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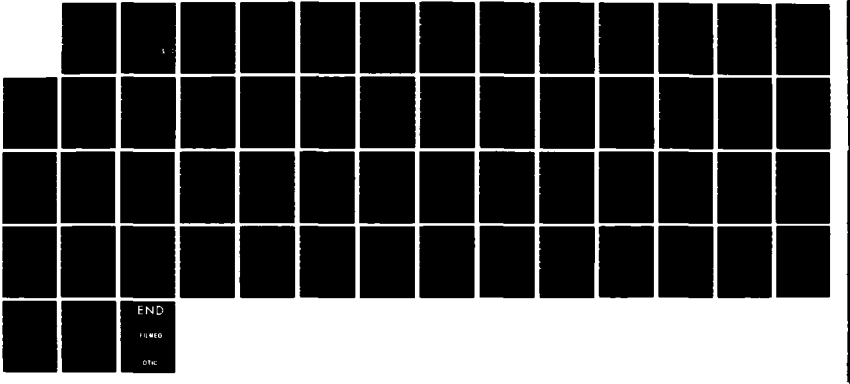

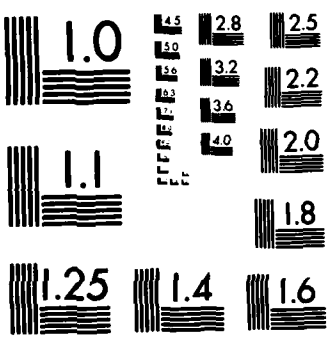

HEALTH CARE STUDIES DIVISION REPORT #80-001

DECENTRALIZED INPATIENT PHARMACY SERVICE STUDY:

Chief of Pharmacy Survey

by

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

Directors of Pharmacy (N = 35) at Army inpatient facilities were requested to complete survey instruments regarding unit dose services, problems experienced by the pharmacy, and possible solutions to problems expressed. Survey replies were received from 28 inpatient facilities (83%). The results indicate that Inadequate staffing was the most frequently perceived problem affecting the delivery of pharmacy service and Implementation or expansion of clinical pharmacy services, the most frequent recommendation to improve pharmacy services to inpatients. Unit dose medications were dispensed by 22 of 28

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pharmacies to one or more departments or services, while nine of these pharmacies reported operating a complete unit dose system. General Medicine, General Surgery, and Orthopedics were services most frequently found to be on unit dose. Ten of the 22 unit dose facilities operate a decentralized service. Overall, more than half of the pharmacies dispensed between 76% to 99% of their medications on a unit dose basis and 16 of 28 pharmacies maintained medication profiles on patients. The present findings support considering (a)more efficient utilization of pharmacy technicians and (b)implementation or expansion of decentralized unit dose services.

The present report is the first of a two-part study concerning decentralization of inpatient pharmacy services.

A-1

DECENTRALIZED INPATIENT PHARMACY SERVICE STUDY:

Chief of Pharmacy Survey

SUMMARY

Under existing Army Pharmacy programs, the preparation of parenteral solutions has been centralized and unit dose drug distribution systems established at numerous Army inpatient facilities. While unit dose has resulted in some increased utilization of a pharmacist's professional training, experience and knowledge, the pharmacist all too often remains an under-challenged and under-utilized member of the health care team.

From April to June 1979, Directors of Pharmacy at Army inpatient facilities (N = 35) were requested to fill out survey instruments regarding unit dose services, problems experienced by the pharmacy and possible solutions to problems expressed. Survey replies were received from 28 inpatient facilities (83%).

The findings of the present study show that Inadequate staffing was the most frequently perceived problem affecting the delivery of pharmacy service to inpatients. Implementation or expansion of clinical pharmacy services was the most frequent recommendation to improve the Pharmacy Service. Less than half of the pharmacies surveyed reported having adequate space for Pharmacist-patient consultation and Drug information services.

Unit dose medications were dispensed by 22 of 28 pharmacies to one or more departments or services while nine of these pharmacies reported operating a complete unit dose system. Services most frequently found to be on unit dose were: (1) General Medicine, (2) General Surgery and (3) Orthopedics. Ten of the 22 unit dose facilities operated a decentralized unit dose system. Overall, more than half of the pharmacies dispensed between 76% to 99% of their medications on a unit dose basis.

Very few pharmacies reported using computer or automated data processing equipment. Drug information services to hospital staff were primarily achieved through pharmacy newsletters. Sixteen of 28 pharmacies maintained medication profiles on patients.

The present findings support the following considerations:

(1) Pharmacy staffing problems may be improved by more efficient utilization of pharmacy technicians. This may be accomplished by transferring drug distribution tasks from the pharmacist to the pharmacy technician. Delegation of these tasks is dependent on the training of the technician.

(2) Implementation or expansion of unit dose services is an important step to establishing clinical pharmacy services, minimizing medication errors, insuring patient safety, providing more efficient utilization of pharmacy personnel, reducing drug wastage, and reducing costs.

(3) Communication between physicians, nurses and pharmacists may be enhanced through decentralized unit dose programs, thus enabling the pharmacist closer contact with physicians and nurses and greater clinical experience.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DECENTRALIZED INPATIENT PHARMACY SERVICE STUDY:
Chief of Pharmacy Survey

I. INTRODUCTION.

A. Purpose.

The basic objectives of the "Decentralized Inpatient Pharmacy Service Study (DIPSS): Chief of Pharmacy Survey" were:

1. To document the extent to which unit dose operations have been implemented for inpatient services at Army Medical Treatment Facilities (MTF).

2. To identify problems affecting the delivery of pharmaceutical services to inpatients.

3. To identify factors to improve the delivery of pharmaceutical services to inpatients.

4. To determine if there is a relationship between unit dose operations, problems experienced by the Pharmacy Service and suggested factors to improve pharmaceutical services to inpatients.

B. Background.

1. The concept of pharmacists practicing in patient care areas and selected decentralization of unit dose services is expanding rapidly. However, indicators to justify the establishment of such services in Army Medical Treatment Facilities (MTF) remain to be developed.

2. Under existing Army pharmacy programs, the preparation of parenteral solutions has been centralized and unit dose drug distribution systems have been established at numerous Army inpatient facilities. The former procedure has obviated the need for ward personnel to compound a patient's final intravenous (I.V.) solution, while the latter has relieved the ward station from having to maintain an extensive bulk drug storage and dispensing facility.

3. While unit dose has resulted in some increased utilization of a pharmacist's professional training, experience and knowledge, the pharmacist all too often remains an under-challenged and under-utilized member of the patient care team. Services other than unit dose, such as maintaining patient medication profiles, drug information services, practicing in patient care areas and inpatient satellite services, have been found to improve patient care, reduce costs, improve communication, and offer the pharmacist a more challenging and enriching job (Yorio, 1972; Cooper, 1976; Smith, 1972).

To date there have been no previous studies conducted at Army MTF's to determine: (a) the extent to which unit dose operations have been implemented; (b) what factors, if any, affect the delivery of pharmacy services to inpatients; or (c) what factors, if any, are necessary to improve pharmacy services to inpatients.

