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Technicians in pharmacy

Kenneth Scott Mericle
Iowa State University

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TECHNICIANS IN PHARMACY

by

Kenneth Scott Mericle

A Thesis Submitted to the
Graduate Faculty in Partial Fulfillment of
The Requirements for the Degree of
MASTER OF SCIENCE

Major Subject: Economics

Signatures have been redacted for privacy

Iowa State University
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Ames, Iowa
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CHAPTER I: INTRODUCTION

"Educational institutions, health agencies and health workers--individually and through their associations--should give high priority to increasing the number of both existing and new kinds of allied and auxiliary personnel. (Recommendation 5)"

"The health team should function with each member contributing his most highly developed skills. Innovation and experimentation should be undertaken to expand and develop the roles of allied and auxiliary personnel. (Recommendation 6)" (1, p. 21)

In making the above two recommendations, the Task Force on Health Manpower of the National Commission on Community Health Services has formally recognized the important role of technicians and other subprofessionals in assuring an adequate supply of health manpower. The Task Force sees allied and auxiliary workers as being the most promising single measure for this purpose.

"Adequate numbers of such workers can permit the efficient use of highly educated and specialized personnel. Many allied health workers have a unique competence in specific segments of health service. With adequate supervision and effective liaison among related professional and occupational groups, allied health workers in different specialties and with varying levels of education and training can make an enormous contribution to enlarging the provision of community health services. Their participation in the health team can enhance the quality of services and implement the principle that health personnel should not normally be used for tasks below the level for which they are prepared." (1, p.22)

The ultimate purpose of this thesis is to determine if the incorporation of a technician or other subprofessional
is possible and desirable for the pharmacy profession in Iowa. The effectiveness of such allied and auxiliary health workers in new roles will depend to a large extent on the quality of answers to the following questions:

a) What are the prerequisite conditions to creating new types of occupations?

b) What will the duties and responsibilities of the new occupation be?

c) How can the proper amount and type of training best be provided?

d) What are the responsibilities of existing professional and occupational groups to the newly emerging occupation?

Manpower research can be effectively utilized in attempting to answer these questions. In providing the answers much can be learned from past experiences with new technician or subprofessional occupations in the health service industry. Chapters II, III, and IV of this study will survey the past experiences of the health service industry as they pertain to the above questions. A review of these experiences should provide useful background and some guidelines for studying the problem of introducing a new category of workers into the practice of pharmacy.

Chapter V will examine the current state of affairs of the pharmacy profession. An attempt will be made to review the supply and demand situation on a national basis.
The future role of the pharmacist as envisioned by professional leaders and health planners will be discussed. Finally, the possible effects on pharmacy of Federal legislation and other outside variables will be dealt with. This section should provide some indication of the status of the profession and of the direction pharmacy is likely to move in the future.

Chapters VI and VII will present the results of a piece of research jointly financed by the Iowa State University Industrial Relations Center and the Iowa Pharmaceutical Association on the subject of technicians or subprofessionals in pharmacy. The research is based on results of a questionnaire mailed to the members of the Iowa Pharmaceutical Association. It is hoped that the questionnaire will provide an indication of the type of subprofessional most desired by pharmacists in Iowa, the demand for such subprofessional workers, pharmacists' ideas on training and licensing for the pharmacy subprofessional, and professional characteristics of individual pharmacists favoring the use of subprofessionals.

The final chapter will present conclusions drawn from the evidence of the preceding seven chapters. An attempt will be made to answer the questions posed on page 2 with regard to the incorporation of a technician or subprofessional into the practice of pharmacy in Iowa: specifically, under what conditions should a technician or other subprofessional be employed in pharmacy, what should be the duties
and responsibilities of such a worker, how should he be trained, and what role should the pharmacist have in his utilization and supervision.
CHAPTER II: NEW CATEGORIES OF WORKERS

In the past new types of technician, professional, and subprofessional jobs have been formed to meet needs which were not being adequately met by existing health personnel. Typically, people for the new occupations were recruited from existing occupations and prepared for the new job through on-the-job training. As demand for the new workers increased, formal training programs were developed, licensing procedures established, and professional organizations created. Recently the government has shown an active interest in manpower planning in the health field with the objective of assuring a supply of health workers of all skills which will best suit the nation's health needs. In this regard great interest has been shown in the creation of new categories of health workers. The involvement of government combined with manpower shortages has caused the health professions to experiment with allied and auxiliary personnel. Professional groups are reexamining their own job content with an eye to duties which could be reassigned. With specific efforts being made to create new types of jobs where none previously existed, a new pattern of occupation building is beginning to emerge. A profession or area of the health service industry is examined to determine if a new occupational group is needed; the exact duties of the new job are specified; training programs are established; and finally help is provided in gaining employment for the new workers. The first two steps of this procedure are
highly related since determining if a new job is needed and will be accepted depends greatly on the content of the new job. Among the factors of principal importance in deciding if the new job will be created and what its new duties will be are: 1) the ability of the new occupation to increase the effectiveness of related professionals and other occupational groups by freeing their time and allowing an upgrading of their activities, 2) the ability of the new occupation to fill voids in trained manpower created by new technology or knowledge, 3) the effect of the new occupation on costs and quality, and 4) the ability of the new occupation to meet special needs involving special problems. Each of these factors will be discussed in detail in the sections which follow.

Increase Effectiveness of Related Professions

A rapid increase in the demand for health services is expected in the next decade as a result of the growth in population, increasing ability and willingness of individuals to pay for health care, and the growing ability of the medical professions to provide more and better services (2, p. 1). The emergence and growth of new occupational groups could be a key factor in alleviating this demand. New occupational groups can be used to extend existing scarce professional resources. This can be done either by 1) taking over tasks formerly performed by the professional which have become
routinized, or 2) becoming highly skilled in and assuming responsibility for a specific, well-defined area of health services which might otherwise have required professional attention.

Dental hygienists offer an outstanding example of the first category of workers.

"The hygienist, working under the direction of the dentist, performs prophylaxes (scaling and polishing of the teeth), exposes and processes dental x-ray films, applies flouride solution to the teeth of children, instructs individual patients in tooth brushing techniques and proper diet as related to the teeth, and performs other duties in conformity with her training and licensing." (J, p. 44)

All of these activities were once, and probably in a majority of cases still are, performed by dentists; however, as the number of trained hygienists increases and as more and more dental offices hire them, a growing amount of the dentist's time will be freed for other activities.

The number of new occupational groups in the second group of workers providing services in a limited well-defined area of health services has increased greatly in recent years. Hospitals seem to be a particularly fertile area for the birth of new occupations of this kind. Some of these include: inhalation therapist, prosthetic technician, medical emergency technician, surgical technician, blood bank technician, medical electronic engineer, electronic instrument technician, ward secretary (or floor manager), ward supply technician, and electronic data processing and
maintenance specialists of various kinds (4, p. 77). The services of these groups have greatly broadened and improved hospital care.

A very important reason for the development of new types of jobs is to take over, extend, or supplement the activities of existing related professional and occupational groups. In contemplating the creation of a new occupational group, great importance should be attached to the following question: Will the new group improve the overall performance of related professional and occupational groups in existence? If this question can be answered affirmatively, an important precondition for establishing a new occupation will be satisfied and a basis will be made for selling the new occupation to existing professional and occupational groups.

Respond to New Technology or Knowledge

"New knowledge creates the need for new technologies, and with the development of new bodies of knowledge come new professions." (5, p. 3) This has been precisely the effect of the knowledge and technological explosion on the health service industry. New occupations have developed to fill a variety of needs created by the advent of new knowledge and technology and the new application of existing knowledge and technology to the health service industry. When the utilization of new knowledge or technology can improve or extend health services and when the provision of the
improved or extended services can best be accomplished by a new skill group, these new occupational groups should be formed. New occupations designed to take advantage of electronic medical equipment provide an example of new jobs created for specific technological requirements.

New technology may indirectly create a demand for new occupational groupings. An advance in technology may make routine a formerly complicated activity which demanded professional time, thus making it suitable for reassignment to an allied worker. Technological advances may also be introduced by an existing professional group, and with the passing of time, reassigned to new specialists. This has been the case with many traditional nursing activities (4, p. 78).

Another area in which new technology and knowledge can effect the demand for new types of workers is in the design of new types of physical facilities or organizational patterns. In most cases such innovation would normally use existing types of personnel and possibly significantly reduce their number. But the redesign of facilities or organizational patterns should not be completely dependent on existing occupational types. Just as new occupations have developed to take advantage of advances in medical equipment, so new occupations can be developed to take advantage of new designs or patterns of organization of the health service institutions. An example of the latter case exists in medicine where the movement to group practice has resulted in the employment of a wide vari-
osity of paramedical workers in medical groups (6, p. 680).

The health service industry has recently been exploiting the talents of professionals not normally connected with the provision of health services. Engineers have been responsible for the design and development of exciting new medical equipment. Administrators and organizational experts have improved the operations of hospitals and other institutions. Systems analysts and computer programmers will quite probably be of great importance in the immediate future. Still other hybrid occupations will result as existing bodies of knowledge and advanced technologies are applied to the health service industry.

Lower Cost and Improve Quality

This factor is very closely tied to each of the preceding two. If a new occupational group can improve the overall performance of its related occupational and professional groups, or if the new group is successful in filling a manpower gap created by new technology or knowledge, it is quite likely that either costs will be lowered or quality raised. This item has been listed separately to emphasize the primacy of the interests of the consumer of medical services. The health professions have an ethical responsibility to insure to consumers of health services the lowest possible costs consistent with high quality. If this standard is used to examine the job content of a health professional, all activities
which could be done as well by a person of less skill and training should be done by such a person in order to lower costs. Fortunately, ethical considerations are often reinforced by more pragmatic ones. In the common case when the supply of professionals is insufficient to meet demand, health professionals have a vested interest in reassigning some of their duties to allied and auxiliary workers in order that their time may be spent more productively. It is doubtful that any such reassignment will occur given a sufficient or excess supply in the profession unless new, "more professional" roles can be created concurrently with the reassignment of "unprofessional" activity.

Special Needs Involving Special Problems

Special needs will be defined as those needs created by exogenous variables or conditions which result in special manpower requirements within the health service industry. The most obvious of these is the involvement of government in the financing of health services. With the institution and expansion of the Medicare and Medicaid programs, a trend which is likely to continue, the government has had a direct influence on manpower requirements. Besides expanding the demand for health facilities and professional time, the programs also specify conditions for participation of health facilities which will affect manpower requirements. In the case of nursing homes and hospitals, to qualify for Federal aid a registered pharmacist, consultant pharmacist, or pharmacists'
committee must serve on the staff (7, p. 29). Such require-
ments as these could easily lead to a reorganization of profes-
sional activities and the emergence of new occupations.

New occupations could also result from Federal programs
in direct response to needs of the program. For example,
health professionals have complained about the quantities of
paper work for billing, record keeping, etc. associated with
government programs and other third party payment arrange-
ments. It is quite possible that workers with secretarial
training who are acquainted with the requirements of the laws
and regulations of Federal programs could be a valuable asset
to health professionals.

Another nagging manpower problem which has plagued the
health service industry is the disproportionately low dis-
tribution of health personnel in nonurban areas, urban
ghettos, and in certain geographic areas of the country.
Professional workers do not seem to be willing to work in
these areas in adequate numbers. Improvements in remuneration
and working conditions and the financing of education of people
from these areas will certainly help, but it is questionable
that these solutions will prove entirely satisfactory.
Perhaps a new approach should be taken. If less highly
trained personnel are more willing to live in such areas and
if their activity could be delineated and controlled, they
could fill some of the immediate health requirements. The
idea of new types of subprofessionals and technicians serv-
ing the health needs of these problem areas will be very repugnant to many who hold the quality of American health services in high esteem. However, given proper controls, new health occupations could provide valuable services to people who are presently denied them.

Conclusion

The creation of new categories of workers is not seen as a cure-all for all manpower problems in the health service industry. The purpose of the preceding section has been to illustrate the conditions under which new occupational groups have been successfully integrated into the health service industry and to suggest areas where they might be successfully integrated in the future. That the creation of new occupational groups can be a valuable means of dealing with health manpower problems, and of expanding and improving health services, is undeniable. To fulfill these promises the proper training and control for the new occupations are essential.
CHAPTER III: EDUCATION AND TRAINING

During the period 1960-66, employment in the health service industry increased from 2.8 million to 3.7 million or by nearly one-third. The Bureau of Labor Statistics predicts that between 1966 and 1975, 2.65 million workers will be required to fill new openings and for replacements. An additional 200,000 health workers will be required outside the health industry (2, p. 1). These data indicate that about 2.85 million additional workers will be needed in health occupations by 1975. Many of these workers will need to be highly trained, and many will be in new occupations for which training programs have not existed in the past. A great challenge faces the health and educational institutions in responding to these training needs. New training programs must be created, existing programs expanded, and new patterns of education tried.

High turnover of employees has been a persistent problem in the health service industry. This phenomenon has at least partially resulted from the lack of advancement opportunities in the industry. Training must be tied to the future as well as immediate needs of the workers if the high turnover rates are to be arrested. Vertical and horizontal mobility for allied health workers is seen as an important means of increasing worker satisfaction within the industry and thus lowering turnover rates. A fuller discussion of plans promoting mobility is given later in this chapter.
The matching of the types of educational programs with their appropriate educational institutions is very important if educational resources are to be properly exploited in the training of health service workers. A short section of this chapter identifies the educational facilities available and discusses their potential roles as training centers for health service workers.

The final part of this chapter touches on the necessity for local and regional involvement in establishing health worker training programs. No attempt has been made to analyze the interaction between the local, state, and Federal levels of government. The underlying premise of this section is that Federal and state involvement is most effective if limited to financing, advising, and planning activities, and that, especially for lower level occupations, local involvement in manpower planning is essential. The bulk of this section deals with an organizational structure for local involvement in health planning which has been proposed by the National Commission on Community Health Services. Their "community of solution" proposal is of interest in dealing with all health problems and may have great merit in the manpower context.

Mobility

The mobility of auxiliary and allied health workers has been the subject of much discussion in the recent literature on training programs. Vertical mobility is seen as a means
of retaining workers in the health service industry by giving them a chance to advance within the industry. Workers are interested in future earnings as well as in beginning wages. At present it is extremely difficult to move from one major occupational group in the health service industry to another. Training and education for one profession is generally non-applicable to higher positions. Thus workers are for the most part stuck in the occupation of their original choice with definite salary and advancement limitations. Such limitations have the effect of discouraging individual initiative and can lead to workers leaving the industry. Recruitment for dead end jobs is also extremely difficult. The improvement of vertical mobility by creating career ladders is a valuable aid in recruiting and retaining health service workers.

Health planners have also exhibited considerable interest in promoting horizontal mobility. With the rapidly changing technology and state of knowledge of the health service industry, horizontal mobility may be essential to preventing large groups of workers from becoming redundant. If workers can move to new occupations with a minimum of retraining, manpower readjustment will be greatly facilitated and disruptions caused by the displacement of workers minimized.

The key to promoting vertical mobility of health service workers is to recognize past training and education.
For example, every year more than 10,000 corpsmen and other health technicians are released from the armed services. These men have been trained and can function effectively in many areas, yet there have been no mechanisms developed for identifying them, attracting them to civilian medical services, and utilizing their valuable skills\(^1\)(5, p. 12). Other trained people whose training is outside the generally accepted and established academic patterns could be properly utilized—additional training should be provided to allow these people to meet licensing and educational requirements. It has been suggested that one means by which past achievement can be recognized would be to adopt the principle of credit for attainment in a field which could be tested by examination (5, p. 22). If a comprehensive examination or series of examinations could be passed, a candidate would satisfy the conditions for licensure regardless of formal educational requirements.

The development of career ladders would require a great deal of cooperation between the professional associations of the various occupational groups. If a nurse is to be able to pass examinations and receive credit for a couple of years of medical school, for example, it is essential that medical schools cooperate and that they have the endorsement of the

\(^1\) A notable exception is at the Duke University Medical Center where a project is underway to train men, who were formerly medics and corpsmen in the armed services, as physicians' assistants (4, pp. 81-82).
American Medical Association. Gaining the endorsement of the AMA or other professional associations on such issues may be very difficult unless these associations can be convinced that their own interests will be furthered. This may very well be the case if conditions of acute undersupply exist within the profession.

