A SURVEY OF DRUG FORMULARY
PROCEDURES IN NAVAL HOSPITALS
AND THE FEASIBILITY OF CHANGE

by

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ABSTRACT

Formulary compilation and revision is a time-consuming task undertaken by all Naval Hospital pharmacists. If this effort were consolidated, there would be economies of both time and effort. Such a consolidation could be accomplished by making electronic data processing card decks available to each individual command. These card decks would contain common formulary information, allowing each hospital to select the desired information.

A survey was made to determine the present status of formularies in Naval Hospitals and to gauge the acceptance of a standardized formulary format by Naval pharmacists.

To obtain this information, Chiefs of Pharmacy Service at all 39 Naval Hospitals in the United States and overseas were surveyed.

The results showed the majority of Naval formularies listed their drugs under both generic and proprietary names in alphabetic and therapeutic sections. Other information listed was strength, form and category. Most formularies were revised at yearly intervals, with an average time spent of 30 hours per year.

Most of the Naval Hospital pharmacists surveyed were in favor of a consolidated Navy formulary and in agreement as to its contents. Six recommendations were made based on the results.

CHAPTER 1

INTRODUCTION

The hospital formulary is used as a part of the formulary system to inform the hospital staff about accepted therapeutic agents available for their use. Some kind of formulary is found in a majority of Naval Hospitals. In 1964 Francke, Latiolais, Francke and Ho found that 85 percent of Naval Hospitals had formularies.

There are two basic reasons that suggest the need for formularies in Naval Hospitals. The first is the economics of the system within which the Navy operates. This system is based on generic drugs supplied by a central source. The second reason is the requirement made by the Joint Commission on Accreditation of Hospitals. The Commission states, "The Pharmaceutical Service should be responsible for . . . participating in development of a hospital formulary" (Davis 1971, page 14). Accreditation by the Joint Commission on Accreditation of Hospitals is mandatory for all Naval Hospitals.

The formulary system used in the United States Naval Hospitals differs from its civilian counterpart because the commanding officer, and not the staff, of the federal government hospital confirms or denies the recommendations of the Pharmacy and Therapeutics Committee. There is another difference in the Navy's major source of medical supplies. The Federal Supply System buys and stores drugs centrally allowing for lower medication costs than non-federal hospitals. The individual Naval

Hospital is obliged to support this system both from the aspect of economics as well as the need for total participation to continue the system.

Formularies in Naval Hospitals vary from drug lists to monographed formularies. Tober (1964) describes an automated formulary containing four sections totaling 151 pages being used in a Naval Hospital. Much of the time that Naval pharmacists spend on their formularies could be reduced through the central consolidation of information which, at the present time, is individually researched for formulary compilation. If such information were available in a data processing card file, the Naval pharmacist could add, subtract or retain cards to generate a data processing print-out, the basic framework of his formulary. It is desirable, therefore, to reduce the time spent by Naval Hospital pharmacists on formularies without sacrificing quality.

Purpose

This study was undertaken to ascertain the current formulary practices in Naval Hospitals and to determine if Naval pharmacists are amenable to change in their methods of preparing formularies. Other determinations to be made were the acceptance of a standardized Naval Hospital formulary, the concurrence on the format of such a formulary and the availability of facilities to carry out such a consolidation.

The scope of pharmacy practice in the Navy has the great potential to expand in coming years. The implementation of unit dose, intravenous additive, patient profile, patient consultation and clinical programs will demand much of the pharmacist's time. This time

is at a premium in most Naval Hospital pharmacies, but some consideration must be given these new programs. However, the preparation and revision of the formulary is an essential task and progress of Navy pharmacy will not be aided by offering advanced programs while sacrificing its basic operations. Therefore, there is need to determine the feasibility and contents of a consolidated, centralized Navy formulary.

Definitions

Bureau of Medicine and Surgery: Controlling section of the Medical Department of the United States Navy.

Chief of Pharmacy Service: Registered pharmacist in charge of a Naval Hospital Pharmacy Service.

Chief of Service: Chief of clinical service in a Naval Hospital.

Chief of Staff: Chief of medical staff, second medical officer to the Commanding Officer.

Commanding Officer: Physician, first in line of command in a Naval Hospital.

Drug List: A publication listing drugs normally stocked in pharmacy.

Electronic Data Processing Formulary Card File: An electronic data processing card file to be used as core for formulary make-up.

Executive Officer: Second to Commanding Officer in line of command in a Naval Hospital.

Formulary: A compilation of varied information concerning drugs stocked for use in prescribing.

Formulary System: A system requiring physicians of a particular facility to use drugs found in the local formulary or make application and provide justification for other drugs to be used.

FSN: Federal Stock Number--identification of Standard Stock Item.

Naval Hospital: A United States federal government hospital under the control of the Bureau of Medicine and Surgery located on United States soil.

Open Purchase Drugs: Drugs other than those supplied through the Federal Stock System, bought on the open market.

OTC: Over the Counter (Drug)--a drug sold without the requirement of a prescription.

Pharmacy and Therapeutics Committee: A local hospital committee which, among other duties, screens and recommends drug usage to the Commanding Officer of that hospital.

Standardized Formulary: A formulary produced from a central Electronic Data Processing Formulary Card File. Additions and deletions may be made to reflect local preference in drugs.

Standard Stock Drugs: Drugs supplied through the Federal Stock System.

United States Naval Hospital: Same as Naval Hospital but located on foreign soil.

CHAPTER 2

RELATED LITERATURE

The focal point of written material about the hospital formulary is the Statement of Guiding Principles on the Operation of the Hospital Formulary System. It was originally issued in 1960 by the American Hospital Association and the American Society of Hospital Pharmacists and reissued in a revised form in 1964 approved by the American Hospital Association, American Society of Hospital Pharmacists, American Medical Association and the American Pharmaceutical Association. Following the 1964 version of the Principles allows a pharmacist to organize an effective system while avoiding the pitfalls of inexperience. Although of little relevance in a study of a military system, much of the literature about the Principles has dealt with the legal basis of the system (Fink 1974, Francke 1961, Willcox 1960). Other references have more applicability. Lawson (1962) explained and broadened the meanings of the Principles. Brodie (1963) found reason to critique the Principles on several points. He wrote of the Principles, " . . . a complex monstrosity that has little chance of being put to effective use" (page 287). More specifically, he challenged the advisory capacity of the Pharmacy and Therapeutics Committee, use of the pharmacist's judgment and generic drug substitution as they appear in the guidelines.

Another contribution made by the American Society of Hospital Pharmacists is the American Hospital Formulary Service (1973). Seim and

Kabat (1966) made a survey comparing usage of the American Hospital Formulary Service with other compendia. They found usage of the former quite low. This was attributed to difficulty in using it and caused mainly by lack of familiarity with it. Also in 1966, Lamy and Flack made a survey of the current status of the American Hospital Formulary Service. At that time, the authors recommended the use of a deck of data processing cards for printing of a basic list of drugs in a hospital. Provost (1968) reported a computerized drug list was being prepared to augment the American Hospital Formulary Service. These efforts resulted in the development of the Drug Product Information File (Dougherty 1971). Muno (1967) told how to use the American Hospital Formulary Service alone or in conjunction with a drug list as a basis for a local hospital formulary.

