

# An Efficiency Analysis of the Kirby Lester KL16df Automatic Tablet and Capsule Counting System



## EXECUTIVE SUMMARY



The Thomsen*Group* Inc.

## INTRODUCTION

The purpose of this study was to compare the efficiency of the Kirby Lester KL16df tablet and capsule counting system to filling prescriptions manually. Three pharmacies, an independent, a chain and a hospital outpatient, were selected for this project. At each site we observed and recorded all pharmacy related activities for 5 days before the KL16df was installed and for 5 days after the KL16df was installed.

The study showed that each pharmacy reduced filling times, ranging from 32% to 48%, after the KL16df automatic tablet and capsule counting system was installed.

The KL16df did not affect prescription volume, but additional personnel were not needed to cope with increases in prescription volume due to seasonal variation. The KL16df provided an increase in prescription filling capacity that ranged from 3% to 16%.

Pharmacists at each site noted that the KL16df brought a higher level of confidence to the filling process because of its counting accuracy and the utilization of bar code scanning and onscreen drug images.

Pharmacists indicated that after the KL16df was installed they spent less time filling prescriptions and more time performing prescription inspections and verifications and patient counseling sessions.

## DEFINITIONS

For the purpose of this study the term "filling" included:

- Retrieving script label
- Reviewing script label
- Traveling to drug storage area
- Obtaining drug
- Traveling back to filling counter
- Counting the oral solid dose prescriptions, tablets or capsules, as follows:
  - Use a counting tray before installing the KL16df
  - Use the KL16df after installing the KL16df
- Obtaining vial
- Pouring tablets or capsules into vial (vial is capped after verification)
- Changing oral liquid bottle with secured cap if needed
- Recording drug lot number and expiration date
- Attaching label to filled prescription
- Placing filled prescription and paperwork into appropriate bin
- Placing bin and filled prescription in the prescription inspection or verification area
- Returning (or discarding if empty) stock bottle to shelf

For the purpose of this study the “inspection or verification” started when the pharmacist retrieved the prescription from the “prescriptions to be checked” bin and included:

- Checking the name, quantity, strength and dosage form of the drug on the patient label
- Visually inspecting the prescription as follows:
  - Visually, only, before installing the KL16df
  - Visually comparing with an onscreen image on the KL16df, after installing the KL16df
- Placing cap on vial
- Checking expiration dates
- Reviewing the patient profile
- Attaching auxiliary labels to prescription label
- Correcting problems when found
- Signing the inspection log and attaching a log sticker in the prescription file
- Filing documents
- Organizing or collating prescriptions into groups
- Placing verified prescriptions into the will call sorting area

# INDEPENDENT PHARMACY

Crestville Drugs  
 2446 Anderson Road  
 Crescent Springs, KY 41017



The table below lists the daily prescription volumes before and after installing the KL16df automatic tablet and capsule counting system. The change in dispensing level was due to seasonal variation. Whereas automation did not affect prescription volume, additional personnel were not needed to cope with the change.

Before installing the KL16df	After installing the KL16df
Five day Test - August 2003	Five day Test - December 2003
Total Prescription Volume - 1,168	Total Prescription Volume - 1,268
Average Daily Volume - 233.6 prescriptions	Average Daily Volume - 257.2 prescriptions

Tables A & B show each stage of the preparation and filling cycle with the total and average time per prescription, expressed in minutes, to complete each stage before and after the KL16df was installed.

## A. Before installing the KL16df

Activity	Total minutes	Avg. minutes per RX
Receiving RX	436	0.373
Order Entry	2,133	1.826
Filling	3,108	2.723
Compounding	274	0.235
Inspection/Verification	1,382	1.183
Packaging/Storing	908	0.777
Dispensing/Billing	1,044	0.894
Total	9,357	8.011

## B. After installing the KL16df

Activity	Total minutes	Avg. minutes per RX
Receiving RX	489	0.380
Order Entry	2,366	1.840
Filling	1,816	1.412
Compounding	309	0.240
Inspection/Verification	1,517	1.180
Packaging/Storing	1,003	0.780
Dispensing/Billing	1,171	0.911
Total	8,671	6.743

Crestville Drugs realized a reduction in filling time of 1.311 minutes per prescription after installing the KL16df automatic tablet and capsule counting system. Table C compares before and after results:

**C. Before and After Comparison (in minutes)**

Activity	Before KL16df installed	After KL16df installed
Receiving	0.373	0.380
Order Entry	1.826	1.840
Filling	2.723	1.412
Compounding	0.235	0.240
Inspection/Verification	1.183	1.180
Packaging/Storing	0.777	0.780
Dispensing/Billing	0.894	0.911
Total	8.011	6.743

# LARGE CHAIN PHARMACY

Northern Kentucky



The table below lists the daily prescription volumes before and after installing the KL16df automatic tablet and capsule counting system. The change in dispensing level was due to seasonal variation. Whereas automation did not affect prescription volume, additional personnel were not needed to cope with the change.

