

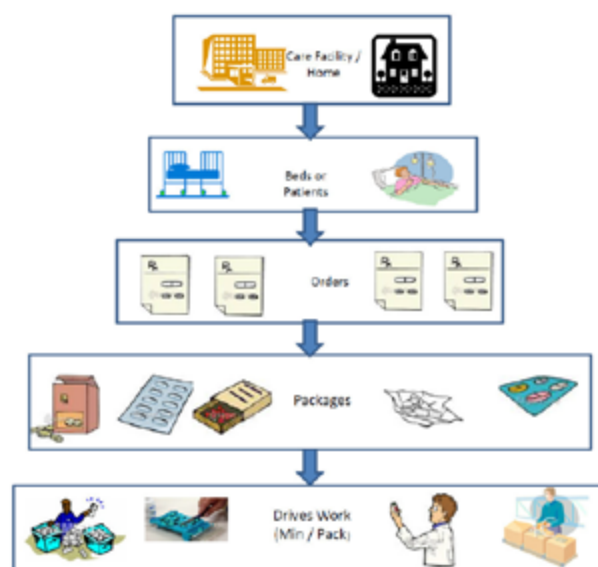
Study Purpose & Content

By 2013, health reform regulation will establish uniform requirements for the long term care (LTC) pharmacy market to dispense shorter cycle medication prescriptions in an attempt to reduce patient waste associated with 30-day cycle fills. There has been much debate in the market of determining these requirements based upon limited information and data. In 2010, a six-month industrial engineering pilot study was conducted in 12 pharmacies across the United States that dispense oral solids in different refill cycles and packaging formats including bingo cards, unit-dose boxes, multi-dose reusable cards, unit-dose reusable cassettes, and unit-dose and multi-dose automation strips. This study measured the average pharmacy's patient costs including materials, labor, administration, and waste across the different packaging formats.

Study Methodology & Scope

Twelve independent pharmacies with various packaging formats and refill periods participated in this study, servicing an average of 3,945 beds (range: 1,500 to 9,500 beds). The study started with a discovery stage that included a minimum three-day period of interview conduction and data collection. Data was obtained from several areas including time studies, physical inventories, and participant feedback related to the cost of materials, labor, and waste. In the case of labor, costs were further broken down into subcategories such as packaging, picking, checking, packing, returns processing, automation support. The study also measured the labor elements identified within the pharmacy, but excluded the work elements such as order entry, non-oral solid fills, emergency kits, delivery, and labor performed at the LTC facility. The results presented in this document reflect an average cost per packaging format based upon the participating pharmacies.

In identifying cost drivers, the market generally utilizes broad variables such as the number of LTC facilities and beds in order to estimate the workload at a LTC pharmacy. This study has identified that the number of packages a pharmacy fills is a better measure of the workload (in measuring dispensing costs) than the number of LTC facilities and beds it serves. The above diagram represents the study methodology. These costs



were calculated using the required number of oral solid packages per patient, the average pill cost, returns, and unburdened labor costs per hour for technicians and pharmacists. To compare costs accurately for the different packaging formats, the study normalized the data to a 30-day period for comparison purposes.

Study Results

The total number of packages needed for each patient per month drives the pharmacy's labor and packaging material costs. Currently, an average LTC patient is administered 10 oral solid medications, which equates to an average of 468 pills per month (Table 1).

This study found that the 30-day cycle created the most waste and pharmacy returns as compared to the shorter cycle formats. Longer cycle formats (Multi-Dose Reusable Cards, Unit-Dose Boxes, and Bingo Cards) overproduce the patient's requirements by an average of 46 out of a total of 514 pills dispensed per month. Short dispense cycle packaging formats have the most significant impact on waste reduction, are better suited to accommodate change, and deliver pills that are closer to the patient's needs. Note the difference between the pills dispensed and the number of pills actually taken included medications that were returned to stock and/or destroyed.

