The original documents are located in Box 1, folder "Aging - Optometry Study" of the Spencer C. Johnson Files at the Gerald R. Ford Presidential Library.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH RESOURCES ADMINISTRATION
BETHESDA, MARYLAND 20014

APR 27 1976

BUREAU OF HEALTH MANPOWER

Dear Dr.

Enclosed is a copy of the Optometry Study which has been forwarded for review in the Department. The report was approved by Dr. Kenneth M. Endicott, Administrator of the Health Resources Administration, and has been forwarded to the Assistant Secretary for Health.

I want to take this opportunity to thank you for your assistance and input to the preparation of the report. As I indicated at the last consultant session, it was indeed a pleasure to work with such a knowledgeable and competent and, at the same time, congenial group. It was a rewarding experience for me and for the rest of the staff.

We will keep you advised as to the progress of the clearance process.

Sincerely yours,

Daniel F. Whiteside

Daniel F. Whiteside, D.D.S.
Director

Enclosure

April 30 deadline working OMB review

REPORT TO THE CONGRESS

REGARDING COVERAGE UNDER PART B OF MEDICARE FOR CERTAIN SERVICES PROVIDED BY OPTOMETRISTS

As Required by Title I, Section 109, of the Social Security Amendments of 1975 (P.L. 94-182)

April 1976

U.S. DEPARTMENT OF

HEALTH, EDUCATION, AND WELFARE

PREFACE

This report has been prepared in accordance with Study requirements mandated by Title I, Section 109, of the Social Security Amendments of 1975. It provides findings and recommendations, including supportive material, concerning the appropriateness of altering current coverage provisions under Part B of Medicare to include services related to aphakic and cataract conditions when provided by optometrists.

The report has three major segments. Conclusions and recommendations provided by the Department of Health, Education, and Welfare to Congress, as well as additional considerations raised by expert consultants to the Study, are provided in the beginning. Part I consists of three sections which provide an overview to the Study framework, the current status of Part B coverage and reimbursement of interest to the Study, and principal findings and conclusions underlying the recommendations. Part II, in turn, consists of five sections which provide detailed supportive material developed as part of the Study effort.

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CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The following set of conclusions responds directly to the Congressional charge concerning whether it is appropriate to alter Part B coverage under Medicare for services related to aphakic and cataract conditions when provided by optometrists. These conclusions have been derived from factual information, analytic findings, and professional judgements assembled in the study effort.

1. Qualifications of optometrists. Optometry is a profession qualified to provide a broad range of services which are effective in patient management, including the management of aphakic and cataract patients. These services are reasonable, non-experimental, safe, and generally acceptable to the vision/eye care community and the public.

2. Services related to aphakic and cataract conditions. Many of these services are the same as the specific diagnostic, therapeutic, and consultative services currently covered under Part B of Medicare when provided to pre- and post-surgery cataract patients by ophthalmologists or other doctors of medicine and osteopathy. (See Table 1, Part I, Section I-B.)

3. Detection and diagnosis of disease. Evidence presented during this study supports the conclusion that optometrists are qualified to provide services for the detection and preliminary diagnosis of ocular disease and ocular manifestation of systemic disease. Referral, where indicated, is made to ophthalmologists and other health care practitioners for definitive diagnosis and medical or surgical treatment.

4. Standards of Procedure. Clinical standards committees of professional associations have identified effective instrumentation and procedures that are available to and utilized by optometrists which are effective in the diagnosis/detection of disease, notwithstanding limitation by certain State jurisdictions regarding the use of topical drugs.

5. Quality Assurance. Quality assurance is attainable in the provision by optometrists of reasonable, safe, non-experimental, and acceptable services to the Medicare eligible population. The development of criteria of care for diagnostic, therapeutic, and consultative services provided by optometrists, that are similar to those existing for certain other health professional groups, does appear feasible in both organized and independent health care settings. Such criteria currently exist in a number of individual situations or are in various stages of development.

6. Access to services. Vision/eye care services for aphakic and cataract patients, as well as for patients more generally, can be made more accessible to the Medicare eligible population by expanding present coverage to include services when provided by optometrists. In general, optometrists are more widely distributed geographically and practice in many smaller communities where other vision/eye care practitioners are not available.

7. Equity. Financial equity can be extended to those Medicare beneficiaries who currently obtain necessary and reasonable health services from optometrists but who do not currently receive the reimbursement to which they should be entitled.

8. Delivery patterns. It is reasonable to infer that an extension of current Medicare coverage to include services for aphakic patients when provided by optometrists would not significantly alter existing provider delivery patterns within the vision/eye care community. The impact upon such delivery patterns of an extension of current Medicare coverage to include services to optometrists for cataract patients, while likely to be small, however, is less clear.

9. Costs. It is reasonable to infer, furthermore, that an extension of current Medicare coverage to include services related to aphakic and cataract conditions when provided by optometrists would result in some added costs to the

Medicare program. These added costs will be to the extent of the Medicare enrollees currently served by optometrists without reimbursement, as well as those patients not now receiving care, who would do so as a result of an extension of coverage. Estimates suggest, however, that such added costs would not be significant in the context of overall Medicare costs for vision/eye care services and service benefits.

RECOMMENDATIONS

1. Based primarily on considerations of patient needs, qualifications of optometry to provide services effective in patient management, and increased access of Medicare beneficiaries to vision/eye care services, the Department recommends that coverage of services under Part B of Medicare be extended to include services related to aphakia when provided by optometrists, and that optometrists be defined as "physicians" for the purpose of providing these covered services which shall be reimbursable. This recommendation is presented in direct response to the requirements of Section 109 of the Social Secutity Amendments of 1975 (P.L. 94-182).

2. Based on the same considerations as indicated above, the Department recommends that coverage of services under Part B of Medicare be similarly extended to include services related to cataract conditions when provided by optometrists. This recommendation is in response to the broader legislative intent interpreted for the scope of this study.

ADDITIONAL CONSIDERATIONS BY STUDY CONSULTANTS

During the course of the study effort, a number of issues and concerns were identified by the expert consultants to the study which, although important considerations, represented matters not directly responsive to the specific legislative charge as interpreted. The recommendations and comments below, made unanimously by the consultants, provides an opportunity to bring these matters to the attention of the Department and the Congress.

1. Refractive services for aphakic patients

Aphakic patients, specifically, should be considered as having special needs given their disabled condition. Refractive services for such patients represent non-routine and necessary services in the provision of prosthetic devices, i.e., lenses.

Study advisors recommend that consideration be given to extending coverage under Part B of Medicare to include refractive services for aphakic patients when provided by either ophthalmologists or optometrists.

2. Low vision services and aids

For those patients who have inoperable cataracts or have less than optimal results from cataract surgery, that is, those who have reduced visual acuity, low vision services and aids represent essential components of reasonable and necessary health care services for these patients.

Study advisors recommend that coverage under Part B of Medicare be extended to include the provision of appropriate low vision services and optical aids for the above-referenced patients, when provided by either ophthalmologists or optometrists.

3. Prevention, health maintenance, and health education

In the interests of health care cost advantages, effects on productivity, and the overall improvement of benefits that can be afforded our population, the expert consultants recommend that a more effective effort be made to improve preventive, health maintenance, and health education measures. While this is needed in all areas of health services, the vision/eye care field offers a particularly promising area for such approaches.

4. Other service provided by optometrists

Vision/eye care services currently covered by Part B of Medicare, when provided by ophthalmologists or other physicians, include eye conditions other than cataract and aphakia. Optometrists can provide appropriate services for some of these conditions. It is recommended that extension of coverage to include the services of optometrists for such appropriate conditions is a desirable subject for further consideration.

5. Administrative considerations

Also during the course of the study effort, expert advisors raised several concerns pertinent to the administration of the Medicare program. These issues, also applicable to other Medicare

services, include the following: (a) inconsistent application of coverage and reimbursement policies by individual carriers, (b) the problem of payment duplication for services and reimbursement for similar diagnostic procedures when performed for specific individuals by more than one provider; and (c) need of improvement in coding and billing proceedures for vision/eye care services.

6. Cooperative working relationships between vision/eye care professionals

It became clear during the course of this study that more effective working relationships between optometry and ophthalmology and other providers in the vision/eye care field would enhance patient care and result in improved services to individual patients. While improved interdisciplinary coordination applies to all the health disciplines and specialties, it is a problem of particular concern in the vision/eye care field. Such working relationships could be significantly strengthened by

a. Development of joint educational programs at the undergraduate and graduate levels, including rounds, clinics, conference, and meetings and publications;

b. Establishment of interdisciplinary clinics with optometrists and ophthalmologists working together;

c. Facilitation of referral of patients between the optometrist and the ophthalmologist when in the best interest of the patient;

d. Joint development of quality standards for service and materials by peer review mechanisms. By materials, particular reference should be assigned to varying quality of lenses and frames and the need for furnishing laboratory invoices of material costs for reimbursement.

e. Joint development of appropriate revision to State licensure laws to permit use of diagnostic drugs (mydrictics and local anesthetics) by optometrists.

While such joint endeavors are evident in various areas of the couttry, they need to be broadened and routinized.

PART I

The three overview sections presented in this first part of the report provide the reader with a general summary of the entire study effort. The first major section presents an account of the study background, strategy, and methodology. The second major section provides the reader with a synopsis of existing Medicare provisions pertinent to the study query. The concluding major section, in turn, presents key findings and conclusions that have resulted from this study effort.

SECTION I-A

STUDY BACKGROUND, STRATEGY, AND METHODOLOGY

The Department of Health, Education, and Welfare currently provides, through a variety of mechanisms, financial assistance for the provision and receipt of health care services. As stated in its Forward Plan for Health (June 1975): "The focus of providing access to medical services through Federal financing has gradually shifted from limited activities for the control of communicable diseases among various Federal beneficiary groups, to services for special age and population groups; to care related to specific health needs; to comprehensive service delivery systems; to insurance for the aged and disabled; to reimbursement of services to the poor and medically indigent. In terms of expenditures, Medicare and Medicaid represent by far the greatest share of the Department's health financing activities."

Slightly over a decade ago, the Medicare program was promulgated as part of the Social Security amendments of 1965, when Congress enacted a dual program of health care to meet the growing problems of providing services for the aged. In effect, this program was intended to provide financing of health care services for beneficiaries who tended to be in poorer health than many other population groups and who often had inadequate financial resources to purchase such services. As enacted, Title XVIII of the Social Security Act consisted of provisions relating to hospital benefits (Part A), financed by universal mandatory contributions, and a voluntary supplementary medical benefits plan (Part B), available to any person aged 65 or over, irrespective of Social Security status.

At various times furing the past decade of Medicare experience, interest has arisen in the appropriateness of altering provisions as originally mandated by the 1965 legislation. Where Congress has favored modifications, changes have been enacted through a series of emendments to Title XVIII of the Social Security Act.

One areas of interest in recent years has been directed to the appropriateness of selectively altering coverage under Part B of Medicare to include certain health care services when provided by nonphysician professional practitioners. Currently, for example, the Department of Health, Education, and Welfare is engaged in several efforts directly or peripherally related to this issue. This particular document represents the output of one such effort.

Legislative Charge

During the Senate floor debate on December 17, 1975, on H.R. 10284, Amendments to the Medicare Law, the following amendment, which was later enacted as Section 109 of P.L. 94-182, was proposed to require a study by the Secretary of DHEW, due four months after enactment, regarding eligibility under Part B of Medicare for certain vision/eye care services when provided by optometrists:

> "Sec. 109. The Secretary of Health, Education, and Welfare shall conduct a study of, and submit to the Congress not later than four months after the date of enactment of this section a report containing his findings and recommendations with respect to, the appropriateness of reimbursement under the insurance program established by Part B of Title XVIII of the Social Security Act for services performed by doctors of optometry but not presently recognized for purposes of reimbursement with respect to the provision of prosthetic lenses for patients with aphakia."

The amendment is essentially the same as the one adopted by the Senate two years earlier as part of H.R. 3153, the Social Security Amendments of 1973, which did not become law. At that time, it was suggested in the Senate report on the bill that an appropriate study should be undertaken utilizing the expertise of both optometrists and physicians who are not employed directly or indirectly in governmental agencies, and that at least half of the professionals consulted should be actively practicing optometrists.

Supporting his amendment to H.R. 10284 this past December, Senator Robert Dole referred to the guidelines set forth in the 1973 Senate report and added:

> ". . . I would further suggest now that the Secretary might assign the designated task to his Assistant Secretary of Health, and that his office in turn utilize existing Health Manpower agencies so that information could be supplied regarding the optometric curriculum and the distribution of optometrists generally. I would also hope that the panel formed would include consumer representatives and than, in the course of their investigation, consideration can be given to services provided the entire cataract patient--including precataract cases where appropriate."

Interpretation of Charge

Interpretation of the charge from Congress was based on the joint context of the amendment itself and the Senate floor speech. In order to meet the requirements intended for the study, consequently, the following question was viewed as the principal query for examination: What services related to aphakic and cataract conditions currently covered under Part B of Title XVIII when provided by a physician, are appropriate for coverage when provided by an optometrist? Implicit in this interpretation was the expectation that any recommendations which might result from the study for altering Part B of the Medicare program would require legislative change.

Two points should be noted in the context of this Departmental interpretation. First, it was deemed appropriate to confine the study inquiry to optometrists and optometric practice. Accordingly, limited attention was directed within the study framework to other providers of vision/eye care services. Second, although the principal focus of the study would be to examine matters germane to the specific legislative charge, it was also viewed appropriate to keep the study framework sufficiently flexible to accommodate consideration of related areas of interest (e.g., services presently excluded from Medicare coverage for any provider of vision/eye care services).

Departmental interpretation of the legislative intent regarding substantive content of the study, as well as the use of non-government expert advisors, is treated in the remainder of this section.

Study Strategy

In addressing the appropriateness of introducing modifications to existing provisions under Part B of Title XVIII, a balanced assessment must examine considerations of population health care needs, the quality of service delivery provided to the Medicare eligible population, resource distribution and access concerns, and respective cost implications. The intensity of any study inquiry into such areas, however, must be tempered by the availability of time, resources, and information of relevance. Given the time constraints available for the conduct of this mandated study, the Department adopted a closely-defined strategy to undertake this effort.

Health Care Needs. As stated in Vision Research Program Planning, a report developed under the auspices of the National Advisory Eye Council and published this past year by the National Eye Institute, the National Institutes of Health, "the great toll taken each year

in the United States by eye diseases is. . . not measured in terms of mortality--few disorders originating in the eye cause death--but rather in degrees of physical limitation and financial burden. But such measurements are inadequate, for they do not convey the hardship or mental anguish of having to function in a complex environment deprived of normal vision. Perhaps for these reasons, Americans have indicated that they fear blindness more than any other physical affliction with the single exception of cancer."

Although applicable to persons generally, this passage has particular relevance for any consideration of vision/eye care disorders and their impact upon the elderly members of our society. Persons sixty-five years of age and over continue to account for a disproportionate share of vision/eye problems, a fact that often further complicates the already complex life conditions faced by many geriatric persons.

An assessment of the extent of overall vision/eye care needs of the elderly is itself a difficult undertaking, similar to efforts addressing broader health care needs and other population segments. Judgments from professional providers or other experts close to the subject yield approximations with wide variation for both overall vision/eye care needs as well as needs more pertinent to aphakia and cataract. For this brief study effort, it was believed reasonable that the identification of relevant incidence and prevalence data, along with selected data on utilization, would provide an adequate information base to address this area.

Quality of Service Delivery. In an consideration of modifications to the Medicare program, an assessment of the qualitative dimensions of health care delivery is also relevant. It is principally due to a concern for minimizing variability within the qualitative aspects of health care delivery that de facto adoption of State Practice Act provisions, which often exhibit extensive variations from one jurisdiction to another, has not been routinely accepted as an exclusive criteria for extending eligibility to providers currently outside the provisions of the program. This consideration has been particularly relevant in situations where universal coverage experience has not existed.

Given this context, the question of relevance is not whether the quality of health care delivery should be addressed, but rather how should it best be addressed. The quality of health services is admittedly an elusive concept, involving measures that are often, at best, imprecise.

The strategy of this study, in view of this consideration, was to direct attention to selected structure, process, and outcome variables.

As such, consideration was given to the appropriateness of equipment and procedures utilized by optometrists for providing required services; the extent to which optometric education and usual practice correspond to the skills and experience identified for the requisite services; and the existance of any optometric practice standards that might exist or be in the process of development. Bibliographic searches were undertaken to uncover the availability of any controlled studies that have been directed to assess the effectiveness of optometric practice. Attention was also directed to an analysis of State Optometry Practice Act, primarily to document the extent of uniformity or variability among extant provisions, as well as to supplement analyses of relevant structure or process variables (e.g., the extent to which continuing education requirements are stipulated in State Practice Acts).

Distribution, Access, and Cost. Although access to health care can be conceptualized in several ways, such as in terms of financial, physical, and attitudinal barriers to obtaining services, a thorough examination of this issue requires a relatively broad view of resource availability and distribution. For example, a consideration of physical access solely in terms of numbers of available health care resources represents a limited input for policy development concerning resource access. Measurement of physical access is better undertaken in terms of the monetary and non-monetary costs of obtaining requisite services, including considerations of respective transportation, time, and search costs incurred. Insuring physical access in monetary terms, consequently, should raise the possibility of tradeoffs between improved financial access and improved physical access.

