Outpatient Pharmacy Fixtures & Equipment

Overview

"Envision and Think In Terms of the Future State"

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If "football is a game of inches", then outpatient pharmacy success is a game of seconds.[1]

There is clearly no shortage of pharmacy design experts, from equipment vendors, architects, healthcare consultants, and transplanted retail pharmacists. Every equipment vendor knows how to design a pharmacy in such a way as to *hold all their fixture and/or equipment products*. Major healthcare consulting companies seemingly only know how to clone retail drug stores if their clients are any measure of their expertise. Transplanted retail pharmacists most often superimpose their passive demand mindset and mimic operations former employers designed for their use. This abundance of expertise suggests that there is no one way to *design* the fixture and equipment footprint of a pharmacy. That is not entirely true when it comes to outpatient pharmacy.

If your outpatient pharmacy has the same fixtures and equipment as a retail clone, then there is a good chance you have the wrong fixtures and equipment. If the engine of your outpatient pharmacy is a full featured robotic like Parata Max© or other similar machines, chances are very good you are using the wrong equipment. If you have more than one full featured robotic, you likely overspent.

Cost versus the Patient

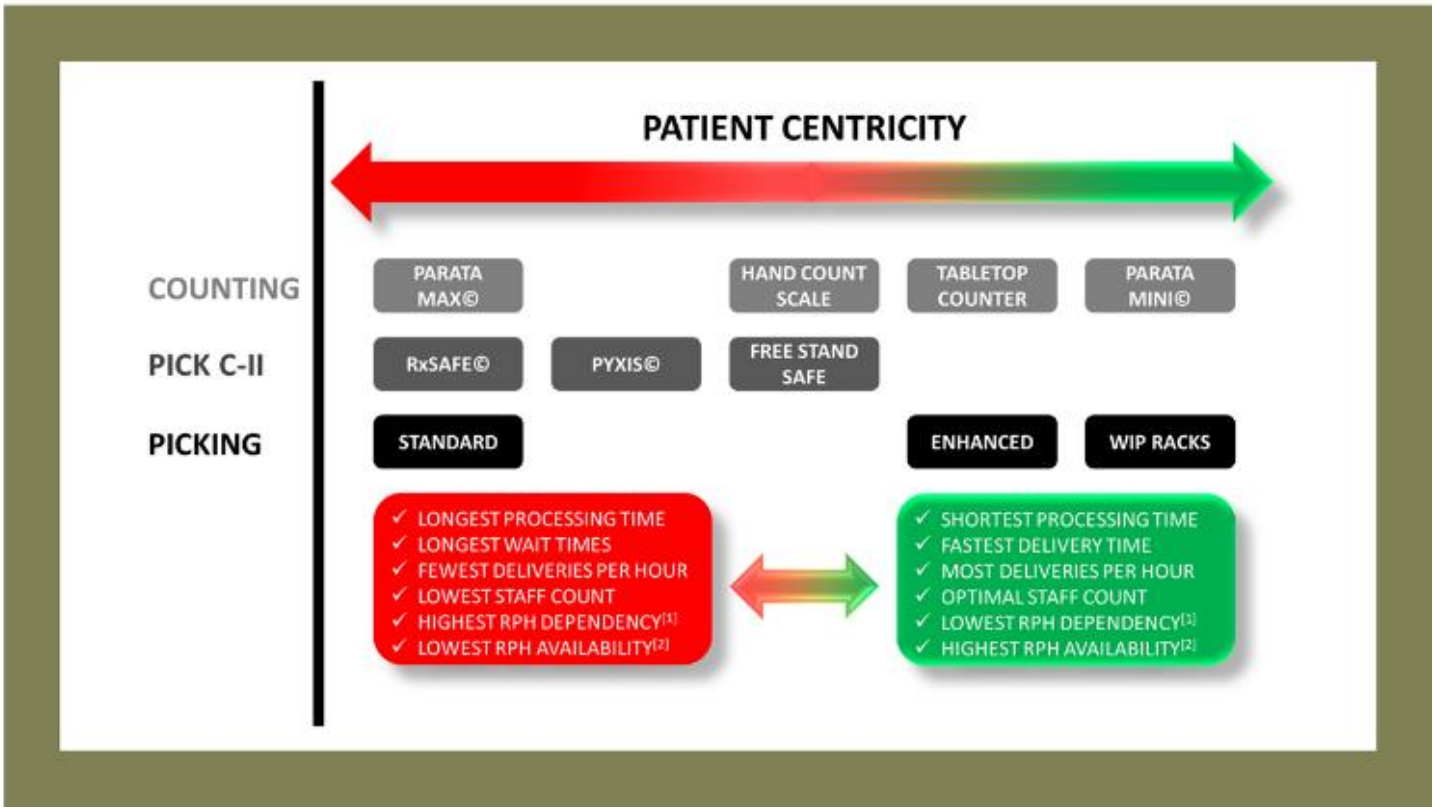
Pharmacy fixture and equipment vendors design products to serve *retailers* and require *inelastic* business models able to pass on delays and costs to consumers. The full feature robotic offerings can transform a *poorly* run pharmacy into one requiring less management skill, training, or oversight. However, the investment is a measure of poor management, not improved performance. These investments can come at the expense of patients.