The second major means of promoting mobility is the concept of core or shared curriculum for several different occupational groups. The sharing of a core curriculum has the side benefits of promoting economy in teaching, broadening a student's career choice, and strengthening the functioning of the health team (5, p. 23). Core curriculum enhances mobility in two ways. First, in the case of courses shared by professional students and students in technical programs, for example dentists and dental hygienists, upward mobility is promoted in that dental hygienists who successfully complete the course will have satisfied some of the course requirements for dentistry. Secondly, the sharing of curriculum by several occupational programs at the same level should facilitate transfer between these groups with a minimum of retraining.

Several universities are already experimenting with the concept of core curriculum. At St. Louis University, a combined School of Nursing and Health Services offers combined classes in liberal arts, anatomy, physiology, psychology, and medical ethics (5, p. 16). Some other general areas which have been suggested as likely areas for combined study are
pathophysiology, pathopsychology, health field ethics, and clinical experience (8, p. 30). Under a combined curriculum approach, students can be attracted to the health field generally, thus simplifying recruitment and avoiding wastage resulting from premature career choice based on an incomplete knowledge of the field.

The third major means for increasing mobility is through continuing education, on-the-job training, and various other retraining programs. Effective retraining is essential to the movement of workers either up to higher positions or horizontally to areas of need in other occupational groups. A wealth of continuing education and on-the-job training arrangements already exist in the health service industry. The National Commission on Community Health Services has called for a "re-examination of the quantity and quality of continuing education and determination of the principles that should shape such programs in the future." (1, p. 141) One of these principles should certainly be to create logical patterns of courses designed to provide the educational background for workers transferring from one occupation to another.

Patterns of Education and Training

It is becoming increasingly apparent that educational institutions and not the hospitals and other clinical agencies should have the primary responsibility for educating allied and auxiliary health workers.
"Hospital training activities related to the allied health occupations can be categorized in three areas: they provide basic education for students enrolled in their own programs, they provide clinical experience for students of health related occupations in affiliated educational institutions, and they provide inservice training for their own staff and for new employees." (5, p. 21)

As educational institutions accept greater responsibility for didactics, the role of the hospitals as centers of clinical training will be paramount in their participation in the education of allied health workers. The development and maintenance of a cooperative relationship between the educational institutions and their hospitals or other clinical agencies will be essential to effective programs.

A major obstacle to the expansion of educational programs for health workers in the educational institutions lies in the shortage of trained faculty. If occupations are closely related to a professional group, affiliation with the existing professional schools or the use of professionals as teachers is possible. In the case of remote "specialty" health occupations, people with advanced training will be scarce. Efforts should be made in existing programs to identify potential teaching talents among students and encourage them to pursue teaching careers.

Although many exceptions exist, educational programs for preprofessional allied and auxiliary health workers generally have been taking one of three forms: baccalaureate level programs, two-year certificate programs, and various
programs for assistants, aides, and attendants requiring one year or less training. To suggest that this variety of programs can be incorporated neatly into the existing array of educational facilities with no overlap is certainly oversimplification. However, logical patterns of where to teach what types of programs do seem to emerge.

The year or less programs are probably most at home in technical and vocational schools or in on-the-job training programs in the health institutions themselves. The intimate relationship of the technical and vocational schools with the communities they serve is a great advantage in determining the health needs of the community and receiving feedback on existing programs. The major advantages of the technical and vocational schools probably are: low expenses and flexible admission requirements for students, good contact with community clinical facilities for the provision of clinical experience for students, the ease in identifying and establishing programs to meet community health needs, and the ease of placing graduates. The greatest problem these schools will encounter will be in the hiring and retaining of quality staff members.

Junior colleges will share many of the same functions, exhibit many of the same advantages, and are likely to encounter the same types of problems as the technical and vocational schools. Generally, the junior colleges are better suited for the two-year training programs. It is often possible to transfer junior college credit to related programs
in four-year colleges and universities, which facilitates upward mobility. This feature is a distinct advantage over programs in the technical and vocational schools. The expansion of the role of junior colleges in providing education for allied and auxiliary health workers is virtually certain. The National Commission on Community Health Services has recommended that: Educational programs for the health occupations in two-year colleges be expanded as rapidly as is consistent with quality (Recommendation 14)." (1, p. 150)

Writing in the September 1965 issue of the Journal of Medical Education, Dr. Robin Buerke states,

"It would seem that junior colleges across the country offer the most appropriate and most immediate solution to the problem of training in specialty areas where shortages exist. Technical education in many para-medical specialties could easily be accomplished in a two-year curriculum which would also provide an opportunity for...liberal arts subjects." (9, p. 852)

In the case of new occupations which are closely associated with existing health professions, such as doctor's assistant, dental hygienist, or pharmacy technician, training can be provided most expeditiously in programs affiliated with the professional schools. There are several inherent advantages in using professional schools to train their related allied personnel. Some of these have been mentioned previously, such as the possibility of a partially shared curriculum and the availability of high quality faculty. Other advantages include the ease of providing baccalaureate length programs (when
four-year programs are desirable), the possibility of constant interaction between the professional group and the related auxiliary occupation, and the reduction of administrative costs. These advantages must be weighed against the disadvantages of overcrowded conditions which currently exist in many professional schools and the relatively high costs of attending these schools.

A recent development which shows much promise as a training center for baccalaureate and graduate level programs has been the grouping together of a number of health curricula in a college or school within a university medical center.

"The programs which are inherently related are placed in an environment where constant interaction is possible. With the combining of several programs in a college or central unit, duplications in such areas as administration, faculty, and facilities can be minimized. More importantly, individuals who will later work together in the medical scene are prepared together. Communication with other health professionals, a critical factor in the provision of health services, is learned during their educational experience."¹(5, p. 15)

The trend toward providing education for allied health occupations in educational institutions seems to be in line with the educational aspirations of today's youth who increasingly prefer the colleges and universities to post-high school training elsewhere. The preference of young people for junior college, college, or graduate work could be an important

¹At present 16 universities and colleges have or are developing schools of allied health professions.
factor in recruiting candidates for allied health training programs. If possible new programs should be established within a framework consistent with educational goals of young Americans.

Local Involvement in Education and Training

The National Commission on Community Health Services in its report _Health is a Community Affair_ suggests that health service administrative areas as defined by traditional community, state, and national boundaries are no longer adequate in dealing with major health problems. They propose instead that:

"The organization and delivery of community health services by both official and voluntary agencies must be based on the 'community of solution'—that is, environmental health problem-sheds and health service marketing areas, rather than primarily on political jurisdiction." (10, p. 196)

The merits of this principle in dealing with health problems such as air and water pollution which are independent of political boundaries are obvious. The effective mobilization of all resources within the problem area under one administration certainly is more appealing than overlapping and ambiguous jurisdictions based on political boundaries.

The concept of community of solution also has relevance to the problem of providing education and training for allied health workers. Regions defined as health marketing areas should be used as a basis for identifying health manpower needs, establishing educational and training programs, and
recruiting participants for the programs. This approach has been used by four Canadian hospitals which pooled their resources in a joint training program for medical technologists (11, p. 126). Educational ventures such as this should be based on regional resources and needs. As envisioned by the National Commission on Community Health Services, a State Health Policy and Planning Commission would coordinate the work of the regional health planning groups. These groups would be led by top echelon citizens and professionals from the region. Health professionals, employers of health workers, and educators have vested interests in the manpower aspects of regional planning, and they could be expected to play an active role on planning commissions. State and Federal governments can be an important source of finances, but the initiative in establishing educational and training ventures must come from local groups. Health planning regions based on the community of solution concept offer a potentially effective means of stimulating grass roots interest and a promising organizational structure for dealing with health manpower problems.

Conclusion

This chapter has not attempted to deal exhaustively with the educational and training problems of the health service

1For a detailed description of the organization of community health services based on the concept of community of solution, see Health is a Community Affair, Chapter 7 (10).
industry. It is impossible to anticipate all problems that training programs for new categories of workers will encounter. However, a consideration of the importance of mobility, an investigation of the full spectrum of educational possibilities, and a recognition of the importance of local involvement will help minimize the difficulties faced by new programs.
CHAPTER IV: THE RELATIONSHIP OF NEW OCCUPATIONS TO EXISTING PROFESSIONAL GROUPS

Success or failure of a new occupation will depend to a great extent on establishing the proper relationship of the new group with related professional and occupational groups. A thousand competent physician's assistants are of little or no use if physicians are unwilling or unable to use their services. Likewise a highly trained technician placed in an unrewarding and unchallenging job will probably become another of the health industry's "dropouts." Existing health professional and occupational groups have a definite responsibility in accomplishing full integration of new occupational groups into the health team. In their role as employers, supervisors, co-workers, and as publicly recognized members of the health team, existing groups must aid new occupations to gain worthwhile jobs and public recognition of their skills.

Responsibility as an Employer

In nearly all cases, newly created occupational groups will be employed by existing groups of health professionals or administrators. As an employer the health professional or administrator has the twofold responsibility of insuring a worthwhile, satisfying job and of providing good wages and working conditions. The necessity of meeting these responsibilities is well documented in the literature:
"It has always been an error to focus on increasing the supply of health manpower without simultaneously considering the wage structure and utilization patterns. If the latter are awry then, no matter how many are recruited and trained, the supply will still be inadequate since dissatisfied workers will leave." (4, p. 80)

"Each job must be made worthwhile so that the employee feels that the service he contributes is important, regardless at what level he is working." (8, p. 45)

"Effective techniques of recruitment can attract personnel to various specialties and jobs. Ultimately, however, supply and retention of manpower in various health specialties are determined by the satisfaction the health worker derives from his job... The most obvious factors affecting job satisfaction concern salaries and working conditions, but the legitimate desire for recognition, nonmonetary rewards, and the privilege to engage in decision making also influence job satisfaction and staff morale among all levels of personnel." (1, p. 110)

The consensus of experts in the health manpower field is that recruitment and training programs for existing and new occupations will be unsuccessful unless wage rates, working conditions, and other motivational factors are improved and maintained at high levels. Health professionals and administrators clearly have a responsibility in their role as employers to insure wage structures and working conditions conducive to the successful integration of new occupational groups.

Responsibility as a Supervisor

In much of the health service industry, especially in the case of physicians and dentists in private practice, the role of employer and immediate supervisor of paramedical personnel are coincidental. It is important to recognize that the
goal of establishing good wage structures, working conditions, and satisfactory job content for new auxiliary health occupations should be shared by employers and supervisors. In this section the distinction between supervisor and employer has been made for the purpose of emphasizing the supervisor's role of actually directing the work of new types of workers. Foremost in this activity is the necessity to delineate tasks for the supervised workers which are consistent with their education and training, the various laws and regulations governing their activity and the maintenance of high quality, low cost medical care. The dental profession has recognized the importance of the dentist's role as a supervisor of paradental workers. "With financial help from the Federal Government, dental schools have instituted programs specifically designed to teach graduates how they can serve public health needs better through a careful sharing of appropriate functions with dental auxiliary personnel." (8, p. 28) Similar programs will be necessary in other health professions if health professionals are to be able to effectively utilize new types of health workers. As new occupations emerge in the health service industry, professionals in their role as supervisors will play an increasingly important part in shaping the new occupations.
Responsibility as a Co-Worker

Through their service to the public, the established professional and occupational groups in the health service industry have established occupational identities and gained public recognition. New occupational groups must achieve a similar status if they are to effectively participate on the health team. Americans are very quality conscious concerning health services and as a result are conservative when confronted with changes in the normal patterns of health care. Acceptance of new categories of health workers by the public is essential to their occupational survival. The established professions and occupations can be a tremendous help in educating the public on the use of new auxiliary health personnel both by the example of their effective use and through discourse. The new groups can help to achieve status by establishing accreditation procedures for their training and education and by establishing licensing programs. Once again the existing professional organizations can and should help establish accreditation and licensing procedures for new occupations.

At present the Council on Medical Education of the American Medical Association has developed minimum standards for, and grants "approval" or accreditation of, schools or programs for medical technologists, radiologic technologists, occupational therapists, medical record librarians, medical record technicians, cytotechnologists, and inhalation therapists
By participating in accreditation and licensing procedures the parent profession aids the public by helping to insure high quality programs. It also aids the new occupation by lending the prestige of its name to the accreditation program. The American Medical Association and other established professional groups can be a valuable aid to newly emerging occupations in gaining public recognition and approval of the new groups.

Conclusion

Several means by which existing professional and occupational groups can aid new groups have been suggested in this section. In their role as employers and supervisors, the existing groups can help create the wage structures and working conditions necessary for new occupations to develop. As supervisors the existing groups can help define the optimal job content of new workers subject to educational, legal, and quality constraints. Finally, in their role as co-workers, the established occupational groups can help new groups to gain public recognition and approval. Three items not mentioned in the section above but still very important areas in which the established professional and occupational groups can contribute are the planning of educational and training programs, the recruitment of workers for such programs, and the placement of successful graduates of the programs.

All of the discussion in this section has been based on
the assumption that existing occupational and professional groups will want to contribute to the success of programs designed to create new categories of paramedical personnel. Perhaps this assumption is premature. The National Commission on Community Health Services in a discussion on the acceptance of auxiliary health workers has characterized the health professions as follows:

"Since most established professions tend to be conservative in orientation—a desirable trait when viewed as an effort to safeguard standards and enhance quality—these groups are naturally reluctant to share functions or responsibility previously recognized as their sole prerogative. This reluctance may create conflicts between the old and new professions as each seeks the same end—patient well-being or a healthful environment—by different means. Resistance to pressure for change can even be more difficult to overcome when the status quo is firmly embedded in a multiplicity of statutes, accreditation procedures, and criteria for certification. Economic vested interests, supposedly a hallmark of guilds rather than professional groups, add to the resistance to change. In such situations the forces of logic and rationality may be no match for tradition and vested interests. Nevertheless rationality must prevail if effectiveness, efficiency, and economy in health manpower are to be achieved." (1, pp. 69-70)

The situation may not be as bleak as this pessimistic passage suggests. Indeed, confronted with the success of paramedical occupations in the past, present health professionals may not be able to deny the future potential of new paramedical groups. What doctor would deny the contribution of the paramedical occupations to the general health welfare of the nation? Similarly, one would be hardpressed to find
a dentist who would deny the importance of paradental workers to the practice of dentistry. The evidence overwhelmingly supports the "forces of logic and rationality"—allied and auxiliary health workers have made valuable contributions in the past—new categories of these workers will make valuable contributions in the future.
CHAPTER V: PHARMACY MANPOWER

"Pharmacy is the health profession which is concerned with the preparation and distribution of medicinal products. It embraces the art and science of preparing, from natural or synthetic sources, materials for the prevention, diagnosis and treatment of disease. Pharmacy embraces the professional, legal, and economic function of distributing medicinal products properly and safely." (12, p.1)

In 1967, there were about 122,000 pharmacists actively engaged in the practice of pharmacy in the United States. By type of practice, this total was distributed as follows: 1) community pharmacy, 85.7%; 2) hospital pharmacy, 6.2%; 3) manufacturing and wholesale, 4.2%; and 4) teaching, government, and others, 3.9%. Of the community pharmacists nearly one-half, or 46%, were part owners or owned their own stores (12, Table 4).

Pharmacy education can currently be obtained in 73 accredited colleges of pharmacy in the United States (13, p. 1). The first professional degree in pharmacy requires five years of post high school education for the Bachelor of Pharmacy degree or six years for the Doctor of Pharmacy degree. The five-year program, by far the most common, consists of two years preprofessional training and three years of professional education. The first year or two can usually be taken in an approved junior college or liberal arts college. Upon completion of academic requirements, all states administer a comprehensive examination which the pharmacist must pass.
before being licensed. Some states require up to a one-year intern period before the exam can be taken. Many states have reciprocal licensing agreements.

Demand for Pharmacists

Relative to most other health occupations the demand for pharmacists is not expected to expand very rapidly. The U.S. Department of Labor predicts a 5% increase in the number of pharmacists required between 1966 and 1975. This raises the total number of active pharmacists from 120,000 to 126,000. In addition, 32,000 pharmacists will be required for replacements of those who die, retire, or otherwise leave the profession. This total projected need—32,000 for replacements and 6,000 for growth—translates into an annual average of 4,200 new pharmacists needed over the nine-year period (2, p. 22)\(^1\).