The possibilities of applying data processing equipment to the hospital formulary were recognized by Lamy, Bourn and Flack (1961). Later Tober (1964) wrote concerning the use of data processing in hospital pharmacy. An application in which Tober used electronic data processing was the production of a hospital formulary, one of the first such in Naval Hospitals. Flack, Downs and Lanning (1967) in comparing different formulary systems, found the electronic data processing method of producing a formulary to be easiest, most accurate, less time-consuming, less expensive and requiring minimal storage space. Frankenfeld, Black and Dick (1971) outlined automatic formulary printing using the computerized Drug Product Information File. Some of the features developed in this University of Iowa Hospital Formulary were

automatic index and contents, an automatic page reference and the first use of lower case letters as well as upper case letters with electronic data processing methods.

The text Mirror of Hospital Pharmacy by Francke, Latiolais, Francke and Ho (1964) devotes a chapter to the Pharmacy and Therapeutics Committee and the formulary system. The material deals with the history and interrelation of the Committee and the system. Much of the information contained is in the form of tables derived from current studies about hospital formularies. Another text, Hospital Pharmacy by Hassan (1967), makes a differentiation between drug lists and formularies and enumerates contents to be found in each. Also of interest are the sample formulary pages which Hassan uses to demonstrate the variety possible in hospital formulary make-up.

In Naval Hospitals there are three classifications of drugs. These classifications based on their source are standard stock, open purchase, and locally compounded drugs. The standard stock drugs are those supplied through the Federal Stock System. They are bought on contract in large lots and resold to individual Naval Hospitals through a generic catalog. This is the largest group of drugs used in a Naval Hospital. Open purchase drugs are those bought on the open market. This group of drugs is limited to 25 percent of the total medication costs which directs the majority of purchases into the standard stock category. The third group is compounded drugs, which are manufactured at the individual hospitals.

Methods of formulary revision available to Naval pharmacists include Withdraw and Reissue, Send Information and Pen and Ink Change

methods. The Withdraw and Reissue method requires the pharmacy to withdraw all copies of the formulary and replace pages containing the changes desired, then reissue the revised formulary. In the Send Information method some written form of formulary changes, often a memo, is sent to the formulary holders who are expected to integrate the information into their formularies. In the third method pen and ink changes are made either by personnel in the pharmacy or on the ward by writing them into the formulary. This third process can sometimes be considered an extension of the Send Information method, since pen and ink changes may be made from a memo sent to the ward relating drug changes.

Much has been written about hospital formularies over the years. With the need for Navy pharmacy to move into other fields, the best method of automating the formulary process within the Navy must be determined.

CHAPTER 3

DESIGN OF THE STUDY

Methodology

A cover letter explaining the purpose of the study, a questionnaire and sample formulary pages were pretested soliciting written comments from two Chief Pharmacists at two different Naval Hospitals. The sample formulary pages were included to complement the questionnaire by demonstrating possible alternatives. A wide range of alternatives is offered using the two sequences in combination with the ten components found in these sample formulary pages.

After making necessary adjustments based on comments from the pretest, the cover letter (Appendix A), questionnaire (Appendix B) and sample formulary pages (Appendix C) were sent to all 39 Naval Hospitals under the control of the Bureau of Medicine and Surgery, Navy Department. Thirty-one of these are in the United States and eight are outside of the continental United States. They range in bed size from 35 to 1700, as listed in the Journal of American Hospital Association ("Guide Issue" 1973), with a mean bed size of 304. One month subsequent to mailing the questionnaire, a follow-up postcard (Appendix D) was sent to each hospital which had not yet responded. Responses then were tabulated and the information analyzed.

CHAPTER 4

RESULTS AND DISCUSSION OF DATA

The data in the questionnaire was divided into several areas. Information about the present status of the formulary in Naval Hospitals was sought, as well as the willingness of the Naval pharmacists to change to a more standardized format. Inquiry was also made about facilities, personnel and programs.

Of 39 hospitals in the population surveyed, 38 responded to the questionnaire for a 97.4 percent return. The official designation defined Naval Hospitals as those within the United States and United States Naval Hospitals as those on foreign soil. For the purpose of this study, all hospitals in the survey were designated as Naval Hospitals. Table 1 shows the bed capacity of Naval Hospitals responding.

Table 1. Distribution by bed size of thirty-eight Naval Hospitals responding to the questionnaire.

Bed Capacity	Responses
99 or less	13
100 to 299	12
300 to 599	6
600 and over	7

The second principle of the Statement of Guiding Principles on the Operation of the Hospital Formulary System (1964) states "The hospital formulary system shall be sponsored by the medical staff based upon recommendations of the Pharmacy and Therapeutics Committee" (page 2). A portion of principle number three goes on: "written policies and procedures governing the hospital formulary system as developed by the Pharmacy and Therapeutics Committee . . . shall afford guidance in evaluation or appraisal, selection, procurement, storage, distribution, use, safety procedures and other matters relating to drugs in the hospital" (page 2). In this survey, 36 of the 38 (97.3 percent) respondents indicated that their Pharmacy and Therapeutics Committees made recommendations on additions and deletions of drugs to the formulary. One hospital did not respond.

Based on the three classifications of drugs used in Naval Hospitals, the respondents were asked about the actions of their Pharmacy and Therapeutics Committees. The survey showed that 30 out of 38 Pharmacy and Therapeutics Committees made recommendations on all drugs used in the hospital. Three (7.8 percent) Pharmacy and Therapeutics Committees made recommendations on open purchase drugs only. This practice of only making recommendations on open purchase drugs can be accounted for in several different ways. One possible reason could be preferred consideration given to open purchase over standard stock drugs. This thinking can be rationalized by saying that the Navy has already approved the standard stock drugs leaving no necessity for review again. With this philosophy, however, a hospital could be sacrificing some of its prerogatives.

Short term usage of any drug can demonstrate another possibility to explain this finding. One of the survey respondents wrote that in his hospital a limited one-month supply of any drug may be purchased without review by the Pharmacy and Therapeutics Committee. Two respondents answered affirmatively both questions about Pharmacy and Therapeutics Committee recommendations on drugs, indicating a misunderstanding of the questions.

Four of the Naval Hospitals, where pharmacists considered their publications to be drug lists, also reported use of the American Hospital Formulary Service on nursing units. This system can be demonstrated by the method described by Muno (1967). The drug list complements the American Hospital Formulary Service, providing a more complete but more costly formulary system.

One of the survey respondents wrote that "copies of the American Hospital Formulary Service were available on hospital wards in the past but were never used--a waste of money". This supports earlier findings by Seim and Kabat (1966).

When pharmacists were asked to evaluate their own formularies, 23 felt it to be a formulary, 22 thought of it as a drug list, and seven said it was both. This indicated some amount of confusion in the minds of part of the population concerning either their publications or the definitions represented in the questions.

The general composition of present Naval Hospital formularies is shown in Table 2. The most widely used sections were 'alphabetical and therapeutic which appear in 35 (92.0 percent) and 30 (78.9 percent)

Table 2. Frequency of eight selected sections in present formularies of thirty-eight responding Naval Hospitals.

