The state of the art in large robotic prescription filling machines (start with an empty vial and finish with a labeled vial with the required pills in it) is such that it is not economically justifiable to use them in most retail pharmacies, and even when they are used a 200 cell unit will only aid in dispensing between 50% and 67% of scripts that can be filled by tablet counting. A 100 cell robot will do about 2/3 as many scripts because the drugs are usually picked on a usage basis. Not a negligible feat, but far from complete automation.

In the end, all pharmacies must face doing the script filling completely manually or adding some forms of pharmacy automation to help relieve the physical burden or save time and money. There are many forms of automation and all pharmacies have some form of PMS (Pharmacy Management System) to help with the large clerical burden, and most of these are capable of generating the label packet required for filling a script.

Vial storage and selection is manual, or PMS guided in some cases, but not a problem nor time consuming. The same is true for applying the customer's script label to the vial. The largest area of effort and potential time savings seems to be in the area of getting the correct capsules or tablets into the customers vial.

The process starts with finding the correct supply bottle and delivering it to the pill counting work station. The process ends with returning the supply bottle to its proper location. Organizing the supply bottles to reduce the leg work and search time is usually well worth the effort. In some of the automation systems this chore is reduced by dumping the entire supply bottle contents into a counting cell that is dedicated to this one drug. Instead of finding the supply bottle for each script calling for that drug, it only has to be found when the cell is empty or near empty. Some pharmacies set their most popular drugs in separate cabinets or shelves near the work stations. There are cabinets that can be linked to the PMS and specify or indicate (with lights) where the drug is stored. Time and effort can be saved in this area.

Many of the companies that supply the large robotic machines that use drug cells for the pill counting function also sell what are essentially the same systems without the robot. The robot is replaced by a human, and vial handling and labeling are manual. Scripts can be filled in parallel, but must be picked up in series (one at a time). The same 100 or 200 drug solution (or less).

Now for what many consider to be the meat of the problem, the actual counting of the pills at a work station. Many small to medium size pharmacies are still using a manual counting tray. There are economical alternatives that make sense. Unfortunately, in many of the solutions the

ugly specter of cross contamination appears. The manual counting tray itself requires cleaning to avoid the problem, but it is easily cleaned. Other systems that have enclosed surfaces that the drugs encounter, and use electro optics for counting, require cleaning both to avoid counting mistakes and to avoid cross contamination. Some of these devices are capable of both accurate and speedy pill counting. They cannot count all pills because some have optical properties that prevent proper counting. Their economy depends upon how conscientious the pharmacy is with cleaning.

Counting by weight with qualified prescription scales avoids the cross contamination problem in the same way as the robotic cell counters, namely by counting directly into the customers vial. The technique involves establishing and storing the average piece weight (APW) of each different drug, and, in order to maintain high counting accuracy over time, these APW's should be updated periodically. Time spent in establishing and updating APW information is overhead, just like cleaning is in optical counters. One supplier has greatly reduced this problem by using an algorithm that allows the scale to do the work and completely eliminates manual counting in establishing the APW. The technique is as fast as, or faster, than the electro optic techniques, and is the most economical of pharmacy automation techniques.

There is a new counter on the market that uses optics in conjunction with target recognition algorithms to count pills. It is a cross contaminator like the manual counting tray, but is easy to clean. The operator must be diligent about not allowing pills to sit on top of each other. It claims high accuracy and high speed. . .