The expression of a single aggregate projected demand figure for pharmacists can easily be misleading in that aggregation can obscure problems which dispersed data might uncover. For example, dealing with state data, a great variation between the states is found in the number of resident

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\(^1\) The Department of Labor demand projections allow for the impact of expected change in Federal programs, technology, employer utilization patterns, and patterns of consumer expenditures. A more detailed discussion of the methodology may be found in America's Industrial and Occupational Manpower Requirements 1964-75, a report prepared for the National Commission on Automation, Technology, and Economic Progress.
pharmacists per 100,000 population. This figure ranges from 27.6 in Hawaii to 106.9 in Washington, D.C., with a national average of 61.6. Thirteen states, including eight southern and border states, three New England states, and Alaska and Hawaii, have less than fifty pharmacists per 100,000 population (12, Table 1). A pharmacist-population ratio of 68 per 100,000 has been used in projecting manpower needs (12, p. 6). This ratio would indicate a marked undersupply of pharmacists in the above mentioned areas of the country.

A similar situation exists when demand for pharmacists is subdivided according to type of practice. A study of the nation's hospitals conducted in 1966 by the Bureau of Health Manpower and the American Hospital Association indicated an additional need for about 1,900 pharmacists (14, p. 3)\(^1\).

A demand for pharmaceutical services also exists in various other institutions including extended care facilities, nursing homes, and custodial homes. The services required by these institutions could most conveniently be provided by community pharmacists on a consultant basis. "The profession itself is taking steps to orient the community pharmacist to assume additional responsibilities in institutional practice." (12, p. 12) Community pharmacists are on the average greatly underutilized professionally. W. S. Apple, executive secretary of the American Pharmaceutical Association, has stated the

\(^1\)This figure is the number of pharmacists required to fill existing budgeted vacancies plus the additional personnel needed to provide optimal care.
problem as follows:

"If health planners believe what they read—that is, that the pharmacist on the average spends less than half his time practicing pharmacy—then the question is going to be asked: Why shouldn’t he spend all of his time practicing pharmacy?" (15, p. 214)

Dr. Apple sees dangerous implications in the current professional underutilization. Difficulties could arise in obtaining Federal funds for financing educational facilities. Recruitment of pharmacy students could be made more difficult. If community pharmacists will respond to demands for their services as consultants in institutional practice, the problem of professional underutilization in pharmacy will be greatly reduced.

Demand for pharmacists has been estimated at 4,200 per year for the period 1966-75. This figure is probably an accurate reflection of the country’s needs; however, if attempts are made to correct the maldistribution of pharmacists according to geographical and professional dispersion, the figure may slightly understate needs.

Supply of Pharmacists

During the ten-year period 1958-1967, an annual average of 3,512 students have received undergraduate degrees from U.S. schools of pharmacy. (See Table 1.) Unfortunately no information is available on the number of foreign pharmacists
Table 1. Undergraduate degrees conferred by U.S. schools of pharmacy, 1958-1968

<table>
<thead>
<tr>
<th>Year</th>
<th>Graduates</th>
<th>Year</th>
<th>Graduates</th>
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<tbody>
<tr>
<td>1958</td>
<td>3,683</td>
<td>1963</td>
<td>4,163</td>
</tr>
<tr>
<td>1959</td>
<td>3,686</td>
<td>1964</td>
<td>2,195</td>
</tr>
<tr>
<td>1960</td>
<td>3,497</td>
<td>1965</td>
<td>3,360</td>
</tr>
<tr>
<td>1961</td>
<td>3,438</td>
<td>1966</td>
<td>3,659</td>
</tr>
<tr>
<td>1962</td>
<td>3,699</td>
<td>1967</td>
<td>3,744</td>
</tr>
</tbody>
</table>

Note: Excludes graduates of schools in Philippine Island and Puerto Rico.

*From the American Journal of Pharmaceutical Education 27, No. 1, also prior annual reports.*

Licensed annually\(^1\). In spite of these limitations, it is reasonable to assume that the supply of pharmacists will have to be expanded to meet a projected yearly demand for 4,200 pharmacists during the period 1966-75. During 1950, 1951, and 1952, the output of pharmacists from schools of pharmacy exceeded 4,200 annually (16, p. 66). This would indicate that current enrollments could be expanded quite rapidly in present schools to meet projected annual requirements. Reports indicate that all schools are not presently filled to

\(^1\)If a comparison with physicians is valid, this could be a significant number. Fourteen percent of all acting physicians in the U.S. are foreign medical graduates (17, p. 432).
capacity, and thus stepped up recruiting programs could be effective in increasing enrollments. The construction of new schools of pharmacy especially in New England or in southern and border states should also be considered if supply falls seriously short of demand.

The increase in the enrollment of women in colleges of pharmacy in recent years has been encouraging. The percentage of women has steadily increased up to 16.5% of total enrollment in pharmacy colleges in 1967-68 (13, p. 1). In 1967, only 7.9% of active pharmacists were women (12, Table 2). Increases in the number of women students may help alleviate manpower problems in hospitals since a relatively higher percentage of women choose this type of practice than men.

The number of active nonwhite pharmacists has increased between 1950 and 1960, but the percentage of nonwhite pharmacists, though rising at a rate of 64% for the period, was still painfully low in 1960 at 2.6% (16, p. 34). Many universities are making special efforts to recruit minority group students. Colleges of pharmacy would do credit to themselves by participating in these efforts.

Another potential source of pharmacy students is returning veterans from the armed forces. The new G.I. Bill should make it easier financially for veterans to attend college, and considering their exposure in the service to medical training, including pharmacy, many soldiers should be interested in pursuing civilian careers in the health fields.
It is hard to imagine any serious undersupply of pharmacists developing in the next several years. The current supply of graduates from pharmacy colleges is not seriously short of projected needs, and the supply of pharmacy graduates could be increased quite rapidly by aggressive recruiting, should the need arise. Additional needs for pharmacists in hospitals could be met by upgrading wages and working conditions. The same is probably true of the geographical areas currently experiencing an undersupply, though new pharmacy colleges in these areas might be needed. Research to determine whether an area is a net importer or exporter of pharmacists would be valuable in determining whether emphasis should be placed on improving employment conditions or on constructing new schools.

It might be difficult to convince a pharmacist who works 50- and 60-hour weeks, or the dean of a pharmacy college who is plagued by daily phone calls requesting pharmacists for job vacancies, that the supply of pharmacists is adequate. This situation has resulted primarily from the poor utilization of pharmacists in nonprofessional activity. For years the fear has existed that if pharmacists attempted to be full time practitioners of pharmacy one-half or more of the pharmacies in the United States would have to close (15, p. 215). This fear has resulted in the expansion of the merchandising and other nonprofessional activities which are so demanding on many pharmacists' time. With expanding demand for the professional services of the community pharmacist both in terms
of increased prescription volume and opportunities for consultant activities, there is no longer any basis for the fear that there isn't enough professional work to go around. It makes very little sense to educate a man for five years in an intellectually demanding profession like pharmacy and to expect him to be satisfied with a job in which he spends half his time as a sales clerk. The result is professional frustration and the substitution of monetary for professional gratification. The real manpower challenge to pharmacy is to improve the professional utilization of pharmacists. Expanding the supply of pharmacists makes little sense, economic or otherwise, unless pharmacists abandon merchandising and concentrate on the professional practice of pharmacy.

Significant Trends in Pharmacy

Several significant trends are beginning to emerge which will shape the future of pharmacy and have important manpower implications. Some of these trends--the increased volume of prescription trade and the decreasing importance of compounding--can be readily supported by existing statistical evidence. Other trends can best be stated in terms of new needs for professional services, as in institutional practice and more generally in new patient-oriented roles. These needs for professional pharmaceutical services have been well documented by pharmacy's progressive leadership, and early evidence indicates that pharmacists are responding to the new professional challenges. The role of outside parties such as government,
insurance companies, and even labor unions in third party payment agreements and, in the case of government, as a direct employer of pharmacists, is bound to increase. Finally, there seems to be a growing professional consciousness in pharmacy which manifests itself in a new concern for professional ethics and a responsiveness to new professional opportunities. Each of the above mentioned trends will be examined in more detail in the following sections.

**Increased volume of prescription trade**

The amazing increase in the volume of prescription trade which has occurred in recent years can best be illustrated by data on per capita prescription usage. Between 1942 and 1963, the average annual number of prescriptions utilized by Americans more than doubled from 1.47 prescriptions per capita to 3.93 (18, p. 12). The A. C. Nielsen Company predicts that this figure will fall in the range of 6.8-8.0 prescriptions per capita by 1975 (19, p. 9). Thus, in slightly over 30 years a five-fold increase in per capita prescribed drug usage is predicted. The expansion of per capita prescription usage can be attributed primarily to a great expansion in the number and kind of pharmaceutical products and to an increasing ability and willingness on the part of the public to pay for drugs. When the effect of per capita increases is added to that of normal population growth, the absolute increase in the number of prescriptions dispensed is tremendous.
Decreasing importance of compounding

The industrial or manufacturing pharmacist has largely assumed the compounding functions formerly performed by community pharmacists. Drugs are increasingly prepackaged in unit doses by the manufacturer. By 1964, only 2.3% of the new prescriptions dispensed by community pharmacists required compounding (20, p. 6). In the past this trend has to a large extent offset the effects of increases in per capita prescription trade, but due to the tiny portion of prescriptions which required compounding in 1964--2.3%--further gains in terms of freeing the time of community pharmacists for other activities will be minimal. The long standing trend of the evershrinking importance of compounding by the community pharmacist has largely run its course. The traditional function of compounding has effectively disappeared from community pharmacy.

The effect of outside parties on pharmacy

All indicators point to an increase in the involvement of outside parties such as government, insurance companies, labor unions, and others in the practice of pharmacy. This involvement can be subdivided into indirect involvement, as typified by third party payment arrangements, and direct involvement which directly affects how pharmacy will be practiced. Indirect involvement will quite probably be most important.

There is a great deal of concern in this country over the high cost of medical care. Prepayment insurance programs
have long been a feature of medicine and hospitalization; similar programs are being discussed as a means of offsetting drug costs. Several prepayment programs for pharmaceutical services are presently available, and the American Pharmaceutical Association has worked closely with organizations in developing these programs (21, p. 306). It is quite likely that the public will respond favorably and enrollment in these programs will increase.

The role of government in third party payment arrangements will most certainly increase also. Senator Joseph M. Montoya has introduced legislation to provide protection against the cost of outpatient prescription medicine for people covered by Medicare. The bill currently is being cosponsored by 38 members of the Senate and has the endorsement of the APhA (22, p. 435). Considering the general public acceptance of Medicare, this measure or some similar proposal will quite probably be passed at some time in the future. Legislation to protect the old and the needy from excessive drug charges would certainly seem to be a logical extension of current health welfare programs.

Labor unions have also shown considerable interest in drug prepayment programs. The United Auto Workers have succeeded in negotiating a prescription drugs program which pays all costs beyond $2.00 per prescription. This provision will undoubtedly spread within the UAW and also to other unions in future rounds of contract negotiation.
Government has become directly involved in the practice of pharmacy, and an expansion of its direct involvement seems likely. Activity in the important area of drug control has resulted in drug recalls, provisions to keep narcotics records, and numerous other regulations which can be demanding on the pharmacist's time. Provisions in Medicare set guidelines for the participation of hospitals and other health institutions which provide the pharmacist with an opportunity to expand his professional horizon (23, p. 121). More recently the Office of Economic Opportunity health centers have stirred considerable controversy. These centers are located in sections of our cities where health care of the residents, including availability of drugs, has been virtually nonexistent. The centers are designed to provide comprehensive health care to people who were previously denied it. Many pharmacists in areas affected by OEO centers view them as a serious economic threat. L. F. Tice, editorializing in the American Journal of Pharmacy, describes the problem as follows:

"The question arises however as to whether these centers are a threat or an opportunity. Since few of the poor have been able to avail themselves of pharmaceutical services, it does not seem likely that any loss in prescription volume could be experienced by pharmacies in the area... The really big question that must be answered is whether prescription drugs and other pharmaceutical services shall be supplied utilizing a vendor program and the pharmacies in the area or by on-site pharmacies and pharmacists in the centers themselves." (24, p. 68)

Nearly all government involvement in pharmacy can be
viewed as an opportunity or a threat. Certainly government involvement places direct demands on the pharmacists. Many, or perhaps most, pharmacists may be ideologically opposed to expansion of government social welfare programs. In spite of the opposition of health professionals however, the governmental role in the provision of health services is likely to expand. The relevant question does not seem to be whether or not we will have comprehensive medical coverage for all Americans, but rather when we will have it. Pharmacists can and will take a stand to aid or impede this process. Some useful evidence can be drawn from the example of Great Britain before making this decision.

"...It has been reported that 70 million prescriptions were dispensed annually in England and Wales before the National Health Program began in 1948. In 1949, however, over two hundred million prescriptions were dispensed." (25, p. 9)

"In summing up how the average British pharmacist feels about the National Health Service, it would be most meaningful to enumerate some of the most noticeable effects the NHS has had upon British pharmacy:

1. Effective separation of pharmacy and medicine.

   Physician dispensing virtually disappeared, because physicians are not reimbursed for dispensing under the NHS. This has been especially important for the development of British pharmacy since 1948, because prior to NHS it is estimated about 75% of all dispensing had been done by British physicians.

2. Cost of pharmaceutical services increased.

3. Prescription departments expanded, along with development of a shortage of pharmacists and a decline in self-medication (long a favorite sport with the British public).

4. Employed pharmacists gained better working hours and increased salaries, with somewhat lesser gains perhaps for pharmacy owners.
The greatest complaints, perhaps, of pharmacists under NHS have always concerned the delays in receiving payments for their prescriptions from the government. All taken into consideration however, British pharmacists in general appear to favor the National Health Service plan." (26, pp. 43-47)

New roles for pharmacists

Community pharmacy faces the challenge of defining new, relevant professional roles for the pharmacist if community drug stores are to remain viable economic institutions. The merchandising function of the community pharmacy is becoming less profitable as mass merchandisers increasingly take over the field. During the past 15 years, disposable personal income in the U.S. has increased at an average annual rate of 5.5%. Total pharmacy sales have exceeded this figure by expanding at a rate of 6%. But when the sales figure is subdivided, it is found that prescription sales expanded at 8.6%, while nonprescription trade averaged only 5.2%, or less than the rate for the economy as a whole (27, p. 102). Discount merchandisers will probably cause a further deterioration of the merchandising sales position of community pharmacy in future years.

With economic indicators pointing to the decline in profitability of merchandising, the community pharmacist will be forced to look to other areas in providing professional services. One area where needs are well documented is the provision of pharmaceutical services in small hospitals, nursing homes, and other extended care facilities. The need
for pharmaceutical services in this area has been mentioned in the section of this chapter dealing with demand. The American Society of Hospital Pharmacists and the National Pharmaceutical Council have administered and financed a very successful traineeship program designed to orient the community pharmacist to institutional practice. The program utilizes practicing hospital pharmacists as teachers of a 40-80 hour on-the-job training course spread over 8-10 weeks. The first program was run in 34 states and involved about 600 participants. A second program which is expected to reach 500-600 community pharmacists has been launched. Participants in the program were overwhelmingly pleased with it (28, p. 292). The response to this program indicates that pharmacists are willing to provide services to small health institutions but may not have felt they were adequately prepared to provide such services. The training efforts of the ASHP and NPC should prove valuable in preparing community pharmacists for consultant activities in small health institutions.

A very important and controversial question which faces pharmacy is whether or not the profession will become more patient oriented. Although pharmacists in institutional practice will doubtless be affected more directly, all pharmacists will be affected by this question. The major means by which pharmacy could become more patient oriented are as follows:

1) the use of patient or family drug records by pharmacists,
2) a greater responsibility by the pharmacist in direct patient
care, and 3) the expanded use of the pharmacist by the physician as a drug consultant.

The first category—keeping of family drug records—is already being done by many community pharmacists. This service can make a valuable contribution to public health welfare by preventing patients from taking concurrently two medications which may be therapeutic antagonists or synergists. Considering the increased specialization in medicine and the likelihood that a patient may be seeing several specialist physicians at once, each of whom could be prescribing drugs, family drug records will be a very important contribution to public health welfare. Drug records will also be a second line of defense in protecting a patient from drugs to which he has reacted in the past. The keeping of family or patient drug records is an activity which will quite likely occupy more of the pharmacist's time in the future.

