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Pharmacists' Perceptions of Practice Roles:
Opportunities and Challenges Facing Pharmacy with Respect
to Expanding the Scope of Practice in Mississippi

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A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of the McDonnell-Barksdale Honors College.

Oxford
May 2002

Approved by

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and the almost 500 Mississippi pharmacists who took part in this research

ABSTRACT

Title: Pharmacists' Perceptions of Practice Roles: Opportunities and Challenges Facing Pharmacy with Respect to Expanding the Scope of Practice in Mississippi

Objective: To provide objective evidence as to the opportunities and challenges that pharmacists will encounter when implementing an expanded role in the health care system from the perspective of the practicing pharmacist.

Methods: Questionnaires were mailed to Mississippi licensed pharmacists. The first section contained questions dealing with the demography of the respondent including a utilization of skills scale and several domains of job satisfaction. The second section contained the health care activities inventory. Respondents were asked to report which health care professional should be providing each of the services using a scale ranging from entirely pharmacist to entirely physician. In the six weeks following delivery of the surveys, 533 were returned. 51 of the surveys returned were incomplete and were not included in any subsequent analyses, a 18.8% usable response rate.

Results: Traditional pharmacy roles supported by the findings included: dispensing prescriptions and compounding prescriptions. Other support existed for pharmacist activity in counseling patients about medications. Traditional physician roles were also supported by Mississippi pharmacists. Many health care activities were believed to be shared responsibilities. In some cases, pharmacists were believed to carry more of the responsibility and in some cases it was the physician. In comparing community and institutional practitioners, community pharmacists held more firmly to the ideas of traditional roles than did the institutional pharmacists.

Conclusions: As is evidenced by the data presented, in the opinion of Mississippi pharmacists, there are some traditional roles that remain the exclusive domain of pharmacy or medicine (e.g., dispensing medications, compounding medications, and diagnosing disease). While respondents did support these traditional roles, there is evidence to suggest that the pharmacist has opportunities to expand his/her practice beyond the count, pour, lick and stick moniker that too often has been applied.

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CHAPTER I INTRODUCTION AND PURPOSE

The evolution of pharmacy practice appears to have occurred in distinct, yet major, phases. Pharmacy began in the 20th Century as apothecaries whose primary function was procuring, preparing and evaluating therapeutic agents. The primary obligation of the pharmacist was to ensure that drugs were unadulterated and prepared according to the art. This traditional period began its close with the shift in pharmaceutical manufacturing from the local pharmacist to the pharmaceutical industry and the shift in choice of therapy from the apothecary to the physician. This change led to a period of significant ambiguity and uncertainty for the practicing pharmacist. No longer was the pharmacist responsible for the creation of dosage forms, thus pharmacy began in earnest searching for a role to fill in the health care system. (Sonnedecker, 1976)

About 25 years ago, pharmacy began to change dramatically. Medications became more sophisticated and research into mechanisms of action and effects of the new drugs demonstrated the complexity of pharmacology and therapeutics. Given the voluminous amount of information that now needed to be managed, physicians and the public alike began to see the pharmacist and his or her abilities in a different light. This opportunity gave rise to the practice of clinical pharmacy. The clinical pharmacy era saw changes in the pharmaceutical education system that would produce better educated pharmacists. The clinical pharmacy movement attempted to realize the concept of the pharmacist as the therapeutic advisor. (Hepler, 1987) Expected to restore past losses to industrialization and stave off future losses from automation, its emphasis on drug information came at a time

where that expertise was in demand. Although these new clinical pharmacists participated in patient care, insurers and institutional management often limited their contributions to economic considerations, namely formularies and other ways to diminish costs. (Strand, Cipolle, Morley, 1992) Along the way the patient seemed to get lost. There now appeared to be an obvious need for a professional role that restored emphasis of the pharmacist's direct responsibility to the individual patient, thus, began the patient-centered era of pharmacy practice or the pharmaceutical care era.

Medications are utilized for the purpose of achieving definite outcomes that improve not only a patient's quantity of life (avoidance of premature mortality) but also to improve a patient's quality of life. (Hepler and Strand, 1990) These outcomes are: the cure of a disease, the reduction or elimination of symptoms, the arresting or slowing of a disease process, and the prevention of a disease or its symptoms. Pharmaceutical care involves the process through which a pharmacist cooperates with a patient and other professionals in designing and implementing and monitoring a therapeutic plan that will produce the specific therapeutic outcomes for the patient. This outline in turn involves three major functions: identifying potential and actual drug-related problems, resolving actual drug-related problems, and preventing future drug-related problems.

Four factors influence the pharmaceutical care needs of the patient and hence direct the patient-pharmacist relationship. These factors are the patient's medical condition, the drug therapy he or she is receiving, the degree of action required by the pharmacist, and the interprofessional relationships between the pharmacist and other health care providers. The degree of actions required by the pharmacist ultimately is determined by the clinical situation. The response of the pharmacist is based on drug knowledge, judgement, and communication

skills. Cooperative and effective interprofessional relationships are essential to achieving comprehensive pharmaceutical care.

Translated into everyday practice, the concept of pharmaceutical care is what a pharmacist does when he or she evaluates a patient's health care needs (primarily drug-related), determines whether the patient has one or more actual or potential drug-related problems, and then works with the patient and other professionals to design, implement, and monitor a pharmacotherapeutic plan that will resolve the drug-related problem. (Strand, Cipolle, Morley, 1992) In practice, pharmacists practicing under the auspices of pharmaceutical care serve as pharmacotherapeutic advocates for the patient and ultimately extend the care of the physician, especially in areas that are under served.

Throughout its short history, the concept of pharmaceutical care exclusively has dealt with issues surrounding pharmacotherapy and its associated problems and concerns. Interested practitioners have challenged pharmacy practice to consider other activities, consistent with the spirit of pharmaceutical care, but are extensions of the current practice model. Pharmacy is considered to be one of the health professions, however, the reactive nature of its practice might be better titled "illness profession" or "disease profession." Pharmacists are not currently handling the patient's needs with respect of wellness, the physical, emotional, mental, and spiritual status of the patient. (Dole, 1994) Pharmacy must move from the traditional illness model of pharmaceutical care to a wellness model of care where all four realms of the patient are in balance. In order to meet this challenge, pharmacy must undergo another period of change, a paradigm shift, that will require that pharmacists (and patients) begin seeing the profession not as a conglomerate of health care managers with "magnetic bullets" that cure, but rather as "coaches" who offer tools that are not but one component of a total wellness prescription. (Dole, 1994) A shift by pharmacists from

caretaker to coach will provide some impetus for the patients to empower themselves. Patients will be encouraged to take an active and responsible role in their care. Pharmacy needs to consider a role beyond the one-dimensional pharmaceutical care concept that centers only on medication, to pharmaceutical health care that encompasses all realms of the patient's life. (Dole, 1994) Additionally, there is a call for the leaders of public health programs to view the pharmacist as a health care professional who is highly educated in drug therapy, who is in the midst of a role transformation, and who will respond to heightened expectations. (Zellmer, 1994)

While many in the pharmaceutical industry are eager to advocate and provide pharmaceutical care, one must consider what is pharmaceutical care. Today, there does not exist an exact regimen for what one must do to properly provide pharmaceutical care. While one pharmacist may believe that pharmaceutical care is counseling patients about the drugs they are selling them, another pharmacist could reasonably believe that he or she must provide information about the prescription as well as educate the patient about their disease state. A third pharmacist might also hold that he or she should counsel about the drugs, the disease state, and monitor the patients progress as a result of the drug therapy. The list goes on without any clear end; it could be reasonable that a pharmacist offer laboratory monitoring services for all medications, but is this service really what is expected from pharmaceutical care? Therefore, the question arises of what services should pharmacists provide in order to meet their pharmaceutical care expectation.

Despite having clear definitions of pharmaceutical care, little information is available as to what is wanted or even expected from pharmacy practitioners with respect to advancing practice opportunities. There exists no uniform guidelines by which pharmacists follow in implementing pharmaceutical care or expanding his or her role within the health care system.

Instead, currently each individual pharmacist has his or her own perspective on what they should do to fulfill their role as pharmacist. Therefore, this investigation was begun to provide objective evidence as to the opportunities and challenges that the profession of pharmacy will face from within itself when implementing an expanded role in the health care system. Specifically the four research objectives and their associated hypotheses are as follows:

Objective 1: Determine pharmacists' opinion (overall) regarding the provision of health care activities.

Objective 2: Determine if differences exist in pharmacist opinion toward the provision of health care services on the basis of general characteristics.

H_{O1}: There are no differences between community pharmacy practitioners' opinions and institutional pharmacy practitioners' opinions with respect to the provision of health care activities.

H_{A1}: Institutional pharmacy practitioners will perceive more of a role for pharmacy in health care activities than will community pharmacy practitioners.