II. OBJECTIVES.

The study objectives addressed in this report were:

A. To document the extent to which unit dose operations have been implemented for inpatient services at Army MTF's.

B. To identify problems affecting the delivery of pharmacy services to inpatients.

C. To identify factors to improve the delivery of pharmacy services to inpatients.

D. To determine, from the findings of the present study, if there is a relationship between unit dose operations, problems experienced by the Pharmacy Service and suggested factors to improve the Pharmacy Service to inpatients.

III. METHODOLOGY.

A. Overview.

The general methodology was to mail a survey instrument to directors of Army MTF pharmacies. When completed, the survey instruments were returned by mail to the investigators.

B. Survey Instrument.

The data were obtained by means of a survey questionnaire designed to assess the current state of inpatient pharmacy practice in Army MTF's (See Appendix A). The questionnaire was developed from two previous survey instruments (Cullen and Henrich, 1971; Smith, 1972) and presented to selected Directors of Pharmacy Service in Army MTF's to judge clarity and content validity.

C. Procedure.

Directors of Pharmacy at eight Army Medical Centers (MEDCEN) and 27 Army Medical Department Activities (MEDDAC), under Health Services Command (HSC), were mailed survey instruments in April, 1979. Respondents were instructed to return the survey instruments, using a government franked return address sheet. Each was asked to complete the questionnaire assessing the tasks and procedures used in the inpatient pharmacy.

IV. RESULTS AND DISCUSSION.

A. Overview.

The principal objective in the analysis of data was to determine the basic distribution characteristics, variability, central tendencies and inferential statistics on responses. To enable a breakdown of the data by hospital size, MTF's were assigned to one of three groups: small hospitals (less than 225 beds), medium hospitals (225 to 404 beds) and large hospitals (405 beds or more). Frequency distribution tables and accompanying statistics were obtained by the statistical Package for the Social Sciences (SPSS) (Nie et al., 1975).

B. Sample Characteristics.

1. A total of 23 of 27 MEDDAC's and six of eight MEDCEN's returned questionnaires resulting in an overall 83% response rate. Table 1A summarizes the descriptive statistics of the Army MTF's surveyed, and Table 1B and Figure 1 show the demographic characteristics of Directors of Pharmacy by MTF size.

C. Factors Affecting the Delivery of Pharmacy Service to Inpatients. (Table 2).

The findings of the present study indicate that inadequate staffing was the most frequently occurring problem affecting pharmacy service to inpatients. Other frequent areas of concern were ineffective communication with nurses and physicians, inadequate space, lack of clinical pharmacy services, and inadequate methods of medication delivery. These problems will be discussed in the following sections.

D. Factors to Improve the Pharmacy Service (Table 3).

1. Implementation or expansion of clinical pharmacy services was the most frequent factor recommended to improve pharmacy services to inpatients. In view of the concern over staffing, the establishment of clinical pharmacy services may be facilitated by transferring several drug distribution tasks from the pharmacist to the pharmacy technician. Implementation of these changes in task responsibilities should increase the utilization of pharmacy technicians and allow the pharmacist more time for patient care. Additional factors of concern included extending hours of operation, implementation or expansion of unit dose, and increasing the staff. Extending the hours of pharmacy operation should provide the pharmacist with more patient care contact if pharmacists are utilized as members of the hospital emergency team. Moreover, implementing or expanding unit dose services is an important step in the development of clinical pharmacy services. In addition, the main objectives of unit dose and clinical pharmacy services are interrelated. These objectives are to: (1) reduce medication errors; (2) insure the safety of the patient; (3) enable health care personnel to be effectively utilized; (4) reduce drug wastage; and (5) minimize costs. Previous studies report that unit dose services are far more effective at achieving these objectives than more traditional methods of drug distribution (Parker, 1968; Hynniman et al., 1970, Camarata, 1972). Thus, the pharmacist is able to assign most of the routine and mechanical drug distribution duties to an assistant and is allowed more time for clinical activities.

2. As an alternative to increasing the size of the pharmacy staff: by transferring drug distribution tasks to pharmacy technicians, as mentioned previously, more effective utilization of pharmacists and pharmacy technicians should be achieved. Hence, it may be more feasible to increase the number of technicians, rather than pharmacists.

3. Ineffective communication with nurses and physicians was a current, significant problem expressed by Directors of Pharmacy. However, previous studies have shown that communications among nurses, physicians and pharmacists may be enhanced through decentralized unit dose programs which enable the pharmacist closer contact with physicians and nurses. (Cooper, 1976; Adelman, 1976).

E. Distribution of Personnel and Hours of Pharmacy Operation (Tables 4A-B and Figures 1-2).

Table 4A reflects mean values and standard deviations for military and civilian pharmacists/pharmacy technicians across small, medium and large MTF's. Figure 2 depicts the distribution of pharmacists by hospital size, $r = 0.89$, F (1, 26) = 101.69, $p = .001$, and Figure 3 shows the distribution of pharmacy technicians by hospital size, $r = 0.83$, F (1, 26) = 61.17, $p = .001$. It is

apparent that there is a strong, linear relationship indicating that the number of pharmacy personnel assigned to an MTF is a function of its size. In addition, Table 4B shows that there was a significant difference in the hours of pharmacy operation as a function of MTF size, X^2 (2) = 10.67, p = .0048.

F. Pharmacists' Perceptions of Pharmacy Service to Inpatients and Outpatients (Table 5).

Directors of Pharmacy were asked to indicate their level of satisfaction with inpatient and outpatient services. Responses were arranged in a 7-point Likert-type format. Means and standard deviations are reflected in Table 5. There was no significant difference in satisfaction with inpatient and outpatient services as a function of MTF size.

G. Physical Facilities (Table 6).

Twenty-six out of 28 respondents reported they perceived the pharmacy to be located in an area easily accessible to patients. There was no significant difference as a function of MTF size. A private office or area for the Director of Pharmaceutical Services was found in 24 out of 28 pharmacies. The distribution was not a significant function of MTF size X^2 (2) = 5.38, p = .067, but there was certainly a trend in the data indicating so. It is noteworthy that few pharmacies (five of 23) had a private area or office for pharmacist-patient consultation.

H. Unit Dose Operations (Tables 7A-7B)

1. Unit dose medications were dispensed by 22 of 28 (79%) pharmacies to one or more departments or services, while nine (41%) of these pharmacies reported operating all inpatient beds on unit dose (i.e., complete unit dose). There was no statistically significant difference in the distribution of unit dose services X^2 (2) = 4.45 or complete unit dose services X^2 (2) = 4.81, as a function of MTF size. Services most frequently found to be on unit dose were: (1) General Medicine, (2) General Surgery and (3) Orthopedics. Overall, more than half of the pharmacies dispensed between 76% to 99% of their medications on a unit dose basis. There was no significant difference in the distribution as a function of MTF size X^2 (8) = 12.64. Table 7A shows that 19 of 25 MTF's dispensing medications by unit dose purchase not more than 50% of their unit dose medications commercially. There was no significant difference between small, medium and large MTF's X2 (8) = 8.18. The items most commonly packaged in unit dose form by the pharmacy were capsules, tablets, and liquids.

2. Previous reports generally substantiate the effect of unit dose on reducing medication errors, insuring patient safety, controlling drug wastage, reducing costs and providing more efficient use of personnel resources (Parker, 1968; Hynniman et al., 1970). Furthermore, with specific training and utilization objectives, pharmacy technicians may perform all of the technical tasks of drug distribution with minimal supervisory time required of the pharmacist.