The expansion of the pharmacist's role in direct patient care will depend on the role the pharmacist is expected to play on the health team. There has been a great deal of discussion by health planners on the concept of team health care but very little detailed specification of roles for team members. Pharmacists, especially those in institutional practice, are in an excellent position to expand their roles in direct patient care. The pharmacist's knowledge of drug side effects permits early recognition of drug reactions which can be immediately reported to the prescribing physician. Hospital
pharmacy will reorient itself from traditional emphasis on product distribution to a new and far more challenging role in direct patient care (29, p. 596). Pharmacists can visit with patients and discuss drug problems with them directly. This is a service which most physicians will welcome.

The third means by which pharmacy could become more patient oriented is by increasing the importance of the pharmacist in determining the medicine to be prescribed. Many physicians presently consult pharmacists in determining their choice of medication. In 1965, it was estimated that pharmacists aided prescribers in their selection of prescribed medication at a rate of over 13 million times a year (30, p. 12). This is still a very low percentage of the total new prescriptions filled, but it is an indication that pharmacists recognize their new role and that prescribers are willing to use them in this capacity. Opinion varies greatly on the importance of the pharmacist’s role as drug consultant. Senator Joseph M. Montoya sees the pharmacist as being ideally prepared for this type of service:

"The American pharmacist receives more education in pharmacology and toxicology than any other health professional—including the physician who has overall responsibility for the patient’s well-being. It is my sincerest hope that our medical practitioners will begin to more fully utilize the experience of our community pharmacists as much as hospital physicians now rely on pharmacists who are members of hospital pharmacy and therapeutics committees." (22, p. 434)

L. F. Tice, editor of the American Journal of Pharmacy, feels
that physicians may be forced to delegate some of their duties:

"Pharmacists must absorb and take on many new assignments and, indeed, may even be expected to absorb some of the work done in the past by physicians...the medical profession, faced with the mounting pressures and demands for service, will find it necessary to delegate to others in para-medical fields many duties and responsibilities which until now they have considered strictly their own. The physician's time must be devoted almost exclusively to those functions actually requiring the knowledge and training of the physician... Pharmacy is the only profession which has the necessary background of training to take up some of this slack work done by physicians and we must accept this challenge." (31, p. 48)

In spite of optimistic predictions on the part of leaders of the pharmacy profession and many others in the health field, including former FDA Commissioner James Goddard (32, p. 429), the role of the pharmacist as therapeutic advisor is still very much in question. Dr. Dwight L. Wilbur, current president of the American Medical Association, sees an expansion of the role of the pharmacist but not as a therapeutic advisor:

"It is the feeling of the AMA, and my feeling, that pharmacists also can play a larger role on the health team by accepting more responsibility as pharmacists--rather than by trying to make themselves therapeutic consultants to physicians." (33, p. 433)

Dr. Wilbur views drug therapy as only a part of the total patient-physician relationship and a part which depends as much on the art of medicine as the science. Even though Dr. Wilbur appears to be speaking for the AMA, the country's physicians are very much divided on this issue. Many of them
are currently using pharmacists in the capacity of therapeutic advisor and finding their services very valuable. Dr. Goddard believes that physicians will turn to pharmacists for advice on drugs:

"Will physicians accept this new role for pharmacists? I think they will--and in many of our major medical centers they already have. I have been there and talked with the staffs. Chicago, New Haven, Los Angeles, New York, Birmingham, Seattle--the change is taking place. Acceptance of the pharmacist as a vital member of the health team in clinical medicine is very close to being an accomplished fact wherever pharmacy has put its best foot forward." (32, p. 429)

The future use of the pharmacist as therapeutic advisor will probably depend most on the ability and the willingness of the pharmacist to serve in this capacity.

Growth of professional consciousness

The growth of professional consciousness among pharmacists is a rather difficult trend to support by hard facts. Still this tendency does seem to exist, and it could have important implications for future manpower policy in pharmacy. A few visible indicators of the growth of professional consciousness in pharmacy are as follows: 1) the general willingness of pharmacists to participate in special training and continuing education programs, 2) the desire of a growing number of pharmacists to replace mark-up pricing with a professional fee, 3) the response of the profession to demands for pharmaceutical services created by Medicare, and 4) the great amount of discussion and debate by leaders in pharmacy on the changing role
of the pharmacist. Each of these factors indicates that pharmacists are ready to accept change and even willing to work for constructive change in the profession. As in all areas experiencing rapid change, the rhetoric of change in pharmacy has greatly outpaced the actuality of change. The leaders of the pharmacy profession, admittedly, are far ahead of the average pharmacist in their thinking, but pharmacy needs the kind of progressive change its leaders are outlining, and, as most indicators would suggest, its practitioners are accepting.

**Educational reform**

Educational reform can hardly be classified as a trend in pharmacy, although certain limited changes have been made and others have been discussed which could accelerate change in the profession. The question might be asked: Does change in professional practice result in educational reform, or is the opposite true? In the case of pharmacy both are probably true. Certainly some pharmacists are becoming more patient oriented in their practices, and more and more community pharmacists are availing themselves for service in small health institutions. These changes in professional practice have probably resulted in the addition of a course in hospital or institutional pharmacy to many pharmacy curricula. On the other hand, education can initiate changes—Wayne State University has added a course in clinical pharmacy which exposes
students to the "bedside" practice of pharmacy. The objectives of the course are:

1. to provide the student with a more comprehensive understanding of the responsibilities of each team member in patient care
2. to expose the student through communication techniques to medical terminology
3. to involve the student at the patient's bedside where he will be exposed to the practical application of clinical medicine
4. to develop the student's potential as a medication expert
5. to assist the student in exploring new areas of community and hospital pharmaceutical practice involving a more personal approach to patient service
6. to develop the student clinical pharmacist's unique qualities for the role of educator and public speaker." (34, p. 285)

Obviously this course is designed to broaden the student's outlook on the type of pharmaceutical services he could provide. Courses of this sort could be very influential in shaping the future of pharmacy.

Other writers have gone even further and called for a complete overhaul of the pharmacy curriculum. One such writer, Robert E. Abrams, feels that the science of pharmacy has been overstressed relative to the profession of pharmacy.

"As a result we are graduating highly scientifically trained individuals who in the main are becoming frustrated and disillusioned while discussions are going on to find ways to meet the current and future unmet needs of the public for health services by establishing a new category of individual while the pharmacist by his training and knowledge could function ably in this area. There is a serious need for training pharmacists as professionals as well as scientists but this cannot be done by one program and cannot be done under our existing five-year program." (35, p. 129)
Mr. Abrams goes on to call for two, 6-year programs—one professionally oriented and the other science oriented. The final 2 years of the professional program:

"would be the clinical years. They would include pharmacology from a clinical standpoint, dispensing, medical chemistry, biopharmaceutics, cosmetic science, dosage form development, hospital pharmacy, manufacturing pharmacy, prosthetics, pharmacy administration, jurisprudence, ethics, professional indoctrination, and even supervised internship training." (35, p. 129)

This is precisely the kind of education that would prepare the pharmacist for a patient oriented practice. Any educational reform in this direction cannot help but accelerate tendencies which cause pharmacy to become patient oriented.

Educational reform may be the key to understanding the direction of future changes in the practice of pharmacy. The pharmaceutical journals may be full of articles on pharmacy of the future, but such articles could prove to be empty rhetoric if proposed changes in curriculum fail to materialize. If pharmacists are to make the transition to patient oriented practice, educational reform and continuing education programs will be necessary. These changes, if they occur, will be early indicators of widespread change in pharmacy and thus will be useful in manpower considerations as policy indicators.

Group practice

Group practice has not yet become a significant trend in pharmacy. It is considered in this section for three reasons: 1) Some movement to group practice has occurred.
2) If such a trend developed, it would probably transform pharmacy in a very short period of time. 3) Changes in pharmacy resulting from group practice could be very profound.

In medicine the trend toward group practice has produced vast change in a relatively short period of time. The dividing of the demand for physicians according to their specialty was one immediate manpower effect. Another was the creation of a demand for a variety of paramedical workers. Where individual physicians had found it economically unfeasible to employ technicians and subprofessionals, physicians in group practice not only could afford to hire these workers but found them to be a valuable means of increasing the efficiency and extending the medical services provided by the group practice. The movement to group practice in medicine was largely a response to a manpower shortage for physicians. Group practice has proven to be an effective means of extending and upgrading the services of physicians.

Although it is unlikely that a movement toward group practice would be caused by manpower shortages, other economic tendencies exist which could produce such a change in pharmacy. It has been argued that the United States has too many pharmacies. Yet the same people would say that the demand for pharmaceutical services is more than sufficient to support the nation's population of pharmacists. The paradox is that while legitimate needs for professional pharmaceutical services go unmet, many pharmacists struggle to keep
their pharmacies open by devoting hours of their time to merchandising. Mass merchandisers are making the struggle more and more difficult as profit margins on merchandising are cut. One means of escaping this cycle might be through group practice. If three or four "marginal" stores could be consolidated the prescription volume would eliminate dependence on merchandising and the partners would be freer to provide professional services to small hospitals, nursing homes, and other areas where such services are needed. Fixed costs under such an operation would be drastically cut as would many variable costs such as the cost of maintaining inventory and direct labor costs for clerks. W. S. Apple has suggested that group practices could produce a more efficient system of providing an even greater quantity and quality of pharmaceutical services at less cost to the public (36, p. 345).

Donald A. Dee writing in a recent issue of the Journal of the American Pharmaceutical Association suggests that the type of amalgamation described above has been occurring at an ever-increasing rate especially in large cities. Mr. Dee sees multiple ownership as the first step toward group practice. The second principle of group practice, specialization of functions, is a very real possibility for pharmacy also. Mr. Dee enumerates ten possible specialties for community pharmacists (37, p. 295).

Although group practice with its resultant specialization of functions has not yet become an important trend in pharmacy,
if such an idea were to gain favor, it could spread very quickly through the profession and result in some far-reaching changes in professional practice. Group practice could easily serve as an impetus for the use of technicians and other sub-professionals in pharmacy. Specialization would imply that supply and demand conditions would have to be considered separately for each specialty and not for the profession as a whole. Finally, group practice seems to be very compatible with the new patient oriented roles that are anticipated for pharmacy, and thus any mass movement to group practice could accelerate the change to patient oriented practice. Group practice may play a very important role in the future of pharmacy; its development and diffusion in the profession should be watched closely.

Conclusion

Pharmacy is experiencing a period of dynamic change in which the very functions of the pharmacist are being questioned. The traditional role of the community pharmacist as prescription dispenser and merchandiser may be inadequate to support the profession in the future. Merchandising is becoming less profitable, and dispensing is becoming more mechanical. Neither of these functions can fully justify the amount of education and training a pharmacist must undergo. There is considerable frustration and discontent in pharmacy which is largely a result of the lack of professional challenge
in many pharmaceutical functions. Professional organizations and leaders have sought and successfully outlined new areas where pharmaceutical services are needed and which offer a great challenge to the profession. Whether or not pharmacists respond to these new demands by providing services to small health institutions and by becoming more patient oriented in their practice is the critical manpower issue in pharmacy. Debates on the undersupply or oversupply of pharmacists are irrelevant in the context of the present practice of pharmacy. The relevant questions are: How can the pharmacist be fully utilized professionally? What can professional and educational leaders do to encourage change in pharmacy? What can be done to help prepare the average pharmacist for change? The changes in pharmacy referred to in this chapter will certainly not result in a magic overnight transformation of the profession. Some of the "trends" mentioned may fizzle. But changes will occur. Economic pressure and the desire of a progressive minority of pharmacists to upgrade the profession will insure that.
CHAPTER VI: GENERAL DATA ON IOWA PHARMACY

This chapter will present the results of research on the subject of technicians in the practice of pharmacy. The research was financed by the Iowa State University Industrial Relations Center and the Iowa Pharmaceutical Association and is based on a questionnaire entitled "Technicians in Pharmacy" (see Appendix A for cover letter and copy of the questionnaire) which was sent to all pharmacists on a mailing list of the Iowa Pharmaceutical Association in January 1968. Of the 1,960 questionnaires mailed, 334 were returned for a response rate of 17%. No second mailing was used. (See Appendix B for a discussion of the nature of the sample.)

The questionnaire was designed to provide information on the following topics: 1) general data on the professional characteristics of Iowa's practicing pharmacists, 2) information on the condition of the labor market for pharmacists, 3) the attitudes of Iowa pharmacists on the use of technicians, 4) the identification of professional characteristics of pharmacists likely to favor the use of technicians, and 5) the comments of pharmacists on the use of technicians. Each of these topics will be dealt with at length in this and the following chapter.

Professional Characteristics of Iowa Pharmacists

This part of the questionnaire was concerned with col-
lecting general information about practicing pharmacists in Iowa. Such information as type of practice, ownership of the pharmacy, number of prescriptions filled daily per pharmacist, and the average number of prescriptions filled daily per pharmacy has been of traditional interest in pharmacy studies. In addition to this information, this study attempts to measure the extent to which community pharmacists are providing consulting services to nursing homes and hospitals. This information should be interesting in and of itself, and it will also prove useful later in the chapter in identifying the professional characteristics of pharmacists favoring the use of technicians.

**Type of practice**

The five types of practice listed in the questionnaire with the percentage of pharmacists in each type are as follows: hospital pharmacy, 12%; community, 64%; Rx shop, 6%; chain type operation, 14%; and other, 4%. Normally in pharmacy studies, community, Rx shop, and chain type operations are all lumped together and termed COMMUNITY\(^1\) pharmacy. When this grouping is made and compared with a study done by the National Association of Boards of Pharmacy in January 1967, the results are very similar, with hospital pharmacy being perhaps a bit over-represented in our study (see Table 2).

\(^{1}\)For the remainder of this thesis, when the categories Rx shop, community, and chain type operation have been grouped together, they will be designated as COMMUNITY.
Table 2. Classification of practicing pharmacists in Iowa by type of practice

<table>
<thead>
<tr>
<th>Type of practice</th>
<th>Percent of pharmacists:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ISU-IPhA study(a)</td>
</tr>
<tr>
<td>Hospital pharmacy</td>
<td>12.0</td>
</tr>
<tr>
<td>COMMUNITY pharmacy</td>
<td>83.7</td>
</tr>
<tr>
<td>Others</td>
<td>4.3</td>
</tr>
</tbody>
</table>

\(a\)These percentages do not include 10 questionnaires which did not specify type of practice.

\(b\)The NABP are based on 1,021 responses and as such are probably highly representative of the actual breakdown by type of practice (12, Table 4).

Ownership of pharmacy

In the 1967 NABP study (12, Table 4), it was found that 55.1% of Iowa COMMUNITY pharmacists owned or were part owners of their own stores. The ISU-IPhA study gives remarkably similar results with 55.8% of COMMUNITY pharmacists owning their own stores.

Number of pharmacists filling prescriptions

Each pharmacist filling out the questionnaire was asked to give the number of pharmacists filling prescriptions in his pharmacy. Table 3 shows the percentage of pharmacists in each size of outlet for each type of COMMUNITY practice.

Prescriptions per pharmacy and pharmacist

Employee pharmacists were to indicate the number of
Table 3. Pharmacists in COMMUNITY pharmacies by size of staff

<table>
<thead>
<tr>
<th>Type of COMMUNITY pharmacy</th>
<th>Number and (%) of pharmacists in following outlets:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-person</td>
<td>2-person</td>
<td>3-person</td>
<td>4-or-more-person</td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>59(29.6)</td>
<td>80(40.2)</td>
<td>50(25.1)</td>
<td>10( 5.0)</td>
<td></td>
</tr>
<tr>
<td>Rx shop</td>
<td>6(33.3)</td>
<td>7(38.9)</td>
<td>1( 5.6)</td>
<td>4(22.2)</td>
<td></td>
</tr>
<tr>
<td>Chain type operation</td>
<td>0( 0.0)</td>
<td>17(40.5)</td>
<td>14(33.3)</td>
<td>11(26.2)</td>
<td></td>
</tr>
<tr>
<td>COMMUNITY or total</td>
<td>65(25.1)</td>
<td>104(40.1)</td>
<td>65(25.1)</td>
<td>25( 9.7)</td>
<td></td>
</tr>
</tbody>
</table>

prescriptions they dispensed personally. This information is itemized for each type of COMMUNITY practice in Table 4.

