In Part 3 of this series we examined where time savings were possible in filling scripts using the manual filling technique as a reference. We had divided the task into 5 sections and estimated times for each section in Parts 1 and 2. Part 3 had a lot of meat in it, where we examined various types of pharmacy automation, but it kind of came out a complicated stew. In Part 4 we will attempt to provide some evaluation tools that tie the series together.

For our evaluations we are going to use the following:

1. t = net time saved per script by adding automation system in seconds.
2. C = capital investment in automation system in $
3. N = number of scripts filled by pill counting in average day
4. H = average fully burdened hourly rate of system operators in $
5. 3600 = number of seconds in one hour
6. 300 = assumed number of days the pharmacy is open per year.

Then [(N * t)/3600] * H = C/300. Please don't let this equation bother you, the first part in brackets is simply the time savings per day in seconds converted to hours, the gets multiplied by the burdened hourly rate to produce the daily savings. This must equal the total capital investment divided the number of days the pharmacy is open (filling scripts) per year. This states that the capital investment is recouped in 1 year (a common goal in capital budgets for equipment like this). This capital must include the cost of any added floor space, interest lost (or paid) because of investment, cost of installation and training, cost of added power, etc.

Example 1. A very large busy Pharmacy. We will try full robotics time savings here. In full robots Item 1 pill counting time savings = 36.9sec, Item 2 fetch/replace supply bottle time savings = 11.6sec, Item 3 deliver to pickup station time savings = 0sec (no reduction), Item 4 fetch vial and label time saving = 6sec, Item 5 pharmacist's inspection time savings = 0sec (no reduction). Total tine savings, t = 54.5 sec per script
Let's try N = 1000 scripts/day (remember must come from most popular 60, or 100, or 200, or 220 drugs, which means total scripts per day is much larger, probably 2000 to 3000), t = 54.5sec, H = $25/hour and calculate the maximum C for one year
[(1000 * 54.5)/3600] * 25 = 378.47 = C/300, C = $113,541.67 (Probably a tight fit for a 100 cell unit)

Example 2. Large busy Ppharmacy. We will try a non-robotic parallel cell pill counter. In this type Item 1. Pill counting time saving is estimated at 22 seconds for one type and 11 seconds for other types, Item 2. fetch/replace supply bottle time savings = 11.6sec, Item 3. deliver to pickup station time savings = 0sec, Item 4. fetch vial and label time savings = 0sec, Item 5. pharmacist's inspection time savings = 0sec. Total time savings t = 33.6sec
Let's try N = 500 scripts/day (same caveat as before, must come from most popular drugs), t = 33.6 seconds (unit must store pre-counted script), H = $25/hour, and see what C can be.
[(500 * 33.6)/3600] *25 = 116.66 = C/300, C = 116.66* 300 = $34,998 (Probably too tight a fit for this type of unit, need a larger value of N)

Example 3. Busy Retail Pharmacy. We are now down to Hopper fed Electro–optical units, Rotating table units, Scale Systems, and Optical Target ID units, all of which only save time in Item 1. Pill counting. Time Savings (t) ranges from about 7 seconds to 23 seconds. We will use 17 seconds (scale system) for our analysis.
Let's try N = 300 scripts/day, t = 17.seconds, H = $25/hour,
[(300 * 17)/3600] * 25 = 35.41 = C/300, C = 35.41 * 300 = $10,625 (Good for a 3 workstation scale system.)
If you substitute t = 23sec (the Target ID system suppliers claim) you get C = $14,375. We have no pricing on that unit.

Example 4. Small Retail Pharmacy. The Scale System is the most economical. Scales count all pills. Let's see if it fits.
Let's try N = 100 scripts per day, t = 17 seconds, H = $25/hour
[(100 * 17)/3600] * 25 = 11.80 = C/300, C = 11.8 * 300 = $3540 (Probably OK for a one workstation scale system).

Use the numbers that best describe your pharmacy and your choice for automation. If your pharmacy can justify the robotic solutions for the most popular drugs, it can almost certainly justify a less expensive solution for the balance of your formulary (that can be counted). The Scale System is a good solution in that it counts all pills, it is a non-cross contaminating solution, is an expandable workstation solution, does drug verification, interfaces to PMS systems, eliminates all manual counting, and is economical and reliable.