# How Much is Enough? Managing Safety Stock for Hospital Supplies



Dr. Lars Maaseidvaag March 30, 2017

#### About MoreSteam

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## Today's Program

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- Welcome
  - Introduction of MBB Webcast Series
    - Ellen Milnes
- "How Much Is Enough? Managing Safety Stock for Hospital Supplies"
  - Dr. Lars Maaseidvaag
- Open Discussion and Questions





#### About Our Presenter



#### Dr. Lars Maaseidvaag

Vice President of Product Development

- Lead instructor for Master Black Belt and Black Belt programs
- Previous experience includes Curriculum Director for Accenture/George Group, operations research, and management consulting
- PhD Operations Research (Illinois Institute of Technology), M.S. Operations Research & Industrial Engineering and MBA (The University of Texas in Austin)



Never just right...

How much time do you spend thinking about safety stock?

Is it a "set it and forget it" approach?

And how do you set it in the first place?













# The typical approach

 $Saftey Stock = Service Level \times Std. Dev. of Demand \times \sqrt{Lead time for Replenishment}$ 





## Consideration #1 – Replenishment Frequency



Faster replenishment frequency = lower average inventory, but more risk points

Slower replenishment frequency = fewer risk points, but higher average inventory



## Characteristics of a hospital environment





#### Consideration #2 – Points-of-use

With many points-of-use, if inventory can be efficiently moved between the points-of-use, safety stock levels can be reduced at each individual point



#### Consideration #3 – Substitutes

The ready availability of sufficient substitutes at the same point-of-use also allows safety stock on each individual item to be reduced. Safety stock can be thought of as "pooled" for a particular type of item.



## Consideration #4 – Lead time for replenishment

In two-bin systems, the lead time for replenishment is typically much quicker than the time it takes to empty the next bin. In this case, safety stock is not required as you have safety <u>time</u> built into the system



# Pulling it all together

						Factors			Weightings			
												<b>Final Safety</b>
	Average	StdDev of	Lead Time	Repl.	Safety Stock	Points-of-			Points-of-	Substitutes	<b>Risk Points</b>	Stock per
Item	Demand	Demand	for Repl.	Frequency	Formula	use	Substitutes	<b>Risk Points</b>	Use factor	Factor	Factor	POU
ABC123	10	2	5	5	9	10	0	1	50%	100%	50%	3
DEF456	20	5	5	10	23	5	2	0.5	75%	100%	100%	18
GHI789	10	5	10	1	32	1	4	10	100%	75%	125%	30

=D6/E6

=ROUNDUP(L6\*K6\*J6\*F6,0)

Safety stock must be monitored. Key metrics include:

- Consuming safety stock this is expected to happen, on average, for about half of the inventory cycles.
  - If it happens every cycle, check average demand, vendor lead time reliability, scrap
  - If it never happens, check vendor lead time it was probably overreported
- Stock-out or near stock-out this should be rare if safety stock is well sized
  - Check for special cause variation in demand or supply
  - Check vendor reliability, you may need to add that factor to your spreadsheet



## A side note on transactions and pull systems

1	Average	Repl.	Transactions	Average	New Repl.	Transactions	Average
Item	Demand	Frequency	per week	Inventory	Frequency	per week	Inventory
А	100	5	1	250	2	2.5	100
В	100	5	1	250	2	2.5	100
С	100	10	0.5	500	5	1	250
D	100	10	0.5	500	5	1	250
E	100	10	0.5	500	5	1	250
F	100	20	0.25	1000	10	0.5	500
G	100	20	0.25	1000	10	0.5	500
Н	100	20	0.25	1000	10	0.5	500
I	100	20	0.25	1000	10	0.5	500
J	100	20	0.25	1000	10	0.5	500
		Total:	4.75	7000		10.5	3450

Forgetting to balance the transaction traffic of a pull system with the inventory savings is the number one error that is made with new pull systems





## Testing it out with a virtual pilot

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## Thank you for joining us



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