

Impact of the Frequency of Camps and Target Inventory on Shortage and Wastage

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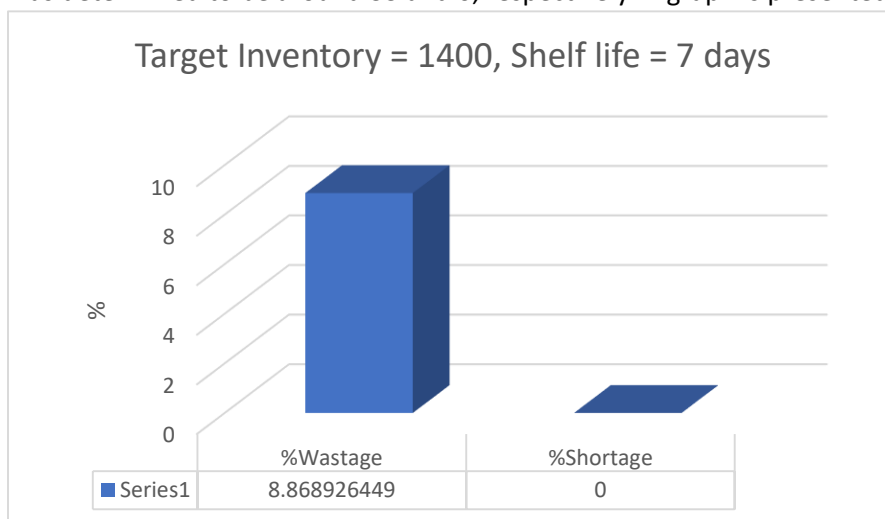
Full data presented in "Analysis" csv file.

SCENARIO: We are interested to analyze the impact of different policies on the platelets' shortage and wastage. Suppose that the shelf life of platelets is 7 days, the target inventory is 1400, and the donation camps are held every day. For both supply and demand, 10000 random observations are provided in the "Supply_and_Demand_Dataset" csv file.

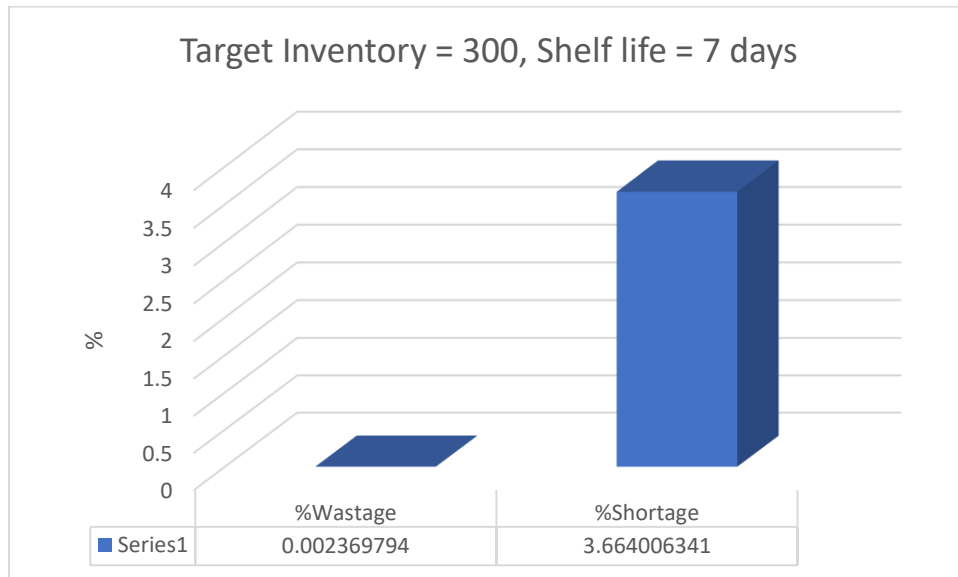
THREE DIFFERENT CASES:

- A) Assume that the target inventory is decreased to 300 units. Calculate the daily average wastage and shortage for the blood bank.
- B) We are considering to decrease the donation camp's duration by 3, 4, and 8 hours which leads to 10%, 20%, and 60% less supply for each period, respectively. How do the average shortage and waste change as the supply decreases? Should the blood bank reduce the donation camp's duration?
- C) The blood bank is willing to examine the impact of decreasing the frequency of donation camps on the percentage of wastage and shortage. What would happen if the donation camps are held every other day instead of every day? Based on the results, discuss the effect of reducing the frequency of donation camps. Can assume that the supply of day i is equal to the supply of day $i + 1$.