H_{O2}: There are no differences between male practitioners and female practitioners with respect to their opinions regarding the provision of health care activities.

H_{A2}: Female pharmacy practitioners will perceive more of a role for pharmacy in health care activities than will male pharmacy practitioners.

P_{O1}: There are no differences in pharmacist opinions toward the provision of health care activities on the basis of geographical location.

H_{O3}: There are no differences between B.S trained practitioners and Pharm.D. trained practitioners with respect to their opinions regarding the provision of health care activities.

H_{A3}: Pharm.D. trained practitioners will perceive more of a role for pharmacy in health care activities than will B.S. trained pharmacists.

Objective 3: Determine if differences exist in pharmacist opinion toward the provision of health care services on the basis of community pharmacy characteristics.

H_{O4}: There are no differences between the opinions of community pharmacy practitioners working in different settings with respect to the provision of health care activities.

H_{A4}: Independent community pharmacy practitioners will perceive a greater role for pharmacy in the provision of health care activities than will chain pharmacy practitioners.

H_{O5}: There are no differences between the opinions of community pharmacy practitioners working in different community pharmacy positions (owner/manager/staff) respect to the provision of health care activities.

H_{A5}: Community pharmacy managers will perceive a greater role for pharmacy in the provision of health care activities than will staff pharmacists.

H_{O6}: There is no relationship between pharmacy workload (as measured by average daily prescription volume) and opinion toward the provision of health care services.

H_{A6}: There will be a negative correlation between prescription volume and pharmacist opinion toward the provision of health care services.

H_{O7}: There is no relationship between practice age (as measured by number of years practicing community pharmacy) and opinion toward the provision of health care services.

H_{A7}: There will be a negative correlation between practice age (as measured by number of years practicing community pharmacy) and pharmacist opinion toward the provision of health care services.

Objective 4: Determine if differences exist in pharmacist opinion toward the provision of health care services on the basis of institutional pharmacy characteristics.

H_{O8}: There are no differences between the opinions of institutional pharmacy practitioners working in different institutional pharmacy types with respect to the provision of health care activities.

- H_{A8}: Pharmacists employed in public institutions will perceive a greater role for pharmacy in the provision of health care activities than will pharmacists employed in privately-owned institutions.
- H_{O9}: There are no differences between the opinions of institutional pharmacy practitioners working in different institutional pharmacy positions (Directorship/Clinical/staff) with respect to the provision of health care activities.
- H_{A9}: Clinical pharmacists will perceive a greater role for pharmacy in the provision of health care activities than will staff pharmacists or directors.
- H_{O10}: There is no relationship between pharmacy workload (as measured by bed size and average daily census) and opinion toward the provision of health care services.
- H_{A10}: There will be a negative correlation between pharmacy workload and pharmacist opinion toward the provision of health care services.
- H_{O11}: There is no relationship between practice age (as measured by number of years practicing institutional pharmacy) and opinion toward the provision of health care services.
- H_{A11}: There will be a negative correlation between practice age (as measured by number of years practicing institutional pharmacy) and pharmacist opinion toward the provision of health care services.

CHAPTER II RESEARCH METHODS

INSTRUMENT DEVELOPMENT

A self-administered, mailed survey instrument was selected for the recruitment survey to ensure that the necessary data could be collected, coded, entered, and analyzed easily and inexpensively compared with other data collection methods. Because no funding was secured before fielding this portion of the project, cost-consciousness was essential. The mail survey instrument offers the advantage of reaching widely dispersed respondents inexpensively. (Singleton and Straits, 1999) A mail survey is less costly on a per respondent basis than either personal or telephone interviews. Furthermore, because of the variability of the personal schedules of the respondents, an instrument that allowed the flexibility of completing the survey at their convenience was necessary. In addition, the mail survey affords the respondent more anonymity and confidentiality than do other survey methods.

A survey instrument (Appendix A) was developed that consisted of four sections: pharmacist and pharmacy practice characteristics, job satisfaction, perceived utilization of skills, and health care activities inventory. Of these four sections, only two, pharmacist and pharmacy characteristics and health care activities were part of this investigation (the remaining items pertained to the research questions of the thesis advisor). The questions were arranged within the survey instrument in what was believed to be a logical order based on subject matter. This design was intended to promote ease of response and by

that, increase the likelihood of successful completion and return by Mississippi pharmacists.

Pharmacist and pharmacy characteristics

The pharmacist and pharmacy practice characteristics section was placed at the beginning of the instrument to build rapport with the respondents before the answering of the questions relating to the research objectives. To encourage responses from pharmacists, it is suggested that demographic (pharmacy characteristic) questions be nonthreatening and require a minimal amount of thought for completion. (Sudman and Bradburn, 1989) Referring to the pharmacy characteristic questions included in the survey instrument, it was believed that each question was nonthreatening and did not require a great deal of effort from the respondent. This section was logically divided into two sections, each with specific questions for community pharmacists and institutional pharmacists respectively. In the interest of maintaining a questionnaire of reasonable length, pharmacist and pharmacy characteristics were collected from these two types of pharmacy practitioners as they comprise an overwhelming majority of practitioners in the State of Mississippi (Mississippi Board of Pharmacy, 2000)

Five general questions are asked of all respondents. For the purposes of making comparisons, in addition to asking practice type, respondents were asked to report on their gender, the type of practice degree obtained (B.S. or Pharm.D.) and year, location of their pharmacy practice within Mississippi (north, central and southern) and the approximate size of the community served by the practice site.

Community pharmacy practice characteristics

Several questions were asked of the community pharmacy practitioners to assist in the testing of the hypotheses presented in Chapter 1. Type of community pharmacy practice, position within the pharmacy, number of years practicing community pharmacy, and average daily prescription volume were collected from respondents.

Institutional practice characteristics

Several questions were asked of the institutional pharmacy practitioners for the purposes of hypothesis testing. Type of institution type, position within the pharmacy, number of years practicing instructional pharmacy, bed size and average daily census were collected from respondents.

Health care activities

In addition to assuming more responsibility for the outcomes associated with pharmacotherapy, some pharmacists began looking at other ways to expand services and assume more of a role in the health care system. These activities are broad in scope and range from the simplest of services such as offering drug information to the more complex ones of reviewing a patient's laboratory data.

In order to obtain an idea for the types of services to include in the project, the American Pharmaceutical Association's Pharmacist Practice Activity Classification lists were consulted. This list contained over two hundred individual tasks that a pharmacist might perform. Items in the list that could logically be combined were, and the list was narrowed to fifty-two items. From the list of fifty-two, the list was again narrowed to a final list of twenty-five items, based on general opinion of which items were the most easy to implement within Mississippi pharmacies.

The scaling technique used is a variation on research conducted by Deber et. al. In their research subjects (patients) were asked to report as to how active they would like to be given a series of decisions (diagnosis, treatment options, risk and benefits, probabilities, utilities, and what is ultimately chosen). Patients used a five-point scale where 5 was doctor only and 1 represented you only (self). For this research project, pharmacists were asked to evaluate each health care activity from the perspective of just whom should be providing the service to patients. A seven-point continuous scale was used where 1 represented entirely pharmacist and 7 represented entirely physician. A rating of 4 implied that the activity was viewed as the equal responsibility of the pharmacist and physician. The health care activities included in the survey instrument are presented in Table 1.

TABLE 1: Health Care Activities	
a.	Administer immunizations to adults
b.	Administer immunizations to children
c.	Administer injections to adults
d.	Administer injections to children
e.	Administer nebulized treatments
f.	Cancel/stop drug therapy
g.	Compound medications
h.	Counsel patients about disease
i.	Counsel patients about medication
j.	Diagnose disease
k.	Dispense medications
l.	Make referrals to specialists
m.	Measure blood glucose
n.	Measure blood pressure
o.	Monitor disease
p.	Monitor drug therapy
q.	Order lab tests
r.	Perform physical assessment
s.	Review lab tests
t.	Review patient history
u.	Select drug
v.	Select drug dose
w.	Select drug dosage form
x.	Select drug route of administration
y.	Select drug dosing schedule

PRETESTING THE SURVEY INSTRUMENT

The survey instrument was pretested using graduate students (n=9) in the Department of Pharmacy Administration at The University of Mississippi. These pretest subjects were believed to be appropriate because ❶ each was a School of Pharmacy graduate thus providing a similar base of experience as the actual population of interest and ❷ each had training in research methods and techniques at the graduate level.

The objectives of the pretest procedure were: ❶ to assess the adequacy of the data collection materials, ❷ to assess the appropriateness of the data collection methods, ❸ to assess the time commitment to participate in the investigation and ❹ to elicit general impressions about the investigation.

Each pretest subject was asked to complete the survey as it was originally constructed. Once completed, each subject was asked to report the time necessary to complete the instrument. Additionally, each pretest subject was asked to provide detailed comments about the instrument with respect to content and organization.

