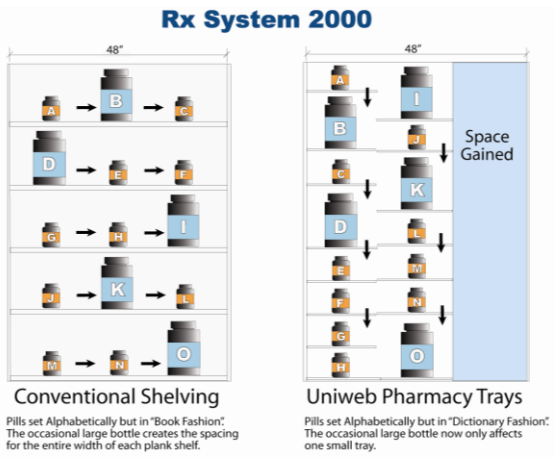
What's the best pharmacy shelving layout?

During my 25-years designing pharmacies I've seen many pharmacy layouts, and many ways of arranging dispensary shelving. I have often wondered what the best layout of pharmacy shelving is, and decided to study the issue from a time and motion perspective.

North American pharmacies have historically used either front shop gondola or traditional 'bay' style shelving but most are moving away from these to the newer high-density shelving options that were pioneered by Uniweb Inc. (Rx System 2000).



The reason most pharmacies are moving to these high-density systems is their ability to fit 33% more product in the same footprint as traditional bay shelving. This is achieved in a number of ways: 1) the shelves are replaced by trays (on slat wall) making them easier to move; 2) the trays are only 16" wide, allowing greater flexibility than traditional bays with their 30, 36 and 48" wide shelves; 3) the smaller width and ease of removal allow the trays to be staggered to fit the largest stock bottle on each 16" tray (see diagram[1]).

Given these benefits we decided to use high density shelving in our analysis – with a total of 30 x 16" units in each layout[2].

Using a detailed drug movement & distribution report from an Ontario, Canada independent pharmacy we analyzed placement of the medications and walking patterns in 7 layouts[3].

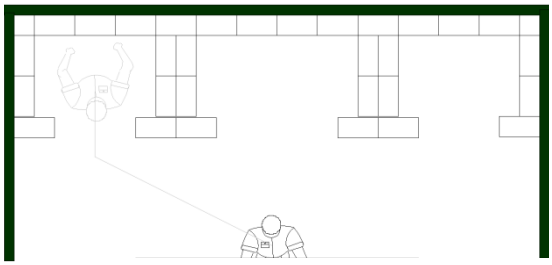


Figure 1: Option B – 9'-10" x 17'-4" (171.9 sq.ft. Traditional with large end caps)

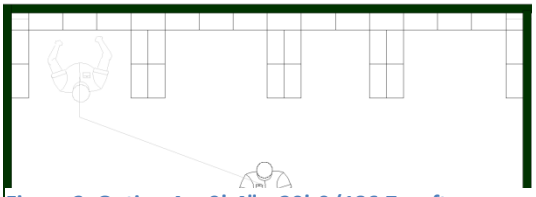


Figure 2: Option A – 9'-4" x 20'-0 (186.7 sq.ft. Traditional layout)

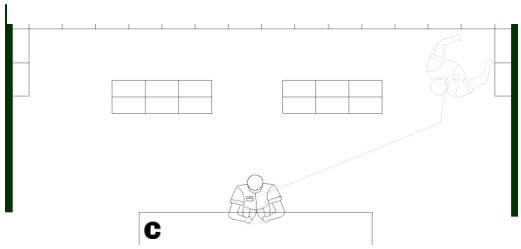


Figure 3: Option C – 10'-0 x 20'-0 (200 sq.ft. Facing bays)

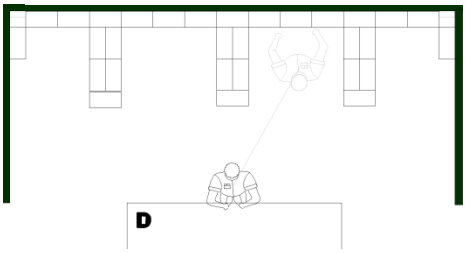


Figure 4: Option D – 10'-0 x 18'-9" (187.5 sq.ft. Traditional with small end caps)

[1] Courtesy Uniweb Inc.
[2] Other benefits of some high density shelving is edging to keep bottles in place, fixtures that are "stand alone" (not needing a substrate), and the ability to have "backless" shelving which improves air circulation and visibility within the pharmacy (reducing shrinkage).
[3] Courtesy Solutions by Design™

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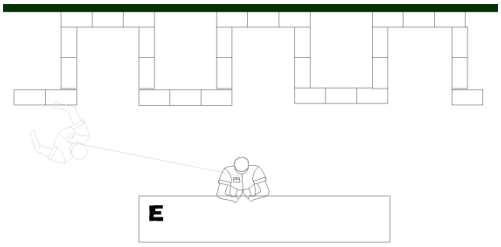

