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ABSTRACT

This document is a lengthy summary of the Report of the National Study of Optometric Education. Contents include: introductory material; evolution of optometric training; vision care; institutions providing optometric education and their objectives; the scope of optometry; educational implications of contemporary developments in optometric practices; manpower in optometry; faculty, curricula and libraries of colleges of optometry; students of optometry; vision research and optometric education; and financing optometric education. Recommendations concern cooperation with other professions, manpower in optomery, curriculum in optometry, faculty in schools of optometry, students of optometry, and financing optometric education. (MJM)

Optometric Education:

A SUMMARY REPORT

National Study of Optometric Education

National Commission
on Accrediting

Robert J. Havighurst
Study Director

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Foreword

This is a lengthy summary of the Report of the National Study of Optometric Education, which was completed in December, 1972 and which will be published in the summer of 1973.

The principal features of the Report are presented in short form in this Summary. Recommendations are collected at the end and stated in somewhat more general form than they are in the Report itself, where the context clarifies the most specific statements.

The Preface and the Introduction appear here in the same form that they have in the Final Report.

Copies of the Summary may be obtained from the office of the National Commission on Accrediting at $2.00 per copy, postpaid. Orders for ten or more copies will be filled at a reduced price.

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Preface

As early as 1962, the American Optometric Association took the initiative in recommending that an objective study by an independent group should be made of optometric education. This initiative was prompted by a growing awareness within the profession that optometry was entering a new era. Hopefully, the conflict with the medical profession was ended, or coming to an end. And the science of vision was on the threshold of new and vital development.

The American Optometric Association was insistent that a study of optometric education and its relationship to the profession of Optometry should be undertaken by an outside group. The study was not to be dominated by the profession but was to provide new insights into such factors as the changing nature of the profession, the changing requirements of optometric education, the type of students attracted to the profession, and the role of practitioners in serving the vision needs of their patients and their communities.

Several years elapsed before this study of optometric education was finally begun under the auspices of the National Commission on Accrediting. Fortunately, the National Commission has always had a broad conception of its mission in stimulating the professions and associations of educational institutions to improve their activities in establishing minimum standards of educational quality and in evaluating performance of particular colleges and universities in terms of those standards. A grant of $90,000 by the American Optometric Association to the National Commission on Accrediting in 1971 officially launched this Study of Optometric Education. The membership of the study commission was designated by the National Commission on Accrediting.

This study of optometric education has been organized as a two-fold or two-tiered enterprise. The study commission of 13 persons was responsible for the selection of a study director, who has in turn had the assignment of preparing the study materials and writing the study report with the assistance of various consultants. In addition, the study commission has held five meetings to appoint the study director, to approve the study outline, to

discuss various aspects of the optometric profession and optometric education, to review study materials, and to endorse the study recommendations. In the work of the study commission, Byron S. Hollinshead as vice-chairman has played a major part in assisting the commission itself to become effective participant in the enterprise.

This Study of Optometric Education was fortunate indeed to be able to persuade Dr. Robert J. Havighurst, Professor of Education and Human Development at the University of Chicago, to serve as study director. The principal credit for such accomplishment as may be claimed by this study must go to Dr. Havighurst. He has been diligent and imaginative in the collection of materials, in visiting the 13* schools of optometry, in obtaining study materials, and in interviewing students, faculty, and practitioners. This study could not have been made or completed without the work of Dr. Havighurst.

In planning this study, it was inevitable that the study commission should consider as models both the famous Flexner report of 1910 and the survey of dental education by the American Council on Education published in 1962. Optometry is the third largest of the primary health professions, ranking in numbers of practitioners and in the importance of health care service immediately after the medical profession and the dental profession. Yet no two professions are ever alike or confront the same problems. Accordingly, the study commission and the study director have had to think about new approaches to the assessment of professional performance and education for that performance.

In particular, the study commission and the director have been especially concerned about the new patterns being developed for the delivery of health care service to the American people and about the new arrangements for teams of specialists to provide the health care which health sciences now make possible.

In essence, the objective of a survey is to compare the ideal situation with what actually exists. When stated in this fashion, it is apparent that the performance in any field of endeavor will always fall short of the ideal. The purpose of a survey is to suggest ways by which this gap can at least partially be closed. The study commission and the director hope that this survey will perform that purpose.

It has seemed clear to the members of this study commission that the United States is on the verge of adopting one or more patterns of a national health plan. It has also seemed clear to the study commission that, as a health care profession, optometrists will have a vital role in such a plan—the role of meeting the vision care needs of the American people. The scope of optometric service will encompass a full range of vision care serv-

* Includes one Canadian school.

ice, and a better educated practitioner – and eventually an increased number of practitioners – will be necessary to meet these needs. There is also much yet to be done to advance the science of vision. These are the primary themes of this study.

It has always seemed to me that in this country we have been somewhat remiss in arriving at a definition of a profession. We tend to think of persons as pursuing either a vocation or a profession but the distinction is often blurred and the boundary line often is indistinct. The studies of professions which have been made from time to time in this country have not been as helpful as they might have been in clarifying our understanding.*

There are at least three minimum requirements in order for a profession to deserve designation as such: (1) a specialized body of knowledge and experience available for utilization; (2) an educational program within the social institution of higher education for conserving, transmitting, and advancing this knowledge along with development of the requisite personal skill in the application of that knowledge; and (3) an ethical commitment that this knowledge and skill shall be utilized only for the benefit and well-being of other humans. Optometry is today a profession under this definition.

On behalf of the study director, Dr. Hollinshead, and myself, I wish to express appreciation to our colleagues of the study commission who have contributed so cheerfully and so generously of their time, their energy, and their wisdom in making this study possible.

JOHN D. MILLETT

Chairman, Commission on
the Study of Optometric Education

Washington, D. C.
March 1973

* cf. Kenneth S. Lynn and the editors of Daedalus, *The Professions in America* (Cambridge: Houghton Mifflin Company, 1965); Lewis B. Mayhew, *Graduate and Professional Education, 1980* (New York: McGraw-Hill Book Company, 1970); and Edgar H. Schein, *Professional Education* (New York: McGraw-Hill Book Company, 1972).

Commission on the Study of Optometric Education

MEMBERS OF THE COMMISSION*

John D. Millett, Vice-President, Academy for Educational Development; Chancellor Emeritus, Ohio Board of Regents; Washington, D.C., *Chairman*

Arthur S. Adams, New England Center for Continuing Education, University of New Hampshire; President Emeritus of the American Council on Education.

Frank G. Dickey, Executive Director, National Commission on Accrediting, Washington, D. C.

H. Ward Ewalt Jr., O.D., Past President, American Optometric Association; Pittsburgh, Pennsylvania

Alden N. Haffner, O.D., Dean, State College of Optometry, State University of New York, New York City.

Joseph L. Henry, D.D.S., Dean, College of Dentistry, Howard University, Washington, D. C.

Watts Hill Jr., Past Chairman, North Carolina Board of Higher Education; Durham, North Carolina.

Byron S. Hollinshead, Dean Emeritus of University College, University of Florida; Director of the Survey of Dentistry, New Smyrna Beach, Florida; *Vice-Chairman.*

Raymond M. McKeown, M.D., Past President, American Medical Association Education and Research Foundation; North Bend, Oregon.

Alfred A. Rosenbloom Jr., O. D., President, Illinois College of Optometry, Chicago, Illinois.

* Appointed by the National Commission on Accrediting.

Charles E. Seger, O.D., Past President, American Optometric Association; Chairman, Council on Optometric Education; San Luis Obispo, California.

*Elvis J. Stahr, President, National Audubon Society, New York, New York.

STUDY DIRECTOR

Robert J. Havighurst, Professor of Education and Human Development, University of Chicago, Chicago, Illinois.

* Was not present at Commission meeting when recommendations were approved

Introduction

The Study of Optometric Education was commenced in the Spring of 1971 when the American Optometric Association requested the National Commission on Accrediting to appoint members of the Commission, to select a Director, and to publish the survey report. Professor Havighurst was appointed Director in May of 1971. He gave about half of his time to the Study from midsummer of 1971 to the close of 1972. The Commission met three times as a full Commission. Individual members and small groups worked with the Director at other times as well.

Leading up to the Study was a *Conference on Optometric Education* called by the National Commission on Accrediting and held in Washington, D.C. on January 18 and 19, 1971. About 50 persons attended this conference, including representatives of the schools of optometry, officers and other leaders of the American Optometric Association, and leaders in the fields of higher and health education. This conference concluded that a Study was needed and outlined in a general way the areas that should be covered. The people who later constituted the Commission were present at this conference.

OBJECTIVES OF THE STUDY

The Study was expected to analyze the present situation and to look ahead, making recommendations for the future. This meant that the following objectives should be achieved:

1. To explore the implications of the contemporary practice of optometry for the curriculum and administration of schools of optometry.
2. To suggest probable and desirable changes in optometric education relative to probable changes in the delivery of vision care.
3. To examine the characteristics and career expectations of students of optometry.
4. To estimate the probable needs for more students and for new schools of optometry over the next 20 years.

5. To study problems of faculty for schools of optometry;
6. To study and report on ways of financing optometric education.

The present situation was understood to be unstable, due mainly to the recent subsidies by the federal government which supported a major expansion of schools of optometry but which did not guarantee continuation of such support. Therefore, a realistic appraisal of future needs for optometrists was necessary as well as a careful study of the problems of future financing of optometric education.

Although a broad and intensive Survey would have been desirable, financial limitations indicated a need to focus the study on *education for optometry*, giving as much attention to research and to the nature of optometric practice as possible. Since an extensive examination of optometric practice could not be made as part of the Study, ways were found to get criticisms and evaluations by practitioners of the existing programs of schools and optometry. In this way, a connection was made between contemporary practice and the preparation of new practitioners. Also there was a substantial store of published and unpublished reports on optometric practice, which was available to the Director through the files and publications of the American Optometric Association.

CONDUCT OF THE STUDY

The Study actually took about 18 months and made liberal use of consultants and research associates. Visits were made to all 13* accredited schools and colleges of optometry. These visits consisted primarily of interviews with students and faculty members.

CONFERENCES AND MEETINGS

Conferences were organized or attended by the Director as follows: June 8–9, 1971, Chicago, Orientation Conference with heads of schools of optometry and leaders among practitioners; December 16–18, 1971, Toronto, Annual Meeting of American Academy of Optometry; January 8–10, 1972, New Orleans, National Optometric Conference; March 11–12, 1972, Chicago, National Student Conference on Health Manpower; May 5, 1972, Washington, Conference on Research in Optometry with leading researchers; June 17–21, 1972, St. Louis, Congress of the American Optometric Association; November 26–27, 1972, Williamsburg, Virginia, AOA

* Twelve in U.S., one in Canada.

Conference on Continuing Education; and December 16-19, 1972, New York, Annual Meeting of the American Academy of Optometry.

Commission Meetings were held on January 27-28, 1972; June 8-9, 1972; and October 16-17, 1972.

Small one-day conferences to obtain the perspective of practitioners on optometric education were held in Las Vegas (February 1972); Tallahassee, Florida (March 1972); Boston (April 1972); and Arlington Heights, Illinois (May 1972).

STUDY OF STUDENTS

Much effort was put into the study of students of optometry through interviews and questionnaires. Assisting the Director on this project was Mrs. Carol A. Brun, of the Extension Division of the University of Missouri at St. Louis. She had advice from Professor Fred Brechler on the design of the questionnaire and from Professor John C. Marshall on the computer analysis of the questionnaire and interview data.

ACKNOWLEDGEMENTS

There are many people who gave most valuable assistance to the Study. Merely listing their names hardly does justice to their important contributions. Some of them were:

Presidents or Deans of Schools and Colleges of Optometry: Charles A. Abel, William R. Baldwin, Spurgeon B. Eure, Lawrence Fitch, Edward J. Fisher, Alden N. Haffner, Gordon G. Heath, Frederick W. Hebbard, Meredith W. Morgan, Henry B. Peters, Chester H. Pheiffer, Alfred A. Rosenbloom Jr., and Bradford W. Wild.

Staff Members of the American Optometric Association in St. Louis: J. Harold Bailey, Executive Director; George M. Milkie; and Raymond I. Myers.

Staff Members of the AOA in Washington, D.C.: Richard W. Averill and Harry Doyle.

Presidents of the American Optometric Association: Richard L. Hopping, President, 1971-72; J. C. Tumblin, President, 1972-73; and Robert E. Day, President-elect, 1972-73.

Council on Education of the American Optometric Association: Charles E. Seger, Chairman.

Leading Practitioners: James A. Boacher, Irvin M. Borish, Howard M. Coleman, Robert Greenberg, John D. Robinson, Leo Manas, Adalbert Kamimski, and Bernard J. Shannon.

Researchers and Faculty Members of Schools of Optometry: Richard Feinberg, Glenn A. Fry, Monroe J. Hirsch, H. W. Hofstetter, Mrs. Alison Howard, John R. Levene, Nora Levine, Col. H. E. Maes, Donald G. Pitts, Vonne F. Porter, Roy Rengstorff, Jerome Rosner, John W. Streff, Mrs. Grace Weiner, and Emerson Woodruff.

For their knowledge and critical integration of material in several chapters, the Study is indebted especially to Frederick Brechler, Spurgeon Eure, Watts Hill Jr., Monroe J. Hirsch, Meredith W. Morgan, Henry B. Peters, and Alfred A. Rosenbloom Jr. Members of the Study Commission who also served on the Editorial Committee to put the finishing touches on the report were Frank G. Dickey, H. Ward Ewalt, Jr., Byron S. Hollinshead, and John D. Millett.

The Study owes an inestimable debt to Frank G. Dickey, Executive Director, and Miss Crystal G. Crone of the National Commission on Accrediting, who handled administrative matters, thus enabling the Director to use his time on the substance of the Study.

Smooth and efficient handling of correspondence and maintaining accessibility to files of a complex assortment of information are crucial to the conduct of such a Study. For this, the Director is grateful to his secretary, Mrs. Mabel Frazier. Much of the typing and retyping of manuscripts was done faithfully and well by Edythe M. Havighurst, wife of the Director, and by Mrs. Frazier.

Finally, the Director expresses his appreciation for the critical and positive assistance of the members of the Study Commission. These men gave freely of their time and knowledge and experience because of their belief in the values of professional education in the health care sciences.