Table 4. Employee pharmacists in COMMUNITY pharmacies by number of prescriptions personally dispensed daily

<table>
<thead>
<tr>
<th>Type of COMMUNITY pharmacy</th>
<th>Number and (%) of pharmacists daily dispensing:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Under 20</td>
<td>20-40</td>
<td>40-60</td>
<td>60-80</td>
<td>80 or over</td>
</tr>
<tr>
<td></td>
<td>Rx</td>
<td>Rx</td>
<td>Rx</td>
<td>Rx</td>
<td>Rx</td>
</tr>
<tr>
<td>Community</td>
<td>4(7.0)</td>
<td>13(22.0)</td>
<td>20(34.0)</td>
<td>12(20.0)</td>
<td>10(17.0)</td>
</tr>
<tr>
<td>Rx shop</td>
<td>0(0.0)</td>
<td>0(00.0)</td>
<td>5(45.4)</td>
<td>5(45.4)</td>
<td>1( 9.2)</td>
</tr>
<tr>
<td>Chain type operation</td>
<td>2(5.6)</td>
<td>5(13.9)</td>
<td>7(19.4)</td>
<td>11(30.6)</td>
<td>11(30.6)</td>
</tr>
<tr>
<td>COMMUNITY or total</td>
<td>6(5.7)</td>
<td>18(17.0)</td>
<td>32(30.2)</td>
<td>28(26.4)</td>
<td>22(20.7)</td>
</tr>
</tbody>
</table>

As might be expected, employees in Rx shops and chain type operations on the average dispense more prescriptions than those in community pharmacies. The data in Table 4 show that 61.2%
of the employee pharmacists in chain type operations and 54.6% in Rx shops dispense 60 or more prescriptions daily, whereas only 37% of employee pharmacists in community pharmacy dis-

dense 60 or more prescriptions.

Owner pharmacists answering this question were to report

the daily number of prescriptions dispensed by the entire

pharmacy. Unfortunately not enough Rx shop owners or chain

type operation owners reported for a meaningful breakdown

of the data by type of community pharmacy. Table 5 shows the

aggregate data for COMMUNITY pharmacies.

Table 5. Owner pharmacists in COMMUNITY pharmacy by the

number of prescriptions dispensed daily by the

whole pharmacy


| Number and (%) of owner pharmacists whose phar-
| Number and (%) of owner pharmacists whose phar-
| macies dispense daily: |
| macies dispense daily: |
| Under 20 | 20-40 | 40-60 | 60-80 | 80 or over |
| RX | RX | RX | RX | RX |
| COMMUNITY | 7(5.1) | 37(26.8) | 31(22.4) | 28(20.3) | 35(25.4) |

Consulting services

The previous chapter outlines the importance of this

function to the future of pharmacy. This study shows that

17.8% of employees of COMMUNITY pharmacies and 42.3% of owners

of COMMUNITY pharmacies that responded to this question

(question 4 of the questionnaire) were providing consulting

services to nursing homes or hospitals. Table 6 shows the

breakdown of pharmacists by ownership and type of COMMUNITY
practice.

Table 6. COMMUNITY pharmacists providing consulting services to nursing homes and hospitals

<table>
<thead>
<tr>
<th></th>
<th>No. and (%) of pharmacists consulting</th>
<th>Average hrs/wk spent consulting</th>
<th>No. and (%) not consulting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owners</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>53(42.4)</td>
<td>4.7</td>
<td>72(57.6)</td>
</tr>
<tr>
<td>COMMUNITY or total</td>
<td>58(42.3)</td>
<td>4.7</td>
<td>79(57.7)</td>
</tr>
<tr>
<td><strong>Employees</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>13(21.3)</td>
<td>9.4</td>
<td>48(78.7)</td>
</tr>
<tr>
<td>Rx shop</td>
<td>4(36.4)</td>
<td>--b</td>
<td>7(63.6)</td>
</tr>
<tr>
<td>Chain type operation</td>
<td>2(5.7)</td>
<td>--b</td>
<td>33(94.3)</td>
</tr>
<tr>
<td>COMMUNITY or total</td>
<td>19(17.8)</td>
<td></td>
<td>88(82.2)</td>
</tr>
</tbody>
</table>

aToo few Rx and chain type owners reporting to make their breakdown meaningful.

bToo few reporting to be meaningful.

The weekly number of hours spent consulting ranged from 1 to 20 for both employee and owner pharmacists with averages of 4.7 and 9.4 hours per week respectively (Table 6).

The Labor Market for Pharmacists

This section is basically concerned with responses to questions 5, 6, 7, and 8 of the questionnaire. Through these questions it was hoped that the following information could be gathered: 1) the number and category (type of practice) of budgeted vacancies for pharmacists in Iowa, 2) an estimate
of short run demand for pharmacists in Iowa, 3) an estimate of short run supply conditions for pharmacists, and 4) identification of important sources of supply of pharmacists in the Iowa market.

Budgeted vacancies

A breakdown of the existing budgeted vacancies by type of practice is shown in Table 7. Unfortunately there is no

Table 7. Budgeted vacancies for pharmacists by type of practice

<table>
<thead>
<tr>
<th>Type of practice</th>
<th>No. of budgeted vacancies reported</th>
<th>Total no. of pharmacists</th>
<th>Ratio of vacancies to total no. of pharmacists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>10</td>
<td>39</td>
<td>0.26</td>
</tr>
<tr>
<td>Community</td>
<td>29</td>
<td>207</td>
<td>0.14</td>
</tr>
<tr>
<td>Hx shop</td>
<td>7</td>
<td>19</td>
<td>0.37</td>
</tr>
<tr>
<td>Chain type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operation</td>
<td>12</td>
<td>45</td>
<td>0.27</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>14</td>
<td>0.07</td>
</tr>
<tr>
<td>TOTAL</td>
<td>59</td>
<td>324</td>
<td></td>
</tr>
</tbody>
</table>

Ten pharmacists did not specify type of practice.

way of determining the amount of double counting of vacancies which occurred as a result of two or three responding co-owners reporting the same vacancy. Table 7 also shows the ratio of the number of vacancies to the total number of pharmacists reporting for each type of practice. These figures could be used for a very rough comparison of demand for pharmacists in each of the five types of practice. As one might postulate
a priori, the ratio of vacancies to practicing pharmacists in hospital pharmacy, Rx shops, and chain type operations seems to be expanding more rapidly than in community practice.

Short run demand

It was hoped that the questionnaire, in addition to estimating current budgeted vacancies, could be used to give an estimate of the anticipated short run demand for pharmacists. Owner or employer pharmacists were asked to estimate the anticipated number of pharmacists in their practice in 1968, 1969, and 1970 (question 6). Pharmacy practices that indicated an increased number of pharmacists in 1969 or 1970 over 1968 were designated growth practices. Table 8 shows the percent of growth practices in each category of practice. Only about

Table 8. Percentage of growth practices

<table>
<thead>
<tr>
<th>Type of practice</th>
<th>% of growth practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>67</td>
</tr>
<tr>
<td>Community</td>
<td>30</td>
</tr>
<tr>
<td>Rx shop</td>
<td>50</td>
</tr>
<tr>
<td>Chain type operation</td>
<td>62</td>
</tr>
</tbody>
</table>

60% of the respondents that were eligible to answer this question did so. For this reason the percentage growth figures are probably overstated since it is reasonable to believe that most of those not answering the question probably did not anticipate growth. The relative difference in growth rates between the
various types of practices should still give an indication where most of the demand for pharmacists will occur. The table is more useful for comparative purposes than for estimating precise growth rates. One should remember also that growth is shown only for existing practices and does not include the establishment of new practices. This might help explain the relatively low growth rate (30%) in community practice where entry of new firms is quite high.

**Short run supply**

The overwhelming opinion of responding owner or employer pharmacists is that in the period 1968-1970 there will be a shortage in the supply of pharmacists. Only about 2% of owner or employer pharmacists predicted a surplus. Employee pharmacists also foresaw a tight labor market. Table 9 shows the anticipated condition of the labor supply by employee-employer status.


<table>
<thead>
<tr>
<th>Employment status</th>
<th>Critical shortage, more than 5%</th>
<th>Moderate shortage, less than 5%</th>
<th>Adequate, job vacancies, 5%</th>
<th>Surplus, less than 5%</th>
<th>Surplus, more than 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Employee</strong></td>
<td>17(26.6)</td>
<td>28(43.6)</td>
<td>17(26.6)</td>
<td>1(1.6)</td>
<td>1(1.6)</td>
</tr>
<tr>
<td><strong>Employer</strong></td>
<td>48(34.8)</td>
<td>51(36.9)</td>
<td>36(26.1)</td>
<td>1(0.7)</td>
<td>2(1.4)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>65(32.2)</td>
<td>79(39.1)</td>
<td>53(26.2)</td>
<td>2(1.0)</td>
<td>3(1.5)</td>
</tr>
</tbody>
</table>

status, while Table 10 shows labor supply by type of practice.
Table 10. Anticipated condition of labor supply for pharmacists 1968-1970 by type of practice

<table>
<thead>
<tr>
<th>Type of practice</th>
<th>No. and % of pharmacists responding as follows:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Critical shortage, moderate shortage, surplus,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>more than 5%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>less than 5%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Adequate, moderate shortage, surplus, vacancies</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>less than 5%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>surplus, more than 5%</td>
<td>5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of practice</th>
<th>Hospital</th>
<th>Community</th>
<th>Rx shop</th>
<th>Chain type operation</th>
<th>Other</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10(50.0)</td>
<td>47(28.3)</td>
<td>3(27.2)</td>
<td>13(48.2)</td>
<td>3(60.0)</td>
<td>76(33.6)</td>
</tr>
<tr>
<td></td>
<td>5(25.0)</td>
<td>66(40.5)</td>
<td>3(27.2)</td>
<td>9(33.3)</td>
<td>2(40.0)</td>
<td>85(37.6)</td>
</tr>
<tr>
<td></td>
<td>5(25.0)</td>
<td>45(27.6)</td>
<td>4(36.4)</td>
<td>5(18.5)</td>
<td>0(0.0)</td>
<td>59(26.1)</td>
</tr>
<tr>
<td></td>
<td>0(0.0)</td>
<td>3(1.8)</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
<td>3(1.3)</td>
</tr>
<tr>
<td></td>
<td>0(0.0)</td>
<td>2(1.2)</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
<td>3(1.3)</td>
</tr>
</tbody>
</table>

The high percentage of hospital pharmacists (50%) and pharmacists in chain type operations (48.2%) anticipating critical shortages of pharmacists could be a result of some of the following reasons: difficulty in attracting pharmacists to these types of practice, high turnover rates, and high anticipated manpower needs.

Sources of supply

The most important supply schools for pharmacists are Iowa's two schools of pharmacy at the University of Iowa and Drake University. Of pharmacists hired directly from college, 70% came from these two schools. Table 11 shows, in order of importance, the schools of pharmacy from which pharmacists were hired.

If pharmacists were hired from other employers, community pharmacy was by far the most important source. Table
Table 11. Pharmacists hired directly from pharmacy colleges by school of supply

<table>
<thead>
<tr>
<th>Pharmacy college</th>
<th>Number of pharmacists</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Iowa</td>
<td>63</td>
<td>44</td>
</tr>
<tr>
<td>Drake University</td>
<td>38</td>
<td>26</td>
</tr>
<tr>
<td>South Dakota State University</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>University of Nebraska</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Creighton University</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>North Dakota State University</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Others</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>144</td>
<td>99</td>
</tr>
</tbody>
</table>

Table 12. Pharmacists hired from other employers by type of practice of former employer

<table>
<thead>
<tr>
<th>Type of practice of former employer</th>
<th>Number of pharmacists</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Community</td>
<td>102</td>
<td>72</td>
</tr>
<tr>
<td>Rx shop</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Chain type operation</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>142</td>
<td>100</td>
</tr>
</tbody>
</table>

12 shows the relative importance of each type of practice as a source of employee pharmacists. The above two tables would lead one to believe that pharmacy colleges and other employers are about equally important as sources of supply of pharmacists.

Conclusion

Given the high percentage of budgeted vacancies (59 reported by 334 questionnaires, for a rate of 17.7%), the high
growth rates anticipated for 1969-1970 (Table 8), and the shortage of manpower which over 70% of responding pharmacists predict, the market for pharmacists in Iowa appears to be very much a "sellers" market. Employment possibilities seem to be especially good in hospital, Rx shop, and chain type practices. A very high percentage of hospital pharmacists and pharmacists in chain type operations foresee critical manpower shortages (Table 10). This probably reflects current hiring difficulties in these types of practices. If hospital and chain type practices are to fill their relatively high number of budgeted vacancies, and meet the needs of high anticipated growth rates, employment opportunities must be made more attractive relative to community practice.

Many people have questioned the economic viability of community pharmacies. Most of the data of this section would indicate that relative to other types of practice, community practice is not keeping pace. Still, one in seven owners of community pharmacies reports an existing budgeted vacancy for a pharmacist (Table 7), and 30% anticipate an increase in the size of staff of their pharmacy in 1969 or 1970 (Table 8). That community pharmacy is very much alive and growing is probably partially a reflection of general economic prosperity. There are indications too that community pharmacists are expanding the scope of their services--two in five responding owners and one in five employees in community practice are now providing consulting services to hospitals.
or nursing homes (Table 6). The future strength of community pharmacy lies in its flexibility and willingness to respond to change.
CHAPTER VII: IOWA PHARMACISTS' ATTITUDES ON THE USE OF PHARMACIST TECHNICIANS

The central purpose of this thesis is to examine the feasibility of the use of technicians in the practice of pharmacy in Iowa. The attitudes and opinions of Iowa pharmacists are essential to reaching a rational position on this matter. (Of the 334 pharmacists responding to the questionnaire, 152 or 45.5% favored, 164 or 49.1% opposed, and 18 or 5.4% had no opinion on the use of technicians.)

This chapter will summarize pharmacists' attitudes on the following topics: 1) the duties of technicians, 2) the educational requirements for technicians, 3) the desirability of examination and licensure for technicians, and 4) salary and employment opportunities for technicians. This information summarizes questions 10 through 13 of the questionnaire. Also in this chapter, an attempt will be made to identify the professional characteristics of pharmacists likely to favor technicians. A final section presents the comments of pharmacists on the use of technicians.

The Duties of a Pharmacist Technician

Ten duties were specified in question 10 of the questionnaire as possible activities technicians could perform under the supervision of a licensed pharmacist. Table 13 gives the activity and the opinions of answering pharmacists on whether or not the duty was suitable work for technicians.
### Table 13. Duties for technicians

<table>
<thead>
<tr>
<th>Duty</th>
<th>All responding pharmacists&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Pharmacist favoring technicians&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Favor</td>
<td>Oppose</td>
</tr>
<tr>
<td>Typing Rx labels</td>
<td>52.5%</td>
<td>47.5%</td>
</tr>
<tr>
<td>Assembling Rx ingredients</td>
<td>25.4%</td>
<td>74.6%</td>
</tr>
<tr>
<td>Prepackaging Rx items</td>
<td>33.0%</td>
<td>67.0%</td>
</tr>
<tr>
<td>Keeping drug stock</td>
<td>65.4%</td>
<td>34.6%</td>
</tr>
<tr>
<td>Calculating Rx prices</td>
<td>37.0%</td>
<td>63.0%</td>
</tr>
<tr>
<td>Cleaning equipment</td>
<td>92.5%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Dispensing non-Hx products</td>
<td>60.5%</td>
<td>39.5%</td>
</tr>
<tr>
<td>Keeping &quot;family record systems&quot;</td>
<td>78.9%</td>
<td>21.1%</td>
</tr>
<tr>
<td>Filling out phoned Rx blanks</td>
<td>11.5%</td>
<td>88.5%</td>
</tr>
<tr>
<td>Giving drug orders to suppliers</td>
<td>51.5%</td>
<td>48.5%</td>
</tr>
</tbody>
</table>

<sup>a</sup>Thirty-one questionnaires left this question unanswered.

<sup>b</sup>Includes only the 152 respondents who favored the use of technicians.

When all answering pharmacists were considered, 6 of the 10 duties were favored by 50% or more of the pharmacists. When only the pharmacists who favored the use of technicians were considered, 7 of the 10 duties were approved by 50% or more, and the margin of favor rose substantially for all duties (Table 13). Table 14 regroups the data and shows the percentage of pharmacists (only those favoring technicians) favoring any given number of duties. Less than 7% checked all 10 duties, and less than 20% checked 8 or more.
Table 14. Number of duties favored by pharmacists\textsuperscript{a} who favored the use of technicians

<table>
<thead>
<tr>
<th>Number of duties favored</th>
<th>10</th>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3 or less</th>
</tr>
</thead>
<tbody>
<tr>
<td>% pharmacists favoring</td>
<td>6.6</td>
<td>3.9</td>
<td>9.2</td>
<td>21.7</td>
<td>22.4</td>
<td>22.4</td>
<td>6.6</td>
<td>7.2</td>
</tr>
<tr>
<td>Cumulative %</td>
<td>6.6</td>
<td>10.5</td>
<td>19.7</td>
<td>41.4</td>
<td>63.8</td>
<td>86.2</td>
<td>92.8</td>
<td>100.0</td>
</tr>
</tbody>
</table>

\textsuperscript{a}For only 152 pharmacists.