Sections	Affirmative Answers
Alphabetical Listing	35
Therapeutic Listing	30
General Instructions	10
Locally Manufactured Items	6
Reconstitution and Stability	2
Poisoning and Toxicology	1
O T C Drug Table	1
Available Prepak List	1

Naval formularies, respectively. The alphabetical section in one hospital's formulary was further subdivided into oral, parenteral, otic and nasal, rectal and vaginal, and dermal and ophthalmic routes of administration. This further subdivision in drug listing could provide better access to the information, particularly to the various medical specialties represented by the categories.

Twelve formularies were received in response to the request in the cover letter. A review of these twelve formularies showed that ten used the American Hospital Formulary Service therapeutic classification index (Appendix E) and that two other Naval Hospital formularies have adopted classifications (Appendices F and G) which differ from this standard. The latter are attempts to expand and improve the

classifications listed in the former. However, the American Hospital Formulary Service therapeutic classification has the advantage of widespread usage over other classifications.

Of those surveyed, ten had formularies which included sections of general instructions and six had formularies which included listings of locally manufactured items (Table 2). Under the title of general instructions were found many different sources of information including drugs normally prepackaged, prescribing limitations, listings of controlled drugs and their regulation, handling of investigational drugs, prescription writing, weights and measures equivalency tables, standard container lists and lists of approved abbreviations and chemical symbols. The increase in availability of commercial drugs in the Federal Stock System could be considered the main cause for the decreased number of locally manufactured pharmaceuticals. This would make the federally stocked drugs more economical in terms of man-hours and patient safety as well as money.

One formulary contained a reconstitution and stability section listing commonly used parenterals. This section detailed reconstitution and stability of both refrigerated and room temperature injectables. Another formulary included an O T C Drug Table which was basically for use in accidental poisoning and listed the preparations' ingredients and toxicological potential.

More specific information included in present formularies is represented in Table 3. This data was mainly found included in alphabetical and therapeutic sections, though not limited to these areas.

Table 3. Frequency of thirteen specific components in present formularies of thirty-eight responding Naval Hospitals.

Component	Affirmative Answers
Generic Name	36
Proprietary Name	36
Drug Form	36
Strength	36
Category (Use)	31
Cross-index	29
Quantity to be Dispensed	10
Cost of Drug	6
Dose	5
Monographs	4
FSN (Source)	3
Toxicology	2
Cautions	1

Of the 38 surveyed 36 pharmacists listed both generic and proprietary names of drugs in their formularies, though only 29 pharmacists reported their publications to be cross-indexed. Thirty-six (94.7 percent) respondents also indicated that drug forms and strengths were found in their formularies. Category or use of drugs was reported by 31 (81.5 percent) of those surveyed. Beginning with quantity to be dispensed in the listing of Table 3 the numbers are smaller. Of these results ten

pharmacists included recommendations on quantities of drugs to be dispensed. In a military hospital these are more than recommendations in that limitations are set with command approval. They are to be enforced by the pharmacy and followed by the medical staff. The specific component FSN (source) was found in three (7.9 percent) Naval formularies. The letters FSN stand for Federal Stock Number and indicate how the drug was purchased, that is, obtained through standard stock system, open purchase or locally compounded.

Table 4 shows the ages of the initial compilation of present Naval formularies. The majority of publications were compiled within the last two years. Those formularies more than two years old were found in the larger hospitals, all having a bed size capacity higher than 600. This could be indicative of several different possibilities. Pharmacists in smaller hospitals perhaps are able to devote more time to their formularies. Larger hospitals may have more stable Pharmacy Service direction, or may have a formulary format which does not require frequent change.

The information compiled about the time spent on the original compilation of Naval formularies was insufficient to draw any conclusions. Seventeen pharmacists (44 percent) reported that they did not know what the original production time was. Seven pharmacists (18.4 percent) reported this statistic in terms of months' duration of time when the formulary was being worked on rather than total man-hours as 13 pharmacists responded.

As shown in Table 5, 14 pharmacists (36.8 percent) did not know how much time was spent on revising their formularies. This

Table 4. Age of original formulary publication in thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Age of Formulary				Not Known
	1 Year	2 Years	3 Years	4 Years	
99 or less	7	4	0	0	2
100 to 299	4	6	0	0	2
300 to 599	3	1	0	0	2
600 and over	1	1	2	2	1
Totals	15	12	2	2	7

Table 5. Amount of time spent on formulary revision in thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Hours				Not Known
	Up to 15	16 to 30	31 to 60	Over 60	
99 or less	2	2	1	1	7
100 to 299	4	2	3	1	2
300 to 599	0	2	2	1	1
600 and over	1	0	1	1	4
Totals	7	6	7	4	14

finding is understandable considering that most people make no record of time spent on a process unless required to do so and an estimation of time spent is not always accurate nor easy to establish. The rest of Table 5 shows that the larger hospitals (above 300 beds) spent slightly more time on revisions than the smaller hospitals. Six of 25 hospitals with less than 300 bed size spent less than 15 hours on revisions whereas one out of 13 hospitals over 300 beds used less than 15 hours. This may be explained by the results from Table 4 showing larger hospitals had older original publications.

Twenty-seven Naval pharmacists revised their formularies at least yearly as indicated by Table 6. Hospitals making revisions in their formularies every two years and longer may be limiting the effectiveness of their publications. Two of the hospitals reported a monthly

Table 6. Frequency of formulary revision in thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Frequency						As Needed	Not Known
	Monthly	Every 6 Months	Yearly	Every 2 Years	Longer			
99 or less	0	3	5	2	1	0	0	2
100 to 299	1	3	7	0	0	1	0	0
300 to 599	0	1	3	2	0	0	0	0
600 and over	1	0	3	1	1	0	0	1
Totals	2	7	18	5	2	1	0	3

revision of their formularies in conjunction with changes generated by the Pharmacy and Therapeutics Committee meetings. This is an excellent means of keeping the publication up to date with the latest decisions on drugs.

Although 29 pharmacists reported the availability of electronic data processing at their hospitals, only 24 respondents used it in formulary preparation. Of the other possible formulary production methods, eight respondents typed stencils, five reported using commercial printing and one Naval pharmacist mimeographed his formulary. Facilities associated with the production of formularies such as printing shops and photo labs were found in many Naval Hospitals. Twenty-three of the hospitals surveyed had access to a print shop either in the building or at an allied facility. A photo lab was available to 20 of those surveyed. Photographic services are very useful when reduction of formulary size is desired. One formulary received by the author had been reproduced in this way in order to fit into the physician's coat pocket.

Table 7 shows that 23 (60.5 percent) formularies were revised by the Withdraw and Reissue method. The next highest number of formularies, 14 (36.8 percent), used the Send Information method. These findings may be ameliorated by the fact that some Naval pharmacists reported using a combination of both the Send Information and Withdraw and Reissue methods. This combination should create more formulary effectiveness overall.

The Withdraw and Reissue method lends itself more to total pharmacy control than the other methods. The methods not controlled

Table 7. Frequency of three methods of formulary revision in thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Methods			
	Information	Withdraw & Reissue	Pen & Ink	Not Known
99 or less	2	9	1	1
100 to 299	8	4	1	0
300 to 599	2	5	1	0
600 and over	2	5	0	0
Totals*	14	23	3	1

* Total greater than population because some respondents used a combination of methods.

by the pharmacy tend to be more disorganized and haphazard, leading to a less effective publication.

