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THE CONTINUING EDUCATION OF WISCONSIN PHARMACISTS

BY

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A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of
MASTER OF SCIENCE
(Pharmacy)
at the
UNIVERSITY OF WISCONSIN
1963

ACKNOWLEDGEMENTS

The author expresses appreciation to Professor Robert W. Hammel for his guidance and encouragement during the course of this study.

Appreciation is also expressed to the University of Wisconsin Extension Services for clerical services rendered by the Extension Services in Pharmacy.

The author wishes to thank the Office of the Wisconsin State Board of Pharmacy which provided the names and addresses of the pharmacists who participated in this study.

Finally, and most important, much appreciation is expressed to the Wisconsin pharmacists whose cooperation made this study possible.

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Chapter One

INTRODUCTION

In our dynamic, changing society can an individual rely upon his formal education to maintain his proficiency in rendering a service to society? The answer is obviously, "No." This report is a study on the continuing educational activities of Wisconsin pharmacists. The report is designed to determine how Wisconsin pharmacists continue their educations and what characteristics influence their continuing education activities.

Purpose of Continuing Education

Continuing or "adult education includes all existing opportunities for adults to gain information, develop ideas, or create works of art."[1] Human beings constantly must attempt to increase their knowledge to maintain and increase their productivity to society.

> "The true purpose of adult education is based upon the idea that education is a continuing life process, that mental and spiritual life, as well as physical life, are subject to the laws of growth and atrophy. Human beings possess physical, intellectual, and aesthetic potentialities, sometimes only half-guessed, which must have a chance to mature if persons are to live to the full rather than merely to exist."[2]

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1. Dorothy Hewitt and Kirtley F. Mather, Adult Education: A Dynamic for Democracy, D. Appleton - Century, N. Y., 1937, p. 11.

2. Ibid.

The desire to learn is not shared equally by everyone. Most people, however, do seek knowledge in varying degrees. There are various means by which individuals continue to learn.

> They read, belong to organizations to share in studies; they take courses, or they visit museums and exhibits, listen to radio and watch television with discrimination, and travel to enlarge their horizons... They approach life with an air of openness and an inquiring mind.[3]

It is not only important to determine how adults continue to learn, but an effort must be made to discover the characteristics of individuals who use the various means of continuing education.

> Who uses the public library? What kinds of people go to the evening school, the evening college, the museum, the community center, the settlement house, or the extension class? Who belongs to the clubs, councils and conferences, the societies and associations, the leagues and lodges which are so widespread in our society?[4]

How do varying characteristics of people influence continuing education activities?

> Age is very important: the very young adult seldom takes part, but there is a sharp upturn in the late twenties, a fairly constant level of activity until the age of fifty, and a decline afterward. Many more professional, managerial, and technical people take part relative to their number in the population than do people from other occupational groups. But the most universally important factor is schooling. The higher the formal education of the adult, the more likely it is that he will take part in continuing education.[5]

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3. Cyril O. Houle, The Inquiring Mind, The University of Wisconsin Press, Madison, 1961, p. 3.
4. Ibid., p. 5.
5. Ibid., p. 7.

If there is a need for continuing education by the public in general, there is a much greater need for professionals to expand their knowledge. "Everyone who rises above the common level has received two educations: the first from his teachers; the second, more personal and important, from himself."[6] The professional individual must rise above the common level, and has a responsibility to refresh old and gain new knowledge in his profession to serve the public adequately.

Need for Continuing Education in Pharmacy

> A continuing educational program is absolutely necessary to maintain any profession, be it medicine, pharmacy, dentistry, law or whatever. Progress and change are present and essential in any profession which is dynamic and purposeful and from this pharmacy most assuredly is not exempt. One cannot undergo the learning process to just one particular point such as the graduation year from the school of pharmacy and then proclaim full knowledge from this point thereon... We need imagination in this field and desperately need guidance to provide unanimity of procedure or else each man placing his own interpretations of his profession into every-day practice will continue to pull the pharmacy image apart.[7]

In the Squibb Review for Pharmacy Seniors, it was stated,

> Knowledge in most fields, pharmacy included, is growing at such a rate that unless one continues to study after graduation, the road to obsolescence is quickly traveled. To make progress in pharmacy, you cannot stand on the education you acquired in college. You must diligently build on it through

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6. Edward Gibbon, Autobiography, Everyman Edition. E. P. Dutton, New York, 1923, p. 66.

7. Erwin John Dohmen, Personal Correspondence, dated December 11, 1962.

a program of continuous academic updating.[8]

The need for continuing education in pharmacy was emphasized in Tile and Till, a publication of Eli Lilly and Company which is designed to meet the needs of practicing pharmacists.

PROFESSIONAL TRANQUILITY

> Professional tranquility is one of the chief occupational hazards of the pharmacist. This is a state of mind in which the pharmacist assures himself that as long as he pays the renewal fee for his license, he continues to be a competent practitioner of his profession and is fulfilling all his obligations for serving the health needs of his community. The danger of this type of thinking is the same, whether the pharmacist works in a community pharmacy or a hospital pharmacy.
>
> Self-complacency is acquired and maintained by completely ignoring or suppressing any thoughts that might occur about continuation of education. Since these thoughts usually are vague, uneasy feelings about a person's own ability or about his understanding of new advances in his profession, they are quickly dismissed. Many a pharmacist occasionally has a fleeting idea that it might be wise to do a little studying, read up on a new class of therapeutic agents, or even review pharmacology or medicinal chemistry; but more often than not, he finds various reasons for not acting upon such impulses. Examined under the strong light of truth, however, none of the excuses offered will hold up. The pharmacist who does not continually interest himself in new ideas, both in a professional concept and in a general sense, has succumbed to the habit of being professionally tranquilized and will soon sink into the rut of giving routine and mechanical service to his patrons. This rut is filled with quicksand, because he sinks deeper and deeper into it until he becomes buried in his work and loses all contact with progressive ideas.
>
> Progressive ideas are the foundation on which each pharmacist must build his future. It must be

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8. ___, "Watch Your Obsolescence Rate, The Squibb Review for Pharmacy Seniors, 1:1, October, 1962, p. 2.

> recognized that anyone who considers his academic training as the complete basis for a professional career will be disappointed. Only by keeping abreast of current developments and by understanding technological advances can he establish himself as a professional person and achieve the success he desires.[9]

How can a pharmacist keep from becoming professionally tranquil? He can read literature on new professional and business developments, attend conventions, institutes, and seminars, or engage actively in informal discussions of mutual problems with other professionals; or, as stated by Professor Brodie,

> Today, anyone who professes to be qualified to provide a specialized service in the health professions can do so only when his formal education is constantly reinforced by new knowledge produced by research.[10]

Pharmacists must read journal articles or attend lectures on new research in the health professions.

Mr. Frank Lobraico, then chairman of the executive committee of the National Association of Retail Druggists emphasized the need for continuing education by stating,

> ... to insure that pharmacists themselves maintain their professional standing it is mandatory that we never cease to be students of pharmacy. That too few pharmacists try to keep up with scientific advances is evident from the fact that attendance at refresher and post-

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9. ____, "P/R Bulletin for Pharmacists", Tile and Till, 48:2, November - December, 1962, p. 91.

10. Donald C. Brodie, "The Scope of Pharmacy Service in Hospitals", Hospitals, 36:4, February 16, 1962, p. 69.

> graduate courses sponsored by colleges of pharmacy is much too small.[11]

Dr. Theodore J. Shannon, Associate Dean of the University of Wisconsin Extension Division addressed the 1962 Wisconsin Pharmacy Fall Institute on the subject of continuing education. Dr. Shannon stated,

> Yours is a perfect profession to address on this subject. It's hard to imagine a calling that has witnessed --- and even brought about --- more radical changes than yours. Multiply this by the hundreds of subjects taught to the scores of professions and you are impressed with the immensity and profundity of change in our midst.
>
> Add to this enormous accumulation of knowledge such factors as the speed of communication and travel, the shrinking world it brings about, the inter-dependence of nations, the rapid industrialization, the growth of cities, the increased leisure, and all of these phenomenal changes point clearly to the topic: increasing need for continuing education.
>
> We cannot any longer transmit knowledge downward to the young only. We've to learn to transmit knowledge horizontally to the adult generations the minute knowledge is discovered, if we are to survive.[12]

The pharmacist has a responsibility to devote time to continuing his education, and a similar responsibility must be borne by pharmacy educators and journal editors to meet the needs of practicing pharmacists.

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11. ____, "Hard, APhA Examine Olive Branch as States Ponder Intermediary Role", Drug News Weekly, 2:38, September 19, 1962, p. 11.

12. Theodore J. Shannon, "The Increasing Need for Continuing Education", School of Pharmacy Bulletin, The University of Wisconsin Extension Division, Winter, 1962-1963, p. 11.

Dean Harold G. Hewitt, University of Connecticut School of Pharmacy stated,

> Education and learning are a life process; if we stop, we do not stand still --- we retrogress as this rapidly changing world leaves us behind. If this is true of general education, it is infinitely and more vitally true of professional education.
>
> Our schools of pharmacy must meet this need by establishing or expanding existing extension programs and refresher courses, and they must make them so vital and attractive that practicing pharmacists will be eager to attend them.
>
> This will be no substitute for reading professional journals; rather, it will supplement them in bringing the latest trends, not only in public health practice but also in related scientific disciplines, to the pharmacists.[13]

Purposes of the Study

There is a definite need for pharmacists to continue their education in pharmacy as well as a need to provide information in a manner best suited to the needs of pharmacists.

The purposes of this study are:

1. To determine to what degree and by what means Wisconsin pharmacists are continuing their educations in pharmacy.
2. To determine the pharmacists' evaluations of some of the various means of continuing education.
3. To determine the characteristics of pharmacists who use the various means to continue their educations in pharmacy.

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13. H. G. Hewitt, "Public Health Requirements Must Be the Measure of What and How to Teach Pharmacy", NARD Journal, 84:24, December 17, 1962, p. 37.

4. To determine what further may be done in continuing educational programs to maintain or improve the proficiency of practicing pharmacists.

Some Other Studies of Continuing Education

Medicine

Parke, Davis and Company conducted two surveys to attempt to evaluate continuing medical education. For the first survey mail questionnaires were included in the November, 1961, issue of Patterns of Disease.[14] Continuing medical education or postgraduate medical education was referred to as,

> the third phase of a physician's education. It follows completion of his undergraduate medical education, the first phase, and his graduate education, phase 2, which is his internship or residency. Expansion of medical knowledge in recent years has emphasized the importance of continuing medical education. Purpose of these programs is not only to help the physician keep abreast of developments in medicine, but also cultivate his analytic powers and, thus, sharpen his diagnostic acumen.[15]

The article also emphasized that the continuing education programs should best meet the needs of the physicians.

> The type of course offered most frequently in continuing medical education is the intensive continuous course. In the opinion of experts, educational techniques should not only be passive,

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14. ____, "Continuing Medical Education", Patterns of Disease, Parke, Davis and Company, March, 1962, p. 2.

15. Ibid.

such as in lectures and panel discussions, but should include attendance at live clinics, bedside rounds, seminars, open question periods, laboratory work, and study of patients under supervision.[16]

Results of 4,426 completed questionnaires from the first survey showed that 90% of the sample reported they had taken postgraduate courses since graduating from medical school. Forty-six percent took courses in 1961, and 62% reported they intended to take courses in 1962. One-third of the 1961 enrollees had graduated from medical school within the last 10 years, one-third between 1941-1950, and almost 10% had graduated more than 30 years ago. More than 90% indicated they favored courses lasting one week or less. Lectures and seminars were the types of programs preferred by the physicians.[17]

For the second survey mail questionnaires were included in the February, 1962, issue of Patterns of Disease.[18] When asked which means of continuing education are most effective, 40% of the physician respondents considered publications as the most beneficial, 23% considered courses in postgraduate or continuing medical education, 19% considered discussions with colleagues, 14% considered medical meetings (national, state, county), and 4% considered programs for physicians

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16. Ibid.

17. Ibid.

18. ____, "Continuing Medical Education", Patterns of Disease, Parke, Davis and Co., June, 1962, p. 4.

on FM radio and closed-circuit television as the most beneficial means.[19]

More than 80% considered keeping informed of developments in medicine to be a difficult task. Lack of time due to the demands of daily practice was the reason given by 81% of these physicians as to why continuing education was a difficult task. The fast pace of development was mentioned by 39%, and 19% stated the means of medical communication are not effective enough.[20]

The results from the second survey showed that continuing education is not always a pleasurable duty, either for the professionals continuing their education or the educators and individuals in charge of programs. Dr. Edward C. Rosenow, Jr., President, Association of Medical and Allied Publications stated,

> I have been to a lot of conferences on post-graduate education. The doctors wring their hands. We put on good programs but we can't get the doctors to come to these. Probably 15 percent of the doctors don't do anything about their further learning. I don't think they are all ignorant about all these new things coming out. You don't have to go to meetings to learn. The best informed man in my field was a neuro surgeon. He knew more about my field than I did, and he never went to the meetings. I never saw him there. But he read all the time. He was a great reader. Detail men also teach doctors something.[21]

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19. Ibid.

20. Ibid.

21. Edited Proceedings, "Seminar in Journal Advertising," Sponsored by Association of Medical and Allied Publications, New York, N.Y., October 3, 1962, p. 47.

Nursing

A descriptive study of nurses registered in Wisconsin in 1960 was conducted by the University of Wisconsin Extension Division. One of the purposes of the study was to determine how nurses feel about continuing education. Questions were asked to determine whether nurses believed there was a need for continuing education, and their reasons for not continuing their education.[22]

Out of 1,137 respondents who completed mail questionnaires, 881 (77.5%) believed in the need for continuing education.[23] Of those who commented on why they did not continue their educations, 37.47% stated that changes in nursing were so great that it was too difficult to keep informed of the changes. About 20% stated "family responsibilities" as the reason.[24]

"Over 61% of the respondents indicated that opportunities were available to them for additional education."[25] The means referred to in this question were formal courses or seminars. It was emphasized that if courses are available to only three out of five nurses, an effort must be made to provide continuing education programs to the remaining 40%. Nearly half of the respondents stated they were familiar

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22. Signe S. Cooper, R.N., "Wisconsin Registered Nurses", University Extension Division, University of Wisconsin, Madison, 1962, p. 62.

23. Ibid.

24. Ibid., p. 63.

25. Ibid.

with the services offered by the University of Wisconsin Extension Division in Nursing.[26]

Employed Scientists and Engineers

A series of studies were conducted by the Manpower Branch, Human Resources Division, Office of Naval Research to determine activities of employed scientists and engineers for keeping currently informed in their fields of work.[27] Results of 46 cases from the Bureau of Ordnance, Washington, D.C., showed that "the idea of continuing education, or at least the idea of the need for continuing intellectual stimulation, has not been sold to these persons."[28] The preceding statement again shows that continuing education is not always pleasurable or easy, and that individuals must learn to appreciate the importance of continuing education.

Reading professional periodicals and books was considered the most beneficial means of keeping abreast by the scientists and engineers. Other means stated, in order of benefit, were attending and participating in meetings of professional associations, and attending lectures.[29]

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26. Ibid., p. 67.

27. Douglas E. Scates and Alice V. Yeomans, "Activities of Employed Scientists and Engineers for Keeping Currently Informed in their Fields of Work", American Council on Education, Research Staff on Scientific Personnel, Washington, D.C., August, 1950.

28. Ibid., p. 7.

29. Ibid., p. 5.

Pharmacy

The American Association of Colleges of Pharmacy in cooperation with the American Council of Pharmaceutical Education attempted to determine the activities of schools of pharmacy in providing continuing education programs.[30]

A questionnaire was sent to all 76 member colleges, and all responded.

> The cooperative study revealed that approximately 80% of the member colleges presented at least one formal continuing education program during the 1960-61 academic year. This figure is particularly significant when compared with the figure obtained in a survey conducted for the academic year 1950-51 at which time only 37% of the member colleges reported offering a formal continuing education program. The continuous upward trend in the number of member colleges offering such programs during the past decade is commendable and indicative of the increasing awareness of responsibility on the part of member colleges to provide adequate opportunity for the pharmacy practitioner to keep abreast of developments in his profession through participation in continuation programs.[31]

The committee on continuing education of the AACP emphasized that the programs were readily available to approximately only 10% of the practicing pharmacists in the United States. The committee also noted a lack of specific goals in the programs, and emphasized that each institution should decide clearly what the goals of its continuing programs should be.[32]

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30. Arthur G. Zupko, Chairman, Continuing Committee Reports, "Report of the Committee on Continuation Studies," Am. J. Ph. Ed., 26:3, Summer, 1962, pp. 325-326.

31. Ibid.

32. Ibid.

Chilton Research Services conducted a survey for Drug Topics in an attempt to evaluate some characteristics of community pharmacists. Two-hundred twenty pharmacists throughout the United States were interviewed and some of the questions related directly to continuing education.[33]

One of the questions was: "Here is a list of places from which you might get information of help to you in your business or profession. Which do you feel are the most important to you?"[34] Approximately three out of four pharmacists reported "drug trade publications" were one of the most important. Table I lists the percentage distributions for the answers to the question.[35]

The Chilton report concluded that, "Drug trade publications are the leading source of information for pharmacists. They provide excellent back-up for the manufacturers' and wholesalers' salesmen which rate second and third respectively."[36]

Using an unaided recall technique where no publications were shown or names mentioned, the pharmacists were asked, "Specifically thinking of publications as an information source, which ones do you read or look through, that you

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33. ____, "A New Look at Today's Retail Druggists" conducted for Drug Topics by Chilton Research Services, Philadelphia, Penna., 1962.

