

PROGRESS REPORT --

PHARMACY STUDY

371 - 67

AUTHOR: C. McCOLLUM



COMMUNITY SYSTEMS FOUNDATION

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TO : Sister Carlos McDonnell,
Administrator

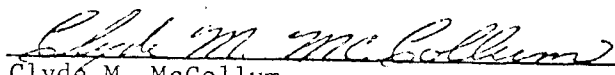
FROM : Clyde McCollum,
Project Director, Community Systems Foundation

SUBJECT: Pharmacy Study

At your request, a report on progress made thus far in the Pharmacy has been completed. The following report presents a summary of the author's findings in two of three areas of concentration, and recommends changes in operating procedures and staffing which are expected to improve the quality and efficiency of pharmacy services.

Cooperation and participation received from members of the pharmacy staff has been excellent. In particular, I wish to commend the assistance received from Mr. Dave Richards, Chief Pharmacist, and also a recent addition to the pharmacy staff, Mr. Dean McKean, Pharmacist.

Respectfully submitted,


Clyde M. McCollum
Project Director

cc: Robert Cannon, Controller
George Foss, Assistant Administrator

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TABLE OF CONTENTS

Review of Objectives

I. Prepackaging of High Volume Regular Drugs

A. Present System

B. Staffing Requirements for Prepackaging

II. Pickup and Delivery of Regular Drug Orders

A. Present System

B. Need For Improved Messenger Service,

C. Estimated Floor Unit Demands On Pharmacy

D. Pharmacy Controlled Pickup and Delivery Service of
Regular Drug Orders

III. Conclusion and Recommendations

Appendix

REVIEW OF OBJECTIVES

Referring to the author's memo of June 1, 1967, to Mr. George Foss, Assistant Administrator, it was agreed between Mr. Foss and myself that immediate concentration should begin towards improvement in three areas. These areas and the objectives formed are set forth below:

- A. A system proposal for the prepackaging of high volume regular drugs.
- B. A system proposal for the delivery of narcotics to the floor units on a standard basis.
- C. A proposal for improvement of the present messenger service involving pick-up and delivery of regular drug orders.

Progress made in A and C thus far has been documented and laid forth in the following pages. For the lack of sufficient data, progress made in area B will not be made at this time.

I. PREPACKAGING OF HIGH VOLUME REGULAR DRUGS

A. Present System.

The present method of filling regular drug orders in the pharmacy is entirely free of prepackaging techniques. Each prescription is filled at the time the request is interpreted by the pharmacist.

The general procedure followed in filling an order is -

- Interpret the order
- Pull the stock bottle from a shelf
- Get a container
- Count tablets or capsules into container one by one
- Type and attach label
- Check filled order against request
- Price
- Return stock bottle to shelf

Only the pharmacist is involved in the filling of a patient order. At the present, the pharmacy staff is comprised of 6.85 equivalent full time pharmacists, one full time pharmacy helper, and one part time clerk (8-16 hrs/wk). The helper assists in making pharmacy stock solutions, runs errands, and performs general clean up duties. The clerk stocks shelves, packs return drugs, separates and packs clinic samples, and performs other miscellaneous duties.

From a modern technique standpoint, it is readily apparent that the

above system is in need of improvement. In today's modern hospital pharmacy, trained clerks and helpers, under the supervision of the pharmacist, are being used to perform many of the simple and stereotyped tasks involved in the filling of a patient's orders. Among the more important results to be obtained in the transfer of these tasks (from a pharmacist to a non-professional trainee) are -

- Reduction in operating costs
- Increase in speed of distribution
- Reduction in medication errors
- More time for the pharmacist to perform more professional duties

One of the more popular systems being inserted by hospital pharmacies to quickly realize the benefits of the above mentioned results, is a program involving the prepackaging of high volume regular drugs.

The decision to investigate prepackaging and its effects was then made, the first step being staffing requirements.