ROBERT J. HAVIGHURST

March 1973

Evolution of Optometric Training

Toward the end of the 13th century the correction of vision defects by the use of lenses and frames known as spectacles was developed. Bacon, Kepler, Newton, Snell, Descartes, Huygens, Porta, and Hooke helped to make optics a science. Later Benjamin Franklin, inventor of the bifocal, and George B. Airy, one of the early workers with cylindrical lenses to correct astigmatism, applied optical principles to the problems of human vision.

The three-volume handbook *Physiological Optics* (1866) by Herman Helmholtz and *On the Anomalies of Accommodation and Refraction by the Eye* (1864) by Franz C. Donders are the scientific bases for physiological optics and sight testing.

Optometry grew out of these bases in the latter half of the 19th century and became established as a budding profession by 1901.*

During the first half of the 20th century, the training of optometrists in vision care became progressively more scientific, more intensive, longer lasting, and more expensive. The development of the profession of optometry might be said to have begun in the United States in 1892 when the first training school was established. By 1900, there were 60 private training schools in optometry where people with some practical training in the manufacture of spectacles could learn how to examine vision and prescribe the best lenses for an individual client.

* Became a full time occupation	1890
First training school established	1892
First local professional association	1896
First national professional association	1897
First state licensing law	1901
First use of the term "optometry"	1904
First university course	1910

In 1910, the first university program in optometry was established at Columbia University. This was a two year course of study. Within the next 15 years, three other university courses were instituted at the University of Rochester, Ohio State University, and the University of California at Berkeley. These were four year programs.

In the 1950s, the optometry curriculum was lengthened to five years, and in the 1960s to six years. The first two years, consisting of basic science and mathematics courses and some general education, are now generally taken in a liberal arts or community college. Then the student enters a professional school or college of optometry for a four year program leading to the degree of O.D. (Doctor of Optometry).

The broad scope of present day optometry has been officially recognized by government's Department of Health, Education, and Welfare as is seen in a report by Elliot L. Richardson, former Secretary of HEW:*

> Although the primary service performed by most practicing optometrists is the provision of eye examinations and visual analyses, optometrists are trained to detect any departure from the optimally healthy eye. The scope of optometric services has expanded beyond basic clinical refractions, fabricating and dispensing eyeware; now included are visual screening examinations, clinical instrumentation, contact-lens fitting, visual training, orthoptics, low-vision aids for the partially sighted, artificial eyes, industrial vision-consultation, and public and community health. The most rapidly expanding area of service is in school consultation and remedial services for low achievers.
>
> The optometrist is trained and bound by professional ethics to refer patients in whom indications of disease have been found to a physician or other health practitioner for definitive diagnosis and appropriate medical, surgical, or other treatment.

* "The Health Professions Educational Assistance Act." *Report to the President and the Congress*, Elliot L. Richardson, Secretary, U.S. Dept. of HEW, September 1970, page 67.

Vision Care

There are two categories of licensed health care practitioners who provide vision care in the United States. These are *optometrists* (about 18,000 in active practice) and *ophthalmologists* (about 9,000 in active practice). The ophthalmologist, with an M.D. degree and three or four years of specialty training, is licensed to provide all kinds of medical services and specializes in eye surgery and the treatment of such diseases as glaucoma. A study of vision manpower by Herbert Mote reports that in 1968 ophthalmologists were present in 2,049 communities, generally in larger cities. The same study reports that optometrists were in practice in 5,428 towns and cities, many of these locations being small cities in the 5,000 to 50,000 population range. Another study indicated that 47 percent of optometrists are in practice in communities of this size range.

The optometrist provides a wide variety of vision care services. However, the treatment of eye problems with drugs and surgery is provided by the ophthalmologist.

Lenses are ground to prescriptions by *optical technicians* and spectacles are fitted by *dispensing opticians*. There were approximately 15,000 of the former and 10,000 of the latter in 1968. Finally, there were about 10,000 *ophthalmic assistants* who assisted ophthalmologists and about 18,000 *optometric assistants*.

A survey made by the Public Health Service in 1965 66 indicated that approximately 30 percent of the people who acquired glasses in the two year period before the survey obtained prescriptions for their lenses from ophthalmologists. Somewhat more than 60 percent had obtained their prescriptions from optometrists. Presumably the others purchased glasses "over the counter."

Specialists in eye and vision care, whether they be optometrists or ophthalmologists, are not distributed evenly throughout the country. Some states and regions have as many as one optometrist to 7,000 residents, while six have only one optometrist to 17,000 to 19,000 residents. The north central states and the Pacific coast states have the highest proportion of optometrists to the population, while the southern region has the lowest pro-

portion. Furthermore, the large cities have fewer than average optometrists in proportion to the population though their suburbs generally have a relatively higher proportion. There are only a very few counties without at least one optometrist. Less than half of the counties have a resident ophthalmologist.

VISION CARE OVER THE LIFE SPAN

Optometry aims to help people attain clear, comfortable, efficient vision and to enhance their visual performance skills.

An estimated 80 percent of what an average human learns depends on his vision. If he needs to read a good deal, or to do other work requiring accurate visual function, he is likely to need vision care services.

In a national health survey made by the U. S. Public Health Service in 1965-66, it was found that when appropriate age groups of male and female are averaged, approximately 48 percent of the civilian, non-institutionalized population age three years and over had corrective glasses. The proportion increased with age, ranging from a low of 15 percent for persons 3-16 years of age to a high of 88 percent for persons 45 years and over (Table 1). Women obtained glasses earlier than men. Among those with glasses who were over 45 years of age, 59 percent of the women and 42 percent of the men obtained corrective lenses before reaching age 45.

Objectively observable consequences of visual problems are seen primarily in school and in the labor market. Approximately 25 percent of children have some difficulty in learning to read and an unknown proportion of this group have some sort of visual problem. In industrial work, uncorrected vision problems among workers account for a substantial share of waste and spoilage of materials, accidents, and lowered productivity.

TABLE 1

Percent of Persons With Corrective Lenses: 1965-66

	Percent of Age Group	
	Male	Female
All Ages, 3 years and over	43	53
3-16	13	17
17-24	34	49
25-44	35	48
45-54	76	86
55-64	89	95
65 and over	90	95

Source: National Center for Health Statistics. Series 10, No. 53. *Characteristics of Persons with Corrective Lenses: 1965-66. This table applies to the civilian, non-institutionalized population.

From the facts about the incidence of vision problems in relation to age, it appears possible to divide the life span roughly into four periods, which differ from each other in vision characteristics and in needs for vision health services.

a. Childhood and Youth (Age 4–25).

There is a steady increase of significant vision problems, involving 20 percent of children age 5–9 and rising to 30 percent in youth age 15–19.

b. Young Adulthood (Age 25–45).

The normal course of visual development finds the eyes to be stabilized by age 25 and does not produce much observable developmental change until the decade of the 40s, when loss to elasticity of the eye lens makes it difficult for the eye to accommodate itself to near vision and therefore requires reading glasses for most people.

c. Middle Age and Maturity (Age 45–70).

As the crystalline lens loses elasticity, most people will need vision care of the eye several times during this period. Furthermore, cataract, glaucoma, and degenerative eye diseases appear with increased frequency.

d. Old Age (70 and over).

The survey shows a great increase of vision problems during the 60s, and nearly 100 percent of persons over 70 need professional eye care. Many older people resign themselves to poor vision when they could have near normal vision with adequate treatment. A recent estimate of the frequency of vision care indicates that only about 20 percent of the 65 and over age group receive vision care of any kind within a given year.

A great deal of research has been devoted to problems of *low vision* in recent years, and older people—who are most likely to encounter these problems—are now in a position to profit from eye care given by specialists in the low vision field.

THE NEED FOR VISION CARE

In considering the frequency of vision care service for all segments of the population, it should be recognized that, under the present health care sys-

tem, cost makes the ideal program difficult to attain. This ideal program probably should be:

1. An examination of the infant at whatever age the parents or pediatrician suspect an eye or vision problem.
2. A professional examination, comprehensive in scope, by an optometrist or ophthalmologist of every child before he enters school.

Early detection and correction of visual problems are important because they are easier to correct, as in amblyopia and squint, at an early age. Uncorrected visual problems may interfere with the learning process and thus hinder development.

3. Annual examination during the school years. During this period of rapid growth and development, changes in the visual structure and function are most likely to occur.
4. Biennial examination of those age 20-45 is recommended.
5. Annual examinations of those over 45 is the ideal. By age 45, prebyopia has set in, and the incidence of glaucoma, cataract, and other degenerative diseases is increasing.

DEFINITIONS

For the purposes of this Study the term "vision" as in *vision care* or *visual problem* is used to mean the function of the visual mechanism and visual perception. It is differentiated from *eye care* or *eye problem* which refers to the structure of the eyes and its adnexae.

Vision is a complex process with maturational and experiential components, of which acuity is only one. Some aspects of vision are innately determined while others are learned. The quantity and quality of the visual performance skills affect directly an individual's achievement in many life situations—ability to learn, to drive a car, to become skillful in sports, to enjoy many leisure time activities.

Visual perception refers to a conscious awareness and interpretation of the environment through interaction with other sensory modalities.

An *optometric eye examination* and visual analysis include a determination of the integrity of the external and internal eye, an assessment of visual function and visual perception. Measures of visual function include visual acuity, monocular and binocular motility, depth perception, fusion, refractive status, power and accuracy of convergence, monocular and binocular range of accommodation, accommodative-convergence relationships, fusional reserves, and color vision.

Where indicated, central and peripheral visual field studies, interocular pressure, eye-hand coordination, tests for amblyopia and strabismus, and a battery of tests of visual perception are included.

Refraction (sight test) is one step in a visual analysis which involves the measurement of the degree of myopia, hyperopia, and astigmatism.

Vision therapy is a program of training designed to improve visual performance; promote visual readiness for learning, readiness for vocational demands or leisure time interests, and to enhance visual comfort and efficiency. One component of vision therapy (orthoptic training) is used to straighten squints (crossed eyes and other deviations) and improve the vision in amblyopia.

Institutions Providing Optometric Education and Their Objectives

During the 50 year period beginning in 1910, the Council on Optometric Education of the American Optometric Association became established as the accrediting authority for schools and colleges of optometry. The Council adopted a policy which finally led to the demise of the proprietary schools, several of them converting to independent non-profit institutions. There are now five such colleges, together with eight university affiliated colleges which are accredited in the United States and Canada.

These schools and colleges are:

Independent non-profit educational institutions

Illinois College of Optometry – Chicago
Massachusetts College of Optometry – Boston
Pennsylvania College of Optometry – Philadelphia
Southern California College of Optometry – Los Angeles
Southern College of Optometry – Memphis

Schools that are affiliated with universities

Indiana University – Bloomington
Ohio State University – Columbus
Pacific University – Forest Grove, Oregon
State University of New York – New York City
University of Alabama Medical Center – Birmingham
University of California at Berkeley
University of Houston
University of Waterloo – Waterloo, Ontario, Canada

These schools have enrollments as shown in Table 2. They have all grown in size during the past seven years, and are due to expand further, though their rate of expansion will depend on policy and financial decisions made in the various schools and also in federal and state government circles.

It will be noted that the university related schools offer graduate programs leading to the M.S. and Ph.D. degrees in addition to their main body of professional students in the four year professional course which leads to a doctor's degree (O.D.) and which prepares students to take the state examinations for licenses to practice.

All of the states in the United States have passed laws to license optometrists and to control the educational requirements for the license. The first state to do this was Minnesota in 1901. By 1924 every other state had done so.

The objectives of education in optometry are analogous to the objectives of education for every primary health profession. They have been stated unofficially as follows:

1. To qualify men and women for the practice of optometry as this practice has been defined in this Report.
2. To instill in the student a scientific and professional attitude.

TABLE 2
Enrollment and Graduates of Schools of Optometry: 1973-1975

School	Enrollment 1972-73	Graduates 1973	Graduates Expected 1975	Graduate Students, 1972*
Alabama	70	7	23	**
California (Berkeley)	214	45	53	13
Houston	242	57	57	3
Indiana	248	54	60	12
Ohio State	210	47	56	10
New York	45	0	20	6
Pacific	274	66	66	2
Waterloo	250	50	60	
Illinois	497	106	114	
Massachusetts	251	55	64	
Pennsylvania	507	100	124	
Southern California	261	58	61	
Southern	498	96	119	
Total	3,567	741	877	46

* Figures supplied by the Council on Optometric Education.

** Supports graduate students in other departments.

Source: Adapted from Stuart Bernstein, "Optometric Education Statistics," *Journal of the American Optometric Association*, 43: 869-872, (August, 1972).

3. To provide a background of experience and motivation for the graduate's contribution to the civic and social welfare of his community.

4. To encourage and facilitate graduate study leading to teaching and research.

5. To encourage and facilitate research, both in the clinical aspects of optometry and in the fundamental sciences which support optometry.*

* Adapted from H. W. Hofstetter, "Objectives in Optometric Education," *Journal of the AOA*, 42:544 549 (June 1971).

The Scope of Optometry

The function of optometry was initially the testing of vision in order to prescribe appropriate lenses for spectacles. But this had to be broadened as people went to optometrists with visual problems that could not always be corrected by glasses. The optometrists had to be able to recognize defects of vision that could be treated through vision therapy (popularly called eye exercises). They also had to learn to recognize and diagnose diseases of the eye that required medical attention for which they would refer the patient to an ophthalmologist or other appropriate health care specialist.

The training course expanded as the scope of optometry expanded. Students studied general pathology and ocular pathology. As research on vision produced more useful knowledge, students spent more time studying physiological optics and the psychology of vision. Furthermore, as contact lenses became practical for general usage, optometrists became especially proficient in designing contact lenses, fitting them to the individual patient, and teaching patients to use them with safety and efficiency. Optometrists fit about 70 percent of the contact lenses that are worn today.