34. Ibid., p. 9.

35. Ibid.

36. Ibid.

Table I

PERCENTAGE DISTRIBUTION OF THE EXPRESSED BENEFIT OF VARIOUS MEANS FOR PHARMACISTS TO OBTAIN PROFESSIONAL AND BUSINESS INFORMATION

(Chilton Survey)

Means	Percent
Drug Trade Publications	76.8
Drug Manufacturers' Salesmen	68.6
Wholesale Druggists' Salesmen	57.7
Professional Journals	53.2
Manufacturers' Catalogs	40.0
Drug Trade Publishers' Catalogs	32.7
Direct Mail	29.5
Television	21.8
Other Pharmacists	20.5
Wholesalers' Catalogs	18.6
Other Manufacturers' Salesmen	18.2
Conventions and Trade Shows	15.9
Radio	13.6
Other Wholesale Salesmen	12.3
Other Business Publications	9.5
Local and Metropolitan Newspapers	9.5
General Magazines (for consumers)	7.3
Other	7.7

find useful in your business or profession?"[37]

Over three out of four pharmacists mentioned Drug Topics, and about two out of three mentioned American Druggist.[38] Table II lists the percentage distribution for the answers to the question. The conclusion was that, "Drug Topics shows a 17.2% greater recognition over the second publication as a useful source of information."[39]

A third question was, "Could you tell me which of these publications you find most helpful to you in your work?"[40] Approximately 38% of the pharmacists considered Drug Topics to be the most helpful publication.[41] Table III lists the percentage distribution for the answers to the question. The conclusion was that "Drug Topics is helpful to more retail druggists in their work than any other drug trade publication ... 28.9% more than the 2nd publication."[42]

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37. Ibid., p. 10.
38. Ibid.
39. Ibid.
40. Ibid., p. 14.
41. Ibid.
42. Ibid.

Table II

PERCENTAGE DISTRIBUTION OF PUBLICATIONS MENTIONED BY PHARMACISTS AS BEING USEFUL IN THEIR PROFESSION OR BUSINESS

(Chilton Survey)

Publication	Percent
Drug Topics	78.3
American Druggist	66.3
NARD Journal	35.3
Drug News Weekly	22.1
APhA Journal	12.4
Chain Store Age	9.7
APhA Newsletter	3.7
Other	47.9
None	2.8

Table III

PERCENTAGE DISTRIBUTION OF PUBLICATIONS MENTIONED BY PHARMACISTS AS BEING MOST HELPFUL IN THEIR PROFESSION OR BUSINESS

(Chilton Survey)

Publication	Percent
Drug Topics	37.9
American Druggist	29.4
Drug News Weekly	6.2
NARD Journal	5.2
Chain Store Age	4.3
APhA Journal	3.8
APhA Newsletter	2.8
No Choice	10.4

Chapter Two

METHODOLOGY

This research project is a descriptive study of continuing educational activities of Wisconsin pharmacists. The major areas of interest were practicing pharmacists attendance at local, district, state or national conventions or meetings, attendance at programs sponsored by Extension Services in Pharmacy, readership of professional and business publications, and discussions with other pharmacists, detail men, and drug wholesale representatives.

Study Universe

The universe for the study was all practicing pharmacists in the State of Wisconsin whose names and addresses were recorded in the office of the Wisconsin State Board of Pharmacy in November, 1962. The universe included only practicing pharmacists who were listed as Wisconsin residents. The names of pharmacists known not to be practicing pharmacy such as teachers, graduate students, and professional service representatives were not included in the universe.

Data Collection Method

A mail questionnaire was used to collect the data.[1] A sample of 100 pharmacists from the universe was used to pretest preliminary questionnaires. In December, 1962, 50

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1. See Appendix I.

pharmacists were mailed a questionnaire containing primarily open-end questions, and 50 were mailed a questionnaire containing primarily multiple choice questions. The two forms of the questionnaire were used to evaluate which form would produce a larger response, and the relative accuracy and completeness of the responses. Forty-seven percent of the multiple choice form and 34% of the open-end form were returned.

A combination form was used for the final questionnaire. Since the multiple choice form had a higher response in the pre-test, more multiple choice questions were used in the final form. The open-end form of question was used where it was difficult to list all possible alternatives. Otherwise there would be too great a possibility of understating alternatives not listed, and overstating listed alternatives. "If a researcher inadvertently omits one of the major alternatives, the number of times it is offered will be very small. In other words, the alternatives where offered, must be complete."[2]

The final questionnaire was further revised by adding an age category, a category on whether the pharmacist was an employee, owner, or partner, and a question asking how many pharmacists regularly service the pharmacy in which the respondent practiced. Minor word changes were made in other

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2. ____, Committee Reports, "Questionnaire Preparation and Interviewer Techniques", reprinted from the Journal of Marketing, October, 1949, p. 401.

questions where a lack of clarity was indicated by the pre-test responses.

The revised questionnaire was mailed to the remaining 1,914 pharmacists in the universe in March, 1963. A cover-letter was included in the first page of the questionnaire.[3] A self-addressed, stamped return envelope was enclosed with each questionnaire. The questionnaires were numbered so a follow-up questionnaire could be mailed to a portion of the non-response group. Two weeks after the initial mailing follow-up questionnaires coded for identity were sent to 150 non-respondents, selected at random.

Definition of Terms

A pharmacist in this report is defined as a Wisconsin resident licensed as a registered pharmacist by the Wisconsin State Board of Pharmacy and who is practicing pharmacy in a community or hospital pharmacy in the state of Wisconsin.

An independent pharmacy is a pharmacy that is owned by a single proprietor, partners, or corporation, having less than 11 such units.

A chain pharmacy is a pharmacy which is one of 11 or more such units under common ownership.

A hospital pharmacy is a pharmacy located in a hospital or similar type of institution.

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3. See Appendix I.

Method of Data Analysis

The data were edited, then hand tabulated. Frequency distributions were listed for all questions. The types and extent of pharmacists' continuing educational activities were cross-classified by the type of pharmacy in which respondents practiced; percent of the pharmacies total sales derived from prescriptions; pharmacists' years of practice, years of formal education in pharmacy, and age; whether pharmacists were employees, owners or partners; and the number of pharmacists servicing the pharmacies in which the respondents practiced. Statistical significance tests were made to determine which variables had the greatest influence upon continuing educational activities.

Research Limitations

1. Respondent bias --- Pharmacists' replies may have overstated or understated certain types of activities. In a large sample these errors will tend to cancel each other.
2. Incompleteness of some returned questionnaires --- All questions were not answered by some respondents, and the decreased sample size for these questions decreases their significance.
3. Editing, tabulating and recording errors --- With a large sample size, there is a possibility of some editing or mechanical errors.
4. Difficult in measuring non-response group --- Time and financial limitations did not permit interviewing a sample of pharmacists. Therefore a mail questionnaire was used,

resulting in non-respondents, as expected. To help evaluate comparability of response and nonresponse group, each returned questionnaire was dated according to the post-marked date on the envelope and the average score of key questions was computed for each day. These daily means were used to make a cumulative frequency curve for each of the key questions. These curves permitted estimates of the continuing educational activities of the non-response group.

The responses to key questions from the second mailing were compared with responses from the initial mailing. The average score of these questions from the second mailing were included in the frequency curve to determine similarity or dissimilarity between the two groups.

Chapter Three

RESEARCH FINDINGS

Data from the questionnaires were tabulated, analyzed, and compared with relevant secondary data. Hypotheses were made and tested by the use of appropriate significance tests. An attempt was made to determine what variables had the greatest effect on the continuing educational activities of the respondents.

Questionnaire Response

Of the original 1,914 questionnaires, 48 were returned because of unknown addresses. Of the 1,866 remaining questionnaires, 504 were returned. Sixteen questionnaires were returned from the second mailing for a total of 520, or 25.8% of the 2,016 questionnaires received by the pharmacists. Of the 520 returned questionnaires, 76 were unusable, leaving 444 usable responses.

Classification Data of Respondent Pharmacists

Page four of the questionnaire was tabulated initially. Table IV lists the frequencies and percentages for each group of research variables.

Over 80% of the pharmacists practiced in an independent pharmacy; almost half the pharmacists practiced in a pharmacy that derived 20-35% of total sales from prescriptions; over half of the pharmacists had been practicing less than 15 years, and over 30% had been practicing more than 25 years;

Table IV

CLASSIFICATION DATA OF RESPONDENT PHARMACISTS

Variable		Frequency	%N
A.	Type of Pharmacy	440	100.0
	1. Independent Pharmacy	367	83.4
	2. Chain Pharmacy	35	8.0
	3. Hospital Pharmacy	38	8.6
B.	% Prescription/Total Sales	383	100.0
	1. Less than 20%	63	16.5
	2. 20-35%	190	49.6
	3. 36-50%	79	20.6
	4. More than 50%	51	13.3
C.	Years of Practice	440	100.0
	1. Less than 5	69	15.7
	2. 5 but less than 10	76	17.3
	3. 10 but less than 15	101	22.9
	4. 15 but less than 20	30	6.8
	5. 20 but less than 25	28	6.4
	6. 25 or more	136	30.9
D.	Years of Formal Education in Pharmacy	436	100.0
	1. Apprenticed or less than two years	61	14.0
	2. Two-year graduate	32	7.3
	3. Three-year graduate	22	5.1
	4. Four-year graduate	321	73.6
E.	Age	443	100.0
	1. Under 30 years	87	19.7
	2. 30-39	134	30.2
	3. 40-49	76	17.2
	4. 50-59	95	21.4
	5. 60-64	27	6.1
	6. 65-69	11	2.5
	7. 70 years and over	13	2.9
F.	Position in Independent Pharmacy	379	100.0
	1. Employed Pharmacist	150	39.6
	2. Owner	181	47.8
	3. Partner	48	12.6
G.	Number of Full-time Pharmacists Servicing Pharmacy	431	100.0
	1. One full-time pharmacist	167	38.7
	2. Two full-time pharmacists	164	38.1
	3. More than two full-time pharmacists	100	23.2
H.	Total Number of Pharmacists Servicing Pharmacy	431	100.0
	1. One pharmacist	74	17.2
	2. Two pharmacists	184	42.7
	3. More than two pharmacists	173	40.1

almost three out of four pharmacists were four-year graduates from pharmacy school; approximately nine out of ten pharmacists were less than 60 years old; over 60% of the pharmacists practicing in an independent pharmacy were proprietors and about 40% were employed pharmacists; and over 60% of the pharmacists practiced in a pharmacy serviced by at least two full-time pharmacists.

Representativeness of Response

The classification data of the sample were compared with the classification data, as reported by the Wisconsin State Board of Pharmacy.[1] Table V lists the percentage comparisons for the variables that were analogous.

The sample was fairly representative of all pharmacists registered to practice in Wisconsin. There are about 300 more pharmacists listed by the State Board than were mailed questionnaires for this project. There was a smaller percentage of pharmacists beyond age 60 and a smaller per cent of employed pharmacists in the sample group. These two groups may be part of the 300 extra pharmacists who did not reside in Wisconsin at the time of the study. There is more reason to believe the older pharmacists and employed pharmacists would relocate more readily than owners and pharmacists still in the prime years of their practice.

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1. Proceedings of the National Association of Boards of Pharmacy, 58th Annual Convention, Las Vegas, Nevada, March 26-27, 1962, pp. 67-72.

Table V

REPRESENTATIVENESS OF SAMPLE

Variable	Registration Frequency	Universe %	Sample %
A. Type of Pharmacy	2,329	100.00	100.00
1. Community Pharmacy	2,059	92.71	91.37
2. Hospital Pharmacy	162	7.29	8.63
B. Age	2,329	100.00	100.00
1. Less than 30	254	10.90	19.70
2. 30-39	535	23.00	30.20
3. 40-49	346	14.90	17.20
4. 50-59	639	27.40	21.40
5. 60-64	204	8.80	6.10
6. 65-69	192	8.20	2.50
7. More than 70	159	6.80	2.90
C. Position in Community Pharmacy	2,059	100.00	100.00
1. Employed Pharmacist	1,136	55.20	44.70
2. Owner	768	37.30	43.70
3. Partner	155	7.50	11.60
D. Number of Full-Time Pharmacists Servicing Pharmacy	1,104	100.00	100.00
1. One Pharmacist	443	44.10	38.70
2. Two Pharmacists	539	48.80	38.10
3. More than 2 Pharmacists	122	11.10	23.20

Hypotheses

Before data from the final questionnaires were analyzed, a set of hypotheses was formulated. The hypotheses were based upon previous studies and results from the pre-test. Null hypotheses were used to determine if there were any differences attributable to the research variables. The null hypothesis states that there is no significant difference between any two means or percentages, and that any difference is attributed to random chance. The null hypotheses were tested by the use of statistical significance techniques.

The hypotheses that were tested are:

1. (a) At least four out of five pharmacists believe it is very important for pharmacists to continue their educations in pharmacy.
   (b) There is no significant difference between the percentage of pharmacists in the various groups of each research variable that believe it is very important to continue their education in pharmacy.

2. (a) The pharmacists would acknowledge attending an average of at least two different types of local, district, state, or national pharmacy meetings or conventions within the last two years.
   (b) There is no significant difference between the percentage of pharmacists in the various groups of each research variable that acknowledge attending at least two different types of local, district, state,

or national pharmacy meetings or conventions.

3. (a) The pharmacists would acknowledge attending an average of at least one type of program sponsored by Extension Services in pharmacy within the last two years.
(b) There is no significant difference between the percentage of pharmacists in the various groups of each research variable that acknowledge attending at least one type of program sponsored by Extension Services in pharmacy.

4. (a) At least half the pharmacists would acknowledge reading at least five different professional and business journals, magazines, bulletins, and other periodicals within the past month.
(b) There is no significant difference between the percentage of pharmacists in the various groups of each research variable that acknowledged reading at least five different professional and business journals, magazines, bulletins, and other periodicals.

5. There will be no significant difference between the pharmacists' acknowledged benefit of local, district, state, or national meetings and conventions; Extension Services in Pharmacy; professional and business publications; and discussions with other pharmacists, detail men, and drug wholesale representatives.

Expressed Need For Continuing Education

The first question in the questionnaire was, "Please check how important you believe it is for practicing pharmacists to continue their education." Over two out of three pharmacists checked that it was very important for pharmacists to continue their education. Only one pharmacist checked not important. Table VI lists the frequency of each category checked.

Table VI

FREQUENCY DISTRIBUTION OF EXPRESSED NEED FOR CONTINUING EDUCATION

(N = 435)

Measure of Importance	Frequency	% N
5 (Very Important)	298	68.5
4	68	15.6
3	56	12.9
2	12	2.8
1 (Not Important)	1	0.2
Total	435	100.0

On the five-point scale, the mean score for the question was 4.49 with a standard deviation of 0.838.[2]

The hypothesized percentage of pharmacists who believe it is very important for pharmacists to continue their education was 80%. The actual percentage was 68.5%. The

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2. See Appendix II for computation of Mean and Standard Deviation.

11.5% difference is significant at the 95% confidence level; therefore, the hypothesis that four out of five pharmacists believe it is very important to continue their education is rejected.[3]

Expressed Need Cross-Classified with Research Variables

The expressed need was selected as one of the questions to cross-classify with the research variables to determine if there are any differences between groups. Table VII is a frequency distribution of the responses to the question cross-classified with the research variables. The percentage of pharmacists who checked very important in any particular group is also listed in Table VII.

Significance Tests for Expressed Need

The null hypothesis was tested by use of significance tests to determine if there were any groups that were significantly different from others in their expressed need for continuing education.[4]

The significance tests (Table VIII) show that a greater percentage of hospital pharmacists believe it is very important to continue their education than do pharmacists practicing in independent or chain pharmacies. The differences may be attributed to many factors. Hospital pharmacists' closer working relationships with staff physicians and nurses

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3. See Appendix III for computation of statistical significance tests.

4. See Appendix III.

Table VII

EXPRESSED NEED FOR CONTINUING EDUCATION CROSS-CLASSIFIED WITH RESEARCH VARIABLES

Variable	N	Importance of Continuing Education: 5 - Very Important	4	3	2	1 - Not Important	5's as % of N
A. Type Pharmacy	435	298	68	56	12	1	68.5
1. Independent	366	244	58	51	12	1	66.7
2. Chain	31	19	8	4	0	0	61.3
3. Hospital	38	35	2	1	0	0	92.1
B. % R_x's/Total Sales	368	238	68	61	11	0	64.7
1. 20%	61	37	13	8	3	0	60.7
2. 20-35%	179	113	36	27	3	0	63.1
3. 36-50%	78	51	12	11	4	0	65.4
4. 50%	50	37	7	5	1	0	74.0
C. Years of Practice	428	292	67	56	12	1	68.2
1. 5	69	51	15	2	1	0	73.9
2. 5 - 10	76	57	10	8	1	0	75.0
3. 10 - 15	101	62	17	21	1	0	61.4 X
4. 15 - 20	27	15	5	4	3	0	55.6
5. 20 - 25	27	20	4	2	1	0	74.1
6. 25	128	87	16	19	5	1	68.0
D. Years of Formal Education in Pharmacy	427	294	65	55	12	1	68.9
1. Apprenticed or less than 2 years	58	36	7	11	3	1	62.1
2. 2-year graduate	30	25	2	3	0	0	83.3
3. 3-year graduate	20	11	2	4	3	0	55.0
4. 4-year graduate	319	222	54	37	6	0	69.5

Table VII (Cont.)

Variable	N	Importance of Continuing Education: 5 - Very Important	4	3	2	1 - Not Important	5's as % of N
E. Age	429	296	66	54	12	1	69.0
1. 30	83	64	14	5	0	0	77.1
2. 30-39	134	92	20	20	2	0	68.7
3. 40-49	73	44	15	10	4	0	60.3
4. 50-59	90	57	13	16	4	0	63.3
5. 60-64	26	21	2	1	1	1	80.8
6. 65-69	11	9	2	0	0	0	81.8
7. 70 or over	12	9	0	2	1	0	75.0
F. Position in Independent Pharmacy	368	247	57	51	12	1	67.1
1. Employed Pharmacist	147	94	29	21	3	0	63.9
2. Owner	173	119	21	24	8	1	68.8
3. Partner	48	34	7	6	1	0	70.8
G. Number of Full-Time Pharmacists	409	284	59	54	11	1	69.4
1. One Full	154	98	21	26	8	1	63.6
2. Two Full	164	110	30	22	2	0	67.1
3. More than Two	91	76	8	6	1	0	83.5
H. Total Number of Pharmacists Servicing Pharmacy	409	282	61	54	11	1	68.9
1. One	65	41	9	13	2	0	63.1
2. Two	169	108	31	22	7	1	63.9
3. More than Two	175	133	21	19	2	0	76.0

Table VIII

SIGNIFICANCE TESTS FOR EXPRESSED NEED CROSS-CLASSIFIED WITH THE TYPE OF PHARMACY IN WHICH THE PHARMACIST PRACTICES

Test Between	Critical Value	Accept or Reject Null Hypothesis
Independent and Chain	0.59	Accept
Independent and Hospital	5.08	Reject
Chain and Hospital	3.21	Reject

result in greater demands for pharmaceutical knowledge; many hospital pharmacists do some manufacturing for which more technical knowledge is needed; hospital pharmacists require knowledge for participation in the hospitals' therapeutic committees; many hospital pharmacists use the Formulary System, and therefore knowledge is required for product comparisons; knowledge is needed by pharmacists when the hospitals' medical staffs engage in clinical evaluations of drugs; and sometimes in hospitals that have a nursing school, pharmacists teach pharmacology to student nurses.