B. Staffing Requirements for Prepackaging.

The approach taken to estimate staffing requirements was (a) obtain a proposed list of items to be prepackaged, along with shelf standards, weekly requirements, and unit package sizes, and (b) apply input volumes and methods (current and proposed) to a proven "Hospital Pharmacy Staffing Methodology Manual"¹. The proposed list of items to be prepackaged may be seen in Appendix A. This list was derived from visits made to hospitals with prepackaging systems, and from St. Vincent's Pharmacy records. The above mentioned methodology manual is based on information extracted and compiled from many hospitals throughout the nation, and has been proven to be extremely accurate for estimating staffing requirements for various pharmacy systems. The sequence used and results obtained from the manual are as follows:

1. Estimated Man-hours Required For Prepackaging Regular Drugs - Results only will be shown in this section, refer to Appendix B, section I, for calculations, various methods of prepackaging available, elemental times, volumes used, and definitions.

¹Hospital Staffing Methodology Manual MM-1 Pharmacy, Bartscht, Karl G., Hospital Systems Research, ISRL, Dept. of Industrial Engineering, West Engineering Bldg., Room 231, University of Michigan, Ann Arbor, Michigan 48104, PP 22-26, 68-72.

a) Tablets, Pills, Capsules

	<u>Method 1</u>	<u>Method 2</u>	<u>Method 3</u>
Total man-hr/wk required with PFD* allowance factor included	85.92	74.79	78.06

b) Liquids

	<u>Method 1</u>	<u>Method 2</u>	<u>Method 3</u>
Total man-hr/wk required with PFD allowance factor included	7.55	7.55	7.55

c) Total estimated man-hr/wk required for prepackaging of tablets, pills, capsules and liquids

	<u>93.47</u>	<u>82.34</u>	<u>85.61</u>
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2. Estimated Pharmacist Time Currently Spent on Items to be Prepackaged - Results only will be shown in this section, refer to Appendix B, section II for details.

a) Label preparation time - - - - - 5,784.79 man-min/wk

b) Drug collection time - - - - - 549.26 man-min/wk

Total 6,424.05 man-min/wk

c) Total pharmacist time including PFD allowance factor - - - - - 7,516.14 man-min/wk

or 125.27 man^{11/5}-min/wk

3. Estimated Pharmacist Time Required for Checking Prepackaged Items - 3.13 man-hr/wk (Appendix B, section III)

4. Estimated Pharmacist Time Required for Labeling of Prepackaged Drugs - 76.33 man-hr/wk (Appendix B, section IV)

*Personal, fatigue, and delay allowances

5. Results

	Man-hr/wk			
	<u>Pharmacist</u>	<u>Clerk</u>		
		Method 1	Method 2	Method 3
a) Present man-hr requirements/wk for processing of items proposed for prepackaging	125.27	-	-	-
b) Man-hr requirements for prepackaging				
1. Prepackaging clerks	-	93.47	82.34	85.61
2. Checking of pre-packaged items	3.13	-	-	-
3. Final labeling	76.46	-	-	-
Totals for b)	79.49	93.47	82.34	85.61

It has been confirmed that the pharmacy will most likely go to automatic labeling and counting equipment. Therefore, using method 2 for analysis purposes the following results may be derived from the figures in the table above:

- As compared to the present system, prepackaging will require an additional 36.53 man-hr/wk.
- Pharmacist time can be reduced by 45.81 man-hr/wk.
- Estimated savings by going to prepackaging will be the difference between the cost of 3 pharmacists (present system) and the cost of 2 pharmacists plus 2 clerks (proposed system) or approximately \$4,500/yr.*

This then summarizes the progress made in the prepackaging phase of the pharmacy study. Based on the results obtained above, it is recommended by the author that

*Assuming that 1 full time equivalent pharmacist is phased out of the Pharmacy. Average pharmacist salary (not incl. supervisor) = \$5.84/hr including benefits (Personnel Dept.). Estimated pharmacy trained clerk salary = \$1.85/hr (incl. benefits).

full approval for the establishment of a prepackaging program at St. Vincent's Hospital Pharmacy be given.