I. Computer Support and Equipment (Tables 8A-8B).

1.Very few pharmacies reported using computer or automated data processing equipment. Of those that did, the most common function for use of that equipment was printing labels.

2. Directors of Pharmacy were asked to rate the adequacy of the pharmacies' equipment for a variety of activities. Responses were arranged in a 4-point Likert format. Means and standard deviations are reflected in Table 8B. There were significant differences for prescription dispensing, F (2, 25) = 4.24, p = 0.25, and bulk compounding manufacturing, F (2, 25) = 7.84, p = .002, as a function of MTF size.

J. Drug Information Services (Table 9-10).

1. Twenty-seven of the pharmacies surveyed provided a routine system for keeping the hospital staff current on drug information, yet only 13 respondents indicated having adequate space to provide drug information services. Table 10 shows that the most frequent method for distributing drug information to the hospital staff was by the pharmacy newsletter. Only four of the pharmacies that have a Drug Information Center maintained a log of all requests.

2. The objective of the Drug Information Service should be to provide the health care team, especially physicians, with information about drug therapy. The Service has the potential to provide pharmacists in clinical practice with the necessary experience and resources to respond to physicians', nurses', and patients' need for drug information. Moreover, the Service may coordinate drug therapy seminars for physicians and nurses, pharmacy newsletters, drug reviews, and inservice education for pharmacists and hospital staff.

K. Medication Profiles (Table 11)

Overall, 16 of 28 pharmacies maintained medication profiles on patients. No statistically significant difference X^2 (2) = 3.08, in the incidence of pharmacies using medication profiles over MTF size was found. The purpose of using medication profiles is to consolidate facts concerning a patient's drug therapy. Thus, the pharmacist is in a better position to comment on drug efficacy and safety. Medication profiles enable the pharmacist to review and analyze a patient's drug therapy. By patient drug monitoring, the pharmacist evaluates each drug order for a particular patient, thus gaining valuable clinical experience. Potential questions that arise may then be researched by the Drug Information Service.

V. CONCLUSIONS.

A. According to Directors of Pharmacy Services, the factors affecting the delivery of pharmacy service to inpatients included: (1) Inadequate staffing and personnel, (2) Inadequate space, (3) Lack of clinical pharmacy services, and (4) Inadequate methods of medication delivery.

B. Factors to improve the pharmacy service to inpatients were: (1) Implementation or expansion of clinical pharmacy services, (2) Extending hours of operation, (3) Implementation or expansion of unit dose, and (4) Increase in staff.

C. Unit dose medications were dispensed by 22 of 28 pharmacies to one or more departments or services. Nine of the pharmacies utilizing unit dose had complete unit dose systems.

D. Twenty-seven of 28 pharmacies provided a routine system of keeping the hospital staff current on drug information. The most frequent method for dis-

tributing drug information was by the pharmacy newsletter.

E. Medication profiles on patients were maintained in 16 of 28 pharmacies.

F. Pharmacy staffing problems may be improved by more efficient utilization of pharmacy technicians. This may be accomplished by transferring drug distribution tasks from the pharmacist to the pharmacy technician. Delegation of these tasks is dependent on the training of the technician.

G. Implementation or expansion of unit dose services is an important step to establishing clinical pharmacy services, minimizing medication errors, insuring patient safety, providing more efficient utilization of pharmacy personnel, reducing drug wastage and reducing costs.

H. Communication between physicians, nurses and pharmacists may be enhanced through decentralized unit dose programs, thus enabling the pharmacist closer contact with physicians and nurses and greater clinical experience.

VI. RECOMMENDATIONS.

Recommendations based on the findings herein will be presented in the second part of the "Decentralized Inpatient Pharmacy Service Study: The Relative Merits of Decentralized Clinical Pharmacy Service".

APPENDIX A

TABLE 1A

DESCRIPTIVE STATISTICS ON FACILITY SIZE

	MEAN	SD	F	SIG
Number of Operating Beds			47.54	.001
Small MTF	94.92	44.24		
Medium MTF	301.22	64.11		
Large MTF	569.33	195.80		
Average Beds Occupied			29.28	.001
Small MTF	60.31	42.44		
Medium MTF	183.50	80.91		
Large MTF	449.50	198.22		
Average Daily Admission			6.25	.007
Small MTF	9.58	7.32		
Medium MTF	28.75	16.44		
Large MTF	29.25	20.71		

TABLE 1B

DEMOGRAPHIC CHARACTERISTICS OF DIRECTORS OF PHARMACY

	MEAN	SD	F	SIG
Age of Director of Pharmacy (Years)			10.01	.001
Small MTF	34.15	4.69		
Medium MTF	39.22	4.55		
Large MTF	43.67	3.67		
Years Practicing Hospital Pharmacy			8.64	.001
Small MTF	8.92	4.61		
Medium MTF	14.11	5.06		
Large MTF	18.67	5.35		

TABLE 2

FACTORS AFFECTING THE DELIVERY OF PHARMACY SERVICE
TO INPATIENTS AS PERCEIVED BY DIRECTORS OF
PHARMACEUTICAL SERVICES (N = 29)

Question: "What Are The Top Five Problems (In Order of Priority) Affecting The Delivery of Pharmacy Service to Impatients in Your Hospital?"

PROBLEM		FREQUENCY
1.	Staffing and Personnel	21
2.	Communication with Physicians and Nurses	11
3.	Adequate Space	8
4.	Lack of Clinical Pharmacy Services	8
5.	Medication Delivery	7

TABLE 3

FACTORS TO IMPROVE PHARMACY SERVICES AS PERCEIVED BY DIRECTORS OF PHARMACEUTICAL SERVICES (N = 29)

Question: "Assuming Resources Are Available, What Changes Would you Make To Improve The Pharmacy Service To Inpatients?"

FACTOR	FREQUENCY
1. Implement or Expand Clinical Pharmacy Services	16
2. Implement or Expand Unit Dose Services	12
3. Extend Hours of Operation	11
4. Increase Pharmacy Staff	7
5. Implement or Expand Computer Support	6

TABLE 4A

ASSIGNED PHARMACY PERSONNEL TO INPATIENT FACILITIES

	MEAN NUMBER ASSIGNED	SD	F	SIG
MILITARY PHARMACISTS			22.78	.001
Small MTF	2.00	1.36		
Medium MTF	5.90	1.73		
Large MTF	7.67	3.27		
CIVILIAN PHARMACISTS			14.98	.001
Small MTF	2.67	1.80		
Medium MTF	7.20	5.03		
Large MTF	11.83	4.17		
MILITARY TECHNICIANS			24.09	.001
Small MTF	5.80	3.49		
Medium MTF	12.50	3.69		
Large MTF	18.67	5.57		
CIVILIAN TECHNICIANS			8.46	. 01
Small MTF	1.20	0.94		
Medium MTF	2.50	2.37		
Large MTF	5.00	2.83		

TABLE 4B

HOURS OF PHARMACY OPERATION AS A FUNCTION OF MTF SIZE

Question: "Is the Pharmacy Open 24 Hours a Day?"