- A) The average wastage and shortage when the target inventory was 1400 and shelf life = 7 days was determined to be around 33 and 0, respectively. A graph is presented:

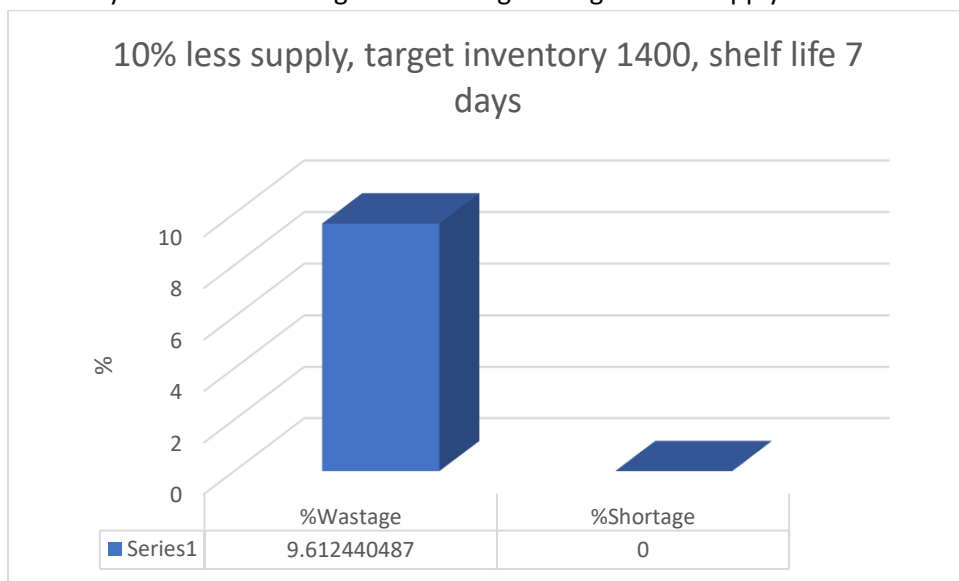


When the target inventory decreased to 300 units, the average wastage and shortage for the blood bank were respectively 0 and 6. Graph is presented:

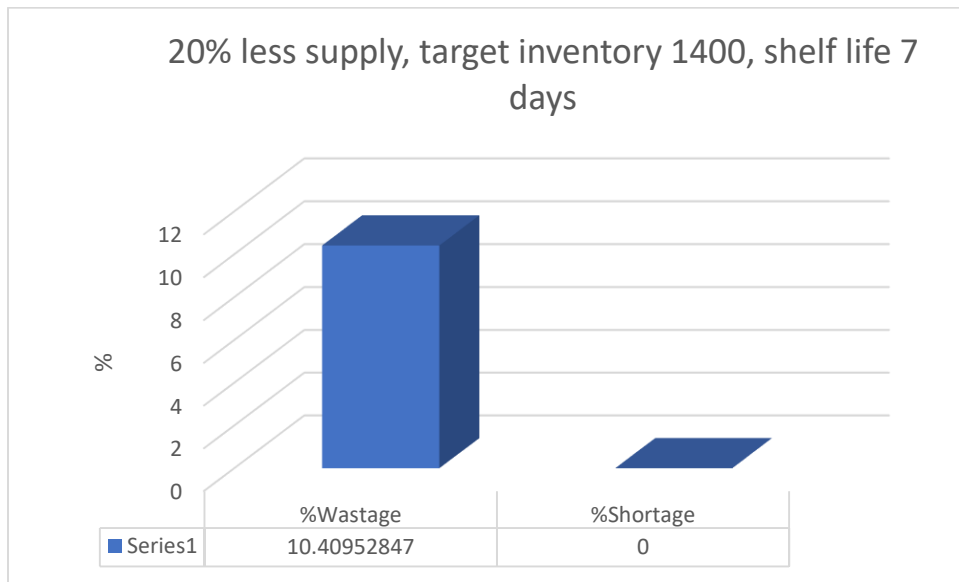


Due to the decrease in inventory capacity, less of the old supply can be carried over to the next day. As a result, this causes demands to not be met. When the inventory target was 1400, there was more wastage since there were more perishable item at inventory. Therefore, decreasing inventory space results in fresher blood products.