In answer to the question about Naval formulary distribution 36 of the 38 respondents reported their formularies were distributed in three areas, the ward, clinic and doctor's office. The two exceptions gave negative answers in the clinic areas and were from hospitals with less than 300 beds. Four respondents indicated distribution to local civilian physicians either selectively or on a request basis.

The number of formularies distributed increased in proportion to the bed size capacity of the hospital (Table 8). There was a tendency for the number of formularies to equal one-half the number of beds in a given hospital. This tendency has some exceptions which

Table 8. Number of copies of formularies distributed by thirty-eight responding Naval Hospitals for four bed size categories.

Bed Capacity	Numbers Distributed					Not Known
	Up to 50	51-100	101-200	201-400	401-900	
99 or less	9	1	0	0	0	3
100 to 299	3	5	1	1	0	2
300 to 599	1	1	1	2	0	1
600 and over	0	1	1	2	2	1
Totals	13	8	3	5	2	7

might be explained by the practice of some Naval Hospitals to go beyond distribution of formularies in their own hospitals and to send their publications to civilian physicians in their communities.

The estimated use of Naval formularies by hospital staff is tabulated in Table 9. Twenty-two (57.9 percent) Chief Pharmacists thought their formularies got moderate use by the medical staff. The nursing staff used the formulary most extensively of the three groups. They were shown to compile six reports in the extensive use column. The group designated as other staff was composed chiefly of hospital corpsmen. These staff members used the formulary to the smallest extent. Although the nursing staff had a slight edge over the medical staff in formulary usage, the results in Table 9 demonstrated the distribution of the intended recipients of formulary information.

Table 9. Estimated use of formulary by hospital staff members in thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Staff	Use		
		Little	Moderate	Extensive
99 or less	Medical	3	9	1
	Nursing	6	7	0
	Other	10	3	0
100 to 299	Medical	4	6	2
	Nursing	5	5	2
	Other	6	6	0
300 to 599	Medical	1	4	1
	Nursing	3	1	2
	Other	4	2	0
600 and over	Medical	3	3	1
	Nursing	2	3	2
	Other	4	3	0
Totals	Medical	11	22	5
	Nursing	16	16	6
	Other	24	14	0

Table 10 shows the number of pharmacists found in the Naval pharmacies surveyed. Naval pharmacists are always registered pharmacists and generally commissioned officers. The use of civilian pharmacists employed by the Navy is on the rise today. There are 99 pharmacists in 38 Naval Hospitals averaging 2.6 pharmacists per hospital. Table 10 shows that the number of pharmacists in each hospital is quite varied. Actually the number of pharmacists per hospital varies in proportion to bed size of the institution. Twenty-eight (72.9 percent) of the hospitals surveyed reported having one or two

pharmacists. These were all smaller Naval Hospitals. In the medium bed size range, four hospitals each had three pharmacists. Those pharmacies employing more than three pharmacists were in hospitals with more than 600 bed size capacity. There was one 500 bed hospital which reported having one pharmacist and one pharmacy technician in the pharmacy due to the imminent closure of the hospital.

Table 10. Number of registered pharmacists staffed in thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Number of Pharmacists								
	1	2	3	4	5	6	8	11	12
99 or less	12	1	0	0	0	0	0	0	0
100 to 299	5	5	2	0	0	0	0	0	0
300 to 599	2	2	2	0	0	0	0	0	0
600 and over	0	1	0	1	1	1	1	1	1
Totals	19	9	4	1	1	1	1	1	1

Naval pharmacy technicians are secured in three different ways. The first is to enlist a registered pharmacist. However, the days of the enlisted registered pharmacist are past, since the demise of the Selective Service Act, which was often a factor in the enlistment of a registered pharmacist unable to obtain a commission. Another ramification of the situation is that enlisted pharmacists would be officially considered as Navy pharmacy technicians. The other methods are by

Navy Pharmacy Technician School or by on-the-job training. The school is the major means of training, with the on-the-job method used mainly as a back-up to the former. The survey showed (Table 11) that 22 Naval Hospitals (57.9 percent) had five or less pharmacy technicians assigned to them. Twelve hospitals (31.6 percent) used between six and nine pharmacy technicians, and there were four hospitals with over 600 beds that had billets for 12 to 29 technicians.

Table 11. Number of pharmacy technicians staffed in thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Number of Pharmacy Technicians												
	0	2	3	4	5	6	7	8	9	12	13	20	29
99 or less	0	7	1	3	0	0	2	0	0	0	0	0	0
100 to 299	0	1	3	3	2	1	0	1	1	0	0	0	0
300 to 599	1	0	0	0	1	1	1	0	1	0	1	0	0
600 and over	0	0	0	0	0	0	1	2	1	1	0	1	1
Totals	1	8	4	6	3	2	4	3	3	1	1	1	1

Thirty-three of the hospitals surveyed (86.8 percent) did not have a clerk-typist on the pharmacy staff (Table 12). Four of the five hospitals that did employ a typist were all over 300 in bed size capacity. The use of supply clerks was found to be more evenly spread out over all Naval Hospitals. When the job was not specifically billeted, these clerical positions were filled by other members of the pharmacy staff.

Table 12. Number of clerical positions employed in Naval Hospital pharmacies in thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Number of Clerk-typists			Number of Supply Clerks	
	0	1	2	0	1
99 or less	12	1	0	12	1
100 to 299	12	0	0	8	4
300 to 599	5	1	0	4	2
600 and over	4	2	1	5	2
Totals	33	4	1	29	9

On-the-job training is one method of preparation for becoming a Navy pharmacy technician. The trainee must be a member of the pharmacy staff for one year and in that time must receive training comparable to the Navy Pharmacy Technician School. Of the hospitals surveyed 15 Naval Hospitals (39.4 percent) had some on-the-job trainees as shown in Table 13. The number of trainees that a pharmacy can handle depends on the size of its staff. The larger hospitals had more trainees.

The last component of the Naval pharmacy staff to be considered were the General Service corpsmen. Ten hospitals had either one or two of these corpsmen (Table 14). Those pharmacies using more than three General Service corpsmen on their staffs were in hospitals with larger than 250 bed size capacity. Members of this group were used in non-professional tasks such as clerk-typist, supply clerk or other function.

Table 13. Number of on-the-job trainees being trained in Naval Hospital pharmacies in thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Number of On-the-job Trainees						
	0	1	2	3	4	6	15
99 or less	13	0	0	0	0	0	0
100 to 299	5	3	2	1	1	0	0
300 to 599	3	1	1	1	0	0	0
600 and over	2	2	0	0	1	1	1
Totals	23	6	3	2	2	1	1

Table 14. Number of General Service corpsmen employed in Naval Hospital pharmacies in thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Number of General Service Corpsmen						
	0	1	2	3	4	5	8
99 or less	9	2	1	1	0	0	0
100 to 299	7	1	3	0	0	1	0
300 to 599	4	1	1	0	0	0	0
600 and over	4	1	0	0	1	0	1
Totals	24	5	5	1	1	1	1

Table 15 indicated the participation of Naval pharmacies in some of the newer programs. Intravenous additive service was the most popular program according to the survey. Sixteen hospitals (42.0 percent) reported an intravenous additive service, but two of these reported it as a limited service. The term limited signifies a service providing anything from only hyperalimentation to a program carried out on a limited number of wards. The second ranking program in popularity was unit dose, with eight Naval pharmacies (21.0 percent) offering it. The modifications in the unit dose programs indicated in Table 15 were described by one of the respondents as individual patient medications sent to the ward in a five-day supply.