	Small MTF	Medium MTF	Large MTF
Frequency Yes	1	4	5
Frequency No	12	5	1

$\underline{X}^2$ (2) = 10.67, $p < .0048$

TABLE 5

PHARMACISTS' PERCEPTIONS OF THE PHARMACY SERVICE
TO INPATIENTS AND OUTPATIENTS

	Very Dissatisfied			Neutral			Very Satisfied
SCALE =	1	2	3	4	5	6	7

	MEAN	SD	F	SIG
INPATIENT SERVICE			-	Not Significant (NS)
Small MTF	4.80	1.42		
Medium MTF	5.10	1.79		
Large MTF	4.83	0.98		
OUTPATIENT SERVICE			-	NS
Small MTF	5.53	1.06		
Medium MTF	5.30	1.49		
Large MTF	4.83	0.98		

TABLE 6

PHYSICAL FACILITIES

Question: "Is the Pharmacy Located in an Area Easily Accessible to Patients and Staff?"

	Small MTF	Medium MTF	Large MTF
Frequency Yes	12	8	6
Frequency No	1	1	0

$\underline{X}^2$ (2) = 0.68, NS

Question: "Is There a Private Office or Area for the Director of Pharmaceutical Services?"

	Small MTF	Medium MTF	Large MTF
Frequency Yes	9	9	6
Frequency No	4	0	0

$\underline{X}^2$ (2) = 5.38, p <.067

Question: "Is There a Private Office or Area for Pharmacist-Patient Consultation?"

	Small MTF	Medium MTF	Large MTF
Frequency Yes	4	1	0
Frequency No	9	8	6

$\underline{X}^2$ (2) = 3.06, NS

TABLE 7A

UNIT DOSE OPERATIONS

Question: "Does your facility utilize the Unit Dose System?"

	Small MTF	Medium MTF	Large MTF
Frequency Yes	8	8	6
Frequency No	5	1	0

$\underline{X}^2$ (2) = 4.45, NS

Question: "If yes, are all beds on the Unit Dose System?"

	Small MTF	Medium MTF	Large MTF
Frequency Yes	6	2	1
Frequency No	2	6	5

$\underline{X}^2$ (2) = 4.81, p <.09

Question: "What percentage of your medications is dispensed on a unit dose basis?

	Small MTF	Medium MTF	Large MTF
0 - 25%	4	4	0
26 - 50%	0	2	0
51 - 75%	1	0	1
76 - 99%	7	1	0
100%			

$\underline{X}^2$ (8) = 12.64, NS

Question: "What percentage of your unit dose medications is purchased commercially (ready to use)?"

	Small MTF	Medium MTF	Large MTF
0 - 25%	5	2	1
26 - 50%	2	5	4
51 - 75%	1	1	1
76 - 99%	3	0	0
100%	0	0	0

$\underline{X}^2$ (8) = 8.18, NS

TABLE 7B

DEPARTMENTS OR SERVICES ON THE UNIT DOSE SYSTEM

Department or Service	Frequency Yes
1. General Medicine	12
2. Orthopedics	9
3. Pediatrics	6
4. Urology	6
5. ENT, Plastic Surgery	6
6. Thoracic Surgery	5
7. Oral Surgery	5
8. Gynecology	5
9. Pulmonary Disease	5
10. Medical ICU	4
11. Cardiology	4
12. Oncology	4
13. Psychiatry	4
14. General Surgery	4
15. Obstetrics	4
16. Neurosurgery	4
17. Neurology	3
18. Surgical ICU	3
19. Burns	3
20. Neonatal/Nursery	2

TABLE 8A

COMPUTER SUPPORT AND EQUIPMENT

Question: "Do You Use Any Computer or Automated Data Processing Equipment in Your Pharmacy?"

		Small MTF	Medium MTF	Large MTF
Frequency	Yes	2	0	3
Frequency	No	11	9	3

$\underline{X^2}$ (2) = 6.24, p < .044

TABLE 8B

EQUIPMENT

Question: "How Adequate is Your Present Equipment for Carrying Out the Following Activities?"

	Very Adequate	Adequate	Poor	Very Inadequate
Scale =	1	2	3	4

	MEAN	SD	F	SIG
Prescription Dispensing			4.24	.025
Small MTF	2.00	.58		
Medium MTF	1.33	.50		
Large MTF	2.00	.63		
Non-sterile Extemporaneous Compounding			2.29	NS
Small MTF	2.15	.69		
Medium MTF	1.67	.50		
Large MTF	1.67	.52		
Bulk Compounding Manufacturing			7.84	.002
Small MTF	2.38	.65		
Medium MTF	1.78	.44		
Large MTF	1.33	.52		
Sterile Product Manufacturing			1.90	NS
Small MTF	1.69	.85		
Medium MTF	1.22	.44		
Large MTF	1.83	.41		
Unit Dose and Other Prepackaged Preparations			1.42	NS
Small MTF	2.27	1.00		
Medium MTF	1.88	.99		
Large MTF	1.50	.55		
Product Control			1.83	NS
Small MTF	3.00	.85		
Medium MTF	2.56	.73		
Large MTF	2.33	.52		

TABLE 8B

EQUIPMENT

	MEAN	SD	F	SIG
Product Development and Special Information			2.11	NS
Small MTF	2.75	.87		
Medium MTF	2.50	.53		
Large MTF	2.00	.63		
Delivery to Inpatient Areas			.48	NS
Small MTF	2.15	.80		
Medium MTF	2.56	1.01		
Large MTF	2.20	1.30		
Records and Office Procedures			2.58	NS
Small MTF	1.85	.55		
Medium MTF	1.33	.50		
Large MTF	1.50	.55		
Library Reference Facilities			.60	NS
Small MTF	2.08	.95		
Medium MTF	1.78	.67		
Large MTF	1.67	.82		

TABLE 9

DRUG INFORMATION SERVICES

Question: "Is There a Routine System (Pharmacy Newsletter, etc.) for Keeping the Medical and Nursing Staff Informed About the Drugs Used in the Hospital and About Relevant Pharmacy Procedures?"

		Small MTF	Medium MTF	Large MTF
Frequency	Yes	12	9	6
Frequency	No	0	0	0

Question: "If the Pharmacy has a Formal Drug Information Center, is a Written Log Maintained of all Requests?"

		Small MTF	Medium MTF	Large MTF
Frequency	Yes	1	2	1
Frequency	No	7	6	3

$\underline{X}^2$ (2) = 0.468, NS

TABLE 10

FREQUENT METHODS OF DISTRIBUTING DRUG INFORMATION TO THE HOSPITAL STAFF

Methods	Frequency
Pharmacy Newsletter	26
Inservice Seminars	7
Therapeutic Agents Board	6

TABLE 11

MEDICATION PROFILES

Question: "Are Pharmacy Medication Profiles Maintained for all Patients?"

		Small MTF	Medium MTF	Large MTF
Frequency	Yes	9	3	4
Frequency	No	4	6	2

$\underline{X}^2$ (2) = 3.08, NS

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5. Hynniman, C. E. et al. A comparison of medication errors under the University of Kentucky unit-dose system and traditional drug distribution systems in four hospitals. Amer. Journ. Hosp. Pharm. 27:803, 1970.

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7. Parker, P. F. Unit-dose systems reduce error, increase efficiency. Hospitals, 42:65, 1968.