Despite such broader considerations, including respective implications for health manpower education policy, time and data availability constraints for this study effort suggested a more narrow course for examination. Attention was focused, therefore, on the geographic distribution of the Medicare eligible population and the corresponding distributional patterns of optometrists and ophthalmologists. The rationale was to conduct a first-order level of analysis concerning potential impacts upon availability of manpower (services) from any potential alterations in existing coverage.

Changes in existing utilization patterns, potential alterations in the patterns of service delivery by providers, as well as possibilities for duplication of services all represent minimum considerations for analytic endeavors attempting to assess the cost implications of any shifts in prevailing coverage. Attention to respective consequences for Medicare program costs and health care costs generally represents an integral part of any inquiry

concerning the appropriateness of potential modifications to existing Medicare provisions and policy. Given such considerations and again within the time and data constraints for this effort, the study intent was to provide a rough first-order magnitude of the respective cost implications at issue, as well as to delineate several key dimensions that might be relevant for any definitive inquiry into this matter.

Study Methodology

Current and historical studies, as well as data collection efforts already completed, were heavily relied upon for information utilized in this study. This process was expedited by the use of selected bibliographic searches, as no primary data collection activities were undertaken for this effort.

In accordance with the legislative charge, furthermore, a panel of nine expert consultants was convened. This group of individuals assisted the study effort by reviewing material assembled by the study staff; provided information sources and, where appropriate, access to relevant material for the conduct of the study; and served in a technical advisory capacity. Although the consultants contributed substantially to the preparation of this report, including its conclusions and recommendations, its overall contents, apart from the statement on Additional Considerations at the beginning of this report, are the responsibility of the Department. The panel consisted of three active practicing optometrists, three ophthalmologists, one optometric educator, and two public members. (See the Attachment to this section for a listing of the names of consultants.) During the course of the study, the panelists were convened on three occasions, although informal dialogue between individual consultants and respective study staff continued throughout the study's duration.

The above discussion concerning "study strategy" briefly outlined the analytic components of the study. Logistically, during their first meeting, panelists were presented with a series of questions that study staff intended to address as part of the analytic endeavors. Dialogue between panelists and study staff during that meeting, as well as inputs provided by selected organizational components of the Department, served to finalize the study framework. During the latter part of the effort, the expert consultants reviewed findings suggested by study staff, and, at the request of staff, provided their professional views concerning the range of potential conclusins and recommendations which might reasonably be related to these findings.

The Bureau of Health Manpower of the Health Resources Administration, PHS, which is directed by Daniel F. Whiteside, D.D.S., had primary responsibility for the staff work. Expert assistance in specific areas of the study was provided by the Office of Policy Development and Planning, Office of the Assistant Secretary for Health, PHS; Bureau of Quality Assurance, Health Services Administration, PHS; National Eye Institute, National Institutes of Health, PHS; National Center for Health Statistics and National Center for Health Services Research, Health Resources Administration, PHS; and the Bureau of Health Insurance and the Office of Research Statistics, Social Security Administration. A listing of study staff, as well as formal linkage persons in Departmental organizations identified above is also provided in the Attachment. In addition, a number of additional governmental and non-governmental sources were contacted informally during the course of the study. Where information was obtained from such sources and utilized in this effort, appropriate references are provided in the text of this report.

ATTACHMENT

LISTING OF EXPERT CONSULTANTS, STUDY STAFF, FORMAL AGENCY LIAISON

I. Expert Consultants

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SECTION I-B

CURRENT STATUS OF MEDICARE COVERAGE[1/]

In order to provide the basis for a review of the question of the appropriateness of extending coverage under the insurance program established under Part B of Title XVIII of the Social Security Act of services to cataract patients provided by optometrists, but not presently recognized for coverage, it is essential to understand the current status of coverage. The purpose of this section is to provide that understanding.

Part B of Title XVIII of the Social Security Act (Sec. 1831-1879) entitled "Supplementary Medical Insurance Benefits," in contrast to the hospital benefits program (Part A), is a voluntary program for eligible individuals who elect (or in certain cases do not decline) to enroll. It is financed from premium payments by enrollees and from contributions from fxnds appropriated by the Federal Government. Eligible enrollees include persons who have attained the age of 65 years and (after 1973) certain persons under age 65 who are disabled or suffer from chronic renal disease. As the title implies, the program supplements the benefits provided under the hospital benefits program by covering physician and certain other practitioners' services, additional home health visits, plus a number of other medical and health services not covered by the Hospital Benefits program. There are, however, limitations on the benefit entitlements in the form of deductibles and coinsurance, as well as exclusions relating to specific services.

The implementation of the Social Security Act is vested, by statute, with the Secretary of Health, Education, and Welfare. Operational responsibility for the Medicare program is carried out by the Social Security Administration.

Coverage is defined by the statute and by regulations promulgated pursuant to the statute by the Department of Health, Education, and Welfare. It is also important to recognize the importance of "legislative history" to both the formal regulatory process and implementation of the program. Thus, where more than one interpretation may be made from the statutory language itself, various congressional documents, particularly reports issued by Congressional committees, are utilized to determine congressional intent. Also, one cannot underestimate the importance of the staff of the Department of Health, Education, and Welfare, particularly the Social Security Administration which has responsibility for implementing the program within the law and regulations in a consistent manner.

The program is administered on a day to day basis through contracts negotiated between the Federal Government and health insurance carriers whereby the carriers reimburse from the trust fund established from premium payments of enrolled beneficiaries and Federal contributions. The Federal Government may also enter into agreements with States for coverage of eligible individuals who are concurrently receiving payments under public assistance programs provided through the Social Security Act.

It is the responsibility of the carriers (or State agencies) to interpret policies regarding benefits and limitations in accepting or rejecting bills submitted for reimbursement and to determine that charges made for covered services are reasonable and necessary. To assist carriers in this process, the Social Security Administration issues Health Insurance Manuals (HIM's). There are active contracts with more than 70 carriers and one State agency agreement for implementation of Part B.

As of July 1, 1973, 23.5 million aged and disabled persons were insured under Medicare. Of these, 22.5 million were enrolled under Part B, with 22.2 million covered under both Part A and Part B, and 244,000 under Part B only. Part B enrollees included 20.9 million persons over age 65 and 1.6 million under age 65.[2/]

Basic Services Covered by the Supplementary Medical Insurance Program

The Social Security Act (Sec. 1832) divides the scope of benefits covered by Part B into three basic elements: (1) "home health services," (2) "medical and other health services," and (3) "outpatient physical therapy services."[3/] In general, reimbursement to, or on behalf of, enrolled beneficiaries is made for such services subject to the Definition of Services, Institutions, etc.; and the Exclusions from Coverage outlined in Part C of Title XVIII (Sec. 1861 and 1862).

Medical and Other Health Services are defined (Sec. 1861(s)) to include:

(1) physicians' services
(2) services and supplies furnished as an incident to a physician's professional services
(3) diagnostic X-ray laboratory and other diagnostic tests
(4) X-ray, radium and radioactive isotope therapy
(5) surgical dressings, and splints, casts and other defices used for reduction of fractures and dislocations
(6) rental or purchase of durable medical equipment
(7) ambulance service
(8) prosthetic devices
(9) leg, arm, back, and neck braces

The Act (Sec. 1861(q) and (r)) further, defines "physicians' services" and "physician."

The term "physicians' services" means "professional services performed by physicians, including surgery, consultation, and home, office, and institutional calls...." (except those services provided by interns and residents, which are outlined separately.)

"The term 'physician,' when used in connection with the performance of any function or action, means (1) a doctor of medicine or osteopathy legally authorized to practice medicine and surgery by the State in which he performs such fxnction or action...." Dentists, podiatrists, optometrists and chiropractors are also defined as "physicians" for certain specific and limited purposes within the Act.

Section 1862 sets forth exclusions from coverage under the Act, prohibiting payment, notwithstanding any other provisions of Titles A or B, for any expenses incurred for certain items and services. A list of thirteen exclusions is specified. Of pertinence to this study are items or services

- "which are not reasonable and necessary for the diagnosis or treatment of illness or injury or to improve the functioning of a malformed body member;"

- "where such expenses are for routine physical check-ups, eyeglasses or eye examinations for the purpose of prescribing, fitting, or changing eyeglasses, procedures performed (during the course of any eye examination) to determine the refractive state of the eyes, hearing aids or examinations therefor, or immunizations."

Current Coverage for Services Provided to Persons with Cataracts

In general, diagnosis and treatment of cataract conditions are services to which beneficiaries enrolled under Part B are entitled. However, there are certain limitations to this coverage, both as to specific services for which reimbursement may be made as well as to the nature of the practitioner who provides the service. Exclusions relating to the services for which expenses are not covered are as follows:[47]

1. Routine physical checkups. Thus, for example, the diagnosis of cataracts, if made during the course of a routine physical examination, would not be covered.

2. Provision of eyeglasses or contact lenses, except both temporary and permanent post surgical lenses which, after the natural lens of the eye has been removed, are considered to be prosthetic devices.

3. Eye examinations for the purpose of prescribing, fitting, or changing eyeglasses or contact lenses for refractive error only.

4. Procedures performed in the course of any eye examination to determine the refractive state of the eye.

Limitations to the nature of the practitioner who provides covered services to a cataract patient are principally related to the definition of "physician" for purposes of the Act.

As noted above, in addition to doctors of medicine and osteopathy, the Act defines other practitioners, including optometrists, as "physicians" for specific purposes within the program. In the case of optometrists, this definition is limited to "establishing the necessity for prosthetic lenses."[5/] Regulations clarify this by defining an optometrist as a "physician" "...only for the purpose of attesting to the necessity of prosthetic lenses."[6/]

Regulations further state that "The prescription or order of a doctor of optometry will be accepted as evidence of the medical need for prosthetic lenses. However, optometric examinations for any purpose are not covered."[7/]

Inclusion of the above definition relating to doctors of optometry was made by amendment to the Social Security Act in 1972. Prior to that time, while prosthetic lenses were reimbursable when provided by an optometrist, it was necessary for the patient to have a prescription from a physician. The intent of the amendment was to eliminate the necessity for an aphakic patient to obtain a physician's order for prosthetic lenses by recognizing the ability of an optometrist to determine a beneficiary's need for such lenses. The reports of both the Senate and House Committees made it clear, however, that the purpose of the amendment was solely for the purpose of establishing or attesting to the medical need for prosthetic lenses, and did not provide for coverage of services performed by optometrists other than those previously covered.[8/]

In summary, current Part B coverage for cataract patients includes, when provided by any doctor of medicine or osteopathy, (1) eye examinations, except that part of the examination related to refraction, if the examination is carried out in relation to a specific patient complaint; (2) surgical and related professional services carried out in connection with removal of the lens; and

(3) services in connection with the provision of both temporary and permanent prosthetic lenses, including fitting and providing the lenses themselves. The only services for which optometrists may be reimbursed are dispensing services in connection with the actual fitting and provision of prosthetic lenses. Table 1 delineates the status of Part B reimbursement for services within the scope of practice of both physicians and optometrists.

TABLE 1

Part B Reimbursement Status of Services to Cataract and Aphakic Patients which are Provided by both Physicians and Optometrists

Service*	Eligible for Part B Reimbursement Under Certain Conditions	
	MD/DO**	OD
Personal and Family Health History, Symptoms and Vision Requirements	X	
Visual acuity - distance and near, with and without correction	X	
External examination (eye and adjacent structures)	X	
Direct and indirect ophthalmoscopy	X	
Biomicroscopy	X	
Tonometry	X	
Central and peripheral visual fields	X	
Ophthalmometry/Keratometry	X	
Refraction - objective and subjective, distance and near		
Ocular motility and binocular function	X	
Visual perception, color vision, Stereopsis, motor	X	
Evaluation for contact lenses	X	
Evaluation for low vision aids	X	
Evaluation for vision training therapy	X	
Ophthalmic prosthesis and services	X	X

* Services listed include only those within the scope of practice of both physicians and optometrists. All of the listed services would not necessarily be provided by either provider to every cataract or aphakic patient during the course of each examination.

** Most of these services, when provided by physicians, are typically provided only by those specializing in Ophthalmology. However, any doctor of medicine or osteopathy is authorized to carry out any of the services listed and could be reimbursed for any covered services provided.

Footnotes and Bibliography

1/ Basic information included in this section is derived from the "Social Security Act and Related Laws (including Amendments through January 2, 1976)," Committee on Finance, United States Senate, February 1, 1976; Federal Regulations No. 5, 39 F.R. 28624 (Aug. 9, 1974); and "Health Insurance Manuals" (HIM's) issued by the Social Security Administration as instructions to carriers. A useful supplementary compilation of the various pertinent documents is "1974 Social Security and Medicare Explained -- Including Medicaid --," Commerce Clearing House, Inc., Chicago, Ill., 1974.

2/ U. S. Department of Health, Education, and Welfare, Social Security Administration "Medicare 1973," DHEW Publication No. (SSA) 76-11705, U. S. GPO, Washington, D.C., 1975, p. 1.

3/ Since home health services and outpatient physical therapy services are not pertinent to this study, they will not be discussed further.

4/ See Social Security Act, Part B, Section 1862(a)(7); Regulations No. 5, Subpart C, paragraph 405.310; Medicare Carriers Manual, HIM 14-3 paragraphs 2320, 4125, 5217. See also Social Security Act, Part B, Sec. 1861(s)(8).

5/ Social Security Act, Title XVIII, Part B, Sec. 1861(r).

6/ Regulations No. 5, paragraph 405.232(a)(4).

7/ Regulations No. 5, paragraph 405.232(c).

8/ See United States Senate Report of the Committee on Finance to accompany H.R. 1, Senate Report No. 92-1230, September 26, 1972, pp. 43-44; and U. S. House of Representatives Report of the Committee on Ways and Means on H.R. 1, House Report No. 92-231, May 26, 1971, pp. 117-118.

SECTION I-C

FINDINGS AND CONCLUSIONS -- SUMMARY

This section provides a summary of the key study findings and conclusions which underlie recommendations presented in the beginning of this report. The points highlighted below have been documented on the basis of statistical or factual information, or professional judgements concerning what would represent reasonable and likely inferences given professional experience. Detailed inputs to the study, which were used in the preparation of this section, are provided in Part II of the report.

Vision/Eye Care Needs of the Elderly

Geriatric patients are likely to suffer from multiple symptoms and various interrelated disabilities, with underlying pathology that is complex and that requires a range of diagnostic, therapeutic, and domiciliary care services. Their health conditions are often further complicated by social, psychological, and economic instability, requiring various health consultative services as well.

The elderly population accounts for a disproportionate share of vision/eye problems, including cataract and aphakia, and requires vision/eye care services provided in a professional, compassionate manner. Lack of mobility, as well as dependency and depression, represent but a few examples of life conditions experienced by geriatric patients. Vision problems, furthermore, may precipitate other problems, such as consequences of accidents and injuries attributable to visual difficulties.

Cataract, as a structural definition, refers to any opacity of the crystalline lens. Since such opacities result in most instances from the normal physiological process of aging, it is therefore not unusual for large numbers of the elderly to have varied degree of cataract in technical terms. Although respective stages in the progression of cataract can be generally classified, there does not currently exist a means for objectively and consistently determining these stages. Consequently, general agreement does not exist in the provider community concerning appropriate functional definitions for cataract.

During the course of this study, the panel of expert consultants did agree upon a functional definition of cataract for diagnostic purposes:

A clinically significant cataract is any opacity of the lens that reduces visual acuity and may be functionally disabling or disruptive of the normal life style, more particularly for near or distant vision (e.g., reading or driving). This definition served as a framework for addressing requisite patient services and provider qualifications. Given the lack of concensus within the provider community on functional definitions, as well as considerations relevant for administering Medicare, this definition was not necessarily formulated as a disease-specific criteria for Medicare regulation-drafting purposes.

Statistical profiles on cataracts, despite definitional variations, remain informative in addressing the general magnitude of this eye disorder. Approximately three-fourths of an estimated incidence of 912,000 new cases of cataract per year, for example, is accounted for by the elderly. Among eye disorders, furthermore, the relationship between cataract and blindness is particularly significant.

Although senile (senescent) cataract accounts for approximately ninety percent of the documented cases, it should also be noted that most cataract of this type has no demonstrable etiology. Approximately one out of every ten persons with senescent cataract has overt diabetes millitis. Typical diabetic cataract usually develops in patients with severe, prolonged poorly-controlled diabetes. These patients are most commonly seen in later years of life, although they may be seen early in their youth.

At the present time, surgery is the only method for treating cataract. There is no medical treatment available that will dissolve the opacity or prevent its development and progression. It is estimated that in 1972 somewhat over 300,000 surgical operations were performed for cataract extraction, with the largest proportion occuring among the elderly. Most aphakic patients, that is, thsoe who do not have their natural lens(es), have lost their natural lens(es) as a result of surgery performed for cataract.