6. Remaining Factors to be Considered -

- Prepackage methods and procedures
- Type and amount of containers
- Controls
- Storage (amount and location)
- Workplace area and location
- Equipment

II. PICKUP AND DELIVERY OF REGULAR DRUG ORDERS

A. Present System.

At the present, a central messenger service is operating out of the Central Service Department. This service operates from 5:30 A.M. to 9:00 P.M. daily, and includes pickup and delivery service for the following departments:

- EKG
- X-ray
- Pharmacy
- Laboratory
- Dietary (A.M. orders only)
- CSR

The time schedule for rounds is as follows:

- 5:30 A.M. - Cart rounds with thermometers
- 7:30 - 8:00 A.M. - Cart rounds, East & West
- 10:00 A.M. - Thermometers /c messenger
- 12:00 N. - Messenger
- 1:00 P.M. - Cart rounds, East & West
- 2:00 P.M. - Messenger
- 4:00 P.M. - Messenger
- 5:30 P.M. - Thermometers
- 7:00 P.M. - Messenger
- 8:00 P.M. - Cart rounds, East & West
- 9:00 P.M. - Messenger

Only in the case where "messenger" is listed on the above schedule, is pickup and delivery service performed for departments other than CSR. All other cases involve CSR service only. Staffing for the above system involves one person only for each round.

B. Need for Improved Messenger Service.

The present messenger service has proved to be very inadequate in terms.

of satisfying demands being placed on the pharmacy department. The pickup and delivery times as scheduled do not coincide with peak demand loads imposed on the pharmacy by the floor units. Consequently, nursing personnel are delivering a high percentage of request slips from the floor units to the pharmacy and picking up orders filled for delivery.

In reference to the above, an eleven day survey was taken to estimate the RN-PN time lost in having to drop requests off to, and pick up orders filled by the pharmacy.

Survey results indicate that approximately \$11,300/yr is lost in RN-PN time to the pharmacy for pickup and delivery during pharmacy working hours. Survey results and calculations may be seen in Appendix C.

C. Estimated Floor Unit Demands On Pharmacy.

A two week survey was taken in the pharmacy to determine the demand imposed by the floor units at hourly intervals. The above mentioned survey results may be seen in Appendix D, in percent load form - by hour and by day. These figures are based on prescriptions only - not refills.

By taking into consideration the time elapsed from the time the request was initiated until the pharmacy received it, a tentative messenger pickup and delivery schedule was derived from the survey.

Pharmacy Hours

Monday - Friday	7:30 A.M. to 9:00 P.M.
Saturday	7:30 A.M. to 8:30 P.M.
Sunday	8:00 A.M. to 7:30 P.M.

It is estimated that with the exception of stat orders and narcotics, nursing personnel would not have to come to the pharmacy if a messenger could be dispatched from the pharmacy for pickup and deliveries at 7:30 A.M., 9:30 A.M., 11:30 A.M., 1:30 P.M., 3:30 P.M., 6:30 P.M., and 8:30 P.M., respectively, Monday through Friday. On Saturday the last pickup should begin at 8:00 P.M., and on Sunday the first pickup at 8:00 A.M., and the last at 6:30 P.M. The pickup and delivery route should begin at Main West and continue with ICU, CCU, 4 W, 3 E, 2 E, and Pediatrics in order.

D. Pharmacy Controlled Pickup and Delivery Service of Regular Drug Orders.

Most hospitals alleviate delivery problems by making use of mechanical systems such as the dumbwaiter or vacuum tube. Since St. Vincent's has neither, and will soon be building a new hospital, economically it would be best to remain with a manual delivery system.

One approach towards solving this problem is for the Pharmacy Department to hire and train a nonprofessional person for pickup and delivery of

drugs. It is felt by the author that a system could then be worked out whereby a seven day messenger service between the hours of 7:30 A.M. and 5:00 P.M. could be provided by the pharmacy. Since floor demands are relatively light after 5:00 P.M., the CSR messenger service could continue to cover in the evenings. The system in mind would entail the use of the messenger mentioned above and also the prepackage clerks in section I.

The messenger would of course be available for forty hours per week, however, only an estimated 3-4 hours per day would be required to meet the pickup and delivery schedule. This person could then be trained and used for prepackaging between trips to the floors. The prepackaging clerks in turn would be trained to cover for the messenger during the remaining 16 hours of the week.

By introducing a system such as that mentioned above, at least sixty percent of the RN-PN time now being lost in trips to the pharmacy would be converted back to patient care on the floors. Another 10-15% could be saved by delivering narcotics to the floors on a standard basis (a separate system now in the early stages of a feasibility study).