Table 15. Existence of four advanced programs in progress at thirty-eight responding Naval Hospitals by four bed size categories.

Bed Capacity	Programs			
	IV Additive	Unit Dose	Clinical Pharmacy	Patient Profile
99 or less	2	3*	0	1
100 to 299	3	1*	0	1**
300 to 599	4 (2**)	0	1**	0
600 and over	7	4	3	1
Totals	16	8	4	3

* Modified

** Limited

Looking at advanced programs in relation to the bed size of Naval Hospitals, there were 15 with over 600 beds accounting for 39.5 percent of the subject programs. Eighteen hospitals had no programs, eleven hospitals had one program, six hospitals had two programs, one hospital had three programs and one hospital had four programs in progress.

The respondents were asked in the questionnaire to explain the absence of advanced programs in their hospitals. Of those surveyed 24 (63.1 percent) listed lack of personnel, eleven (28.9 percent) reported lack of funds and eight (21.0 percent) listed lack of facilities as reasons. Other reasons reported in smaller numbers were lack of time, need not fully established and lack of acceptance by the command. There were four respondents whose reason for lack of programs was that their hospitals were due to close soon.

The sample formulary pages (Appendix C) were prepared to demonstrate the possibilities of content and form and to learn the preference of Naval pharmacists in a proposed consolidated formulary. These preferences are listed in Table 16. There is a similarity between this table and Table 3, both in the contents and the results. However, the results in Table 16 tend to show a higher number of affirmative answers indicating more desire for these elements to be included in the formulary than there is contained at present. Naval pharmacists were not asked their preference of the cross-index, but this component was present in 29 (76.3 percent) of the present Naval formularies indicating a desire for its inclusion.

Two additional components listed in Table 16 are ingredients and interaction, which received preference from 36 and 28 hospitals respectively. Of the interaction component, several respondents commented that they thought it would be nice to have but nearly impossible to implement.

Table 16. Preference indicated by number of responding Naval pharmacists for ten components of sample formulary pages.

Component	Number Indicating Preference
Drug Name (Generic or Proprietary)	38
Form	38
Strength	38
Ingredients	36
Category	35
Dose	33
Route	33
Interaction	28
Cost	28
FSN (Source)	21

The two sequences of information demonstrated in the sample formulary pages were chosen as examples of the predominant forms to be found in existence. Formulary A, the tabulated sequence, has the advantage of fewer data processing cards in preparation, but Formulary B,

the listing sequence, is easier to read. Twenty-six pharmacists (68.5 percent) preferred Formulary B, compared with 11 pharmacists (28.9 percent) in favor of Formulary A (Table 17). When asked for their support of their choices of the sample formulary pages as the basis for an all-Navy formulary, 36 Naval pharmacists (94.7 percent) replied in the affirmative. The two respondents who were not in favor of their choice as an all-Navy formulary felt that the proposal was "not necessary nor feasible" and the information was "readily and quickly available and the proposal is an unnecessary duplication".

Table 17. Preference by number of responding Naval pharmacists of two sequences demonstrated in sample formulary pages and choice by number of responding Naval pharmacists of such preference for an all-Navy formulary.

Sequence Preference and Choice for All-Navy Formulary	Number Indicating Preference
Formulary A, Tabulated Sequence	11
Formulary B, Listing Sequence	26
No Opinion Given	1
In Favor of Above Choice as All-Navy Formulary	35
Not in Favor of Above Choice All-Navy Formulary	2
No Opinion Given	1

Thirty-two respondents (84.2 percent) felt an all-Navy formulary would be time saving. Four Naval pharmacists (10.5 percent) answered negatively and two (5.3 percent) had no response. Of those in favor of the concept 23 respondents (71.3 percent) thought it would be of value in preparation of the original formulary and 30 respondents (93.0 percent) indicated that revisions would benefit. Thirty-one Naval pharmacists (81.5 percent) indicated that they would be interested in using such a system and four (10.5 percent) said they would not. The majority of those not interested in the all-Navy formulary concept also made comments indicating that they did not understand the mechanics of the proposal. Comments such as, "Variance in drug usage patterns at different facilities necessitates individual formularies" and "Formularies for each activity are more realistic" showed that these respondents did not realize that the proposal does not remove individuality of the local formulary. The form and method of formulary composition are the only elements to be standardized. This allows the individual hospital to vary the informational contents at will.

The comments made by many respondents in this survey were enthusiastic about the concept of a centrally prepared Navy formulary utilizing electronic data processing methods. These respondents, plus those who misunderstood the concept, indicate a good possibility of service-wide acceptance of a data processing prepared, consolidated formulary by Naval pharmacists.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The Pharmacy and Therapeutics Committees' overall activity in Naval Hospitals was commendable, though a few hospitals may not discharge their duties completely. There was little use of the American Hospital Formulary Service in Naval Hospitals. In smaller Naval Hospitals, where it was used, the pharmacists thought of their publications as drug lists.

Most Naval pharmacists had facilities for data processing and printing immediately available to them. Some respondents indicated access to facilities of allied organizations. One respondent claimed to have no such availability of any kind.

The average formulary in Naval Hospitals was less than two years old and contained alphabetical and therapeutic sections as basic framework. The American Hospital Formulary Service category system was used by most Naval formularies to catalog the therapeutic sections. The drug information contained within these sections was cross-indexed by generic and proprietary names, drug form, strength and use. The revisions of Naval formularies were done mostly within one year intervals taking up to 60 hours and primarily using the Withdraw and Reissue method.

The Naval formulary was used most extensively by the medical and nursing staffs of Naval Hospitals. There was little mention of usage of Naval Hospital formularies by civilian physicians.

Naval pharmacists have begun to provide several new services with intravenous additive the preferred program. More programs were offered in the larger Naval Hospitals. Lack of personnel, funds and facilities were reasons given for the absence of these programs in those hospitals not having them.

Most Naval Hospitals did not have enough qualified personnel to move into advanced programs. This was not as much of a problem in larger Naval Hospitals with three or more pharmacists on their staffs. They were able to add on these programs much more successfully than the smaller facilities. The larger hospitals have expanded their staffs to include clerk-typists, supply clerks and larger on-the-job training groups increasing their free time and allowing them to move into new areas of endeavor.

A majority of Naval pharmacists were in favor of all the components of the sample formulary pages with the exception of the federal stock number component. Those who were against inclusion of this component felt that such information was irrelevant to medical personnel using the formulary. Many respondents were in favor of the interaction component but did not think it possible to accomplish. They also preferred the Formulary B sequence over the Formulary A sequence, mainly because the B form was easier to read.

Most Naval pharmacists were interested in using the all-Navy formulary. Therefore, it was concluded that Navy pharmacists probably

would welcome and use the proposed consolidated formulary utilizing electronic data processing methods.

Recommendations

Recommendation No. 1: The Pharmacy and Therapeutics Committee in Naval Hospitals should strive for full control over all drugs used in their facilities. Although the majority indicated full control, there were still some hospitals in which the Pharmacy and Therapeutics Committees did not review all the drugs used in the hospital. For these hospitals, it is advised that they review their procedures to obtain better control over use of all drugs in the hospital.