Approximately five percent of cataract extractions have significant complications and most of these complications occur during or soon after cataract surgery. Within this group, some common complications consist of vitreous loss, intraocular hemorrhage, cystoid maculopathy, a shallow anterior chamber, postoperative intraocular infection, Elschnig pearls, glaucoma, and retinal detachment.

Refractive services are particularly important for the aphakic patient. Optical correction of aphakia usually begins within a day or two after surgery utilizing temporary eye glass correction. A final permanent prescription is not given until two to three months and sometimes longer after the extraction. Rarely are contact lenses prescribed before six weeks following surgery. However, there are several varieties of soft, hydrophilic contact lenses now available which are prescribed early in the post-operative period. These are prosthetic devices used to replace an excised body organ.

Patient rehabilitation is initiated prior to surgery and is continued afterwards, beginning when final physiological changes subsequent to surgery have taken place. With most patients, stability tends to occur within six to eight weeks after surgery; in some instances, however, the final fitting of prosthetic lenses cannot be undertaken until six months or more have elapsed. For certain patients, rehabilitation in the use of prosthetic devices is necessary to assist the patient with spatial orientation and mobility.

Since aphakic patients tend to be older, difficulties may result in adapting to contact lenses. For example, physical disabilities such as tremor and arthritis may require a lengthy period of supervised use of contact lenses or preclude their use entirely. In these patients, the structure of the eye lids may be soft and flaccid, which may cause difficulties in contact lens removal or may cause the lens to ride low with its center below the center of vision. Other circumstances, such as abnormally large pupils or cornea scarring resulting from surgery may complicate the adaptation process as well.

For certain aphakic patients, the use of prosthetic devices such as spectacles and contact lenses, or the implantation of a plastic lens within the eye following cataract surgery after removal of the natural lens, does not provide optimal vision for their lifestyle and occupational requirements. The Study consultants recommended that such patients be considered for low vision aids, such as special microscopic reading glasses and telescopic spectacles. Such devices have been very effective, when properly applied, in providing the best possible vision function for certain lifestyle activities, a requirement that is most important to the physical and mental well-being of these patients.

Access To Vision/Eye Care Services

The management of cataract and aphakic patients requires a range of diagnostic, consultative, and therapeutic services, apart from surgery specifically. As outlined earlier, many of these services

related to the eye are eligible for coverage under current Medicare provisions. For the most part, in addition, doctors of medicine and osteopathy, when legally authorized to practice medicine and surgery by States in which they practice, are the practitioners recognized by Medicare to render and be reimbursed for these services.

It is virtually self-evident that currently covered vision/eye care services related to aphakic and cataract conditions can be made more accessible to the Medicare eligible population by expanding the present coverage for services to include services provided by optometrists. As a minimum, greater financial equity can be extended to those Medicare beneficiaries who currently obtain necessary and reasonable health services from optometrists without Medicare reimbursement.

This conclusion is principally supported by analyzing comparatively the distributional patterns of optometric and ophthalmologic manpower. It should be noted that ophthalmologists are not the only physician group rendering vision/eye care services and included under Medicare provisions. Among physician providers, however, it is reasonable to infer that ophthalmologists provide the bulk of overall vision/eye care services.

In 1973, there were approximately two active optometrists for every one active ophthalmologist in the United States. Respective active supply estimates numbered 19,300 and 10,500. On a comparative basis, the supply of optometrists was more evenly distributed across the country. The study effort, utilizing data assembled from American Medical Association records, the 1972-73 optometry inventory conducted by the American Optometric Association and supported by the Bureau of Health Manpower, and statistics collected by the National Center for Health Statistics, DHEW, identified specific findings relevant for examining overall supply and distributional patterns between the two provider groups.

Despite the national two-to-one relationship, most States exceeded or approximated this ratio, as a number of large, heavily populated areas statistically influenced the overall figure. Active ophthalmologists exceeded the number of active optometrists in only two areas of the nation, Maryland and the District of Columbia. In seven States, in contrast, there were greater than three times as many optometrists than ophthalmologists.

The overall national relationship largely reflects distributional experiences in the nation's metropolitan areas. For example, in 1973, there were approximately 1.7 optometrists for every ophthalmologist in metropolitan areas, in contrast to a ratio of 4.2 in non-metropolitan areas. A total of 5,300 active optometrists were located in non-metropolitan areas, or slightly more than one-fourth

of the overall active optometric supply; this compared with 1,200 active ophthalmologists, or somewhat more than one-tenth the supply of this provider group. In terms of persons sixty-five years of age and older, there were 55 ophthalmologists and 99 optometrists per 100,000 persons in metropolitan areas, in contrast to ratios of 19 and 79, respectively, in non-metropolitan areas.

It should be noted that such metropolitan and non-metropolitan differences vary by size of the respective areas and by regional setting. For example, available data indicate that there are somewhat higher ratios of both ophthalmologists and optometrists to the Medicare eligible population in areas of 500,000 population or more than in smaller metropolitan areas. In non-metropolitan areas of the North Central States, for example, there are between six and seven optometrists for every ophthalmologist, in contrast to four and five-to-one relationships evidenced in the South, and three-to-one relationships in the remaining non-metropolitan areas of the nation.

One-third of all counties in the nation had the services of ophthalmologists in 1968 (latest data available), compared with two-thirds of the countries for optometrists in 1973. Here, also, more specific variations can be noted concerning metropolitan and non-metropolitan counties. Overall, in comparing 1968 ophthalmologist data with 1973 optometrist data by county, 1,251 or 40 percent of the counties had one or more optometrists and no ophthalmologists; 33 or 1 percent had one or more ophthalmologists and no optometrists; 1009 or 32 percent had both optometrists and ophthalmologists; and 851 or 27 percent had neither provider group represented.

Based upon existing trends, little change in the proportion of either ophthalmologists or optometrists practicing in non-metropolitan areas can be projected. The proportion of recent graduates from schools of optometry, aged 30 and younger, practicing in non-metropolitan areas is about the same or slightly lower for nine out of ten established optometry schools as compared to the proportion of total graduates practicing in these areas. In comparing 1968 to 1972 data, a lower proportion of ophthalmologists were practicing in non-metropolitan areas in 1968, only 13 percent were practicing in such areas in 1972.

In terms of overall supply, the Bureau of Health Manpower projects the overall number of active ophthalmologists in the United States to rise to 13,300 in 1980 and to 18,400 by 1990; this compares with projected levels of 22,000 and 28,200 for optometrists in the same time intervals. The proportion of ophthalmologists as a percent of total professional vision care manpower it projected to grow from 35 percent in 1973 to 38 percent in 1980 and 39 percent in 1990.

Available data preclude such projections on a detailed geographic basis. (Note: These estimates should be interpreted cautiously, and should be undertaken in the context of written documentation available from the Bureau of Health Manpower.

Available documentation, in sum indicates that there are a number of areas in the country, particularly in non-metropolitan settings, where population groups are only served by optometrists. An examination of basic measures of productivity further suggests that such optometrists may be seeing fewer patients on the average than optometrists not practicing in these areas. This observation results from an examination of data on average vision analyses performed by optometrists and the utilization of auxiliaries by optometrists. While non-metropolitan optometrists showed a somewhat greater proportionate utilization of auxiliaries than did optometrists in metropolitan areas, optometrists in metropolitan areas utilizing auxiliaries had a somewhat greater average number of vision analyses than did optometrists in non-metropolitan areas utilizing auxiliaries.

The above discussion has focused on access considerations pertinent to Medicare beneficiaries in need of vision/eye care services, including cataract and aphakic patients specifically. Attention needs to be focused at this point, however, on the optometry profession itself, including its respective scope of practice, as well as its qualifications for providing reasonable and necessary services as required by law.

Optometric Practice

The Institute of Medicine of the Natinal Academy of Sciences, in describing primary health professions who are direct providers of patient care, defined optometry as follows: "The Doctor of Optometry (O.D.) is a health professional who performs eye examinations to determine the presence of visual, muscular, or neurological abnormalities, and prescribes lenses, other optical aids, or therapy, such as eye exercises to enable maximum vision. Optometrists are trained to recognize disease conditions of the eye and ocular manifestations of other diseases, and to refer patients with these conditions to the appropriate health professional."

This definition, as well as available documentation on the utilization of optometric services, points to the optometrist's role as a provider of primary health care services. In this role, the optometrist functions as a principle point of contact within the health care system for persons having visual complaints, including certain numbers who have symptoms or conditions that require referral to other health practitioners.

The scope of practice for optometry, similar to that for other health care providers, is difficult to define precisely. Here also, information is available from a number of sources to develop valid concepts of a profession's role and function. Such sources include State laws, judgements of courts concerning the responsibilities of practitioners, the usual and customary practices of the profession, and the objectives, content, and standards of education and training for the profession.

An examination of a variety of such sources in the study effort suggests persuasively that optometry is a profession qualified to provide a broad range of services which are effective in patient management, including the management of aphakic and cataract patients. (See discussion in Part II of this report for detail on sources cited and information examined.) It is reasonable to infer that such services correspond to many specific diagnostic, therapeutic, and consultative services currently reimbursable under the Part B provisions of Medicare when provided to pre- and post-cataract surgery patients by ophthalmologists or other doctors of medicine.

Expert advisors to the study detailed more specifically the broad range of services provided by optometry. These include personal and family health history (symptoms and vision requirements); visual acuity, distance and near (with and without correction); external examination; direct and indirect ophthalmoscopy; biomicroscopy; gonioscopy; tonometry; central and peripheral visual fields; macular integrity, fixation; ophthalmometry/keratometry; refraction, objective and subjective, distance and near; ocular motility and binocular function; visual perception, color vision, stereopsis, motor; evaluation for contact lenses; evaluation for low vision aids; evaluation for vision training therapy; and the provision of ophthalmic prosthesis and services.

It was the further opinion of the study consultants that such services comprise appropriate therapeutic modalities in eye care including: prescription of lenses (spectacles or contact lenses), vision training, rehabilitative services, including the teaching of patients to use prescription devices properly, and post-surgical monitoring of referred patients. Furthermore, the professional judgement of the provider as to which therapy or combination of therapies above should be used, is dictated by the presence or absence of related ocular disease and complications of systemic disease, as well as the occupation and life style of the patient.

In terms of practice setting, most optometrists are solo practitioners and, therefore, serve in independent settings. Partnerships or group practice arrangements account for approximately one-eighth of

the optometric manpower supply. In independent settings, specifically, similar to situations evident for many other health provider groups, it is difficult to determine the extent to which individual practitioners provide the detailed range of services articulated for the profession overall.

Advisors to the study effort indicated that, in their collective professional judgement, most of these services would be provided by optometrists. Variations in services provided by practitioners generally would likely reflect differences in professional judgement and the circumstances specifically characterizing the patient presented. Given the variations in cases presented to vision/eye care providers, it would be difficult to rigidly identify "cataract-specific" vision/eye care services; such services, for example, might often vary depending upon the type of cataract. In addition, the nature of such services would also likely differ if the patient were pre- or post-surgical.

Some documentation on this issue is available from the survey of optometric practice, which was funded by the Bureau of Health Manpower, DHEW, in 1968. The survey indicated that, as of that year, most optometrists who were educated in the preceding twenty-five years did report providing a broad range of services. The extent to which the above-referenced services are provided by optometrists is more easily documented, however, in organized health care settings.

In settings such as the armed forces, health maintenance organizations, and, to a lesser extent, the Veteran's Administration facilities, optometrists are used extensively for initial vision examination purposes, and, therefore, serve largely in the role of primary care providers. In larger military medical facilities, for example, optometry is a section of the department of ophthalmology, while in smaller installations the optometrists generally work under the supervision of the director of hospital clinics, but without close professional supervision. Overall, ophthalmologists in military installations do not provide services without the assistance of optometrists. In this setting, furthermore, the practice of triaging has been implemented successfully, where ophthalmologists, optometrists, and medical corpsmen are utilized together.

The Veteran's Administration, in contrast, has relied much more heavily upon ophthalmology than optometry. The lower rate of optometric utilization results in part from the establishment of non-competitive civil service salary rates for optometrists, and, in part, by only limited affiliation of VA hospitals with optometry schools. A multidisciplinary committee within the VA has recommended that training affiliations be established or strengthened with the nation's optometry schools. The Opthalmological Advisory

Committee of the VA, furthermore, has endorsed and fully implemented the concept of expanding the present emphasis on eye health care to the more comprehensive concept of vision care via interdisciplinary team delivery.

On a parallel note, optometric services have been included in a number of reimbursement systems, including various Medicaid programs. Of relevance to the study query, conditions of participation in a number of State programs itemize explicitly the content of a visual examination which is covered for reimbursement to optometrists. Although perhaps circumstantial, there does exist a clear correspondence between these service listings for participation and the detailed range of services identified above.

Quality Indicators and Controls

Similar to considerations pertinent to defining the scope of practice for health professions, the precise delineation of the practitioners' area of professional competence is equally difficult to set forth. Here also, a variety of sources must be examined and consulted to provide reasonable and highly probable inferences. This is particularly the case given the limited availability of any carefully undertaken, controlled investigations that have been directed to assess the effectiveness of services provided by individual practitioner groups.

As indicated earlier, a principal conclusion from the study review is that optometry is a profession qualified to provide a broad range of services which are effective in patient management, including the management of aphakic and cataract patients. It is reasonable to infer from information examined in the study, furthermore, that such services are reasonable, non-experimental, safe, and generally acceptable to the vision/eye care community and the public. Evidence presented, in addition, supports the conclusion that optometrists are qualified to detect and make preliminary diagnosis of ocular disease and ocular manifestation of systemic disease.

Material provided in Part II of this report presents the detailed supportive findings which underlie these conclusions. The following discussion, in turn, highlights several points of particular relevance to this issue.

Optometric Education

Optometrists are primary providers of health care and as such are responsible for determining whether the problem of the patient is within his scope of treatment or whether the patient should be referred to another health provider. Optometric education includes specific curriculum and clinical training related to the detection and diagnosis of ocular disease and ocular manifestation of systemic disease. Schools include on their faculty and in their clinical

programs physicians, and particularly ophthalmologists, in the training of optometric students. Particular attention is paid to the detection and diagnosis of cataract, the complications following cataract surgery and the procedures for the management and proper followup of aphakic patients. On the basis of this educational and clinical experience, the optometric student demonstrates a mastery of the skills and knowledge necessary for the diagnosis and management of the cataract and aphakic patient--for both graduation and licensure.

Although each of the individual schools and colleges of optometry has developed its own philosophy and objectives for optometric education, certain principles are stated by all of the institutions. Chief among these are the provision of a high-quality educational program intended to prepare each graduate to conduct a practice which is competent, service oriented and ethical; and the stimulation of any research which will further existing knowledge in the visual sciences, usually through the medium of graduate programs.

While certain curricular components may be particularly relevant concerning care for the cataract and aphakic patient specifically, the basic curricular elements of schools of optometry are targeted to overall evaluation and anlyses of patients, followed by a selection of treatment based on all of the disorders present, the needs and characteristics of the patient, the prognosis, and the possible interrelated effects of the proposed treatment procedures.

The basic curricular elements of optometry schools include the following: biological science knowledge base; physiological optics knowledge base; pathology knowledge and skills base; optics knowledge and skills base; professional orientation knowledge and skills base; clinical patient care knowledge and skills base; and patient care experience. Each of these generic areas are subdivided into more specific areas for study and, where appropriate, to clinical experience.

Clinics maintained by the schools provide students with supervised clinical experience with a variety of patients, including cataract and aphakic cases. The clinical experience for the optometry student now commences in the second year and expands until, in the fourth year, the optometric student devotes at least half-time to work under supervision in a clinic setting. In the clinical area, experience is gained 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.

Some areas of the optometric curriculum, as noted above, have more information on or are directed more toward the care of the patient with cataract or aphakia. In particular, these include considerations of geriatric, low vision, pathology, optic, and visual performance matters.

Similar to developments in education for all health professional groups, the educational process and structure for optometry has been strengthened overtime. The accreditation process of optometry schools, for example, was informally iniated with the establishment of the International Association of Boards of Examiners in Optometry (IAB) in 1922. At this time, all optometric schools are accredited by the regional college accrediting associations.

Prior to 1968, uniform requirements as to length of training were not mandated for all schools of optometry. The requirement of four years of training in an optometry school was made mandatory by the Council on Optometric Education of the American Optometric Association for all schools for the entering class of 1968. The length of study currently in accredited schools of optometry is four years following pre-optometry college studies.

In addition to the basic four-year curriculum in optometry schools, a number of institutions offer advanced degrees as well. By the 1974-75 academic year, a total of sixty-six students were enrolled in graduate programs. Recent trends suggest that this figure is likely to increase further.

The strengthening of the overall educational process and structure for optometry students has been particularly bolstered by efforts undertaken by the Association of Schools and Colleges of Optometry (ASCO).

In 1941, this Association was formally established with the goal of "aid in the advancement of optometry by giving attention to the problems of the education of optometrists, and by formulating and supporting desirable educational standards and policies." The Association, representing all U.S. schools and two programs in Canada, was incorporated in 1972 and established a staffed national office in 1974 which publishes a monthly newsletter and quarterly publication.