A list of vision problems diagnosed and treated by optometrists today includes:

Myopia (near-sightedness)
Hyperopia (far-sightedness)
Astigmatism
Presbyopia
Low vision
Amblyopia
Suppression
Strabismus
Aniseikonia
Anisometropia
Binocular vision problems
Visual perceptual deficiences
Learning disabilities
Spatial disorganization
Laterality-directionality problems
Color vision deficiencies
Fusion inadequacies
Intrinsic and extrinsic ocular muscle problems
Job-specific vision performance problems

Accommodative-convergence abnormalities
Phoria problems
Visual development problems
Environmental problems influencing eye safety and visual efficiency

RELATIONS OF OPTOMETRY WITH OTHER PROFESSIONS

The practice of optometry up to the present day has been structured primarily upon the basis of individual or solo practice. This arrangement has often isolated the optometrist from other professionals in health care and has inhibited the desirable communication and interprofessional referrals needed in health care delivery. Where clinic and group health practice has developed, there is a growing tendency to include one or more optometrists within the structure. As of 1972, however, it has been estimated that only about 15 percent of all practicing optometrists are involved in group practice. It seems likely that this proportion will increase, and the integration of optometric education with other health education groups could do much to advance a desirable cooperative relationship in health care delivery.

The fields of service of optometry and ophthalmology overlap. Optometry has unique concerns and interests in eye health. Optometrists and many ophthalmologists perform vision examinations and prescribe spectacles for the vision needs of their patients. This overlapping of service has given rise to conflicts in professional jurisdiction and to conflicts in economic-social status which have marred the need for friendly, cooperative relationships. The complex nature of the various disorders of the visual system (physical, physiological, psychological), their incidence and prevalence, their epidemiology and demography, the numbers and distribution of professional practitioners, and the unique knowledge and skills of both optometry and ophthalmology—all of these considerations argue forcefully and cogently for close, continuing, and harmonious relationships between the two professions. Optometry and ophthalmology need each other; or, more precisely, we should assert that the public needs both.

When one asks how these relationships are to be cemented, perhaps the best examples are those provided by the Joint Interprofessional Relations Committee in Michigan* and the Kansas Joint Committee of Ophthalmologists and Optometrists.

Both groups have met frequently to improve communications, eliminate misunderstandings, and solve mutual problems. They have set up guidelines

* A full account of the work of the Michigan Committee is to be found in *The Sight Saving Review, Spring 1971 edition*, pages 5–8, by Ball and Henderson.

and rules for committee operations. Further, they have developed concepts relating to patient care and the efficient delivery of services. Among these concepts are agreement concerning the mutual professional independence of ophthalmology and optometry, agreement on how to use and supervise auxiliaries, and agreement that "the referral of patients in and out of an interprofessionally staffed office must be treated with great respect."

OPTOMETRY IN THE HEALTH CARE TEAM

The practice of medicine is a responsibility which the physician and the surgeon cannot delegate to the other members of the medical team, no matter how indispensable or helpful is their contribution. The concept of the "medical team" should not be confused with the concept of the "health care team." The health care team brings together practitioners of different professional competencies, joined by their interdependent concern of meeting the total health needs of a patient.

In the past three or four decades in particular, optometry has greatly expanded its own diagnostic and treatment armamentarium in the wide field of visual performance, visual efficiency, visual skills, visual development, and visual comfort and safety. It has contributed important new knowledge in the fields of physiological optics, sensory psychology, ophthalmic optics (including contact lenses), orthoptics, learning theory, and recognition of pathology.

There is substantial evidence that optometrists are well trained to recognize pathology. This is evident from a study of the optometry curriculum. Some of the schools of optometry are located in large highly respected state universities. For example, one of these universities appointed an Ad Hoc Committee on pathology training for optometry students consisting of representatives of microbiology, anatomy, pathology, physiology, ophthamology, and optometry to arrange the pathology program of optometrics. Other optometry schools have arranged similar programs in pathology.

Most state optometric practice legislation prohibits the use of drugs or surgery by optometrists. There are 14 states whose statutes either do not contain such a prohibition with regard to the use of drugs or contain specific provision for optometrists to use diagnostic pharmaceutical agents in the determination of the ranges and powers of human vision, measurement of refractive error (and the use of lenses and prisms for the aid thereof). A present issue is whether it is in the public interest for optometrists to use diagnostic pharmaceutical agents, and whether the various optometric acts should be changed to permit their use provided certain educational qualifications are met. Various contact lens solutions and fluorescin have been in

wide use for a quarter of a century. The use of topical anesthetics has become more widespread with the universal use of tonometers for the detection of increased intraocular pressure. Should mydriatics and cycloplegics be included also? Some ophthalmologists have been vigorously and bitterly opposed to this, believing it to be an encroachment on the field of ophthalmology, even though its principal effect would be to aid the optometrist in the earlier detection of ocular disease and referral of such cases to the ophthalmologist for diagnosis and treatment.

Optometrists view their service as related to vision performance. As such they are concerned with eye health, acuity, comfort, visual perception, binocular coordination, vision development, visual efficiency, and vision performance. Ophthalmologists tend to regard their service in relation to eye health, the medicine and surgery of the eye, and refractive errors as well as diseases of the eyes. This difference, instead of creating complementary interacting services, has, in fact, served as a further source of conflict—a semantic problem. Much confusion has arisen between the professions with regard to the particular use by each of such terms as "refraction—vision examination," "eye care—vision care," "detection—diagnosis," "vision performance—visual acuity," "treatment—therapy," and the various uses of the term "drug." It seems likely that members of any interprofessional committee devoted to the improvement of relations between optometry and ophthalmology will need to be especially sensitive to this semantic difference and the emotional connotations involved.

Clearly there is a real need and a present opportunity, as well as a variety of mechanisms, for a renewed effort to establish improved relations between optometry and ophthalmology that would be in the public interest. Built upon the many personal, cooperative, mutually respectful relationships existing at the local level, the leadership of the two professions should be challenged anew to develop a meaningful dialogue. The large unmet need for vision care, and the significance of excellent vision in our highly industrialized society, demand that this challenge be accepted.

OPTOMETRY AND THE SOCIAL SCIENCES

The psychology of vision is one of the basic science areas for students of optometry. Vision may be studied as a psychophysiological process and also as a function of behavior related to the personality, especially to the developing personality of the child and adolescent. There is a rapidly growing body of knowledge regarding this important aspect of behavior which has challenged the optometrist and from which the optometrist is gaining new insights in the field of developmental vision.

Optometry has had a long and mutually rewarding relationship with the profession of education, especially in the elementary schools. Optometrists

have done much to advance knowledge in the field of vision screening and have applied this knowledge to the particular benefit of school children. The optometrist is especially concerned about detecting functional disorder in visual performance; the ophthalmologist is especially concerned about detecting any pathological disorder in visual performance. Both are necessary, but functional disorders are far more likely to occur among children than pathological disorders. Optometrists have worked closely with reading specialists in programs of remedial reading and with clinical psychologists who work with problems of learning impairment.

A cooperative relationship between optometric practice and the protession of social work is in an early stage of development. The growth of federal, state, and local government health care delivery systems in conjunction with social welfare programs has encouraged this relationship. A similar relationship of long standing involves the optometrist and the safety engineer as they deal with problems of eye safety and vision performance in industry.

Educational Implications of Contemporary Developments in Optometric Practice

The trend in all forms of health care appears to be moving in the direction of group practice with facilities and paraprofessional assistants organized to promote efficiency and economy. Thus, the specialist (the optometrist and other health care specialists) serves more patients.

However, there are great advantages in the close person-to-person relationship between the doctor and his patient which have contributed to making optometry a viable and a growing profession. It is very probable that solo or partnership or associate practice will continue to be the most common form of practice, especially in communities of 5,000 to 50,000 population where approximately 50 percent of optometrists are now located.

Recognizing that prepayment health care programs are on the increase, and that a national health service plan will include this feature, the American Optometric Association adopted the following Resolution at its 1972 meeting:

BE IT RESOLVED, that the American Optometric Association will support any equitable system of health care that contains the following criteria:
1. Vision care be a primary health care service.

2. The plan be financially sound and fiscally responsible.
3. The plan provides for high standards of care, including peer review.
4. The plan provides for the free choice of practitioner and does not discriminate in the awarding of fees for service.
5. The optometrist be a primary point of entry.

PUBLIC HEALTH AND COMMUNITY OPTOMETRY

The greatest unmet need for vision care at present lies in the low income areas of the big cities. What has become known as the "inner city crisis" of big cities and metropolitan areas has resulted in severe shortages of health services, including optometric services in the crowded low income areas of the cities. As the middle income segment of the big city population has moved to the outer areas of the city and to the suburbs, there has been a concentration of low income residents in the inner city.

Clearly, adequate health services must be restored to the inner city and optometrists must take part in this development. The need will probably be met partly through the establishment of community health centers with a professional and paraprofessional staff offering all kinds of health services. It will be met partly by the establishment of optometric centers with state or federal government support as exemplified in the Optometric Center of New York City. And it will also be overcome in the end by true urban renewal which makes the inner city a safe and attractive place for people of all income levels to live.

OPTOMETRY AND PUBLIC HEALTH

The public health movement in the profession of optometry began in the early 1960s with the growing awareness of evolving trends in both government activities and community developments. Since that important health decade began, the American Optometric Association and the optometric communities in the various states have stressed the importance of participation on the part of optometrists in all phases of health planning, regional medical programs, group practices, programs of Medicaid, peer review, and professional audit. Likewise, optometrists have been encouraged to exercise their leadership roles in community health developments.

Parallel to these developments has been an encouragement of talented recent graduates from the schools and colleges of optometry to enter into programs leading to advanced degrees in public health, public administration, social services, epidemiology, and health services administration.

Of special significance is an important shift in emphasis in the teaching of public and community health in the schools and colleges of optometry

with particular reference to some of the social aspects of health care delivery. This is evidenced by the increase in the numbers of papers relating to these subject areas that have been published in the optometric journals and periodicals, as well as the introduction of courses in public health in the optometric curriculum.

Since about 1965, the American Optometric Association, through its Committee on Public Health and Optometric Care, has encouraged schools of optometry to develop courses in public health and community optometry. Thus, there has been a definite attempt to alert students to the importance of community optometry in the development of the profession.

TECHNOLOGICAL AND ECONOMIC FORCES TEND TO FAVOR GROUP PRACTICE

Another of the causes of change in optometric practice is the technological development accompanying the growth of visual science during the past 30 years. This has expanded the scope of optometry, made the training of the optometrist more complex and costly, and made the cost of equipping and operating a modern office much more costly. These developments, in turn, are changing the nature of the practice of optometry.

As would be expected, the new technological devices are expensive and are justified only if they add valuable information and can be used by the average practitioner. The increasing cost of starting an office practice is striking. Inflation, technological improvements, and the need for additional equipment and space are substantial factors in these rapidly increasing costs.

With the application of electrophysiology to the measurement and monitoring of visual functions, the cost of adequate equipment for an optometric office will probably increase more in the next decade than it has in any previous 10 year period. Additional equipment needed for electrophysiology and other new techniques could double present equipment costs.

With increasing functions and increasing equipment, the optometrist needs assistance from technicians. This is another increased overhead expense. As costs accelerate, they become an economic stimulus to keep the equipment busy seventy hours a week (rather than thirty-five) with very little increased expense. This is possible when two or more optometrists are in group practice or share facilities.

This overview of the social, technological, and economic forces that promote change in the practice of optometry indicates clearly that the next 10 years will require major innovations in policy and practice which organized optometry should try to foresee.

Manpower in Optometry

Health care is sure to demand the services of more men and women during the next two decades. The coming of a national health insurance program with federal government support should extend health services on an adequate basis to all of the population. However, there will need to be more than a simple addition to the existing corps of health specialists. This may involve drastic changes in the geographic location of practitioners as well as intensive study of ways of providing care at less cost.

THE RATIO OF OPTOMETRISTS TO POPULATION

The average optometrist-to-population ratio is 1:11,000 or 9.4 per 100,000 population. While observers disagree about the optimum number of optometrists to population, there can be no doubt that the number of practicing optometrists is now less than adequate. This is due to population growth, attrition rate, increased scope of optometric training and service, geographic distribution, and the possibilities of prepaid health care or extensions of third party health care payments.

Schools of optometry have expanded greatly since 1967, graduating approximately 700 new optometrists in 1973 compared with 350 a decade ago. Table 3 shows the expected number of graduates by the end of the 1970s to be about 1,000 a year if the existing schools go ahead with their present plans for expansion of enrollments or if new schools are established.

FUTURE MANPOWER NEEDS

Estimates of the numbers of optometrists that will be needed during the next 25 years must take into account prepayment and group health plans, the coming of a national health service plan, and the growth of population. The national population will grow to 234 million by 1980, 270 million by

TABLE 3
Graduates of Optometry Schools in the USA

Academic Year	Total Graduates
1941-42	418
1944-45	157
1947-48	1452
1948-49	1934
1949-50	1572
1952-53	684
1955-56	333
1960-61	319
1965-66	413
1969-70	445
1970-71	528
1971-72	683
1972-73	701
1974-75	817
1978-79	984

1990, and somewhat over 300 million by the year 2000, according to conservative estimates of future birthrates. If we should make the conservative assumption that the demand for optometric services increases 10 percent because of a variety of group health plans, and also increases in relation to the population growth, this would require 23,400 optometrists in 1980, 27,000 in 1990, and 30,000 or more in the year 2000.

Assuming that 23,400 optometrists will be needed in 1980, at a ratio of one optometrist to 10,000 population, there would have to be an increase of 5,400 between 1972 and 1980. In addition, there will have to be enough new graduates from optometry schools to make up for attrition due to retirement and death. This is estimated at about 425 per year under 1970-80 conditions.* Adding 425 per year for the eight year period from 1972 to 1980, we get a total of 9,000 new optometrists needed between 1972 and 1980. But the 12 colleges in the United States will graduate only about 6,400 between 1972 and 1980. Thus, on the basis of this most conservative estimate, there is likely to be a deficit of approximately 2,400 optometrists in 1980.

For projection purposes, it may be useful to estimate the minimum, medium, and maximum optometric manpower needs by 1980 and then relate these needs to the size of graduating classes of optometric schools. Using the figure of 2,400 as a conservative estimate of the currently foreseeable shortage by 1980, we see that if we added 500 to each entering class

* This attrition figure may be too low. The problem of measuring attrition is discussed in the chapter on Manpower.

beginning in 1974, we would start to close the obvious manpower gap with the graduating class of 1978, and would close it completely by 1982.

But the above figures represent a minimum that does not take account of the probable development of a national health plan which would include vision care. While no one knows precisely what the effects of a national health plan would be, there are numerous studies which indicate that at least 20 percent of the population have unmet vision care needs. These needs are in three principal areas: comprehensive examination and vision care for school children, comprehensive vision care for those living in impoverished rural and urban areas, and the special vision care needs of the elderly.

