Point-of-use systems (POU) have been used in healthcare for as long as operating rooms drive supplies. In healthcare, up to 80% of spend is attributed to physician preference items, which is a list used to appropriately set up the operating room and pick supplies for a case or procedure. Ahead of the procedure, case items (e.g. gloves, catheters) are pulled from sterile storage or other locations---the point-of-use.

The POU is stocked by generating either a purchase order (non-inventory items) or a pick list (inventory items). Traditionally, storage that is replenished from inventory is called a PAR location or bin. PAR is short for Pick-and-Replenish. It also stands for Periodic Automatic Replenishment. The "automatic replenishment" is enabled by setting a PAR level, below which point the Materials Management Information System (MMIS) creates a requisition for a pick list.

Sterile storage is an example of a PAR location. Other PAR locations include OR suites, Anesthesia Carts, Equipment Cards, Sub sterile rooms, Endoscopy Suites, C Section Rooms, Specialty Cards, and Warming Cabinets. *Cardinal Pyxis* Supply cabinets are computerized PAR locations that generate a requisition without physical handling.

Traditional PAR locations are not so automated. On a daily basis, the supply manager carries a handheld terminal, scans the barcodes, enters the counts, docks the handheld, then uploads the data. Minneapolis-based *Lawson Software* integrates a mobile application that streamlines the process a little bit by sending PAR counts over the wireless network.

The concept of PAR works well if PAR levels are set properly. An optimal level eliminates “Just In Case” stockpiling while increasing product availability. By implementing their own PAR optimization techniques, one hospital reduced stockouts by 24% and their replenishment trips by 12% resulting in improved labor productivity and better use of space.

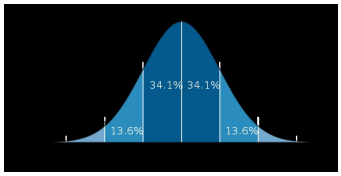
Reducing PAR

Historically, supply managers have “guess”-timated PAR levels, often times to the upside. If set too high, it negates any benefits gained from reduced cycle times. Buying and stocking more quantities affect cost of goods and carrying costs, respectively.

For PAR optimization, the recommended technique is to utilize available usage or purchase history in the MMIS to calculate the optimal PAR level. Procedural volume and seasonal trends translate to variability. In statistics, variability is measured in standard deviations from the average. A target of 3 standard deviations translates to a 99.7% service level. In terms of customer satisfaction (patient, nurse), that is also the product availability rate.

Suppose PAR usage of gloves were as follows: 100 per day (Days 1-10), 200 per day (Days 11-20), and 300 per day (Days 21-30). The average usage is 200 per day. One standard deviation is 82. This means that---on any given day---usage falls in the range 118-282 units 68% of the time. If we set PAR level to three standard deviations above the average, the PAR location can deliver up to 446 units 99.7% of the time.

Why 3 standard deviations? In statistics, the 68-95-99.7 rule, or three-sigma rule, or empirical rule, states that for a normal distribution, nearly all values lie within 3 standard deviations of the mean, or average.



Although the expected result is to reduce PAR levels, that is not necessarily the outcome. But if PAR levels happen to be reduced, less inventory need to be carried at the replenishing location (read: carrying costs). And lesser quantities need to be purchased at the same rate (read: cost of goods).

To help with decision support, New York-based *Skumatics* created *Analyz* software. See http://www.skumatics.com

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On a periodic basis, adjusted PAR levels can be calculated based on trailing usage and compared against the current values.
For example, the following savings can be achieved:

Item Description

Hospital Item Number

Vendor Part Number

Cost per EACH

Old Par Level

New Par Level

COGs savings

GlovesLatex

56789

2032900

$ 1.25

300

200

$ 125

FoleyCatheter24fr

23991

498184

$489.00

120

90

$ 14,670

Total Savings

$ 14,795

Extrapolating to all replenishment inventory and assuming a Total Savings of $250,000 and given other sample input:

Yearly supply expense = $25,000,000

12-month OR cases = 22,000

Existing spend per case = $1,200

The potential spend per case improvement can be calculated as:

Existing spend per case – [(Yearly supply expense – Financial savings) / 12-month OR cases]

or

$1,200 – [($25,000,000 - $250,000) / 22,000] = $75 per case per year or $1,650,000 per year.

To track results, scorecards may be kept of Inventory Turns—at the company level, replenishment location, or product category. If current inventory value is $4,000,000 with a carrying cost of 16% and holding other factors constant, any upswing in the turn ratio produces the following results:

Turns

Owned Inventory

Annual Holding Cost

Inventory Reduction

Holding Cost Savings

6

$ 4,166,667

$ 666,667

$ (166,667)

$ (26,667)

6.25

$ 4,000,000

$ 640,000

$	-
$	-
6.5	
$	3,846,154
$	615,385
$	153,846
$	24,615
7	
$	3,571,429
$	571,429
$	428,571

$	68,571
8	
$	3,125,000
$	500,000
$	875,000
$	140,000

Re-engineering PAR

In taking the PAR to the next level, the healthcare industry has borrowed the concept of the Efficient Consumer Response (ECR) from retail. See http://www.medicaldevice-network.com/features/feature81024/ . The ECR is a collaborative strategy between the hospital, its logistics providers (distributors), and manufacturers to maintain product availability at the point-of-use with minimum inventory levels throughout the supply chain.

In recent years, healthcare has transformed traditional replenishment locations into non-stock

receiving locations. Instead of a PAR location replenishing from stock, it generates a requisition for a purchase order. Upon delivery, the items are immediately “put away”. The time between requisition and delivery is usually same-day or next-day. In this case, the hospital works closely with its distributor for Just-In-Time (JIT) ordering. Service reps rotate with their customers for issue resolution and exception-handling (back-orders or substitute products, etc).

Although PAR management is attributed mostly to surgery supplies, cath lab, and radiology supplies, pharmacy items are no exception. Pharmacy departments have long been practicing ECR with their use of pharmacy systems, which are integrated with the vendor’s system or totally outsourced. With systems like *AmerisourceBergen Echo*, replenishment is done via punch-out to the vendor’s website and, in some cases, vendor-managed.

While PAR has become the embedded practice in healthcare, lean practitioners tout the benefits of kanban instead. See http://ezinearticles.com/?The-Par-Level-Myth-Exposed---The-Method-Nobody-Uses-(Except-Hospitals)&id=3955875 . Although this method reduces labor (true to its lean principle), it will likely increase PAR levels and storage space---what with its requirement for a paired-bin system for each set of SKUs. Software-wise, the MMIS needs to be re-engineered to support the process.

But the best re-engineering methodology is automation. Rather than sending 10 to 11 people from floor to floor and scan bardodes with handheld devices, why not deploy computerized supply cabinets? Vendors like Cincinnati-based *Par Excellence*, for example, provide systems with product checkin/checkout capability that tracks PAR usage in real-time. Any process that eliminates eyeball inspection is certainly more efficient than any counting method to date.

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