This Association currently maintains standing Councils in three major educational areas: Academic Affairs, Student Affairs, and Institutional Affairs. Beginning in 1973, the Council on Academic Affairs began development of a major statement concerning curricular standards for optometry schools. Guidelines for optometric residency programs and post-graduate pharmacology training have been developed as well.

State Practice Acts and Licensure. The regulation and control of professional services to the public is a function of individual State jurisdictions. For many health professions, including optometry, State Practice Acts define (with varying degrees of precision) permissible and impermissible acts of individuals who are licensed by the State to practice the profession.

To qualify for licensure, an applicant must be a graduate of an approved school with a program leading to a Doctor of Optometry Degree. All States require applicants to pass a written examination as a condition precedent to licensure. A National Board Examination is currently accepted in lieu of the State written examination in eighteen States.

In 1951, the National Board of Examiners in Optometry was established to resolve the problem of varying content and quality of the State board examinations for graduating optometrists. The National Board Examination, which emerged from this initial concern and subsequent efforts, is currently administered over a two-day period and involves examination in the broadly ranging areas of visual science; ocular pathology; theory and practice of optometry; theoretical optics; ophthalmic optics; ocular anatomy; social, legal, ethical, economic, and professional aspects of optometry; and ocular pharmacology.

Continuing Education. Similar to many other health professional groups, the training of optometrists does not cease upon graduation. Most States require that optometrists, as well as other health professionals which are licensed, continually upgrade their skills. For the few States without formal requirements, a number of State optometric associations have instituted a system of continuing education requirements for membership purposes. Currently, forty-three states require continuing education for license renewal by optometrists.

Continuing optometric education courses are offered by over 100 agencies, including the 51 State associations affiliated with the American Optometric Association. It is estimated by the Association that between 17,000 and 18,000 licensed optometrists have and will continue to participate in continuing education courses.

Currently, the Council of Academic Affairs of ASCO is developing a proposal to study the feasibility of conducting an organized and structured national program of continuing education for practicing optometrists, using existing schools and colleges as a base for such training. This development is consistent with overall

endeavors of the profession continually to upgrade and make uniform its respective educational programs. (Detailed documentation on the existing content and overall nature of continuing education offerings is provided in Part II of this report.)

Other State Developments. Apart from the above discussion, other indicators of professional competence can be suggested. For example, optometrists are increasingly being included in various health care programs. A 1975 Kansas statute allows nonprofit corporations to be created specifically to provide group optometric care programs. In 1974, California included optometrists in prepaid health plans. In 1975, Rhode Island included services by optometrists in its State catastrophic health insurance program. In 1974, Maryland included services of optometrists in group health insurance policies. And, in 1973, Colorado added optometry to services which certain corporations may make available to health benefit subscribers. The fact that optometric services have been included for reimbursement purposes in many State Medicaid programs has been noted earlier.

Optometrists appear to be infrequently subject to malpractice suits, in part reflected by the existing insurance premium for optometrists (i.e., $280.00 per year). Suits have been brought, however, and study staff examined cases available to shed further light on the question of professional competence. A number of courts have emphasized that diagnostic services, specifically, are within the realm of the optometrists' professional competence. In approximately ten decisions examined, all cases emphasized this role indicating that optometric competence included the ability to discover, detect. and/or recognize eye disease.

Among recent developments in State Practice Acts, several statutes have revised the definition or scope of practice of optometrists, raising reasonable inferences concerning professional competence. In 1974, Wisconsin construed the meaning of "physicians" to include optometrists in all accident and sickness policies. New York, in 1974, included optometrists with other professionals who receive legal immunity for service on utilization review committees. California law now indicates that in determining whether an individual is blind, the patient may be examined either by a physician skilled in diseases of the eye or by an optometrist.

Referral Patterns and Provider Relationships. Studies of referral practices of private practitioners would, if adequately conducted, likely provide valuable insight into the extent to which optometrists, as well as certain other health care providers, are able to detect dispositions. Although studies have been undertaken in this area, marked variations tend to exist in comprehensiveness, quality, and overall objectivity. (The reader is ferred to Part II for detailed discussion on studies examined during this study effort.)

Ethical standards within the optometric profession speak directly to the responsibilities of optometrists to refer patients to other providers of vision/eye care services where appropriate. Ten of the States expressly require by statute or regulation that an optometrist refer patients in need of other professional care to the appropriate practitioner.

Referral rates from optometrists to physicians typically may be higher in organized settings than in the independent setting. A number of studies examined during the course of this study indicated that between two and three percent of patients examined by optometrists in independent settings require referral to a physician; within the military setting, in contrast, referral rates ranged between three and seven percent of the patients seen. A 1968 study of vision care within the Kaiser-Permanente prepaid care plan in the Los Angeles area, however, indicated that 2.75 percent of the patients seeing an optometrist were referred to ophthalmologists.

The collective judgement of the study advisors was that working relationships between providers in the vision/eye care arens are quite good and constructive. Although documentation on relationships between respective practitioner groups are generally lacking, study staff were able to uncover a recent effort that specifically surveyed physicians about their relationships with optometry. This particular effort was quite supportive of the viewpoint expressed by study advisors.

Tonometry, A Case in Point. The provision of vision/eye care services raises controversial issues within the provider community concerning what services and procedures shouls be undertaken, respective levels of effectiveness of such services and procedures, and what types of specific manpower group should be engaged in these functions. For example, tonometry is a relatively simple process used for the determination of intraocular pressure and the detection/diagnosis of glaucoma. In some clinic and group practice settings, tonometry is only undertaken by ophthalmologists; in a number of others, by any doctor of medicine. In other instances, optometrists do tonometry, and in what appears to be an increasing number of cases, technicians are being trained to undertake this procedure.

The Department of Medicine and Surgery of Harvard Medical School, in a 1974 study, found justification for glaucoma screening by technicians in medical and ophthalmology clinics for all patients

40 years or more of age. Elsewhere, however, professional judgements have been documented that, at least for patients with vision complaints, tonometry should be a routine part of the optometric examination for younger patients and for all adults.

Such disagreement within the provider community extends beyond tonometry and glaucoma to other services and respective abnormalities of the eye. Although this area lacks adeauate documentation to resolve controversy, a number of inferences can reasonably be drawn for relevance to this study effort.

First, the detection of cataract and/or aphakia is essentially an uncomplicated process. Optometrists, as well as ophthalmologists, are qualified to carry out requisite diagnostic services. Second, many of the functions and procedures in dispute are being undertaken currently by optometrists. The primary care role outlined earlier for optometrists in organized settings, for example, speaks to the capabilities of the profession to effectively undertake such functions.

Although legal constraints exist in most State jurisdictions concerning the use of topical drugs by optometrists, this issue relates more to potential limiting factors in optometric capabilities rather than to questions of professional competence. Despite such constraints, suitable instrumentation and procedures affording quality performance are identified by the clinical standards committees of professional associations and are available for diagnostic purposes.

Overall, agreement exists within the provider community that the broad range of services identified earlier in this report does represent reasonable and necessary vision/eye care services, and constitutes safe and non-experimental practice. The evidence available to attest to the professional competence of optometry is persuasive for one to conclude that the quality of such services is not compromised when provided by optometry.

Quality Control

The development of standards of care for diagnostic, therapeutic, and consultative services provided by vision/eye care practitioners generally, and including optometrists specifically, does appear feasible in both organized and independent health care settings. Such standards do currently exist in a number of individual situations or are in various stages of development. As such, quality assurance is attainable in the provision of reasonable, safe, non-experimental, and acceptable services by optometrists to the Medicare eligible population.

Criteria and methodologies for performing review of the quality of optometric practice under the aegis of Professional Standards Review Organizations (PSRO) are just beginning to be developed. The concepts of peer review utilizing explicit criteria basic to the PSRO program are applicable to review of optometry practice in the ambulatory care settings, even though PSRO emphasis is currently on the review of inpatient care services. The optometry profession recognizes its obligation for leadership in the development and ongoing refinement of quality measurements.

Cost Considerations

Widespread interest exists in seeking ways to make the health care delivery system more effective and efficient. Apart from considerations of patient needs, provider qualifications, and access concerns, attention in the study was also directed to the potential cost implications of an alteration in Medicare coverage. It is reasonable to infer that an extension of current Medicare coverage to include services related to aphakic and cataract conditions when provided by optometrists would result in some added costs to the Medicare program. Rough calculations suggest, however, that such added costs (i.e., between two and five million dollars) would not be significant in the context of overall Medicare costs for vision/eye care services.

An uncertain cost effect results from any increase in cataract surgery rates that might occur given the change assumed in the analysis for reimbursement. Expert advisors to the study viewed the likelihood of such increased rates as negligible. Nonetheless, it should be noted that, for every additional operation that might occur for Medicare eligible patients, Medicare program costs would rise by roughly $1,500.

It has been suggested, furthermore, that such an extension of coverage might change the nature of optometric practice sufficiently to raise the cost of malpractice insurance for optometrists. Study staff did not have an opportunity to examine this matter in detail, although a number of factors suggest such an occurrence to be highly unlikely. First, the elderly represent a small fraction of optometric practice and cataract services represent a still smaller proportion. Second, optometrists would obviously not be performing surgery, the major source of malpractice claims. Third, in areas where Medicaid has extended coverage and reimbursement to optometric services, there is no evidence that malpractice premiums have changed significantly.

Broader Concerns and Review

The material assembled and examined in the study effort, as outlined above, is highly supportive of recommendations to extend coverage for currently covered services under Part B of Medicare to include diagnostic, consultative, and therapeutic services related to aphakic and cataract conditions when provided by optometrists. Considerations of particular relevance include patient needs, qualifications of optometrists to render effective and necessary services, and concerns in assuring equitable access to requisite services by the Medicare eligible population.

Much of the information reviewed pertains to vision/eye care services generally, rather than to services related to aphakic and cataract patients specifically. In part, this situation reflects the available level of specificity in existing documentation. To some extent, however, such as is the case with cataract patients, a number of vision/eye care services are not disease specific and extend equally to circumstances where different eye disorders may be presented.

In inference arises from this last observation that it may be appropriate to consider a broader scope of inquiry regarding the provision of vision/eye care services and Medicare coverage. This study effort, however, did not provide an opportunity to consider such a broader concern in any detail.

PART II

Detailed staff contributions to this study effort are provided in this second part of the report. Specific sections include discussions concerning cataract conditions and aphakia; State law and optometric practice; optometric education; access considerations; and potential cost implications of altering current reimbursement under Medicare Part B.

SECTION II-A

NATURE, INCIDENCE AND PREVALENCE OF CATARACTS

Compiled by
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A cataract is an opacity of the crystalline lens of the eye. For the purposes of this paper, a clinically significant cataract is defined as an opacity of the lens that reduces visual acuity (sharpness of vision) and may be functionally disabling or disruptive of the normal life style, more particularly for near or distant vision, e.g. reading or driving. The most effective treatment of cataract is the surgical extraction of the opaque lens. This results in the condition of aphakia (the absence of the crystalline lens).

The lens is one of the most unique tissues in the body. It is a powerful refracting organ of the visual system, transparent and without a blood supply.[1/] It is also unique for another reason: cells in other parts of the body are constantly being broken down (catabolism) and rebuilt (anabolism). Yet in the lens there is no apparent protein synthesis or cell machinery present to maintain the protein. It is, therefore, interesting that protein synthesized during the embryonic period remains the same for sixty or more years throughtout the life of an individual and still the lens remains transparent.[1/] As one progresses through life, however, internal and external factors can impinge upon the lens to cause in it's transparency. For example, normal physiological changes in protein content of this structure will bring on changes in transparency.

The refractive power of the lens depends upon its curvature (variable in the young eye), its refractive index (a function of its composition), and its location. Cataracts usually affect vision by altering the refractive index more than by change in size or location of the lens[2/] and by the resultant opacity blocking the passage of light to the retina.

Symptoms of Cataract

The visual symptoms of cataracts usually consist of a slowly progressive, painless decrease in visual acuity while some patients

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experience a rapid loss of acuity over a period of months, weeks or even days. Visual function will vary according to the location of the opacity in the lens. For example, if the opacity is diffuse, the haze will be constant, both indoors and out, and may be somewhat worse in bright light. If the opacity is confined to the front area of the lens, the individual will experience a "glare", especially outdoors or in intense light (which brings the pupil down over the opacity and cuts down the vision). This person may function normally in a house or dim light, but be "blind" outdoors. If the center or nucleus of the lens is opaque, there will be a constant haze and the individual will feel like he is looking through a "dirty window". The patient may be visually limited (blur, glare, distortion) in the tasks of driving and reading to the point that he/she is disabled in his/her every day life style or handicapped in the performance of his/her occupation.

It should be noted that a characteristic common to elderly patients with cataracts is the renewed ability to read news print without glasses, in spite of a decrease in distance acuity. This so called "second sight" is due to a slow progression of nuclear sclerosis and acquired myopia (nearsightedness)[2] related to swelling of the lens, an early diagnostic sign of cataract usually preceding opacification.

Reduced color vision in cataract patients is not common because discrimination of color changes very gradually. However, a "yellowing" of vision is frequently experienced because the shorter wave lengths of the visual spectrum (violet and blue) are selectively absorbed and the longer yellow and red wave lengths are transmitted.[1]

It should be noted that cataract can be associated with nearsightedness which is attributable to nuclear sclerosis or farsightedness when the cortex is affected disproportionately. In either circumstance, areas of the lens with different refractive indexes can cause a beam splitting effect which results in projection of two images on the retina. Thus, there is monocular diplopia (double vision)[2]; where present, it is usually related to early stages of cataract.

It is important to emphasize that cataracts can cause almost the full spectrum of loss of vision ranging from a very mild impairment to a severe degree of impairment characterized by minimal light perception and poor appreciation of the direction from which light enters the eye. Cataracts alone, however, are not responsible for total blindness[2], but, surely account for a substantial proportion of legal blindness.

Formation of Cataracts

The formation of a cataract is a highly complicated physico-chemical

process, whether it be a result of normal physiological aging, external physical insult, or internal metabolic changes. Two major elements appear to be implicated in the generation of lenticular opacities, namely, the water content and nature of the protein within the lens. Relative to the first element, one important mechanism in maintaining the viability of the lens is the capacity of the electrolyte pump to maintain a normal state of hydration (water content). As long as a normal equilibrium between the intraocular fluids outside the lens and the fluids within the lens can be maintained in terms of sodium and potassium ion content, the lens will remain normal. If on the other hand, an imbalance occurs in the pump equilibrium system, causing the lens membrane to leak, high levels of water-retentive sodium will move into the lens from the intraocular fluids causing osmotic swelling which is a common feature of many cataracts.[3,4] The other important mechanism of cataract formation is related to the relative concentrations of soluble and insoluble protein within the lens. The normal lens has a water content of approximately 65% and a protein content of about 35%.[3] As the lens ages, there is a decrease in water content, and more and more of the soluble protein becomes insoluble. Increases in concentration of insoluble protein are related to the development of cataracts.[3] Also associated with and probably directly related to the changing character of lens protein (increase in insoluble and decrease in soluble protein) is a progressive hardening of the lens which usually becomes clinically manifest after age 40.[2] Thus, some loss of transparency of the lens with age is as inevitable as the wrinkling of the skin and greying of the hair. For an excellent review of the more recent biochemical studies on lens protein and enzymes, lens lipids, water balance in the lens, etc., the reader is referred to an article by Kirsch[3] and a symposium entitled "The Human Lens In Relation to Cataract".[5]

Classification of Cataracts

While the physico-chemical processes involved in the formation of a cataract are fairly well delineated, the etiology or causes initiating the aforementioned sequence of events leading to a cataract are not clear. However, studies[6] of the close association of cataracts with systemic, hereditary and metabolic diseases as well as externally-induced chemical and physical agents, provide a great deal of insight into the possible causes of cataracts. One of the preferred classification[6,7] of cataracts is based upon the above considerations:

Note: For vision terminology, see "Current Optometric Information and Terminology".[35]

A. Primary

1. Senile (Senescent)
2. Congenital

B. Secondary

1. Metabolic
2. Endocrine
3. Inflammatory
4. Toxic-chemical agents
5. Traumatic-physical injury

The word senile (more appropriately senescent) is commonly used in association with primary cataracts developing in older persons. Ninety percent of all cataracts are of the senescent type which no demonstrable etiology.[2] The only relevant history may be that of a familial occurrence. Nevertheless, there may be some underlying factor which may aggravate the development of this type of cataract. For example, approximately 10% of patients with senescent cataracts have overt diabetes mellitus. Other patients have a history of glaucoma.[2]

The mature senescent cataract is seen as a diffusely opaque lens that is usually white from complete cortical opacification. A yellow nucleus is often detectable and in some cases the entire lens is brown or even black in color.[2]