The cost of the messenger service (messenger's salary) would approximate the amount saved in section I by going to a prepackaging program. Further investigations as to messenger duties, education, assignments, equipment required, etc., are now being made.

III. CONCLUSION

Progress made thus far in the Pharmacy Study has brought out the fact that there is definitely room for improvement in the drug distribution system at St. Vincent's Hospital.

Although system proposals for a prepackaging program and a messenger service have yet to be completed, it is immediately apparent that several benefits can be expected from the approaches recommended thus far by the author. First, it can be expected that both the prepackaging program and the messenger service will produce the desired results mentioned in section I, part A, namely, reduction in operating costs, increase in speed of distribution, reduction in medication errors, and more time for the pharmacist to perform more professional duties. Secondly, an improved messenger service will result in many hours of nursing time being converted back towards patient care on the floors.

APPENDIX

APPENDIX A

ST. VINCENT'S HOSPITAL
INDIANAPOLIS, INDIANA

August 2, 1967

TO : Mr. Clyde McCollum, Systems Engineer
FROM : Mr. David R. Richards, Chief Pharmacist
SUBJECT: Proposed Medication Prepackaging List

<u>TABLETS AND CAPSULES</u>	<u>Unit Package Size</u>	<u>Minimum Shelf Standards</u>	<u>Buffer Stock</u>	<u>Daily Packaging Requirements</u>	<u>Weekly Packaging Requirements</u>
Antivert	20	25/day	5	20	100
A.S.A. Compound Tablets	20	50/day	10	40	200
A.S.A. (Aspirin) 5 gr Tablets	20	50/day	10	40	200
A.S.A. (Aspirin) 10 gr Capsules	20	40/day	8	32	160
Azo-Gantrisin Tablets	20	50/day	10	40	200
Bentyl With Phanobarbital Capsules	20	40/day	8	32	160
Bufferin Tablets	20	50/day	10	40	200
Butisol Sodium 15 mg ($\frac{1}{2}$ gr) Tablets	20	40/day	8	32	160
Butisol Sodium 30 mg ($\frac{1}{2}$ gr) Tablets	20	40/day	8	32	160
Choloromycetin 250 mg Capsules	20	40/day	8	32	160
Chymoral Tablets	20	25/day	5	20	100
Combid Spansules	20	25/day	5	20	100
Compazine 5 mg Tablets	20	30/day	6	24	120
Compazine 15 mg Spansules	10	25/day	5	20	100
Darvon Compound 65 Capsules	20	50/day	10	40	200
Darvon Compound 32 Capsules	20	25/day	5	20	100
Darvon 65 mg Capsules	20	45/day	9	36	180
Declomycin 150 mg Capsules	20	30/day	6	24	120
Declomycin 300 mg Tablets	20	25/day	5	20	100
Diamox 250 mg Tablets	20	40/day	8	32	160

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Page 2

Proposed Medication Prepackaging List

To: Mr. Clyde McCollum, Systems Engineer

August 2, 1967

TABLETS AND CAPSULES (Con't)	Unit Package Size	Minimum Shelf Standards	Buffer Stock	Daily Packaging Requirements	Weekly Packaging Requirements
Digitoxin 0.1 mg Tablets (Squibb) Crystodigin Puridigin	10	50/day	10	40	200
Dimetapp Tablets	10	25/wk	5	-	20
Diuril 500 mg Tablets	10	30/day	6	24	120
Donnatal Tablets	20	35/day	7	28	140
Dulcolax Tablets	10	20/day	4	16	80
Elavil 10 mg Tablets	20	20/day	4	16	80
Elavil 25 mg Tablets	20	20/day	4	16	80
Equanil 200 mg Tablets	20	25/day	5	20	100
Equanil 400 mg Tablets	20	25/day	5	20	100
Equagesic Tablets	20	25/day	5	20	100
Ergotrate 1/320 gr Tablets	6	20/day	4	16	80
Ergotrate 1/320 gr Tablets	10	20/day	4	16	80
Erythrocin 250 mg Tablets	20	25/day	5	20	100
Ferogradumets Tablets	20	20/day	4	16	80
Furadantin 50 mg Tablets	20	25/day	5	20	100
Gantrisin 0.5 gm Tablets	20	45/day	9	36	180
Ilosone 250 mg Capsules	20	40/day	8	32	160
Indocin 25 mg Capsules	20	25/day	5	20	100
Librium 10 mg Capsules	20	25/day	5	20	100
Librium 5 mg Capsules	20	20/day	4	16	80
Micebrin Tablets	10	35/day	7	28	140