Vendor products, especially in-line use, often do not create the opportunity for *revenue growth*. The wrong fixtures and equipment will not materially change the *delivery rate* of a well-run pharmacy, an essential piece of the revenue growth puzzle. Vendors are fond of claiming their products free the pharmacist and staff to spend more time with patients and reduce labor cost (more of an either or), rather than emphasizing any revenue creating potential.

Illustration A provides an example of how fixtures and equipment impact the delivery, and therefore, revenue of a pharmacy. The products included in this example are shown for illustrative purposes only and readers are encouraged to reach out to these vendors directly to discuss their specific needs.

The illustration looks at alternative fixtures and equipment for counting, C-II, and storage requirements. In this example, I chose the familiar Parata as the frame of reference although I could have easily used any of the other full automation devices. Note that patient centricity increases as we move from left to right across the illustration, from highest to less automated equipment. Conversely, storage shelving enhancement increases patient centricity.

ILLUSTRATION A
PATIENT CENTRICITY OF ALTERNATIVE FIXTURES & EQUIPMENT



It may seem counterintuitive to suggest that increased automation leads to less patient centricity. This is certainly not true for all automation as increasing it at the point of delivery improves centricity. Let's take a closer look as to why this is true.

Key Concepts

Elasticity

A measure of demand response for changes in supply drivers. Inelasticity occurs when the seller can increase things like price or wait time, or reduce quality of benefit, without significantly changing demand. We characterize drug chain markets as inelastic because patients have no choice but to accept change in supply drivers. On the other hand, *outpatient pharmacy markets are highly elastic* and sensitive to changes affecting wait time, price, etc.

Degrees of Freedom

The ability to change direction at each task of a process may be the easiest way to think of this. Imagine a process with five steps. If the process can be interrupted at one of those tasks, the process has one degree of freedom. We add one degree of freedom for every task we can interrupt *without changing* the standard time for any of the five tasks. *Higher number of degrees indicate more adaptable processes than lower numbers.* A word of caution: interrupting tasks increases the potential for leakage owing to task recovery steps.

Handlers

It is easiest to think of handlers as staff or equipment facilitating the movement of product from storage to the patient. The counter technician is the most visible pharmacy handler. Each counter technician can represent one or more degrees of freedom to serve the scrip demand queue. *Highly elastic demand queues require higher process and delivery degrees of freedom.*

Parallel

The *simultaneous* (or virtually so) processing of multiple orders. Sequential (one-at-a-time) processing

is the opposite of parallel processing. Drug chains employ sequential processing methods.