Table 1: Pharmacy Production Costs

Pharmacy Production Cost	Multi-Dose Reusable Card	Unit-Dose Box	Bingo Card	Unit-Dose Reusable Cassette	Unit-Dose Strip	Multi-Dose Strip
Cycle	28 Days	30 Days	30 Days	14 Days	<=7 Days	<=7 Days
Average # oral solid medications per patient	10	10	10	10	10	10
Average # pills dispensed per patient/month	514	514	514	491	479	470
Average # pills administered per patient/month	468	468	468	468	468	468
Average # packages/month/patient (cards, boxes, cassettes, bags)	7.3	13.2	17.1	33.4	444.6	230.0
Labor cost/patient/month	\$20.34	\$12.36	\$12.07	\$21.71	\$6.33	\$4.37
Packaging cost/patient/month	\$9.67	\$4.15	\$3.38	\$5.09	\$7.25	\$5.48
Total production cost/patient/month	\$30.01	\$16.51	\$15.45	\$26.81	\$13.58	\$9.85

The pharmacy production costs findings support the following assessment:

- Labor Costs:
 - Multi-Dose Reusable Cards and Unit-Dose Reusable Cassettes were the highest costing.
 - Unit-Dose Strips and Multi-Dose Strips were the lowest costing.
- Packaging Costs:
 - Multi-Dose Reusable Cards and Unit-Dose Strips were the highest costing.

- Bingo Cards and Unit-Dose Box were the lowest costing.

Adding the labor and packaging costs, the pharmacy production costs can be established as:

- Total Production Costs:
 - Multi-Dose Reusable Cards and Unit-Dose Reusable Cassettes were the highest costing.
 - Unit-Dose Strips and Multi-Dose Strips were the lowest costing.

In Table 2, waste cost included the ingredient cost of the destroyed medication and the associated average third party incineration. From these calculations, the destruction of the patient's medication ranged from five to 24 pills per month.

Table 2: Waste Costs

Waste Destruction Cost	Multi-Dose Reusable Card	Unit-Dose Box	Bingo Card	Unit-Dose Reusable Cassette	Unit-Dose Strip	Multi-Dose Strip
Refill Cycle	28 Days	30 Days	30 Days	14 Days	<=7 Days	<=7 Days
Average # pills-Destruction/patient/month	24	24	24	13	5	5
Medication destruction/patient/month	\$32.69	\$32.69	\$32.69	\$17.39	\$6.86	\$6.86
Incineration cost/patient/month	.17¢	.17¢	.17¢	.09¢	.03¢	.03¢
Waste cost/patient/month	\$32.86	\$32.86	\$32.86	\$17.48	\$6.90	\$6.90

Table 2 shows that the 30-day cycles created more waste than the shorter cycles. It can be assessed that the shorter cycles and not the packaging format created a more efficient system that eliminates unneeded packaged medications due to changes in the prescription.

In Table 3, a summary of the patient’s costs per month are broken down into 1) pharmacy production plus waste cost and 2) total pharmacy patient cost. The pharmacy patient cost per month is the sum of the production, waste, and administered ingredient costs.

Table 3: Pharmacy Patient Costs

Pharmacy Patient Cost Per Month	Multi-Dose Reusable Card	Unit-Dose Box	Bingo Card	Unit-Dose Reusable Cassette	Unit-Dose Strip	Multi-Dose Strip
Production Cost (Packaging & labor)	\$30.01	\$16.51	\$15.45	\$26.81	\$13.58	\$9.85
Waste cost (Medication & destruction)	\$32.86	\$32.86	\$32.86	\$17.48	\$6.90	\$6.90
Pharmacy production cost & waste cost	\$62.87	\$49.37	\$48.31	\$44.29	\$20.48	\$16.75
Patient consumed medication ingredient cost**	\$644.34	\$644.34	\$644.34	\$644.34	\$644.34	\$644.34
Pharmacy patient cost per month	\$707.21	\$693.71	\$692.65	\$688.63	\$664.82	\$661.09

+Note, some smaller costs were not included in this analysis. The cost of automation equipment and the overhead/indirect costs associated with the more labor-intense packaging approaches were excluded from this analysis.

The pharmacy patient cost data supports the following conclusions:

- Multi-Dose Reusable Cards have the highest production and total pharmacy cost per month.
- Multi-Dose Strips have the lowest production and total pharmacy cost per month.

This study measures and compares different pharmacy packaging formats by benchmarking their component costs and can serve as a reference for evaluating the operational and waste impact issues of short and long dispense cycles. One can see from this study that the limited pharmacy prescription costs significantly contribute to the overall long-term-care patient cost. Regardless of the upcoming uniform regulations, pharmacy owners and managers should continually evaluate medication packaging options that will give them a market advantage, mitigate ecological affects, and lowering patient costs.

***\$1.38 ingredient cost / pill was derived from "MHA Independent Long Term Care Member Study", 2010 and NetRx reference.*