Proposed Medication Prepackaging List

To: Mr. Clyde McCollum, Systems Engineer

August 2, 1967

TABLETS AND CAPSULES (Con't)	Unit Package Size	Minimum Shelf Standards	Buffer Stock	Daily Packaging Requirements	Weekly Packaging Requirements
Micebrin T Tablets	10	35/day	7	28	140
Modane Tablets	10	40/day	8	32	160
Nitroglycerin H.T.					
1/150 gr	20	20/day	4	16	80
1/200 gr	20	20/day	4	16	80
1/100 gr	20	20/day	4	16	80
Noctec (Chloral Hydrate) 0.5 gm (7½ gr) Capsules	20	25/day	5	20	100
Ornade Spansules	20	25/day	5	20	100
Orinase 0.5 gm Tablets	20	40/day	8	32	160
Pan Alba Capsules	20	25/day	5	20	100
Pathibamate 200 mg Tablets	20	35/day	7	28	140
Phenobarbital 15 mg (¼ gr) Tablets	20	30/day	6	24	120
Phenobarbital 30 mg (½ gr) Tablets	20	40/day	8	32	160
Phenobarbital ¼ gr Belladonna 1/8gr#2	20	40/day	8	32	160
Phenobarbital ½ gr Belladonna 1/8gr#1	20	40/day	8	32	160
Pericolace Capsules	10	20/day	4	16	80
Pentid "400" Tablets	20	10/day	2	8	40
Placidyl 500 mg Capsules	10	25/day	5	20	100
Polycillin 250 mg Capsules	20	25/day	5	20	100
Polycillin 500 mg Capsules	20	25/day	5	20	100
Prednisone 5 mg Tablets	20	25/day	5	20	100
Deltra - M.S.D.					
Deltasone - Upjohn					
Premarin 1.25 mg Tablets	20	20/day	4	16	80
Quinidine Sulfate 200 mg(3gr)Tablets	20	20/day	4	16	80

Proposed Medication Prepackaging List

To: Mr. Clyde McCollum, Systems Engineer

August 2, 1967

TABLETS AND CAPSULES (Con't)	Unit Package Size	Minimum Shelf Standards	Buffer Stock	Daily Packaging Requirements	Weekly Packaging Requirements
Reserpine 0.25 mg Tablets (Squibb)	20	30/day	6	24	120
Ritalin 5 mg Tablets	20	20/day	4	16	80
Ritalin 10 mg Tablets	20	20/day	4	16	80
Tandearil Tablets	20	15/day	3	12	60
Tetracycline Phosphate Complex Buffered Capsules 250 mg (Sumycin) Achromycin V 250 mg Capsules Tetrex 250 mg Capsules	20	50/day	10	40	200
Terramycin 250 mg Capsules	20	40/day	8	32	160
Thyroid 30 mg ($\frac{1}{2}$ gr) Tablets (Armour's)	10	40/day	8	32	160
Thyroid 60 mg (1 gr) Tablets (Armour's)	10	40/day	8	32	160
Thyroid 130 mg (2gr) Tablets (Armour's)	10	20/day	4	16	80
Varidase Oral Tablets	20	50/day	10	40	200
Valium 2 mg Tablets	20	25/day	5	20	100
Valium 5 mg Tablets	20	30/day	6	24	120
V-Cillin K 250 mg Tablets	20	30/day	6	24	120
V-Cillin K 500 mg Tablets	20	35/day	7	28	140
Vistaril 50 mg Capsules	20	25/day	5	20	100
<u>LIQUIDS</u>					
Benylin Expectorant	2 oz	20/day	4	16	80
Elixophyllin Elixir	4 oz	15/day	3	12	60
Phenergan Syrup 6.25 mg/5cc	2 oz	20/wk	4		16
Phenergan Expectorant	2 oz	20/wk	4		16
Robutussin Syrup	2 oz	20/wk	4		16
Paregoric	2 oz	25/wk	5		20