Translation

Handlers must *translate* orders into action. The most difficult translations are text-to-action because they require interpretation of text to create actionable mental images. Images are the least difficult because they require very little translation. The more translation required for a task, the greater the leakage.

Key Goals

Scrip Potential

The goal of serving 100% of scrip potential is very different than serving 100% of counter demand. The latter is always the easiest to achieve in elastic markets because counter demand shrinks with the inability to serve it. This, unfortunately, is the situation most outpatient pharmacies find themselves.

Scrip Rate

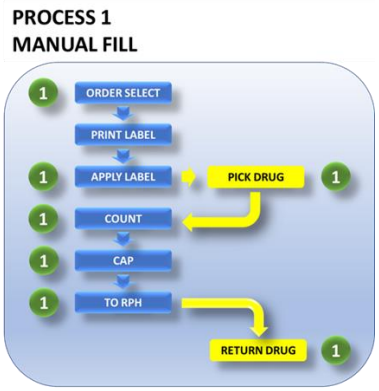
This is the key delivery metric. *Fixtures and equipment must align a delivery rate with the physical queue*. This is critical and most often requires high numbers of degrees of process freedom. The best way to appreciate this concept is that a patient with three scrips *cannot delay* the delivery of scrips to those who *follow in the queue*.

Process Determines F&E

Sample Process 1: Manual

Process 1 assumes enhanced shelving and table-top counters.[2] An *effective* manual *pick-to-production* fill process is critical to any pharmacy. It can be the longest process time and, barring changes in inventory staging and automation, a significant delivery disrupter.

The manual filling process offers a high degree of freedom for this sequential filling process. A handler can stop and re-direct efforts at nearly all steps in the manual process. The green circles show where the process can be interrupted. The handler can prioritize scrips to waiting patients. The handler can also stop the current task and redirect efforts without 'significantly' affecting the standard fill time for the paused fill process. Caution: Although a manual process offers a high degree of freedom, it comes at the cost of the interrupted process.



The manual process time can be reduced by things like enhanced shelving, additional handlers, process folding, trap sidings, and other changes to process, fixtures, and equipment. The goal is *function*, not aesthetic when choosing the right fixtures and equipment. A client in North Carolina was of the mind that aesthetic added to the marketability of the pharmacy. Unfortunately, the overpriced aesthetic came at the cost of functionality and the fixtures would need to be replaced to improve capacity and delivery time.

The importance of *seconds* to successful outpatient pharmacies cannot be overemphasized. Time must be considered when selecting the right fixtures and equipment for an on-demand delivery system.

Storage

These are among the most under-thought sources of leakage. The wrong fixture can add not only seconds, but *minutes* to a process. If a three-foot shelving section is good, then six feet would be even better. Shelving of equal spacing would be great for storing different sized products. The cul-de-sac shelving not only looks nice and saves floor space, and it adds storage to the aisle. In fact, ***none of these are true*** because of the seconds added to the pick and return process in a sequential process.

What about carousels? Cabinets? Drawers? The same guidelines apply, even more so because these fixtures often require a larger footprint, provide less storage/access per square foot, and increased motions and/or steps to access product.

The translation of task to actionable image occurs quite rapidly for highly educated and/or experienced handlers.[3] Not all handlers have this education or experience since it would be too costly for the fill process. Therefore, storage fixtures must address the leakage attributed to a handler with average or below average experience.

ILLUSTRATION B
TASK TRANSLATION TO ACTIONABLE IMAGES

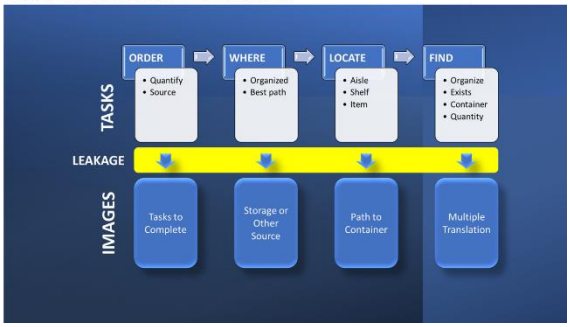


Illustration B shows the high degree of translation required for interpreting tasks to actionable images for the pick process. Although pharmacy managers attempt to simplify the translation by organizing and perhaps sectioning inventory, this often results in changing how a handler must create an actionable image rather than significantly changing leakage.