Before installing the KL16df	After installing the KL16df
Five day Test - August 2003	Five day Test - November 2003
Total Prescription Volume - 1,572	Total Prescription Volume - 2,027
Average Daily Volume - 314.4 prescriptions	Average Daily Volume - 405.4 prescriptions

Tables A & B show each stage of the preparation and filling cycle with the total and average time per prescription, expressed in minutes, to complete each stage before and after the KL16df was installed.

## A. Before installing the KL16df

Activity	Total minutes	Avg. minutes per RX
Receiving RX	895	0.569
Order Entry	2,568	1.634
Filling	4,051	2.577
Compounding	243	0.155
Inspection/Verification	2,081	1.324
Packaging/Storing	1,168	0.743
Dispensing/Billing	1,759	1.119
Total	12,765	8.120

## B. After installing the KL16df

Activity	Total minutes	Avg. minutes per RX
Receiving RX	1,157	0.571
Order Entry	3,314	1.635
Filling	3,301	1.628
Compounding	315	0.155
Inspection/Verification	2,684	1.324
Packaging/Storing	1,509	0.745
Dispensing/Billing	2,270	1.120
Total	14,550	7.178

The Chain Pharmacy realized a reduction in filling time of 0.949 minutes per prescription after installing the KL16df automatic tablet and capsule counting system. Table C compares before and after results:

**C. Before and After Comparison (in minutes)**

Activity	Before installing KL16df	After installing KL16df
Receiving RX	0.569	0.571
Order Entry	1.634	1.635
Filling	2.577	1.628
Compounding	0.155	0.155
Inspection/Verification	1.324	1.324
Packaging/Storing	0.743	0.745
Dispensing/Billing	1.119	1.120
Total	8.120	7.178

## HOSPITAL OUTPATIENT PHARMACY

Cincinnati Children's Hospital  
3333 Burnet Avenue  
Cincinnati, OH 45229



The table below lists the daily prescription volumes before and after installing the KL16df automatic tablet and capsule counting system. The hospital outpatient pharmacy was not affected by seasonal variations and their daily prescription volume remained about the same.

Before installing the KL16df	After installing the KL16df
Five day Test - July 2003	Five day Test - January 2004
Total Prescription Volume - 781	Total Prescription Volume - 775
Average Daily Volume - 156.2 prescriptions	Average Daily Volume - 155.0 prescriptions

Tables A & B show each stage of the preparation and filling cycle with the total and average time per prescription, expressed in minutes, to complete each stage before and after the KL16df was installed.

### A. Before installing the KL16df

Activity Categories	Total minutes	Avg. minutes per RX
Receiving RX	798	1.022
Order Entry	1,511	1.937
Filling	1,927	2.467
Compounding	975	1.248
Inspection/Verification	583	0.746
Packaging/Storing	271	0.347
Dispensing/Billing	668	0.855
Total	6,733	8.620

### B. After installing the KL16df

Activity Categories	Total minutes	Avg. minutes per Rx
Receiving RX	816	1.053
Order Entry	1,508	1.946
Filling	1,310	1.690
Compounding	1,247	1.609
Inspection/Verification	620	0.800
Packaging/Storing	291	0.374
Dispensing/Billing	693	0.894
Total	6,485	8.368

The Cincinnati Children's Outpatient Pharmacy realized a reduction in filling time of 0.777 minutes per prescription after installing the KL16df automatic tablet and capsule counting system. Table C compares before and after results:

**C. Before and After Comparison (in minutes)**

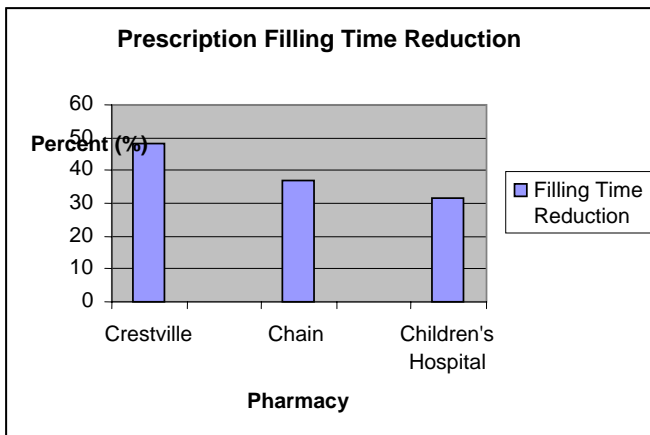
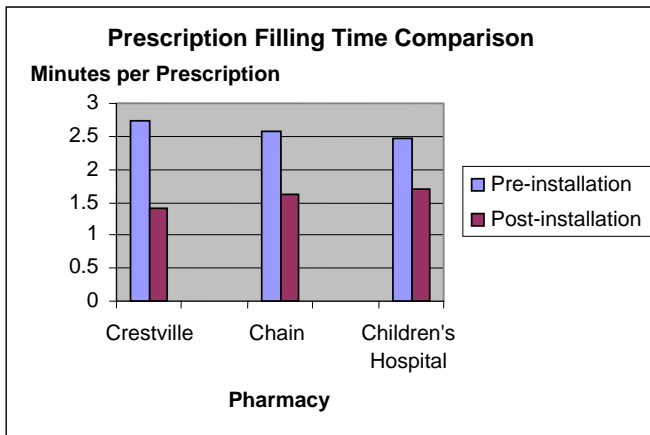
Activity Categories	Before installing KL16df	After installing KL16df
Receiving RX	1.022	1.053
Order Entry	1.935	1.946
Filling	2.467	1.690
Compounding	1.248	1.609
Inspection/Verification	0.746	0.800
Packaging/Storing	0.347	0.375
Dispensing/Billing	0.855	0.894
Total	8.620	8.367