SAMPLING AND DATA COLLECTION

The sampling for the study was Mississippi-licensed pharmacists residing in Mississippi. The names and addresses of pharmacists were obtained from the Mississippi Board of Pharmacy. Every Mississippi licensed pharmacist residing within the state was mailed a questionnaire (Appendix A) and cover letter (Appendix B) explaining the purpose of the investigation and asking for their participation (n=2,562). In the event that the pretest subjects were licensed in the State of Mississippi, they were removed from the sample frame for the actual data collection. Because a one-time mailing was proposed, no identifier was placed on the questionnaire further assuring anonymity.

DATA MANAGEMENT AND DATA ANALYSIS

After data were collected, all data were coded and entered into a database using FoxPro Version 7.0. The data were analyzed using the SPSS for Windows Version 10.0. Frequencies were run to determine if all responses were within normal limits. Data deemed inappropriate were verified by comparing the database record and the corresponding data on the questionnaire. Appropriate corrections were made prior to subsequent analysis. Outliers were identified and records were eliminated from the data set when responses were believed to be illogical or suspect.

Data analysis was conducted using SPSS for Windows Version 10.0. The specific analyses are discussed below as they apply to each objective and where appropriate, associated hypotheses.

Descriptive statistics were performed on several variables in order to describe the sample of respondents relative to gender, pharmacy degree earned, degree, location of practice within Mississippi, and community size. Additional analyses were conducted in order to describe the community practitioners and institutional practitioners.

Objective 1: Determine pharmacists' opinion (overall) regarding the provision of health care activities.

Objective 1 was accomplished using primary descriptive statistics. Means and standard deviations were calculated for each of the 25 health care activities included in the survey instrument. Means that tended toward the poles of the scale represent activities that, in the opinion of this sample of pharmacists, are the exclusive domain of pharmacy or medicine. Activities whose means were centrally located on the scale could be interpreted as equally shared activities between two professions.

Objective 2: Determine if differences exist in pharmacist opinion toward the provision of health care services by type of practice

H_{O1}: There are no differences between community pharmacy practitioners' opinions and institutional pharmacy practitioners' opinions with respect to the provision of health care activities.

H_{A1a}: Institutional pharmacy practitioners will perceive more of a role for pharmacy in health care activities than will community pharmacy practitioners.

H_{O1} was tested using multiple independent sample t-tests with an a priori established α -level of 0.05. This α -level was selected in an attempt to minimize Type I error (the error associated with rejecting the null hypothesis when it should not be). An alternative approach would have been to use a multivariate technique such as MANOVA for this analysis, however, it was determined that MANOVA would not be the most appropriate statistical technique. Because the investigation at hand is somewhat exploratory in nature, it cannot be said that the 25 health care activities were conceptually or theoretically sound, therefore it is generally not recommended that MANOVA be used (Hair, et.al, 1992).

The use of separate univariate tests is not without its problems. The primary problem with this approach relates to the overall or experiment-wide error rate. Using the present study as an example, the experiment-wide error rate will vary from 5 percent (in situations where all dependent variables are perfectly correlated) to $1 - .95^{25}$ or 73 percent (in the event that all dependent variables are uncorrelated) (Hair, et.al., 1995).

In order to control for this potential ballooning of experiment-wide error, a Bonferroni correction was undertaken. (Hays, 1994) The original a priori α -level was reduced making it more difficult to reject the null hypothesis. The Bonferroni-corrected α -level for this analysis was 0.002, or 0.05/25. This technique was also used to test null hypotheses 2, 3, 4, and 8.

- H_{O2}: There are no differences between male practitioners and female practitioners with respect to their opinions regarding the provision of health care activities.
- H_{A2}: Female pharmacy practitioners will perceive more of a role for pharmacy in health care activities than will male pharmacy practitioners.
- P_{O1}: There are no differences in pharmacist opinions toward the provision of health care activities on the basis of geographical location.

Testing for differences in the mean number of unclaimed prescriptions by the various demographic variables (e.g., type, location, community population, prescription concentration, presence of delivery service, and presence of delivery charge) were accomplished by utilizing the one-way analysis of variance (ONEWAY). ONEWAY was selected because of its appropriateness to measure the relationship between categorical and continuous variables. (Agresti and Finlay, 1986) The results of the analyses of variance that showed significance among the tested groups were subjected to post-hoc multiple comparison tests. The multiple comparison test allowed the researcher to compare all possible means to determine which pairs differ significantly. The Scheffé test was selected for the tests of multiple comparisons due to the fact that it allows for a posteriori comparisons to be employed where the least amount of significant differences among groups can be presented. (Marks, 1982) (Kerlinger, 1973) Thus it is the optimal post-hoc test to control the experiment-wide error rate. (Bruning and Kintz, 1977). This technique was also used to test null hypotheses 5 and 9.

- H_{O3}: There are no differences between B.S trained practitioners and Pharm.D. trained practitioners with respect to their opinions regarding the provision of health care activities.
- H_{A3}: Pharm.D. trained practitioners will perceive more of a role for pharmacy in health care activities than will B.S. trained pharmacists.

Objective 3: Determine if differences exist in pharmacist opinion toward the provision of health care services on the basis of community pharmacy characteristics.

H_{O4}: There are no differences between the opinions of community pharmacy practitioners working in different settings with respect to the provision of health care activities.

H_{A4}: Independent community pharmacy practitioners will perceive a greater role for pharmacy in the provision of health care activities than will chain pharmacy practitioners.

H_{O5}: There are no differences between the opinions of community pharmacy practitioners working in different community pharmacy positions (owner/manager/staff) respect to the provision of health care activities.

H_{A5}: Community pharmacy managers will perceive a greater role for pharmacy in the provision of health care activities than will staff pharmacists.

H_{O6}: There is no relationship between pharmacy workload (as measured by average daily prescription volume) and opinion toward the provision of health care services.

H_{A6}: There will be a negative correlation between prescription volume and pharmacist opinion toward the provision of health care services.

Simple bivariate correlations were used to assess this hypothesis. This is appropriate given that both variables under consideration are continuous, workload, and the each of the health care activities. The Pearson correlation indicates the direction of an association (positive or negative) and falls between -1 and +1. As the value of the correlation approaches -1 or +1 the stronger the degree of linear association. Values approaching zero indicate less of a linear association (none in the case of it being zero).

This technique was also used to assess null hypotheses 7, 10, and 11.

H_{O7}: There is no relationship between practice age (as measured by number of years practicing community pharmacy) and opinion toward the provision of health care services.

H_{A7}: There will be a negative correlation between practice age (as measured by number of years practicing community pharmacy) and pharmacist opinion toward the provision of health care services.

Objective 4: Determine if differences exist in pharmacist opinion toward the provision of health care services on the basis of institutional pharmacy characteristics.

H_{O8}: There are no differences between the opinions of institutional pharmacy practitioners working in different institutional pharmacy types with respect to the provision of health care activities.

H_{A8}: Pharmacists employed in public institutions will perceive a greater role for pharmacy in the provision of health care activities than will pharmacists employed in privately-owned institutions.

H_{O9}: There are no differences between the opinions of institutional pharmacy practitioners working in different institutional pharmacy positions (Directorship/Clinical/staff) with respect to the provision of health care activities.

H_{A9}: Clinical pharmacists will perceive a greater role for pharmacy in the provision of health care activities than will staff pharmacists or directors.

H_{O10}: There is no relationship between pharmacy workload (as measured by bed size and average daily census) and opinion toward the provision of health care services.

H_{A10}: There will be a negative correlation between pharmacy workload and pharmacist opinion toward the provision of health care services.

H_{O11}: There is no relationship between practice age (as measured by number of years practicing institutional pharmacy) and opinion toward the provision of health care services.

H_{A11}: There will be a negative correlation between practice age (as measured by number of years practicing institutional pharmacy) and pharmacist opinion toward the provision of health care services.

CHAPTER III INVESTIGATION RESULTS

RESPONSE RATE AND DATA PREPARATION

A total of 2,562 survey instruments were mailed to Mississippi pharmacies residing within the state. In the six weeks following delivery of the surveys, 533 questionnaires were returned. Fifty-one of the surveys returned were incomplete or contained uncomplimentary remarks such that their validity was called into questions. These questionnaires were not included in any subsequent analyses. As a result, the final usable response rate for the investigation was 18.8 percent.

EXAMINATION OF NON-RESPONSE BIAS

Mail surveys have often been criticized for non-response bias. The presence of non-response bias, meaning that non-respondent differ significantly in some way from those choosing to respond, prohibits the investigator from making any valid generalizations to the population from which the sample was drawn. (Armstrong and Overton, 1977) Non-response bias was estimated using two methods. The first method compared the responses with certain "known" values for the population. It was possible to use this method due to the completeness of the database provided by the Mississippi Board of Pharmacy with respect to type of employment. One criticism of this methods is that even if the variable that are tested do not show differences (i.e., free from bias), it

does not mean that responses on other variables are bias-free. (Armstrong and Overton, 1977)

Another method utilized to estimate non-response bias was the time trends-extrapolation test (Armstrong and Overton, 1977), commonly called the first ten-last ten test. The assumption underlying this test is that non-respondents are more like late respondents than they are to people who respond early. This method is not subject to the same criticism as the first method mentioned in that the responses from the first ten percent and the last ten percent come from the same instrument thus possibly covering all variables. This characteristic allows comparison of demographic variables and variables under investigation.