The duties pharmacists seem least willing to delegate to a pharmacist technician are those directly concerned with the actual dispensing of the prescription— assembling Hx ingredients, prepackaging Hx items, filling out phoned Hx blanks, and calculating Hx prices. The other six duties can largely be classified as clerical, secretarial, or janitorial.

There seems to be considerable interest in technicians among Iowa pharmacists answering this questionnaire. On closer examination of the type of duties pharmacists tend to favor for technicians, one might conclude that a sophisticated retail clerk with secretarial training, some exposure to the principles of retail management, and a limited pharmacy background would be the type of technician most useful to Iowa pharmacists.

A space was left on the questionnaire for pharmacists to list duties other than the 10 specified. The 60 respondees who took the trouble to list additional duties generally confirm the above image of an "ideal type" technician.
additional duties most commonly listed were:

1. miscellaneous paper work--social welfare, third party payment, title XIX, or narcotics entries (listed on 23 questionnaires)

2. meeting with customers, handling telephone, cash register, and floor stock (listed on 18 questionnaires)

3. janitorial work in pharmacy (9 questionnaires)

4. running errands and making drug deliveries (7 questionnaires)

5. checking drug orders and stocking drugs in bottles and containers (6 questionnaires)

6. miscellaneous duties related to dispensing--simple compounding, looking up refill Rx's, preparing medications for dispensing, rechecking drug and dose after pharmacist fills Rx (7 questionnaires).

There is great variance in type of technician favored by individual pharmacists (see Table 14). The number of duties for technicians favored by the pharmacist is a rough measure of the degree of skill the technician should have. In order to check if any subgroup of pharmacists on the average favored a substantially more or less skilled technician, the average number of technician's duties was used as a proxy variable for desired skill level.

An attempt was made to identify any professional characteristics of pharmacists which might affect the average number of duties favored for technicians. It was hypothesized that there might be significant differences in the average
number of duties favored when pharmacists were grouped in
the following ways: 1) by type of practice, 2) by the
number of prescriptions filled per COMMUNITY pharmacy,
3) by the number of prescriptions filled per COMMUNITY phar-
my employee pharmacist, 4) by status of COMMUNITY phar-
macist as a consultant or nonconsultant to hospitals or
nursing homes, 5) by the pharmacist's anticipations of the
condition of the labor market for pharmacists, and 6) by
pharmacy owners having vacancies for pharmacists and those not
having vacancies.

The first variable, type of practice, has five sub-
divisions: 1) hospital, 2) community, 3) HX shop, 4) chain
type operation, and 5) others. The following hypothesis was
made:

HYPOTHESIS ONE: The average number of duties favored for
technicians is equal for pharmacists in each of the five
types of practice.

Use of a multiple comparison chi-square test showed that this
hypothesis could not be rejected at the 90% or 95% significance
levels. It was then concluded that the type of practice
of a responding pharmacist did not significantly affect the
average number of duties favored for technicians. Similarly
none of the following hypotheses could be rejected at 95% or
90% significance levels.

HYPOTHESIS TWO: The average number of duties favored is equal
for COMMUNITY pharmacy owners who favor the use of technicians
and whose pharmacies fill under 20, 20-40, 40-60, 60-80, and over 80 prescriptions per day.

HYPOTHESIS THREE: The average number of duties favored is equal for COMMUNITY pharmacy employees who favor the use of technicians and who personally fill under 20, 20-40, 40-60, 60-80, and over 80 prescriptions per day.

HYPOTHESIS FOUR: The average number of duties favored is equal for COMMUNITY pharmacists consultants and for non-consultants to hospitals or nursing homes.

HYPOTHESIS FIVE: The average number of duties favored is equal for pharmacists who anticipate a critical shortage, moderate shortage, adequate number, critical surplus, and moderate surplus in the supply of pharmacists in 1968-1970.

HYPOTHESIS SIX: The average number of duties favored is equal for pharmacy owners and employers whose pharmacies have existing budgeted vacancies for pharmacists and for those owners and employers without budgeted vacancies.

Since none of the hypotheses can be rejected, none of the six variables show statistically significant variation in the average number of duties favored for technicians. At least for the above groupings then, no grouping of pharmacists can be identified which has any statistically significant effect on the average number of duties favored for technicians. One is tempted to conclude that all subgroups of pharmacists are on the average interested in approximately the same type (skill level) of technician. A safer conclusion would be
that for the six factors tested above, none was successful in identifying any professional characteristics of pharmacists which affected the average number of duties favored for technicians.

Educational Requirements

Five alternatives were listed in the questionnaire (question 11) as possible educational requirements for a pharmacist technician. Table 15 shows the five alternatives and the percent of pharmacists favoring each.

Table 15. Type of educational requirements for technicians

<table>
<thead>
<tr>
<th>Educational requirement</th>
<th>No. and (%) of pharmacists favoring:</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of pharmacy</td>
<td>34(10.9)</td>
</tr>
<tr>
<td>Junior college graduate of pharmacy technician course</td>
<td>71(22.8)</td>
</tr>
<tr>
<td>On-the-job training</td>
<td>66(21.2)</td>
</tr>
<tr>
<td>Combination of college and on-the-job training</td>
<td>116(37.3)</td>
</tr>
<tr>
<td>No requirements</td>
<td>24(7.7)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>311(99.9)</td>
</tr>
</tbody>
</table>

*Sixty-six pharmacists did not respond to this question and were not included in the table.

*Forty-three pharmacists checked more than one alternative; both are included in the table.

For three of the alternatives—college of pharmacy, on-the-job training, and combination of college and on-the-job training—pharmacists were asked to specify the number of years training or education required. Tables 16 and 17 sum-
Marize this information.

Table 16. Years of education or training for technicians\textsuperscript{a}

<table>
<thead>
<tr>
<th>Years of education or training</th>
<th>Less than 1 yr</th>
<th>1 yr</th>
<th>2 yr</th>
<th>3 yr</th>
<th>4 yr</th>
<th>5 yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of pharmacy</td>
<td>--</td>
<td>3</td>
<td>9</td>
<td>5</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>On-the-job training</td>
<td>5</td>
<td>31</td>
<td>19</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Includes only responses favoring: 1) college of pharmacy or 2) on-the-job training.

Table 17. Years of education and training for technicians\textsuperscript{a}

<table>
<thead>
<tr>
<th>Years of college</th>
<th>Years of on-the-job training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>less than 1 yr</td>
</tr>
<tr>
<td>Less than 1 yr</td>
<td>2</td>
</tr>
<tr>
<td>1 yr</td>
<td>1</td>
</tr>
<tr>
<td>2 yr</td>
<td>4</td>
</tr>
<tr>
<td>3 yr</td>
<td>--</td>
</tr>
<tr>
<td>4 yr</td>
<td>--</td>
</tr>
<tr>
<td>5 yr</td>
<td>--</td>
</tr>
</tbody>
</table>

\textsuperscript{a}Includes only responses favoring a combination of college and on-the-job training.

An examination of Tables 15, 16, and 17 reveals a great variance in how pharmacists think technicians should be trained. Suggested training varied from none to 5 years of college and 1 year on-the-job training. Most of the variance reflects differences in the type of technician desired. When pharmacists specify 5 years in college as was done in
15 of 311 or 4.7% of the responses, they probably do not visualize such a highly skilled technician. Rather they probably see education as a barrier to entry—a means of discouraging technicians. A highly skilled technician with 3 or 4 years of college education is conceivable but is favored in only 30 of 311 or 9.6% of the alternatives checked. By far the most common type of educational requirement was 2 years of college. A total of those favoring junior college graduates, 2 years in a college of pharmacy, and a combination of 2 years of college and some on-the-job training, accounts for 146 of the 311 or 47% of all responses. A lesser number, 21 or 6.8%, favored 1 year of college or 1 year of college and some on-the-job training. If on-the-job training with no college was favored, 55 or 17.7% favored 1 year or more training. Thirty-two or 10.3% favored no education requirements or less than 1 year college or on-the-job training. The remaining 12 responses (3.9%) not mentioned above selected college, on-the-job training, or a combination but did not specify the number of years required.

In summarizing Iowa pharmacists' attitudes on the educational requirements for the pharmacist technician, it should be emphasized that Iowa pharmacists do not favor a highly educated technician. Four of five responses on this question specify 2 or less years of college. A majority of these favor exactly 2 years of college with, perhaps, some on-the-job training. Considering the type of work pharmacists generally
favor for technicians, a college course of longer than 2 years seems unrealistically stringent and a 1 year course, or only on-the-job training, may be adequate.

Examination and Licensure

There are two opposing aspects of licensure which should be carefully considered. On the one hand, licensure can serve as a means of maintaining uniformly high qualifications for technicians through public control. This official recognition can facilitate public acceptance of the new occupational group. On the other hand, flexibility in the skill level of technicians may be lost since the rigidity of licensure could result in overly trained technicians for whom there are few employment opportunities. If flexibility is important, then licensure should probably be delayed at least until technicians can be studied in their employment situations.

Table 18 shows the opinions of Iowa pharmacists on examination and licensure.

Table 18. Examination and licensure for technicians by type of practice

<table>
<thead>
<tr>
<th>Type of practice</th>
<th>No. and (%) of pharmacists:</th>
<th>Favoring</th>
<th>Opposed</th>
<th>No response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td></td>
<td>21(53.9)</td>
<td>17(43.5)</td>
<td>1(2.5)</td>
</tr>
<tr>
<td>Community</td>
<td></td>
<td>116(55.0)</td>
<td>65(31.4)</td>
<td>26(12.6)</td>
</tr>
<tr>
<td>Rx shop</td>
<td></td>
<td>14(73.7)</td>
<td>3(15.8)</td>
<td>2(10.5)</td>
</tr>
<tr>
<td>Chain type operation</td>
<td></td>
<td>22(48.9)</td>
<td>16(35.6)</td>
<td>7(15.5)</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>9(64.2)</td>
<td>3(21.4)</td>
<td>2(14.3)</td>
</tr>
<tr>
<td>Not specified</td>
<td></td>
<td>6(60.0)</td>
<td>0(00.0)</td>
<td>4(40.0)</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>188(56.3)</td>
<td>104(31.1)</td>
<td>42(12.6)</td>
</tr>
</tbody>
</table>
Salary and Employment Opportunities

To gauge the extent to which jobs were available for technicians, pharmacists were asked (question 13) if their pharmacy could offer a job to a pharmacist technician. Table 19 shows how pharmacists in the various types of practices responded. Slightly less than half of responding pharmacists in community or chain type practice indicated that their pharmacy could employ technicians, whereas 75% of the pharmacists in Rx shops and 85% of hospital pharmacists indicated potential openings for technicians.

Table 19. Number of pharmacists whose pharmacies could offer jobs to technicians by type of practice

<table>
<thead>
<tr>
<th>Type of practice</th>
<th>Number of pharmacists indicating:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Possible job</td>
</tr>
<tr>
<td>Hospital</td>
<td>28</td>
</tr>
<tr>
<td>Community</td>
<td>79</td>
</tr>
<tr>
<td>Rx shop</td>
<td>12</td>
</tr>
<tr>
<td>Chain type operation</td>
<td>17</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
<tr>
<td>Unspecified</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>142</td>
</tr>
</tbody>
</table>

Question 13 of the questionnaire also asked pharmacists to specify the number of technicians their pharmacy could hire. Table 20 shows how the 142 pharmacists with potential openings for technicians responded.

Table 21 presents salary data for technicians. It is notable that hospital pharmacy, the area of highest relative
Table 20. Number of pharmacists whose pharmacies could hire various number of technicians

<table>
<thead>
<tr>
<th>Number of pharmacists specifying the following number of technicians:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4 or more</td>
<td></td>
</tr>
<tr>
<td>103</td>
<td>17</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

*Thirteen of 142 pharmacists who indicated their pharmacy could hire technicians did not specify how many.

*Hospital practices account for two of the four.

*Hospital practices account for three of the five.

Table 21. Starting salary data for technicians by type of practice

<table>
<thead>
<tr>
<th>Type of practice</th>
<th>Average hourly wage</th>
<th>Range of offers</th>
<th>% of wages $2.50 or over</th>
<th>% of wages $2.00 or over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>2.03</td>
<td>1.40-2.75</td>
<td>15.8</td>
<td>63.2</td>
</tr>
<tr>
<td>Community</td>
<td>2.24</td>
<td>1.35-3.43</td>
<td>23.7</td>
<td>68.9</td>
</tr>
<tr>
<td>Rx shop</td>
<td>2.35</td>
<td>1.37-3.00</td>
<td>40.0</td>
<td>80.0</td>
</tr>
<tr>
<td>Chain type</td>
<td>2.42</td>
<td>1.13-3.75</td>
<td>53.8</td>
<td>84.6</td>
</tr>
<tr>
<td>operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>2.24</td>
<td>1.13-3.75</td>
<td>37.8</td>
<td>70.7</td>
</tr>
</tbody>
</table>

*Not enough "other" type of practice reporting to make data meaningful.

demand for technicians, offers the lowest average salary.
The great range of offers within each type of practice probably reflects ability or inability to pay as well as real differences in the skill level of desired technicians.
The fourth column of Table 21 gives the percent of wages which were $2.50 or over. This figure might be taken as a
rough bench mark of the salary required to attract and re-
tain a junior college graduate of a 2-year technician course.
Only 37.8% of the starting salaries are equal to or above this
figure, and only 70.7% are $2.00 or above. It is quite likely
that if pharmacists knew the exact skill level and educational
background (for example, junior college graduate) of tech-
nicians, they would be willing to pay higher salaries. Some
upward adjustment would seem necessary to attract the kind of
educated technician, one with about 2 years of college, which
the largest number of pharmacists prefer.

The Professional Characteristics of
Pharmacists Favoring Technicians

If the professional characteristics of pharmacists who
tend to favor the use of technicians could be identified, this
information could prove valuable in identifying areas of con-
centrated need for technicians, uncovering pharmacists' rea-
sons for favoring technicians, and generally providing infor-
mation which could prove useful to pharmacy organizations in
determining policy on the question of technicians. It was
speculated that the following factors might be important in
determining if pharmacists would favor or oppose technicians:
1) the professional utilization of the pharmacist, 2) the
size of the pharmacy, 3) the type of practice, 4) the status
of the pharmacist as owner or employee, 5) the location of
the pharmacy (urban or rural), and 6) opinion on the con-
dition of the labor market for pharmacists. Some of these
factors could be measured directly from the questionnaire; others necessitated the use of proxy variables which were taken from the questionnaire.

The statistical method used was a simple chi-square contingency test of independence. This test can be used to test the hypothesis that two classifications, represented by rows and columns of a contingency table, are statistically independent. "If the hypothesis is rejected, the two classifications are not independent and we say that there is some interaction between the two criteria." (38, p. 129) This test can be used to test pharmacists' opinions on technicians (classification one) against each of the factors mentioned in the previous paragraph (classification two). It will be possible to conclude that opinion on technicians is statistically independent or dependent of each of the factors.

A full discussion of the chi-square contingency test with the formula of the test statistic, a discussion of degrees of freedom and a discussion of hypotheses it can be used to test appears in reference 38 (pp. 129-131). Analysis for each of the variables will consist of the following: 1) a discussion of why the variable was chosen, 2) an explanation of any proxy variable used, 3) a presentation of the hypothesis to be tested, 4) the contingency table and test statistic, and 5) the tabulated chi-square value with decision to accept or reject the hypothesis.
Professional utilization of the pharmacist

Many COMMUNITY pharmacists are underutilized professionally. It was felt that pharmacists who spend most of their time in professionally oriented work might tend to favor technicians, viewing them less as a threat and more as a means of freeing time for further professional pursuits. Professional utilization is a very intangible concept which cannot be measured directly by the questionnaire. The questionnaire does, however, measure two factors which can be used as proxies for professional utilization. Consulting is an important new professional activity for COMMUNITY pharmacists. The number of prescriptions personally dispensed by employee COMMUNITY pharmacists can also give an indication of professional utilization. The following two hypotheses were made using these two variables:

HYPOTHESIS SEVEN: Preference for technicians is independent of status as a consultant or nonconsultant.