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FIGURE 1

RELATIONSHIP BETWEEN YEARS PRACTICING HOSPITAL PHARMACY AND MTF SIZE

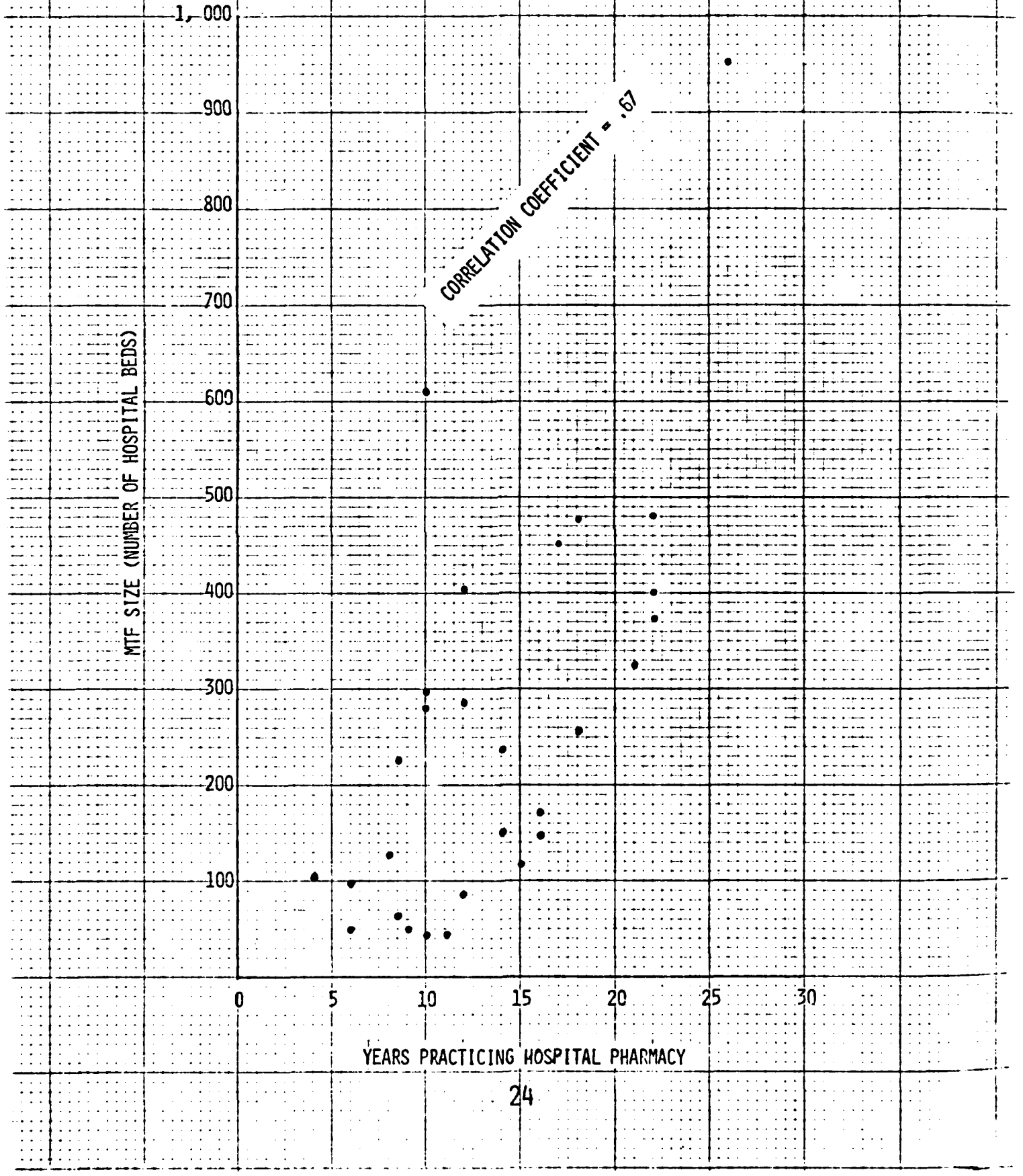


FIGURE 2

DISTRIBUTION OF PHARMACISTS ACCORDING TO HOSPITAL SIZE (N = 29)

