



ARTICLE

# COST ANALYSIS FOR AUTOMATING THE SINGLE DOSE BLISTER FILLING PROCESS

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## EXECUTIVE SUMMARY

### Purpose

To explore potential labour and cost savings in a pharmacy operation providing medication management to long term care facilities by switching from manual filling and sealing of blister cards to a semi-automated unit dose machine producing blister inserts.

### Summary

The provision of medication management systems to long term care facilities is a common and profitable business activity with many Canadian pharmacies. Recently in an effort to become more efficient

and reduce costs, many pharmacies are expanding their services to a larger number of homes to create economies of scale, while exploring methods of reducing labour costs. One area of interest is in automating the labour intensive production of blister cards which can be a limiting factor when expanding the pharmacy's customer base. Manrex Limited has worked closely with Pentapack, a leading European supplier of pharmaceutical packaging machines to the drug industry, to develop a unit dose, semi-automated blister filler that will significantly reduce the la-

bour involved in the filling, sealing and labelling of blister cards. The final blister product is designed to fit with the Manrex, environmentally friendly, colour coded, plastic reusable card system.

### Conclusion

Any pharmacy using single dose blister cards with a client base over 1,000 beds should consider the BP500 automated blister filling machine used in conjunction with the plastic reusable unit dose carded system as an effective means of reducing labour and materials costs when providing for their nursing home customers.

## Canadian Experience

Based on several time analyses performed at larger Manrex customers manually filling 35 unit dose blister cards, it is apparent that pharmacies providing services to nursing homes can benefit from automation if they have sufficient volume to warrant the higher speed of automated packaging machinery.

Using actual Canadian pharmacy data, the typical nursing home patient will be receiving anywhere from 6.2 oral solid prescriptions, administered on a B.I.D or twice daily regimen up to 8.4 oral solid prescriptions, also on a B.I.D. regimen. To err on the side of caution in this cost analysis, we have chosen to use the more conservative number of 6.2 prescriptions per

INSIDE THIS ISSUE:	
CANADIAN EXPERIENCE	1
LABOUR & MATERIAL COSTS IN A MANUAL FILL BLISTER SYSTEM	2
NEW AUTOMATION	2
LABOUR & MATERIAL COSTS IN AN AUTOMATED FILL BLISTER SYSTEM	3
ANNUAL TECHNICIAN SALARY	3
COST COMPARISON BETWEEN MANUAL & AUTOMATED SYSTEMS	3
CONCLUSION	4



Figure 1  
Manual Filling of  
Blister Cards



Figure 2  
Manual Heat Sealer

“...THE TOTAL COST PER MANUALLY FILLED 35 DOSE CARD INCLUDING MATERIALS AND LABOUR TO \$.73 PER CARD OR \$.02 PER DOSE.”

month for our calculation. Under a blister card system, this would require 12.4 blister cards per patient per month.

Data from a variety of long term care pharmacies indicates that an average time of 1.5 minutes is required to manually fill and label a unit dose blister card (average of 35 doses). This task involved the picking of a blister card, the picking of the blister insert, the filling of each of the individual blisters and sealing the card (normally in a heat sealer press which allows the sealing of two cards at one time) and finally labelling the final product (Figures 1 & 2). The average number of cards produced per hour is 40 and over a 7.5 hour day a total of 300 cards can be produced by a single technician (this does not take into account any work breaks). If a month is considered 20 working days, then the average tech produces a maximum of 6,000 cards a month.

**Labour & Material Costs  
in a Manual Fill Blister System**

If a Canadian average of \$12.00 per hour is used for a pharmacy technician, plus an additional 20% added on for benefits, then a technician could fill 40 blister cards per hour at a cost of \$.36 in labour per card (\$12.00 x 1.2 divided by 40). The typical cost for a blister card, a blister and a Med ID label is \$.3643 each. This brings the total cost per manually filled 35 dose card including materials and labour to \$.73 per card or \$.02 per dose (\$.7243 divided by 35 doses). (Figure 3)

This brings the total cost per patient per month for a cardboard blister card system (excluding cost of drug, but including labour and materials) to \$8.98 (\$.7243 x 12.4 cards = \$8.98).