Tables 2 and 3 contain the results from examination of non-response bias. Based on type of practice, pharmacists who had responded were not different from the initial mailed sample. Table 2 reveals that the frequency distribution of pharmacy types was not different in the sample of pharmacies that returned the recruitment questionnaire compared with expected frequencies.

TABLE 2: Sample Comparison to Known Values			
type of practice			
	Observed N	Expected N	Residual
COMM	322	309	13.0
INST	110	122	-13.0
Total	432		
Chi-Square	1.196		
df	1		
Asymp. Sig.	0.166		

TABLE 3: Time-trends Extrapolation Tests

Crosstab		TTET		Total
		first ten	last ten	
q01_gender	male	35	30	65
	% within TTET	70.0%	61.2%	65.7%
	female	15	19	34
	% within TTET	30.0%	38.8%	34.3%
Pearson Chi-Square		0.845		
df		1		
Asymp. Sig.		0.358		

Crosstab		TTET		Total
		first ten	last ten	
q29_practice location	north MS	11	14	25
	% within TTET	22.4%	28.6%	25.5%
	cent MS	27	30	57
	% within TTET	55.1%	61.2%	58.2%
	south MS	11	5	16
	% within TTET	22.4%	10.2%	16.3%
Pearson Chi-Square		2.768		
df		2		
Asymp. Sig.		0.251		

Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	.989	225.849 ^a	25.000	65.000	.000
	Wilks' Lambda	.011	225.849 ^a	25.000	65.000	.000
	Hotelling's Trace	86.865	225.849 ^a	25.000	65.000	.000
	Roy's Largest Root	86.865	225.849 ^a	25.000	65.000	.000
TTET	Pillai's Trace	.333	1.300 ^a	25.000	65.000	.198
	Wilks' Lambda	.667	1.300 ^a	25.000	65.000	.198
	Hotelling's Trace	.500	1.300 ^a	25.000	65.000	.198
	Roy's Largest Root	.500	1.300 ^a	25.000	65.000	.198

a. Exact statistic
b. Design: Intercept+TTET

Using a random number chart, two variables (that all respondents were expected to answer) were selected in addition to the entire battery of health care activities for inclusion in the time-trends extrapolation test. Table 2 presents the results of those analyses. No differences ($p < 0.05$) were found between the early respondents and late respondents with respect to respondent gender and geographical location of practice site.

Additionally, the two groups were compared on their opinions toward the provision of health care activities. No differences were found across all health care activities collectively (Hotelling's Trace = 0.500) or when considered individually (Bonferroni-corrected ($p < 0.002$)).

While the results of these analyses are supportive of the finding that the study, while suffering from poor response rate, is free from bias related to non-response, additional analyses are possible, yet not performed due to budgetary limitations and design characteristics. The monies available to the researcher allowed for only one mailing. As a result, no identifier information was recorded on the instruments, making it impossible to track and ultimately contact non-respondents. As this is another suggested method for assessing non-response bias, the failure to complete this analysis precludes the determination that the sample is free of bias, however, on the basis of the analyses that were possible and performed, it appears that bias due to non-response is not existent in this sample.

DESCRIPTION OF THE SAMPLE

Tables 4 through 6 contain the descriptive statistics of the overall sample and for community pharmacy practice and institutional pharmacy practice respectively. None of the values appear to be grossly out of line with what might be expected within the State of Mississippi.

TABLE 4: Overall Sample Profile			
gender:	male (64.9%)	female	(35.1%)
professional degree:	B.S. (92.5%)	Pharm.D.	(14.7%)
location:			
	north	(31.2%)	
	central	(43.6%)	
	south	(25.5%)	
type of practice:			
	COMM	(66.8%)	
	INST	(22.8%)	

TABLE 5: Community Pharmacy Sample Profile			
type of community practice:			
	independent	51.4%	
	chain	29.3%	
	discount	10.3%	
	grocery	9.0%	
daily Rx volume:		195 (121)	
current position:			
	owner/mgr	32.8%	
	employee/mgr	32.5%	
	staff pharm.	34.4%	
years in comm pract:		20.3 (13.0)	
mean (sd)			

TABLE 6: Institutional Pharmacy Sample Profile			
present position:			
	Director	20.2%	
	Assoc/Asst Dir	8.2%	
	Staff (inpt)	50.5%	
	Staff (outpt)	4.6%	
	Clinical Pharm	15.6%	
institution description:			
	private/profit	14.7%	
	private/non	32.1%	
	public	22.0%	
	University	11.0%	
	Federal	15.6%	
acute care beds:		248 (210)	
average daily census:		68.9% (15.1)	
years in inst practice:		14.4 (9.41)	
mean (sd)			

EXAMINATION OF RESEARCH OBJECTIVES

Objective 1: Determine pharmacists' opinion (overall) regarding the provision of health care activities.

Table 7 reveals the attitudes of all respondent Mississippi pharmacists regarding health care professional involvement in the provision of certain activities. "Traditional" roles for the both types of health care professionals (pharmacist and physician) were supported by pharmacists. Traditional pharmacy roles supported by the findings included: dispensing prescriptions and compounding prescriptions. Other support existed for pharmacist activity in counseling patients about medications. Traditional physician roles were also supported by Mississippi pharmacists. Although primarily restricted to diagnosing disease in a magnitude equivalent to those traditional pharmacist functions, pharmacists supported other activities as being mostly physician including: performing physical assessment, ordering lab tests, making referrals to specialists.

Many other health care activities were believed to be shared responsibilities. In some cases, pharmacists were believed to carry more of the responsibility and in some cases it was the physician. For example, shared responsibility activities where the pharmacist was perceived to have a slightly higher role would be monitoring drug therapy (-0.68) and selecting the drug dosage form (-0.20). The remaining health care activities, while being mostly considered to be the shared responsibility of both pharmacy and medicine were rated slightly in the direction of the physician.

When closely related health care activities were compared, pharmacists did differentiate between them. Pharmacists were far less supportive of pharmacy's role in providing immunizations and injections to children (1.19 and 1.32 respectively) than giving immunizations and injections to adults (.639 and .880 respectively). Pharmacists

reported perceiving almost an equal role with physicians in counseling patients about disease (.54), but believed that the pharmacist should maintain a dominance in the role as counselor about medications (-1.39). Pharmacists viewed monitoring a patient's disease largely as a physician role (1.05), yet, perceived monitoring a patient's drug therapy as a fairly shared activity (-0.68).

In addition to these descriptive techniques, 25 separate one-sample t-tests were executed to determine which of the ratings of the health care activities by all pharmacists was significantly different from zero, the midpoint of the scale. An a priori, Bonferroni-corrected α -level of 0.002 was used for each of these analyses. With the exception of measuring blood glucose, measuring blood pressure, selecting drug route of administration and selecting drug dosing schedule, the ratings of health care activities were significantly different from zero (the midpoint of the scale). Although several items had ratings within 0.25 of the midpoint, the distributions about the mean for these items were such that statistical significance was found, however, one might question the practical significance of these differences.

Additional analyses were performed to assess differences in attitudes toward health care activities as they relate to adults and children (paired t-tests). In both instances, pharmacists were less likely to perceive a role for pharmacy in the administration of injections to children ($p=0.00$) and providing immunizations to children ($p=0.00$).

TABLE 7: Pharmacists' Opinion Toward Health Care Activities (overall)

	mean (sd)
a. Administer immunizations to adults.....	0.64 (1.35) *
b. Administer immunizations to children.....	1.19 (1.41) *
c. Administer injections to adults.....	0.88 (1.33) *
d. Administer injections to children.....	1.32 (1.32) *
e. Administer nebulized treatments.....	0.25 (1.42) *
f. Cancel/stop drug therapy.....	0.98 (1.38) *
g. Compound medications.....	-2.46 (0.97) *
h. Counsel patients about disease.....	0.54 (1.28) *
i. Counsel patients about medication.....	-1.39 (1.25) *
j. Diagnose disease.....	2.32 (1.06) *
k. Dispense medications.....	-2.55 (1.02) *
l. Make referrals to specialists.....	1.31 (1.33) *
m. Measure blood glucose.....	0.09 (1.04)
n. Measure blood pressure.....	0.01 (0.92)
o. Monitor disease.....	1.05 (1.26) *
p. Monitor drug therapy.....	-0.68 (1.26) *
q. Order lab tests.....	1.38 (1.33) *
r. Perform physical assessment.....	1.80 (1.18) *
s. Review lab tests.....	1.10 (1.29) *
t. Review patient history.....	0.43 (0.98) *
u. Select drug.....	0.35 (1.41) *
v. Select drug dose.....	0.21 (1.45) *
w. Select drug dosage form.....	-0.20 (1.37) *
x. Select drug route of administration.....	0.07 (1.39)
y. Select drug dosing schedule.....	0.03 (1.43)

* significantly different from zero (p<0.002)

Objective 2: Determine if differences exist in pharmacist opinion toward the provision of health care services by type of practice

H₀₁: There are no differences between community pharmacy practitioners' opinions and institutional pharmacy practitioners' opinions with respect to the provision of health care activities.