The right fixtures can address leakage in some key areas of the pick task.[4] The goals are to improve access, reduce confusion, and improve organization.

To increase visibility and access

- Line of sight high volume, low height, small container shelves
- Low, high height, larger container pull-out shelves
- Short-run shelves with stack breaks for cross aisle access
- Variable size wire bin shelving for non-stackable containers

To reduce search and confusion at container location

- Inexpensive, portable shelf dividers
- Surface availability for scannable shelf labels
- Solid surface, gravity shelves

To increase container organization

- Manufacturer, lot number separators or color-coded labels
- Bottle/vial container trays
- Tip-out bins
- Product pushers

The right shelving combined with location and inventory management system are critical for delivery-on-demand pharmacy models. Pharmacies must invest in the *back-end* (organization, stocking, etc.) outside the critical delivery window(s) to ensure the quickest in-window pick time.

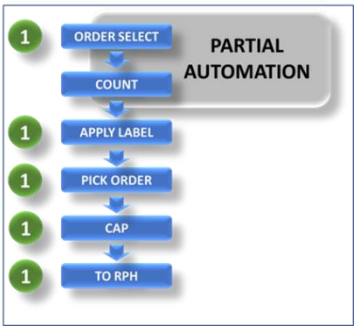
Equipment

There are only two choices when it comes to a successful outpatient pharmacy … you are either all in or all out. This means that these pharmacies will require *some* automation to supplement the manual fill process. The goal for automation is to increase the delivery rate, whether to a wholly bedside program for low volume markets, or to a combination of bedside and counter markets.

More *is not necessarily better* when it comes to outpatient pharmacy automation. More is better for vendors, so it is very important that pharmacies keep their focus on how the automation, and *each* additional feature, *contributes* to the ability to serve the on-demand delivery queue. A good rule of thumb is that each automated task reduces the degrees of freedom required to service on-demand patients.

Pick and restock is normally the greatest source of leakage. Process 2, partial automation, improves pick and restock leakage by allowing staging of *counter* high volume *on-demand* inventory. Staging, however, does not eliminate *all* pick and restock leakage. The staging cells must have a capacity and flexibility to avoid frequent pick-fill-restock service. A 90-day recovery drug regimen and a 500/lot bulk container will require re-service every five fills. You may need more than one staging location or an alternative production channel process.

PROCESS 2
PARTIAL AUTOMATION



A key to inventory staging automation is to ensure simultaneous or *near* simultaneous access to **all** the inventory. The loss of access to inventory decreases the degrees of freedom available for shelved inventory. A good example of this is automation of box inventory. Imagine having very organized box inventory enhanced shelving. Now, place a glass wall in front of the shelves so you can still see the inventory, but you cannot touch it. Order picking capacity is now reduced to one box (sequential) at a time. This may not be a big problem for low box

demand queues, but the problem grows as scrip box potential increases.

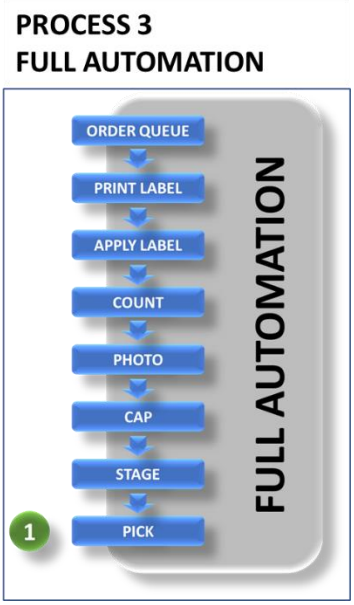
Apart from pick-and-stock leakage, counting can be an additional source of leakage owing to inconsistent counting speed and errors. There are some very good countertop pill counters that address both issues, and these should be the first additional automation consideration rather than melding the inventory stage with an automated counter. If you are comfortable with parallel inventory staging (shelving or machine), the next comparison is whether the tabletop counter maintains degrees of freedom and reduces leakage associated with this task. If so, we look at the next level of automation for this task.