The tests imply that percent of total sales derived from prescriptions was not an important variable for the differences in expressed need for continuing education. The null hypothesis is accepted. However there appears to be a positive relationship between the extent of a pharmacist's prescription practice and his evaluation of continuing education since the greatest critical value (1.62) existed

Table IX

SIGNIFICANCE TESTS FOR EXPRESSED NEED CROSS-CLASSIFIED WITH PERCENT OF TOTAL SALES DERIVED FROM PRESCRIPTIONS

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 20% and 20-35%	0.37	Accept
Less than 20% and 36-50%	0.62	Accept
Less than 20% and more than 50%	1.62	Accept
20-35% and 36-50%	0.35	Accept
20-35% and more than 50%	1.54	Accept
36-50% and more than 50%	1.05	Accept

between pharmacists with the lowest and highest prescription practices.

The data imply that years of practice was not a contributing variable to explain the differences of expressed need for continuing education. The null hypothesis is accepted.

Table X

SIGNIFICANCE TESTS FOR EXPRESSED NEED CROSS-CLASSIFIED WITH YEARS OF PRACTICE

	Critical Value	Accept or Reject Null Hypothesis
Less than 5 and 5 but less than 10	0.15	Accept
Less than 5 and 10 but less than 15	1.74	Accept
Less than 5 and 15 but less than 20	1.66	Accept
Less than 5 and 20 but less than 25	0.02	Accept
Less than 5 and 25 or more	0.88	Accept
5 but less than 10 and 10 but less than 15	1.92	Accept
5 but less than 10 and 15 but less than 20	1.85	Accept
5 but less than 10 and 20 but less than 25	0.09	Accept
5 but less than 10 and 25 or more	1.08	Accept
10 but less than 15 and 15 but less than 20	0.54	Accept
10 but less than 15 and 20 but less than 25	1.31	Accept
10 but less than 15 and 25 or more	0.87	Accept
15 but less than 20 and 20 but less than 25	1.46	Accept
15 but less than 20 and 25 or more	1.24	Accept
20 but less than 25 and 25 or more	0.65	Accept

Table XI

SIGNIFICANCE TESTS FOR EXPRESSED NEED CROSS-CLASSIFIED WITH FORMAL EDUCATION IN PHARMACY

	Critical Value	Accept or Reject Null Hypothesis
Apprenticed and two-year graduate	2.28	Reject
Apprenticed and three-year graduate	0.55	Accept
Apprenticed and four-year graduate	1.07	Accept
Two-year graduates and three-year graduates	2.18	Reject
Two-year graduates and four-year graduates	1.89	Accept
Three-year graduates and four-year graduates	1.27	Accept

The only significant differences were that two-year graduates expressed a greater need for continuing education than did both pharmacists who were apprenticed and three-year graduates. Since there was no consistent relationship between formal education in pharmacy and respondents' ratings, there is no major implication that this variable had much effect on the differences for expressed need for continuing education.

Table XII

SIGNIFICANCE TESTS FOR EXPRESSED NEED CROSS-CLASSIFIED WITH AGE

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 30 and 30-39	1.40	Accept
Less than 30 and 40-49	2.27	Reject
Less than 30 and 50-59	1.99	Reject
Less than 30 and 60-64	0.41	Accept
Less than 30 and 65-69	0.38	Accept
Less than 30 and 70+	0.16	Accept
30-39 and 40-49	1.20	Accept
30-39 and 50-59	0.89	Accept
30-39 and 60-64	1.39	Accept
30-39 and 65-59	1.07	Accept
30-39 and 70+	0.48	Accept
40-49 and 50-59	0.39	Accept
40-49 and 60-64	2.14	Reject
40-49 and 65-69	1.50	Accept
40-49 and 70+	1.09	Accept
50-59 and 60-64	1.88	Accept
50-59 and 65-69	1.46	Accept
50-59 and 70+	0.87	Accept
60-64 and 65-59	0.07	Accept
60-64 and 70+	0.40	Accept
65-59 and 70+	0.40	Accept

The data do not imply that the age of the pharmacists greatly influenced their expressed need for continuing education. The groups from 40 to 60 checked very important slightly less than the other groups.

Table XIII

SIGNIFICANCE TESTS FOR EXPRESSED NEED CROSS-CLASSIFIED WITH POSITION IN INDEPENDENT PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
Employed Pharmacists and Owners	0.98	Accept
Employed Pharmacists and Partners	0.92	Accept
Owners and Partners	0.27	Accept

The data imply that respondents' positions as employed pharmacists, owners, or partners did not influence their expressed need for continuing education.

Table XIV

SIGNIFICANCE TESTS FOR EXPRESSED NEED CROSS-CLASSIFIED WITH THE NUMBER OF FULL-TIME PHARMACISTS SERVICING THE PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
One and two pharmacists	0.66	Accept
One and more than two pharmacists	3.43	Reject
Two and more than two pharmacists	2.92	Reject

More pharmacists practicing in pharmacies serviced by more than two pharmacists believed there is a greater need to continue their education. These pharmacists most likely are dispensing more prescriptions than the other groups, and therefore experience a greater need to maintain and expand their pharmaceutical knowledge. Also, they may do more consulting for physicians. Another factor is that many hospital pharmacists, who expressed a great need, practice where more than two pharmacists service the pharmacy.

Table XV

SIGNIFICANCE TESTS FOR EXPRESSED NEED CROSS-CLASSIFIED WITH THE TOTAL NUMBER OF PHARMACISTS SERVICING THE PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
One and two pharmacists	1.14	Accept
One and more than two pharmacists	1.98	Reject
Two and more than two pharmacists	2.47	Reject

These results probably occurred for the same reasons as were stated above.

Local District, State, and National Pharmacy Meeting and Conventions

Over 85% of the pharmacists acknowledged attending at least one local, district, state, or national pharmacy meeting or convention. Table XVI lists the frequency and

percentage of each type of meeting attended at least once by respondents during the past two years.

Table XVI

FREQUENCY DISTRIBUTION OF ATTENDANCE AT LOCAL, DISTRICT, STATE OR NATIONAL PHARMACY MEETINGS OR CONVENTIONS

(N = 444)

Type of Meeting	Frequency	% N
Local or County Association Meeting	328	73.9
W.Ph.A. District Meeting	253	57.0
W.Ph.A. Convention	134	30.2
Wisconsin Branch A.Ph.A. Meeting	87	19.6
National Convention	41	9.2
W.S.H.P. Meeting	31	7.0
Preceptor Conference	14	3.2
Others	31	7.0
None	59	13.3

Number of Different Types of Local, District, State or National Pharmacy Meetings or Conventions Cross-Classified with Research Variables

Table XVII lists the frequency of acknowledged attendance at different types of local, district, state or national meetings or conventions cross-classified with the research variables. The pharmacists reported attending an average (mean) of 2.02 different types of meetings.[5] Therefore, the hypothesis that the pharmacists would acknowledge attending an average

5. The mean was derived by the same method as illustrated in Appendix II.

Table XVII

FREQUENCY DISTRIBUTION OF ATTENDANCE AT DIFFERENT TYPES OF LOCAL, DISTRICT, STATE OR NATIONAL MEETINGS OR CONVENTIONS CROSS-CLASSIFIED WITH RESEARCH VARIABLES

Research Variable	N	Number of Meetings Attended 0	1	2	3	4	5	6	% that Attended 2 or More
A. Type of Pharmacy	440	59	105	124	95	37	15	5	62.7
1. Independent	367	44	93	105	79	31	12	3	62.7
2. Chain	35	10	5	11	7	1	0	1	57.1
3. Hospital	38	5	7	8	9	5	3	1	68.4
B. % R_x/Total Sales	380	47	88	113	82	33	13	4	64.5
1. <20%	62	15	14	19	10	1	1	2	53.2
2. 20-35%	187	19	50	53	35	20	8	2	63.1
3. 36-50%	80	4	16	27	21	10	2	0	75.0
4. >50%	51	9	8	14	16	2	2	0	66.7
C. Years of Practice	440	59	105	124	95	37	15	5	62.7
1. 5	69	7	17	25	12	5	3	-	65.2
2. 5 - 10	76	5	20	26	18	6	1	-	67.1
3. 10 - 15	101	8	26	29	23	9	4	2	66.3
4. 15 - 20	30	5	9	10	3	2	1	-	53.3
5. 20 - 25	28	3	4	7	11	1	-	2	75.0
6. >25	136	31	29	27	28	14	6	1	55.9
D. Years of Formal Education in Pharmacy	436	57	105	122	95	37	15	5	62.9
1. Apprenticed or less than 2	61	17	11	10	12	6	3	2	54.1
2. 2-year graduate	32	5	9	6	9	2	-	1	56.3
3. 3-year graduate	22	4	3	7	4	3	1	-	68.2
4. 4-year graduate	321	31	82	99	70	26	11	2	65.0

Table XVII (Cont.)

Research Variable	N	Number of Meetings Attended 0	1	2	3	4	5	6	% that Attended 2 or More
E. Age	443	60	105	124	97	37	15	5	62.7
1. <30	87	10	27	29	13	6	2	-	57.5
2. 30-39	134	13	32	37	33	10	7	2	66.4
3. 40-49	76	5	14	28	22	5	1	1	75.0
4. 50-59	95	19	18	18	23	12	4	1	61.1
5. 60-64	27	9	5	7	2	3	1	-	48.1
6. 65-69	11	-	4	4	2	-	-	1	63.6
7. >70	13	4	5	1	2	1	-	-	30.8
F. Position in Independent Pharmacy	379	49	94	109	79	33	12	3	49.6
1. Employed pharmacist	150	24	40	55	22	6	3	0	40.7
2. Owner	181	22	44	41	41	24	7	2	56.9
3. Partner	48	3	10	13	16	3	2	1	50.0
G. Number Full-Time Pharmacists Servicing Pharmacy	431	56	102	122	94	37	15	5	63.3
1. 1 full	167	27	45	46	33	12	3	1	56.9
2. 2 full	164	23	38	44	37	14	7	1	63.4
3. >2 full	100	6	19	32	24	11	5	3	75.0
H. Total Number Pharmacists Servicing Pharmacy	431	56	102	122	94	37	15	5	63.3
1. 1 total	74	16	21	21	12	3	1	-	50.0
2. 2 total	184	25	46	50	41	16	5	1	61.2
3. >2 total	173	15	35	51	41	18	9	4	71.1

at least two different types of local, district, state or national pharmacy meetings or conventions within the last two years was accepted.

Significance Tests for Attendance at Local, District, State or National Meetings or Conventions

Table XVII also shows the percentage of any group in the research variables that reported attending at least two different types of local, district, state or national meetings or conventions within the last two years. The null hypothesis between these percentages was tested by use of a statistical technique.[6]

Table XVIII

SIGNIFICANCE TESTS OF ATTENDANCE AT DIFFERENT TYPES OF LOCAL, DISTRICT, STATE OR NATIONAL MEETINGS OR CONVENTIONS CROSS-CLASSIFIED WITH TYPE OF PHARMACY IN WHICH THE PHARMACIST PRACTICED

Test Between	Critical Value	Accept or Reject Null Hypothesis
Independent and chain	0.64	Accept
Independent and hospital	0.75	Accept
Chain and hospital	0.97	Accept

The tests imply that the type of pharmacy in which respondents practiced did not influence the number of different types of meetings and conventions that the respondents attended.

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6. See Appendix III.

Table XIX

SIGNIFICANCE TESTS OF ATTENDANCE AT DIFFERENT TYPES OF LOCAL, DISTRICT, STATE OR NATIONAL MEETINGS OR CONVENTIONS CROSS-CLASSIFIED WITH PERCENT OF TOTAL SALES DERIVED FROM PRESCRIPTIONS

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 20% and 20-35%	1.29	Accept
Less than 20% and 36-50%	2.83	Reject
Less than 20% and more than 50%	1.50	Accept
20-35% and 36-50%	1.89	Accept
20-35% and more than 50%	0.47	Accept
36-50% and more than 50%	1.08	Accept

The tests show that pharmacists who had less than 20% of total sales derived from prescriptions did not attend as many different types of meetings as the 36-50% group. However, the tests imply that the percentage of total sales derived from prescriptions did not influence greatly the different types of meetings attended by the respondents.

Table XX

SIGNIFICANCE TESTS OF ATTENDANCE AT DIFFERENT TYPES OF LOCAL, DISTRICT, STATE OR NATIONAL PHARMACY MEETINGS OR CONVENTIONS CROSS-CLASSIFIED WITH YEARS OF PRACTICE OF THE PHARMACISTS

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 5 year and 5 but less than 10	0.25	Accept
Less than 5 years and 10 but less than 15	0.16	Accept
Less than 5 years and 15 but less than 20	1.19	Accept
Less than 5 years and 20 but less than 25	0.98	Accept
Less than 5 years and 25 or more	1.01	Accept
5 but less than 10 and 10 but less than 15	0.11	Accept
5 but less than 10 and 15 but less than 20	1.38	Accept
5 but less than 10 and 20 but less than 25	0.79	Accept
5 but less than 10 and 25 or more	1.28	Accept
10 but less than 15 and 15 but less than 20	1.30	Accept
10 but less than 15 and 20 but less than 25	1.94	Accept
10 but less than 15 and 25 or more	1.32	Accept
15 but less than 20 and 20 but less than 25	2.06	Reject
15 but less than 20 and 25 or more	0.48	Accept
20 but less than 25 and 25 or more	1.78	Accept

The tests show that pharmacists who practiced at least 15 but less than 20 years did not attend as many different types of meetings as the 20 but less than 25 group. However, the tests do not imply that years of practice alone generally influenced respondents to attend. different types of pharmacy meetings.

Table XXI

SIGNIFICANCE TESTS OF ATTENDANCE AT DIFFERENT TYPES OF LOCAL, DISTRICT, STATE OR NATIONAL PHARMACY MEETINGS OR CONVENTIONS CROSS-CLASSIFIED WITH FORMAL EDUCATION IN PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
Apprenticed and 2-year graduates	0.20	Accept
Apprenticed and 3-year graduates	1.17	Accept
Apprenticed and 4-year graduates	1.55	Accept
2-year graduates and 3-year graduates	0.92	Accept
2-year graduates and 4-year graduates	0.92	Accept
3-year graduates and 4-year graduates	0.32	Accept

The data show that the years of formal education in pharmacy did not influence pharmacists to attend different type pharmacy meetings or conventions.

Table XXII

SIGNIFICANCE TESTS OF ATTENDANCE AT DIFFERENT TYPES OF LOCAL, DISTRICT, STATE OR NATIONAL PHARMACY MEETINGS OR CONVENTIONS CROSS-CLASSIFIED WITH AGE

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 30 and 30-39	1.35	Accept
Less than 30 and 40-49	2.43	Reject
Less than 30 and 50-59	0.50	Accept
Less than 30 and 60-64	0.85	Accept
Less than 30 and 65-69	0.40	Accept
Less than 30 and 70 and over	1.78	Accept
30-39 and 40-49	1.34	Accept
30-39 and 50-59	0.47	Accept
30-39 and 60-64	1.83	Accept
30-39 and 65-69	0.20	Accept
30-39 and 70 and over	2.54	Reject
40-49 and 50-59	1.99	Reject
40-49 and 60-64	2.45	Reject
40-49 and 65-69	0.71	Accept
40-49 and 70 and over	2.76	Reject
50-59 and 60-64	1.18	Accept
50-59 and 65-69	0.16	Accept
50-59 and 70 and over	2.02	Reject
60-64 and 65-69	0.91	Accept
60-64 and 70 and over	1.00	Accept
65-69 and 70 and over	1.64	Accept

For the most part the above analysis does not show any significant differences although pharmacists in the 40-49 age group did attend more types of meetings than pharmacists in the other age groups. Many of the owners and association leaders are in this group, which accounts for much of the difference. The 70 and over age group attended fewer types of meetings which would be expected since older people are not as active and many are probably semi-retired.

Table XXIII

SIGNIFICANCE TESTS OF ATTENDANCE AT DIFFERENT TYPES OF LOCAL, DISTRICT, STATE OR NATIONAL PHARMACY MEETINGS OR CONVENTIONS CROSS-CLASSIFIED WITH POSITION IN INDEPENDENT PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
Employed Pharmacists and Owners	2.57	Reject
Employed Pharmacists and Partners	1.12	Accept
Owners and Partners	0.79	Accept

There is a significant difference between employed pharmacists and owners. This may be explained partially because many of the meetings are designed to meet the interests, needs, and problems of owners rather than employed pharmacists. However the greater flexibility in many owners' working schedules and their greater economic capacity are other contributing factors.

Table XXIV

SIGNIFICANCE TESTS OF ATTENDANCE AT LOCAL, DISTRICT, STATE OR NATIONAL MEETINGS OR CONVENTIONS CROSS-CLASSIFIED WITH THE NUMBER OF FULL-TIME PHARMACISTS SERVICING THE PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
One and two pharmacists	1.20	Accept
1 and more than 2 pharmacists	3.15	Reject
2 and more than 2 pharmacists	2.04	Reject

Table XXV

SIGNIFICANCE TESTS OF ATTENDANCE AT LOCAL, DISTRICT, STATE OR NATIONAL MEETINGS OR CONVENTIONS CROSS-CLASSIFIED WITH THE TOTAL NUMBER OF PHARMACISTS SERVICING THE PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
1 and 2 pharmacists	1.62	Accept
1 and more than 2 pharmacists	3.10	Reject
2 and more than 2 pharmacists	1.99	Reject

The tests reported in Tables XXIV and XXV show that pharmacists practicing in a pharmacy where more than two pharmacists service the pharmacy attend more types of meetings than pharmacists practicing alone or with only one other pharmacist. The pharmacists in the former pharmacies probably have more free time from their practice than ones in pharmacies serviced by two or less pharmacists. The variable that appeared to influence most greatly the amount of attendance at local, district, state or national

conventions was the number of pharmacists servicing the pharmacy.