Recommendation No. 2: Some guidelines should be distributed to Naval pharmacists to standardize formulary revision interval time. It is recognized that the individual hospital commands must have their autonomy, but some form of guideline would be welcomed and for the most part followed.

Recommendation No. 3: Formulary revisions should be made in conjunction with Pharmacy and Therapeutic Committee meetings. Depending on the frequency of committee meetings, some written form of formulary changes should be sent to formulary holders. This would not be the main revision but a means of keeping the formulary current.

Recommendation No. 4: An electronic data processing card deck with capacity to recreate a formulary similar to sample Formulary B should be made available to each Naval Hospital. The components preferably would include drug name, form, strength, ingredients, category, dose, route, interaction and cost. The therapeutic section of this

formulary would use the American Hospital Formulary Service classification of categories with some provision for subdivision of the alphabetical section into routes of administration. It is further recommended that color coded sections should be used in formularies to facilitate finding of desired information.

Recommendation No. 5: More attempts should be made by Naval pharmacists to provide the local civilian physicians with up-to-date formularies. Civilian physicians are becoming increasingly involved in care of patients eligible for Navy benefits. To improve their prescribing for such patients, the civilian physician should have better knowledge of the drugs available in the Navy pharmacy.

Recommendation No. 6: General information tables for inclusion in Naval formularies should be made centrally available. This information, like the basic formulary, should be in the form of electronic data processing card decks. Tables to be optional on a local level are:

Prescription Writing

Weights and Measure Conversions

Investigational Drugs

Standard Container Lists

Reconstitution and Stability of Parenterals

Over-the-Counter Drug Tables

APPENDIX A

COVER LETTER*

Dear Colleague:

In the years that I have been a Naval Pharmacy Officer, I have seen how there is always more to do than there is time to do it. The call today is for new programs that will best utilize the pharmacist and benefit the patient. It appears that what we need most is the time to develop these new programs and to find this time, we need to streamline some of our basic operations. One very time-consuming operation is maintenance of our local formularies.

I am sending you, and pharmacists of all other Naval Hospitals, a questionnaire designed as the first step toward an all-Navy formulary. From your response to this inquiry, I hope to compile a meaningful picture of the practices and thinking of Naval Pharmacists on the subject of the formulary. The composite findings of this study will be used to investigate the feasibility of an electronic data processed card file to be used as a core for local formularies.

Please fill out the questionnaire enclosed and make any additional comments that you think may be helpful. No individual or hospital will be identified in the tabulated results which will be used in partial fulfillment for a Master's Degree in Hospital Pharmacy.

The sample formulary pages are enclosed for guidance, and any comments you have about them will be gratefully accepted. In addition, I would appreciate receiving a copy of your present formulary which would be meaningful to the outcome of this project. In closing, let me say that your cooperation could help to accomplish something that might help us all, so please signify your support by returning the completed questionnaire in the enclosed envelope as soon as possible.

Thank you for your kind consideration.

Sincerely yours,

John R. Lucas
LCDR, MSC, USN
Graduate Student

Encl.

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* Sent on University of Arizona, College of Pharmacy letterhead

APPENDIX B

QUESTIONNAIRE

A. Present Formulary

1. Does the Pharmacy and Therapeutics Committee in your hospital make recommendations on:

Additions to formulary?	Yes <u> </u> No <u> </u>
Deletions from formulary?	Yes <u> </u> No <u> </u>
All drugs used?	Yes <u> </u> No <u> </u>
Open purchase drugs only?	Yes <u> </u> No <u> </u>

2. Formulary format:

Do you consider your publication as a	
Formulary?	Yes <u> </u> No <u> </u>
Drug list?	Yes <u> </u> No <u> </u>
What sections do you include	
Alphabetical?	Yes <u> </u> No <u> </u>
Therapeutic?	Yes <u> </u> No <u> </u>
Other (please list) _____	
What information is included in formulary?	
Generic drug name	Yes <u> </u> No <u> </u>
Proprietary drug name	Yes <u> </u> No <u> </u>
Cross-index of drug names	Yes <u> </u> No <u> </u>
Drug form	Yes <u> </u> No <u> </u>
Drug strength	Yes <u> </u> No <u> </u>
Categories (Use)	Yes <u> </u> No <u> </u>
Monographs	Yes <u> </u> No <u> </u>
Recommended quantity dispensed	Yes <u> </u> No <u> </u>
Usual dose	Yes <u> </u> No <u> </u>
Toxicology	Yes <u> </u> No <u> </u>
Other significant information included _____	

3. Do you use Electronic Data Processing in preparation of your present formulary? Yes   No

4. Is the American Hospital Formulary Service used on nursing units at the present time in your hospital? Yes   No

5. When was the original compilation made of the formulary now in use at your hospital? (mo./yr.) _____ Not known _____
If you directed this compilation, could you estimate the time spent on this phase? _____

A. Present Formulary (contd)

6. How is the formulary revised?
☐ Send information to formulary holders
☐ Withdraw formulary and make pen and ink changes
☐ Withdraw formulary and issue new publication
☐ Other method (please describe) _____
 _____
7. How often are revisions made?
☐ Every six months
☐ Yearly
☐ Every two years
☐ Longer
8. How many hours are spent on revision per year? _____
9. Use of formulary:
 (a) Where is the formulary distributed?
☐ On wards
☐ In clinics
☐ Doctors' offices
 (b) How many copies are distributed? _____
 (c) What is the estimated use by
     Medical staff   Little ☐ Moderate ☐ Extensive ☐
     Nursing staff   Little ☐ Moderate ☐ Extensive ☐
     Other staff members   Little ☐ Moderate ☐ Extensive ☐
10. What is the method of formulary preparation?
☐ Commercial printing
☐ Typing on a stencil
☐ Electronic data processing
☐ Other (please specify) _____
 _____

B. Proposed All-Navy Formulary (as outlined in letter to you)

1. Could this proposal save you time? Yes ☐ No ☐
 (a) If yes, in what areas?
☐ Preparation of original
☐ Revisions
2. Are you interested in using such a system? Yes ☐ No ☐
 For what reasons? _____
 _____

C. Facilities available at your hospital:

- ☐ Electronic Data Processing
☐ Printing Department
☐ Photo Laboratory

- D. Please list the number of personnel in your pharmacy in the following categories:
- ☐ Pharmacists
  - ☐ Technicians
  - ☐ Clerk-typists
  - ☐ Supply clerks
  - ☐ Other (please identify) _____

E. Programs now in progress at your hospital:

- ☐ Unit dose
- ☐ IV additive
- ☐ Patient profile
- ☐ Clinical pharmacy

1. Do you desire to have any of these programs if you do not have them presently? Yes ☐ No ☐

2. Are you able to identify reasons for lack of these programs?
- _____
- _____

F. Sample Formulary Pages

1. Please show your preference for
- ☐ Formulary A - Tabulated Sequence
  - ☐ Formulary B - Listing Sequence

2. Please indicate desire for information to be included in choice above:

- ☐ (a) Drug name
- ☐ (b) Ingredients
- ☐ (c) Form
- ☐ (d) Dose
- ☐ (e) Strength
- ☐ (f) Interaction
- ☐ (g) Cost
- ☐ (h) Route
- ☐ (i) Category
- ☐ (j) FSN

3. What would your reaction be to your choices above being the basis for an all-Navy formulary?

☐ In favor

☐ Not in favor. Please comment _____

_____

Thank you for your cooperation in answering this questionnaire.