Since calculations involving the effects of a national health plan will doubtless involve the use of large scale clinics, and the increasing use of paraoptometric personnel, it is very difficult to estimate exactly what the additional professional manpower requirements might be. However, if we assume that 20 percent is a fairly accurate estimate of unmet vision care needs, and if we assume that increasing efficiency, improved equipment, plus considerable division of labor with paraoptometrists may reduce manpower requirements by half, we are still left with a *substantial* need for additional optometric manpower under a national health plan. At the least, this would amount to an additional 10 percent beyond the need previously estimated under minimum requirements — or an increase of 2,340 optometrists. Again, this would require an addition of about 500 students to each entering class beginning in 1974 to reach the goal by 1982. These calculations, then, indicate that if and when a national health plan is begun, the present entering classes should be doubled. In sum, to reach the most conservative estimate of the shortage of optometrists by 1980 (2,400) would require a 50 percent increase in the entering class of 1974. To take care of a modest estimate of the additional optometrists needed under a national health plan (2,340) would require an increase of another 500 students in the entering class of 1974 if the goal were to be reached by 1982.

One additional estimate should be made representing the ideal situation in optometric manpower. This would be the goal of 1:7,000. Such a ratio would require 33,430 optometrists by 1980, or about 10,000 beyond the minimum foreseeable requirement of 23,400. While the manpower ratio of 1:7,000 would be highly desirable, it seems unrealistic to expect that it could be reached by 1980. If what we have called the minimum and medium goals could be attained by 1982, then perhaps plans could be made to try to attain the ideal goal by 1990, though by that time the population would have increased to 270 million and the ideal optometric manpower figure would be 38,555 — approximately double the number of optometrists practicing today.

At present, there are four states with a ratio of approximately 1:7,000: Illinois, Oregon, Rhode Island, and South Dakota. Twenty percent of the

counties in the United States also have this ratio. The Commission has had no evidence that such a ratio represented an oversupply.

FORMS OF GROUP PRACTICE IN RELATION TO MANPOWER DEMAND

There is evidence that the optometrist who is a member of a group, either for vision care or for comprehensive health care, is utilizing his time more efficiently than the average optometrist who has a private, solo practice. For example, the Puget Sound Health Cooperative in the state of Washington serves about 145,000 members on a prepayment basis. This organization employed 12 optometrists and three ophthalmologists in 1972. This is a very efficient operation with optometrists generally seeing the patient who comes in for a routine eye examination and referring the patient to an ophthalmologist only when he concludes that an ophthalmologieal examination is indicated.

The patient load is generally greater in the group plans than in solo or associate practices. Thus, the Southern California Kaiser optometrist generally sees 15 patients per day, his Puget Sound Health Cooperative colleague sees 13 or 14 patients, while a practitioner in solo practice is more likely to see eight to 10 patients a day. However, the group plan may offer a minimal rather than comprehensive vision care service. For example, Group Health of the District of Columbia did not provide vision training in 1972 and some plans did not provide contact lenses unless they were needed for medical reasons.

By looking at existing health prepayment groups, some conclusions can be drawn about the effective utilization of optometrists by consumers. These groups utilize both ophthalmologists and optometrists.

	Ratio	
Members	Ophthalmologists	Optometrists
780,000 Health Insurance Plan of Greater New York	1:33,333	1:18,800
145,000 K-P Portland	1:48,333	1:18,130
962,000 K-P Oakland	1:32,333	1:18,000
900,000 K-P Los Angeles	1:45,000	1:18,750
136,000 Puget Sound Health Cooperative	1:47,000	1:13,600
75,500 Group Health of D.C.	*	1:12,000

* Not provided in group's budget in 1970. When services were required, they were purchased by the plan outside the group.

Source: Henry R. Mason, "Manpower Needs by Specialty," *Journal of the American Medical Assn.* 219, 1621–1626, March 20, 1972.

The average utilization of optometrists in these six prepayment plans is 1:16,500 members. The range is from 1:12,000 to 1:18,750. The highest ratio is at Group Health of the District of Columbia, which did not budget for ophthalmologists. The ratio of ophthalmologists in five areas is 1:41,000 members. The ratio of optometrists to ophthalmologists is 2.5:1, and varies between 3.5:1, and 1.8:1.

In Great Britain, with a national health service, there is one optometrist to 10,050 persons, and one ophthalmologist to 53,600 persons. Under the British plan, 19 percent of the vision tests are administered by ophthalmologists and 81 percent by optometrists.

CONCLUSIONS ABOUT NUMBERS OF OPTOMETRISTS NEEDED OVER THE NEXT 20 YEARS

It is fairly clear that the current expansion of enrollments in colleges of optometry is barely sufficient to maintain the existing ratio of approximately one actively practicing optometrist to about 11,000 persons over the remainder of the 1970s. With a 10 percent addition, this seems to be a reasonable arrangement under present conditions for the contemporary group of optometrists. But a national health plan, including eye care, will certainly step up the demand. Furthermore, the increasing development of group health organizations offering comprehensive vision care will doubtless increase the demand above what we have indicated.

Several health service cooperatives and group service corporations give empirical evidence of the practicable ratio of optometrists to ophthalmologists in an organization where it is to the interest of both groups of practitioners to use their skills efficiently and economically. Where they have worked out a rational and mutually satisfactory division of labor, it appears that the practicable ratio is somewhere around three optometrists to one ophthalmologist. Since the 1973 ratio in this country as a whole is about 2.1:1, this suggests that there may be a demand for increasing the relative numbers of optometrists in order to staff the growing group health services which are assuming more and more of the load of health services in this country.

On the other hand, the group health organizations operate so that the optometrist sees more patients per day or week than is customary in a solo practice. This fact may tend to hold down the absolute numbers of optometrists who are needed even though the ratio of optometrists to ophthalmologists may increase.

Until there is a sound basis for decision about numbers of practitioners needed, it seems wise to expand by about 50 percent the enrollments in colleges of optometry beyond the level of approximately 1,000 in the beginning class of 1974.

This might be achieved in either of two ways. One way would be to increase the size of the entering classes to 70 or 75 in the nine schools of optometry which now have less than that number; the number of graduates from the 12 United States schools would then increase to approximately 1,000 per year. But six of the nine schools with less than 75 students in the entering class are state-supported. These schools are not likely to increase their present enrollments unless they receive substantial out-of-state aid, increased federal government support, or payment from states which do not have schools of optometry and therefore rely on other states or private resources to supply training. Furthermore, the smaller schools cannot expand their enrollments without new buildings and clinical facilities. This would involve large capital expense and an increase in the base population from which to draw clinical patients.

The other way of expanding numbers of graduates is by adding several new schools. Vigorous forces are under way to develop new state-supported schools. There is evidence of a need for new schools in the southeast, the middle Atlantic, the north central, and the mountain states. Even though there are difficulties tending to impede the establishment of new state-supported institutions, the Commission agrees with the consensus of the optometric profession that new schools of optometry should be affiliated with a state university or a health science center rather than be free-standing.

Ways by which a state-supported school could serve students from states without schools of optometry, through regional compacts or contracts with state boards of higher education, are discussed in the chapter on Financing Higher Education.

New schools of optometry are needed for several important reasons:

1. To increase opportunity for students in areas distant from present schools.
2. To provide for the neeessary increase in numbers of students with class sizes appropriate to each institution's total educational resources—buildings, clinical facilities, and clinical patients.
3. To provide more opportunity for innovative programs through new schools located in places that facilitate cooperation with training programs for other health science disciplines.
4. To increase the force behind the drive for greater financial support for optometric education from the federal and certain state governments.

As 1980 approaches, the leaders of the profession and of the colleges of optometry will be in a better position to estimate manpower needs for the 1980s. The development of a national health service plan, the effects of new technology and instrumentation, and the increasing rate of retirement of optometrists who came into the profession during the 1948-53 graduation bulge can be more accurately predicted.

Faculty, Curricula, and Libraries of Colleges of Optometry

FACULTY

In discussing the faculty of schools or colleges of optometry, it is well to distinguish the two main categories with respect to their form of governance: the five independent, non-profit institutions and the eight university affiliated schools.

Each of these schools offers a basic four year course leading to the O.D. (Doctor of Optometry) degree. Entrance to this course requires a minimum of two years of college or university undergraduate work. Several schools have programs of graduate studies which go beyond the professional O.D. program. Three of the schools (IU, OSU and UCB) have for a number of years operated graduate academic programs leading to the M.S. and Ph.D. degrees in physiological optics. Two (PU and UCB) have operated programs leading to the M.S. degree in physiological optics and one (UH) has just expanded its graduate program so that it too will offer the Ph.D. degree. One of the newly developing schools (SUNY) has instituted a graduate program while the other (UA) supports graduate students in other divisions of the university.

Table 4 gives data on numbers of students, faculty, and administrative officers in the schools which have been separated into two categories: free standing and university affiliated. The abbreviation, *FTE*, stands for Full-Time Equivalent. This is an important concept for schools of optometry since many of the clinical instructors are private practitioners who give clinical instruction one or two days a week.

TABLE 4
Faculty Numbers and Enrollment: 1971-1972

FREESTANDING

School*	Faculty: Total number*	Administrative number	Administrative FTE	Teaching Number	Teaching FTE	Student Enrollment: Prof.	Grad.	Para.	Other	FTE Students
A	61	12	11.0	52	31.6	455	—	—	—	455.0
B	60	11	6.7	57	28.4	226	—	9	—	230.5
C	62	13	11.0	52	37.2	452	—	—	—	452.0
D	64	4	3.9	61	25.0	247	—	—	—	247.0
E	58	15	13.0	48	37.5	479	—	5	17	485.8
Total	305	55	45.6	270	159.7	1859	—	14	17	1870.3
Average	61.0	11.0	9.1	54.0	31.9	371.8	—	2.3	3.4	374.1

AFFILIATED

	Faculty					Student Enrollment				
J	56	1	0.9	56	29.8	246	12	13	—	276.5
K	70	6	3.1	68	30.8	197	10	—	—	217.0
L	44	4	4.0	40	24.7	273	2	—	—	274.0
N	60	2	0.5	60	27.7	212	13	—	3	238.8
O	51	8	3.9	51	32.5	243	3	—	—	249.0
P	58	7	2.2	57	19.2	192	—	—	—	192.0
Total	339	28	14.6	332	164.7	1363	40	13	3	1447.3
Average	56.5	4.6	2.4	55.3	27.5	227.2	6.7	2.2	0.5	241.2

* *Note:* Except for librarians arbitrarily included in teaching faculty, the division of faculty into administration and teaching was on the basis of reported budgetary listing of academic personnel by each school. In general departmental or divisional chairmen are counted as faculty rather than as administrators. Two developing schools were excluded from this table because their current status would have distorted the data. Because of division of responsibility, the "number" columns under "administrative" and "teaching" faculty are not mutually exclusive; thus, the figures listed do not equal the figure in the column "Total number." The last column listing FTE students has been calculated as follows:

Prof.—one full-time professional degree student = 1 FTE
Grad.—one graduate student working for M.S. or Ph.D. degree = 2 FTE
Para.—one student in a para-optometric program = 0.5 FTE
Other—one part-time or special student = 0.25 FTE

The largest proportion of faculty members have a degree in optometry (about 72 percent) with about 15 percent having a Ph.D. and four percent an M.D. degree. Because of the rapid increase of enrollment since 1965, about 40 percent of the faculty members have only three years or less of teaching experience.

The university affiliated schools have 19 percent of their faculty members with Ph.D.'s compared with 11 percent for free standing schools. This reflects the greater participation of university affiliated schools in graduate programs and in research. It is generally recommended that the free-

standing schools seek additional forms of affiliation or cooperation with universities.

The teaching loads of faculty members are rather heavy compared with the teaching loads of faculty in schools of dentistry and medicine. Faculty salaries are somewhat less than salaries in dental schools which are comparable in nature. The average dental school salaries are higher than the highest salaries paid in schools of optometry at every level from instructor to professor.

Faculty research has been understressed in recent years, partly because the rapid expansion of enrollments pushed up the teaching load so much that some faculty members found themselves preoccupied with teaching, even though they were supposed to have time for research as part of their faculty effort. At present, there is almost a controversy between two schools of thought: one believes that every professional school should have an active research program; the other group believes that faculty members who do research are likely to neglect their teaching responsibilities.

The Commission favors more support of basic science research by faculty members, as well as increased research in clinical procedures.

CURRICULA

In 1910, a two year course in optometry was established at Columbia University, the first university course in the subject. This was later increased to four years. But these were all undergraduate years and a graduate of a four year course earned a bachelor's degree. In 1922, the American Optometric Association, through its Conference on Optometric Education, developed a system to evaluate schools of optometry. From this time on, the academic quality of the curriculum improved and the number of schools decreased.

This sequence of events produced the present four year professional curriculum in optometry, based on a minimum of two years of preprofessional college work with emphasis on the biological and physical sciences. Almost half of the present entering students in the schools of optometry have completed a four year college program.

In general, the objectives of the professional curriculum are: preparing individuals with adequate scientific and technical knowledge of optometry; teaching them basic skills needed to utilize this knowledge, with proper standards of professional-ethical conduct; and helping them to assume responsibility to continue to study throughout their professional career.

Optometry shares with other health professions the practice of teaching a core of basic principles in each of the sciences on which health service is based; physics, physiology, anatomy, pathology, biochemistry, and ecology.

There is also a tendency, in university affiliated schools, for optometry to share with other health professions in the use of basic health science courses taught by a single basic science faculty to students of medicine, dentistry, nursing, and podiatry.

The move from a two year to a four year professional course over the past 25 years has resulted in much more clinical experience for the optometry student, now commencing in the second year and expanding until, in the fourth year, he devotes at least halftime to work under supervision in the clinic. He gains experience in such areas as contact lenses, low vision, children's vision, and vision therapy, in addition to basic visual analysis and the prescription of lenses. The clinical experience is supplemented in some schools by a brief externship whereby a student observes and works alongside a practitioner in private practice.

Students themselves are asking for more "practical" courses and less emphasis on the introductory basic science courses. Here there is need for more communication between students and faculty on issues of curriculum development. Students, on the average, feel that their views are being ignored. However, a questionnaire directed to faculty members revealed a fair degree of agreement between faculty and students on desirable changes in the curriculum.

With a growing use of optometric technicians, several schools of optometry have instituted two year programs for the training of technicians and assistants such as the program now operating at the University of Alabama at Birmingham.