Partial automation in Process 2 below combines staged inventory with an automated counter. This next level of automation is available from most vendors who engage in automating counting and can be significantly less costly than their full automation machines. By example, Parata offers a Parata Mini© that offers ready-to-count inventory staging with about 50 canisters. Some vendors offer the ability to chain these machines together and increase the number of staged drugs. The high output rate of these automated machines preserves critical degrees of freedom for the handler.

Available equipment significantly reduces count time and errors resulting in virtual parallel processing output rates. The output rate is so short that these partial processing machines effectively offer one additional degree of freedom for *each* cell, or the capacity to *simultaneously* serve as many patient orders as cells (assuming all orders could be serviced by inventory staged in these machines and an equal number of handlers.)

Process 3 looks at the impact of full automation on the filling process. All tasks are continuous and uninterruptable. The machine must run a complete cycle before starting the next order in the queue. A handler intervention in the queue requires an increase in standard task time and increases delivery/wait time for orders in the queue. Because the cycle cannot be interrupted, the handler delay in changing task is delayed 75-90 seconds. Moreover, all else being equal, waiting patient delivery time increases the same. It is important to remember that success or failure in outpatient pharmacy is measured in seconds.

The disadvantage of full automation is easy to understand when you realize that these machines are intended to serve an *inelastic* production business model where the focus is on *maximizing profit* than patient benefit or health. The impact of the loss of handler flexibility is easily passed to the captive patient, or results in a non-fill risking patient recovery, health, or even life.



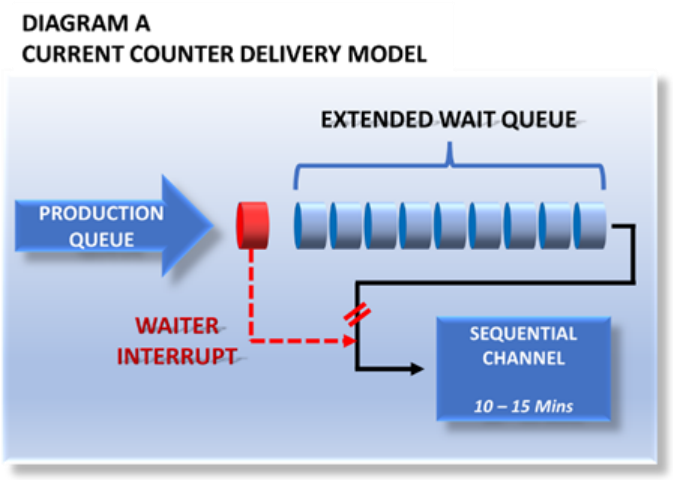
Focus on the Front End

Most every retail and outpatient pharmacy are built ***back-to-front.*** This means front-end delivery rates become a *consequence* of the back-end output rate potential. This works well for retailers with inelastic demand queues and can rely on most patients to wait for their prescriptions. A major retailer doubled down on this inelasticity by investing in micro-fulfillment centers thereby removing the process one step further way (to the back) from the patient.

Forcing the front-end to improve the delivery product does not work either. We can look at failed retailer experiments that attempted to improve pharmacist-patient engagement. Once again, the shortcomings in design of the back-end dictated the delivery rate (this time a patient benefit) of the front counter.

Outpatient pharmacy transformation process begins with front-end requirements and builds ***front-to-back***. This ensures the back-end supports the front-end product delivery rate requirements. Fixtures and equipment tune to demands of multiple production channels supporting both counter (pull) and delivered (push) product distribution channels.