A large variety of congenital lens opacities exists buy may not cause visual impairment.[2] Virus damage from maternal rubella is common; many cases of rubella catarcts were diagnosed during the American rubella epidemic of 1963-1964.[3] Congenital cataracts are also a prominant feature of a number of multiple congenital disease syndromes[3] such as the oculo-cerebro-renal syndrome of Lowe, Werner's syndrome (premature aging) and a host of others.[2] Cataracts have also been associated with inborn errors of metabolism involving genetic enzyme deficiencies. Examples are: diabetes mellitus and galactosemia as well as syndromes with identified chromosomal abnormalities such as mongolism and dwarfism.[2] For a more complete discussion and insight into the etiology of cataracts, including the congenital type, the reader is referred to Harley[8] and Table A.[2] Evidence seems to indicate that congenital (infantile) cataract is not a single disease but a part of a disease affecting other systems and caused by different factors.[9]

Lens damage may be caused by metabolic disturbances such as maternal or infantile bypocalcemia, galactosemia, and diabetes mellitus.[7] Diabetes mellitus was the first metabolic disorder dnown to be associated with cataract formation. This disease is now one of the leading causes of blindness in the United States

TABLE A

A Practical Classification of Cataracts

I. Congenital (Present at Birth)

A. Genetic origin

1. Congenital cataracts without other abnormalities (autosomal dominant, autosomal recessive, sporadic, rarely sex-linked); many morphologic varieties such as nuclear, zonular, mature
2. Lens opacities without visual impairment such as Mittendorf dot, anterior polar "cataracts," sutural "cataracts"

B. Maternal origin

1. Secondary to maternal infections, *e.g.*, rubella, syphilis
2. Secondary to amniocentesis

II. Infantile or Juvenile Onset (Genetic Origin)

A. Inborn errors of metabolism, *e.g.*, diabetes mellitus, galactosemia, hyperlysinemia, homocystinuria, hepatolenticular degeneration (Wilson's disease), oculocerebrorenal (Lowe's) syndrome

B. Syndromes with identified chromosomal abnormalities, *e.g.*, trisomy of chromosome 21 (mongolism, Down's syndrome), monosomy of X chromosome (Turner's syndrome), trisomy of chromosome 13 (Patau's syndrome)

C. Syndromes of unknown etiology, *e.g.*, familial craniofacial dysostosis, heredofamilial atrophic dermatoses (Rothmund's syndrome), muscular dystrophy, idiopathic hypoparathyroidism

D. Various ocular syndromes, *e.g.*, persistent hyperplastic primary vitreous, Rieger's anomaly, aniridia, microphthalmia, retinitis pigmentosa

III. Late Onset (Senescent Type)

A. Without associated familial or acquired disease

B. With contributory factors such as diabetes mellitus, familial incidence, ocular trauma, glaucoma, intraocular surgery, Paget's disease of bone

IV. Secondary

A. Directly related to acquired systemic disorders, *e.g.*, tetany (hypocalcemia), starvation, aortic arch syndrome

B. Related to acquired ocular disease

1. Inflammatory, neoplastic, *e.g.*, heterochromic iridocyclitis, intraocular neoplasms
2. Physical trauma and physical agents, *e.g.*, blunt injuries, perforating injuries, radiation (atomic, infrared), electric shock (lightning)

C. Secondary to local or systemic chemical agents, *e.g.*, steroid therapy, chlorpromazine, ergot, dinitrophenol, thallium, intraocular deposition of iron (siderosis) or copper (chalcosis)

and over 50% of the visual loss is due to abnormalities of the lens or retina.[10] Typical diabetic cataracts usually develop in patients with severe, prolonged, poorly controlled diabetes. They may be seen as early as seven years of age but most commonly in the advanced years.

Examples of endocrine diseases that are associated with cataracts are hypothyroidism and hypoparathyroidism.[3]

Inflammatory diseases of the interior of the eye may lead to the development of a lens opacity. Acute and chronic iridocyclitis with synechia formation (adhesions of the iris to the anterior capsule of the lens) may severly compromise the clarity of the lens. Chronic uveitis and vitritis frequently leads to posterior capsular opacity and may be referred to as cataracta complicata. At times, the entire lens may become opaque in association with chronic uveitis.

The literature documents many agents that will provide chemical insult upon the lens to produce a toxic cataract.[10] Corto-costeroids administered systemically or topically, naphthalene, paradichlorobenzol, ergot alkaloids, oral contraceptives, miotics, and the tranquilizer, chlorpromazine are but a few of the many examples.

The exposed eye ball is extremely valnerable to flying objects and particles which may cause severe injury. High velocity particles striking the head may injure the eye via transmission of kinetic energy from the point of impact in the head or face to the eye.[10] Penetrating injuries more commonly enter the eye through the cornea than through the sclera. Violation of the lens capsule by a flying chip of steel penetrating the eye will admit fluid into the lens, disrupt metabolism and result in cataract. Rupture of the eye ball may also follow injury by an explosive blast which causes an enormous increase in the atmospheric pressure. Traumatic cataract is encountered more frequently in military men, particularly during war, as well as men engaged in hazardous industrial occupations. Blows to the eye while participating in active sports--boxing, golf, tennis, and skiing may also produce cataracts. Thus, traumatic cataracts may be caused by three types of physical insult: blunt injuries with or without rupture of the lens capsule, explosive blasts, and penetrating injuries of the globe.

Detection Procedures

The objective means of clinically determining the existence of a cataract involves the use of the ophthalmoscope, retinoscope, and slit-lamp biomicroscope.[11] The objective sign of cataract is, of course, the presence of opacities in the lens. While an advanced cataract is readily detected with simple instrumentation, a more accurate assessment of early opacities is made by transmitted

light when opacities, obstructing the light reflected from the fundus (back of the eye) appear black in the pupillary reflex. Accurate information can also be obtained by direct observation, using local illumination of the ophthalmoscope or biomicroscope slit-lamp. The objective clinical examination is, therefore, most satisfactorily started by observing the fundue reflex with the ophthalmoscope or retinoscope, at first, at a distance of about one third of a meter and then with a +20 D lens.[11] Dobree[12] recommends use of the ophthalmoscope with a +10 D to +8 D lens to obtain accurate information as to position, form and nature of lens changes. For the best view of the interior of the eye, such an examination should be done with a widely dilated pupil. One can also assess the integrity of the retina at the same time. The use of an indirect ophthalmoscope is particularly useful in studing the periphery of the retina. Examination with the slit-lamp, however, provides information of even more value, since it permits a detailed microscopic view of the lens by direct or transmitted light and by indirect lateral illumination by which fine changes and vacuoles can be detected. By its means, not only can an accurate knowledge of the type and form of any opacity be gained but it reveals the density of any opacity. Pathological changes can be accurately localized topographically in the cortex as well as in the nucleus of the lens.[11] Most importantly, the optical significance of the opacity can also be objectively evaluated.

Complications of Cataract Surgery

About 5% of cataract extractions have significant complications during or soon after the operation but most can be managed satisfactorily and good vision obtained.[2] Poor vision following cataract extraction is usually the result of unrelated degenerative changes such as macular disease, corneal dystrophy or glaucoma. The macula is a small yellowish area of the retina, containing the fovea centralis, the region of most acute vision.[13] In the presence of cataract, it is not always possible to accurately evaluate the functioning of the macular prior to surgery.

Some complications of cataract surgery are: vitreous loss, intraocular hemorrhage, cystoid maculopathy, shallow anterior chamber, intraocular infection (e.g. endophthalmitis), Elschnig pearls, retinal detachment, glaucoma, corneal decompensation, would rupture, posterior capsule opacification, uveitis, vascular occlusion, hyphema, vitritis, optic atrophy, changes in astigmatism, and dislocation of intraocular lenses. Only some of the more frequent complications will be discussed.

Vitreous loss is the most undesirable of the common complications occurring at the time of surgery. The vitreous humor is a gel-like substance which bathes the lens and occupies a large portion

of the intraglobal space. If drawn into the anterior chamber of the eye, it will transmit traction into the retina increasing the possibility of retinal detachment. Just as important, vitreous which migrates to the anterior chamber after cataract extraction can come in contact with the posterior surface of the cornea and damage the endothelial cells producing an intractable corneal edema. Vitreous loss does occur in 2 to 4 percent of cases in spite of all operative measures to avoid vitreous disturbances at the time of surgery.[2]

Intraocular hemorrhage, another complication, may arise from the iris, the wound, but only rarely from the posterior segment of the eye. The latter is of major significance because bleeding from that area can cause an outflow of intraocular contents at the time of cataract extraction. Hemorrhaging from the iris or wound is usually self limiting and manageable.[2]

Cystoid maculopathy is a fairly common complication characterized by onset of macular edema in the early weeks following cataract extraction. This condition occurs with greater frequency following vitreous loss, in blue-eyed individuals, and in patients with post-operative inflammation of the anterior segment. Vision may be reduced as low as 20/200. The condition is most readily diagnosed by fluoroscein angiography which reveals a typical stellate appearance of leaking dye at the macula or by measurement of elevation with the slit-lamp and Hruby or Goldmann lens. The condition is usually considered self-limiting.[2]

A shallow anterior chamber usually results from wound leakage in the early post-operative period. Permanent damage to the eye does not result if management is appropriate and prompt. Less frequently, shallowing of the anterior chamber is a result of spontaneous hemorrhage of the choroid. This fluid accummulation leads to a marked displacement of both choroid and retina and to detachment of the ciliary body. Usually, however, the fluid is reabsorbed and there are no lasting effects. Pupillary block glaucoma is still another cause of a shallow anterior chamber following cataract extraction. The pupil becomes occluded by formed vitreous but the pressure can be relieved by a surgical procedure.[2]

Post-operative intraocular infection occurs in approximately 1 or 2 patients per five thousand operations, usually within a day or two post-operatively.[2] A diagnosis is suspected by the occurrence of ocular pain, lid swelling, and increase redness of the globe. Slit-lamp examination reveals inflammatory cells in both the anterior chamber and the vitreous. Because prompt control of the infection is mandatory, the aqueous should be aspirated and bacteriologically cultured. Appropriate broad spectrum antibiotics should be prescribed until culture reports and sensitivity studies are available.[2]

Elschnig Pearls appear as small translucent vacuoles arranged in clusters following surgery. They are remnants of lens epithelium which remain in the eye following incomplete extracapsular cataract surgery.[2]

The incidence of retinal detachment following surgery for acquired cataracts is reported to be approximately 2%.[14] The average interval between cataract surgery and the development of the retinal detachment has been reported as 33.3 years.[15] Routine examination of the retina through a dilated pupil is highly desirable on an annual basis for the remainder of the patient's life.

Glaucoma in the aphakic eye may have pre-existed, may develop de novo as primary open angle glaucoma following uncomplicated cataract extraction, or may result as a surgical complication. The various causes of aphakic glaucoma and their treatment are summarized by Francois.[16] The latter type of glaucoma mentioned above is termed aphakic obstructive glaucoma and is usually due to the blockage of the normal circulation of aqueous humor, resulting in inflammation and angle obstruction. For the aphakic patient, the refractive error, particularly astigmatism, may change significantly, post-operatively. Such changes will affect the visual acuity of the patient and may require modification of his/her prosthesis.

Incidence and Prevalence

The actual extent of the problem of cataract and aphakia in this country is not clear from the data available. There is no known report of the numbers of individuals who have cataracts and have not sought professional services or who have had cataracts diagnosed and have not had surgery.

It is, however, clear from the data available, both published and unpublished, that cataracts are a condition, most predominantly, of the elderly and a result of the normal physiological aging process. Congenital, metabolic, endocrine and toxic cataracts do not occur with the frequency to be epidemiologically significant. Senile (senescent) cataracts, on the other hand, account for approximately 90% of all of the documented cases.[2]

Data that is available on the incidence and prevalence of cataract provides some general idea about the magnitude of the problem. The National Ambulatory Medical Care Survey (1973)[17] indicates that 2,723,000 visits were made to physicians' office for cataract (primary diagnosis) for the period May 1973 to April 1974. During the same period of time, 4,400,000 visits were made in which cataract was only one of the diagnoses.[18] While there is no documented data on the incidence and prevalence of aphakia, it is

estimated that approximately 1,000,000 visits were made for aphakia during the same period of time.[18]

Data on cataracts from the Health Interview Survey (1971)[19] indicates a prevalence of about three million persons which is equivalent to 14.9 cases per 1,000 persons. It also reported that approximately 2,764,000 individuals or 13.7 per 1,000 persons had visual impairments resulting from cataract. This is equivalent to about 1.5 cases of all ages per one hundred people in the United States. The following table (Table B below)[18] provides the prevalence data by age grouping:

TABLE B

Prevalence of Cataract and Number of Cases Per 100 People

Age	No. of Cataracts	No. per 100 People
Under 17	---	---
17-44	197,000	0.3
45-64	565,000	1.4
65+	2,212,000	11.4

Unpublished data from the National Eye Institute[20] indicates that there is estimated to be about 912,000 new cases of cataracts per year, based upon first visits to physicians, exclusive of referrals. About three fourths of these were first diagnosed at ages 65 and over. The incidence for women is considerably higher than for men. In addition, there were estimated to be approximately 332,000 cataract surgeries performed in 1972. The only data (Table C below) available, indicating the number of cataract surgeries by age grouping, is that obtained from short-stay hospitals in 1972.[21]

TABLE C

Estimated number of cataract operations in short stay hospitals by age. U.S. 1972

Age	Est. No. Cataract Operations*
10-29	3,000
30-39	3,000
40-49	9,000
50-59	30,000
60-69	64,000
70-79	90,000
80+	42,000
Total	241,000

* first listed diagnosis of cataract in combination with lens extraction.

Table D provides incidence and prevalence data for blindness by age groupings. It is clear from all of the data shown above that the extent of the problem of cataracts is greatly magnified with advancing age and becomes a socio-economic health problem of national significance.

TABLE D

PROJECTION OF CATARACT BLINDNESS IN L1975 BY AGE

Age Group	Newly blind from cataract rate/100,000[1]	Minimum Number[2]	Blind from cataract rate/100,000[3]	Minimum Number[2]
	(Incidence)		(Prevalence)	
5	.9	143	1.9	302
5-19	.7	411	6.4	3758
20-44	.4	290	8.2	5951
45-64	3.5	1524	23.0	10015
65-74	4.9	680	52.6	7208
75-84	14.0	931	128.4	8539
85+	40.8	766	492.2	9239
Estimated Total		4745 or 4700		45,102 or 45,000

1/ Age specific rates/100,000 of all additions to registers, 14 MRA states, average 1969 and 1970 in Kahn, H.A. and Moorhead, H.B: Statistics on Blindness in the Model Reporting Area, 1969-1970. DHEW Publication No. (NIH) 73-927, U.S. Government Printing Office, 1973.

2/ Number resulted from applying the incidence or prevalence rate to the July 1975 resident population in the United States. Population estimates are from: Current Population Reports. Population estimates and Projections, Bureau of the Census. Series P-25 No. 614, November 1975.

3/ Age specific rates/100,000 of persons on register, 14 MRA States, Dec. 31, 1970 in Kahn, H.A. and Moorhead, H.B: Statistics on Blindness in the Model Reporting Area, 196901970. DHEW Publication No. (NIH) 73-927, U.S. Government Printing Office, 1973.

Aphakia

Aphakia is defined as the absence of the lens of the eye.

Removal of the lens renders it highly hyperopic (requiring a strong convex lens) and without accommodation. One fourth of the normal static power of 60 diopters is lost and the refractive system is reduced only to the refractive power of the cornea. Some degree of astigmatism is always present after cataract extraction.[22]

Optical Correction of Aphakia

One of the great causes of disappointment to a patient following surgery is the unexpectedly poor vision without glasses and distortion of vision with glasses which may occur after cataract surgery. The spectacle lenses required for the compensation of the removal of the eye lens are of high power. Such lenses create substantial magnification and distortion which results in spacial disorientation for the patient. Since the retinal image is magnified, the patient feels that all his surroundings are crowded on top of him. Spherical aberration in the spectacle lens causes flat surfaces to appear curved;[23] peripherally, lines are distorted, "blind" zones are present and there is a reduction in panoramic vision. In addition, there may be colored fringes around everything seen and if only one eye is being used, a serious disturbance of depth perception will be present. During the early post-operative period, the patient continuously finds himself reaching short of objectives and stepping too high for stairs well below his feet. As a result, care has to be taken in negotiating curbs and in going up and down stairs. Fortunately, with adaptation, these distortions become less noticeable, but in a few cases, the difficulty persists for a year or longer. It is not an easy period for the young and it may be a hazardous time for the aged. For many patients, the post-operative period is particularly challenging. It is thus imperative that, prior to surgery, the patient fully understands the effects that cataract extraction will have on his vision.[2]

Monocular aphakia occurs when a cataract operation is performed on one eye only and in this case, either the operated or unoperated eye may be used, but the two eyes can no longer function together using eye glass correction for the aphakic eye. This situation occurs because the retinal image as seen through an eye glass lens in front of an aphakic eye is usually about 25% larger than the image on the retina of the normal eye. The brain simply can not fuse two such vastly different images together (double vision). If a contact lens is used, however, the discrepancy in image size between the operated eye and the normal eye is limited to approximately 8% and therefore, single binocular vision is possible.[2]

Correction of refractive errors in aphakic patients is usually done by either eye glasses, contact lens or the new implanted intraocular lens.