H_{A1}: Institutional pharmacy practitioners will perceive more of a role for pharmacy in health care activities than will community pharmacy practitioners.

Table 8 reveals the attitudes of community and institutional pharmacists regarding health care professional involvement in the provision of certain activities. Community pharmacists held more firmly to the idea of traditional roles than did the institutional pharmacists. Overall, community pharmacists and institutional pharmacists differed in their opinion regarding the provision of health care services. More specifically, community pharmacists and institutional pharmacists viewed many of the health care

activities in the same direction (pharmacist versus physician activity), however, on many activities, these two groups of practitioners differed with respect to the magnitude with which they held their opinion. With the exception of the two most closely held “traditional” pharmacy roles (compounding medications and dispensing medications), community pharmacists perceived less of a role for pharmacists in the activities included in the battery. Significant differences between the two groups existed when considering immunizations/injections, cancel/stopping therapy, ordering lab tests, performing physical assessment, reviewing lab tests, selecting the drug dose, and selecting the dosage schedule.

TABLE 8: Pharmacists’ Opinion Toward Health Care Activities (type)

	COMM mean (sd)	INST mean (sd)
a. Administer immunizations to adults.....	0.80 (1.32)	0.29 (1.43) *†
b. Administer immunizations to children.....	1.39 (1.37)	0.79 (1.51) *†
c. Administer injections to adults.....	1.02 (1.34)	0.63 (1.38) *
d. Administer injections to children.....	1.48 (1.30)	1.00 (1.34) *†
e. Administer nebulized treatments.....	0.27 (1.46)	0.35 (1.39)
f. Cancel/stop drug therapy.....	1.23 (1.36)	0.48 (1.35) *†
g. Compound medications.....	-2.53 (0.88)	-2.27 (1.22) *
h. Counsel patients about disease.....	0.53 (1.27)	0.47 (1.33)
i. Counsel patients about medication.....	-1.42 (1.26)	-1.44 (1.26)
j. Diagnose disease.....	2.36 (1.07)	2.19 (1.13)
k. Dispense medications.....	-2.63 (0.96)	-2.35 (1.10) *
l. Make referrals to specialists.....	1.27 (1.34)	1.56 (1.16)
m. Measure blood glucose.....	0.13 (1.07)	0.05 (1.00)
n. Measure blood pressure.....	0.04 (0.96)	-0.15 (0.80)
o. Monitor disease.....	1.10 (1.33)	0.94 (1.15)
p. Monitor drug therapy.....	-0.66 (1.33)	-0.82 (1.16)
q. Order lab tests.....	1.72 (1.28)	0.61 (1.11) *†
r. Perform physical assessment.....	1.90 (1.20)	1.59 (1.15)
s. Review lab tests.....	1.37 (1.37)	0.49 (0.90) *†
t. Review patient history.....	0.45 (1.04)	0.39 (0.86)
u. Select drug.....	0.39 (1.47)	0.38 (1.36)
v. Select drug dose.....	0.36 (1.50)	-0.12 (1.36) *
w. Select drug dosage form.....	-0.14 (1.43)	-0.28 (1.28)
x. Select drug route of administration.....	0.17 (1.46)	-0.11 (1.25)
y. Select drug dosing schedule.....	0.17 (1.50)	-0.21 (1.25) *

* significant difference (p<0.05)
† significant difference (p<0.002)

H₀₂: There are no differences between male practitioners and female practitioners with respect to their opinions regarding the provision of health care activities.

H_{A2}: Female pharmacy practitioners will perceive more of a role for pharmacy in health care activities than will male pharmacy practitioners.

Table 9 reveals the attitudes of male and female pharmacists regarding health care professional involvement in the provision of certain activities. Using the Bonferroni-corrected α -level, no statistically significant differences exist in opinion toward the provision of health care services between men and women.

TABLE 9: Pharmacists' Opinion Toward Health Care Activities (gender)		
	MALE mean (sd)	FEMALE mean (sd)
a. Administer immunizations to adults.....	0.67 (1.38)	0.64 (1.32)
b. Administer immunizations to children.....	1.17 (1.41)	1.31 (1.43)
c. Administer injections to adults.....	0.91 (1.35)	0.89 (1.31)
d. Administer injections to children.....	1.36 (1.30)	1.35 (1.34)
e. Administer nebulized treatments.....	0.17 (1.48)	0.42 (1.35)
f. Cancel/stop drug therapy.....	0.99 (1.39)	1.00 (1.32)
g. Compound medications.....	-2.53 (0.96)	-2.38 (0.97)
h. Counsel patients about disease.....	0.55 (1.32)	0.53 (1.19)
i. Counsel patients about medication.....	-1.41 (1.27)	-1.38 (1.21)
j. Diagnose disease.....	2.33 (1.12)	2.31 (0.94)
k. Dispense medications.....	-2.54 (1.10)	-2.60 (0.73)
l. Make referrals to specialists.....	1.21 (1.29)	1.55 (1.27) *
m. Measure blood glucose.....	0.06 (1.08)	0.08 (0.92)
n. Measure blood pressure.....	-0.02 (0.99)	0.13 (0.78)
o. Monitor disease.....	1.06 (1.29)	0.96 (1.21)
p. Monitor drug therapy.....	-0.76 (1.31)	-0.58 (1.14)
q. Order lab tests.....	1.42 (1.34)	1.38 (1.26)
r. Perform physical assessment.....	1.84 (1.16)	1.72 (1.23)
s. Review lab tests.....	1.17 (1.34)	0.96 (1.22)
t. Review patient history.....	0.44 (1.01)	0.40 (0.93)
u. Select drug.....	0.33 (1.49)	0.44 (1.30)
v. Select drug dose.....	0.20 (1.52)	0.30 (1.33)
w. Select drug dosage form.....	-0.29 (1.45)	0.01 (1.18) *
x. Select drug route of administration.....	0.02 (1.45)	-0.18 (1.24)
y. Select drug dosing schedule.....	0.00 (1.50)	0.12 (1.25)
* significant difference (p<0.05)		
† significant difference (p<0.002)		

P_{O1}: There are no differences in pharmacist opinions toward the provision of health care activities on the basis of geographical location.

There were no differences in pharmacists' opinion toward the provision of health care activities on the basis of geographical location. Although no significant differences

exist, it is interesting that the central region had responses that could be considered more supportive of an expanded role for pharmacy. Although one might consider this result plausible because of the concentration of institutional practice sites in the Jackson metro area which is located in the central region of Mississippi, additional analysis shows that the expected and observed frequencies of institutional practitioners is not significantly different across regions.

TABLE 10: Pharmacists' Opinion Toward Health Care Activities (location)

	North mean (sd)	Cent mean (sd)	South mean (sd)
a. Administer immunizations to adults.....	0.47 (1.25)	0.68 (1.42)	0.83 (1.37)
b. Administer immunizations to children.....	1.13 (1.41)	1.24 (1.42)	1.30 (1.42)
c. Administer injections to adults.....	0.73 (1.25)	0.94 (1.38)	1.04 (1.37)
d. Administer injections to children.....	1.27 (1.32)	1.37 (1.32)	1.40 (1.32)
e. Administer nebulized treatments.....	0.19 (1.47)	0.21 (1.45)	0.45 (1.38)
f. Cancel/stop drug therapy.....	0.99 (1.36)	0.90 (1.39)	1.17 (1.34)
g. Compound medications.....	-2.40 (1.00)	-2.62 (0.86)	-2.32 (1.07) *
h. Counsel patients about disease.....	0.55 (1.32)	0.39 (1.27)	0.73 (1.18)
i. Counsel patients about medication.....	-1.47 (1.24)	-1.41 (1.25)	-1.30 (1.28)
j. Diagnose disease.....	2.25 (1.03)	2.41 (1.04)	2.25 (1.15)
k. Dispense medications.....	-2.54 (1.02)	-2.64 (0.93)	-2.48 (1.00)
l. Make referrals to specialists.....	1.46 (1.29)	1.23 (1.26)	1.33 (1.35)
m. Measure blood glucose.....	0.13 (1.02)	0.00 (0.95)	0.14 (1.18)
n. Measure blood pressure.....	-0.02 (0.77)	-0.03 (0.90)	0.03 (1.12)
o. Monitor disease.....	1.13 (1.20)	0.86 (1.22)	1.15 (1.37)
p. Monitor drug therapy.....	-0.80 (1.26)	-0.73 (1.20)	-0.55 (1.34)
q. Order lab tests.....	1.45 (1.28)	1.33 (1.28)	1.49 (1.40)
r. Perform physical assessment.....	1.76 (1.19)	1.77 (1.17)	1.86 (1.22)
s. Review lab tests.....	1.19 (1.38)	0.98 (1.19)	1.19 (1.39)
t. Review patient history.....	0.38 (0.96)	0.42 (0.93)	0.51 (1.10)
u. Select drug.....	0.43 (1.45)	0.30 (1.30)	0.37 (1.59)
v. Select drug dose.....	0.22 (1.52)	0.17 (1.31)	0.30 (1.60)
w. Select drug dosage form.....	-0.19 (1.47)	0.23 (1.18)	-0.61 (1.53)
x. Select drug route of administration.....	0.10 (1.45)	-0.02 (1.21)	0.22 (1.56)
y. Select drug dosing schedule.....	-0.03 (1.52)	0.03 (1.22)	0.15 (1.62)