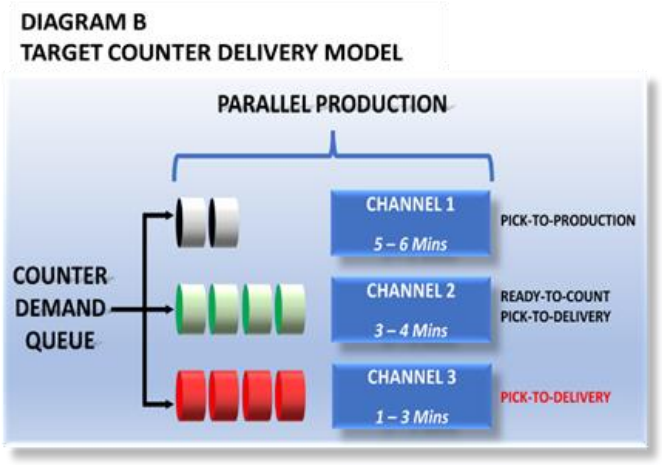
Diagram A illustrates how *current* retail and outpatient designs move through a single sequential production/delivery channel. The pancaking of production demand causes untenable delivery rates and wait queues for outpatient pharmacy, the extent to



which depends on the selection of fixtures and equipment. In this example, we are assuming these pharmacies use either a manual and/or fully automated process coupled with standard fixtures and equipment. (Note: All models assume a constraint on the number of handlers.)

We examine queueing in a separate article, but suffice to say, the retail sequential production queue creates significant wait times for patients. It has been reported that primary non-adherence is as high as 30% depending on how and who defines the term.[5]. Unfortunately, there are not current statistics on this issue and citations are often ten or more years old. Even so, it is not difficult to imagine patients unwilling to wait for or return to the pharmacy for their prescriptions, particularly in underserved communities, and the lack of response by drug store retailers to address the issue.

Diagram B illustrates target counter delivery rate requirements for back-end fixtures and equipment. In this instance, the user has determined that 100% of the counter *potential* can be served with parallel production channels with the indicated delivery rates. All that remains (not to over-simplify) is to find the right process, fixtures, and equipment for the job.



From the perspective of queuing theory, parallel production is similar to increasing the number of servers. This allows for balancing the incoming and outgoing queue rates, a requirement for outpatient pharmacy queue management.

Front-End Equipment

Major drug chains generally ignore front-end handlers. But, as outpatient pharmacy success is a matter of seconds, these handlers are critical to both managing the counter queue and minimizing transaction leakage. First, a handler is necessary to eliminate non-transactional engagements like questions, fill status, arrival for pick-up, and requests to see administrative staff (eg. financial assistance). There are several kiosks that do this job well. In addition, the use of monitors help keep patients informed and redirect their attention to additional services.

Will-call systems are an essential component of counter management. These electronic systems significantly reduce leakage caused by searching for a patient prescription ensuring optimum throughput performance of counter handlers.

Footnote

[1] Vince Lombardi. "Football is a game of inches and inches make the champion."
[2] As a reminder, it is always important to compare fixture and equipment investment to the next best alternative to ensure a correct marginal impact analysis.
[3] There is still a time cost (leakage) for even the highly education and experienced.
[4] Fixtures augmented by locator and inventory systems will reduce leakage to a minimum.
[5] Pharmacy Times, 2014

About the Author

Sabrina Hannigan is a retired Walgreen executive with over three decades of experience in labor, location, layout, and operations. She consulted HURON Healthcare and clients on outpatient pharmacies.

Sabrina recognizes retail models are not transferable to the complex hospital markets. She created outpatient pharmacy business models incorporating methods and processes experienced over 50 years in manufacturing retail, and consulting.

Sabrina envisions hospital-centric solutions improving therapeutic outcome and population health. Towards this end, she continues to develop new processes and methods for outpatient pharmacies.