LIBRARIES

The library serves three main functions in a school: it supports faculty and graduate student research; it supplements classroom instruction; and it provides resources for graduate student research. In 1969, the number of volumes in libraries varied from 3,780 to 10,000 in independent schools and from 1,152 to 4,242 in the affiliated schools where a small branch library was supplemented by the main university library.

A definite need exists for standards suited to the optometry library, in which elements of reference service, library hours, seating capacity, space, organization, staffing, quantity and quality of collections, curriculum needs, user population, technical processing, and book selection policy are all carefully weighed.

Advances in audiovisual and computer technology have made possible extensions of the library. Examples of these may be seen at Pacific University where a Learning Resources Center is set up to centralize audiovisual materials in the field of vision and to furnish bibliographical information on them, and at the University of California at Berkeley, whose Multi-

Media Center is engaged in producing slides, video-tapes, tape cassettes, and 8-mm films on optometric topics for students. Space adjacent to the library is provided for student use of these materials and they are also available to other schools for purchase. Both these centers are connected solely with the schools of optometry in the two institutions; both have received federal funding.

Students of Optometry

In 1973, there are 3,300 students in the 13 accredited colleges of optometry.* Who are they? What are their characteristics? How did they decide to enter optometry? How do they perceive their profession? What kinds of practice do they want? How do they feel about the education they are receiving? What are their financial problems?

These questions were explored with students in all of the colleges in two ways. All students were invited to answer a confidential questionnaire which was mailed to the Survey office and tabulated and analyzed by Survey staff. Sixty-one percent of the students responded—a total of 2,020. The second method was to interview a random sample of fourth and third year students with a systematic interview guide so that the students' responses could be recorded and analyzed semiquantitatively with the aid of rating scales. About one-third of the fourth year and one-sixth of the third year students were interviewed. Most of the interviews were conducted by Professor Havighurst.

CHARACTERISTICS OF STUDENTS

Personal-social characteristics of the students are shown in Table 5. The vast majority of the students are white males 20 to 25 years of age. The youngest in 1971-72 was 18 and the oldest was 53. Average age was 23.6 years. The majority entered optometry school after a two year college program (34 percent) or a four year college program (40 percent). Forty-five percent were married.

Students reported their fathers' occupations and levels of education, thus making it possible to compare their own expected socio-economic status with that of their parents. Roughly half of the students are definitely upward mobile, rising from the working class or lower middle class status

* Includes the Canadian School at Waterloo.

TABLE 5
Social Characteristics of Students: 1971-72

	Percentages	
	Optometry	Male Graduate Students
Marital Status		
Single	55	35
Married	45	65
Religion		
Catholic	18	21
Jewish	19	10
Protestant	46	39
Other	5	5
No Affiliation	12	25
Relative in Optometry		
Parent	9	
Brother or Sister	2	
Wife	1	
Uncle	3	
Cousin	4	

Source: Student Questionnaire, No. of students = 2020. Creager, John A., *The American Graduate Student: A Normative Description.* ACE Research Reports, Vol. 6, No. 5, 1971, Washington, D.C. American Council on Education.

of their own parents to an upper-middle class level—the status generally ascribed to the optometrist.

As shown in Table 6, the students come from all kinds of communities. The largest number come from small cities of 10,000 to 50,000 population. When we consider the fact that more than 65 percent of the present national population lives in counties containing cities of 50,000 or more, we see that optometry students tend to come from towns and small cities out of proportion to the population in these areas.

When asked what size community they preferred to work in, they again expressed a strong preference for the small city of 10,000 to 50,000—36 percent of them. Only 12 percent wanted to practice in a city over 100,000. In view of the fact that some 25 percent of the population lives in cities over 100,000, it appears that the distribution of optometrists will be a matter of some concern to the people who will cope with the problem of delivery of health services to the urban low income population.

OTHER OCCUPATIONS CONSIDERED

Optometric students were asked what occupations they had considered seriously while they were in the process of deciding on a vocation. The

most frequently mentioned professions were medicine (23 percent) and dentistry (15 percent). Other commonly mentioned professions were school teaching (13 percent), college teaching (9 percent), scientific research (12 percent), engineering (9 percent), business (6 percent), and law (6 percent). Nevertheless, only 29 percent of the students reported that they had applied to other schools besides optometry. Of these applications, the most frequent were to dental school, medical school, and graduate school of science, in that order. Forty-two percent of these applications were accepted, but the student chose instead to go into optometry.

These data throw some light on the question of whether optometric students tend to be disappointed applicants to medical or dental school. From the responses of students to the questionnaire, it appears that, at the most, 10 percent of them had applied and been rejected by a medical or dental school.

CAREER INTERESTS AND EXPECTATIONS

The types of career desired by students are presented in Table 7. The great majority want a solo or associate practice. Interest in areas of specialization tends to follow the present pattern of specialization with contact lens work at the top, followed by vision training and pediatric optometry.

TABLE 6
Community Background and Preferences of Students
Optometry compared with all male graduate students (Percentages)

	Optometry		Male Grad. Students		
Nature of Community	Home Community	Community where Student Prefers to Practice	Home Community	Prefer to live	
Farm or Small Town, under 2,500	11	2	19	Farm Small Town	12
2,500–10,000	18	13			
10,000–50,000	22	36	37	Mod. Size City	43
50,000–100,000	10	19			
100,000–500,000	14	8	22	Large City	14
City over 500,000	12	4			
Suburb of city, 100,000–500,000	3	12	22	Suburb	31
Suburb of city, over 500,000	9	6			

Source: Student Questionnaire for Optometry Students. For male graduate students: Creager, John A., *The American Graduate Student*, ACE Research Reports, Vol. 6, No. 5, 1971. Washington, D.C. American Council on Education.

Note: Creager's categories are not identical with ours.

TABLE 7
Career Interests of Students

A. Forms of Career: Percent indicating

	High Interest	Low Interest
Solo Practice	54	11
Associate Practice	65	5
Clinic or Health Center	28	23
Administration	3	0
Teaching and Research	7	63
In Business as Optometrist	1	89
Working for an Ophthalmologist	7	67

B. Forms or Styles of Practice

In what kind of setting do you want to work?	Private Office Practice	Neighborhood Health Center	College of Optometry	Military Service
Percent favoring:	81	15	3	1

C. Interest in Areas of Specialization: Percent indicating

	High Interest	Low Interest
Vision Therapy	39	13
Low Vision	22	27
Contact Lenses	78	3
Public Health	23	27
Pediatric Optometry	43	16
Geriatric Optometry	16	23
Industrial, Occupational Vision	15	35
Aniseikonia	9	45

Source: Student Questionnaire. Remainder of students indicated "some interest."

Expected annual income after five years of practice shows a median figure of $23,000 net income, which is almost exactly what Haffner reported from his survey of practicing optometrists in 1971.

QUALITY OF STUDENTS

There appears to be a universal conviction that the quality of students in schools of optometry has improved a great deal in the past decade. This is indicated by the testimony of faculty members of all the colleges who were interviewed by Professor Havighurst. He asked the question: "In what ways have your students changed during the past five or six years?" The usual response was, "Well, in the first place they are much better students

in terms of academic ability." This statement would be followed by a wide variety of other comments, some unfavorable in terms of student attitudes toward the conventional courses but mostly favorable in terms of student initiative and ability to grasp basic principles.

MINORITY GROUP STUDENTS

The American Optometric Association, in March 1971, adopted the following resolution:

> Resolved that the Board of Trustees, recognizing the need for increasing the number of optometrists in minority groups, does hereby call for and urge the participation of local, state, and national optometric organizations, schools, and individual optometrists in an active and coordinated program to recruit optometry students representing minority groups.

The American Optometric Association commenced with an appropriation of $15,000 to support a minority recruitment program in 1971, which was repeated in 1972, and continued with financial support from the National Urban Coalition to engage in a campaign to enroll a total of 96 minority students in the class entering in the autumn of 1972.

The major underrepresented groups are blacks and Spanish surname students. There are so few Puerto Ricans that they are not even counted. Asian Americans are more fully represented than they are in the total national population. Japanese and Chinese Americans made up 3.6 percent of the total enrollment of schools of optometry in 1971–72, although they were only 0.8 percent of the total population.

WOMEN STUDENTS

Women made up 3.9 percent of the optometry students in 1971–72, and six percent of the entering class of that year. In Haffner's survey, 3.3 percent of the national sample of optometrists were women. The women who were interviewed by Professor Havighurst were asked, as were the men, what kind of practice they expected to have in 10 years. Most of them said they were uncertain about this, because they expected to have children by that time and would adjust their optometric practice to the needs of their family. Nearly all of them expected to continue their practice after having children. They believed, however, that marriage and child rearing would impinge on their career in ways that were somewhat uncertain and adjustments would have to be made as their situation changed.

A woman optometrist who sees a number of women in health services (she works in a large HMO) discussed the matter of women in optometry

with Professor Havighurst. She regarded optometry as an ideal vocation for a woman with a family, since there are opportunities for part-time practice during the years when a woman is rearing young children. She felt that optometry is seen by many women as a "male profession." Furthermore, it requires an investment of at least six years of higher education, whereas school teaching, nursing, and many other professions open and attractive to women require no more than four years of college level training. She said she thought that more aggressive counseling of college and high school girls, with exposure to female optometrists, would lead more girls to choose optometry.

ADMISSION PROCEDURES

In 1971 there were approximately 2,500 applicants for 900 places in colleges of optometry. With such a high proportion of applicants who must be rejected, the quality of admission procedures becomes a critical matter. Thirty percent of optometric students said they thought the admission requirements were "too easy." Since nearly all colleges are rejecting more applicants than they accept, this criticism is puzzling. On purely academic criteria, the admission requirements have grown more stringent, just as they have in medical school admissions. Possibly the requirements can be made more satisfactory in relation to certain criteria concerning the kinds of students wanted by the various colleges. This is a problem which should receive serious attention by the Council on Optometric Education and by the Association of Schools and Colleges of Optometry.

STUDENT PERCEPTIONS AND EVALUATIONS OF THEIR COLLEGES

The interviews with students in the fourth and third years gave them the opportunity to speak freely of their feelings and perceptions of their colleges. They were assured that their remarks would be kept confidential. Seven dimensions of evaluation and perception of the colleges were covered in the interview and are reported in Table 8 in terms of percentage of students at each point on a rating scale. It will be noted that there is almost a balanced distribution of scores, from positive to negative, on most of the scales. For instance, in their general evaluation of the college, three percent were notably unfavorable and two percent were notably favorable, with nearly equal percentages at points two and four in the scale. Forty-four percent were in the middle, with a generally neutral attitude combined with criticism of one or two elements of the situation.

TABLE 8
Students' Evaluation of Their College

Percentages of Students Rated in Each Category

A. General Evaluation of the College

	Percent
1. Unfavorable to a notable degree	3
2. Unfavorable to some degree, but expect the college to improve.	23
3. Balanced. Unfavorable specifically to one or more elements of the situation, generally administrators or faculty.	44
4. Balanced, judicious attitude: on the favorable side.	28
5. Generally favorable to a notable degree.	2

B. Evaluation of Curriculum

1. Basically dissatisfied with curriculum.	17
2. Fairly positive. Faculty is aware of and working on weak spots in the curriculum.	69
3. Generally approves of the curriculum.	14

C. Critique of Faculty Teaching

1. Say that many of the faculty either do not know how to teach or are not interested.	8
2. Say that *some* of the faculty are not teaching well.	35
3. Report generally good teaching, or do not comment on teaching methods.	53
4. Say that faculty and their teaching methods are especially good.	5

D. Evaluation of Student-Faculty Interaction

1. Weak communication. Administration ignores or opposes student proposals or points of view.	23
2. Need more student activity or responsibility. Student feels that, in a professional school, the faculty knows best, but should pay some attention to student perceptions and attitudes. Local situation needs some improvement.	56
3. Good interaction; working quite well.	21

E. Students' Relation to Authority Structure of the Schools

1. Very critical; almost hostile to faculty and administration.	5
2. Somewhat dissatisfied or apathetic about faculty and administration.	33
3. Aware of authority structure and go along with it.	42
4. Tend toward cooperation with faculty and administration.	21

F. Evaluation of Student Groups in the School: Fraternities and Clubs

1. Such groups are not useful in a professional school. They do not exist here, or are on the way out.	11
2. Such groups are marginal to the interests of the respondent, and he does not care about them one way or the other	28
3. Such groups exist here, and are useful; but respondent participates only nominally	32
4. Active in fraternity, club, or student organization. Enjoy it and find it useful.	29

G. Student Evaluation of His Preparation for Cooperation with Other Health Professions

1. Agree that there should be cooperation with ophthalmology, psychology, etc., but think training has *not* given enough acquaintance with these disciplines to enable them to communicate and cooperate with them.	40
2. Agree that cooperation is desirable. Think training has helped to prepare them for it, but are vague about it.	41
3. Say training has prepared them well, both in knowledge about the other professions and in experience in working with them.	19

Source: Interviews with third and fourth year students. Number = 240 white males.

To anyone who is familiar with the mood of students during the 1968–73 period, these findings are not surprising. Students are critical. But students in professional schools are somewhat less critical than undergraduate students. This particular group of fourth and third year students was generally 24 to 26 years old and more than half of them were married. They were professionals already in some respects. None of the colleges of optometry had experienced the demonstrations and the disruptive protest activities that had disturbed the academic waters in their neighboring undergraduate colleges.

Perhaps for this reason, the critical quality of as much as a third of the interviews should be taken quite seriously. For instance, the *Evaluation of Student-Faculty Interaction* (Table 8.D) reports that 23 percent of the students felt that their communication with the faculty and administration was weak and their proposals or points of view were being opposed or ignored. Another 56 percent indicated that the local situation needed improvement in this respect, even though they felt that the faculty judgment must be respected in a professional school. This set of judgments is confirmed by the ratings in Table 8.E on *Students' Relation to the Authority Structure of the School.* However, it should be noted that there was a wide variation among the schools on this latter dimension. Students in certain schools reflected a good deal of hostility toward the administration, while there were very friendly relationships reported in other schools. Nevertheless, there was a widespread minority view in all the colleges that the faculty was not adequately responsive to student opinion.

Vision Research and Optometric Education

Research on vision has provided the foundation for the science and the art of optometry. During recent decades, there has been a rapid expansion of research, both on the biology of vision and on methods of improving and protecting vision. People working in optometric practice have to spend a good deal of time just keeping up with new knowledge and procedures.

