Toward Effective Common Operating Policies in Ongoing Humanitarian Operations – The Science and Art of Segmentation – A Case Study

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Topic Area(s): Inventory

Summary: This research focused a case study and whether segmentation in ongoing humanitarian operations could theoretically improve expected item availability and maintain expected costs. Therefore the research question became Could segmentation, or the grouping of medical items with similar characteristics and tailored inventory polices for these segments, improve item availability in ongoing humanitarian operations while maintaining appropriate costs?

KEY INSIGHTS

1. Expected item availability can improve when demand variability is formally considered.
2. Segmentation benefits from visual assessment, iterative analysis and formal sensitivity analysis.
3. For the practitioner, a clear, repeatable process may be preferable.
4. Optimization is not necessary for improvement in outcomes.
5. Common operating policies can allow for decisions based upon informed levels of risk.

Introduction

The magnitude of humanitarian relief operations continues to grow (UN, 2017) and with it the importance of logistics and supply chain management. Via a case study, this thesis examined how the inventory management of medical items at a field-level dispensary could move toward more effective common operating policies.

Specifically, this thesis examined the policies of “when” and “how much” medical items could be ordered with reference to “segments” or groups of “similar” medical items..

A project-specific 2017 assessment concluded that 29% of consumable items where either in rupture or

at risk of rupture, while 58% of consumable items were in overstock (Organization, 2017b).

Models

The model looked at expected item availability and expected costs, both annual and investment. The methodology was in five steps.

1. *Obtain a list of medical items to stock.*

A list of 187 medical items was obtained from a dispensary standard medical list of the project under study. This list was retrieved from the project's Enterprise Resource Planning (ERP) software.

2. *Determine candidate drivers, key drivers and their respective values.*

The term "driver" describes a characteristic which presumably affects a medical item's availability and/or cost. This thesis focused on three types of candidate drivers (after discussion with both medical and supply personnel): item, demand, and supply. Figure 1 shows the key drivers of segmentation

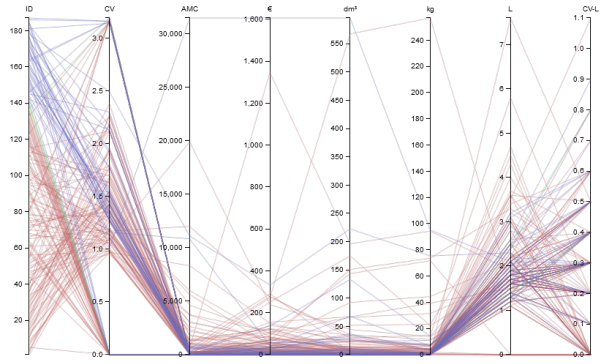

Figure 1. Multivariate graph of identified key drivers

3. *Group items into segments by key drivers.* Numerous combinations of drivers could result in many groups, or segments. Greater segmentation, however, may incur greater operational complexity. Therefore, the theoretical was balanced with the practical

4. *Assign an inventory policy per segment.* A wide range of inventory models were theoretically available. McGuire (2015) notes that periodic review models are well suited to humanitarian operations.

5. *Evaluate.*

Once key drivers had been selected, segments created, inventory policies assigned, and scenarios created, five different scenarios were evaluated. In two scenarios medical items remained unsegmented, though different methods of safety stock calculation were used. In the three other scenarios medical items were segmented, first based upon demand variability, subsequently by physical size, and finally lead time.

Results

Five scenarios were developed – two unsegmented, three segmented. These results indicate that segmentation and "common operating polices" based upon demand variability, physical size, review periods and transport modes can theoretically improve item availability in ongoing humanitarian operations—but segmentation is not a prerequisite for an increase in expected item availability at appropriate costs.

Conclusion

For the Organization, safety stock determination based upon demand variability has been shown to theoretically increase expected item availability for all medical items, even at lower expected cost. By all accounts, it may be more complex to incorporate demand variability and physical size into inventory policies and segment accordingly. The desirability of the effort would likely depend on the level of risk, and associated cost, deemed acceptable. Nonetheless, informed decisions about groups of medical items may be possible when the information is available. Though it is important to keep in mind that for this case study, similar results were obtained without recourse to segmentation.