Expressed Benefit of Local, District, State or National Pharmacy Meetings or Conventions

Only about one out of five pharmacists reported that local, district, state or national pharmacy meetings or conventions were very beneficial. Table XXVI lists the frequency distribution of the categories checked.

Table XXVI

EXPRESSED BENEFIT OF LOCAL, DISTRICT, STATE OR NATIONAL PHARMACY MEETINGS OR CONVENTIONS

(N = 381)

Measure of Benefit	Frequency	% N
5 (very beneficial)	77	20.2
4	68	17.8
3	140	36.8
2	68	17.8
1 (not beneficial)	28	7.4
Total	381	100.0

On the five point rating scale, the mean score was 3.26 with a standard deviation of 1.18.[7]

Most Beneficial Meetings

Table XXVII lists the number of times each type of meeting was considered the most beneficial. The percent of pharmacists attending a type of meeting who rated it most beneficial is also listed.

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7. Mean and Standard Deviation were derived in the procedures illustrated in Appendix II.

Table XXVII

FREQUENCY DISTRIBUTION OF THE MOST BENEFICIAL MEETINGS

Type of Meeting	Frequency	N	F as % N*
Local or County Association Meeting	91	328	27.7
W.Ph.A. District Meeting	57	253	22.5
Wisconsin Branch A.Ph.A. Meeting	34	87	39.1
W.Ph.A. Convention	20	134	14.9
National Convention	18	41	44.6
W.S.H.P. Meeting	12	31	38.7
Preceptor Conference	3	14	21.4
Other	1	59	1.7

* N is the number of pharmacists who attended the meeting as listed in Table XVI (page 41).

F ---- is the number who considered it most beneficial.

Reasons Why the Meetings Were the Most Beneficial

There were many reported reasons why the various meetings were rated the most beneficial. The most frequently stated reasons were the type of discussions offered and the quality of speakers. Tables XXVIII - XXXII list the various reasons why each type of meeting was considered the most beneficial.

Table XXVIII

WHY LOCAL OR COUNTY ASSOCIATION MEETINGS WERE MOST BENEFICIAL

(N = 77)

Reason	Frequency	% N
Discussion of Local Problems	22	28.6
Discussion of More Current Problems	17	22.1
Variety and Quality of Speakers	13	16.9
Broad Scope of Subjects Discussed	12	15.6
More Personal Contact with Other Pharmacists	8	10.4
Meet More Often	3	3.9
Only Type Attended	2	2.5
	77	100.0

Table XXIX

WHY W.Ph.A DISTRICT MEETINGS WERE MOST BENEFICIAL

(N = 47)

Reason	Frequency	% N
Broad Scope of Subjects Discussed	14	29.8
Discuss Problems at State Level	11	23.4
Discussion of Pertinent Problems in Pharmacy	5	10.6
Discussion of Local Problems	4	8.5
Well Organized Meetings	4	8.5
Best Group Participation	3	6.4
Quality of Speakers	3	6.4
Discuss with More Pharmacists	3	6.4
	47	100.0

Table XXX

WHY WISCONSIN BRANCH A.Ph.A. MEETINGS WERE MOST BENEFICIAL

(N = 27)

Reason	Frequency	% N
Broad Scope of Programs Offered	15	55.6
Professionally Educational	7	25.9
Quality of Speakers	4	14.8
Scientifically Oriented	1	3.7
	27	100.0

Table XXXI

WHY NATIONAL CONVENTIONS WERE MOST BENEFICIAL

(N = 19)

Reason	Frequency	% N
Broad Scope of Programs Offered	7	36.6
Quality of Speakers	4	21.1
Promotional Displays	3	15.8
Discuss with Many Pharmacists	2	10.6
Professionally Oriented	2	10.6
Presented Papers on General Practice	1	5.3
	19	100.0

Table XXXII

WHY W.S.H.P. MEETINGS WERE MOST BENEFICIAL

(N = 11)

Reason	Frequency	% N
More Appropriate Programs	4	36.4
Professional and Academic Programs	3	27.2
Broad Scope of Programs Offered	2	18.2
Quality of Speakers	2	18.2
	11	100.0

Table XXXIII

WHY PRECEPTOR CONFERENCES WERE MOST BENEFICIAL

(N = 2)

Reason	Frequency	% N
Discuss Legal Problems	1	50.0
Practical Business Conference	1	50.0
	2	100.0

New or Additional Types of Programs Desired

The pharmacists reported a variety of new or additional types of programs they would like to have offered at pharmacy meetings and conventions. Some respondents listed more than one answer and there was a fairly balanced desire for scientific, professional, and business programs. Table XXXIV lists the new or additional types of programs desired at pharmacy meetings or conventions.

Table XXXIV

NEW OR ADDITIONAL TYPES OF PROGRAMS DESIRED AT PHARMACY MEETINGS OR CONVENTIONS

(N = 139)

Type of Program	Frequency	% N
Discussion of New and Old Drug Products	33	23.8
Professional Relations Programs (Unification of R.Ph.'s, Relations with M.D.'s and Public)	31	22.3
Business Programs (Management, Merchandising, Advertising, Accounting)	25	18.0
More Professional Speakers	12	8.6

Table XXXIV (Cont.)

Type of Program	Frequency	% N
Panel Discussions with More Group Participation	8	5.8
Discussion of New Pharmacy Legislation	7	5.0
Refresher Courses on Pharmacy, Pharmacology, Math, Management	6	4.3
More Organization of Local Level	6	4.3
Discussions of Practical Pharmacy	6	4.3
More Scientific Programs	5	3.6
	139	100.0

Six Pharmacists stated that the present programs were satisfactory. Some typical responses to the questions were:

> Discussions regarding the newer classes of drugs, the pharmacology, dosage, and administration. The end result is a pharmacist better prepared to discuss medicines with the physician.

* * *

> More on public safety as to our obligations and handling of drugs. How can I best act in an advisory capacity to questions on dangerous drugs which are too often misused?

* * *

> Small meetings where the individual can express himself without being embarrassed, but without boring everyone else into non-attendance.

* * *

> How to organize at county level. Show us ways to strengthen and cooperate at the small local independent level. If we can get along at these basic levels, our state and national organizations will feel the benefit of this type of unity.

* * *

> We cannot dispense with the business aspect of running these organizations, but there should be increased emphasis on not only new products or

pharmacology, but on increased pharmaceutical efficiency.

* * *

Conventions should not depend upon their speakers to be furnished by pharmaceutical industry. They should obtain good speakers from practicing pharmacists and other professions. Programs should bring new ideas and controversial subjects should NOT be avoided.

* * *

Practical pharmaceutical programs --- dosage, review, pharmaceutical arithmetic review, education in answering physicians' questions.

Extension Services in Pharmacy

Over 85% of the pharmacists acknowledged they had received the School of Pharmacy Bulletin or had attended at least one program sponsored by Extension Services within the last two years. Table XXXV lists the frequency and percentage of each service reported.

Table XXXV

FREQUENCY DISTRIBUTION OF BULLETIN READERSHIP OR ATTENDANCE AT PROGRAMS SPONSORED BY EXTENSION SERVICES IN PHARMACY
(N = 444)

Service	Frequency	% N
School of Pharmacy Bulletin	343	77.3
Local Meetings Co-Sponsored by Extension Services	164	36.9
Fall Institute on Campus	144	32.4
Spring Institute on Campus	99	22.3
Hospital Institute	30	6.8
Other	3	0.7
None	64	14.4

Number of Different Types of Programs Sponsored by Extension Services Cross-Classified with Research Variables

Table XXXVI lists frequency of acknowledged attendance at different programs of Extension Services cross-classified with research variables.[8] The pharmacists acknowledged attending an average (mean) of 1.02 different types of programs sponsored by Extension Services.[9] Therefore, the hypothesis that the pharmacists would acknowledge attending at least one type of program sponsored by Extension Services in Pharmacy in the last two years was accepted.

Significance Tests for Attendance at Programs Sponsored by Extension Services in Pharmacy

Table XXXVI also shows the percentage of all groups in the research variables that had an acknowledged attendance of at least one type of program sponsored by Extension Services in Pharmacy. The null hypothesis between these percentages was tested by use of a statistical technique.[10]

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8. Only meetings were used in the cross-classifications. The School of Pharmacy Bulletin was omitted.

9. See Appendix II for method used to compute mean.

10. See Appendix III.

Table XXXVI

ATTENDANCE AT PROGRAMS SPONSORED BY EXTENSION SERVICES CROSS-CLASSIFIED WITH RESEARCH VARIABLES

Variable	Number of Different Types of Meetings Attended						
	N	0	1	2	3	4	% N of 1 or More
A. Type of Pharmacy	440	182	137	69	44	8	58.6
1. Independent	367	158	110	61	35	3	56.9
2. Chain	35	19	12	3	0	1	45.7
3. Hospital	38	5	15	5	9	4	86.8
B. % R_x/Total Sales	383	167	114	63	36	3	56.4
1. Less than 20%	63	32	22	7	2	0	49.2
2. 20-35%	190	86	57	27	18	2	54.8
3. 36-50%	79	31	20	17	11	0	60.8
4. More than 50%	51	18	15	12	5	1	64.7
C. Years of Practice	440	182	137	69	44	8	58.6
1. Less than 5	69	32	19	12	5	1	53.9
2. 5 but less than 10	76	26	29	15	5	1	65.8
3. 10 but less than 15	101	42	31	17	8	3	58.4
4. 15 but less than 20	30	11	11	7	1	0	63.3
5. 20 but less than 25	28	10	9	2	6	1	64.3
6. More than 25	136	61	38	16	19	2	55.1
D. Years of Formal Education in Pharmacy	436	181	137	67	43	8	58.5
1. Apprenticed or less than 2 years	61	31	15	5	10	0	49.2
2. 2-year graduate	32	11	12	4	4	1	65.6
3. 3-year graduate	22	7	11	3	1	0	68.2
4. 4-year graduate	321	132	99	55	28	7	58.9

Table XXXVI (Cont.)

Variable	Number of Different Types of Meetings Attended N	0	1	2	3	4	% N of 1 or More
E. Age	443	183	139	69	44	8	58.7
1. Less than 30	87	40	24	18	4	1	54.0
2. 30-39	134	53	49	19	11	2	60.4
3. 40-49	76	24	24	16	9	3	68.4
4. 50-59	95	43	22	12	16	2	54.7
5. 60-64	27	11	13	2	1	0	59.3
6. 65-69	11	6	2	1	2	0	45.5
7. More than 70	13	6	5	1	1	0	53.8
F. Position in Independent Pharmacy	379	163	114	62	35	5	57.0
1. Employee	150	66	53	21	8	2	56.0
2. Owner	181	79	47	34	19	2	56.4
3. Partner	48	18	14	7	8	1	62.5
G. Number of Full-Time Pharmacists Servicing Pharmacy	431	177	133	69	44	8	58.9
1. One full	167	79	48	25	12	3	52.7
2. Two full	164	71	54	23	16	0	56.7
3. More than two	100	27	31	21	16	5	73.0
H. Total Number of Pharmacists Servicing Pharmacy	431	177	133	69	44	8	58.9
1. One Total	74	34	21	11	5	3	54.1
2. Two Total	184	88	55	26	15	0	52.2
3. More than Two	173	55	57	32	24	5	68.2

Table XXXVII

SIGNIFICANCE TESTS OF ATTENDANCE AT PROGRAMS SPONSORED BY EXTENSION SERVICES CROSS-CLASSIFIED WITH TYPE OF PHARMACY IN WHICH PHARMACIST PRACTICED

Test Between	Critical Value	Accept or Reject Null Hypothesis
Independent and Chain	1.27	Accept
Independent and Hospital	4.90	Reject
Chain and Hospital	4.11	Reject

The tests show that the hospital pharmacists had attended more types of programs sponsored by Extension Services. The hospital pharmacists require more pharmaceutical knowledge for the same reasons as stated previously in the section on expressed need. Also, during the relevant time period there were two institutes solely for hospital pharmacists, one or both of which were attended by most reporting hospital pharmacists.

Table XXXVIII

SIGNIFICANCE TESTS OF ATTENDANCE AT PROGRAMS SPONSORED BY EXTENSION SERVICES CROSS-CLASSIFIED WITH PERCENT OF TOTAL SALES DERIVED FROM PRESCRIPTIONS

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 20% and 20-35%	0.76	Accept
Less than 20% and 36-50%	1.38	Accept
Less than 20% and more than 50%	1.68	Accept
20-35% and 36-50%	0.91	Accept
20-35% and more than 50%	1.30	Accept
36-50% and more than 50%	0.45	Accept

There is an implication that the percentage of total sales derived from prescriptions was not an important factor contributing to the differences in attendance at programs sponsored by Extension Services.

Table XXXIX

SIGNIFICANCE TESTS OF ATTENDANCE AT PROGRAMS SPONSORED BY EXTENSION SERVICES CROSS-CLASSIFIED WITH YEARS OF PRACTICE

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 5 and 5 but less than 10	1.47	Accept
Less than 5 and 10 but less than 15	0.51	Accept
Less than 5 and 15 but less than 20	0.89	Accept
Less than 5 and 20 but less than 25	0.82	Accept
Less than 5 and 25 years or more	0.16	Accept
5 but less than 10 and 10 but less than 15	1.42	Accept
5 but less than 10 and 15 but less than 20	0.25	Accept
5 but less than 10 and 20 but less than 25	0.12	Accept
5 but less than 10 and 25 years or more	1.55	Accept
10 but less than 15 and 15 but less than 20	0.45	Accept
10 but less than 15 and 20 but less than 25	0.46	Accept
10 but less than 15 and 25 years or more	0.43	Accept

Table XXXIX (Cont.)

Test Between	Critical Value	Accept or Reject Null Hypothesis
15 but less than 20 and 20 but less than 25	0.07	Accept
15 but less than 20 and 25 years or more	0.84	Accept
20 but less than 25 and 25 years or more	0.77	Accept

Data in Table XXXIX imply that the number of years of pharmaceutical practice by respondents was not a contributing factor to the differences in acknowledged attendance at programs sponsored by Extension Services.

Table XL

SIGNIFICANCE TESTS OF ATTENDANCE AT PROGRAMS SPONSORED BY EXTENSION SERVICES CROSS-CLASSIFIED WITH FORMAL EDUCATION IN PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
Apprenticed and 2-year graduate	1.55	Accept
Apprenticed and 3-year graduate	1.61	Accept
Apprenticed and 4-year graduate	1.39	Accept
2-year and 3-year graduate	0.20	Accept
2-year and 4-year graduate	0.75	Accept
3-year and 4-year graduate	0.90	Accept

There is an implication that the number of years of respondents' formal education in pharmacy was not a contributing factor to the differences in acknowledged attendance at programs sponsored by Extension Services.

Table XLI

SIGNIFICANCE TESTS OF ATTENDANCE AT PROGRAMS SPONSORED BY EXTENSION SERVICES CROSS-CLASSIFIED WITH AGE

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 30 and 30-39	0.93	Accept
Less than 30 and 40-49	1.89	Accept
Less than 30 and 50-59	0.09	Accept
Less than 30 and 60-64	0.49	Accept
Less than 30 and 65-69	0.53	Accept
Less than 30 and 70 and over	0.001	Accept
30-39 and 40-49	1.18	Accept
30-39 and 50-59	0.56	Accept
30-39 and 60-64	0.11	Accept
30-39 and 65-69	0.96	Accept
30-39 and 70 and over	0.46	Accept
40-49 and 50-59	1.85	Accept
40-49 and 60-64	0.84	Accept
40-49 and 65-69	1.44	Accept
40-49 and 70 and over	0.99	Accept
50-59 and 60-64	0.43	Accept
50-59 and 65-69	0.58	Accept
50-59 and 70 and over	0.09	Accept
60-64 and 65-69	0.78	Accept
60-64 and 70 and over	0.33	Accept
65-69 and 70 and over	0.40	Accept

Data in Table XLI imply that respondents' age was not a contributing factor to the differences in acknowledged attendance at programs sponsored by Extension Services.

Table XLII

SIGNIFICANCE TESTS OF ATTENDANCE AT PROGRAMS SPONSORED BY EXTENSION SERVICES CROSS-CLASSIFIED WITH POSITION IN INDEPENDENT PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
Employed Pharmacists and Owners	0.07	Accept
Employed Pharmacists and Partners	0.80	Accept
Owners and Partners	0.76	Accept

There is an implication that the position of respondents practicing in independent pharmacies was not a contributing factor to the differences in acknowledged attendance at programs sponsored by Extension Services.

Table XLIII

SIGNIFICANCE TESTS OF ATTENDANCE AT PROGRAMS SPONSORED BY EXTENSION SERVICES CROSS-CLASSIFIED WITH THE NUMBER OF FULL-TIME PHARMACISTS SERVICING THE PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
One and two pharmacists	0.80	Accept
One and more than two pharmacists	3.44	Reject
Two and more than two pharmacists	2.76	Reject

Table XLIV

SIGNIFICANCE TESTS OF ATTENDANCE AT PROGRAMS SPONSORED BY EXTENSION SERVICES CROSS-CLASSIFIED WITH THE NUMBER OF TOTAL PHARMACISTS SERVICING THE PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
One and two	0.28	Accept
One and more than two	2.04	Reject
Two and more than two	3.07	Reject

Pharmacists practicing in a pharmacy serviced by more than two pharmacists attended more types of meetings sponsored by Extension Services. They probably have more time to attend meetings, and it is likely that the pharmacies in which they practice enjoy larger prescription volumes which enhance both the desire and need for continuing education.

The two factors that significantly influenced attendance at programs sponsored by Extension Services were the number of pharmacists servicing the pharmacy in which the pharmacist practiced and the type of pharmacy in which the pharmacists practiced. Hospital pharmacists attended more programs sponsored by Extension Services than did chain and independent pharmacists.

Expressed Benefit of Extension Services in Pharmacy

Only about 3% of the pharmacists that evaluated the benefit of Extension Services rated them not beneficial. The mean score for the question with 5 very beneficial and

1 not beneficial was 3.71; the standard deviation was 1.13.[11] Table XLV lists the frequency of each category checked.

Table XLV

EXPRESSED BENEFIT OF EXTENSION SERVICES IN PHARMACY

(N = 351)

Measure of Benefit	Frequency	% N
5 (very beneficial)	112	31.9
4	87	24.8
3	102	29.1
2	38	10.8
1 (not beneficial)	12	3.8
	351	100.0

Most Beneficial Service Sponsored by Extension Services

Institutes were considered the most beneficial programs sponsored by Extension Services. Forty-eight of the respondents to the question listed "Institutes" without specifying which type. Therefore this category is presented in Table XLVI which lists the frequency of each category considered to be most beneficial. The percent of respondents using a particular service who considered the service the most beneficial is also listed in Table XLVI. The percent who rated "institutes" most beneficial was not included because this category was not mentioned previously.