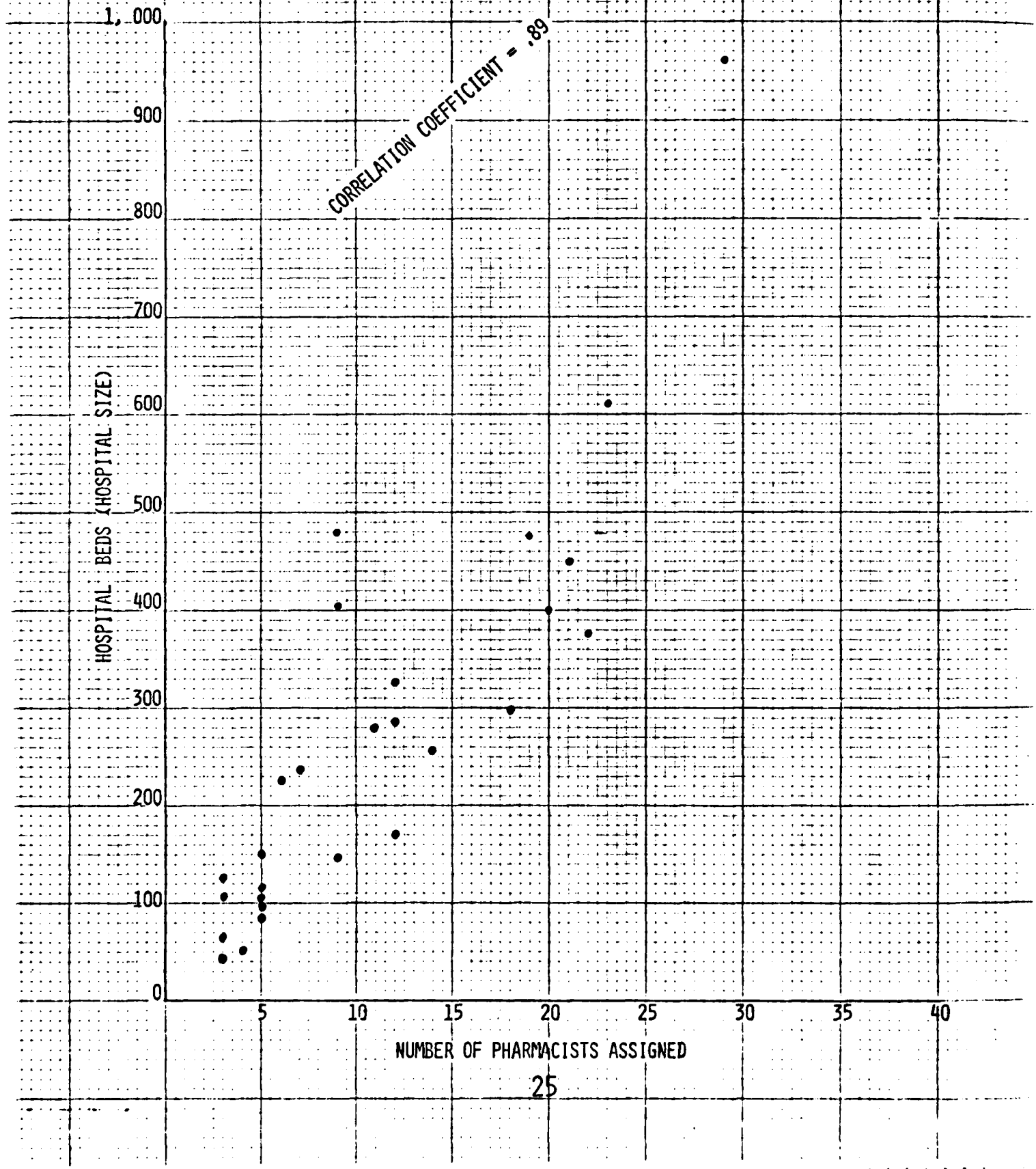
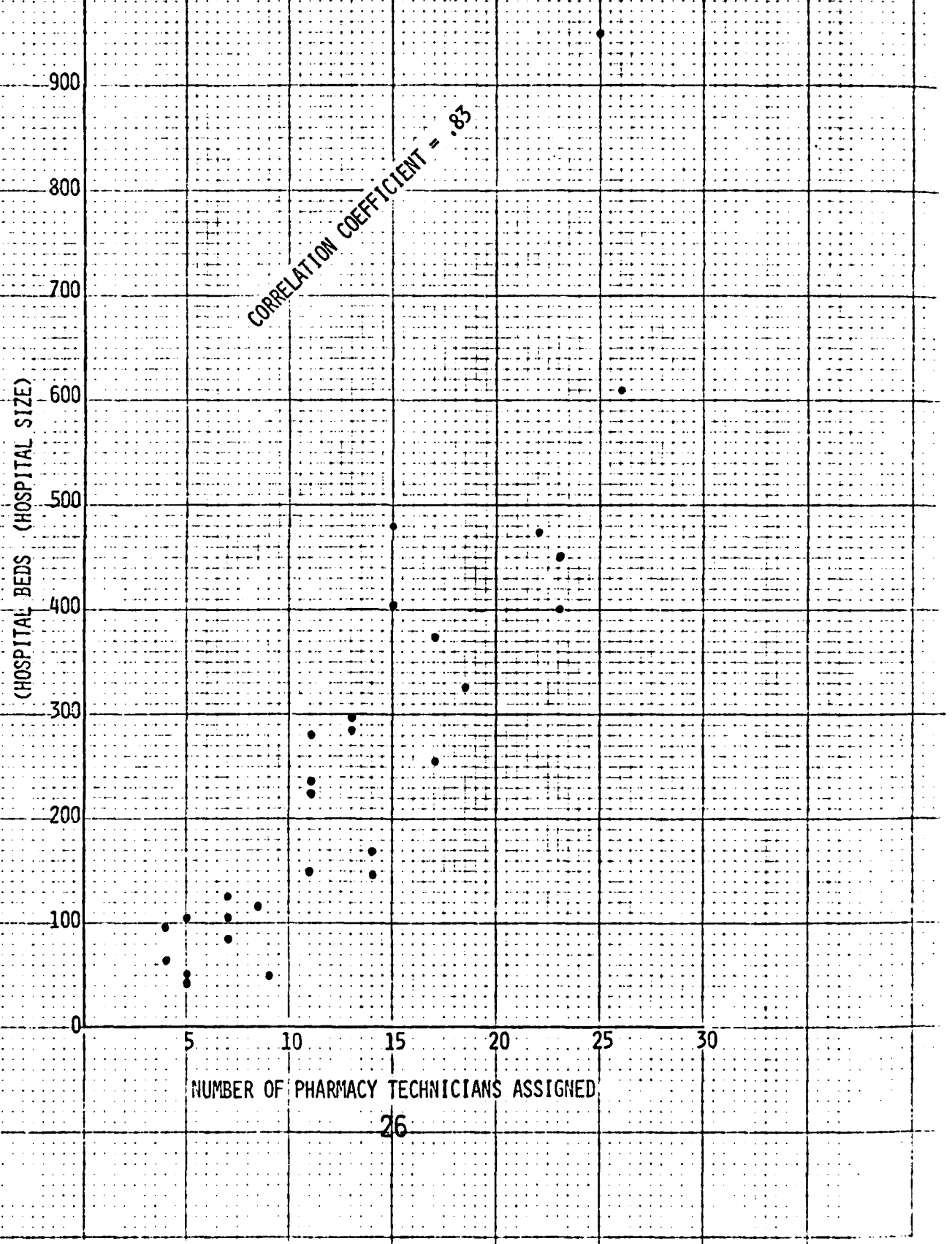


FIGURE 3

DISTRIBUTION OF PHARMACY TECHNICIANS ACCORDING TO HOSPITAL SIZE (N = 29)



VIII. APPENDICES

BACKGROUND INFORMATION SHEET

Please complete this information sheet and return it with the survey form. This is a confidential document and will be used for research purposes only.

1. Facility: a. MEDCEN MEDDAC (circle your answer)

   b. Number of operating beds _____

   c. Average beds occupied _____

   d. Average daily admissions _____

2. Your position title _____

3. Licenses, certificates, or registrations you hold

   (Specify) _____

   _____

4. Indicate below the degree or degrees you received and the year you received it (them).

	Check as many as apply	year
Ph.G or Ph.C	☐	____
Bachelor of Arts	☐	____
Bachelor of Science	☐	____
Master of Science	☐	____
Ph.D or D. Sc	☐	____
Other (Specify)	☐	____

5. What is your age _____

6. How many years have you been practicing hospital pharmacy _____

7. What are your professional affiliations _____

   _____

   _____

   _____

8. Number of pharmacists assigned to your pharmacy:

Military _____ Civilian _____

9. Number of technicians assigned to your pharmacy:

Military _____ Civilian _____

10. Number of other personnel (clerks, etc.):

Military _____ Civilian _____

11. Is the pharmacy open 24 hours a day?

yes no (Circle your answer)

11.1 If no, what are the hours of operation?

(Specify)_____

11.2 When closed, is a pharmacist available on an "on-call" basis?

yes no (Circle your answer)

12. How satisfied are you with the pharmacy service that your organization provides to:

	Dissatisfied						Very Satisfied
a. Inpatients?	1	2	3	4	5	6	7
b. Outpatients?	1	2	3	4	5	6	7

13. What are the top five problems (in order of priority) affecting the delivery of pharmacy service to inpatients in your hospital? (Explain)

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

5. _____

_____

14. Assuming resources are available, what changes would you make to improve pharmacy service to inpatients?

_____

_____

_____

_____

_____

_____

_____

PHARMACY QUESTIONNAIRE

I. Facilities

1. Is the pharmacy located in an area easily accessible to patients and staff?

yes no (Circle your answer)

2. Is there a private office or area for the director of pharmaceutical services?

yes no (Circle your answer)

3. Is there a private office or area for pharmacist-patient consultation?

yes no (Circle your answer)

4. Is there adequate space for each pharmacy function to be performed in a discrete area? (Circle your answer)

a. Packaging and non-sterile compounding yes no

b. Sterile compounding yes no

c. Inpatient drug distribution yes no

d. Outpatient services yes no

e. Drug information services yes no

f. Administrative, secretarial & clerical tasks yes no

g. "Inactive" drug storage yes no

5. Does all drug storage areas and equipment preclude access to unauthorized persons? (Circle your answer)

yes no

II. Unit Dose

1. Does your facility utilize the Unit Dose System?

yes no (Circle your answer)