John R. Lucas
 LCDR, MSC, USN
 Graduate Student

APPENDIX C

SAMPLE FORMULARY PAGES

Formulary A, Tabulated Sequence, Alphabetical Section

DRUG/INGREDIENTS	FORM/DOSE	STRENGTH/INTERACT	COST/ROUTE	CAT/FSN
DIGOXIN (LANOXIN)	TAB MAINT 0.125-0.75MG QD	0.125 MG DRUG	0.95/100 ORAL	2404
DIGOXIN	TAB MAINT 0.125-0.75MG QD	0.25 MG DRUG	0.38/100 ORAL	2404 116-7750
DILANTIN (DIPHENYL- HYDANTOIN)	CAP 100 MG TID-QID	100 MG DRUG	0.69/100 ORAL	2812 584-2338
DILANTIN	CH TAB 5 MG/KG/DAY TO 300 MG	50 MG DRUG	0.50/100 ORAL	2812 687-8486
DILANTIN	INJ 50 MG/MIN(MAX)	250 MG/VL DRUG	0.83/5ML IM IV	2812 823-7985
DILANTIN	SUSP 5 MG/KG/DAY TO 300 MG	125 MG/5ML DRUG	0.55/8 OZ ORAL	2812 890-1110
DIMENHYDRINATE SEE DRAMAMINE				
DIMETAPP DIMETANE-PHENYLEPH-PHENYLPROP/1 TO 2 TSP TO QID	ELIXIR	4MG-5MG-5MG/5ML DRUG	0.44/4 OZ ORAL	0400 890-1892
DIMETAPP DIMETANE-PHENYLEPH-PHENYLPROP/1 BID	LA TAB	12MG-15MG-15MG DRUG	1.14/30 ORAL	0400 890-1891

Formulary A, Tabulated Sequence, Therapeutic Section

DRUG/INGREDIENTS	FORM/DOSE	STRENGTH/INTERACT	COST/ROUTE	CAT/FSN
<u>CARDIOVASCULAR DRUGS</u>				
<u>CARDIAC DRUGS</u>				
ANTROMID S (CLOFIBRATE)	CAP 500 MG QID	500 MG DRUG	5.04/100 ORAL	2404 998-5872
CEDILANID D (DESLANOSIDE)	INJ 8 ML/12 HRS	0.2 MG/ML DRUG	0.26/4 ML IM IV	2404
DIGITALIS DIGITALIS LEAF	TAB MAINT 100 MG QD	100 MG DRUG	0.22/100 ORAL	2404 116-6500
DIGITOXIN	INJ 1.2 TO 1.6 MG	0.2 MG/ML DRUG	0.14/ML IV IM	2404
DIGITOXIN	TAB MAINT 0.1 MG QD	0.1 MG DRUG	0.22/100 ORAL	2404 116-7685
DIGOXIN (LANOXIN)	ELIX 0.4 TO 0.8 ML	0.05 MG/ML DRUG	0.31/60 ML ORAL	2404 890-1726
DIGOXIN	INJ 1 MG IV	0.25 MG/ML DRUG	0.14/2 ML IM IV	2404
DIGOXIN	TAB MAINT 0.125 TO 0.75 MG QD	0.125 MG DRUG	0.95/100 ORAL	2404
DIGOXIN	TAB MAINT 0.125 TO 0.75 MG QD	0.25 MG DRUG	0.38/100 ORAL	2404 116-7750
INDERAL	INJ 1 TO 3 MG	1 MG/ML DRUG	0.51/ML IV	2404

Formulary B, Listing Sequence, Alphabetical Section

DIGOXIN (LANOXIN)

FORM: TABLET 0.125 MG COST: .95/100
 TABLET 0.250 MG .38/100 FSN:-116-7750
 DOSE: MAINTENANCE 0.125 TO 0.75 MG DAILY
 INTERACTION: DRUG
 USE: CARDIAC DRUG (2404)
 ROUTE: ORAL

DILANTIN (DIPHENYLHYDANTOIN)

FORM: CAPSULE 100 MG COST: .69/100 FSN:-584-2338
 DOSE: 100 MG TID TO QID
 FORM: CHEWABLE TABLET 50 MG COST: .50/100 FSN:-687-8486
 SUSPENSION 125 MG/5ML COST: .55/8OZ FSN:-890-1110
 DOSE: 5 MG/KG/DAY UP TO 300 MG
 ROUTE: ORAL
 FORM: INJECTION 250 MG/VIAL COST: .83/VIAL FSN:-823-7985
 DOSE: MAX 50 MG/MINUTE
 INTERACTION: DRUG
 USE: ANTICONVULSANT (2812)

DIMETAPP

FORM: ELIXIR COST: .44/4OZ FSN:-890-1891
 INGREDIENTS: BROMPHENIRAMINE 4 MG
 (PER 5 ML) PHENYLEPHRINE 5 MG
 PHENYLPROPANOLAMINE 5 MG
 DOSE: 1-2 TSP 3-4 TIMES A DAY
 FORM: EXTENTABS COST: 1.14/30 FSN:-890-1891
 INGREDIENTS: BROMPHENIRAMINE 12 MG
 PHENYLEPHRINE 15 MG
 PHENYLPROPANOLAMINE 15 MG
 DOSE: ONE BID
 USE: ANTIHISTAMINE-DECONGESTANT (0400)
 ROUTE: ORAL
 INTERACTION: DRUG

Formulary B, Listing Sequence, Therapeutic SectionCARDIOVASCULAR DRUGSCARDIAC DRUGS

ATROMID S (CLOFIBRATE)

FORM: CAPSULE 500 MG	COST: 5.04/100	FSN:-998-5872

CEDILANID D (DESLANOSIDE)

FORM: INJECTION 0.2 MG/ML	COST: .26/4ML	

DIGITALIS

FORM: TABLET 100 MG	COST: .22/100	FSN:-116-6500

DIGITOXIN (CRYSTODIGIN)

FORM: INJECTION 0.2MG/ML	COST: .14/ML	
TABLET 0.1 MG	COST: .22/ML	FSN:-116-7685

DIGOXIN (LANOXIN)

FORM: ELIXIR 0.05 MG/ML	COST: .31/60ML	FSN:-890-1726
INJECTION 0.1 MG/ML	.17/ML	
INJECTION 0.25 MG/ML	.14/2ML	
TABLET 0.125 MG	.95/100	
TABLET 0.25 MG	.38/100	

INDERAL (PROPANOLOL)

FORM: INJECTION 1 MG/ML	COST: .51/ML	

APPENDIX D

FOLLOW-UP POSTCARD

(Front)

UNIVERSITY OF ARIZONA
COLLEGE OF PHARMACY
TUCSON, ARIZONA 85721

ATTENTION: CHIEF PHARMACY SERVICE

(Back)

DATE

DEAR SIR:

THIS IS JUST A QUICK NOTE TO REMIND YOU TO FILL OUT
AND RETURN THE QUESTIONNAIRE THAT I SENT TO YOU A FEW
WEEKS AGO.