Figure 5: Option E - 9'-10" x 20'-1" (199.2 sq.ft. Reverse bays)

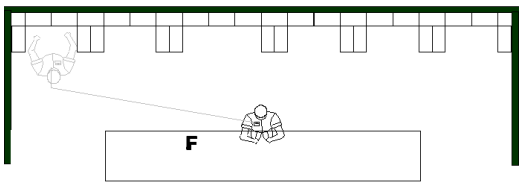

Figure 6: Option F - 8'-3" x 25'-5" (209.7 sq.ft. Shallow bays)

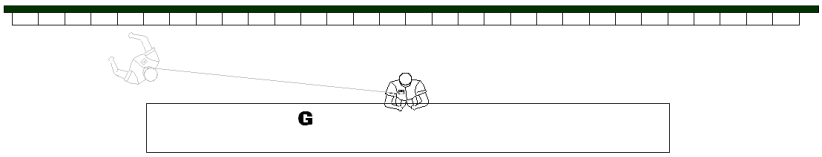

Figure 7: Option G - 6'-7" x 40'-0 (263 sq.ft. Wall only option)

Best use of available space[4]:

The 7 options range from 172 to 263 square feet. The smallest square footage is found in option B which utilizes both a bay style arrangement and large end caps while the largest is option G, using wall shelving only.

Most efficient for filling technicians:

Which layout is most efficient depends on how products are stored in the pharmacy. For the purposes of this study 2 storage methods were analyzed: Alphabetical and by-usage.

Storage method	Description
Alpha non-equal distribution	Assumes all products are located alphabetically throughout the pharmacy. The percentage of Rxs retrieved from each of the 30 shelving units is based on Rx by product distribution obtained from an Ontario-based independent pharmacy.
Usage non-equal distribution	Assumes products are distributed throughout the pharmacy based on their frequency of use, with high volume products as close to the filling tech as possible and lower volume products farther away. The percentage of Rxs retrieved from each of the 30 shelving units is based on Rx by product distribution obtained from an Ontario-based independent pharmacy.

With product arranged in the traditional alphabetical method the most efficient shelving layout is option E which would reduce the annual walking in a 132 Rx/day pharmacy by 13.2 kilometres, providing a 7.2% improvement over the traditional layout (option A). The least efficient layout is option G, adding more than 100 kilometres of walking annually.

[4] All options with 30 units of 16" high-density shelving

It has been argued elsewhere[5] that an alphabetical product arrangement is inefficient, outdated and leads to process errors that in turn may result in medication errors. The alternative is to store products based on their frequency of use, with high volume products located as close to the filling technician(s) as possible and less used products farther away. In addition to improving the efficiency of stock bottle retrieval and replacement this method of storage would separate multiple strengths of the same medication and sound alike drugs, 2 of the most common causes of medication errors.

Using frequency-of-use placement of products results in an increase in efficiency ranging from 33 to 66%. Option G, the least efficient with products placed alphabetically becomes the most efficient once products are placed by frequency of use, reducing annual walking by 87 kilometers a year (over option A-alpha). The least efficient layout using frequency of use is option C.

One other item worth noting is the effect of a change to frequency of use on the overall design. Using the frequency of use increases trips to centrally located shelves and reduces trips to shelves farther removed. Under normal circumstances 30 – 36" between bays is fine, but if the bay in question will be accessed 25 – 40% of the time, by multiple technicians, then the space within will need to be enlarged.

So what's the best layout for pharmacy shelving? It's obviously a complex question with no single correct answer. Layout of the shelving is obviously not the only (or even the most important) aspect of designing a pharmacy and, as an ex-colleague was fond of saying, "every pharmacy is a snowflake"[6]. It is certainly worth paying a premium for high-density shelving given the huge increase in efficiency gains it provides. When planning your next renovation or store opening ask your pharmacy designer to use backless high-density shelving. You will be guaranteed a more efficient and productive pharmacy.

Wayne Morgan Caverly is President, Caverly Consulting Group and its divisions: Efficient Pharmacy Solutions, Solutions by Design, the Efficient Pharmacy Institute and Caverly Management Consulting. Wayne is a contributing author to the recently published Focus On Safe Medication Practices Rantucci M, Stewart I, Stewart C. Lippincott, Williams & Wilkins, Baltimore, MD.

For references, product websites, or additional information please contact wayne@efficientpharmacy.com

[5] For a full explanation of this method of storing products see Caverly WM Improving Efficiencies and Reducing Medication Errors, Part 2 of 4. The Efficient Pharmacy Vol. 3 No. 3. http://www.efficientpharmacy.com/EPI/3-3e.pdf

[6] In memory of Michael Cowley