Generally speaking, optical correction of aphakia usually begins within a day or two after surgery, utilizing temporary eye glass correction. A final permanent prescription is not given until two to three months and sometimes longer after the extraction.[2] Rarely are contact lenses prescribed before six weeks following surgery. However, there are several varieties of soft, hydrophilic contact lens now available which are prescribed early in the post-operative period.[2]

For the purpose of this paper, only spectacles and contact lenses will be discussed since optometrists in their practice do not utilize intraocular implants which involve a surgical skill.

Various lenses have been advocated to solve problems of aphakic correction. Regardless of type, the severity of visual difficulties has been reduced, to some extent, by improved lens grinding techniques.

Spectacle lenses have inherent optical defects which are not appreciated by individuals that wear glasses in the power range of + or -3 diopters (vast majority of patients).[24] The four components of false orientation in aphakic spectacles are: false depth, false projection, swim and distortion.[24] It should be noted that modern light-weight, aspheric, plastic eyeglass lenses are superior to the heavy glass lenses of the past.

While lenticular, aspheric spectacle lenses have been utilized in the past, corneal contact lenses are being used more as improvement occurs in contact lens material and fitting. Development of lenticular cut types of corneal contact lens has greatly enhanced fitting of aphakic patients because they rest on the eye ball, form part of the optical system, and move with the eye; with spectacles, however, the lens are situated in air at a distance from the eye and are immoveable with relation to the eye globe.[22] The literature abounds with articles on the use of contact lenses for aphakia.[25-32] In bilateral aphakia, one study[33] reported success in 200 cases with continuous use of tiny, hard corneal lenses.

In the case of monocular aphakia, where the other eye has good vision, the treatment of choice is to place a contact lens on the aphakic eye; this results in single, binocular vision and is satisfactory for a majority of these patients.

Use of hydrophilic (soft) lenses[34] in aphakic patients gave excellent visual acuity and was more comfortable than hard lenses.

In the case of monocular aphakia, where the other eye has good vision, the treatment of choice is to place a contact lens on the aphakic eye; this results in single, binocular vision and is satisfactory for a majority of these patients.

Use of hydrophilic (soft) lenses[34] in aphakic patients gave excellent visual acuity and was more comfortable than hard lenses. The main advantages of the soft lens over eyeglasses are the lack of spectacle blur, increase in visual fields and simplicity of fitting. Contact lenses also provide an almost normal field of vision with negligible magnification of the retinal image as compared to eye glasses. Some 80% of aphakic patients can learn to wear contact lenses if properly instructed.[2] In the elderly patient, however, decreased manual dexterity may hinder the use of contact lenses unless professional assistance is available.

It should be noted here that no matter how well cataract extraction is tolerated, the visual result is largely determined by the state of the retina as well as such factors as senile macular degeneration and diabetic retinopathy which will cause poor vision even after an excellent cataract operation.[21] Therefore, a careful assessment of the function of the macula and the peripheral retina is important pre-operatively so that the patient may be warned if the visual outcome of the operation seems doubtful even with the best optical correction available. Such assessment may be difficult or impossible in advanced cataracts.

Where indicated, rehabilitation training of patients in the use of his/her prosthetic devices and aiding the patient in spacial orientation and mobility is extremely important. In addition, some post-surgical aphakic patients do not experience optimal vision for their living or occupational requirements through the use of regular (spectacles, contact lenses, intraocular lens implants) ophthalmic prosthesis. These patients should be considered for low vision aids such as special microscopic reading glasses, telescopic spectacles and other such devices. These have been very effective, when properly applied, in providing optimal vision function for certain life style activities, a requirement which is most important to the physical and mental well-being of these patients.

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SECTION II-B

OPTOMETRIC LAW AND PRACTICE

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The scope of practice and area of competence of the health professions are of increasing importance as we attempt to improve the organization and operation of the health care system. While precise definition is not possible, information is available from several sources from which to develop valid concepts of a profession's role and function. The sources are:

- State laws which authorize activities and responsibilities of health workers.
- Board regulations which implement and enforce activities and responsibilities of health workers.
- Decisions by the courts concerning the responsibilities of practitioners.
- The usual and customary practices of the professions.
- The objectives, content, and standards of education and training for the profession.

This section presents information about the legal bases for the practice of optometry, and draws upon evidence of how optometrists function in present day practice. All health professions including optometry are in a state of professional growth--i.e., an expansion or re-definition of their responsibilities and functions--in response to new professional specialties, and the changing demands of society. Typically, professional growth is first observed in certain practice settings, usually those where clinical, academic, or economic pressures encourage the most efficient and effective use of personnel. Professional education will quickly reflect this growth and encourage its spread throughout the rest of the professional community. Eventually, changes in legislation and regulation will be made to accommodate the new responsibilities and functions.

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Therefore, in attempting to state what optometrists or other health personnel can and should do, it is important to examine what they are actually doing and what trends in professional growth can be observed.

* * * *

"The Doctor of Optometry (O.D.) is a health professional who performs eye examinations to determine the presence of visual, muscular, or neurological abnormalities, and prescribes lenses, other optical aids, or therapy such as eye exercises to enable maximum vision. Optometrists are trained to recognize diseased conditions of the eye and ocular manifestations of other diseases, and to refer patients with these conditions to the appropriate health professional."[1/]

"Optometry as a profession is concerned with the problems of human vision. Optometrists examine the eyes and related structures to determine the presence of any visual, muscular, neurological, or other abnormality. They prescribe and adapt lenses or other optical aids and may use visual training aids (orthoptics) when indicated to preserve or restore maximum efficiency of vision. Most optometrists fit and supply the eyeglasses they prescribe. They do not prescribe drugs, make definitive diagnosis of or treat eye diseases, or perform surgery."[2/]

These definitions of optometry reflect the optometrists' role as a provider of primary health care. In this role he functions as a principal point of contact with the health system for individuals who have visual problems, some of whom will have symptoms or conditions which require referral to other health practitioners. A more complete description of optometric functions has been previously published by the Department.[3/]

The optometrist's role as a provider of primary care has been of steadily increasing concern and importance. This trend has received additional sitmulus in recent years from the larger role assumed by optometrists in health care in military settings, and in institutional care as typified by health maintenance organizations, where he may evaluate all patients who present themselves with visual problems. Also, most States have specific statutory provisions prohibiting discrimination between ocular practitioners in public and private insurance programs, thereby giving persons the freedom to select the practitioner to perform vision care services.

All of the health professions have experienced, in the last half-century, tremendous growth in the scope and depth of their discipline, and optometry is no exception. Optometrists have displayed a high degree of responsiveness to technological change, and have made noteworthy efforts to adopt new techniques as part of their practice and to improve the scientific content of their education.[4/],[5/]

Optometric Practice Authorized By State Law and Board Regulations

The practice of optometry is governed by statute in every jurisdiction. While no single definition of optometry is used in all state laws, certain descriptive and limiting phrases recur in almost all States defining this profession. Generally, an optometrist may be defined by statute as one who, having met the requisite legal and education requirements, is licensed to examine eyes and to correct refractive errors through ocular exercises or by prescribing and fitting corrective lenses, but not through the use of drugs or surgery. The optometrist is also expected to recognize, but not treat, disease of the eye. This definition has been broadened by a few States in recent years to authorize the use of diagnostic drugs.

Another significant source of information is regulations of State Boards of Optometry. State Boards are delegated the authority to make rules and regulations governing the practice of optometry which they deem necessary for the effective enforcement of State laws.

Court decisions stemming from malpractice suits constitute a reliable body of information with legal significance for the determination of the scope, responsibilities, and proficiencies of a profession. However, in optometry, malpractice suits have been rare, and there are few such decisions to which we may turn.

A systemic analysis of State optometric practice acts is difficult because of variations in phrasing and coverage of the acts. The variations arise from the nature of the existing legal code of which the act is a part, or conditions giving rise to the need for the law, or for a revision thereof, in a given State. Differences in expression and the use of terminology among authors of laws also result in variations which make authority and intent difficult to compare.

In determining the scope of practice of optometrists, i.e., what procedures or functions they may perform, several indicators may be considered. In rare cases, a statute or regulation will define the term "optometry" or "practice of optometry" so as to detail specifically what procedures fall within the scope of practice. More frequently, the law or regulation defines its terms broadly, discussing specifics elsewhere. Many States include in their laws a schedule of the minimum procedures which must be performed on every patient being examined by an optometrist. These schedules are perhaps the most valuable tool available for determining how expansive the scope of practice is in a given State. A less valuable tool, but nonetheless an indicator, are the statutory or regulatory provisions outlining the equipment which each optometrist must have in his or her office. If the minimum equipment schedule includes a refractor and an ophthalmoscope, it may be concluded that an optometrist may or should perform internal ophthalmoscopic examinations and refractions in that State.

A first procedure undertaken by this study was to use these indicators to compile a chart of functions or procedures specifically authorized in the laws and regulations of each State. The authorization may be either expressed or implied as explained above.

The results of this effort--the chart and a discussion of findings--are provided in Attachment A of this chapter. Although, the chart gives an indication of how optometry is viewed by State legislatures and regulatory bodies, it can be relied upon only as a partial indicator of what optometrists should or should not do. For example, only 24 States specifically mention refraction or measurement of refractive powers among the permitted or required functions of an optometrist, but, by definition, refraction is an essential component of optometric practice in every State. Thus, from analysis of practice acts and related regulations, with few exceptions, the law is unclear as to what services optometrists may perform.

Optometrists As Providers of Primary Care

Of particular relevance to this study, is the extent to which optometrists are permitted by law ot provide a portion of primary care. Primary health care by first-contact health professionals involves the detection of disease or abnormality and proper disposition of the patient.

State laws were examined to determine the extent to which they hold optometrists responsible for, or require them to be knowledgeable about this primary care function. In recent years, several States have amended the laws to redefine optometry, notably, Alabama, Connecticut, Idaho, Pennsylvania and Tennessee. The new definition reflects further recognition of optometrists as primary care providers by expressly enabling practitioners to ascertain the presence of disease or pathological conditions and to refer the patient to the appropriate medical practitioner for further diagnosis.

Further mention of such a requirement or ability is made in Attachment B.

Optometrists are seldom subjected to malpractice suits, the very low rate of insurance ($280.00 per year) reflecting this fact. Suits have been brought, however, and it is informative to note the extent to which courts hold that optometrists are responsible for the care of their patients.

An optometrist has the duty to refer a patient to a physician for pathological conditions which he recognizes. Optometrists have been found both liable and not liable for malpractice in the prescribing and fitting of corrective lenses and for failing to refer, and different standards of care are used by the courts.

In a Maryland optometric malpractice case in 1971, the court equated the duty of an optometrist to advise patients with that of a physician.[6/] The Supreme Court of the State of Washington has apparently held, in a 1974 ophthalmological malpractice case, that standards of eye care will be fixed by the court if professional standards are found wanting--a case which has significant implications for optometry.[7/]

The question of the duty and ability of an optometrist to discover pathology was explored in a New Jersey case in which the Superior Court, Law Division, stated that "--discovery of pathology is included within the scope of the responsibility and the minimum examination to be administered by an optometrist." This and other precedents were cited in an opinion of the Attorney General of the State of New Jersey that authorizes optometrists to utilize local anesthetics. The opinion is quoted at length in footnotes to this chapter.[8/]

Another aspect of the redefinition of optometry has to do with the use of topical drugs for diagnosis. Prior to 1971, optometry law, almost without exception, used the phrase, "any means except drugs to diagnosis ocular abnormalities," in defining the manner in which optometry may be practiced. Since that time, several States have amended the law to permit the use of drugs and appear to have broadened the scope of practice. These recent changes in State law support the conclusion that the States view optometrists as first-contact primary vision care personnel.

Eight States now permit the use of topical drugs for diagnostic purposes and require an examination in pharmacology as it relates to optometry. One State, West Virginia, also permits optometrists to use drugs in the treatment of the eye. The language of the statutes vary from a general statement as to the use of topical drugs to a specific statement as to the precise drugs to be used. Attachment B summarizes recent laws and regulations respecting the use of drugs.

The Assurance of Quality in Optometric Practice

To this point, this chapter has explored the legal basis for the private practice of optometry as it is set forth by the respective States. Several general conclusions can be drawn:

- There is wide variation among States in the manner in which optometry is defined.

- State laws and Board regulations are often inconsistent in specifying functions of optometrists.

- Statutes relating to the practice of optometry have been construed both strictly and broadly by the courts and attorneys general.

- The legal basis for optometric practice does not anticipate the professional growth of practitioners, but rather (as is typical for other licensed health professions) follows developments in education and practice.

- It is not the intention of State legislative and regulatory bodies to restrict the practice of optometry to refraction and the provision of lenses.

A further issue relevant to this study is the assurance of quality in vision care. Quality in health manpower is difficult to define or measure, but it may be said to consist of proficiency--the knowledge and skill of the practitioner--and performance--the extent to which that knowledge and skill is fully applied in the care of patients.

In health professions, both proficiency and performance are of increasing public concern. Proposals to require periodic re-examination of practitioners reflect a concern that proficiency is maintained. Professional Standards Review (PSRO) is an attempt to examine performance--to determine, for example, that economic incentives are not overruling professional judgment in the handling of cases.

In investigating the current quality of any health profession, we must expect considerable frustration. Statistical evidence of the quality of care which also shows the reasons for any deficiencies is hard to come by. So many variables in addition to the proficiency or performance of the practitioner influence the outcome of a case or dictate the need for a certain procedure or treatment that little can be inferred about the practitioners involved. Individual case experiences allow no generalization to a profession as a whole, and of course, they come to our attention through malpractice suits, disciplinary actions, and news accounts of patient's complaints. They are, therefore, almost uniformly negative in tone and there is no corresponding body of anecodotal evidence in general circulation that reflects positively on a health profession.

Nevertheless, there is information from which we can make, cautiously, some general deductions about the quality of a health profession. Principally we have:

- The content and duration of basic education for the profession.

- The nature and extent of organized evaluation and control of basic education (i.e., accreditation).

- Requirements for licensure and/or other forms of professional credentialing (such as certification by a voluntary professional board or agency).

- Requirements for periodic re-licensure and/or re-certification.

- Continuing education: its availability, content, and the extent to which practitioners avail themselves of it.

- Ethical codes and standards of practice promulgated by professional associations.

- The disciplinary procedures and actions within the profession.

Education and accreditation are discussed elsewhere in this study, as part of a review of optometric education. It is convenient to look at licensure, re-licensure, and continuing education in optometry simultaneously, since these are inter-related. (This is unusual among health professions, most of which unlike optometry are not required to meet any quality-related criteria in order to retain licensure or certification).

Initial Licensure Requirements

To qualify for licensure as an optometrist, an applicant must be a graduate of an approved school with a program leading to a Doctor of Optometry degree. Four States require applicants to complete an internship as a prerequisite to being examined for licensure. The length of the internship varies: three months in Alabama, six months in Delaware and Rhode Island and one year in Oregon. North Carolina does not require an internship but does require the applicant to have completed a two week practice orientation.

Most States also specify some courses or subjects that must have been included in basic optometric education or (more usually) that must be covered in a licensing examination. The course which appears most frequently in State statutes and regulations is ocular anatomy. Thirty States examine candidates on this subject and/or require the course for licensure. Twenty-three States require a course in or an exam on ocular pathology. Twenty-three States require practical optometry. Ocular physiology appears as a requirement in the laws or regulations of 20 States, while theoretical optics appears in 19, physiology in 18, and general anatomy in 15.

Thirteen States require course work or exams on pathology and on visual training and orthoptics. A course in contact lenses is required by 11 States, while optics is prescribed in ten.

A number of subjects appear in less than ten of the State's requirements. Refraction and geometric optics appear in nine times each. Eight States require course work in psychology. Physics and hygiene appear six times each, as does prescription and fitting. Pharmacology is tested in five jurisdictions as is clinical optometry. Optical laboratory and clinical work, mathematics, and psychological optics each appear in four State's examination requirements. Physical optics, ocular myology, and ocular neurology are examined on in three States each. Tonometry, mechanical optics, and case analysis are required course work in two States.

Attachment C shows in tabular form the subject matter to be mastered for licensure in each State.

All States require applicants to pass a written examination as a condition precedent to licensure. There is a National Board Examination in Optometry which is used at the discretion of the State Boards and in 18 States is expressly accepted in lieu of the State written examination. Sixteen States also require applicants to pass an oral examination. In five other States, an oral examination is optional. Twenty-eight States require practical examinations and in two others, practical exams may be required at the Board's discretion. Requirements of States for initial licensure are presented in tabular form as Attachment D to this chapter.

Continuing Education and The Renewal of Licensure

Optometry has taken formal steps to assure that practitioners are required to continually upgrade their diagnostic and treatment skills. Beginning with Iowa in 1938, forty-three States have adopted, either by Board rule or statutory law, some form of continuing education requirement for license renewal. Of the remaining States without formal requirement, several State optometric associations have instituted a system of continuing education requirements for membership purposes.9/

Content of continuing education courses also varies widely as do the institutions and entities providing such services.10/,11/,12/ The Southern Council of Optometrists recently provided 102 clock hours of education to some 1200-1300 registered participants. A separate listing which itemizes course offerings related to management of the patient with cataract or aphakia is appended.13/ The list supplied by the Division of Education and Manpower, American Optometric Association, samples courses offered over the last five years.