An effective school of optometry must keep up with the latest developments in vision research and must make its own contribution to the growth of knowledge and the improvement of practice. Engaging in research insures that a teacher will keep up with new developments in his field.

The goal of a school is to produce a practitioner equipped with scientific knowledge and skilled in the arts of optometry. He is a professional rather than a technician. His training should be surrounded and supported by research. The school of optometry can best achieve this fundamental goal by a combination of teaching and research on the part of its faculty.

The inclusion of optometry in the Health Professions Educational Assistance Act enabled many of the schools and colleges to develop, among other things, the basic science portions of the optometric curriculum. New faculty members, many already trained in research procedures, were added to existing faculties. These two changes, one in program and one in personnel, have increased the potential for research within the profession. Simultaneously, the addition of these new faculty members has produced an added burden and responsibility for the profession and, more especially, for the schools and colleges of optometry to provide the means for doing research.

FACILITIES FOR RESEARCH IN A SCHOOL OF OPTOMETRY

To do research, a faculty member needs time for research work, space and equipment, administrative backing, and recognition for achievement.

At present only three or four of the schools of optometry come reasonably close to meeting the needs noted above for a substantial group of their faculty. Buildings and space have been vastly improved in recent years and several new buildings will become available within the next two or three years.

However, at least half of the schools of optometry simply do not have adequate space and facilities. The provision of research facilities should have a high priority during the remainder of the 1970s.

Areas of major research contributions by optometrists in the past 25 years are visual aids for the partially sighted, the electronic tonometer, electrophysiology of visual function, learning disabilities and perceptual problems, visual development in children, contact lenses, and vision and highway safety.

Our student survey indicates that approximately 10 percent of the students in each graduating class in all of the schools plan to continue their training toward an M.Sc. or Ph.D. degree and then go into teaching or research in preference to optometric practice. Many of these young people are receiving fellowship grants from government and private sources. The largest single granting agency, other than the federal government, is the American Optometric Foundation which in 1971 72 awarded 26 fellowships. Furthermore, the AOF has made more than 20 special research grants to optometrists in schools of optometry.

FACULTY RESEARCH POTENTIAL

Currently (1972 73), there are 595 faculty members in the 12 American schools and colleges of optometry. Some of them are teaching on a part-time basis and some are engaged in administration. There are approximately 300 full-time equivalent (FTE) persons whose time is occupied with training students and research. The proportion of their time devoted to research is too small.

Approximately 12 percent of all faculty members in the colleges of optometry are currently engaged in externally funded research on a part-time basis. Other faculty members are doing research with limited financial support from their parent institution. Others, perhaps a majority of all faculty members, are doing casual experimentation on a wide variety of

topics. Many such experiments will be written up and subsequently published in optometric, ophthalmological, physiological, psychological, engineering, physics, educational, and public health journals.

The expectations and requirements of the institutions vary in their commitment to research. One of the newer institutions has developed a level of effort that each faculty member and student is expected to devote to health research programs, i.e.:

	Time to Research
Physiological Optics (basic visual science)	
Faculty	40 percent
Graduate Students	50 percent
Professional Students (fourth year)	10 percent
Optometry (clinical studies, patient care)	
Faculty	20 percent
Residents	25 percent
Professional Students (fourth year)	10 percent

The desirable situation is one in which about 30 percent of a faculty member's time is devoted to research. To reach this goal, the schools of optometry would need to expand their faculties by 75 full-time equivalent positions. To move vigorously toward this goal, funds need to be secured from both government and private sources. The Committee on Research and Development of the American Optometric Association might make a survey of research needs in the field of vision and vision care. It would also be desirable to establish a Council on Research, responsible to the Association of Schools and Colleges of Optometry. This council should receive basic support from the schools of optometry. It probably would also qualify for financial assistance from federal government and private foundation sources. Such a council might secure funds for the support of summer institutes on clinical research and thus stimulate faculty members and selected practitioners to undertake their own research projects. This Commission might stimulate research by students in schools of optometry by frequent circulation of a list of possible projects, and might also help to secure research stipends and grants for graduate students. Some such agency is needed to represent with real force the values and the needs for research in schools of optometry.

Financing Optometric Education

There are now six state supported schools and six independent schools in the United States accredited by the Council on Optometric Education. The state supported schools, of course, have a different financial base than the private, independent schools. Their tuition charges for 1972–73 are shown in Table 9. The state supported schools charge out-of-state students a higher tuition fee than they charge in-state students. The average tuition rate for the six independent schools is approximately $1,950, which is very close to the $1,860 average fee in state schools for non-residents of the state.

Every one of these schools has experienced a great increase of costs during the 1960s, due to increase in the length of the training course, salary increases for the faculty, and increased enrollments. Tuition fees, even in private colleges of optometry, cover only about half of instructional costs.

This Commission has come to the conclusion that an adequate supply of well trained optometrists cannot be maintained under the present arrangements for financing optometric education. There must be greater support from public funds and this support must be stabilized so that schools of optometry can plan ahead. This conclusion grows out of the congressional hearings on education for the health services and the several acts passed by Congress during the 1960s. It is also supported by the general findings of the Carnegie Commission on Higher Education which deal with education for the health services.

THE COST OF OPTOMETRIC EDUCATION

As in all health service professions, optometry has a major task of analyzing its educational costs systematically so as to foresee the financial

TABLE 9
Tuition Fees for 1972-1973

Independent		State Supported	In-State	Out-of-State
Southern	$2,135	New York	$1,600	$2,000
Massachusetts	1,950	Indiana	918	2,108
Pennsylvania	2,000	Alabama	600	1,500
Los Angeles	1,850	Ohio	1,050	2,100
Illinois	1,950	California	600	2,100
Pacific	1,826	Houston	136	1,360
Mean—$1,952		Mean—$851		$1,850
Range—$1,826-$2,135		Range—$136-$1,600		$1,360-$2,108

problems for at least a decade and to act now to keep the road ahead clear of insuperable obstacles. This is especially important because federal government support is now generally understood to be a necessity and thus the schools of optometry must band together for much of their financial planning and activity. They cannot work singly in their approaches to the federal government.

There are four general areas of cost: instruction and operation of the college; buildings and facilities; operation of clinics; and cost to students. They should be separated as cleanly as possible. This kind of separation has not been satisfactory, up to the present, since the second and third areas (costs of buildings and of operating clinics), are not treated in the same way by all colleges. However, the first area, cost of instruction and operation, has been reported fairly well.

The cost of operating the school as an instructional institution is the basic datum in the financial analysis. It includes the salaries of faculty and administrators, the cost of maintaining the facilities, including repairs and upkeep, and the purchase and maintenance of equipment. It omits the initial cost of buildings and other facilities, depreciation, and the payment of interest and amortization charges. It omits the cost of educating graduate students and students training to be technicians.

It is rather easy to ascertain costs for independent schools since their budgets contain all of their instructional costs. This may not be so easy for a university based school where the school of optometry may receive library services and some instructional and some administrative services from other units of the university.

For the years since 1969, the Council on Optometric Education has been getting financial data from each of the schools of optometry on an annual basis. Initial difficulties in securing strictly comparable reporting have been largely overcome and the cost data for 1971-72 are fairly accurate. They

are shown in Table 10. The expenditure per student and the student-faculty ratio are the important comparative data. These are seen to range from $2,730 to $6,500 and from 6.4 to 10.9 respectively. These are wide ranges and show that the costs of instructional programs vary a great deal from school to school. A similar degree of variation has been reported in studies of costs of training of medical students.

The main outcome of this analysis is the clear distinction between the private and the public supported institutions. The latter group are more costly per student. This is due mainly to the lower faculty-student ratio in the public supported schools, which is partly because a considerable number of faculty members in these schools give a part of their time to research. Even though much of their research is budgeted separately, and thus not charged to instruction, they tend to have smaller classes and higher salaries than the faculty in private institutions.

Costs of construction and major renovation of buildings have been large during the past decade when schools were expanding and two new ones were being started. Federal government grants have paid part of such costs. Federal funding is needed even more badly today if optometric schools are to develop new or expanded facilities, and if enrollments of existing schools are to be increased. Several requests for matching funds from the federal government are now pending.

Costs of clinics are partly costs of instruction and partly costs of community services provided by the school of optometry. These schools are more and more establishing multiple clinics or service outposts in low

TABLE 10
Instructional Expenditures per Student 1971-72

School Number	Number of Students	Students Per FTE Faculty	Expenditure Per Student
		Independent	
1	455	10.9	$2.726
2	226	6.6	4.503
3	452	9.4	3,061
4	247	8.5	3,111
5	479	9.6	3.287
6	273	9.5	4.131
Mean	355	9.1	3.920
		Public Supported	
1	246	9.0	$5.624
2	197	6.4	5.691
3	212	8.5	6.283
4	243	6.8	6,300
Mean	225	7.7	5,975

income areas that serve minority groups. This costs more money than it produces in payments from patients or Medicaid.

COSTS TO STUDENTS

The financing of optometric education is partly a problem for administrators and policymakers of schools of optometry and partly a personal problem for students and their families. Since it requires four years of a student's time beyond the age of 20 or 22, it means a significant loss of income he could have been earning on a job.

A broadly accepted social policy arises to make professional careers in health services open to young men and women from families of all economic levels. Therefore, the provision of scholarship aid and loans and the level of tuition charges all are matters of importance for the schools of optometry to handle in light of the problem of student financing.

The actual cost to a student, independent of tuition fees, depends primarily on the cost of subsistence, room and board, and therefore depends on whether he lives at home, whether he is married and has children, etc. The cost to the student in 1971 72 at Indiana University, separate from tuition fees, was estimated by the administration of the School of Optometry as approximately $2,400 for an unmarried student living on or near the campus. A national questionnaire study found that unmarried optometric students in 1970 had average expenses of $3,900, including tuition fees. Many of these students paid low tuition fees to state supported schools. The general average for unmarried students in independent colleges and for non-residents in state supported colleges is between $4,500 and $5,000, including tuition fees.

COMPARISON OF COSTS OF TRAINING MEDICAL AND OPTOMETRIC STUDENTS

It is clear that public funds are being used to train students of optometry as well as to train students in medicine. None of these students pays the full cost of his training, even though he may study in a private college which charges a relatively high tuition fee. Government grants are being given to private colleges to pay part of the cost of instruction. Therefore, the influence of government as well as the interests of the institutions training people for health service combine to favor economical but efficient training programs. In the case of eye care, there is some overlap in the non-medical services provided by optometrists and ophthalmologists. But the ophthalmologist has a much longer training period because of his medical training, which means that he invests more of his time and more of his own and the

government's money in training than does the optometrist. Thus, social policy considerations would suggest that each type of practitioner work in a situation where he can make maximal use of his skills. This consideration becomes especially important when public funds are used to subsidize training costs and where there is a substantial difference between the costs of training the various types of practitioners.

The course in optometry is four years, based on two or more years of pre-professional work in the relevant basic sciences. In this respect, the optometric training is analogous to that for the dentist and for the physician. There is a major difference, however, in that the O.D. and the D.D.S. programs graduate young people who are ready to take a state examination for a license and to go into practice. On the other hand, the M.D. program does not prepare its graduates for immediate practice. They may go into practice after a year of internship. They normally take three to four years of post M.D. work as intern and resident with intensive further training in a specialty. Therefore, the ophthalmologist normally has three or four years more training than the optometrist.

The basic difference in cost between the training of an ophthalmologist and the training of an optometrist, therefore, is due to the extra three or four years of training which makes the cost to him and to the community which supports his training much greater than the cost of training an optometrist.

With such great disparity between the investment of society and of the individual in the two kinds of training, it makes good sense to ask the ophthalmologist to spend most of his time at work which he is specially trained to do and which no other medical specialist can do. It also seems socially wasteful for him to do work which an optometrist is trained to do and can do as well as or better than the ophthalmologist.

FEDERAL GOVERNMENT ASSISTANCE TO OPTOMETRIC EDUCATION

In 1963, the United States Congress, putting into effect its declaration that "health is a human right," passed the Health Professions Educational Assistance Act. This Act at first provided colleges of optometry only with construction funds. But in 1964 the Act was altered to include optometry students as recipients of student scholarships and loans. Then, in 1965, the Act was amended to include colleges of optometry as eligible recipients of institutional and special project grants.

In 1971, Congress passed the Comprehensive Health Manpower Training Act which replaced in a more comprehensive way the earlier Health Professions Educational Assistance Act.

There have been a variety of grants of federal money which have affected optometric education. They are:

Construction Grants
  Major expansion
  Minor expansion
Basic Improvement and Capitation Grants
Special Project Grants
Scholarship Grants
Student Loan Revolving Funds

Under these Acts, the government has supported the eligible health service training institutions at two levels: the MOD (Medicine, Osteopathy, Dentistry) schools have received higher levels of assistance than the VOPP (Veterinary Medicine, Optometry, Pharmacy, Podiatry) schools.

Federal government grants for construction and for basic improvement have all required an expansion in numbers of students to be trained, usually amounting to at least 25 percent of the existing enrollment. In addition, renewal of improvement grants is generally contingent upon further small increases in enrollment. The purpose behind these stipulations of the federal government is to help meet the shortage of optometrists. A similar policy has been adopted by the government in its grants to colleges training students for medicine, dentistry, and other health service professions.

Since 1963, the enrollment in U.S. schools of optometry has increased from 1,284 to 3,040. At an instructional cost of $4,500 per student year, this means that schools of optometry have increased their annual operating and maintenance expenditures over what they would be spending for the 1963 enrollment (1,284 students) by approximately $8 million a year. Federal government support for instructional costs is currently $4 million a year. The deficit must be made up from increased tuition charges to students, increased state support of state aided schools, and increased local and alumni philanthropic support.

Thus, by accepting federal government support for expanded facilities and expanded instructional programs, the schools of optometry have taken on indefinitely a great additional cost for the instruction of students. There is no legislative assurance that the government will maintain even its present level of support per student which is far less than the expenditure per student by the school.

Other institutions training students for the health professions find themselves in a similar situation. Therefore, it seems clear that the federal government must establish a policy of basic support of instructional costs for public and private schools which train students for the health professions.