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11. See Appendix II.

Table XLVI

MOST BENEFICIAL SERVICE SPONSORED BY EXTENSION SERVICES

Service	N*	F**	% N
"Institutes"	-	48	-
Fall Institute	144	47	32.6
School of Pharmacy Bulletin	343	45	13.1
Local Meetings Co-Sponsored by Extension Services	164	39	23.8
Spring Institute	99	23	23.2
Hospital Institute	30	7	23.3

*N is number of pharmacists who used the service as listed in Table XXXV (p. 57).

**F is number of pharmacists who rated the service the most beneficial.

Reasons Why Each Service was Most Beneficial

There were many reported reasons why the pharmacists considered any particular service the most beneficial. Tables XLVII - LII list the reasons why the various services were considered the most beneficial.

Table XLVII

WHY "INSTITUTES" WERE MOST BENEFICIAL

(N = 41)

Reason	Frequency	% N
Variety of Educational Programs	15	36.5
Well Organized Programs	5	12.1
Quality of Speakers	4	9.8
Discussion with Many Pharmacists	4	9.8
Discussion of Current Practical Problems	4	9.8
Discussion of Professional Problems	4	9.8
Discussions on New Drugs	3	7.3
Refresh Professional Attitude	2	4.9
	41	100.0

Table XLVIII

WHY FALL INSTITUTES WERE MOST BENEFICIAL

(N = 27)

Reason	Frequency	% N
Current Educational Programs	13	48.2
Technical Programs on Drugs	6	22.2
Renew Old Acquaintances and Refresh Professional Attitude	4	14.8
Best Speakers	2	7.4
Well Organized Programs	2	7.4
	27	100.0

Table XLIX

WHY SPRING INSTITUTES WERE MOST BENEFICIAL

(N = 16)

Reason	Frequency	% N
Management Program	5	31.2
Academic in Nature	4	25.0
Recruitment Program	3	18.8
Very Personal	2	12.5
Refresh Professional Attitude	2	12.5
	16	100.0

Table L

WHY HOSPITAL INSTITUTES WERE MOST BENEFICIAL

(N = 4)

Reason	Frequency	% N
Respondent was Hospital Pharmacist and Meetings were on Hospital Pharmacy	4	100.0

Table LI

WHY SCHOOL OF PHARMACY BULLETIN WAS MOST BENEFICIAL

(N = 31)

Reason	Frequency	% N
Current Articles on New Drugs and New Developments	9	29.0
Very Complete and Extensive	8	25.8
Easiest Source of Information	6	19.4
Respondent Did Not Attend Meetings	3	9.7
Excellent Reprints of Speeches	3	9.7
Reaches More Pharmacists	2	6.4
	31	100.0

Table LII

WHY LOCAL MEETINGS CO-SPONSORED BY EXTENSION SERVICES WERE MOST BENEFICIAL

(N = 23)

Reason	Frequency	% N
Meetings Easier to Attend	8	34.9
Informative, Varied Programs	5	21.7
Quality of Speakers	3	13.0
More Open Discussion	3	13.0
Discussion of Local Problems	2	8.7
Reaches More Pharmacists	2	8.7
	23	100.0

New or Additional Services Desired from Extension Service

The pharmacists listed a variety of new or additional services they would like Extension Services to offer. More information on drugs and technical and scientific subjects was the most frequently desired service. Some pharmacists expressed preference for more out-state programs because they are unable to attend institutes on the University of Wisconsin campus. Table LIII lists the new or additional services desired.

Table LIII

NEW OR ADDITIONAL SERVICES DESIRED FROM EXTENSION SERVICES

(N = 88)

Service	Frequency	% N
More Institutes and Literature on Drugs and Science	19	21.6
More Out-State Programs	17	19.3
A Series of Evening Refresher Courses	12	13.6
More Business Programs and Surveys	11	12.5
More Practical Pharmacy Programs	6	6.8
Increase Content of Publications of School of Pharmacy Bulletin	6	6.8
Home Study Material on New Developments	6	6.8
Programs Promoting Professional Ethics	5	5.7
Literature and Discussions on Laws and Regulations	4	4.6
Help Improve Internship Program	2	2.3
	88	100.0

Twelve pharmacists considered the present services offered by Extension Services to be satisfactory.

Representative responses to the question were:

Outlines or printed material given out at time of institutes covering lectures that can be kept for permanent reference.

* * *

More publications, as I am not able to attend many meetings.

* * *

Something that would bring pharmacists together to work in harmony instead of fighting each other.

* * *

I believe the present services are adequate if the men will take advantage of them.

* * *

Help in organizing pharmacists on a county level or area level.

* * *

Visits to all parts of the state with professional programs.

* * *

More practical, less theoretical Fall Institute.

* * *

I'm very pleased with the good job the Extension Service is doing now. Their cooperation in aiding local associations is excellent.

* * *

Expansion of the Fall Institute type of program modified to a one day and night district session.

* * *

Extension programs available at district level --- preferably at night. This will give one-man pharmacists a chance to continue education.

* * *

More special courses or if possible, courses which would allow one to work toward a higher degree (i.e., Master's degree in hospital pharmacy).

* * *

Intensive refresher courses in areas of pharmacy practice and pharmacology.

* * *

More merchandising analyses and buying techniques.

* * *

Professional and Business Publications

Reading professional and business journals, magazines, bulletins, and other periodicals was the educational activity employed by most pharmacists. The respondents also considered reading the most beneficial means of continuing their education in pharmacy. Almost 95% of the pharmacists acknowledged reading at least one professional or business publication within the last month.

Number of Publications Read Cross-Classified With Research Variables

Fifty-one percent of the pharmacists acknowledged reading at least five different professional and business publications within the last month. Therefore, the hypothesis that at least half the pharmacists would acknowledge reading at least five professional and business publications within the last month is accepted.

The number of publications each pharmacist acknowledged reading was cross-classified with the research variables. The cross-classification and the percentage of pharmacists in all groups are listed in Table LIV.

Table LIV

NUMBER OF PUBLICATIONS READ CROSS-CLASSIFIED WITH RESEARCH VARIABLES

Variable	N	Number of Journals Read: 0	1	2	3	4	5	6	7	8	More Than 8	% 5 or More
A. Type of Pharmacy	440	25	11	27	70	80	78	46	37	26	40	51.6
1. Independent	367	23	11	22	62	67	64	40	29	19	30	49.6
2. Chain	35	1	0	2	5	9	9	2	3	2	2	51.4
3. Hospital	38	1	0	3	3	4	5	4	5	5	8	71.1
B. % R_x/Total Sales	383	22	10	22	64	74	69	39	32	18	33	49.9
1. 20%	63	3	2	5	12	17	8	3	3	4	6	38.1
2. 20-35%	190	12	4	10	33	30	38	26	16	8	13	53.2
3. 36-50%	79	5	3	6	9	14	15	3	8	5	11	53.2
4. 50%	51	2	1	1	10	13	8	7	4	1	3	47.1
C. Years of Practice	440	25	11	27	70	80	78	46	37	26	40	51.6
1. 5	69	2	2	5	14	9	10	8	6	6	7	53.6
2. 5 - 10	76	3	3	2	11	12	17	9	9	3	7	59.2
3. 10 - 15	101	7	1	6	15	18	12	12	10	5	15	53.5
4. 15 - 20	30	0	1	3	6	7	6	3	1	3	0	43.3
5. 20 - 25	28	3	0	1	2	6	4	6	3	1	2	57.1
6. 25	136	10	4	10	22	28	29	8	8	8	9	45.6
D. Years of Formal Education in Pharmacy	436	25	11	27	70	80	76	46	36	26	39	51.1
1. Apprenticed or less than 2 years	61	6	2	6	12	10	10	3	2	4	6	41.0
2. 2-year graduate	32	3	1	4	6	11	2	0	2	2	1	21.9
3. 3-year graduate	22	1	1	1	3	3	10	1	1	0	1	59.1
4. 4-year graduate	321	15	7	16	49	56	54	42	31	20	31	55.5

Table LIV (Cont.)

Variable	N	Number of Journals Read: 0	1	2	3	4	5	6	7	8	More Than 8	% 5 or More
E. Age	443	25	12	26	71	83	78	45	37	26	40	51.0
1. 30	87	3	2	6	14	14	16	11	9	6	6	55.2
2. 30-39	134	7	4	5	22	20	25	10	14	9	18	56.7
3. 40-49	76	3	1	4	11	17	7	15	6	3	9	52.6
4. 50-59	95	6	3	6	13	21	23	7	4	7	5	48.4
5. 60-64	27	4	0	3	8	4	5	1	1	0	1	29.6
6. 65-69	11	0	0	1	2	3	1	1	1	1	1	45.5
7. 70 and over	13	2	2	1	1	4	1	0	2	0	0	23.1
F. Position in Independent Pharmacy	379	24	12	23	58	74	64	41	30	21	32	49.6
1. Employee	150	12	7	12	28	30	19	14	9	8	11	40.7
2. Owner	181	10	3	7	25	33	39	21	17	12	14	56.9
3. Partner	48	2	2	4	5	11	6	6	4	1	7	50.0
G. Number of Full-Time Pharmacists Servicing Pharmacy	431	24	12	26	68	78	75	45	37	26	40	51.7
1. One full	167	10	3	10	29	29	30	18	15	9	14	51.5
2. Two full	164	11	8	10	27	26	29	18	12	7	16	50.0
3. More than 2	100	3	1	6	12	23	16	9	10	10	10	55.0
H. Number of Total Pharmacists Servicing Pharmacy	431	24	12	26	69	81	73	45	37	25	39	50.8
1. One	74	4	1	3	16	13	13	5	7	5	7	50.0
2. Two	184	7	4	15	21	34	43	21	12	10	17	56.0
3. More than two	173	13	7	8	32	34	17	19	18	10	15	45.7

Significance Tests for Number of Publications Acknowledged as Read

The percentage of pharmacists in any particular group of a research variable that acknowledged reading at least five publications was compared with the other groups in the particular variable. The percentages were tested to determine if there were any significant differences between the percentages. These differences were used to determine what variables influence the reading of publications by pharmacists.[12]

Table LV

SIGNIFICANCE TESTS OF READING PUBLICATIONS CROSS-CLASSIFIED WITH TYPE OF PHARMACY IN WHICH PHARMACIST PRACTICES

Test Between	Critical Value	Accept or Reject Null Hypothesis
Independent and Chain	0.20	Accept
Independent and Hospital	2.76	Reject
Chain and Hospital	2.00	Reject

The tests show that hospital pharmacists read more professional and business publications than independent and chain pharmacists. This finding is consistent with the findings for attendance at meetings. Again, the hospital pharmacists are probably more actively engaged in the practice of pharmacy than the other groups and realize a greater need to read and keep informed of new developments in pharmacy.

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12. See Appendix III.

Table LVI

SIGNIFICANCE TESTS OF READING PUBLICATIONS CROSS-CLASSIFIED WITH THE PERCENT OF TOTAL SALES DERIVED FROM PRESCRIPTIONS

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 20% and 20-35%	2.15	Reject
Less than 20% and 36-50%	1.98	Reject
Less than 20% and more than 50%	1.03	Accept
20-35% and 36-50%	0.00	Accept
20-35% and more than 50%	0.78	Accept
36-50% and more than 50%	0.69	Accept

There are no significant differences between the groups of pharmacists that practice in a pharmacy where more than 20% of total sales are derived from prescriptions. But respondents in the less than 20% group did not read as many publications as the 20-35% and 36-50% groups. The pharmacists in the less than 20% group are probably not as actively engaged in the practice of pharmacy as the other groups and therefore do not realize as great a need to read and keep informed of new developments in pharmacy.

Table LVII

SIGNIFICANCE TESTS OF READING PUBLICATIONS CROSS-CLASSIFIED WITH YEARS OF PRACTICE OF THE PHARMACISTS

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 5 and 5 but less than 10 years	0.67	Accept
Less than 5 and 10 but less than 15 years	0.00	Accept
Less than 5 and 15 but less than 20 years	0.94	Accept
Less than 5 and 20 but less than 25 years	0.32	Accept
Less than 5 and 25 years or more	1.08	Accept
5 but less than 10 and 10 but less than 15 years	0.67	Accept
5 but less than 10 and 15 but less than 20 years	1.49	Accept
5 but less than 10 and 20 but less than 25 years	0.19	Accept
5 but less than 10 and 25 years or more	1.92	Accept
10 but less than 15 and 15 but less than 20 years	0.93	Accept
10 but less than 15 and 20 but less than 25 years	0.32	Accept
10 but less than 15 and 25 years or more	1.04	Accept
15 but less than 20 and 20 but less than 25 years	1.06	Accept
15 but less than 20 and 25 years or more	0.23	Accept
20 but less than 25 and 25 years or more	1.12	Accept

The tests imply that the number of years the respondents had practiced did not contribute to differences in readership among pharmacists.

Table LVIII

SIGNIFICANCE TESTS OF READING PUBLICATIONS CROSS-CLASSIFIED WITH FORMAL EDUCATION IN PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
Apprenticed and 2-year graduates	2.08	Reject
Apprenticed and 3-year graduates	1.62	Accept
Apprenticed and 4-year graduates	2.10	Reject
2-year and 3-year graduates	2.91	Reject
2-year and 4-year graduates	4.31	Reject
3-year and 4-year graduates	0.33	Accept

The tests show that 2-year graduates did not read as many publications as 3-year and 4-year graduates, nor did apprenticed pharmacists read as many publications as 4-year graduates. These findings support the rationale as quoted on page 3 that the higher the formal education of the adult, the more likely it is that he will take part in continuing education.

Table LIX

SIGNIFICANCE TESTS OF READING PUBLICATIONS CROSS-CLASSIFIED WITH AGE

Test Between	Critical Value	Accept or Reject Null Hypothesis
Less than 30 and 30-39	0.22	Accept
Less than 30 and 40-49	0.33	Accept
Less than 30 and 50-59	0.92	Accept
Less than 30 and 60-64	2.51	Reject
Less than 30 and 65-69	0.61	Accept
Less than 30 and 70 and over	2.50	Reject
30-39 and 40-49	0.57	Accept
30-39 and 50-59	1.26	Accept
30-39 and 60-64	2.85	Reject
30-39 and 65-69	0.72	Accept
30-39 and 70 and over	2.71	Reject
40-49 and 50-59	0.55	Accept
40-49 and 60-64	2.19	Reject
40-49 and 65-69	0.44	Accept
40-49 and 70 and over	2.27	Reject
50-59 and 60-64	1.86	Accept
50-59 and 65-69	0.18	Accept
50-59 and 70 and over	1.99	Reject
60-64 and 65-69	0.91	Accept
60-64 and 70 and over	0.46	Accept
65-69 and 70 and over	1.18	Accept

The groups of older pharmacists did not read as many publications as did the pharmacists below sixty years of age. Some pharmacists above sixty probably are not practicing full-time and also have had less education than the groups of younger pharmacists.

Table LX

SIGNIFICANCE TESTS OF READING PUBLICATIONS CROSS-CLASSIFIED WITH POSITION IN INDEPENDENT PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
Employed Pharmacists and Owners	2.95	Reject
Employed Pharmacists and Partners	1.13	Accept
Owners and Partners	0.85	Accept

Employed pharmacists did not read as many publications as owners. One reason may be that some journals are mailed to the pharmacy in care of the owner and may not be as accessible to the employed pharmacists. It is likely that proprietors have more pharmaceutical interests which motivate journal readership to satisfy these interests. Also, as proprietors they may be expected to have greater interest in increasing their knowledge to promote the success of their pharmacy.

Table LXI

SIGNIFICANCE TESTS OF READING PUBLICATIONS CROSS-CLASSIFIED WITH NUMBER OF FULL-TIME PHARMACISTS SERVICING PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
One and two pharmacists	0.28	Accept
One and more than two pharmacists	0.55	Accept
Two and more than two pharmacists	0.79	Accept

The tests imply that the number of full-time pharmacists servicing the pharmacy in which the pharmacist practices does not contribute to differences in readership among pharmacists.

Table LXII

SIGNIFICANCE TESTS OF READING PUBLICATIONS CROSS-CLASSIFIED WITH THE TOTAL NUMBER OF PHARMACISTS SERVICING THE PHARMACY

Test Between	Critical Value	Accept or Reject Null Hypothesis
One and two pharmacists	0.87	Accept
One and more than two pharmacists	0.62	Accept
Two and more than two pharmacists	2.20	Reject

The tests show that pharmacists that practice in a pharmacy serviced by more than two pharmacists read significantly fewer journals than pharmacists practicing in a pharmacy serviced by just two pharmacists. This finding is inconsistent with previous findings on attendance

at various meetings or the tested effect based on only full-time pharmacists. The difference between these tests in Table LXI and LXII is due to the employment of part-time pharmacists which indicates some of the respondents were practicing in pharmacies with too much work for two pharmacists, but yet not quite enough work for another full-time pharmacist.

Publications Read by Respondents

The publication reportedly read most frequently by respondents within the last month was The Wisconsin Pharmacist which was listed by slightly more than two thirds of the pharmacists. Drug Topics was the leading national publication, being mentioned by slightly less than two thirds of the pharmacists.

Table LXIII lists the frequency of each publication mentioned by at least 30 pharmacists.

Table LXIII

FREQUENCY DISTRIBUTION OF PUBLICATIONS READ BY RESPONDENTS

(N = 444)

Publication	Frequency	% N
Wisconsin Pharmacist	303	68.2
Drug Topics	295	66.4
American Druggist	249	56.1
APhA Journal	210	47.2
NARD Journal	210	47.2
American Professional Pharmacist	109	24.5

Table LXIII (Cont.)

Publication	Frequency	% N
Drug News Weekly	85	19.1
Tile and Till	76	17.1
Central Pharmaceutical Journal	62	14.0
Chain Store Age	49	11.0
APhA Newsletter	40	9.0
School of Pharmacy Bulletin	40	9.0
Northwestern Druggist	34	7.7
American Journal of Hospital Pharmacy	32	7.2

Many other publications were mentioned less than 30 times. These publications in order of descending frequency are: SKF Newsletter, Journal of the American Medical Association, Modern Drug Supplement, Hospitals, Pulse, Medical Letter, Wall Street Journal, Lilly Digest, Pharmaquik, Business Week, Voice of the Pharmacist, Nations Business, Spectrum, Illinois Pharmacist, Minnesota Pharmacist, Discount Store News, Hospital Management, Medical Digest, Medical Science, Medical World News, Nurse, DSC News, and various manufacturers' publications.