1.1 If yes, are all beds on the Unit Dose System?

yes no (Circle your answer)

1.2 If the answer to 1.1 is no, which departments or services are on the Unit Dose System? (Specify) (Circle your answer)

a.	General Medicine	# of beds_____	yes	no
b.	Medical ICU	# of beds_____	yes	no
c.	Cardiology	# of beds_____	yes	no
d.	Neurology	# of beds_____	yes	no
e.	Oncology	# of beds_____	yes	no
f.	Pulmonary Disease	# of beds_____	yes	no
g.	Pediatrics	# of beds_____	yes	no
h.	Psychiatry	# of beds_____	yes	no
i.	General Surgery	# of beds_____	yes	no
j.	Surgical ICU	# of beds_____	yes	no
k.	Gynecology	# of beds_____	yes	no
l.	Obstetrics	# of beds_____	yes	no
m.	Neurosurgery	# of beds_____	yes	no
n.	Orthopedics	# of beds_____	yes	no
o.	Urology	# of beds_____	yes	no
p.	Nuclear Medicine	# of beds_____	yes	no
q.	Thoracic Surgery	# of beds____	yes	no
r.	Oral Surgery	# of beds____	yes	no
s.	ENT, Plastic Surgery	# of beds____	yes	no
t.	Cardiology	# of beds____	yes	no
u.	Burns	# of beds____	yes	no
v.	Neonatal/Nursery	# of beds____	yes	no
w.	Other (Specify)	# of beds____	yes	no

2. What percentage of your medications is dispensed on a unit dose basis? (Circle your answer)

   a. 0-25%

   b. 26-50%

   c. 51-75%

   d. 76-99%

   e. 100%

3. What percentage of your unit dose medications is purchased commercially (ready to use)? (Circle your answer)

   a. 0-25%

   b. 26-50%

   c. 51-75%

   d. 76-99%

   e. 100%

4. If you prepackage your own unit dose medications, please indicate what items you prepackage? (Circle your answer)

   a. Capsules

   b. Tablets

   c. Powders

   d. Liquids

   e. Externals

   f. Other (Please describe)

5. Do your packaging and prepackaging procedures conform to the ASHP-ASCP "Guidelines for Prepackaging Oral Solids and Liquids in Single Unit and Unit Dose Packages."

   Yes No (Circle your answer)

6. What information do you record about unit dose medications and what do you put on the inpatient labels?

	Recorded	Label
Name of patient	_____	_____
Name of drug	_____	_____
Name of physician	_____	_____
Dosage form	_____	_____
Route of adiministration	_____	_____
Manufacturer of drug	_____	_____
Lot number of drug	_____	_____
Date prepared	_____	_____
Expiration date	_____	_____
Name or initials of person preparing item	_____	_____
Name or initials of person checking item	_____	_____
Diagnosis	_____	_____
Allergies	_____	_____
Age	_____	_____
Other (Please describe)	_____	_____

7. How are labels prepared? (Circle your answer)

   a. Typed or handwritten

   b. Rubber stamps

   c. Computer controlled printing

   d. Manually operating machinery

   e. Other (Please explain)

III. Decentralized or Satellite Pharmacy Service Concept

1. Do you operate a decentralized or satellite pharmacy service?

   yes no (Circle your answer)

   1.1 If yes, does the decentralized service support: (Circle your answer)

   a. A specific specialty service

   b. Several specialties

   c. A specific patient flow

   d. A general area with several specialties and floors

   1.2 Which services are supported by decentralized pharmacies? (Specify)

   _____

   _____

   _____

   _____

   _____

   _____

IV. General Operations

1. Is information (therapeutic, chemical, pharmacologic) on all investigational drugs currently in use in the hospital maintained in the pharmacy?

   yes no (Circle your answer)

   1.1 Is the pharmacy responsible for storing, packaging, labeling, distribution and maintaining inventory records of investigational drugs?

   yes no (Circle your answer)

2. Are there written regulations governing the activities of medical sales representatives in the Hospital?

yes no (Circle your answer)

3. Are drug samples used in the hospital.

yes no (Circle your answer)

3.1 If yes, are the samples controlled and distributed by the pharmacy?

yes, no (Circle your answer)

4. When medications are brought in by the patient, is the patient allowed to use these medications within the hospital?

yes no (Circle your answer)

4.1 If no, does the pharmacy receive and store these medications?

yes no (Circle your answer)

4.2 If the answer is yes to 4.1, do you use a standard claim check to identify them?

yes no (Circle your answer)

4.3 If the choices above do not describe your procedures, please explain?

_____

_____

_____

_____

_____

5. How are your orders received in the pharmacy?

	Percentage
a. Messenger	_____
b. Pneumatic tube system	_____
c. Teletype	_____
d. Dumb waiter	_____
e. Pickup by pharmacy personnel	_____
f. Delivered by ward personnel	_____

6. In what form are your orders received?

	Percentage
a. Physician's written order	_____
b. An NCR duplication	_____
c. Phone order from physician	_____
d. Phone order from nursing personnel	_____
e. Other (Specify)	_____

7. What information do you usually require on a telephone order? (Circle your answer)

a. Patient's name

b. Patient's hospital number

c. Patient's room number

d. Patient's room number

e. Name and quantity of drug

f. Route of administration of drug

g. Strength of dosage and frequency of administration

h. Expiration or discontinuance date

i. Ward, service, or clinic

j. Other (Please describe)

8. Are copies of medication orders kept by the pharmacy?

yes no (Circle your answer)

8.1 If yes, are they filed? (Circle your answer)

a. By patient's name, alphabetically

b. By patient's hospital number

c. By prescription or order number

d. By ward, service, or clinic

e. By time (week, month)

f. Other (Please describe)

9. Are other dispensing or patient medication records kept?

yes no (Circle your answer)

9.1 If yes, in what form are these records kept?

a. Notebook record of patient and medication

b. Card file of patient and medication

c. Floor records utilized as pharmacy dispensing records

d. Other (Please describe)

10. What information is recorded?

a. Patient's name

b. Patient's hospital number

c. Patient's room number

d. Physician's name

e. Prescription number

f. Date

g. Name or initials of person filling order

h. Name or initials of person checking order

i. Name and quantity of drug

j. Route of adiministration of drug

k. Strength of dosage and frequency of administration

l. Expiration or discontinuance date

m. Number of refills permitted

n. Type of order (stat, PRN, etc.)

o. Allergies

p. Diagnosis

q. Age

r. Other (Please describe)

11. Where are dispensing records kept? (Circle appropriate letters)

a. In pharmacy

b. On ward

c. Areas on ward designated as pharmacy

d. Other (Please describe)

12. Are pharmacy medication profiles maintained for all patients?

yes no (Circle your answer)

13. Do you check dosages on medication orders against list standard dosages?

yes no (Circle your answer)

14. Do you keep large floor stock in your hospital?

yes no (Circle your answer)

14.1 Are floor-stocks or drugs limited to emergency drugs, controlled substances (if handled in this manner) and routinely used, "safe" items such as mouthwash and antiseptics.

yes no (Circle your answer)

15. Is there a written stop order policy or equivalent mechanism for assuring that drug orders are not continued inappropriately?

yes no (Circle your answer)

16. Are unused packages returned to stock?

yes no (Circle your answer)