* significant difference (p<0.05)
† significant difference (p<0.002)

H₀₃: There are no differences between B.S trained practitioners and Pharm.D. trained practitioners with respect to their opinions regarding the provision of health care activities.

H_{A3}: Pharm.D. trained practitioners will perceive more of a role for pharmacy in health care activities than will B.S. trained pharmacists.

While those respondents with a Pharm.D. as their sole practice degree did tend to rate the various activities such that pharmacy had more of a role than did the B.S. trained pharmacists (Table 11). While it was believed that the additional training and experience afforded by the six years of professional education, Pharm.D. trained practitioners would perceive a much greater role for pharmacy in the provision of health care activities, in only one case (providing injections to adults ($p < 0.002$)) was there a significant difference. It is possible that the profession has not changed as a result of the change to the all-Pharm.D. curriculum. While there are examples of expanded services and responsibilities in today's pharmacy practice, some might argue that little has changed with respect to the job in the last decade. Additionally, while much was made of the switch to the Pharm.D. as the sole practice degree in Mississippi, there is no evidence to suggest that faculty changed with respect to their expectations of students as a result of this structure change.

TABLE 11: Pharmacists' Opinion Toward Health Care Activities (degree)

	B.S. mean (sd)	Pharm.D. mean (sd)
a. Administer immunizations to adults.....	0.76 (1.35)	0.12 (1.05) *
b. Administer immunizations to children.....	1.28 (1.41)	0.76 (1.14) *
c. Administer injections to adults.....	0.99 (1.34)	0.24 (1.06) *†
d. Administer injections to children.....	1.41 (1.30)	0.85 (1.20) *
e. Administer nebulized treatments.....	0.29 (1.47)	0.03 (1.24)
f. Cancel/stop drug therapy.....	1.07 (1.39)	0.76 (1.03)
g. Compound medications.....	-2.48 (0.98)	-2.33 (1.02)
h. Counsel patients about disease.....	0.54 (1.30)	0.33 (1.08)
i. Counsel patients about medication.....	-1.38 (1.25)	-1.42 (1.25)
j. Diagnose disease.....	2.29 (1.10)	2.64 (0.65)
k. Dispense medications.....	-2.54 (1.10)	-2.64 (0.49)
l. Make referrals to specialists.....	1.30 (1.30)	1.46 (1.12)
m. Measure blood glucose.....	0.12 (1.04)	-0.24 (0.79)
n. Measure blood pressure.....	0.02 (0.93)	-0.18 (0.53)
o. Monitor disease.....	1.08 (1.28)	0.82 (1.10)
p. Monitor drug therapy.....	-0.65 (1.27)	-0.76 (1.25)
q. Order lab tests.....	1.50 (1.31)	0.97 (1.04) *
r. Perform physical assessment.....	1.84 (1.20)	1.36 (1.14) *
s. Review lab tests.....	1.20 (1.33)	0.61 (1.00)
t. Review patient history.....	0.46 (1.02)	0.27 (0.84)
u. Select drug.....	0.43 (1.43)	-0.06 (1.14)
v. Select drug dose.....	0.30 (1.47)	-0.12 (1.21)
w. Select drug dosage form.....	-0.16 (1.39)	-0.18 (0.95)
x. Select drug route of administration.....	0.14 (1.41)	-0.03 (0.98)
y. Select drug dosing schedule.....	0.10 (1.45)	-0.15 (1.09)

* significant difference ($p < 0.05$)
† significant difference ($p < 0.002$)

Objective 3: Determine if differences exist in pharmacist opinion toward the provision of health care services on the basis of community pharmacy characteristics.

H_{O4}: There are no differences between the opinions of community pharmacy practitioners working in different settings with respect to the provision of health care activities.

H_{A4}: Independent community pharmacy practitioners will perceive a lesser role for pharmacy in the provision of health care activities than will chain pharmacy practitioners.

Table 12 presents community pharmacist opinion toward health care activities.

Chain pharmacists perceived that pharmacists had a greater role in immunizations (adult and child), providing injections to children, cancel or stop orders on medications, ordering lab tests, and reviewing lab tests. These activities are more consistent with the curricula in Schools of Pharmacy in the recent past thus contributing to the relationship between work age and opinion toward the provision of health care activities.

This result is in the opposite direction of the alternative hypothesis and required additional thought and analysis. Chain pharmacists in this sample were significantly younger (16.80 years) than were their independent pharmacy practitioner counterparts (23.73 years) with respect to practice age. This result could mean that the differences between chain and independent pharmacists could be the result by the practice age differences (hence possible training differences) rather than any true differences in opinions between independent pharmacists and chain pharmacists as they relate to their practice characteristics. Additional inspection of the relationship between practice age and opinion toward the provision of health care activities (Table 14) found no significant relationships that might explain this result. Given this additional analysis, the difference between chain pharmacists and independent pharmacists is beyond the explanation of this researcher at this time.

TABLE 12: Community Pharmacists' Opinion Toward Health Care Activities (type)

	INDEP mean (sd)	CHAIN mean (sd)
a. Administer immunizations to adults.....	0.80 (1.32)	0.29 (1.43) *†
b. Administer immunizations to children.....	1.39 (1.37)	0.79 (1.51) *†
c. Administer injections to adults.....	1.02 (1.34)	0.63 (1.39) *
d. Administer injections to children.....	1.48 (1.30)	1.00 (1.34) *†
e. Administer nebulized treatments.....	0.27 (1.46)	0.35 (1.39)
f. Cancel/stop drug therapy.....	1.23 (1.36)	0.48 (1.35) *†
g. Compound medications.....	-2.53 (0.88)	-2.28 (1.21) *
h. Counsel patients about disease.....	0.52 (1.28)	0.47 (1.34)
i. Counsel patients about medication.....	-1.42 (1.26)	-1.44 (1.27)
j. Diagnose disease.....	2.36 (1.07)	2.19 (1.13)
k. Dispense medications.....	-2.63 (0.96)	-2.35 (1.10) *
l. Make referrals to specialists.....	1.27 (1.34)	1.56 (1.16)
m. Measure blood glucose.....	0.13 (1.07)	-0.05 (0.99)
n. Measure blood pressure.....	0.04 (0.96)	-0.15 (0.80)
o. Monitor disease.....	1.10 (1.33)	0.94 (1.15)
p. Monitor drug therapy.....	-0.66 (1.33)	-0.81 (1.16)
q. Order lab tests.....	1.72 (1.28)	0.61 (1.11) *†
r. Perform physical assessment.....	1.90 (1.20)	1.59 (1.15) *
s. Review lab tests.....	1.37 (1.37)	0.49 (0.91) *†
t. Review patient history.....	0.45 (1.04)	0.38 (0.86)
u. Select drug.....	0.39 (1.47)	0.38 (1.36)
v. Select drug dose.....	0.36 (1.49)	-0.12 (1.36) *
w. Select drug dosage form.....	-0.14 (1.43)	-0.29 (1.28)
x. Select drug route of administration.....	0.17 (1.46)	-0.11 (1.25)
y. Select drug dosing schedule.....	0.17 (1.50)	-0.21 (1.25) *

* significant difference (p<0.05)

† significant difference (p<0.002)

H₀₅: There are no differences between the opinions of community pharmacy practitioners working in different community pharmacy positions (owner/manager/staff) respect to the provision of health care activities.

H_{A5}: Community pharmacy managers will perceive a greater role for pharmacy in the provision of health care activities than will staff pharmacists.

Table 13 contains information regarding community pharmacists' opinions toward the provision of health care activities on the basis of position within the pharmacy. No differences were found in opinions toward the provision of health care services on the basis of position within the pharmacy. Owner/managers, employee/managers and staff pharmacists rated each of the health care activities similarly with the owner/manager rating the activities slightly in the direction of the pharmacist.