# CONCLUSION

## Filling Time

All three pharmacies reduced filling times after the KL16df automatic tablet and capsule counting system was installed:

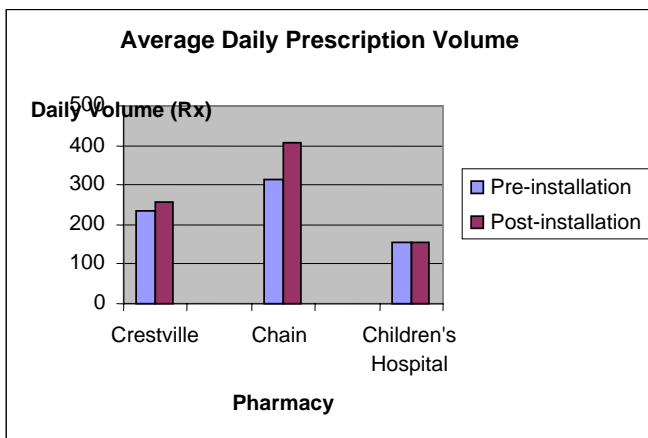
- Crestville Drugs reduced prescription filling time by 1.311 minutes or about 48%.
- The Chain Pharmacy reduced prescription filling time by 0.949 minutes or about 37%.
- The Children's Hospital Outpatient Pharmacy reduced prescription filling time by 0.777 minutes or about 32%.



## Prescription Volume

Automation did not affect the changes in prescription volume, but additional personnel were not needed to cope when there was an increase in the daily volume due to seasonal variation.

- Crestville Drugs filled 233 prescriptions per day before the KL16df was installed and 257 prescriptions per day after the KL16df was installed.
- The chain pharmacy filled 314 prescriptions per day before the KL16df was installed and 405 prescriptions per day after the KL16df was installed.
- The Children's Hospital Outpatient Pharmacy was not affected by seasonal variations and did not experience significant changes in prescription volume. They filled an average of 156 prescriptions per day before the KL16df was installed and 155 prescriptions per day after the KL16df was installed.



## Prescription Filling Capacity

Each pharmacy reduced their filling times after the KL16df was installed and, whereas automation did not affect prescription volume, additional personnel were not needed to cope with increases in prescription volume. This would indicate that the KL16df provided an increase in prescription filling capacity.

Prescription filling capacity is defined as the number of prescriptions that can be completed by each person in the pharmacy, during a normal 8 hour (480 minute) workday.

Prescription filling capacity differs from one type of pharmacy to the next and is illustrated for each site as follows:

<b>Crestville Drugs</b>	Before installing the KL16df	After installing the KL16df
Total average time to complete and dispense a prescription - in minutes	8.011	6.743
Prescription Filling Capacity - in prescriptions	59.918 Rx per person, per day	71.185 Rx per person, per day

Additional Prescription Filling Capacity per person - in prescriptions	+11.267 Rx per day
Additional Prescription Filling Capacity per person - percentage	+15.8%

<b>Chain Pharmacy</b>	Before installing the KL16df	After installing the KL16df
Total average time to complete and dispense a prescription - in minutes	8.120	7.178
Prescription Filling Capacity - in prescriptions	59.113 Rx per person, per day	66.871 Rx per person, per day

Additional Prescription Filling Capacity per person - in prescriptions	+7.758 Rx per day
Additional Prescription Filling Capacity per person - percentage	+11.6%

<b>The Children's Hospital Outpatient Pharmacy</b>	Before installing the KL16df	After installing the KL16df
Total average time to complete and dispense a prescription - in minutes	8.620	8.367
Prescription Filling Capacity - in prescriptions	55.684 Rx per person, per day	57.368 Rx per person, per day

Additional Prescription Filling Capacity per person - in prescriptions	+1.684 Rx per day
Additional Prescription Filling Capacity per person - percentage	+2.9%

## Prescription Inspection and Verification

Pharmacists at each site noted that the KL16df brought a higher level of confidence to the filling process because of its counting accuracy and the utilization of bar code scanning and onscreen drug images.

Pharmacists at each pharmacy spent less time filling prescriptions after the KL16df was installed. This extra free time allowed the pharmacist to perform a greater number of prescription inspections and verifications and patient counseling sessions.

Other studies have also noted that prescription inspection or verification activity generally increases when automated counting or prescription dispensing systems are installed and utilized in community and outpatient pharmacies.

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