Page 5

Proposed Medication Prepackaging List

To: Mr. Clyde McCollum, Systems Engineer

August 2, 1967

LIQUIDS (Continued)	<u>Unit Package Size</u>	<u>Minimum Shelf Standards</u>	<u>Buffer Stock</u>	<u>Daily Packaging Requirements</u>	<u>Weekly Packaging Requirements</u>
Neomycin 2% Solution	Pints	25/wk	5		20
Neomycin 1% Solution	Pints	20/wk	4		16
Potassium Triplex	2 oz	28/wk	6		22
Benzoin Tincture	2 oz	28/wk	6		22
Noctec Syrup 500 mg per 5 cc	2 oz	10/wk	2		8
Phenobarbital Elixir 20 mg per 5 cc	2 oz	20/wk	4		16
Potassium Iodine Saturated Solution	½ oz	15/day	3		12

David R. Richards
Chief Pharmacist

APPENDIX B

I. Estimated Man-hours Required for Prepackaging Regular Drugs.

This operation includes selecting, measuring, labeling and packaging regular drugs into unit issues.

Exclusive of this operation are activities associated with the filling of individual prescriptions, the processing of special requests, and the prepackaging of narcotics.

Weekly Average Number of Issues to be Prepackaged (Appendix A)

Tablets and capsules	7,720
Liquids	372
Ointments	0

A. Tablets, Pills, Capsules

Method 1: Hand counting tablets, pills, and capsules one by one

Method 2: Use of tablet or capsule counting machine

Method 3: Pouring tablets, pills and capsules from the stock bottle to a smaller bottle. This does not involve piece counting, but sample counts are made for each bottle size

1. Prepackaging Methods & Times

6 Tablets / bottle

Total time - Method 1	.353 man-min/unit of issue
Method 2	.292 man-min/unit of issue
Method 3	.378 man-min/unit of issue

10 Tablets / bottle

Total time - Method 1	.426 man-min/unit of issue
Method 2	.324 man-min/unit of issue
Method 3	.421 man-min/unit of issue

20 Tablets / bottle

Total time - Method 1	.534 man-min/unit of issue
Method 2	.451 man-min/unit of issue
Method 3	.468 man-min/unit of issue

a. Constant time - prepackaging

$$= \text{Frequency of prepackaging operation/wk} \\ \times 5.850 \text{ man-min/prepackaging operation}$$

$$= 81 \times 5.850$$

$$= 473.85 \text{ man-min/wk}$$

b. Variable prepacking time

Prepack Size	Average # issues prepacked/wk	Man-min/wk Est. Time - Method		
		1	2	3
6 Tablets	80	80 x .353 =28.24	80 x .292 =23.36	80 x .378 =30.14
10 Tablets	1,625	1,625x.426 =692.25	1,625x.324 =625.50	1,625x.421 =684.13
20 Tablets	6,015	6,015x.534 =3,212.01	6,014x.451 =2,712.77	6,015x.468 =2,815.02
Total man-min/wk for ea method		3,932.50	3,361.63	3,529.29

c. Total (Constant & Variable) prepackaging time for tablets, pills & capsules

	Method 1	Method 2	Method 3
Man-min/wk	4,406.35	3,835.48	4,003.14
Man-hr/wk	73.44	63.92	66.72
Total man-min/wk with PFD allowance factor included	5,155.43	4,487.51	4,683.67
Total man-hr/wk with PFD allowance factor included	85.92	74.79	78.06

B. Liquids

a. Constant time - prepackaging

$$= \text{Frequency of prepackaging operation/wk} \\ \times 5.850 \text{ man-min/prepackaging operation}$$

$$= 13 \times 5.850$$

$$= 76.05 \text{ man-min/wk}$$

- b. Variable prepacking time
 prepackaging time for liquids = .85 man-min/unit of issue
 This includes picking up a bottle, opening the bottle, filling it with liquid, and attaching the label and laying it aside.