The Carnegie Commission on Higher Education has indirectly recommended this policy in its report on the education of medical and dental students.* That Commission recommends a federal "cost of instruction

* Carnegie Commission on Higher Education, *Higher Education and the Nation's Health:* pp. 61-71. New York: McGraw-Hill, (1970).

supplement" of $4,000 per student to be paid to the medical or dental school.

Since the average instructional cost per student in optometric schools is about $5,000 per year in 1971-72, while in medical school it is slightly more than that for an undergraduate medical student, it would be appropriate for the federal government to pay a capitation or cost of instruction grant to the school of optometry that is rather close to the amount paid by the government for undergraduate students in a college of medicine. Yet, actually, in 1972-73 the federal government paid a capitation grant of $1,625 per student to schools of medicine and only $725 per student to schools of optometry.

STUDENT FINANCIAL ASSISTANCE

With the lengthening of the training period since 1955, and with generally increased tuition charges, the problem of student costs has become an urgent one. The federal government has recognized these problems and is providing scholarship and loan funds. Federal scholarship funds administered by colleges of optometry amounted to approximately $500,000 annually in 1970, 1971, and 1972. This was an average of approximately $175 per student. Federal loan funds for students of optometry have been averaging approximately $850,000 a year between 1967 and 1972. The study of optometric student financing made by the Bureau of Health Manpower of the National Institutes of Health in 1970 indicated that 54 percent of students secured one or more loans totalling $1,104 on the average. The most frequent type was a government loan under the Federal Health Professions Act with 32 percent of students borrowing an average of $800 in 1970. Next most frequent was a loan under the guaranteed loans provision of the U.S. Office of Education with 12 percent of students borrowing an average of $1,324.

Scholarship grants should be substantially increased for students from families with below average incomes. Most of the added scholarship money will have to come from the federal government, though this might be contingent on some form of matching from state and alumni funds.

PROPOSED POLICY FOR FINANCING OPTOMETRIC EDUCATION

At present, every one of the colleges of optometry, independent and public, depends heavily upon the federal government for support of its instructional program. With one exception, the schools in 1970-71 drew from 20 to 45 percent of their instructional expenditure from federal gov-

ernment grants. The federal government policy in this area is not yet fixed. There seems to be a growing conviction that the federal government should carry a major part of the cost of the training of health service professionals. However, no college of optometry can count on this and none can plan ahead for the next decade on this basis.

Financial support must come from four sources: federal government, state government, tuition fees, and gifts from alumni and philanthropic funds.

State support will continue to be a major factor and will probably be expanded through provision for states without state supported schools of optometry to pay costs of instruction for a quota of their residents to states having a school.

Gifts to the schools of optometry are generally insignificant at present but they should be expanded with the goal of securing an annual income from gifts and endowment funds amounting to 10 to 20 percent of the costs of instruction. In this connection, the newly organized Federation of Optometric Alumni Associations may make an important contribution. The Federation has proposed an automatic assessment of at least $20 as a part of dues payment to the American Optometric Association. The funds raised in this way would be distributed to optometric schools and colleges in relation to their enrollments. This would provide about $100 per student, initially, and might be increased substantially if members of the profession approved it.

Tuition fees represent a major policy issue since they are significant elements (together with scholarship and loan funds) in determining the economic composition of the student body. At present, tuition fees for residents of states with state supported schools of optometry average $850, with a range of $136 to $1,600. Fees at private schools average $1,950, while out-of-state fees in state schools average $1,850. Thus, the average fees are about 16 percent of the cost of instruction in state schools and approximately 40 percent of the cost in private schools.

It is a matter of social policy to determine the amount of a tuition fee since no school, private or public, now charges the student more than 50 percent of the instructional cost. If tuition charges are high, this throws more of the financial burden on the student or his family. However, this can be offset for students from low income families by scholarship grants and low interest loans. If the tuition charges are low, this throws more of the financial load on the state or federal government since schools of optometry have very small endowment funds. Low tuition charges favor the student from a middle or high income family as much as they favor a student from a low income family. Consequently, some people argue for a relatively high tuition charge accompanied by liberal scholarship and loan funds, which can favor students from low income families and which also

require middle and high income families to carry a larger share of the cost of training for their children.

The Carnegie Commission has proposed a uniform tuition charge for medical schools of approximately $1,000 a year. This is about 15 percent of the cost of undergraduate medical instruction. In addition, the Carnegie Commission proposes a federal program of scholarship grants up to $4,000 a year for medical and dental students from low income families. This would cover a tuition fee of $1,000 and about $3,000 for subsistence which is just about the estimate we have made for the subsistence expenses of optometry students. Since a tuition fee of $1,000 would pay only a small fraction of the instructional cost of medical or dental education, the Carnegie Commission recommends a federal "cost of instruction supplement" of $4,000 per student paid to the medical or dental school. Thus by proposing a low tuition fee of $1,000, the Carnegie Commission favors substantial assistance to families of middle and high income.

COMMISSION PROPOSALS FOR SOLUTION OF THE FINANCIAL PROBLEM

In making proposals concerning the financial problems of optometric education, this Commission recognizes that, ideally, it should take into account the financial problems of training for other health professions. Optometry is one element in a complex system of health care delivery. What it contributes to health care affects the contributions required elsewhere in the system. A general systems approach to the study of the cost and financing of the entire health care complex is needed and may result from the Institute of Medicine study which is just commencing.

In the absence of such an inclusive study, we have attempted to survey the field of manpower needs in vision care and the costs of training various specialists and thus arrive at tentative conclusions about the needs for optometric manpower and financing. These conclusions can be cast in the form of alternatives.

The major support for instruction should be provided by a combination of funds from state and federal governments. But it does not seem probable that state governments will support independent schools of optometry in such states as Illinois, Tennessee, Massachusetts, and Pennsylvania at the same level as the state governments support state schools in Ohio, California, Indiana, Alabama, and Texas. Some progress will no doubt be made toward securing a measure of state support to independent schools in some of the states mentioned above. Pennsylvania already makes a small state payment to the Pennsylvania College of Optometry.

It would be useful to consider the two types of schools separately from the point of view of the level of support they may receive from state or federal governments. In both types, it appears socially desirable that the combined state and federal government support be at the level of about 75 percent of the cost of instruction, leaving a tuition charge of approximately 25 percent. In addition, the federal government should be a source of powerful support for new buildings, for special projects such as minority group recruitment and clinic development, as well as for research, student scholarships, and student loans.

The independent schools should seek as much state support as possible through contracting with state boards of higher education for cost of instruction grants for the number of state residents the state believes are needed for practice in the state. An independent school should make such arrangements with all of the states from which it receives more than a minimal number of students.

The state supported schools will of course receive substantial state support but the enrollment will be kept down by the state legislature to a level believed useful for the state *unless* they too can charge neighboring states a cost of instruction fee for students from those states.

The size of the tuition fee charged by a school is of course related to the income received from other sources, chiefly from the state and federal governments. If a cost of instruction grant is given to the school on a capitation basis, this plus the tuition fee must very nearly equal the cost of instruction.

The tuition fee must also be viewed from the point of view of the student and seen in relation to his family financial situation, his access to scholarship funds, and his access to loan funds. It is convenient to examine the matter from the points of view of students of three levels of family income.

High Family Income.

A low tuition fee is desirable, from this point of view, since there is little likelihood of securing a scholarship grant. (These will generally be limited to students from low income families.) A low tuition fee is essentially a subsidy to students with high family income.

Medium Family Income.

Students from families in the middle third of income are also favored by a low tuition fee since their access to student aid in the form of "opportunity grants" is likely to be restricted and depend on the number of children [illegible]e family. Access to loan funds which are subsidized by the federal or

state government is especially important to those students. The median family income in 1971 was $10,300. This is not enough to provide support for a student in a professional school, especially if there is more than one child in the family.

Low Family Income.

Students from families in the bottom third of the income distribution generally cannot aspire to optometric training or any other that requires as much as six years of higher education *unless* they have substantial financial aid. For them, the most desirable form of aid is an "opportunity grant" which covers tuition and subsistence costs. Therefore, a high tuition fee does not bother them if the level of student aid is adjusted to cover this amount.

ALTERNATE MODELS FOR FINANCING OPTOMETRIC EDUCATION

There are three questions to be answered in making a plan for financing optometric education. They are:

1. How much of the cost of instruction should be paid by the federal and state governments?
2. What tuition fee should be charged?
3. What forms of financial assistance should be given to students by federal or state government ?

The Commission does not have a single proposal which answers these questions. Rather, the Commission presents three possible models, all of which appear to be practicable. Before describing these models, the questions listed above will be addressed.

The cost of optometric education to the college and the student averages $8,000 to $9,000 a year in 1973. This figure includes the cost of operating the college of optometry (cost of instruction) and the cost for subsistence (board, room, personal expense, books and equipment) of the student. The Commission believes that state and federal governments should pay about half of the total cost for students from families in the upper third in income and practically all of the cost for students from families in the lower third in family income. However, a part of the payment should be in the form of loans to be repaid by the student.

The amount of the tuition fee partially determines the extent to which the student and his family must share the cost of his training, though this is modified by the amount and nature of student financial aid which is availa-

TABLE II
Alternate Models for Financing Schools of Optometry and Students of Optometry

Income per Student to Support Institution		Pattern of Financing for Student			Cost to Student		
Tuition Fee	State and Federal Contribution,[1] Cost of Instruction or Capitation Grant	Loan[2]	Earnings and Family Support	Opportunity Grant[3]	Tuition Fee	Living Expense[4]	Economic Status of Student
Model A							
Tuition, 100% of Cost							
$5,500		$3,000	$6,000	0	$5,500	$3,500	High
$5,500		3,000	3,000	2,500	5,500	3,000	Medium
$5,500		2,000	1,000	5,000	5,500	2,500	Low
Model B							
Tuition, 40% of cost							
$2,200	$3,300	2,500	3,200	0	2,200	3,500	High
$2,200	3,300	1,500	2,200	1,500	2,200	3,000	Medium
$2,200	3,300	850	850	3,000	2,200	2,500	Low
Model C							
Tuition, 20% of cost							
$1,100	4,400	2,300	2,300	0	1,100	3,500	High
$1,100	4,400	1,100	1,000	2,000	1,100	3,000	Medium
$1,100	4,400	0	100	3,500	1,100	2,500	Low

[1] State and federal support in the form of a capitation grant to the schools. Gifts and endowment funds are very small for schools of optometry. Research grants would assist, but the cost per student rises as faculty research increases.

[2] Loans should be income contingent as far as possible. Also direct loans to be repaid in 10 years represent a substantial student subsidy if the interest rate is as low as three or four percent.

[3] Opportunity grant would be related to the student's family income and number of children in family.

[4] Living expenses are estimated on the basis of cost to the single student living in a dormitory or separate lodging. If a student lives at home, his living expense decreases. If he is married and living with a spouse, her earnings more than make up for increased expense. If they have small children, their living expense is greater.

ble. The Commission believes that tuition fees should be high enough to throw at least half of the cost of optometric training on the shoulders of the student or his family if the family is in the upper third of income. For students from low income families, the Commission believes there should be government funded student aid to pay the tuition fees.

Financial assistance for optometric students now takes two forms, both of which should be continued. There are government funded opportunity grants which go to students from low income families and to students from middle income families which have unusual expenses due to large numbers

of children or other factors. Student financial aid can also be given through government loan funds with a variety of repayment plans. The income contingent form of loan requires the student to repay the loan by paying two or three percent of his net income for his first 30 or 20 years of practice. A direct loan can be repaid in 10 years of practice with an interest rate of three or four percent which represents a considerable subsidy. Furthermore, a part or all of this kind of loan may be forgiven if a graduate works in an area of manpower shortage such as an inner city slum or an isolated rural area.

With these questions answered in a general way, we may turn to the three models which the Commission presents as practicable and desirable. Table 11 shows these models, each of which is divided vertically to show (1) how the college is supported, (2) how the student finances his program, and (3) the cost to the student. Furthermore, each model is divided horizontally to show how students from three different income levels might manage to finance their program.

A broad general policy for state and federal government assistance to education for the health services should be substantially the same (in policy) for all the primary health services. Some people, including some members of this Commission, would favor Model A, which would cost the government less and would place more of the load on families of students in the high and middle income brackets. However, the Commission believes that Model B is likely to be more generally approved. This model sets tuition at $2,200, and assumes a federal or state government cost-of-instruction grant to the college of $3,300 per student per year. Model A is the least costly to the state or federal government while Model C is the most costly, due partly to the likelihood that this model would bring more students of low family income into the colleges.

Conclusions and Recommendations

The period since 1950 has been one of very rapid development of health services in the United States combined with increases in the cost of health care from 4.6 percent of the gross national product in 1950 to seven percent in 1970. These increases are reflected partly in the expansion of specialized training and specialty practice by practitioners, which are costly; the increases also partly reflect a vastly increased volume of health service demanded by the public and paid for in part by "third parties," such as employers, insurance companies, and government agencies.

The federal government has increased its activity since 1960 in connection with payments for health services (Medicare, Medicaid, Hospital Construction Grants, etc.) and in connection with financial assistance to the education of health service professionals. One result of federal government interest has been a rapid expansion of health services and of training facilities for health service personnel. Another result has been a growing concern about the costs of health care and of the training of health service personnel. This is illustrated by the federal government grant to the National Academy of Sciences for the contemporary Institute of Medicine study of the costs of medical education.

EXPANSION OF OPTOMETRIC SERVICE

The profession of optometry has expanded the scope of its vision care services and the curriculum of its colleges of optometry in response to public need. Optometry has received limited government support—too limited in amount and in commitment to permit the development of a stable policy that guarantees an adequate supply of well trained practitioners over the next two decades. It is essential that federal government support of training in optometry be stabilized on an adequate and continuing basis as is being done for other health service professions.

Future developments for optometry are critically related to the development of a national health service program. This Commission assumes that vision care will be a fully supported part of such a program and that the services of optometrists will be paid for in the same manner as the services of other professionals.

It is essential that optometry be a primary point of entry into the health care system. That is, people can go to an optometrist for an eye examination, be served by him if they need glasses or some other form of optometric care, or be referred by him to ophthalmologists or other health care practitioners if he finds that patients probably need their services.

It is also important for optometry to have a full part in the development of a health service delivery system to low income urban residents. This may come partly through the participation of optometrists in comprehensive health service centers where they can be part of a professional team. It may also come through the expansion of vision care centers.

Full participation of the colleges of optometry is essential in these developments for many obvious reasons. They should have a common base from which to deal with the federal government on matters of training practitioners, developing service and training clinics, and securing research funds.