For a pharmacy servicing the following number of beds the appropriate costs for the preparation of 35 dose blister cards, including material costs and technician labour costs **per month** including would be as follows:

Beds	Total Cards	Total Cost	# of Techs Needed
1,000	12,400	\$8,980	2.06
2,000	24,800	\$17,960	4.1
3,000	37,200	\$26,940	6.2
4,000	49,600	\$35,920	8.2
5,000	62,000	\$44,900	10.33

The pharmacist labour involved in checking is not included in this analysis as the resulting blister cards, whether filled manually or by robot, result in the same end product and therefore will require the same checking process and corresponding time. **Pharmacy labour in checking blister cards is significantly lower than checking multi-dose pouches or multi-dose blisters**, but this information will be considered in a comparison between costs of blister cards versus automated strip packaging in a future analysis.

**New Automation**

Manrex has worked with Pentapack of Belgium to develop a blister filling machine to automate the process of unit dose filling of blisters and foils. (Figure 4)

The machine can be configured to fill our Plastic Reusable 35 slant CDS card, or our 28 day format blister. The unit can be quickly and easily modified by switching the forming station from one plate to the other. These plates can also be sized and changed according to the size of tab-



Figure 3  
Popular 35 Dose  
Blister Card

let or capsule being packaged or even configured to package liquids. (Figure 5)

The unit will form the blister, provide an area for the filling of the blister, label the foil with the drug and pharmacy information, apply the foil to the blister and then cut and separate each blister ready for dispensing. These filled inserts are ready to be placed in the plastic reusable colour coded Manrex cards. (Figures 6)

**Labour & Material Costs in an Automated Fill Blister System**

If we now review the costs of production for the automated blister filling machine, operated by a single technician our costs are as follows:

- 5 blisters per minute or 300 cards per hour
- \$14.40 per hour divided by 300 cards = \$.048 labour per card
- Foil and Blister Printed and Sealed = \$.18 per blister
- Total Cost for the resulting blister = \$.228

This brings the total cost per patient per month for a blister card system filled using automation (excluding cost of drug, but including labour and materials) to \$2.83 (\$0.228 x 12.4 cards = \$2.83).

As a result, the total cost per 35 dose card filled by automation including materials and labour to \$.23 per card or \$.006 per dose.

The average number of cards produced per hour is 300 and over a 7.5 hour day a total of 2,250 cards can be produced. If a **month** is considered 20 working days, then the average tech produces a maximum of 45,000 cards a month.

**Annual Technician’s Salary**

\$14.40 per hour x 7.5 hr day x 10 days x 26 pay periods per year = \$28,080 annual cost per tech per year.

Beds	Total Cards	Total Cost	# of Techs Needed
1,000	12,400	\$2,830	1
2,000	24,800	\$5,660	1
3,000	37,200	\$8,490	1
4,000	49,600	\$11,320	1.1
5,000	62,000	\$14,150	1.37

Using a single pharmacy technician, the BP500 machine would allow a pharmacy to service up to 4,000 beds more cost effectively than a manual system. Should the pharmacy exceed 4,000 beds, then an additional packaging shift, which would require a second technician, could be added or the pharmacy could add another blister filling machine and an additional technician allowing the growth up to an additional 4,000 beds.

**Cost Comparison Between Manual & Automated Systems**

If we consider the costs over a full year, the manual fill would cost the pharmacy \$431,040 for packaging materials and the labour of 8 technicians to fill the blisters required for 4,000 beds, while the automated system would require only a single technician and cost \$135,840 in labour and materials for a net savings of \$295,200 over the course of the year.

Given the cost of the Blister Filling Machine at \$279,000, if a pharmacy is servicing between 1,000 to 4,000 beds, the cost of automation is covered within a time frame of 1 year (4,000 beds) to 4 years (1,000 beds) without considering any costs associated with down time due to vacation and/or illness on the part of the pharmacy technician.



Figure 4 Pentapack BP500

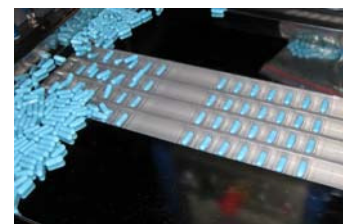


Figure 5 Filling Station

“...THE TOTAL COST PER 35 DOSE CARD FILLED BY AUTOMATION INCLUDING MATERIALS AND LABOUR TO \$.23 PER CARD OR \$.006 PER DOSE.”



Figure 6 Plastic Reusable Blister Card Shown with BP500 Insert

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### Conclusion

Any pharmacy using single dose blister cards with a client base over 1,000 beds should consider the BP500 automated blister filling machine used in conjunction with the plastic reusable unit dose carded system as an effective means of reducing labour and materials costs when providing for their nursing home customers.

By automating the filling process and employing the reusable plastic cards, the pharmacist can significantly reduce their costs in materials and labour up to \$295,000 annually and make the provision of blister card systems to a larger volume of nursing homes more profitable.

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