Continuing optometric education courses are offered by over 100 agencies. This includes the 51 State associations affiliated with the American Optometric Association, the twelve U.S. schools and colleges, national organizations such as the American Academy of Optometry, American Optometric Foundation, and the Armed Forces Optometric Society, and the seven regional councils of optometrists (Central States, North Central States, Northeast States, Mountain States, Southwestern States, and Southern). Several other organizations offer courses either individually or in conjunction with State and regional annual meetings, e.g., the College of Optometrists in Vision Development, The Vision Institute of America, The National Optometric Association, and the Optometric Extension Program. Some State Boards are also providing coursework related to changes in optometry statutes and rules.

The presentation of continuing education can be described in two general categories: that which is primarily clinical and laboratory work (offered by schools and colleges) and the lecture form. The latter frequently incorporate sophisticated learning aids, including print in all forms, including motion pictures, film strips, photographs and models, recordings, and the like. Practitioners involved in continuing optometric education include at a minimum, all licensed optometrists in the States that require it for license renewal. It is estimated that some 17-18,000 of the reported 21,000 licensed Doctors of Optometry are currently obtaining continuing education.

Additional sources for maintaining knowledge of advances in optometry are the various professional journals available to practicing optometrists. These include the Journal of the American Optometric Association (which contains a feature on continuing education self assessment), the American Journal of Optometry, as well as many publications from related professions and sciences. Most State associations have periodicals for distribution to members which contain case histories and new technique information.

The nature of the requirements for continuing education that forty-three States impose varies considerably. Most States specify that credit may be given for optometric or other scientific education, lectures, symposiums or courses approved by the board, post-graduate study at a school of optometry, or a course given by the optometric association.

There is no uniform amount of time required. Requirements range from eight to 25 hours. The requirement is generally a prerequisite to license renewal and consequently must be fulfilled within the renewal period. Attachment E summarizes the license renewal provisions for continuing education in the various States.

In common with other major health professions, optometry has codified ethical standards and mechanisms for disciplining members of State associations independent from any actions of regulatory boards. Of particular interest here is the position of optometry on referral to other sources of health care. The fifth precept of the Code of Ethics adopted by the House of Delegates of the American Optometric Association, at Detroit, Michigan, June 28, 1944, states that "It Shall Be The Ideal, the Resolve, and the Duty of the Members of the American Optometric Association...TO ADVISE the patient whenever consultation with an optometric colleague or reference for other professional care seems advisable."

Information on disciplinary actions of professional organizations might indicate the extent to which the promulgated professional standards are actually enforced. However, this information is not made available (to do so would raise serious questions of the respect of privacy and due process), and special efforts would be required to undertake any assessment of the effectiveness of this method of ensuring professional quality.

Optometry In Organized Health Care Settings

The capabilities of optometry are most easily examined in organized settings such as military establishments and health maintenance organizations. Here, in contrast to private practice, their responsibilities and functions are more clearly defined and their accomplishments and professional relationships with medicine are more apt to be a matter of record.

Most optometrists are in private practice and data on the nature of their practice and the efficiency of the provision of vision care is lacking. Any amount of anecdotal evidence--single case histories or the procedures and experience of single optometrists or ophthalmologists--is available to support the contention that optometrists function effectively as primary care personnel, but from this one can draw no firm conclusions about how the "average" optometrist, or the majority, do in fact function.

However, utilization of the optometrist in an organized health care setting does offer insight into how the private practitioner can function. Organized settings include the armed forces, the Veteran's Administration, and health maintenance organizations.

The armed forces employ 302 ophthalmologists and 521 optometrists. Proportionately more optometrists are employed in the Air Force (176 vs. 58 ophthalmologists), and fewer in the Navy (127 optometrists to 130 ophthalmologists). In larger medical installations, optometry is a section of the department of ophthalmology, while in smaller installations the optometrists will work in the department of surgery or under the director of hospital clinics but without close professional

supervision. In military installations, ophthalmologists do not provide services without the assistance of optometrists. Referral rates from optometrists to physicians range between three and seven percent of the patients seen, a higher percentage than that found in civilian clinics.

Position descriptions for optometrists in Federal service emphasize the breadth of the discipline.[14] The services recognize examinations performed by civilian optometrists. For example, the U.S. Navy recruiting manual, Section 4, "Physical Qualification," C-1401 "general" contains the following statement: "Statements from optometrists will be accepted on all matters pertaining to eye examinations except definitive diagnosis of disease. This does not preclude the acceptance of a statement from an optometrist regarding certain conditions of the eyes or a statement that there is no disease of the eye."[15]

The military have successfully instituted optometric triaging using medical corpsman supplemented by optometrists.[16] In this setting, optometrists successfully function as primary care personnel. The Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) provides or reimburses for health services for armed forces retirees, dependents and others. CHAMPUS authorizes payments to optometrists:

- for eye examinations performed for the purpose of ruling out pathology even though the examination may result in the determination that no pathology exists.

- for spectacles or special lenses required in the surgical or medical treatment of pathological conditions.

but does not reimburse for lenses needed solely for the purpose of correcting refractive error.

In the provision of vision care the Veteran's Administration has relied heavily upon ophthalmology and to a much lesser extent upon optometry. It uses the full-time equivalent of 100 ophthalmologists (including 188 residents, 85 staff, and 90 consulting or attending ophthalmologists) but only 8 full-time, 13 part-time and less than 40 attending or consulting optometrists.[17] This low rate of utilization of optometrists is partially explained by non-competitive civil service salary rates established for them, and partially by the lack of affiliation of VA hospitals and clinics with optometry schools. An exception is the VA Hospital in Birmingham, Alabama, which is affiliated with the School of Optometry, University of Alabama. The VA, however, has recently established a Vision Impairment Committee (with representation from Ophthalmology,

Optometry and Blind Rehabilitation) which has recommended that training affiliations be established or strengthened with schools of or colleges of optometry. The VA's Ophthalmological Advisory Committee has endorsed the concept of expanding the present emphasis on eye health care to the more comprehensive conncept of vision care via interdisciplinary team delivery.[18]

Health maintenance organizations provide a setting in which optometry has well-defined relationships with the other health professions. Group Health Association of Washington provides primary care for about 50,000 people, utilizing 55 full-time and 75 part-time physicians supported by 400 ancillary personnel.[19] Vision care in Group Health Association is provided by two full-time ophthalmologists and 5 full-time and 2 half-time optometrists under the supervision of the Chief of Ophthalmology, a physician. Optometrists evaluate all patients with visual problems, refer them to ophthalmologists as necessary, do refractions, determine visual fields, and fit contact lenses. Ophthalmologists rarely refract and then only in connection with pathology. Experience here and in other health maintenance organizations shows that extensive utilization of the optometrist's capabilities is compatible with high quality health care.

Optometrists are effectively utilized in providing vision care services under various Medicaid programs. The Medical Assistance Program of New York City (Medicaid) for example, utilized optometrists at the onset. It defined comprehensive public funded health care as meaning a vigorous participation of all relevant professional disciplines: medicine, dentistry, pharmacy, optometry, podiatry, clinical psychology, etc.[20] Under this program, the patient is free to choose the practitioners, and the majority of vision services are provided by optometrists. New York City Medicaid reimburses optometrists for all aspects of optometric practice.

Insurance coverage per se cannot be considered as a decisive factor in the utilization of eye care services. In a New York City survey done seven years after the introduction of the Medicaid program, individuals with insurance coverage had significantly lower utilization rates than those without.[21] Ninety-four percent of a sample of adults had had an "eye examination" sometime during their life; of these, twenty percent were not able to state what type of practitioner provided their last examination, "reflecting the widespread confusion among consumers about eye care disciplines and practitioners." Of the individuals who could distinguish between practitioners, 59% had last utilized optometrists, and 41% ophthalmologists. An apparent majority of this urban population, therefore, obtained vision care from optometrists, a finding consistent with other surveys. This survey also showed that utilization of optometrists as opposed to ophthalmologists is apparently unrelated to race and slightly related to socio-economic rank (with the highest rank more often utilizing the physician).

This survey found substantially less utilization of optometrists in the population over age 60 than among younger age groups. A greater proportion of the older population is, no doubt, seeking care from ophthalmologists. Two reasons for this are apparent: the older population suffers to a greater extent from eye disease requiring medical diagnosis and treatment, and present medicare reimbursement policies lead patients requiring optometrist's services, which are not reimbursable, to ophthalmologists, whose service is reimbursable in part. This and other surveys point out that a majority of the population chooses to rely or must rely upon optometrists for primary vision care.22/,23/,24/,25/

From experience in structured multidisciplinary health care settings it is clear that optometrists can function as primary health care providers, with efficient relationships with medicine. Data from private practice suggest that many or most in that setting are equally effective, but that a proportion of private practitioners need better working relationships with medicine than they have been able to establish.

Other Information Bearing on Optometric Practice

It is accepted that optometrists are well-grounded in physical and physiological optics and competent to refract and provide prosthetic lenses. Such documentation of optometric care as exists deals only with these aspects of practice and shows a high quality of service.26/ Some insight into their effectiveness in providing other components of patient care can be gained by examining practices of referral of patients to physicians.

A considerable body of optometric literature has to do with referrals to physicians--criteria for referral, procedures to detect systemic disease, information that should be provided the physician, etc. Optometric educators, administrators of vision care departments in institutions or group practices, and leading practitioners are clearly concerned with improving vision care by establishing more efficient and effective working relationships with medicine in the detection of abnormalities.27/ For example, the Black Hills District Optometric Society has, since the early 1960's, had periodic meetings which include local ophthalmologists in order to devise and refine criteria and procedures for referral of patients and to encourage good referral practices.28/

Various studies indicate that between two and three percent of patients examined by optometrists require referral to a physician. Reliable data are not available to show how this rate varies by age of patient, or the extent to which optometrists may over or under-refer. No satisfactory study of referrals to and from optometrists in private practice has been done; the best information comes from data collected in group practices and clinics.

A 1968 study of vision care within the Kaiser-Permamente prepaid care plan in the Los Angeles area, for example, showed that 2.75 of the patients seeing an optometrist were referred to ophthalmologists. Patients suffering from neurological disorders (e.g., cerebral-vascular accidents, multiple sclerosis, suspected tumors) are referred from physicians to optometrists for visual field testing and examination of the fundus. The optometrist's findings are used in arriving at a diagnosis.

A study of pathology detected, and of referrals in an inner-city vision care clinic staffed by optometrists, optometry students, and ophthalmologists showed a relatively high rate of detection by optometrists and students of abnormalities requiring referral to physicians.[29] Glaucoma was the most prominant condition detected, accounting for 21% of all referrals, with nuclear cataracts accounting for a further 9%. Diabetic retinotopathy caused 6% of the referrals. These represent only conditions for which there was no previous record of diagnosis and treatment. The relatively poor state of health and vision care of elderly innercity populations is apparent from data this clinic, in which 17% of the patients in the age group 51 to 60, and 27% of those in the group 61 to 70, required referral to physicians. In 2.85% of the population of this clinic, the detection of ocular abnormalities by optometrists or optometry students led to the diagnosis of previously unrecognized and untreated ocular or systemic disease.

From experiences in organized health care settings, it is apparent that optometrists can be effective in the detection of abnormalities of the vision system and in selection of patients who require medical care. There is a definite trend toward utilizing technicians and assistants of various types to carry out much of the initial examination, subject to farther screening by the optometrists.

Studies of referral practices of private practitioners would, if adequately done, provide valuable insight into the extent to which optometrists are able to detect abnormalities of the visual system and their disposition of such cases. Unfortunately, no reliable data are available. A mail survey in 1960 of a sample of optometrists revealed only that the overall referral rate to physicians was 2.19% of cases, with 54% of these referrals being to ophthalmologists.[30] No information was obtained with which to judge whether this rate is adequate, excessive, or inadequate.

Relationships between optometrists and physicians have considerable bearing on the mode of practice of the optometrist. Most optometrists have a working relationship with one or more ophthalmologists. Of the information available about the ability and proper role of the optometrist as seen by the physician, little has been collected in any rigorous manner from a defined sample of respondents, and in no case is it available in sufficient detail to allow more than the

grossest speculation about the origin and nature of the opinions of optometry that a minority of physicians hold. It seems likely, however, that any negative opinions are based upon experience with a few individual optometrists, most probably older practitioners who were trained to and do restrict their practice to little more than refraction and dispensing. Hafner's data[31] and findings from the National Center for Health Statistics 1968 Survey of Optometry Practice support this contention. The latter survey in particular showed that many optometrists educated before 1940 (now constituting about 13% of active optometrists) may not attempt to function as primary care personnel and may not make a thorough attempt to detect systemic disease which may have ocular manifestations.

A survey of California physicians concerning their relationships with optometry was published in 1974.[32] General practitioners, internists, and neurologists were surveyed and 372 usable replies were obtained. 61% of the general practitioners had had patients referred to them by optometrists while 55% of the neurologists and 39% of the internists had had such referrals. All but a few of these physicians were of the opinion that the referrals were properly handled and served the patient's best interests. Approximately the same proportion of physicians in this study who had patients referred to them by optometrists referred their patients to optometrists, and almost all reported that these referrals were handled in a satisfactory manner. Of the responding physicians, 70% reported that it is in the patient's best interest for optometrists to check for ocular pathology and ocular signs of systemic disease. These findings confirm an impression that on the individual level, the majority of physicians and optometrists in practice enjoy a fruitful and on the whole harmonious relationship, permitting a high quality of patient care.

Earlier, reference was made to the National Center for Health Statistics Survey of Optometric Practice conducted in 1968. The survey was repeated in 1973, but only the 1968 study asked respondents to check off the types of procedures performed in their office. (Data from the 1973 survey is only now being produced, and has not been published except as a series of reports by State).

The 1968 survey listed 14 services or procedures for the responding optometrist to report as being done in his practice. The data suggested that some optometrists do not perform an examination that is sufficiently complete to serve as an adequate screen for pathology. However, additional analyses were obtained and methods of collection of the data were reviewed. After discussion, the advisors and staff to this study were of the opinion that this data cannot be taken as a reliable indication of the state of optometric practice then or now.[33]

There are numbers of other minor studies of optometric practice which either do not address the proficiency or performance of optometrists or are deficient to the point that they provide no basis for generalization.

In view of this lack of definitive data, any comments about the capabilities, or lack thereof, of all optometrists to provide adequate vision care including primary care must be recognized as having an unsteady base. It can be assumed that in optometry, as in other health professions, there are individuals whose skill and procedures do not conform with the standards set by the professions. It cannot be said, however, that in this respect optometry is in a worse position than any other health discipline.

The situation is not helped by disagreements about what constitutes optical screening or an optometric examination, or disagreements about what types of manpower should be entrusted with various responsibilities and procedures. As we have seen, laws and regulations vary widely when addressing these subjects. This is a reflection of a general disorganization in the provision of vision care.

To a notable degree in this field there are unresolved issues about what procedures should be carried out and what types of manpower should be employed. For example, tonometry, a relatively simple process for the determination of intraocular pressure and the detection of glaucoma is an important component of vision care. Considerable ingenuity has been expended in devising sophisticated devices to determine intraocular pressure. However, in some medical clinics and group practices tonometry is reserved to ophthalmologists, in others it is done by any physician. In some other instances, optometrists do tonometry while in an increasing number of cases, technicians are being trained for this. It seems that considerations other than cost effectiveness are determining the utilization of manpower in glaucoma screening. There is also some disagreement about when tonometry should be done. The Department of Medicine and Surgery of Harvard Medical School in 1974 study found justification for glaucoma screening (by technicians) in medical and ophthalmology clinics for all patients 40 years or more of age.[34/] Elsewhere, however, we have opinions recorded that, at least for patients with vision complaints, tonometry should be a routine part of the optometric examination for younger patients.

Optometric Therapy

Therapy provided for patients who have cataract/aphakia relates to the prescribing of pre- and post-surgical care that rehabilitates the patient to the best possible visual acuity while providing clear single binocular vision (fusion).

Discussions with expert consultants to the study indicated that such therapy may include referral and consultation relating to secondary disease processes that are encountered by the optometrist subsequent to the surgery (see Part II, Section A, Complications of Cataract Surgery).

It was further concluded that the prescribing of lens therapy by spectacles or contact lenses, vision training and rehabilitative services, including the teaching of patients to use new prescription devices properly, are part of the therapy prescribed. It was felt by the consultants also that the post-surgical monitoring by the optometrist of referred patients, especially in remote areas where ophthalmologists are not available, constitutes an appropriate form of therapeutic care. The optometrist may examine the post-surgical patient on several visits to determine the rate of his/her progress toward complete recovery.

Contact lens therapy is especially appropriate in the following conditions: monocular aphakia, corneal disease, corneal injuries, scarred corneas, irregular astigmatism, aniseikonia and keratoconus. Both hard and soft lenses serve specific therapeutic purposes when prescribed for rehabilitative care.

The complications of general systemic disease play an important role in the method of treatment the optometrist may prescribe. For example, arthritis may inhibit the patient from safely and efficiently handling contact lenses, thus, requiring that alternative methods of correction be considered and selected. The total life style as well as occupation of the patient must be considered in the rehabilitation process.