16.1 If yes, are they kept segregated as returned goods?

yes no (Circle your answer)

16.2 If unused packages are not returned to stock, what disposition is made of them? (Please describe)

17. Is there a routine system (pharmacy newsletter, etc.) for keeping the medical and nursing staffs informed about the drugs used in the hospital and about relevant pharmacy procedures?

yes no (Circle your answer)

17.1 If yes, please specify methods used.

_____

_____

_____

_____

18. If the pharmacy has a formal drug information center, is a written log maintained of all requests?

yes no (Circle your answer)

Dose Preparation, Extemporaneously Compounded Non-Sterile Medication

1. Do you prepare such items?

yes no (Circle your answer)

1.1 If yes, how many such items do you prepare daily?

a. 0-5

b. 6-10

c. 11-15

d. 16-20

e. Other (Please describe)

2. Does your hospital have a standard formula book?

yes no (Circle your answer)

3. What does most of your non-sterile compounding consist of? (Circle one or more letters a to e)

a. Ointments or cream

b. Liquids

c. Non-sterile irrigating solutions

d. Capsules or tablets

e. Other (Please describe)

4. Do you record information about the compounding in addition to what is recorded in dispensing or patient medication records?

yes no (Circle your answer)

4.1 If yes, what information do you record about the compounds, and what do you put on the label? (Answer by placing X marks in the appropriate spaces below)

	Record	Label
Name and quantity of drug	_____	_____
Name and quantities of ingredients	_____	_____
Manufacturer of ingredients	_____	_____
Lot number of ingredients	_____	_____
Dosage form	_____	_____
Strength of dosage	_____	_____
Route of administration	_____	_____
Date prepared	_____	_____
Expiration date	_____	_____
Name or initials of person compounding	_____	_____
Name or initials of person checking compounding	_____	_____
Other (Specify)	_____	_____

5. Do you use a horizontal mechanical conveyor within the pharmacy?

yes no (Circle your answer)

VII. Dose Preparation-Sterile

1. Do you prepare sterile medications?

yes no (Circle your answer)

If yes, continue 1.1 to 5

If no, go to next section

1.1 Approximately what percentage of your prescription workload is involved in such preparation. (Circle appropriate letter below)

a. 0-20%

b. 21-40%

c. 41-60%

d. 61-80%

e. Other (Please specify)

2. What type or types of sterile medication do you prepare? (Circle appropriate letters and indicate percentages)

	Percent
a. IV	_____
b. Irrigation solution	_____
c. IV with additives	_____
d. Opththalmic	_____
e. Other (Please describe)	_____

3. Are sterile products checked in the pharmacy for vacuum?

yes no (Circle your answer)

4. Are sterile products checked in the pharmacy for clarity?

yes no (Circle your answer)

5. Are samples of sterile products usually sent to the laboratory?

yes no (Circle your answer)

6. Is all preparation of sterile products (parenteral admixtures, piggybacks, etc.) done in the pharmacy?

yes no (Circle your answer)

1.1 If no, please list other areas where sterile products are prepared.

VIII. Bulk Compounding

1. Is manufacturing of bulk compounds done in your pharmacy?

yes no (Circle your answer)

If yes, continue 2 to 4

If no, go to next section

2. Does bulk compounding represent more than 10% of your total prescription workload?

yes no (Circle your answer)

3. What information do you record about bulk compounds, and what do you put on the labels? (Answer by marking the appropriate spaces below)

	Record	Label
Name and quantity of compound	_____	_____
Names and quantity of raw materials	_____	_____
Manufacturer of raw materials	_____	_____
Lot number of raw materials	_____	_____
Control number	_____	_____
Expiration date	_____	_____
Name or initials of person compounding	_____	_____
Name or initials of person checking compound	_____	_____
Other (Please describe)	_____	_____

4. Are completed compounds stored in quarantine until checked by laboratory?

yes no (Circle your answer)

IX. Transfer to Units

1. After medications are produced, what forms of transport do you use to send them to the floors? (Circle appropriate letters and indicate percentage)

	Percentage
a. Cart or tray	_____
b. Pneumatic tube	_____
c. Dumb waiter or mechanical conveyor	_____
d. Messenger	_____
e. Delivery by pharmacy personnel	_____
f. Pick-up by nursing personnel	_____
g. Other (Please specify)	_____

2. Are medication delivery records kept?

yes no (Circle your answer)

If yes, where can they usually be found?
(Circle one or more letters below)

a. On floor

b. In pharmacy

c. In designated areas outside central pharmacy

d. In the nursing office on each floor

e. Other (Please describe)

3. After delivery has been made to the floor, does the pharmacy in any way help to organize the administration of the medications to patients?

yes no (Circle your answer)

3.1 If yes, how? (Please describe)

X. Storage and Inventory

1. How is storage of drugs arranged in your pharmacy?
(Circle one or more letters below)

a. By generic name

b. By chemical name

c. By manufacturers (trade or brand) name

d. By therapeutic classification

e. By fast or slow-moving items

f. By storage requirements such as security, temperature, etc.

g. Other (Please describe)

2. Do you use inventory control cards in your pharmacy?

yes no (Circle your answer)

2.1 If yes, do you update inventory cards after items are checked in, with storage or damaged items noted?

yes no (Circle your answer)

3. If you use some other type of inventory control please describe.

4. Is a formal inventory ever taken in your pharmacy?

yes no (Circle your answer)

4.1 If yes, will your inventory be a storeroom and overstock inventory or a total inventory of everything in the pharmacy? (Circle a or b below)

a. Storeroom and overstock

b. Total

5. Are all drug storage areas (including emergency kits) inspected by a pharmacist or a trained technician at least every 30 days, with a written record being maintained of these inspections?

yes no (Circle your answer)

XI. Equipment

1. Do you use any computer or automated data processing equipment in your pharmacy?

yes no (Circle your answer)

1.1 If yes, what kind of equipment?
(Circle one or more letters a to d. below)

a. Card punch

b. Card reader

c. Teletype printer

d. Other (Please specify)

1.2 What is the equipment used for?
(Circle one or more of letters a to e below)

a. Receiving orders

b. Processing charges or credits

c. Ordering stock replacements

d. Printing labels

e. Other (Please specify)

2. How adequate is your present equipment for carrying out the following activities? (Check one for each item)

	Very Adequate	Adequate	Poor	Very Inadequate
Prescription dispensing	☐	☐	☐	☐
Non-sterile extemporaneous compounding	☐	☐	☐	☐
Bulk compounding manufacturing	☐	☐	☐	☐
Sterile product manufacturing	☐	☐	☐	☐
Unit dose and other prepackaged preparations	☐	☐	☐	☐
Product control (assay, sterility testing, etc.)	☐	☐	☐	☐
Product development & special informations	☐	☐	☐	☐
Delivery to inpatient areas	☐	☐	☐	☐
Records and Office procedures	☐	☐	☐	☐
Library reference facilities	☐	☐	☐	☐

IX. DISTRIBUTION:

Defense Documentation Center (2)

HQDA (DASG) (1)

Dir, Joint Medical Library, Offices of The Surgeons General, USA/USAF, The Pentagon, RM 1B-473, Washington, DC 20310 (1)

USA HSC (ATTN: HSPA-C)(2)(ATTN: HSCM-R) (5)

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