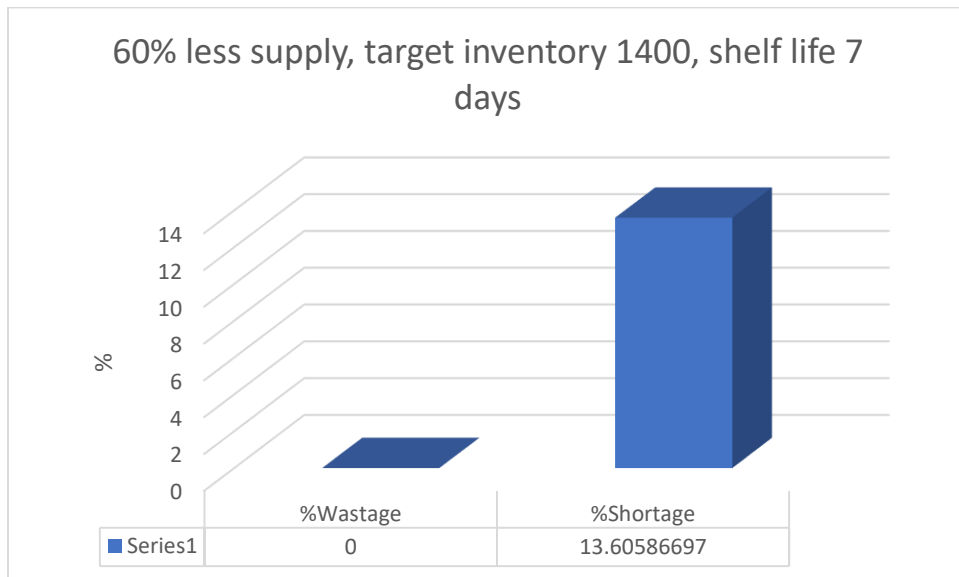
B) Summary of how the wastage and shortage change as the supply decreases is shown visually:



Average wastage = 32, average shortage = 0



Average wastage = 31, average shortage = 0

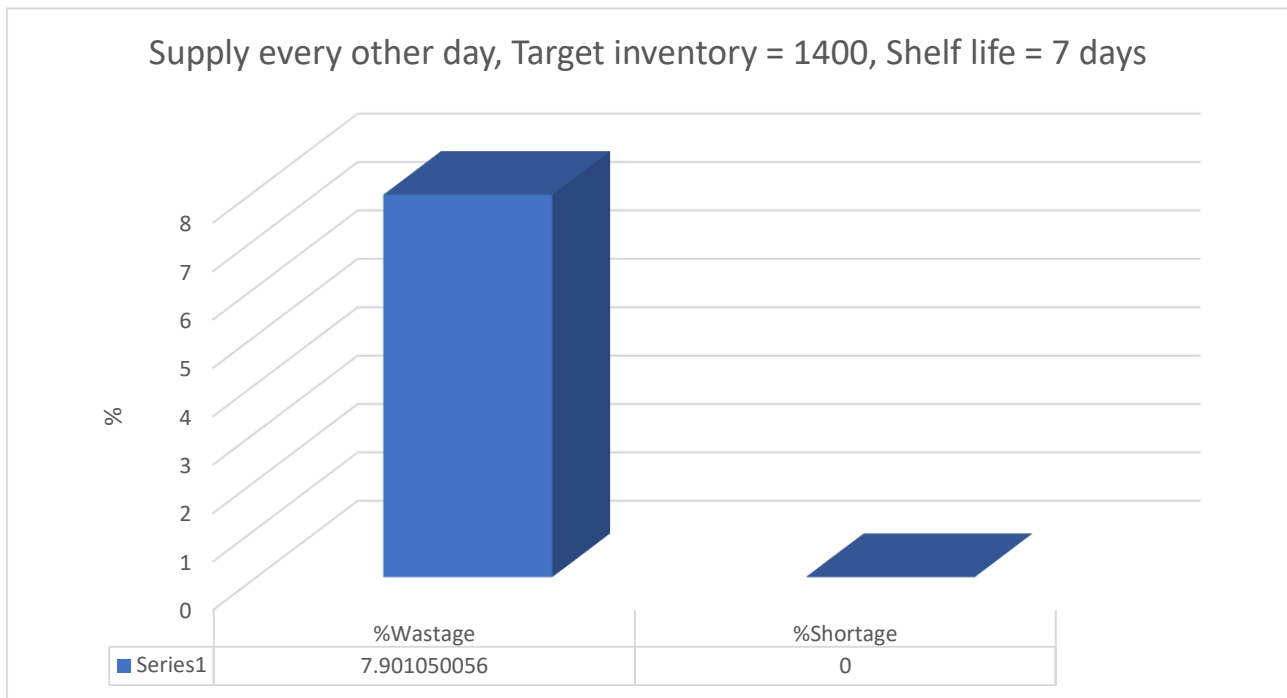


Average wastage = 0, average shortage = 23

Overall, there was a slight decrease in wastage as there was a decrease in donation champ duration between 3 and 4 hours (leading to 10% and 20% supply reduction). In those cases, there was more wastage than shortage. However, when the supply decreased by a lot (60%), the average wastage decreased while shortage increased.

Therefore, if MBB wants to avoid shortage problem where demand is not met then they should not reduce the donation camp's duration. On the other hand, if they want to meet more demands then it would be recommended to increase donation camp duration.

- C) The calculation of the supply every other day was performed with R. The average wastage was determined to be 30 while average shortage was 0. A graph is presented:



Compared to the results in A), where blood was supplied daily, target inventory = 1400, and shelf life = 7 days the wastage decreased from 8.9% to 7.9%. Therefore, reducing the frequency of donation camps to supplying blood every other day would help with decreasing wastage. It does not appear to have an effect on shortage.