Publications such as Tile and Till, School of Pharmacy Bulletin, and Lilly Digest are published bimonthly, quarterly, and annually, and the number of reported readings of these publications probably would have been higher if the questionnaires had been mailed near the date of their release. Conversely, the relative importance of weekly and biweekly

publications such as Drug News Weekly and Drug Topics probably are overstated.

Expressed Benefit of Publications

Almost half the pharmacists considered publications very beneficial in continuing their educations in pharmacy. The mean score, with 5 very beneficial and 1 not beneficial, was 4.15. The standard deviation was 0.97.[13] Table LXIV lists the frequency for each category checked.

Table LXIV

EXPRESSED BENEFIT OF PUBLICATIONS

(N = 416)

Measure of Benefit	Frequency	% N
5 (very beneficial)	202	48.5
4	104	25.0
3	84	20.2
2	24	5.8
1 (not beneficial)	2	0.5
	416	100.0

Most Beneficial Publications

The Wisconsin Pharmacist was considered the most beneficial publication by 71 pharmacists and was listed first or second by 136 pharmacists. American Druggist was listed as most beneficial by 65 pharmacists. This finding is inconsistent with the Chilton survey finding reported in

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13. See Appendix II for method.

Table III (p. 18) which listed Drug Topics as the most helpful national publication. Table LXV lists the frequency of publications listed as most beneficial or second most beneficial. Table LXV also lists the percent of pharmacists reading a publication who considered the publication first or second most beneficial.

Table LXV

MOST BENEFICIAL PUBLICATIONS

Publication	First			Second		First or Second	
	N*	F	F as % N	F	F as % N	F	F as % N
Wisconsin Pharmacist	303	71	23.4	65	21.5	136	44.9
American Druggist	249	65	26.1	46	18.3	111	44.4
Drug Topics	295	37	12.5	58	19.7	95	32.2
APhA Journal	210	43	20.5	28	13.3	71	33.8
NARD Journal	210	26	12.4	26	12.4	52	24.8
American Professional Pharmacist	109	37	33.9	14	12.8	51	46.7
Drug News Weekly	85	12	14.1	14	16.5	26	30.6
American Journal of Hospital Pharmacy	32	14	44.4	4	12.5	18	56.9
Chain Store Age	49	9	18.4	5	10.2	14	28.6
School of Pharmacy Bulletin	40	5	12.5	3	7.5	8	20.0
APhA Newsletter	40	4	10.0	1	2.5	5	12.5
Central Pharmaceutical Journal	62	2	3.2	3	4.8	5	8.0

*N is the number of respondents who read the publication [illegible] (LXIII).

F is the number of respondents rating the publication most beneficial.

Other publications listed as first or second most beneficial less than five times were: Pulse of Pharmacy, Modern Drug Supplement, Tile and Till, Medical Letter, Journal of the American Medical Association, Voice of the Pharmacist, Lilly Digest, Northwestern Druggist, and Illinois Pharmacist.

Why a Publication Was Most Beneficial

The combined reasons why all publications were most beneficial were determined. The Wisconsin Pharmacist and American Druggist are the only publications for which beneficial reasons are reported individually.

There were many reported reasons why a publication was either most beneficial or second most beneficial. The most frequently mentioned reason was information on drug products and other technical information. Table LXVI lists the reasons why a publication was considered most beneficial or second most beneficial.

Table LXVI

WHY A PUBLICATION WAS FIRST OR SECOND MOST BENEFICIAL

(N = 573)

Reason	Frequency	% N
Information on drugs and scientific subjects	91	15.9
State and local coverage	84	14.7
Good retailing and business articles	70	12.2
Broad scope of articles	60	10.5

Table LXVI (Cont.)

Reason	Frequency	% N
National pharmacy coverage	57	9.9
Most current drug news coverage	51	8.9
Good professional articles	51	8.9
Information on legal developments	25	4.4
Quality of articles	24	4.2
Brief, concise articles	22	3.8
Hospital pharmacy articles	20	3.5
Proper blend of business and professional articles	18	3.1
	573	100.0

Many pharmacists prefered a publication because of its professional, technical, or business articles, while many prefered a publication because it contained news events in pharmacy.

Table LXVII

WHY THE WISCONSIN PHARMACIST WAS THE FIRST OR SECOND MOST BENEFICIAL PUBLICATION

(N = 117)

Reason	Frequency	% N
State and local coverage	78	66.7
Information on legal developments	17	14.5
Current pharmacy news coverage	6	5.1
Quality of articles	5	4.3
New drug information	4	3.4
Good professional articles	4	3.4
Concise articles	2	1.7
Good business articles	1	0.9
	117	100.0

Table LXVIII

WHY AMERICAN DRUGGIST WAS THE FIRST OR SECOND MOST BENEFICIAL PUBLICATION

(N = 94)

Reason	Frequency	% N
Broad scope of subjects	23	24.4
Good business and retail articles	14	14.9
New drug and research information	13	13.8
Current pharmacy news coverage	12	12.8
National pharmacy coverage	10	10.6
Good professional articles	6	6.4
Balance between professional and business articles	6	6.4
Quality of the articles	4	4.3
Brief, concise articles	4	4.3
Information on legal developments	2	2.1
	94	100.0

The three preceding tables imply that pharmacists prefer a publication with a broad scope of articles, state and national news coverage, and both technical and commercial articles.

New or Additional Types of Information Desired in Publications

The pharmacists listed many types of new or additional information they would prefer in publications. More complete, unbiased information on new drug products was the most frequently mentioned item. Table LXIX lists the new or additional types of information desired.

Table LXIX

NEW OR ADDITIONAL TYPES OF INFORMATION DESIRED IN PUBLICATIONS

(N = 108)

Information Desired	Frequency	% N
More complete, unbiased information on new drug products	56	51.9
More business articles	13	12.0
More explanation and interpretation of pharmacy laws	10	9.3
Academic refresher course articles	7	6.5
More professional and public relations articles	5	4.6
Articles on professional organizations	5	4.6
Articles on health and disease	4	3.7
Articles on practical problems	3	2.8
Briefer articles	3	2.8
Articles on new teaching methods	1	0.9
More pharmacy jokes	1	0.9
	108	100.0

Seventeen pharmacists stated that present publications are satisfactory. This, plus the high mean score (4.15) for benefit of publications implies that publishers are doing a good job of meeting the needs of practicing pharmacists.

Some of the typical quotes on new information desired were:

Pharmacology and comparisons of similar drugs.

* * *

Review on state laws on pharmacy comparing them between states.

* * *

More complete product information. Its difficult to find complete information on many products both old and new. Many of our pharmacueitcal catalogs don't have complete product information.

* * *

Present us with more academic study --- discuss items to refresh us from our college course.

* * *

More information about drugs still in the investigational stage.

* * *

Have state and federal legislatures' votes on drug bills.

* * *

Listing of mode of action and classification of new products.

* * *

Information on new products should be available to the pharmacist before it reaches the lay public through other publications.

* * *

I feel they are quite adequate --- but an overall condensation needed.

* * *

More information on research as it is transformed into practical applications.

* * *

Resumès of both retailing and professional advances.

* * *

On the whole ---- they do an excellent job.

* * *

Comparative evaluation of drugs in pharmacological categories.

* * *

More on prescription compounding and incompatibilities of drugs.

* * *

Better analysis of our competition (Dispensing M.D.'s, Mail Order Prescriptions, Chain Pharmacies, Discounters.)

* * *

We must read more journals to get different views. Need combined professional literature and state and national news.

* * *

Informal Discussion With Other Pharmacists, Detail Men, and Drug Wholesale Representatives

More than 40% of the pharmacists considered informal discussions with other pharmacists, detail men, and drug wholesale representatives to be very beneficial in continuing their educations in pharmacy. These type of discussions were considered not beneficial by 13 pharmacists. Table LXX lists the frequency of each category checked. The mean score, with 5 very beneficial and 1 not beneficial, was 3.92. The standard deviation was 1.17.[14]

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14. See Appendix II.

Table LXX

BENEFIT OF INFORMAL DISCUSSIONS WITH OTHER PHARMACISTS, DETAIL MEN, AND DRUG WHOLESALE REPRESENTATIVES

(N = 425)

Measure of Benefit	Frequency	% N
5 (very beneficial)	189	44.5
4	86	20.2
3	92	21.6
2	45	10.6
1 (not beneficial)	13	3.1
	425	100.0

Of the three groups, discussions with detail men were considered the most beneficial and were so rated by approximately 2 out of 3 respondents. About 1 out of 4 considered discussions with other pharmacists the most beneficial. Table LXXI lists the frequency of each group.

Table LXXI

MOST BENEFICIAL TYPE OF INFORMAL DISCUSSIONS

(N = 377)

Discussions With	Frequency	% N
Detail men	249	66.1
Other pharmacists	92	24.4
Drug wholesale representatives	19	5.0
Equally beneficial	15	4.0
None beneficial	2	0.5
	377	100.0

Why Informal Discussions with Other Pharmacists, Detail Men or Drug Wholesale Representatives Were the Most Beneficial

The most frequently mentioned reason why informal discussions with other pharmacists were the most beneficial was the pharmacists discuss mutual problems and possible solutions for the problems. New product information was the most frequently mentioned reason why informal discussions with detail men were the most beneficial. The most frequently mentioned reason why informal discussions with drug wholesale representatives were the most beneficial was the wholesale representatives keep up to date on new business developments. Tables LXXII - LXXIV list reported reasons why informal discussions with other pharmacists, detail men, or drug wholesale representatives were the most beneficial.

Table LXXII

WHY INFORMAL DISCUSSIONS WITH OTHER PHARMACISTS WERE THE MOST BENEFICIAL

(N = 77)

Reason	Frequency	% N
Discuss Mutual Problems and Solutions to the Problems	49	63.6
Less Biased than Other Two	12	15.6
Social Connections	7	9.1
More Subjects to Discuss	6	7.8
Current Pharmacy News	3	3.9
	77	100.0

Table LXXIII

WHY INFORMAL DISCUSSIONS WITH DETAIL MEN WERE THE MOST BENEFICIAL

(N = 228)

Reason	Frequency	% N
New drug product information	91	39.9
Information on all drugs	58	25.4
Well informed on variety of subjects	36	15.8
Answer questions intelligently	14	6.2
Keep up to date more than others	9	3.9
Brief and concise	8	3.5
More specific information	5	2.2
Understand problems of pharmacists	4	1.8
Visit the pharmacy more often	3	1.3
	228	100.0

Table LXXIV

WHY INFORMAL DISCUSSIONS WITH DRUG WHOLESALE REPRESENTATIVES WERE THE MOST BENEFICIAL

(N = 23)

Reason	Frequency	% N
Up to date on new business developments	7	30.4
New product information	5	21.7
Visit the pharmacy more often	4	17.4
Well informed on a variety of subjects	4	17.4
Interested in all pharmacies in the area	3	13.1
	23	100.0

Some of the pharmacists reported that discussions with detail men were very helpful in answering inquiries of physicians and patients. Pharmacists believe these are important duties of the pharmacist and reasons why he must be informed on new developments in pharmacy. Some of the comments were:

> They can often help answer questions that come up by doctors and patients that normally wouldn't be found in the literature, but only through clinical use of drugs.
>
> * * *
>
> Keeps one informed to answer M.D. inquiries.
>
> * * *
>
> Keep you up on new items and uses of drugs so you can advise doctors.
>
> * * *

The One Most Beneficial Means of Continuing Education in Pharmacy

Question #7 in the questionnaire asked, "What do you believe is the one most beneficial means of continuing your education in pharmacy?"[15] Over half of the pharmacists considered reading professional and business publications as the one most beneficial means of continuing their educations in pharmacy. Table LXXV lists the frequency of each means of continuing education considered the most beneficial.

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15. See Appendix I.

Table LXXV

THE ONE MOST BENEFICIAL MEANS OF CONTINUING EDUCATION IN PHARMACY

(N = 321)

Means	Frequency	% N
Reading Publications	171	53.3
Attending Pharmacy Meetings, Conventions, Institutes	114	35.5
Informal Discussions with Professional Acquaintances	17	5.3
Practicing Pharmacy	15	4.7
Attending Graduate School	4	1.2
	321	100.0

Comparison of Expressed Benefit of the Various Means of Continuing Education in Pharmacy

The mean scores for the expressed benefit of the various major means of continuing education were reported previously in this chapter. The mean benefit score for pharmacy meetings and conventions was 3.26; Extension Services, 3.71; for professional and business publications, 4.15; and for informal discussions with other pharmacists, detail men, and drug wholesale representatives, 3.92. The means were compared by statistical significance tests to determine if the differences were significantly different or probably were due to random chance.[16] Table LXXVI lists the critical values obtained for each test.

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16. See Appendix IV for computation of significant tests.

Table LXXVI

SIGNIFICANCE TESTS COMPARING THE MEAN SCORES OF THE EXPRESSED BENEFIT AMONG THE VARIOUS MEANS OF CONTINUING EDUCATION

Test Between	Critical Value	Accept or Reject Null Hypothesis
Local, District, State and National Pharmacy Meetings, and Extension Services	5.29	Reject
Local, District, State and National Pharmacy Meetings, and Publications	11.56	Reject
Local, District, State and National Pharmacy Meetings, and Discussions with Other Pharmacists, Detail Men and Drug Wholesale Representatives	7.95	Reject
Extension Services and Publications	5.79	Reject
Extension Services and Discussions with Other Pharmacists, Detail Men and Drug Wholesale Representatives	2.56	Reject
Publications and Discussions with Other Pharmacists, Detail Men and Drug Wholesale Representatives	3.07	Reject

The various means of continuing education were not equally beneficial. The hypothesis that there will be no significant difference between the expressed benefit of local, district, state, and national pharmacy meetings and conventions, Extension Services in Pharmacy, professional and business publications, and informal discussions with other pharmacists, detail men, and drug wholesale representatives is rejected.

The critical values show that publications were more beneficial than local, district, state and national meetings, Extension Services, and discussions with other pharmacists, detail men, and drug wholesale representatives. Discussions with other pharmacists, detail men, and drug wholesale representatives were more beneficial than local, district, state and national pharmacy meetings and Extension Services. Extension Services were more beneficial than local, district, state and national pharmacy meetings.

The finding that reading publications was the most beneficial means of continuing education in pharmacy was consistent with the response to question #7, shown in Table LXXV and also was consistent with the Chilton survey finding reported in Table I.

Discussions with other pharmacists, detail men, and drug wholesale representatives were considered second most beneficial by mean score, but attendance at meetings, conventions, and institutes was second in response to question #7. This inconsistency is partially due to the pharmacists that checked a high score for benefit of discussions with professional acquaintances, but rated reading publications as the one most beneficial means of continuing their educations in pharmacy. Also, two of the four major means of continuing education --- attending pharmacy meetings and conventions and attending institutes sponsored by Extension Services --- are similar in nature. The combined benefits of these two undoubtedly had

considerable influence in the second place rating in response to question #7.

Other Means of Maintaining or Improving the Proficiency of Practicing Pharmacists

Question #6 in the questionnaire asked, "What else do you believe might be done to maintain or improve the proficiency of practicing pharmacists?"[17] There were many answers to the question, some of which overlapped previous areas of the survey. This question and comments at the end were included to allow the pharmacists to express their own feelings and to gain additional insight into how educators and editors better might aid respondents to improve their proficiency as practicing pharmacists. Table LXXVII lists the frequency of each of the various categories listed.

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17. See Appendix I.

Table LXXVII

OTHER MEANS OF MAINTAINING OR IMPROVING THE PROFICIENCY OF PRACTICING PHARMACISTS

(N = 215)

Means	Frequency	% N
Promote professional services and present a professional appearance	43	20.0
Mandatory minimum continuing education requirements to maintain license	27	12.6
Refresher courses (by attendance or correspondence)	20	9.3
Increase public, intra-professional, and inter-professional relations	18	8.4
More lectures and speeches (both in person and printed form)	16	7.4
Attempt to make more pharmacists aware of the need for continuing education	15	7.0
Encouraging or requiring membership and participation in professional associations	15	7.0
Better enforcement of laws	11	5.1
Have institutes and articles at a level R.Ph. can understand	10	4.7
More time off to read and attend meetings	8	3.8
Increase retailing seminars and publications	7	3.3
More short bulletins on new developments and new drugs	5	2.3
More literature from manufacturers	5	2.3
More written resumés of institutes	5	2.3
Read more journals	4	1.9
More relief pharmacists	4	1.9
Have meetings at more convenient times	2	0.0
	215	100.0

Some of the answers to the question and comments by the pharmacists were:

Possibly refresher courses by correspondence both for the purpose of refreshing memory and for the purpose of learning the new developments in the courses offered.

* * *

I think the individual pharmacist has to take a more active interest in improving his own knowledge --- actually most of the facts are available if only his time was better used.

* * *

Continued emphasis on the fact that a pharmacist is in the unique position of not only a businessman but a professional man as well.

* * *

Classes of at least 2 or 3 hours per week on pharmacology, toxicology, etc., once or twice a year for 4 to 6 week period by competent, informal instructors.

* * *

Make the pharmacist aware of change in the needs and problems of the profession. The biggest obstacle is the seeming lack of interest by the pharmacists to avail themselves of present programs. Until we have the participation of the majority we cannot hope to solve the problems of the profession.

* * *

I believe the present programs are adequate if you could only get more people to come to the things that are offered. In essence, a greater effort to get people out to meetings would be the biggest improvement possible.

* * *

Any contact with the outside would improve the proficiency of the pharmacist in the small, one-man store. I think our School of Pharmacy is doing a remarkable job with their institutes

and student recruiting. Wish it were possible to attend all of them instead of reading of the work being accomplished.

* * *

Make at least one institute mandatory for each pharmacist per year so employees could attend these also instead of just owners.

* * *

The opportunities are available --- the pharmacist has to have the desire to attend.

* * *

I believe strongly in belonging to a pharmacy organization, local or national. Many pharmacists do not and I feel much is being missed by them. 100% membership in associations (national or local) would help considerably.