$$\frac{372 \text{ issues prepacked}}{\text{wk}} \times .85 \frac{\text{man-min}}{\text{issue}}$$

$$= 316.20 \text{ man-min/wk}$$

- c. Total (constant & variable) prepackaging time for liquids.

$$\text{Total man-min/wk} = 316.20 + 76.05 = 392.25$$

$$\text{Total man-hr/wk} = 6.54$$

$$\text{Total man-min/wk with PFD allowance factor included} = 458.93$$

$$\text{Total man-hr/wk with PFD allowance factor included} = 7.55$$

- C. Total Estimated Man-hr Required for Prepackaging of tablets, pills, capsules and liquids.

	<u>Method 1</u>	<u>Method 2</u>	<u>Method 3</u>
Man-hr/wk for tablets, pills and capsules (including allowances)	85.92	74.79	78.06
Man-hr/wk for liquids (including allowances)	7.55	7.55	7.55
Est. man-hr/wk for total operation (including allowances)	93.47	82.34	85.61

II. Estimated Pharmacist Time Spend on Processing of Drugs to be Prepackaged.

Weekly Average Number of Issues

Tablets, pills, capsules	7,720
Liquids	<u>372</u>
Total	8,092

- a. Preparation time for labels
 = 8,092 x .726 man-min/label
 = 5,874.79 man-min/wk

b. Drug collection time

$$\begin{aligned}\text{Walking time} &= 6 \text{ paces/prescription item} \times 0.010 \\ &\quad \text{man-min/pace} \\ &= .060 \text{ man-min/prescription item}\end{aligned}$$

$$\begin{aligned}\text{Collection time/item} &= .060 \times 1.129 \text{ man-min/prescription item} \\ &= .068 \text{ man-min/prescription item}\end{aligned}$$

$$\begin{aligned}\text{Total drug collection time} &= 8,092 \text{ issues} \times .068 \text{ man-min/issue} \\ &= 549.26 \text{ man-min/wk}\end{aligned}$$

c. Label preparation and drug collection time

$$= (5,874.79 + 549.26) = 6,324.05 \text{ man-min/wk}$$

d. Total pharmacist time including allowances

$$= 6,424.04 \text{ man-min/wk} \times 1.17 \text{ (PFD allowance factor)}$$

$$= 7,516.14 \text{ man-min/wk}$$

$$= 125.27 \text{ man-hr/wk}$$

III. Estimated Pharmacist Time Required for Checking Prepackaged Items.

a. Frequency of prepackaging operations/wk

$$= 94 \text{ (81 tablet, pill \& capsule + 13 liquid operations/wk)}$$

$$\text{Checking time} = 94 \text{ operations/wk} \times 2 \text{ man-min/operation}$$

$$= 188 \text{ man-min/wk}$$

$$= 3.13 \text{ man-hr/wk}$$

IV. Estimated Pharmacist Time Required for Labeling of Prepackaged Drugs (i.e., patient name, room number, date, doctor's name, and directions).

$$8,092 \text{ labels} \times .566 \text{ man-min/label}$$

$$= 4,580.07 \text{ man-min/wk}$$

$$= 76.33 \text{ man-hr/wk}$$

RN'S TO PHARMACY FOR DRUGS / NARCOTICS

	7-8 a.m.	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9
5/31	-	4	2	4	2	6	5	1	2	1	-	-	-	-
6/1	2	4	4	4	3	5	2	6	1	-	-	1	1	1
6/2	3	10	1	6	3	5	5	3	3	-	-	1	2	3
6/3	-	2	1	1	-	9	3	4	1	-	1	1	2	1
6/4	1	2	4	4	1	4	4	2	1	3	1	2	-	-
6/5	2	3	3	8	6	2	5	4	2	2	-	-	4	-
6/6	-	5	-	4	3	6	7	2	1	1	-	2	-	1
6/7	3	4	3	5	4	4	5	2	6	-	1	3	3	1
6/8	4	3	5	1	5	6	4	3	1	-	-	4	4	3
6/9	2	3	1	1	-	2	4	2	1	-	-	1	4	-
6/10	-	3	5	-	4	2	8	4	-	1	-	-	4	1