HYPOTHESIS EIGHT: Preference for technicians is independent of the number of prescriptions personally dispensed daily.

Tables 22 and 23 are the contingency tables for the above two hypotheses.

Table 22 shows that hypothesis seven cannot be rejected. Preference for technicians is independent of status of COMMUNITY pharmacists as consultants or nonconsultants. Similarly, Table 23 shows that preference for technicians by employees of COMMUNITY pharmacies is independent of the
Table 22. Preference for technicians by status as a consultant or nonconsultant

<table>
<thead>
<tr>
<th>Status</th>
<th>Favor</th>
<th>Oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant</td>
<td>39</td>
<td>43</td>
</tr>
<tr>
<td>Nonconsultant</td>
<td>74</td>
<td>97</td>
</tr>
</tbody>
</table>

Test statistic = 0.41 Tabulated chi-square (0.95) = 3.84
Decision: Accept

aData applies to COMMUNITY pharmacists only.

Table 23. Preference for technicians by number of prescriptions filled by pharmacists daily

<table>
<thead>
<tr>
<th>Rx filled daily</th>
<th>Favor</th>
<th>Oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>under 20</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>20-40</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>40-60</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>60-80</td>
<td>13</td>
<td>15</td>
</tr>
<tr>
<td>80 and over</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

Test statistic = 1.15 Tabulated chi-square (0.95) = 9.49
Decision: Accept

aData applies to employees of COMMUNITY pharmacies only.

number of prescriptions filled personally daily.

Size of pharmacy

This variable was chosen because it was thought technicians might be more useful to large pharmacies than to small. Two measures of size were used, number of pharmacists on the staff and the number of prescriptions dispensed daily. The following two hypotheses were made:
HYPOTHESIS NINE: Preference for technicians is independent of the number of pharmacists on the staff. (Table 24)

HYPOTHESIS TEN: Preference for technicians is independent of the number of prescriptions dispensed daily by the pharmacy. (Table 25)

Table 24. Preference for technicians by number of pharmacists on the staff

<table>
<thead>
<tr>
<th>Number of pharmacists</th>
<th>Favor</th>
<th>Oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23</td>
<td>39</td>
</tr>
<tr>
<td>2 or 3</td>
<td>72</td>
<td>90</td>
</tr>
<tr>
<td>4 and over</td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
</table>

Test statistic = 1.84 Tabulated chi-square (0.95) = 5.99
Decision: Accept

aData applies to COMMUNITY pharmacists only.

Table 25. Preference for technicians by number of prescriptions filled by pharmacy daily

<table>
<thead>
<tr>
<th>Rx filled daily</th>
<th>Favor</th>
<th>Oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 20</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>20-40</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>40-60</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>60-80</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>80 and over</td>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

Test statistic = 0.85 Tabulated chi-square (0.95) = 9.49
Decision: Accept

aData applies to owners of COMMUNITY pharmacies only.

Tables 24 and 25 indicate that both hypotheses must be
accepted. It can be concluded that preference for technicians by COMMUNITY pharmacists is independent of the number of pharmacists on the pharmacy staff, and, also, preference for technicians by COMMUNITY pharmacy owners is independent of the number of prescriptions dispensed daily in their pharmacies.

Type of practice

The shortage of pharmacists in hospital practice is well documented. If a concentrated interest in technicians could be traced to one or more types of practice, this might have important implications for policy on technicians. To test the importance of type of practice the following hypothesis was made:

HYPOTHESIS ELEVEN: Preference for technicians is independent of type of practice. (Table 26)

Table 26. Preference for technicians by type of practice

<table>
<thead>
<tr>
<th>Type of practice</th>
<th>Favor</th>
<th>Oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Community</td>
<td>87</td>
<td>110</td>
</tr>
<tr>
<td>Rx shop</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Chain type operation</td>
<td>19</td>
<td>25</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>

Test statistic=15.43 Tabulated chi-square (0.95)=9.49
Decision: Reject

As Table 26 indicates, the hypothesis is rejected, and it is concluded that an interaction exists between preference
for technicians and type of practice. Table 26 shows a
highly disproportionate interest in technicians among hos-
pital pharmacists.

Status as owner or employee

It was speculated that owner pharmacists might see tech-
nicians as an effective means of cutting costs, whereas em-
ployee pharmacists might view them as a threat. The following
hypothesis was made:

HYPOTHESIS TWELVE: Preference for technicians is independent
of a pharmacist's status as employee or owner. (Table 27)

Table 27. Preference for technicians by owner-employee status

<table>
<thead>
<tr>
<th>Status</th>
<th>Favor</th>
<th>Oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee</td>
<td>50</td>
<td>58</td>
</tr>
<tr>
<td>Owner</td>
<td>57</td>
<td>74</td>
</tr>
</tbody>
</table>

Test statistic=0.19 Tabulated chi-square (0.95)=3.84
Decision: Accept

aData applies to COMMUNITY pharmacists only.

Thus, we conclude that preference for technicians by COMMUNITY
pharmacists is independent of status as owners or employees.

Location of pharmacy

Demand for technicians might be greater in urban than in
rural areas. To check this possibility the following hy-
pothesis was made:
HYPOTHESIS THIRTEEN: Preference for technicians is independent of the location of the pharmacy. (Table 28)

Table 28. Preference for technicians by location of pharmacy

<table>
<thead>
<tr>
<th>Size of community</th>
<th>Favor</th>
<th>Oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000 and under</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>1,000-5,000</td>
<td>37</td>
<td>41</td>
</tr>
<tr>
<td>5,000-10,000</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>10,000-25,000</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>25,000-50,000</td>
<td>27</td>
<td>17</td>
</tr>
<tr>
<td>50,000-100,000</td>
<td>23</td>
<td>45</td>
</tr>
<tr>
<td>Over 100,000</td>
<td>13</td>
<td>17</td>
</tr>
</tbody>
</table>

Test statistic=9.10 Tabulated chi-square (0.95)=12.6
Decision: Accept

Table 28 leads to the conclusion that preference for technicians is independent of the location, by size of community, of the pharmacy.

Labor market

An important factor in determining a pharmacist's opinion on technicians could be the nature of the labor market for pharmacists. Certainly if unemployment were high among pharmacists, few if any could be expected to favor the use of technicians. In an attempt to measure the importance of labor market conditions, two hypotheses were made:

HYPOTHESIS FOURTEEN: Preference for technicians is independent of the existence of budgeted vacancies in the pharmacy. (Table 29)
HYPOTHESIS FIFTEEN: Preference for technicians is independent of the anticipated condition of the labor market. (Table 30)

Table 29. Preference for technicians by existence of budgeted vacancies in the pharmacy

<table>
<thead>
<tr>
<th>Vacancies present</th>
<th>Favor</th>
<th>Oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>34</td>
<td>15</td>
</tr>
<tr>
<td>No</td>
<td>60</td>
<td>84</td>
</tr>
</tbody>
</table>

Test statistic=11.33 Tabulated chi-square (0.95)=3.84
Decision: Reject

Table 30. Preference for technicians by anticipated condition of the labor market, 1968-1970

<table>
<thead>
<tr>
<th>Conditiona</th>
<th>Favor</th>
<th>Oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical shortage</td>
<td>52</td>
<td>23</td>
</tr>
<tr>
<td>Moderate shortage</td>
<td>40</td>
<td>43</td>
</tr>
<tr>
<td>Adequate supply</td>
<td>14</td>
<td>41</td>
</tr>
</tbody>
</table>

Test statistic=24.63 Tabulated chi-square (0.95)=5.99
Decision: Reject

aSo few pharmacists anticipated moderate or critical surpluses that they could not be included in this analysis.

Both hypotheses fourteen and fifteen can be rejected. Pharmacists whose pharmacies have budgeted vacancies are considerably more receptive to the use of technicians than those without vacancies. Similarly, preference for technicians is not statistically independent of the anticipated condition of the labor market. Pharmacists anticipating a critical
shortage of pharmacists are much more likely to favor technicians than other pharmacists.

Conclusion

The only hypotheses which could be rejected were eleven, fourteen, and fifteen. Thus, the only variables with any statistically significant effect on preference for technicians were type of practice, the existence of budgeted vacancies in the pharmacy, and how pharmacists anticipated the condition of the labor market. Preference for technicians is independent of all other variables tested.

Comments of Responding Pharmacists

The comments of pharmacists proved invaluable as a determinant of the direction of this thesis. These comments were candid, and for the most part, raise legitimate issues or make important points. A condensation and aggregation of the comments and in some cases brief discussions of the issues raised will be presented in this section. When possible the data presented in this and the preceding chapter are used to support or attack the conclusions of these commentators. The comments have been grouped according to basic similarities in their content.

Detrimental effect on the practice of pharmacy

Following are the most often mentioned comments on this topic and the number of times each appeared:
1) Technicians would hurt the status of pharmacy and lower professional standards. (45 questionnaires)
2) Technicians would be used to replace pharmacists. (21)
3) Technicians would lower wages for pharmacists. (13)
4) Technicians filling prescriptions would result in ethical, legal, and insurance difficulties. (9)
5) Technicians would discourage enrollment in pharmacy colleges. (4)

These kinds of fears are difficult to allay. Technicians could considerably upgrade the status of pharmacy by freeing pharmacists of repetitive tasks and allowing them to pursue more professional functions. On the other hand, the use of technicians could be abused; sloppy dispensing could be a result. If technicians are to be used, their use must be controlled. Currently, under Iowa law, it would be illegal for technicians to dispense. Policy statements of pharmacy associations and state law should clearly define the technician's role. With proper supervision, the effect of the use of technicians on the status of pharmacy should be positive.

Comments 2, 3, and 5 above, all involve speculation which would be difficult to support or negate with hard facts. Certainly there may be some substitution of technicians for pharmacists; to pretend otherwise is unrealistic. It is more likely however that technicians would be used more to supplement the activities of pharmacists than to replace them.
Pharmacists can and do perform valuable health services that technicians could not. The fact that so many pharmacists view technicians as a threat is symptomatic of the great professional insecurity which pervades pharmacy. Many pharmacists are in doubt about the future of their profession. They do not know where pharmacy is headed or whether they will be prepared for the professional demands made on them in the future. As the new professional roles for pharmacists mentioned in Chapter V become more concrete, resistance of the type expressed in the above comments should decrease.

**Technicians are not needed**

1) Students, interns, and student coops should be used instead of technicians. (10)

2) Pharmacists waste their time in nonprofessional activities; they don't need technicians: they need to reorganize the use of their time. (7)

3) The supply of pharmacists is adequate. (7)

4) Better pay and working conditions for pharmacists would result in an adequate supply and eliminate the need for technicians. (5)

5) There is not enough technician-type work in the pharmacy. (5)

Although the reasons vary, all of the above comments hold that technicians are not needed in pharmacy. It is difficult to take issue with the first comment. Certainly,
students and interns could be used in roles similar to technicians, and that students would appreciate the chance for meaningful professionally oriented employment is undeniable. The seasonal nature of the supply and the limited number available however make students employees something less than ideal in many employment situations.

To the second comment it should simply be said that technicians could absorb much of the nonprofessional activity on which pharmacists now "waste their time."

Comments three and four indicate that pharmacists either could or should perform the work which might be delegated to technicians. Granted there is no great shortage of pharmacists as there is of doctors or dentists; however, there are new demands for pharmaceutical services. It is wasteful indeed to have highly educated pharmacists perform tasks which technicians could easily handle, while legitimate demands for pharmaceutical services go unmet.

A rebuttal of the final comment of this section necessitates a comment on the meaning of the word technician. The questionnaire deliberately did not define technician. In fact one of the important functions of the questionnaire was to determine how pharmacists would define a technician in terms of potential duties. Tables 13 and 14 indicate that most pharmacists favor a variety of clerical, secretarial, and janitorial work for technicians but no real role in dispensing. The three pharmacists who commented that the phar-
macy did not have enough technician-type work probably did not consider the above activities as technician-type work.

Unfair advantage to large stores

1) Technicians would aid chains and hurt small stores. (10)

Table 19 indicates that about the same percent of community pharmacies as chain type operations could provide jobs for technicians. Chain type operations could afford to pay technicians more, $2.42 versus $2.24 per hour, but this is of doubtful importance. The acceptance of hypothesis ten indicates preference for technicians is independent of pharmacy size. In the case of stores too small to hire help in addition to the managing pharmacist, technicians could result in a slight comparative advantage for the large chain type operations. It is doubtful if technicians could cause a serious deterioration of the competitive position of small stores.

Use of technicians

These comments specified how and what kind of technicians should be used. The two most common comments were variations of the following:

1) Technicians should be used to free pharmacists for the role of pharmaceutical consultant and other professional functions. (10)

2) A good secretary-clerk is needed not a technician. (7)

A surprisingly candid comment of the first type was
provided by one respondent:

"Pharmacists mates and technicians can be trained in the armed services in 6 months. They do an excellent job of filling prescriptions and all associated jobs connected with a pharmacy. Quit kidding, anybody with 6 months training can count pills and do a satisfactory job of filling prescriptions. As a therapeutic advisor, which is the latest item on the horizon, a college degree and intensive training would be necessary."

Most pharmacists would stop short of delegating dispensing duties to technicians (Table 13), as the above comment suggests could be done. Still, as has been mentioned many times previously in this thesis, new opportunities do exist and technicians can permit pharmacists to pursue these opportunities.

Comments of the second type are representative of the views of many pharmacists (Table 13). The following description of a pharmaceutical secretary shows a type of employee for which a sizeable demand could exist:

"Our greatest need in reality seems to be more for a pharmaceutical secretary. Someone to fill out family record cards, type and send out duplicate Rx's to M. D.'s for signature--to be concerned with welfare, Title XIX, control drugs, long term Rx's nearing 1 year time limit, etc. Insurance forms and statements are also a time consuming task I believe such an individual could take over. Title XIX clerical requirements are very time consuming, with the outlook for a considerable increase in the future."

Table 13 indicates that nearly 80% of pharmacists would delegate the keeping of family record systems to technicians. There seems to be an almost universal distaste for paper
work among pharmacists. Secretarial duties could easily provide a core of activity for a very significant and broadly accepted technician.
CHAPTER VIII: CONCLUSIONS

In Chapter I it was stated that the success or failure of a pharmacy technician or subprofessional would depend on the following: 1) identification of the conditions under which the new occupational group should be created, 2) determination of the duties and responsibilities of the group, 3) determination of the training requirements, and 4) development of the proper relationship between pharmacist and subprofessional. Each of these points will be briefly examined in light of the information presented in Chapters II through VII, namely the experiences of the health service industry, the present condition of pharmacy, and the attitudes of Iowa pharmacists on technicians.

Prerequisite Conditions for Technicians in Pharmacy

Are technicians needed in pharmacy? If the supply of pharmacists is used as a criterion, the existence of technicians probably cannot be justified. The opinions of Iowa pharmacists to the contrary (one-third predict a critical shortage of 5% or more), most data and the analysis of Chapter V indicate that the manpower problem in pharmacy is one of professional underutilization and not undersupply. Undersupply of professional manpower has been the traditional means of justifying the use of technicians, and technicians have been most successfully incorporated in areas of the
health services suffering from acute manpower shortages. If pharmacy is not experiencing serious manpower difficulties, another basis must be made for rationalizing the use of technicians. This rational basis does exist. In spite of talk of professional underutilization, pharmacists do work long, hard hours. How can pharmacists be expected to contribute more in the way of professional pharmaceutical services when their work time is currently fully exhausted? Certainly one means would be by freeing some of their time through the delegation of some of their more routine duties to a technician or subprofessional. Iowa pharmacists appear willing to do this (Table 13). A technician could make an important contribution to public health welfare by absorbing some of the duties of the pharmacist and permitting him to upgrade his professional services. If technicians were used in this manner, they would benefit the public and the profession of pharmacy.