Within the optometric profession, the Council on Optometric Education has been the effective agency for developing and maintaining standards of professional education through its function of accrediting schools of optometry. This Council appears to have worked quite well. However, its close connection to the American Optometric Association should be examined and perhaps questioned. The Council on Optometric Education is an intimate part of the parent body (the American Optometric Association). Consequently, it is hard for the public to believe that the Council can act in a completely objective manner on matters that are related to policies formulated by the AOA. To an outsider, the Council may appear to be subservient to the professional organization even though it makes every effort to carry out its judicial acts in a way which protects the public interest by the use of consultants who are not members of the optometric profession. The Commission believes that the Council on Optometric Education should be a separate entity tied to the American Optometric Association by only the most slender threads. The public should be represented on the Council on Optometric Education by an individual or individuals not members of the optometric profession.

In this connection it seems wise to develop and strengthen the Association of Schools and Colleges of Optometry. This organization has not had much strength, though it has served to facilitate communication among the administrative officers of the colleges.

Within ASCO there should be a Council of Chief Administrative Officers with authority to speak for the colleges of optometry in dealing with

the federal government, with interstate compacts, and with organizations in other health care fields. In addition, there should be a curriculum planning and evaluation unit. Recruitment and selection of minority group students and policy for loans and scholarship grants to students would also be matters of joint concern to the several colleges that might be assisted by ASCO.

Also, the Commission recommends that the American Optometric Association create and maintain a mechanism for reviewing every five years the status of manpower needs, the distribution of optometrists among various forms of practice and health delivery systems, and the financing of optometric education.

In addition to these reviews, three studies are presently needed: One, there is a need to develop better national figures than we now have of unmet vision problems; two, a variety of practice methods should be studied to indicate which ones are most effective; and three, we badly need a careful study of the epidemiology of vision problems. Such continuing reviews and studies would be of enormous value in planning the future policies of the Association and the colleges of optometry.

BROAD POLICY FOR THE NEXT 20 YEARS

The Study Commission has deliberately focused its attention on probable and desirable developments in optometry during the next 20 years. This period has been divided roughly into two periods of a decade each. The first period, the decade of the 1970s, is treated as a situation needing immediate decision and action on several pressing problems—financing of schools of optometry, expansion of enrollments, and reaction to the forthcoming plan of national health service. The second period, the decade of the 1980s, is seen as a period during which the profession grows in numbers and status on the basis of a rational and generally satisfactory solution of the problems of the 1970s.

A program of long range planning must necessarily be based upon a set of goals that the profession may reasonably expect to reach within the foreseeable future. Such professional goals are anticipated in some degree by the present stage of development in the profession, by a consideration of what the immediate future will probably bring forth, and by a knowledge of presently existing educational programs and scientific clinical developments.

Optometry performs a unique and distinct vision care service. It must fill the needs of a highly technical age in which the visual requirements of all peoples are becoming increasingly important and significant.

Competence in optometry is gained by formal education as well as by example, precept, demonstration, extensive clinical experience under competent teachers at institutions of higher learning, and by programs of continuing education. This fundamental training, with emphasis on the psychophysiology of vision, underlies modern optometry's concept and practice of functional vision care. In addition to good acuity, optometry is dedicated to the practice of preventive optometry as well as to the comfort and efficiency of the patient's vision.

The treatment of pathological conditions and eye surgery is understood by optometry to be in the field of medicine. However, for the protection of the public, and in order to make proper referrals to other practitioners and specialists, optometrists must continue to be well trained in the detection and recognition of ocular signs of pathology.

EMERGING AND CONTINUING FORMS OF OPTOMETRIC PRACTICE

In the early 1960s, the Congress declared that health care is a right rather than a privilege. It is for the 1970s to translate this declaration into the reality of a broad national program which carries health care, including vision care, into the experience of persons of all ages and all income levels.

It is clear that some form of prepayment for health care is a necessity, though it is not yet decided how much of this should be individually paid insurance and how much should be paid under an expanded Social Security plan. In 1920, 12 percent of the health care dollar was prepaid; in 1965 it was about 32 percent and in 1970 approximately 40 percent.

Thus, as of 1973, approximately half of personal health care expenditures is being met by third parties (government, private insurance, industry, philanthropy) with the government responsible for 60 percent of third party payments. Prepayment is a means of mutualizing the cost of comprehensive health care for the population at risk, since the barrier of a fee at the time of service is removed.

There are two major changes which influence the whole range of health services. These are:

1. The concept of *entitlement* to health care through some form of health insurance which pays the cost.
2. The development of a system of delivery of health services through a group clinical environment which is as responsive to the individual patient as the solo practitioner, though not in exactly the same ways.

Group Practice.

Various forms of group practice are growing in popularity for two reasons: this form of practice gives the patient easier access to the kind of service he needs and it makes a more efficient use of health service personnel. Optometrists are initiating group optometric services, and they are also forming loose confederations with other health professionals with some shared services and facilities.

The most significant current development in the delivery of health care is the invention and popularization of the *comprehensive group practice.* Organized optometry has been officially interested in participation in such group practices.

There are essentially four principles involved in the concept of comprehensive group practice:

1. An organized system of health care with a single medical record for each individual as a common denominator;
2. An agreed upon set of comprehensive health maintenance and treatment services;
3. Consumers served through a prenegotiated and fixed periodic payment made by or on behalf of each person or family unit enrolled in the plan;
4. Enrollment of a group of persons in a given geographic area.

At present, optometry is involved in at least 100 group health delivery systems. Many more health care centers will attempt to deliver optometric care in the near future.

Community Health Services.

Probably the health maintenance organization is an interim step toward an institution which we may call a Health Service Organization, which operates through clinical health centers. There will emerge an American system which draws partly on the experience of European systems and partly on the comprehensive group practice experience in this country. Health centers may be attached to hospitals, schools, factories, or other settings which collect people and make it convenient for them to seek health service. Such centers, established in local community areas, may be the answer to the problem of taking optometric services to the residents of low income areas in the large cities.

The Commission expects that these forms of group practice will expand vigorously during the remainder of the 1970s and that optometrists will participate fully in them, although the present well established forms of solo and associate or partnership practice will continue to be the most prevalent patterns of professional service for optometry.

EXPECTATIONS CONCERNING VISION CARE

The following five recommendations are goals which should be reached during the current decade of the 1970s:*

1. Every child in the public schools should be provided with free comprehensive vision screening. When vision care is needed, it should be supplied. Every child in the public schools should receive instruction in the care and use of his eyes.
2. The need for vision care increases rapidly after age 65. Many elderly people put up with inferior vision because either they do not know they could be helped or they cannot afford to pay for better care. Provision should be made for adequate vision aid to people in this age group.
3. Optometrists should be encouraged to form groups or to join comprehensive health service organizations which contract with groups of people or with organizations for the purpose of providing optometric services efficiently on large scale. At the same time, it is expected that the solo practice or the joint practice of two or three optometrists will continue to be the most common type of practice.
4. Third party payment plans for health services should include payment for vision care to optometrists, physicians, and other adequately trained and licensed persons.
5. Community health centers should be established with government support in low income areas with optometrists and visual health services included as essential elements in the centers.

EDUCATIONAL RECOMMENDATIONS

The Commission on the Study of Optometric Education makes the following recommendations that bear especially on the development of education for optometrists.

A. Cooperation with Other Professions

1. Since a closer relationship between faculties of optometry schools and the faculties of other health related schools would create more mutual understanding and respect, there should be a substantial development of faculty interchanges and cooperation.
2. Faculties in schools of optometry should develop close relationships with specialists in such fields of knowledge as psychology, education, social work, and safety engineering.

* Many specific recommendations are not included in this Summary. However, the more important ones appear here.

3. Interprofessional committees of optometrists and ophthalmologists should be established in every state to help develop working relationships similar to those now being developed in Michigan and Kansas.

B. Manpower in Optometry

1. Policy makers in the colleges of optometry should work for at least 50 percent expansion of enrollments beyond the level that they are now scheduled to reach in 1974–78. At the same time, they should seek to cooperate with the federal government to discover a rational and cost efficient division of labor between ophthalmology, optometry, and technician assistant groups under the conditions of an emerging national health plan. This division of labor should help to determine the numbers of each group who are to be trained in the future.

2. If each health professional devoted most of his time to work requiring his highest professional skill, many additional paraprofessional persons could be utilized. Therefore, optometrists should be utilized at their highest level of training and licensed privilege. Further, optometrists should be encouraged to turn over routine or nonjudgment functions to auxiliaries who ought to work under their direct personal supervision. As a result, some present professional shortages could be reduced.

3. Group practices and clinics offer the advantages of greater use of auxiliaries, improved efficiency and economy in the use of equipment and nonprofessional services, diversity of professional specialties, and of making available professional services during vacation periods, illnesses, and absence of staff members for their continuing education. Therefore, with due recognition to the fact that solo and associate practice will continue to be the most prevalent forms, the colleges of optometry should prepare students to consider alternate careers in group practices and in associate practice with ophthalmologists.

4. In order to meet the growing need for optometrists, it will be necessary to establish several new schools attached to universities or to health science centers or possibly to increase the faculties and facilities of some existing colleges of optometry.

C. Curriculum in Optometry

1. The curriculum of schools of optometry should give greater emphasis to: (a) ophthalmic pharmacology and pathology, (b) public and community health, (c) the social and behavioral sciences as they relate to vision, and (d) areas of specialization in optometric practice.

2. Schools of optometry should continue to work on experimental programs aimed to improve the basic professional knowledge of students and

to encourage them in self chosen and self directed educational experience. The federal government grants for this kind of improvement should be continued.

3. Student experience and training in the clinic have been vastly improved in recent years, due to increased time in the curriculum and to the extension of clinics to serve low income families and to serve patients with a wide range of ages and vision problems. The Commission recommends that off campus clinical facilities be developed and expanded.

4. Attention should be given to the development of standards for visual science libraries, including the establishment of criteria for determining the adequacy of the optometric library. Such factors as physical space and equipment standards, qualifications of library personnel, books and reference materials, audiovisual materials, and extent of use by faculty and students should be systematically studied.

5. Schools of optometry which are affiliated with universities should pay more attention to graduate work leading to the master's and doctor's degrees, working with the Council on Optometric Education to avoid needless duplication of programs.

6. Schools of optometry should cooperate with the organizations now providing continuing education for the upgrading of optometrists currently in practice. Present arrangements appear to be working fairly well.

D. Faculty in Schools of Optometry

1. Every school should have a core of full-time faculty with both the O.D. and the Ph.D. degrees.

2. Every school should have a faculty salary scale that approximates that in the other health science schools such as dentistry.

3. Where possible, and especially in university affiliated schools, instruction in pathology and other basic medical disciplines should be taught by faculty members from the relevant departments.

4. Research production should be one of the criteria in promoting faculty members, and a considerable proportion of the faculty should devote one-third to one-half time to research.

E. Students of Optometry

1. In view of the relatively large numbers of applicants for entrance to colleges of optometry and of their relatively good academic performance in liberal arts colleges, the admissions procedures should take greater account of the socio-ethical values and motives of the applicants.

2. There should be a continuing and affirmative effort to recruit students from economically disadvantaged minority groups, especially blacks, American Indians, and Spanish surname persons.

3. Enrollment of greater numbers of women students should be welcomed, and possibly a committee on Women in Optometry should be appointed to work on the matter of informing women of the opportunities of a career in optometry.

4. Efforts to improve relations between students, their faculty, and administration should be increased with support from the Association of Schools and Colleges of Optometry and from the Council on Optometric Education.

F. Financing Optometric Education

1. The federal government should explicitly assume a major share of the responsibility for the financial support of colleges of optometry, just as it is doing for colleges of medicine, osteopathy, dentistry, and other primary health professions.

2. Each school of optometry should work out an optimum enrollment figure in collaboration with the Council on Optometric Education and with federal government representatives; federal government aid should then be provided on a stable, continuing basis. The minimum size of an entering class should be 60 to 75 students.

3. New schools of optometry should be established within a university or health science center structure. Present independent schools should seek university affiliation and develop affiliated programs whose primary purposes are to increase the scope, the quality, and the financial stability of the professional training of optometrists.

4. Federal and state government assistance to schools of optometry should be provided in two complementary forms: (a) there should be a cost-of-instruction grant to the school, set at approximately 60 to 75 percent of the cost of operation of the school; this would require a tuition charge of approximately 25 to 40 percent of instructional cost. (b) there should be scholarship and loan funds to meet tuition fees and student subsistence cost in whole or in part for students from families below the national median income level.

5. There should be substantial increase of federal scholarship and revolving loan funds with federal government support of the administration of these funds.

SUMMARY

This report has attempted to do two things: portray by collecting information the present status of the profession of optometry and indicate by forthright recommendations what the Commission believes would be the wisest future course for the profession to follow.

A technological civilization such as ours creates vast new problems which have their origins in urbanizing a society and industrializing its economy. These new problems require changes not easy to bring about in our professional, social, and political organizations. Exactly what these changes should be with relation to the health professions is not altogether clear, but some new principles seem to be emerging. Chiefly, these concern the methods of delivering and paying for health care. They also concern the need to provide equal opportunities for health care to all our citizens, not only for their own good but for the good of society as well.

A survey such as this gives an independent profession the advantage of an "outside look," which should help its officers and leaders to avoid at least some pitfalls in planning for the future. In a simpler society, where everyone was more or less on his own, planning was much less necessary than in a society in which, willy-nilly, we are all dependent upon each other and the organizations we have created.

Therefore, the Commission wishes to make one final recommendation: it is that the profession of optometry continue to study itself in order to plan its future wisely. In a sense, the future is already upon us and we can deal rationally with its complexities or we can let our decisions be forced upon us by haphazard efforts to deal with problems as they arise.

This Commission has great admiration for the previous planning and the enlightened leadership of the optometric profession. However, good planning and leadership require a base of solid data to guide the making of decisions. Therefore, the Commission hopes that this study will be only the beginning of a series — a series which should help to enable optometry to meet the goal of providing ever better vision care to an ever larger proportion of our people.

Consequently, the Commission recommends that the American Optometric Association create and maintain a mechanism for reviewing every five years the status of manpower needs, distribution of optometrists among various forms of practice and health service delivery systems, and financing of optometric education. This review should become the basis for action by the Association and by the schools and colleges of optometry.