding period.

There is a mathematical formula called the economic order quantity that provides the order quantity that minimizes the total annual inventory cost by balancing ordering costs against holding costs while taking into account the total purchase costs. This economic order quantity does not usually apply for the solo practitioner since the formula assumes a constant demand rate for inventory, with no variability, and a constant price per unit, amongst others. If the particular situation dictates that the ordering costs are negligible, the total inventory cost will truly be dependent on the negotiated prices with vendors and on the holding costs of those items. If a significant cost is associated with an order, then the number of orders will make an impact on total cost and must be factored in. Because holding costs mathematically decrease when the quantity ordered is reduced (which would imply more frequent ordering), the goal is to find an order quantity that satisfies the service provision requirements (cannot lose profit opportunities by not having inventory on hand needed to provide service) but that does not leave unused items on the shelf whose holding period exceeds the purchase credit period. This has to be balanced against the potential benefit of specials and promotions, which could make more financial sense if cash is readily available for investment and investing in inventory is a sounder financial opportunity. A modified total inventory cost formula that takes into account the holding rate and the reduced prices (and order cost, if significant), based on higher purchase quantities, can be utilized to make a sound financial decision when cash is available or when extended credit terms can be secured.

3. Lean Inventory Management System

I have generated a modified fixed-time-interval system that incorporates a reorder point from a fixed-order system. I have termed it my “whatever I need plus one” system. The solo practitioner has a good sense, based on experience and actual usage/consumption, of how much inventory is being utilized, depending on the season. Assuming a lead time of two days for delivery, a practitioner could have on hand whatever they need of an item to cover...
the order interval period, plus the amount deemed as necessary safety stock. I operate under a one day lead time and, therefore, hold whatever will cover the next day, plus my safety stock. When that “plus one” gets transferred to the “in-use” supply, an order of a specific quantity is triggered with the intent of bringing back the inventory level to the target inventory established. In reality, almost everything that I utilize in my reproductive practice covers me for at least several days and I end up having an order trigger event twice a week at most. This type of system provides an inventory turnover that purposely entails the fewest days of supply on hand possible in order to assure a short inventory holding period. The end result being a reduction in inventory costs associated with holding rate and capital financing; the least amount of cash possible ends up attached to stocked inventory. Manipulation of my credit card payment cycle around my vendors’ billing cycle allows me to reduce my cash-to-cash cycle time, which leads to receipt of cash before paying for the inventory used.

In essence, the forgone opportunities and assumed risks associated with holding inventory act in a contra fashion to the desired profitability of the practice by tying up cash that could better be utilized elsewhere. A solo practitioner should never order more inventory than what will be consumed during the vendor’s billing cycle unless a favorable financial condition exists with bulk ordering. If the individual’s cost of capital is lower than the break-even point cost of capital between the bulk and regular-priced orders, then it would actually be cheaper to buy in bulk and hold the inventory (if the individual’s return on invested capital is lower than the holding rate, then the cash is better invested in the inventory). Regardless, the goal is to make your inventory work for you by generating profits not only from the inventory, but also from the cash received from it before having to pay the supplier. The frequency of ordering will be dependent on the practitioner’s level of desire for control of actual inventory on hand and on whether a cost is accrued with each order. Interestingly, experience has shown me that active management of inventory usage has led to the unintended consequence of more accurate procedures performed/billing records before leaving a farm call. An attempt at improving my profits by not wasting tied up cash on inventory has led to increasing my profits by avoiding the failure of complete billing; a major problem in ambulatory practice.

4. Conclusion

Improperly managed inventory leads to an increase in the cost of inventory against income and, with continuously rising pharmaceutical prices, will continue to represent an even bigger proportion of a practice’s total expenses. Additional revenue must be generated, billed, and collected to pay for expenses that are not being utilized themselves to produce revenue during the billing cycle. Improperly managed inventory costs generate the need for more work and reduce the amount of cash available to the practice. The inventory system must allow for the availability of inventory necessary to provide services, while avoiding the common practice of holding on to excess inventory that is not being used to generate revenue (see the Appendix for the formulas used in this article). Equine ambulatory solo practitioners must learn how to implement an inventory management system that reduces costs by eliminating waste and allows the enactment of lean processes by utilizing collaborative relationships with vendors and suppliers, by reducing costs created by waste, and by eliminating activities that consume resources but provide no added value to the customer.

Acknowledgments

Conflict of Interest

The Author declares no conflicts of interest.

Appendix: Formulas

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<thead>
<tr>
<th>Formula</th>
<th>Description</th>
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<tbody>
<tr>
<td>Total annual inventory cost</td>
<td>$TAIC = (annual demand \times unit cost) + [(annual demand/order quantity) \times (order cost)] + [(order quantity/2) \times (holding rate \times unit cost)]$</td>
</tr>
<tr>
<td>Economic order quantity</td>
<td>$EOQ = \sqrt{\frac{2 \times \text{annual demand} \times \text{order cost}}{\text{holding cost}}}$</td>
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<tr>
<td>Reorder point</td>
<td>$ROP = (\text{demand rate}) \times (\text{lead time})$</td>
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<tr>
<td>Demand rate</td>
<td>$d = (\text{annual demand}/\text{days open})$</td>
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<tr>
<td>Order quantity</td>
<td>$Q = (\text{target inventory}) - (\text{inventory position})$</td>
</tr>
<tr>
<td>Inventory turnover</td>
<td>$IT = (\text{annual demand}/(\text{order quantity}/2)) \times (\text{days open})$</td>
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<tr>
<td>Days of supply</td>
<td>$DS = [(\text{order quantity}/2)/(\text{annual demand})] \times (\text{days open})$</td>
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References

2. Vanderspek P. Assistant Professor of Supply Chain Management. Colorado State University College of Business (personal communication, March 2014).