* * *

If there is some way to schedule these meetings on a Sunday, the practicing pharmacist would have more of a chance to attend meetings of one day duration.

* * *

Pharmacists should be urged to belong to their local and state organizations and attend meetings as often as possible to keep up with the many changes in the practice of pharmacy.

* * *

Making attendance at district level seminars compulsory for renewal of license, providing that these seminars would offer useful, professional information.

* * *

Make the institutes and meetings interesting, informative, and at a level that can be listened to and understood by the majority in attendance. Also, they should be relevant to retail pharmacists who make up the largest number.

* * *

Probably a monthly or quarterly publication on new concepts of pharmacy --- not in too scientific a vein but more to the practical aspect that the practicing pharmacist could make use of.

* * *

Have all pharmacists take an active part in their associations.

* * *

Find a way to require membership in APhA and WPhA as a condition for holding our license as is done in other countries; then use the organizations to improve pharmacy.

* * *

I believe the Fall Institute is the type of thing that could be of great value but not enough pharmacists can attend. I would like to receive a bulletin summarizing the talks given.

* * *

Some type of refresher course similar to that of Bankers Course offered by University of Wisconsin following summer school would be an excellent way to bring out new ideas and concepts in pharmacy.

* * *

Have quarterly seminars in local areas so that traveling and time involved are at a minimum. Seminars should be short but concise and at a time the pharmacist can get away (Sunday).

* * *

Broadon the scope of information and knowledge relating to the practical aspects of employment in managing a pharmacy.

* * *

Have more meetings locally co-sponsored by Extension Services. The more populated areas seem to have enough.

* * *

Maybe I'm different, but I have to know what I'm dispensing, not just counting and selling pills. I've often wondered how many pharmacists could pass even a test on the use and dose of today's drugs. I include myself in the group of doubtfuls. Education can raise our standards but first legislation will have to control things in such a way the people want to be called a pharmacist, not a crook. Possibly limiting licenses to only pharmacist owned pharmacies.

* * *

The problem is to get the pharmacist to realize the importance of furthering his education. The programs are available if he will use and improve them.

* * *

Encourage companies to give all literature that is given to M.D.'s to pharmacists, especially the research studies.

* * *

Attempted Measure of Non-Response Group

Daily arithmetic means were computed for expressed need for continuing education, the number of types of local, district, state, or national pharmacy meetings attended, the number of types of meetings sponsored by Extension Services attended, and the number of periodicals read. The questionnaires were grouped by post-marked date on the return envelope. Four curves were constructed, which plotted the daily means with the date. The rationale behind this technique is that a considerable difference between early and late respondents or respondents from the second mailing would indicate that the non-response group was different from the response group. If the curves remain nearly level, they

would indicate that the non-response group was not significantly different from the response group. Table LXXVIII lists the daily means and number of respondents each day. The plotted curves are shown on pages 109 - 112.

Table LXVIII

DAILY MEANS FOR MEASURING NON-RESPONSE GROUP

Date	N	$\bar{X}_{(1)}$	$\bar{X}_{(2)}$	$\bar{X}_{(3)}$	$\bar{X}_{(4)}$
March 9	56	4.32	1.89	0.82	4.88
10	35	4.59	2.11	0.86	5.09
11	95	4.51	1.94	0.92	4.66
12	48	4.60	2.00	1.00	4.94
13	40	4.47	2.38	1.00	4.35
14	29	4.41	2.14	1.14	5.10
15	17	4.82	2.24	1.24	4.18
16	20	4.60	1.75	1.15	5.40
18	18	4.69	2.22	1.28	5.44
19	10	4.50	2.00	0.90	3.50
20	7	4.29	2.29	0.57	4.86
21	7	4.29	1.71	0.71	6.29
22	7	4.86	2.71	1.71	7.00
23	5	5.00	2.80	1.60	5.60
25-31	19	4.63	2.21	1.47	6.21
After 4/1	15	4.40	2.47	0.93	3.73
Second Mailing	16	3.88	1.13	0.69	5.38
	444				

$\bar{X}_{(1)}$ - Expressed Need

$\bar{X}_{(2)}$ - Number of State, Local, District or National Meeting

$\bar{X}_{(3)}$ - Number of Services Sponsored by Extension Services

$\bar{X}_{(4)}$ - Number of Periodicals

Chart 1

ARITHMETIC MEAN CURVE
FOR EXPRESSED NEED

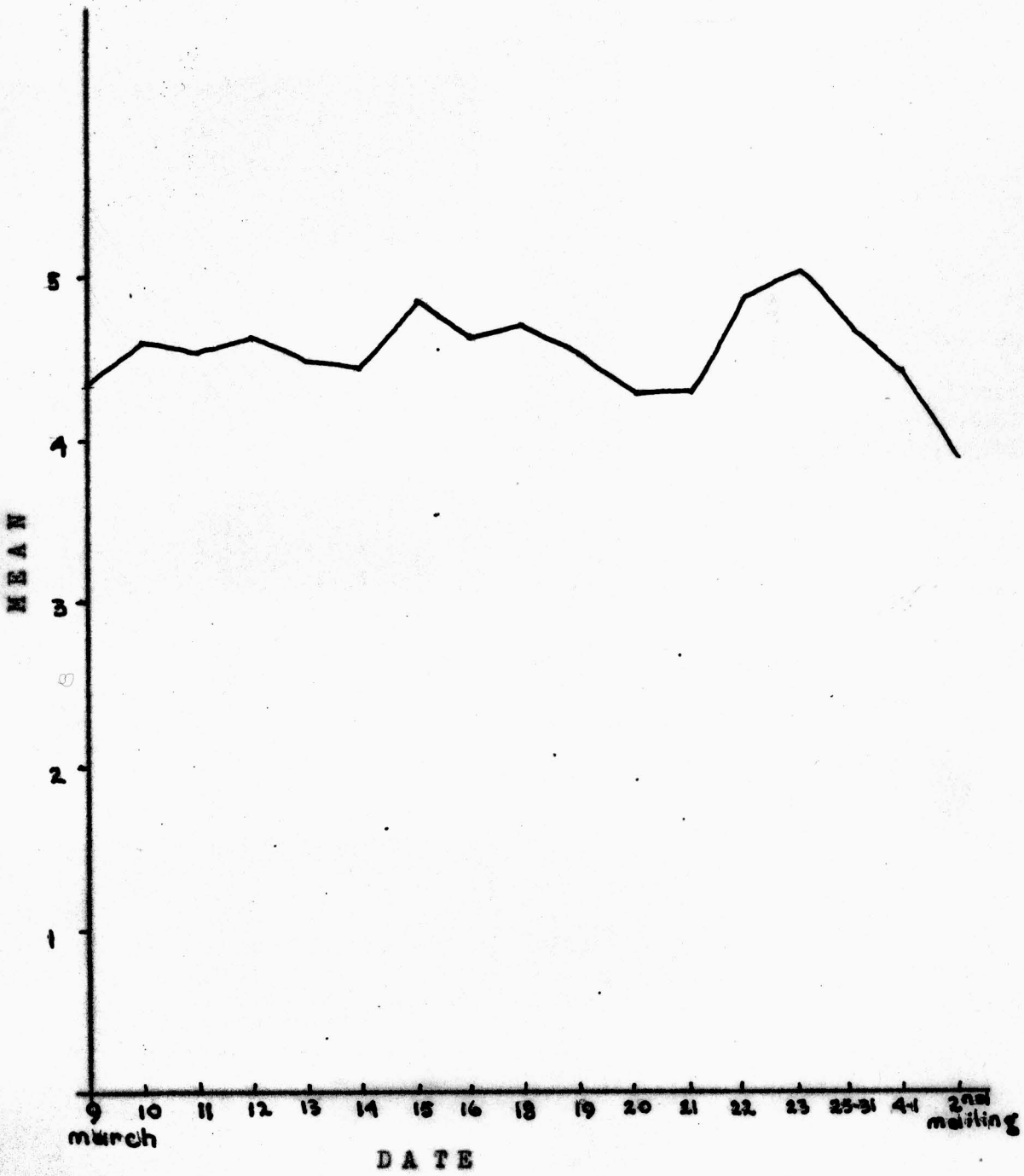


Chart 2

ARITHMETIC MEAN CURVE FOR ATTENDANCE AT LOCAL, DISTRICT, STATE, OR NATIONAL PHARMACY MEETINGS OR CONVENTIONS

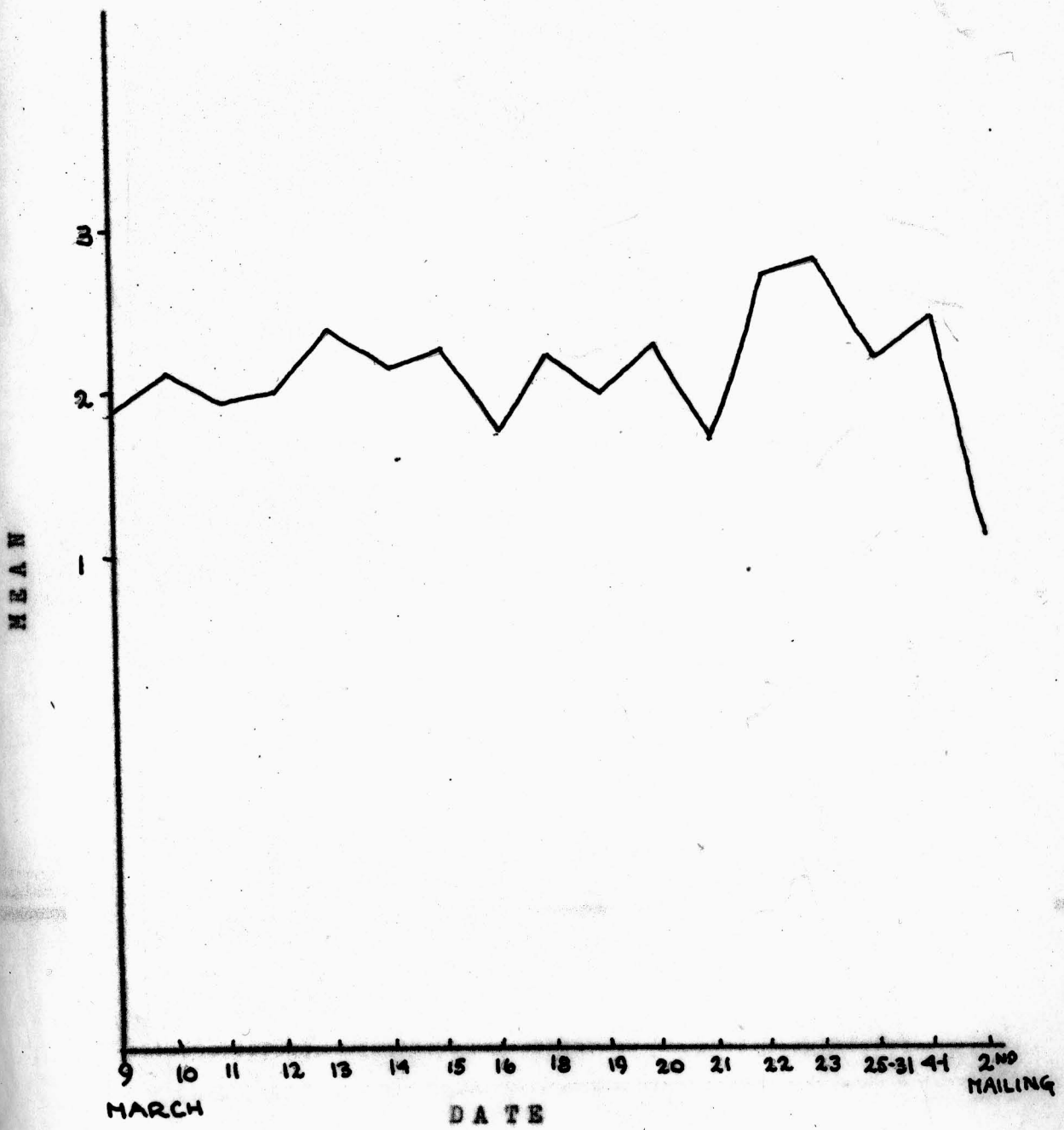


Chart 3

ARITHMETIC MEAN CURVE FOR ATTENDANCE AT SERVICES SPONSORED BY EXTENSION SERVICES

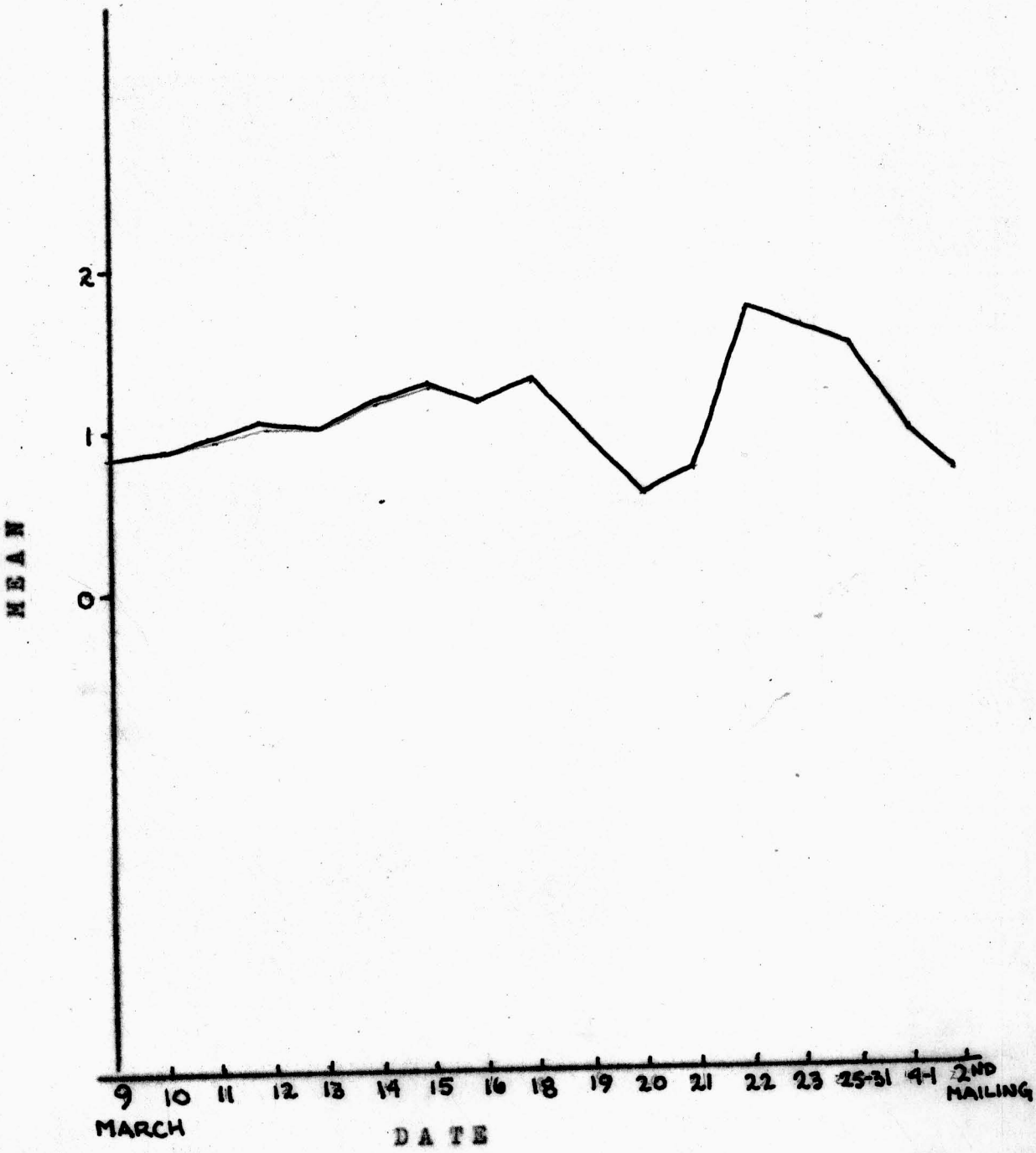
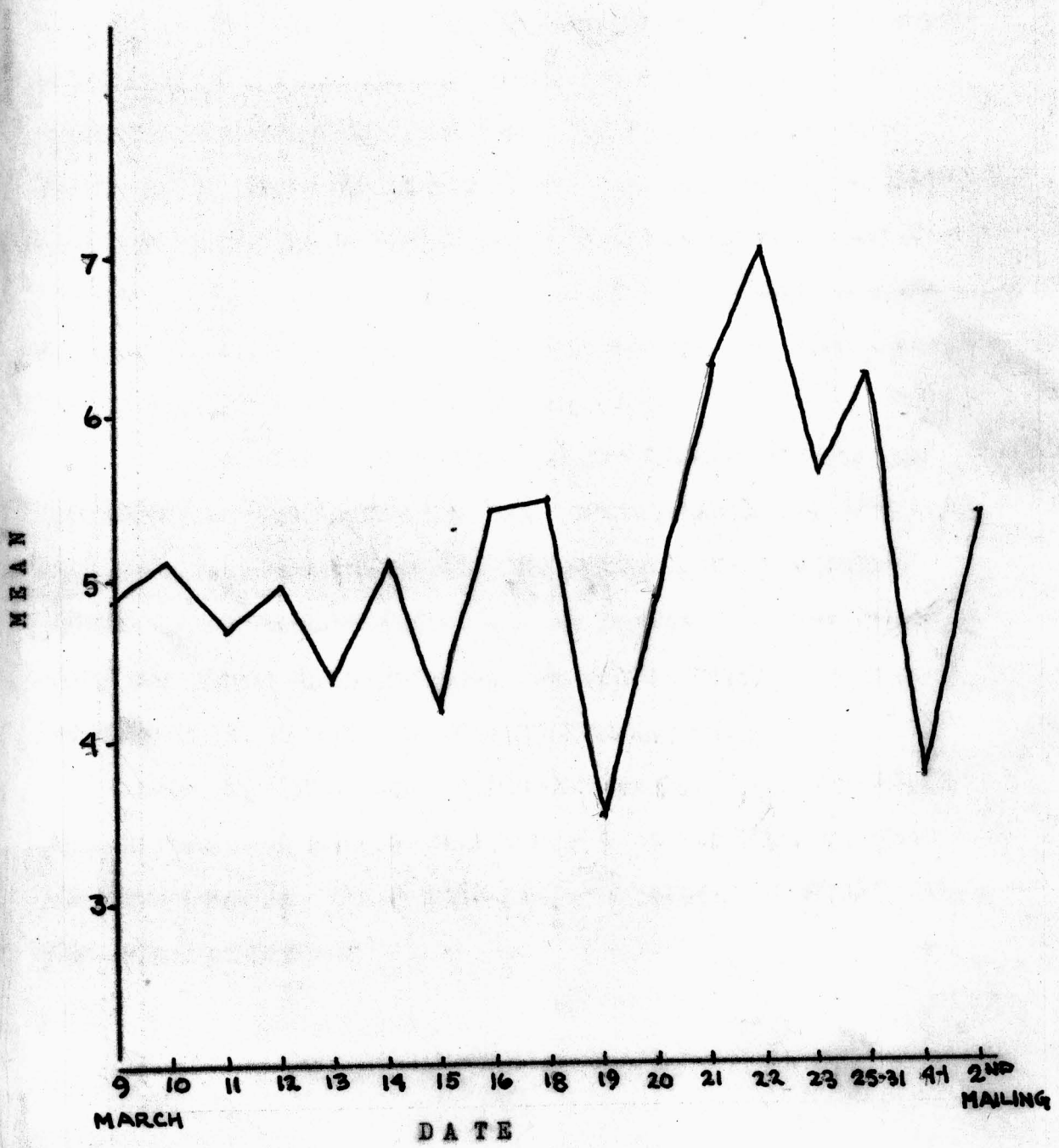


Chart 4

ARITHMETIC MEAN CURVE FOR READING
PROFESSIONAL AND BUSINESS PERIODICALS



The curve for expressed need falls slightly during the last three measured periods. Although evidence is weak, there is some implication that the non-response group does not believe there is as great a need for continuing education in pharmacy as the response group.