**TABLE 13: Community Pharmacists' Opinion Toward Health Care Activities
(position)**

	Owner mean (sd)	Manager mean (sd)	Staff mean (sd)
a. Administer immunizations to adults.....	0.70(1.30)	0.87(1.19)	0.75(1.43)
b. Administer immunizations to children.....	1.33(1.34)	1.36(1.25)	1.35(1.50)
c. Administer injections to adults.....	0.88(1.33)	1.06(1.25)	1.04(1.39)
d. Administer injections to children.....	1.43(1.29)	1.44(1.23)	1.47(1.40)
e. Administer nebulized treatments.....	-0.06(1.54)	0.42(1.48)	0.41(1.30)
f. Cancel/stop drug therapy.....	1.28(1.39)	1.13(1.37)	1.24(1.36)
g. Compound medications.....	-2.67(0.77)	-2.53(0.76)	-2.36(1.08)
h. Counsel patients about disease.....	0.70(1.40)	0.40(1.17)	0.52(1.29)
i. Counsel patients about medication.....	-1.29(1.37)	-1.48(1.13)	-1.45(1.31)
j. Diagnose disease.....	2.38(1.07)	2.46(0.90)	2.24(1.20)
k. Dispense medications.....	-2.74(0.93)	-2.60(0.88)	-2.50(1.14)
l. Make referrals to specialists.....	1.01(1.37)	1.28(1.27)	1.46(1.50)
m. Measure blood glucose.....	0.00(0.97)	0.20(1.02)	0.20(1.16)
n. Measure blood pressure.....	-0.04(0.86)	0.14(0.97)	0.05(0.99)
o. Monitor disease.....	1.31(1.41)	1.02(1.18)	1.04(1.35)
p. Monitor drug therapy.....	-0.55(1.41)	-0.61(1.36)	-0.78(1.20)
q. Order lab tests.....	1.73(1.39)	1.64(1.22)	1.73(1.28)
r. Perform physical assessment.....	1.98(1.17)	1.86(1.13)	1.88(1.31)
s. Review lab tests.....	1.56(1.33)	1.17(1.29)	1.31(1.40)
t. Review patient history.....	0.49(1.08)	0.41(0.91)	0.48(1.14)
u. Select drug.....	0.19(1.53)	0.49(1.29)	0.42(1.52)
v. Select drug dose.....	0.24(1.57)	0.39(1.28)	0.37(1.58)
w. Select drug dosage form.....	-0.36(1.58)	-0.09(1.22)	-0.03(1.46)
x. Select drug route of administration.....	-0.03(1.55)	0.22(1.28)	0.22(1.52)
y. Select drug dosing schedule.....	0.02(1.56)	0.19(1.34)	0.20(1.60)

* significant difference (p<0.05)
 † significant difference (p<0.002)

H₀₆: There is no relationship between pharmacy workload (as measured by average daily prescription volume) and opinion toward the provision of health care services.

H_{A6}: There will be a negative correlation between prescription volume and pharmacist opinion toward the provision of health care services.

H₀₇: There is no relationship between practice age (as measured by number of years practicing community pharmacy) and opinion toward the provision of health care services.

H_{A7}: There will be a negative correlation between practice age (as measured by number of years practicing community pharmacy) and pharmacist opinion toward the provision of health care services.

Table 14 presents the Pearson correlation values for the health care activities and community pharmacy workload and community practice age. With two exceptions, making referrals to specialists (-0.15) and the administration of nebulized treatments (-0.12), there were no significant relationships between either variable and the 25 health care activities included in the battery. In these two cases, the younger pharmacists perceived more of a role for the pharmacist in those activities, possibly owing to the recency of education that is related to the provision of those services.

TABLE 14: Community Pharmacists' Opinion Toward Health Care Activities (practice age and pharmacy workload)		
	Pract age Pearson r	workload Pearson r
a.	Administer immunizations to adults.....	0.05
b.	Administer immunizations to children.....	0.02
c.	Administer injections to adults.....	-0.02
d.	Administer injections to children.....	0.00
e.	Administer nebulized treatments.....	-0.12*
f.	Cancel/stop drug therapy.....	0.08
g.	Compound medications.....	-0.08
h.	Counsel patients about disease.....	-0.02
i.	Counsel patients about medication.....	0.07
j.	Diagnose disease.....	-0.10
k.	Dispense medications.....	0.03
l.	Make referrals to specialists.....	-0.15*
m.	Measure blood glucose.....	0.04
n.	Measure blood pressure.....	0.02
o.	Monitor disease.....	0.11
p.	Monitor drug therapy.....	0.03
q.	Order lab tests.....	0.04
r.	Perform physical assessment.....	0.04
s.	Review lab tests.....	0.10
t.	Review patient history.....	0.06
u.	Select drug.....	-0.07
v.	Select drug dose.....	0.00
w.	Select drug dosage form.....	-0.04
x.	Select drug route of administration.....	0.03
y.	Select drug dosing schedule.....	0.00

* significant relationship (p<0.05)
 † significant relationship (p<0.002)

Objective 4: Determine if differences exist in pharmacist opinion toward the provision of health care services on the basis of institutional pharmacy characteristics.

H₀₈: There are no differences between the opinions of institutional pharmacy practitioners working in different institutional pharmacy types with respect to the provision of health care activities.

H_{A8}: Pharmacists employed in public institutions will perceive a greater role for pharmacy in the provision of health care activities than will pharmacists employed in privately-owned institutions.

Table 15 presents the data from the analysis of pharmacist opinion toward health care activities by type of institution. No significant differences were found between pharmacists employed by public institutions and those employed by private institutions. With few exceptions, pharmacists employed by private institutions reported opinions more supportive of pharmacist involvement.

TABLE 15: Institutional Pharmacists' Opinion Toward Health Care Activities (type)		
	Private mean (sd)	Public mean (sd)
a. Administer immunizations to adults.....	0.27 (1.60)	0.37 (1.29)
b. Administer immunizations to children.....	0.65 (1.63)	1.00 (1.47)
c. Administer injections to adults.....	0.57 (1.35)	0.86 (1.40)
d. Administer injections to children.....	0.92 (1.27)	1.20 (1.41)
e. Administer nebulized treatments.....	0.37 (1.33)	0.23 (1.39)
f. Cancel/stop drug therapy.....	0.37 (1.27)	0.74 (1.38)
g. Compound medications.....	-2.27 (1.19)	-2.29 (1.23)
h. Counsel patients about disease.....	0.39 (1.43)	0.71 (1.25)
i. Counsel patients about medication.....	-1.67 (1.26)	-1.23 (1.30)
j. Diagnose disease.....	2.22 (1.09)	2.09 (1.27)
k. Dispense medications.....	-2.18 (1.17)	-2.46 (1.15)
l. Make referrals to specialists.....	1.57 (1.08)	1.57 (1.24)
m. Measure blood glucose.....	-0.10 (1.10)	0.09 (0.95)
n. Measure blood pressure.....	-0.18 (0.91)	-0.06 (0.68)
o. Monitor disease.....	0.90 (1.03)	0.89 (1.32)
p. Monitor drug therapy.....	-0.90 (1.21)	-0.74 (1.07)
q. Order lab tests.....	0.45 (1.02)	0.61 (1.11)
r. Perform physical assessment.....	1.65 (1.07)	1.66 (1.28)
s. Review lab tests.....	0.45 (0.89)	0.46 (0.95)
t. Review patient history.....	0.39 (0.79)	0.34 (0.80)
u. Select drug.....	0.27 (1.35)	0.51 (1.22)
v. Select drug dose.....	-0.20 (1.41)	0.00 (1.19)
w. Select drug dosage form.....	-0.29 (1.29)	-0.14 (1.09)
x. Select drug route of administration.....	-0.10 (1.34)	-0.09 (1.09)
y. Select drug dosing schedule.....	-0.29 (1.38)	-0.14 (1.14)
* significant difference (p<0.05)		
† significant difference (p<0.002)		

H₀₉: There are no differences between the opinions of institutional pharmacy practitioners working in different institutional pharmacy positions (Directorship/Clinical/staff) with respect to the provision of health care activities.

H_{A9}: Clinical pharmacists will perceive a greater role for pharmacy in the provision of health care activities than will staff pharmacists or directors.

Table 16 contains the institutional pharmacists opinions toward the provision of health care services by position. Although there were no statistically significant differences, clinical pharmacists did view more of a role in pharmacist provision of services that might be considered an expansion upon their current responsibilities.