An area of pharmacy where technicians could be justified on the basis of an existing undersupply of pharmacists is in hospital practice. It is significant that hospital pharmacists answering the questionnaire favor the use of technicians by three to one (Table 26), a much greater margin than for pharmacists in any other type of practice. Similarly a greater portion of hospital pharmacists indicated that their pharmacy could offer a job to a technician than for any other type of practice (Table 19).
In an article outlining the manpower needs of hospital pharmacy, Joseph Oddis suggests that if drug distribution in hospitals were properly supervised and controlled by pharmacists, manpower needs would greatly exceed the 9,000 to 10,000 total of pharmacists currently in hospital practice. Drug studies have shown that as often as 15% to 30% of the time something is wrong with administered drug doses in hospitals. Mr. Oddis suggests that instead of using nurses as "pharmacy technicians," the pharmaceutical activities of hospitals could be accomplished by mechanizing and automating where possible and by using trained technicians under the supervision of a specialist pharmacist (39, p. 155). The use of technicians in hospitals could greatly alleviate hospital pharmacy's manpower shortage and could possibly result in a significant improvement in the quality of hospital drug distribution services.

A definite need exists for technicians in hospitals. If the full spectrum of pharmacists will not accept technicians, perhaps they could be limited to the hospital.

Duties and Responsibilities for Technicians

Iowa pharmacists do not favor a highly skilled technician. A very low portion of the respondents to the questionnaire would delegate activities to technicians that are closely associated with dispensing. Instead there is a general willingness to give up paperwork, stocking activities
and various clerical and janitorial duties. Subprofessional jobs must be rewarding not only in terms of wages and working conditions but also in terms of job satisfaction. The subprofessional worker must feel that his job is worthwhile and meaningful. It is possible that a meaningful job could be built for a subprofessional in pharmacy around a core of secretarial and clerical activities. The comment of a responding pharmacist quoted in Chapter VII gives examples of the type of work a "pharmaceutical secretary could be expected to do. A sizeable demand for this type of technician seems to exist in pharmacy in Iowa.

Training Requirements

It was mentioned in Chapter VII that pharmacists tended to favor about 2 years of college as an educational background for a pharmacist technician. No more than 2 years in a college of pharmacy or junior college would be necessary for the type of technician most pharmacists favor. Two years also happens to be the amount of preprofessional education most pharmacists receive. If possible a 2-year technician's course should satisfy the requirement for entry to the final 3 years of pharmacy school. This would give technicians the opportunity to advance into the profession if they so chose.

Iowa's junior colleges seem to be near ideal institutions for training technicians. Besides being convenient and
inexpensive from the student's point of view, they already provide the general liberal arts education that might be included in a technician's course. Pharmacists from the community could probably be recruited for teaching duties in specialized technician courses. Pharmacy schools are another possibility as training centers. If a more highly skilled technician were desired, these schools would be ideal for providing the type of technical education necessary. However, for the type of technicians most respondents seem to prefer, junior colleges would be excellent training centers.

It is important to establish some uniform training requirements, if not examination and licensure requirements, for technicians. In Scotland, no specific educational requirements were laid down for pharmacy technicians. As a result four programs were created each with different academic requirements and content. No difference was drawn between the graduates, and since the programs were of varying intensity, recruitment for the lengthier programs became difficult (40, p. 70). With proper control by professional pharmaceutical organizations, accreditation standards could be established for technician programs and the Scottish experience could be avoided.

Pharmacists and Subprofessionals

Less than one-half of the pharmacists answering the
questionnaire favored the use of technicians. The support of the pharmacy professional is essential to the successful integration of a group of subprofessional workers into pharmacy. It is possible that presented with a concrete description of the activities of a technician centered around secretarial and clerical duties, a much greater portion of Iowa's pharmacists would be willing to accept technicians. Much of the initial resistance to the idea of technicians probably stems from the threat that technicians would usurp activities pharmacists feel must be done by a professional pharmacist. If it were made clear that technicians would not be involved in dispensing and that technicians could provide a variety of secretarial and clerical services, they would probably have widespread appeal.

Iowa will have properly trained pharmacist technicians only if training programs are created for them. The initiative in creating such programs must come from pharmacists; thus, the responsibility for technicians lies, as it should, with Iowa's pharmacists.
LITERATURE CITED


ACKNOWLEDGMENTS

I would like to thank my major professor Dr. Edward B. Jakubauskas for his assistance throughout my graduate studies. The efforts of the members of my graduate committee, Dr. Neil A. Palomba and Dr. Keith L. McRoberts, are also gratefully acknowledged.

Without the assistance of the Iowa Pharmaceutical Association, this study would not have been possible. Special thanks are extended to Mr. Robert G. Gibbs, IPhA executive secretary.

This study was supported in part through grant funds from the U.S. Office of Education and in part by the Manpower Institutional Grant Program of the Manpower Administration, U.S. Department of Labor.

The views expressed are those of the author and do not necessarily coincide with the policies or position of the grantors.
TO: All Pharmacists  

RE: Technicians and/or Subprofessionals in Pharmacy Questionnaire  

In keeping with the recommendation of the IPhA Professional Committee, the enclosed Questionnaire on Technicians in Pharmacy has been prepared and is being mailed to all Iowa pharmacists to solicit their response. The purpose is to  
1) Acquire some facts to evaluate the degree of pharmacy's manpower problem in Iowa now and in the future;  
2) To gain an expression of pharmacists' general attitude regarding use of technicians in pharmacy, pro and con.  
Your response will provide the Association the objective opportunity to determine it's position and recommendations.  

Enclosed is a reprint of the article "Technicians" carried in the November Iowa Pharmacist to provide you a degree of background information of this very controversial issue. The question has been discussed by the IPhA Education and Hospital Practice Committees. The APhA is conducting a crash program to study the role technicians would have in the profession of pharmacy. The NABP and AACP are also studying the question. However, grass roots opinion is essential in development of practical realistic objective decision on the question and your response is essential.  

Please return by January 15, 1968. Thanks.  

Sincerely,  

IOWA PHARMACEUTICAL ASSOCIATION  

Robert G. Gibbs  
Executive Secretary  

RGG:mn  
Enclosure
INSTRUCTIONS

1. Please answer all questions pertinent to you as an employee or employer pharmacist. Employee pharmacists under question (3) should indicate the number of Rx's you personally dispense. Employer under question 3 should indicate the total number of Rx dispensed per day.

Please attach a sheet to the questionnaire for comments that cannot fit on the questionnaire.

2. In question (5), "Budgeted Vacancies" means an opening (or openings) for pharmacists which exists now and for which money is available to pay the salary. To be answered by employer pharmacists, also question 6.

3. In question (7), the "Shortage-Critical" means that in your estimation (employer) the supply of pharmacists will fall short of demand by more than 5%. The "Surplus-Critical" means that the supply of pharmacists will exceed demand by more than 5%; etc.

4. Question (8) should be answered by employer pharmacists.

5. Questions (9), (10), (12), (13), (14) should be answered by all pharmacists.

Thanks for your cooperation. Please return by January 15, 1968.
QUESTIONNAIRE ON TECHNICIANS IN PHARMACY

I. Questions on Pharmacists

(1) Type of practice you are in?

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Community</th>
<th>Employee</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rx shop</td>
<td>Chain type operation</td>
<td>Other (Please specify)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(2) Number of pharmacists filling prescriptions

(3) Average number of prescriptions filled per day

<table>
<thead>
<tr>
<th>Under 20</th>
<th>20 - 40</th>
<th>40 - 60</th>
<th>60 - 80</th>
<th>Over 80</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(4) Are you serving as a Pharmaceutical Consultant to a nursing home or hospital? Yes No

Number of hours per week spent in this capacity

(5) Current budgeted vacancies for pharmacists

(6) Anticipated number of pharmacists in 1968:

<table>
<thead>
<tr>
<th>1968</th>
<th>1969</th>
<th>1970</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(7) Anticipated condition of labor supply for pharmacists for next 3 years (1968 to 1970):

<table>
<thead>
<tr>
<th>Shortage - Critical, more than 5%</th>
<th>Shortage - Moderate, less than 5%</th>
<th>Adequate - Job vacancies in balance with number of entrants</th>
<th>Surplus - Critical, more than 5%</th>
<th>Surplus - Moderate, less than 5%</th>
</tr>
</thead>
</table>
(8) Where did your present pharmacist(s) come from?

____ Directly from Pharmacy College. (Please list name of each college and the number of pharmacists that came from each college):

________________________________________________________________________

________________________________________________________________________

____ From other employer. (Please list the type of employer and the number of pharmacists that came from each type of employer):

________________________________________________________________________

________________________________________________________________________

____ Other source (Please specify source and the number of pharmacists that came from each source specified):

________________________________________________________________________

________________________________________________________________________

II. Questions on Pharmacist Technicians:

(9) Are you in favor ____ or opposed ____ to the pharmacist technician.

(10) In your opinion, which of the below duties would a pharmacist technician perform under licensed pharmacist supervision and responsibility:

Typing Rx labels
Assembling Rx Ingredients
Repackaging Rx Items
Keeping drug stocks
Calculating Rx prices
Cleaning equipment
Dispensing non-Rx products
Keeping "Family Record Systems"
Filling out "phoned" Rx blanks
Giving drug orders to suppliers
Other (please list) ______
(11) In your opinion what should the educational requirements be?

____ ___ years in a college of Pharmacy.

____ Junior college graduate in a Pharmacy Technician course.

____ ___ years on the job training.

____ A combination of ___ years in college and ___ years of
  on the job training.

____ None.

(12) Should there be an examination and a license given by the State
Board of Pharmacy?

Yes ____ No ____

(13) Could your Pharmacy offer a job to a pharmacist technician?

Yes ____ No ____

If yes, how many pharmacist technicians? _________
Approximate starting salary _______________________

(14) Does your pharmacy employ an intern(s)? (Pharmacy student)?

Yes ____ No ____

Summers _____ Vacation Periods _____ All Year _____
Salary per hour _____________

(15) Could your pharmacy offer a job to an intern during the summer
months? Yes _____ No _____

(16) Comment: ____________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

January, 1968
APPENDIX B

The Sample

In order to determine if the questionnaire respondents were representative of the universe of active Iowa pharmacists, it was decided to compare a characteristic of the respondents with the same characteristic of the universe. The characteristic chosen was the address of the pharmacists. Addresses were chosen for two reasons: 1) This information was readily available for the sample—from return addresses and postmarks, and 2) the Iowa Pharmaceutical Association had available the number of active pharmacists in each of Iowa's counties for the year 1966. The two-year difference between the sample data and universe data was thought to be of little importance since major shifts of the location of pharmacists in this period were highly unlikely.

Methodology

To simplify calculations in making comparisons of the sample and universe data, Iowa's 16 functional economic areas were used instead of the 99 counties. (See Table 31 for the counties in each functional economic area.) One further refinement was necessary. The 1966 IPhA data listed hospital pharmacists separately and not by county location. Since hospital pharmacists in the sample could easily be identified, it was possible to divide the phar-
macists in the sample into 17 categories—those in each of the 16 functional economic areas (excluding hospital pharmacists), and all hospital pharmacists. Thus for the sample and for the universe, the number of pharmacists (excluding hospital pharmacists) in each functional economic area was available, as was the number of pharmacists in hospital practice. Table 32 shows the number of sample

Table 31. Counties in Iowa’s functional economic areas

<table>
<thead>
<tr>
<th>Area</th>
<th>Counties</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lyon, Sioux, Plymouth, Woodbury, Ida, Monona</td>
</tr>
<tr>
<td>2</td>
<td>Harrison, Pottawattamie, Cass, Mills, Montgomery, Fremont, Page</td>
</tr>
<tr>
<td>3</td>
<td>Osceola, Dickinson, Emmet, O’Brien, Clay, Palo Alto, Cherokee, Buena Vista</td>
</tr>
<tr>
<td>4</td>
<td>Sac, Crawford, Carrol, Greene, Shelby, Audubon</td>
</tr>
<tr>
<td>5</td>
<td>Kossuth, Winnebago, Worth, Mitchell, Hancock, Cerro Gordo, Floyd, Franklin</td>
</tr>
<tr>
<td>6</td>
<td>Pocahontas, Humbolt, Wright, Calhoun, Webster, Hamilton</td>
</tr>
<tr>
<td>7</td>
<td>Boone, Story, Guthrie, Dallas, Polk, Madison, Warren</td>
</tr>
<tr>
<td>8</td>
<td>Adair, Adams, Union, Clarke, Taylor, Ringgold, Decatur</td>
</tr>
<tr>
<td>9</td>
<td>Butler, Bremer, Black Hawk, Buchanan</td>
</tr>
<tr>
<td>10</td>
<td>Hardin, Grundy, Marshall, Tama, Jasper, Poweshiek</td>
</tr>
<tr>
<td>11</td>
<td>Marion, Mahaska, Keokuk, Washington, Lucas, Monroe</td>
</tr>
<tr>
<td>12</td>
<td>Wapello, Jefferson, Wayne, Appanoose, Davis, Van Buren</td>
</tr>
<tr>
<td>13</td>
<td>Howard, Winneshiek, Allamakee, Chickasaw, Fayette, Clayton</td>
</tr>
<tr>
<td>14</td>
<td>Delaware, Dubuque, Jackson</td>
</tr>
<tr>
<td>15</td>
<td>Benton, Linn, Jones, Iowa, Johnson, Cedar</td>
</tr>
<tr>
<td>16</td>
<td>Clinton, Scott, Muscatine</td>
</tr>
<tr>
<td></td>
<td>Louisa, Henry, Des Moines, Lee</td>
</tr>
</tbody>
</table>
respondents, the number in the universe, and the inflated sample data for each of the 17 categories. The factor

Table 32. Number of active pharmacists in hospital pharmacy and Iowa's functional economic areas

<table>
<thead>
<tr>
<th>Category</th>
<th>Sample</th>
<th>Inflated sample</th>
<th>Universe</th>
<th>Deviation O - E</th>
<th>Test statistic (O - E)^2/E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>35</td>
<td>143</td>
<td>93</td>
<td>50</td>
<td>26.86</td>
</tr>
<tr>
<td>Area 1</td>
<td>23</td>
<td>94</td>
<td>89</td>
<td>5</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>86</td>
<td>95</td>
<td>- 9</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>33</td>
<td>61</td>
<td>- 28</td>
<td>12.86</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>29</td>
<td>31</td>
<td>- 2</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>65</td>
<td>57</td>
<td>8</td>
<td>1.12</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>45</td>
<td>55</td>
<td>- 10</td>
<td>1.82</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>208</td>
<td>236</td>
<td>- 28</td>
<td>3.32</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>37</td>
<td>27</td>
<td>10</td>
<td>3.70</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>81</td>
<td>73</td>
<td>8</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>57</td>
<td>63</td>
<td>- 6</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>77</td>
<td>76</td>
<td>1</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>53</td>
<td>38</td>
<td>15</td>
<td>5.92</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>49</td>
<td>48</td>
<td>1</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>122</td>
<td>100</td>
<td>22</td>
<td>4.84</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>86</td>
<td>99</td>
<td>- 13</td>
<td>1.71</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>33</td>
<td>56</td>
<td>- 23</td>
<td>9.44</td>
</tr>
<tr>
<td>TOTAL</td>
<td>318</td>
<td>1298c</td>
<td>1297</td>
<td>1d</td>
<td>74.33</td>
</tr>
</tbody>
</table>

Test statistic = 74.33 Tabulated chi-square (0.99) = 32.0
Decision: Reject

a Observed.
b Expected.
c Does not add to 1297 due to rounding.
d Does not add to 0 due to rounding.

used to inflate the sample data was the ratio of the total pharmacists in the universe to respondents in the sample.
It was possible to identify the Iowa addresses of 318 respondents. The inflation factor thus was $1297/318$. The statistical test used was a chi-square goodness-of-fit test. (See reference 38, pp. 126-127, for a discussion and example of its use.) The hypothesis tested was: The inflated sample is distributed the same as the universe. Table 32 shows that the calculated test statistic is 74.33. When this is compared with a tabulated chi-square value with 16 degrees of freedom and 0.99 level of significance (32.0), the test statistic is greater than the tabulated value, and the hypothesis must be rejected.

Conclusions

The unfortunate conclusion of the above analysis is that the sample data are not statistically representative of Iowa's practicing pharmacists. An examination of the components which make up the test statistic suggests the following:

1. Hospital pharmacists are over-represented in the sample.
2. Functional economic areas 8, 12, and 14 appear to be over-represented in the sample.
3. Functional economic areas 3, 7, and 16 appear to be under-represented in the sample.

While it is disappointing that the sample was not more representative of the universe, it is not disastrous.

Given the finances available and the mailing list for the
questionnaires, perhaps little better results could be expected.

At any rate, the sample was the only information available, and an attempt was made to make as accurate use of it as possible. The information presented and conclusions drawn in this thesis should be tempered by the knowledge that the source data were less than perfect.