The respondents from the second mailing had a lower acknowledged attendance at local, district, state and national pharmacy meetings than the other respondents. However the curve is fairly level for each measured daily mean and the single decline does not establish a trend. Therefore it is not possible to estimate if the non-response group is similar to or different from the response group with respect to attendance at meetings.

The curve for acknowledged attendance at services sponsored by Extension Services rises sharply on March 22, but then falls consistently during the four remaining periods. Therefore there is some indication that the non-response group did not attend as many services sponsored by Extension Services as the response group.

The curve for acknowledged reading of publications has no definite pattern and there is no indication that the non-response group read fewer or more periodicals than the response group.

Chapter Four

SUMMARY AND CONCLUSIONS

The need for continuing education in pharmacy is widely recognized. Only one of the 435 Wisconsin pharmacists who participated in this study did not believe there was some need for pharmacists to continue their education. Approximately two out of three pharmacists expressed the belief that continuing education in pharmacy was very important.

Respondents considered reading professional and business publications the most beneficial means of continuing education in pharmacy.

Local and county association meetings were the types of pharmacy meetings and conventions, other than those sponsored by Extension Services, considered the most beneficial. More pharmacists acknowledged attending local meetings than any other type. The pharmacists expressed a need for more unification at the local level to further the profession of pharmacy.

The on-campus institutes were considered the most beneficial service of Extension Services in Pharmacy. The pharmacists expressed a desire for more local and district meetings co-sponsored by Extension Services following the pattern of the on-campus institutes.

Discussions with detail men were considered more

beneficial than discussions with other pharmacists or drug wholesale representatives. Discussions with the three groups were rated the second most beneficial means on the 5 point rating scale.

The pharmacists prefer a variety of new or additional types of information at meetings and in publications. New drug information was mentioned most frequently as the type information desired at meetings and in publications. Respondents expressed nearly equal desire for new or additional professional, "practical pharmacy", and business information.

The number of pharmacists servicing the pharmacies in which the pharmacists were employed was the variable that most influenced the degree of continuing educational activities of the pharmacists. Pharmacists practicing in a pharmacy serviced by more than two pharmacists acknowledged greater participation in continuing educational activities than pharmacists practicing in pharmacies serviced by two or less pharmacists. Hospital pharmacists acknowledged greater participation in continuing educational activities than pharmacists practicing in chain or independent pharmacies. The other research variables did not greatly influence the degree of continuing educational activity.

There was no major finding that would indicate that the continuing educational activities of the non-response group differed significantly from the respondent pharmacists.

although there was some evidence that the non-respondents did not evaluate the need for continuing education as highly as respondents nor did they attend as many educational activities sponsored by Extension Services in Pharmacy.

APPENDIX I

Survey Questionnaire and Cover-Letter

THE UNIVERSITY OF WISCONSIN
Madison 6

School of Pharmacy

February 1963

Dear Pharmacist,

As pharmacists we differ in our opinions as to the amount of time and effort needed to maintain or improve our proficiency as practicing pharmacists. We also differ in our evaluation of the best *means of increasing our knowledge or, in an informal way, of continuing our education in pharmacy.*

We are preparing a report on the continuing education of Wisconsin pharmacists, which will help us to serve your needs and interests. Information such as the publications you read, the type of articles of greatest interest, and the type and nature of the meetings you attend, or would like to attend, is necessary to prepare this report.

This study will be summarized and published in a future edition of the *School of Pharmacy Bulletin.* To complete the project we need an expression of your opinions on this anonymous questionnaire. The form is identified by number only to measure representativeness of the response.

Will you please take a few minutes to complete and return the questionnaire today or prior to the end of this week?

Sincerely,

Jack B. Hunter, R.Ph.

Jack B. Hunter, R.Ph.
Research Assistant

Louis W. Busse

Louis W. Busse
Associate Dean

PHARMACY CONTINUING EDUCATION STUDY

1. Please check how important you believe it is for practicing pharmacists to continue their education.

5	4	3	2	1
Very Important				Not Important

2. (a) Please check the local, district, state, or national pharmacy meetings or conventions you have attended within the last two years.

____ Local or County Association Meeting

____ W.Ph.A. District Meeting

____ W.Ph.A. Convention

____ W.S.H.P. Meeting

____ National Conventions (APhA, NARD, ACA, ASHP)

____ Wisconsin Branch A.Ph.A. Meeting

Other (Please Specify)

_____

_____

(b) Please check how beneficial the meetings listed in 2 (a) were in continuing your education in pharmacy.

5	4	3	2	1
Very Beneficial				Not Beneficial

(c) Which of these meetings were the most beneficial? _____

Why? _____

(d) What new or additional type of programs, if any, do you want at pharmacy meetings and conventions? _____

_____

_____

3. (a) Please check the publications of Extension Services in Pharmacy that you receive, and the meetings (seminars, institutes, or programs) sponsored by Extension Services that you attended within the last two years.

____ School of Pharmacy Bulletin

____ Local Meetings co-sponsored by Extension Services

____ Fall Institute on Campus

____ Spring Institute on Campus

____ Hospital Institute

Other (Please Specify)

_____

_____

(b) Please check how beneficial these services and programs are in continuing your education in pharmacy.

5	4	3	2	1
Very Beneficial				Not Beneficial

(c) Which service is the most beneficial? _____

Why? _____

(d) What new or additional service, if any, do you want Extension Services to offer?

_____

_____

4. (a) Please list the professional and business journals, magazines, bulletins, and other periodicals you *have read* (in whole or part) *within the past month.*

(b) Please check how beneficial the publications in 4 (a) are in continuing your education in pharmacy.

___	___	___	___	___
5	4	3	2	1
Very Beneficial				Not Beneficial

(c) What two publications are most beneficial?

1st _____ Why? _____

_____

2nd _____ Why? _____

_____

(d) What new or additional types of information, if any, do you want in the publications that are regularly available to you?

_____

5. (a) Please check how beneficial informal discussions with *other pharmacists, detail men,* and *drug wholesale representatives* are in continuing your education in pharmacy.

___	___	___	___	___
5	4	3	2	1
Very Beneficial				Not Beneficial

(b) Discussions with which of the three groups in 5 (a) are the most beneficial?

_____ Why? _____

_____

6. What else do you believe might be done to maintain or improve the proficiency of practicing pharmacists?

_____

_____

_____

_____

7. What do you believe is the *one* most beneficial means of continuing your education in pharmacy?

_____

8. Please check the type of pharmacy in which you are practicing.

____ Independent Pharmacy
____ Chain Pharmacy (11 or more units)

Approximately what percent of total sales is derived from prescriptions?

Less than 20% ____ 20-35% ____ 36-50% ____ More than 50% ____

____ Hospital Pharmacy

____ Other (Please specify) _____

9. How many years have you been practicing pharmacy?

Less than 5 ____ At least 15 but less than 20 ____

At least 5 but less than 10 ____ At least 20 but less than 25 ____

At least 10 but less than 15 ____ 25 or more ____

10. Please check the category of your formal education in pharmacy.

Apprenticed or less than two years ____ Three-year graduate ____

Two-year graduate ____ Four-year graduate ____

11. Please check the appropriate age category.

Under 30 years ____ 30 to 39 ____ 40 to 49 ____ 50 to 59 ____

60 to 64 ____ 65 to 69 ____ 70 years and over ____

12. If practicing in an independent pharmacy, are you:

____ Employed Pharmacist ____ Owner ____ Partner

13. How many full-time and part-time pharmacists, *including* yourself, regularly service the pharmac in which you practice?

____ Full-time ____ Part-time

COMMENTS:

Thank you. Your cooperation is appreciated.

Appendix II

COMPUTATION OF MEANS AND STANDARD DEVIATIONS

The arithmetic mean is a measure of central tendency in a frequency distribution. The mean is defined as "the sum of all the observations divided by the number of observations."[1] The standard deviation is a measure of dispersion in a frequency distribution. The standard deviation is the square-root of the variance. "The variance is defined as the sum of squares of the deviations of the observations from the mean divided by one less than the total number of observations."[2]

The computations of the mean and standard deviation for the expressed need for continuing education were used as illustrations for this research project. All other means and standard deviations were computed by the same procedures. For further discussion, refer to Introduction to Statistical Analysis, 2nd Edition, by Wilfrid J. Dixon and Frank J. Massey, Jr.

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1. Wilfrid J. Dixon and Frank J. Massey, Jr., Introduction to Statistical Analysis, McGraw-Hill, New York, N.Y., 1957, 2nd Edition, p. 14.

2. Ibid., p. 19.

Computation of Mean and Standard Deviation of Expressed Need for Continuing Education.

X = Categories | F = Frequencies | s = standard deviation

N = ΣF | $\bar{X}$ = Mean

X	F	FX	X^2	FX^2
5	298	1490	25	7450
4	68	272	16	1088
3	56	168	9	504
2	12	24	4	48
1	1	1	1	1
	435	1955	55	9091

N = 435

$$\bar{X} = \frac{\Sigma FX}{N} = \frac{1955}{435}$$

$$\bar{X} = 4.49$$

$$s = \sqrt{\frac{\Sigma FX^2 - \frac{(\Sigma FX)^2}{N}}{N - 1}}$$

$$s = \sqrt{\frac{9091 - \frac{(1955)^2}{435}}{434}}$$

$$s = \sqrt{\frac{9091 - 8786}{434}}$$

$$s = \sqrt{.703}$$

$$s = .838$$

Appendix III

STATISTICAL TESTS COMPARING PROPORTIONS (PERCENTAGES)

Throughout this project statistical tests were used to determine whether there was a significant difference between any two percentages. The formula used for the tests was:

$$T = \frac{P_1 - P_2}{\sqrt{\frac{(P_1Q_1)}{N_1} + \frac{(P_2Q_2)}{N_2}}}$$

T = critical value

P_1 = greater percentage

P_2 = lesser percentage

$Q_1 = 1 - P_1$

$Q_2 = 1 - P_2$

N_1 = sample size of Group 1

N_2 = sample size of Group 2

When an actual percentage was compared with a hypothesized percentage, the formula was modified to:

$$T = \frac{P_H - P_A}{\sqrt{\frac{(P_H)(Q_H)}{N}}}$$

T = critical value

P_H = hypothesized percentage

P_A = actual percentage

$Q_H = 1 - P_H$

N = sample size

For this project, the 95% confidence level was utilized. If a critical value of 1.96 or greater is obtained there are less than 5 chances out of 100 that the difference between the two percentages is due to random chance. If a critical value of less than 1.96 is obtained, there are more than 5 chances out of 100 that the difference between the two percentages is due to random chance. If the critical value is less than 1.96 there is no significant difference between the two percentages at the 95% confidence level, and the null hypothesis that there is no statistically significant difference between the two percentages is accepted. If the critical value is 1.96 or greater, the null hypothesis is rejected. For further discussion, refer to Introduction to Statistical Analysis, 2nd Edition, by Wilfrid J. Dixon and Frank J. Massey, Jr.

The following three examples illustrate; (1) comparison of a hypothesized percentage and actual percentage; (2) comparison of two percentages where the null hypothesis is accepted; and (3) comparison of two percentages where the null hypothesis is rejected.

(1) Comparison of a Hypothesized Percentage and Actual Percentage.

Hypothesis 1(a) (p. 28) stated at least four out of five pharmacists believe it is very important for pharmacists to continue their education. The actual percentage was 68.5%. The following statistical test was used to determine if the difference between 80% (hypothesized

percentage) and 68.5% (actual percentage) was significant.

$P_H = .80$; $P_A = .685$; $Q_H = .20$; $N = 435$

$$T = \frac{.80 - .685}{\sqrt{\frac{(.80)(.20)}{435}}}$$

$$T = \frac{.115}{\sqrt{.00036}}$$

$$T = \frac{.115}{.019}$$

$$T = 6.00$$

The critical value of 6.00 is greater than 1.96. Therefore the difference of 11.5% is significant at the 95% confidence level, and the hypothesis that at least 80% of the pharmacists believe it is very important for pharmacists to continue their education in pharmacy is rejected.

(2) Comparison of Two Percentages Where the Null Hypothesis is Accepted.

Of the independent pharmacists, 66.7% believed it was very important for pharmacists to continue their education; 61.3% of the chain pharmacists checked very important. (p. 32) The difference of 5.4% was tested for significance by the following test.

$P_1 = .667$; $P_2 = .613$; $Q_1 = .333$; $Q_2 = .387$; $N_1 = 366$; $N_2 = 31$

$$T = \frac{.667 - .613}{\sqrt{\frac{(.667)(.333)}{366} + \frac{(.613)(.387}{31}}}$$

$$T = \frac{.054}{\sqrt{.006 + .0076}}$$

$$T = \frac{.054}{\sqrt{.0082}}$$

$$T = \frac{.054}{.091}$$

$$T = 0.59$$

The critical value of 0.59 is less than 1.96; therefore the difference is not statistically significant and the null hypothesis that there is no difference between the percentage of independent pharmacists and chain pharmacists that believe it is very important to continue their education is accepted.

(3) Comparison of Two Percentages Where the Null Hypothesis is Rejected.

Of the independent pharmacists, 66.7% believed it was very important for pharmacists to continue their education; 92.1% of the hospital pharmacists checked very important. (p. 32) The difference of 25.4% was tested for significance by the following test.

$P_1 = .921$; $P_2 = .667$; $Q_1 = .079$; $Q_2 = .333$; $N_1 = 38$; $N_2 = 366$

$$T = \frac{.921 - .667}{\sqrt{\frac{(.921)(.079)}{38} + \frac{(.667)(.333)}{366}}}$$

$$T = \frac{.254}{\sqrt{.0019 + .0006}}$$

$$T = \frac{.254}{\sqrt{.0025}}$$

$$T = \frac{.254}{.05}$$

$$T = 5.08$$

The critical value of 5.08 is greater than 1.96; therefore the difference is statistically significant at the 95% confidence level. The null hypothesis that there is no difference between the percentage of independent pharmacists and hospital pharmacists that believe it is very important to continue their education in pharmacy is rejected.

The illustrated methods were utilized to test all relevant percentage differences for this project. The critical values for all tests are listed in the body of the report.

Appendix IV

SIGNIFICANCE TEST FOR COMPARISON OF TWO ARITHMETIC MEANS

The difference between two means is tested by a method similar to that used to test the difference between two percentages. The formula is:

$$T = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

T = critical value

$\bar{X}_1$ = larger arithmetic mean

$\bar{X}_2$ = smaller arithmetic mean

s_1 = standard deviation of $\bar{X}_{\#1}$ group

s_2 = standard deviation of $\bar{X}_2$ group

N_1 = sample size of $\bar{X}_1$ group

N_2 = sample size of $\bar{X}_2$ group

If a critical value of 1.96 or greater is obtained, there is a statistically significant difference between the two means at the 95% confidence level. If the critical value is less than 1.96, there are more than 5 chances out of 100 that any difference is due to random chance and the difference between the two means is not statistically significant. If the critical value is 1.96 or greater, the null hypothesis that there is no significant difference between the two means is rejected. If the critical value is less than 1.96, the null hypothesis is accepted.

The above method was utilized to test the differences between the arithmetic means of expressed benefit of (1) local, district, state or national pharmacy meetings; (2) Extension Services in Pharmacy; (3) professional and business publications and (4) informal discussions with other pharmacists, detail men, and drug wholesale representatives.

The difference between the expressed benefit for Extension Services and local, district, state or national meetings or conventions is used as an illustration of the significance test.

Benefit of Extension Services

Mean ($\bar{X}$) = 3.71

Standard deviation = 1.13

N = 351

Benefit of Local, District, State or National Pharmacy Meetings or Conventions

Mean ($\bar{X}$) = 3.26

Standard deviation = 1.18

N = 381

$$T = \frac{3.71 - 3.26}{\sqrt{\frac{(1.13)^2}{351} + \frac{(1.18)^2}{381}}}$$

$$T = \frac{3.71 - 3.26}{\sqrt{\frac{1.28}{351} + \frac{1.40}{381}}}$$

$$T = \frac{0.45}{\sqrt{.0072}}$$

$$T = \frac{0.45}{.085}$$

$$T = 5.29$$

Since the critical value of 5.29 is greater than 1.96 there are less than 5 chances in 100 that the difference between the two means was due to chance. The null hypothesis that there is no significant difference between the expressed benefit of Extension Services and local, district, state or national meetings and conventions is rejected. Extension Services were more beneficial than local, district, state or national meetings and conventions.

The differences between the arithmetic means for the expressed benefit of the various major means of continuing education were tested for significance by the above procedure. The critical values for each test are listed in the body of the report. For further discussion of significance tests between means refer to Introduction to Statistical Analysis, 2nd Edition, by Wilfrid J. Dixon and Frank J. Massey, Jr.

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