TABLE 16: Institutional Pharmacists' Opinion Toward Health Care Activities (position)			
	Director mean (sd)	Staff mean (sd)	Clinical mean (sd)
a. Administer immunizations to adults.....	0.20(1.19)	0.42(1.56)	-0.18(1.33)
b. Administer immunizations to children.....	0.60(1.40)	0.81(1.49)	0.94(1.78)
c. Administer injections to adults.....	0.57(1.19)	0.69(1.49)	0.29(1.40)
d. Administer injections to children.....	1.07(1.22)	1.00(1.36)	0.76(1.52)
e. Administer nebulized treatments.....	0.17(1.26)	0.37(1.50)	0.47(1.18)
f. Cancel/stop drug therapy.....	0.55(1.39)	0.56(1.39)	-0.35(1.11)
g. Compound medications.....	-2.23(1.28)	-2.30(1.25)	-2.18(1.13)
h. Counsel patients about disease.....	0.42(1.11)	0.47(1.52)	0.56(1.03)
i. Counsel patients about medication.....	-1.52(1.20)	-1.36(1.30)	-1.71(1.31)
j. Diagnose disease.....	2.16(1.09)	2.22(1.19)	2.18(1.13)
k. Dispense medications.....	-2.13(1.26)	-2.41(1.10)	-2.65(0.61)
l. Make referrals to specialists.....	1.68(1.17)	1.59(1.13)	1.29(1.36)
m. Measure blood glucose.....	-0.10(0.91)	0.02(1.18)	0.00(0.87)
n. Measure blood pressure.....	-0.06(0.73)	-0.17(1.00)	-0.18(0.39)
o. Monitor disease.....	0.94(1.15)	1.05(1.17)	0.65(1.22)
p. Monitor drug therapy.....	-0.68(1.05)	-0.81(1.25)	-1.06(1.20)
q. Order lab tests.....	0.42(1.29)	0.86(1.04)	-0.18(0.64)
r. Perform physical assessment.....	1.26(1.09)	1.78(1.19)	1.59(1.06)
s. Review lab tests.....	0.48(1.00)	0.73(0.96)	-0.12(0.33)
t. Review patient history.....	0.47(0.73)	0.47(1.00)	0.00(0.35)
u. Select drug.....	0.52(1.23)	0.58(1.40)	-0.59(1.12)
v. Select drug dose.....	-0.65(1.36)	0.08(1.36)	-0.82(1.28)
w. Select drug dosage form.....	-0.58(1.29)	-0.05(1.28)	-0.71(1.26)
x. Select drug route of administration.....	-0.16(1.29)	0.08(1.26)	-0.76(1.25)
y. Select drug dosing schedule.....	-0.16(1.29)	-0.10(1.22)	-0.82(1.33)

* significant difference (p<0.05)
† significant difference (p<0.002)

H_{O10}: There is no relationship between pharmacy workload (as measured by bed size and average daily census) and opinion toward the provision of health care services.

H_{A10}: There will be a negative correlation between pharmacy workload and pharmacist opinion toward the provision of health care services.

H_{O11}: There is no relationship between practice age (as measured by number of years practicing institutional pharmacy) and opinion toward the provision of health care services.

H_{A11}: There will be a negative correlation between practice age (as measured by number of years practicing institutional pharmacy) and pharmacist opinion toward the provision of health care services.

Table 17 presents the Pearson correlation values for the health care activities and institutional pharmacy workload and institutional practice age. The only significant correlations were ordering lab tests (-0.28) and selection of drug (-0.25). Each of these were significantly negatively correlated with pharmacy workload (as measured by average number of beds occupied) suggesting that as the respondent became busier, these activities were left to the physician. As for practice age, the only significant correlation occurred with counseling about medication. This positive correlation implied that as the institutional pharmacist gains experience, he or she holds more firmly to the opinion that medication counseling is a function of the pharmacist.

TABLE 17: Institutional Pharmacists' Opinion Toward Health Care Activities (practice age and pharmacy workload)

		workload Pearson r	pract age Pearson r
a.	Administer immunizations to adults.....	-0.07	-0.05
b.	Administer immunizations to children.....	0.03	-0.15
c.	Administer injections to adults.....	-0.06	0.09
d.	Administer injections to children.....	-0.09	-0.04
e.	Administer nebulized treatments.....	-0.05	-0.08
f.	Cancel/stop drug therapy.....	0.09	0.03
g.	Compound medications.....	-0.15	0.03
h.	Counsel patients about disease.....	0.06	0.09
i.	Counsel patients about medication.....	-0.18	0.91*
j.	Diagnose disease.....	0.03	-0.13
k.	Dispense medications.....	-0.09	0.03
l.	Make referrals to specialists.....	0.05	-0.14
m.	Measure blood glucose.....	-0.09	0.05
n.	Measure blood pressure.....	0.12	0.07
o.	Monitor disease.....	-0.06	0.08
p.	Monitor drug therapy.....	-0.06	0.06
q.	Order lab tests.....	-0.28*	-0.05
r.	Perform physical assessment.....	0.10	-0.15
s.	Review lab tests.....	0.06	-0.03
t.	Review patient history.....	0.18	-0.05
u.	Select drug.....	-0.25*	0.02
v.	Select drug dose.....	-0.19	0.00
w.	Select drug dosage form.....	-0.11	-0.02
x.	Select drug route of administration.....	-0.15	-0.05
y.	Select drug dosing schedule.....	-0.15	0.01

* significant relationship (p<0.05)

† significant relationship (p<0.002)

CHAPTER IV CONCLUSION AND DISCUSSION

When looking at the results obtained, there are clearly defined traditional roles for both the pharmacist and the physician. Traditional roles of pharmacy such as dispensing medications and compounding medications were strongly supported in the study. Diagnosing disease and performing physical assessment were thought to be mainly physician duties. These results do not present a threat to pharmaceutical care because ideally the physician diagnoses and the pharmacist provides the drug, but drug selection and drug advice fall into conflict and pose a threat to the ideal pharmaceutical care model.

Counseling patients about medication was also thought to be a mainly pharmacist role, yet monitoring disease state was found to be the physician's responsibility. This correlation presents major problems for implementing pharmaceutical care, because in order to properly advise patients about their medication, one must know the disease and factors associated with the disease to give correct information. For example, if a pharmacist were presented with a prescription written for minoxidil, a vasodilator, the pharmacist must know if the patient is suffering from hair loss or angina in order to dispense the medication in the correct dosage form. While that may be an extreme example, its principle should be considered a standard. The severity of disease, the history of the patient, and other associated factors of the disease must be known and evaluated by the pharmacist in order for ideal medication counseling to occur.

When considering selection of drug, drug dosage form, drug dose, drug route of administration, and drug dosing schedule, while pharmacists as a whole thought these

aspects to be primarily physician duties, it is important to regard opinions of community pharmacists versus institutional pharmacists. Community pharmacists held more firm to drug selection aspects being physician only roles than did institutional pharmacists. This difference lies primarily in each group's opportunities to participate in drug selection aspects of patient care. Institutional pharmacists as a whole work closer with the physician in selecting drug, drug dosage form, drug dose, drug route of administration, and drug dosing schedule, and therefore feel that they have more of a role in this area. Community pharmacists primarily fill the prescription that they are presented with, where drug, drug dosage form, drug dose, drug route of administration, and drug dosing schedule has already been selected by the physician and do not see an opportunity to participate in these aspects. While selection of drug, drug dosage form, drug dose, drug route of administration, and drug dosing schedule may currently lie with the physician, it is imperative that pharmacists begin to utilize their vast knowledge of drugs and at the least, advise the physician, in order to improve patient care with respect to drug therapy.

Another difference with respect to institutional and community pharmacists lies in administration of immunizations and injections to adults and children. As a whole these were felt to be physician duties, but again, community pharmacists supported physician responsibility more than institutional pharmacists. While community pharmacists might have little opportunity to administer antibiotic intramuscular injections it is shocking to think that they do not see themselves as primary in offering immunizations. Community pharmacies can and should be a leader in promoting and offering immunization for the common flu and pneumonia within their communities. Because institutional pharmacists commonly have the opportunity to administer injections it is not surprising that they supported pharmacist responsibility in this area. Because of the differences in how one

views roles within the health care system based on practice setting, when one discusses the expanded role for pharmacy, one should differentiate whether one is speaking of community-based practice or institutional practice.

Using evidence gained from this project, one would surmise that many opportunities to provide pharmaceutical care await pharmacists in Mississippi. This research has offered insight into what services are expected by pharmacists, and has shown how differences such as practice setting and educational background might affect those expectations. In the future, it appears to be worthwhile to explore how primary care physicians and patients view the provision of these same activities by physicians or by pharmacists. Additionally, there are opportunities to investigate how patients view the expanded role of the pharmacist when compared to the certified nurse practitioner. This research has hopefully laid the foundation for future studies that can pinpoint the exact services that should be offered with regard to practice settings.

As is evidenced by the data presented, in the opinion of Mississippi pharmacists, there are some traditional roles that remain the exclusive domain of pharmacy or medicine. While respondents did support these traditional roles, there is evidence to suggest that the pharmacist has opportunities to expand his/her practice beyond the count, pour, lick and stick moniker that too often has been applied.

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