APPENDIX C

PN'S TO PHARMACY FOR DRUGS

	7-8 a.m.	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9
Weds														
5/31	-	5	2	1	3	1	5	2	2	5	7	9	-	4
6/1	3	4	4	7	2	2	5	2	-	2	2	-	2	2
6/2	2	3	4	5	6	3	3	5	3	3	1	3	1	1
6/3	-	3	11	12	2	5	3	2	5	-	-	-	1	1
6/4	2	6	4	4	1	4	6	5	2	3	1	-	-	-
6/5	2	1	2	1	1	1	5	3	3	-	5	-	2	3
6/6	-	8	5	5	6	-	4	3	3	-	-	-	1	3
6/7	3	-	2	1	-	1	4	7	3	-	5	5	1	4
6/8	-	2	7	4	2	2	7	3	3	2	3	-	2	5
6/9	3	1	8	4	5	4	4	1	3	3	3	1	-	-
6/10	-	-	4	1	1	1	-	4	1	2	1	3	3	2

APPENDIX C

APPENDIX C - CALCULATIONS

a) Data

Average travel time from floor units to Pharmacy = 2 min.

Average travel time from Pharmacy to floor units = 2 min.

Average waiting time at Pharmacy = 3 min.

Total Round Trip = 7 min.

b) Average PN salary (incl. benefits) = \$3.35/hr
Average RN salary (incl. benefits) = \$4.07/hr

Above averages do not include supervision or director salaries.

c) Cost of PN's to Pharmacy for drugs -

1 hr/60 min x 7 min/trip x 38 trips/day x \$3.35/hr = \$14.84/day=\$5,420/yr

d) Cost of RN's to Pharmacy for drugs & narcotics -

1 hr/60 min x 7 min/trip x 34 trips/day x \$4.07/hr = \$16.12/day =\$5,890/yr

e) Total Cost of RN's- PN's to Pharmacy for drugs = \$11,310/yr

APPENDIX D

	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9
MON	7.0	16.3	15.3	14.6	10.6	9.2	12.5	13.9	15.0	17.3	17.7	23.9	21.6	25.1
	.64	10.7	9.9	8.6	6.1	4.1	7.2	10.0	8.5	6.2	4.1	8.0	6.5	9.4
TUE	7.0	17.9	14.9	16.2	12.8	11.0	22.3	13.3	18.1	13.7	7.8	15.2	11.6	18.7
	.64	11.4	9.7	8.6	7.4	4.8	12.9	9.7	10.3	5.0	2.6	5.2	3.5	7.3
WED	29.8	13.9	18.9	17.3	10.0	14.1	17.5	9.1	21.3	18.1	15.7	18.1	19.5	19.1
	2.6	8.3	11.4	9.6	5.4	6.0	9.5	6.2	11.6	6.2	4.8	5.7	5.6	6.9
THUR	21.2	11.3	10.1	14.3	16.1	14.4	10.6	14.8	7.1	10.2	8.3	7.6	7.9	13.7
	2.5	9.3	8.5	11.0	12.0	8.5	7.9	13.8	5.2	4.8	3.5	3.3	3.1	6.8
FRI	22.8	20.6	14.3	15.1	19.2	16.9	11.1	19.5	12.7	18.2	19.5	12.9	11.1	15.3
	2.0	12.3	8.7	8.4	10.4	7.2	6.0	13.2	6.8	6.2	6.0	4.1	3.2	5.7
SAT	5.3	11.8	15.5	15.7	11.7	15.9	11.7	16.2	11.0	10.6	13.7	7.6	15.3	8.3
	.57	8.9	11.9	11.0	7.9	8.5	8.0	13.8	7.4	4.5	5.3	3.0	5.5	3.8
SUN	7.0	8.0	11.1	6.8	19.7	18.3	14.2	13.3	14.4	12.0	22.3	14.8	13.2	
	.77	6.2	8.7	4.8	13.7	10.0	9.8	11.6	9.8	5.2	8.7	6.0	4.8	

LOWER DIAG. - % OF TOTAL PRESCRIPT. FILLED FOR DAY (READ HORIZ.)
 UPPER DIAG. - % OF TOTAL PRESCRIPT. FILLED FOR WEEK (READ VERT.)