IF YOU HAVE ALREADY RETURNED THE NAVAL HOSPITAL
FORMULARY SURVEY, PLEASE DISREGARD THIS FOLLOW-UP POST-
CARD.

THANK YOU AGAIN FOR YOUR COOPERATION IN ASSIST-
ING WITH THIS SURVEY.

SINCERELY YOURS,

JOHN R. LUCAS
GRADUATE STUDENT

APPENDIX E

THERAPEUTIC INDEX CATEGORIES FOUND IN AMERICAN HOSPITAL FORMULARY SERVICE

<u>Category Number</u>	<u>Therapeutic Use</u>
0400	Antihistamines
0800	Anti-infectives
1000	Anti Neoplastics
1200	Autonomic Drugs
1600	Blood Derivatives
2000	Blood Formation and Coagulation
2400	Cardiovascular Drugs
2800	Central Nervous System Drugs
3600	Diagnostic Agents
4000	Electrolytic, Caloric and Water Balance
4400	Enzymes
4800	Expectorants and Cough Preparations
5200	Eye, Ear, Nose and Throat Preparations
5600	Gastro-intestinal Drugs
6000	Gold Compounds
6400	Heavy Metal Antagonists
6800	Hormones and Synthetic Substitutes
7200	Local Anesthetics
7600	Oxytocics
8000	Serum, Toxoids and Vaccines

Category NumberTherapeutic Use

8400	Skin and Mucous Membrane Preparations
8600	Spasmolytic Agents
8800	Vitamins
9200	Unclassified Therapeutic Agents

APPENDIX F

THERAPEUTIC INDEX CATEGORIES DEVELOPED BY DEFENSE MEDICAL MATERIAL BOARD*

<u>Index Number</u>	<u>Therapeutic Use</u>
0001	Abdominal Distention
0002	Acidifiers
0003	Alkalinizers
0005	Analgesics
0006	Anesthetics
0007	Anorexigenics
0008	Antacids
0009	Anthelmintics
0010	Antianemics
0011	Antiasthmatics
0012	Antibacterials and Anti-infectives
0013	Antibiotics
0014	Anticoagulants
0015	Anticonvulsants
0016	Antidiabetics
0017	Antidiarrheals
0018	Antidotes
0019	Antieczematics and Psoriatics
0020	Antiemetics and Antinauseants

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* Exact copy as received

<u>Index Number</u>	<u>Therapeutic Use</u>
0021	Antifungals
0022	Antigout
0023	Antihistamines
0024	Antihypertensives
0025	Antimalarials
0026	Antimigraine
0027	Antioxidants
0028	Antipruritics
0029	Antiseborrheic
0031	Antituberculosics
0032	Antivenin
0033	Astringents
0035	Blood and Blood Derivatives
0039	Caustics
0041	Cholinergics
0044	Counterirritants
0046	Demulcents, Protective
0048	Detergents
0049	Diagnostic and Clinical Aids
0052	Disinfectants
0053	Diuretics
0054	Dusting Powders
0056	Emetics
0057	Enzyme Preparations
0058	Expectorants/Antitussives

<u>Index Number</u>	<u>Therapeutic Use</u>
0059	Fecal Softeners
0060	Flatulence
0062	Gastrointestinal
0063	Heart Preparations
0064	Hormones
0066	Iodine Sources
0068	Laxatives and Cathartics
0069	Liquors, Medicinal
0070	Lubricants
0071	Nasal Decongestants
0074	Ophthalmics
0075	Otic Preparations
0078	Oxytocics
0079	Parasympatholytics
0080	Parasympathomimetics
0081	Pediculicides and Scabicides
0082	Pharmacy Necessities
0083	Psychotherapeutic Agents
0084	Radiopaque Media
0086	Rectal Suppositories
0087	Replenishers, Fluids
0088	Schlerosing Agents
0089	Sedatives - Hypnotic
0090	Skeletal Muscle Relaxants
0092	Solvents

<u>Index Number</u>	<u>Therapeutic Use</u>
0094	Stimulants
0096	Surgical Washes
0099	Sympathomimetics
0100	Throat Lozenges
0101	Urinary Tract
0102	Vaccines and Immunizing Agents
0103	Vaginal Preparations
0104	Vasodilators
0105	Vitamins
0107	Unclassified
0108	Carcinoma Management
0109	Antigout/Antiarthritic
0110	Dermatologicals

APPENDIX G

THERAPEUTIC INDEX CATEGORIES AS FOUND IN RESPONDENT'S FORMULARY*

Alkalinizing Agents
Amebicides
Analgesics, Antipyretics & Narcotic Analgesics
Androgens
Anemia Therapy
Anorectics
Antacids and Adsorbents
Anthelmintics
Antibiotic Preparations
Anticoagulents . . . See Coagulants
Anticonvulsants
Antidepressants
Antiemetic . . . See Emetics
Antiflatulents
Antifungals and Fungicides
Antihistamine Drugs
Anti-infectives and Disinfectants
Anti-inflammatory Agents . . . See also Ophthalmics
Antineoplastic Agents
Antipruritics . . . See also Local Anesthetics

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* Exact copy as received

Antipyretics . . . See Analgesics and Antipyretics

Antispasmodics . . . See Spasmolytic Agents & Parasympatholytics

Antituberculotics

Arthritis Therapy . . . See also Uricosuric Agents

Asthma Therapy . . . See Spasmolytic Agents

Astringents

Calcium Preparations

Cardiac Drugs

Cathartics

Central Nervous System Stimulants

Coagulants and Anticoagulants

Cough Preparations . . . See Expectorants

Detergents

Diabetic Therapy . . . See Insulins

Diagnostic Agents

Diarrhea Therapy

Diuretics

Electrolyte Replacement Solutions

Emetic and Anti-emetics

Emollients, Demulcents and Protectants

Enzymes

Estrogens

Expectorants and Cough Preparations

General Anesthetics

Family Planning

Gout Therapy . . . See also Arthritis & Uricosuric Agents

Heavy Metal Antagonists

Hemorrhoid Therapy . . . See Antipruritics

Hypotensive Agents . . . See also Diuretics

Insulins and Anti-diabetic Agents

Laxatives . . . See Cathartics

Local Anesthetics

Miotics . . . See Ophthalmic Preparations

Mouthwashes and Gargles

Mydriatics . . . See Ophthalmic Preparations

Narcotic Analgesics . . . See Analgesics & Antipyretics

Narcotic Antagonists

Ophthalmic Preparations

Oral Contraceptives . . . See Family Planning

Otic Preparations

Oxytocics

Parasympatholytic Agents

Parasympathomimetic Agents

Pituitary

Plasmocides

Progestogens

Scabies

Sedatives and Hypnotics

Skeletal Muscle Relaxants

Spasmolytic Agents

Stimulants

Sulfonamides

Sympatholytic Agents

Sympathomimetic Agents

Thyroid and Anti-thyroid

Toxoids . . . See Vaccines

Tranquilizers

Trichomonocides

Uricosuric Agents

Urinary Germicides

Vaccines & Toxoids . . . See also Serums

Vaginal Preparations

Vasoconstrictors

Vasodilators

Vitamin Preparations

Unclassified Therapeutic Agents

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