Another example of where the optometrist adapts the therapeutic lens prescription to the patient's individual needs occurs during the progressive visual changes that frequently occur in diabetes. Rapid development and changes in less than three months, associated with the diabetic type of cataract, may require frequent prescription changes to maintain adequate corrected visual acuity and permit the patient to perform daily functions. The complications of diabetic retinopathy may further compound the need for frequent examinations and prescription changes. The patient may also require frequent consultation between optometrists and ophthalmologists where medical and surgical treatment is indicated. Prescription changes of a major nature may be necessary during the dynamic phase of the cataract/retinal complications associated with diabetes.

Other diseases, requiring similar prostheses, as well as frequent examinations and lens changes, are associated with hypertensive retinopathy, senile macular degeneration and arteriosclerosis, all of which may require the prescribing of specific lens modifications

because of the effects that the disease process has on the performance of the eye and vision. These and similar disease processes are best managed, according to the study consultants, by optometrists working together in a complimentary relationship with general physicians and ophthalmologists to enhance the patient's life style.

Trends in Optometric Practice

The regulation of the practice of optometry has undergone a number of changes since 1973. The most frequent change has been the increase in continuing education requirements. Thirteen States introduced continuing education as a prerequisite to license renewal. In addition, Nevada, in 1975 (Ch. 659), strengthened its requirement by giving its Board the power to suspend the licenses of optometrists who fail to fulfill the continuing education requirement. The suspension automatically becomes a revocation if the requirement is not fulfilled within one year of the suspension.

The second major change has been in the relationship of optometrists to programs for delivering health services. Optometrists are increasingly being included in various health care programs. A 1975 Kansas statute (H. 2554) allows nonprofit corporations to be created specifically to provide group optometric care programs. California (Ch. 1141 (Laws 1974)) has included optometrists in prepaid health plans. Rhode Island, in 1975 (Ch. 288), included services by optometrists in the State's catastrophic health insurance programs. Maryland (Ch. 482 (Laws 1974)) has included services of optometrists in group health insurance policies. And finally, Colorado, in 1973 (H.B. 1106), added optometry to services which certain corporations may make available to health benefit subscribers.

Some statutes have revised the definition or scope of practice of optometrists. Wisconsin (Ch. 275 (Laws 1974)) construed the meaning of "physicians" to include optometrists in all accident and sickness policies. New York (Ch. 74 (Law 1974)) included optometrists with other medical professionals who received legal immunity for service on utilization review committees. California states that in determining whether an individual is blind, the patient may be examined either by a physician skilled in diseases of the eye or by an optometrist.

Especially in organized health care settings more attention is being paid to quality assessment in health care, including vision care. The difficulties of making judgments about quality of care, and especially of practitioner proficiency and performance, have been mentioned. Nevertheless optometry for the most part deals with readily visualized or measurable conditions, and is more amenable

to the comparison of practice to standards than are many health professions. Some progress is being made in this, and organized optometry is generally cooperative in these efforts.

Peer review is an approach which may be used to measure and assure the quality of medical and optometric practice. Optometrists have a role in the review responsibilities of the Professional Standards Review Organizations (PSROs). Although the current emphasis on review of inpatient care or services leaves little opportunity for review of optometric services under the aegis of PSRO at this time, the concepts are applicable to the ambulatory care setting. Furthermore, guidelines and possible protocols now exist.

Standards of vision care as they relate to peer review and guidelines for peer review have been developed by many organizations. The American Optometric Association Peer Review Committee Standards were adopted in 1972 and supplementary guidelines for peer review were produced by AOA's Community Health Division's Committee on Clinical Standards in 1973. The National Center for Health Services Research and Development has developed a protocol for the cataract patient which is applicable both to hospital admissions and to outpatients.[35]

The New York State Optometric Association has developed standards for the New York State Regional Health Department Audit and Review which involve site visits to practitioner's offices, clinic visits, records review, and examination of utilization rates. The acceptability of the examination findings is assessed.[36]

In May of 1975, the American Medical Association drafted "Model Screening Criteria to Assist Professional Standards Review Organizations." Standards for hospital admission of patients with cataract, corneal disease, glaucoma, retinal detachment and strabimus were developed by the American Academy of Optomology and Otolaryngology and the American Association of Ophthalmology. Although optometrists do not admit patients to hospitals, the concepts involved in these standards are applicable to review of optometric practice and in general have been endorsed by the American Optometric Association.[37] Also, in 1975 the National Academy of Sciences published the "First Interprofessional Standard for Visual Field Testing," in which both ophthalmologists and optometrists participated.[38]

The California Optometric Care Foundation, a statewide non-profit corporation, has developed an optometric care review program outlined (in an unpublished document of the Foundation) in September 1975. Their review of optometric services is concentrated in two areas, diagnosis and treatment, and materials prescribed. This review would monitor optometric practice principally through statistical profiles of the types of services received by patients in various age groups, of ICDA codes, and similar data.

Thus, it is apparent that within particular defined limits of practice, standards and review mechanisms can be developed for vision care as a means of quality control. It is encouraging to note that much of the development of these mechanisms is being initiated within or with the cooperation of the optometric professions itself.[39]

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2. Health Resources Statistics, 1974. National Center for Health Statistics, U.S. Department of Health Education, and Welfare. Rockville, Maryland, 1974.

3. The Health Careers Guidebook published jointly by the Department of Health, Education, and Welfare and the Department of Labor describes optometry as follows:

> An optometrist, Doctor of Optometry (O.D.), is educated and trained to examine eyes to detect vision problems. He may prescribe eyeglasses or contact lenses as needed, or he may recommend other optical treatment to preserve or to improve eyesight. If evidence of eye disease or injury is observed, he refers the patient to an opthalmologist for diagnosis or treatment. In addition, an optometrist may render service in any or all of the following areas:
>
> Contact Lenses: Recent years have seen greatly increased use of contact lenses. Much of the research and development has been done by optometrists. Some optometrists now devote their entire attention to prescribing and fitting contact lens. To others it has become an ever increasing part of their general practice.
>
> Children's Vision: Optometry is playing a leading role in discovering and solving children's vision problems, especially in the development and use of vision training and in orthoptics. Many optometrists specialize in children's vision; others serve as consultants to schools and school systems.
>
> Aids for the Partially Sighted: Many of the effective aids for the partially sighted have been developed by optometrists. Through their research, telescopic and microscopic lens systems have been improved to benefit many in the older age group; these aids have also helped thousands of children with seriously impaired vision.
>
> Vision Training: Vision training has long been recognized as an effective method of correcting some types of crossed eyes. It is also useful as a way to sharpen visual perception and to improve vision for reading. Some optometrists devote a large part of their time to this specialty; others include it as one of several services.

4. Roberts, Bertram L., "Communication Between Optometrists." J. American Optometric Association. v. 42, No. 1, January 1971.

5. An example of change in the scope and depth of optometry occurred in the 1940's when it became apparent that in the control of blindness due to glaucoma, early detection and treatment was essential. Optometric education was modified to emphasis this and to stress the importance of a case history, physical findings, and the measurement of intraocular tension. Optometrists have been quick to use the latest technical advances in tonometry.

6. Tempchin v. Sampson, 277 A. 2nd 67.

   The court, in its opinion, equated the duty of an optometrist to that of a physician and stated the general rule to be: "The liability of an optometrist to a patient is to be tested by standards analogous to those used to test physicians and surgeons--whether or not he did fail to exercise the amount of care, skill and diligence as [an optometrist] which is exercised generally in the community...in which he was practicing by [other practitioners] in the same field".

7. Helling v. Carey, 519 P.2d 981.

8. In New Jersey, the question raised was whether an optometrist may be permitted to utilize a local anesthetic in performing a normal tonometric examination during the course of examining the eyes for the purpose of prescribing lenses. The Attorney General's opinion stated: "It is clear that the New Jersey Supreme Court has indicated that optometrists have the right to recognize pathology. Since glaucoma is a pathological condition an optometrist has the right, during the course of an examination for determining whether or not such pathological impairment exists. However, while the optometrist has the training to diagnose the pathology to medical doctors because the Code of Ethics of New Jersey Optometric Association, Section 1, prohibits optometrists from the care or treatment of injuries, growths or diseases of the eye. Formal Opinion 1961, No. 8, Attorney General David D. Furman."

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10. 53rd Annual Southern Education Congress of Optometry, Atlanta, Georgia, 1976.

11. Ellerbrock Memorial Continuing Education Courses, American Academy of Optometry, Columbus, Ohio, 1975.

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13. Continuing Education Courses Directed Toward Care of the Ahakic Patient. Compiled by Division of Education and Manpower, American Optometric Association, 1976.

14. The United States Army's MOS Code 3340, "Optometry Officer", lists the duties of the optometrist:

> "Conducts examinations of eyes and, when appropriate, prescribes corrective treatment without the use of medicine or surgery. Determines by means of ophthalmic instruments and optometric procedures, vision abnormalities which may be corrected or improved by contact or ophthalmic lenses, prisms or other ophthalmic devices; prescribes corrective lenses; refers patients for medical treatment or surgery when ocular manifestation of disease is detected; develops and monitors eye and vision protection programs; supervises optician technicians in fabricating and dispensing spectacles, manages optical service unit or lens laboratory; instructs and supervises subordinate personnel in optical and optometric procedures; engages in vision research; provides optometric consultant services; records optometric data on approved forms and records."

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33. The National Center for Health Statistics. Optometric Manpower: Characteristics of Optometric Practice. United States, 1968. (op. cit.)

Table 3, p. 23 of this report shows that of 18,238 optometrists providing refraction, 16,928 provided ophthalmoscopy, 13,780 examination of visual fields, 12,098 tonometry, and 5,907 biomicroscopy. The proportions for solo practitioners only proved much the same. Non-performance of diagnostic procedures proved to be highly correlated with age, year of graduation, State of practice, and school.

The reliability of this data is open to question since the procedures were listed and the respondent was asked to check if they were done but to make no mark if they were not done. Therefore, incomplete response is treated as non-performance of the procedure. Furthermore,

refraction headed the list and to many optometrists (especially those relatively long out of school) the term "refraction" covers all normal diagnostic procedures. (A principal textbook of optometric practice is titled simply "Refraction"). The use of the term refraction in this larger sense is thought to be associated with the school and year of graduation and to some extent with the State of practice. After much discussion, therefore, it was concluded that these data cannot be taken at face value.

In addition, the data were collected in 1968. In the intervening eight years two things have happened: many of the older or part-time optometrists who reported minimal diagnostic procedures have retired, and the active optometric work force has upgraded practice (although to an unknown extent) as standards have risen in the profession, practitioners have been pressured to meet the new standards, and continuing education has been emphasized. It therefore becomes even more difficult to draw conclusions respecting optometrists active in 1976 from this data.

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ATTACHMENT A

SPECIFIC PROVISIONS FOR THE PRACTICE OF OPTOMETRY
AS FOUND IN STATE LAWS AND BOARD REGULATIONS

Based upon provisions of State optometric practice acts and board regulations outlining the equipment which an optometrist must have, a chart of functions/procedures has been compiled. In most cases, only the functions expressly authorized in the laws or regulations appear on the chart for a given State. However, where specific functions were not detailed, an analysis of the provision could often uncover implied functions. For example, the Delaware licensing law authorizes optometrists to "employ any objective or subjective means or methods for the purpose of determining the refractive powers of the human eyes and/or any visual, muscular or anatomical anomalies of the human eyes and their appendages; or any ocular deficiency". On the basis of this definition, the chart for Delaware was composed to reflect the following procedures: external and internal examination, visual fields, visual acuity, refraction, and sensory motor testing. The definition may in fact be broad enough to encompass all of the functions on the chart. If a provision empowers an optometrist to measure visual powers or visual range, the chart will reflect visual acuity and visual fields. If the provision defines "optometry" as the "measurement" or "diagnosis" of the human eye, it may be inferred that the authority to examine the eye is granted.

When both the express and implied functions are tabularized, the following patterns appear. In each State, optometrists may or must perform external and internal examinations of the eye. Visual acuity testing is either part of the required minimum examination of each patient or a function expressly or impliedly permitted in the laws and regulations of 34 States. Visual fields meaurement is required or permitted in 33 jurisdictions. Twenty-seven States direct optometrists to keep patient histories for varying periods of time.

Twenty-four States mention refraction or measurement of refractive powers among the permitted or required functions of an optometrist. The measurement of muscular anomolies or muscle balance falls within the practice of optometrists in 22 jurisdictions.

Eighteen States define the functions of an optometrist to include measurement of the amplitude of convergence and accommodation. In eighteen jurisdictions, one of two situations occurred:

either the retinoscope was required equipment or the optometrist was expressly authorized to perform a retinoscopy.

Phoria and duction appeared 13 times among lists of conditions for which each patient must be tested. In 13 States, either the keratometer is required equipment or the measurement of corneal or curves is expressly within the scope of practice of an optometrist. Color testing and steropsis appeared 8 times each on the minimum requirements lists for patient examination.

"Subjective findings far and near" appears on six lists of conditions which must be tested as part of a minimum patient exam, while "trial case" appears on five lists. Only three States include consultation with the patient, advice, or follow through on lists of required procedures.

To date only 10 States expressly require, by statute or regulation, that an optometrist refer patients in need of other professional care to the appropriate professions. On this chart, the following abbreviations were used to indicate the location of the referral provision:

D - Definition section
Disc. - Disciplinary provision (Suspension and revocation)
M.E. - Minimum Examination of Patients provision
Pol - Statement of policy
Rec - Records provision

SPECIFIC PROVISIONS FOR THE PRACTICE OF OPTOMETRY, 1975

	PATIENT HISTORY	EXTERNAL EXAM OF THE EYE[1]	INTERNAL OPTH. EXAM	SENSORY MOTOR/MUSCLE BALANCE	VISUAL FIELDS	REFRACTION	VISUAL ACUITY	TONOMETRY	COLOR TESTING	SUBJECTIVE FINDINGS		NEUROLOGICAL ASSESSMENT	PHORIA AND DUCTION	TRIAL CASE	CONSULTATION, ADVICE FOLLOW-THROUGH	CORNEAL CURVATURE MEASUREMENTS	RETINOSCOPY	FUSION	STEREOPSIS	AMPLITUDE OF CONVERGENCE & ACCOMODATION	REFERRALS	a. SECTION	b. CITES	
Alabama	X	X																						
Alaska	X	X[4]	X	X[4]																				
Arizona	X	X	X		X[1]		X		X			X	X			X	X	X	X	X				
Arkansas		X[4]	X		X[4]		X[4]																	
California	X	X[4]	X		X[4]	X	X[4]						X	X		X	X			X				
Colorado		X	X	X[4]	X[4]	X	X[4]					X									X	Disc/§12-40-125		
Connecticut	X	X	X		X[4]	X	X[4]						X			X	X	X						
Delaware		X	X	X[4]	X[4]	X	X[4]	X																
Florida	X	X[4]	X	X[4]	X[4]	X	X	X				X				X	X							
Georgia	X	X	X																					
Hawaii		X[4]	X	X[4]	X[4]	X	X[4]																	
Idaho	X	X	X		X[4]	X	X								X					X	X	Disc/Reg. XIV-p.18		
Illinois	X	X	X	X[4]	X[4]		X		X	X			X			X	X	X	X	X				
Indiana	X	X	X		X[4]		X[4]																	
Iowa		X[4]	X		X[4]		X[4]																	
Kansas	X	X	X	X		X	X														X	D Reg. 65-6-6		
Kentucky		X	X		X		X																	
Louisiana		X	X		X	X	X													X				
Maine	X	X	X	X		X	X														X	M.P./32 §2567		
Maryland		X[4]	X																					
Massachusetts	X[2]	X	X				X						X			X	X	X	X	X				
Michigan	X	X	X	X	X	X	X							X	X	X	X				X	D Reg 338.291		
Minnesota	X	X	X	X[4]	X[4]	X	X														X	Reg/Reg. Opt.3		
Mississippi	X	X	X		X		X	X	X	X			X		X	X	X	X	X		X	M.P./Rules 1F & 21		
Missouri		X	X			X																		
Montana	X	X	X														X			X				
Nebraska		X	X																					
Nevada		X	X	X[4]	X[4]							X												
New Hampshire		X[4]	X	X[4]																				
New Jersey	X	X	X	X[4]	X[1]		X	X[3]	X	X			X			X	X	X	X	X				
New Mexico		X[4]	X	X[4]		X																		
New York		X[4]	X	X[4]																				
North Carolina	X	X[4]	X		X[4]		X[4]																	

SPECIFIC PROVISIONS FOR THE PRACTICE OF OPTOMETRY, 1975 (CONTINUED)

	PATIENT HISTORY	EXTERNAL EXAM OF THE EYE[1]	INTERNAL OPTH. EXAM	SENSORY MOTOR/MUSCLE BALANCE	VISUAL FIELDS	REFRACTION	VISUAL ACUITY	TONOMETRY	COLOR TESTING	SUBJECTIVE FINDINGS	NEUROLOGICAL ASSESSMENT	PHORIA AND DUCTION	TRIAL CASE	CONSULTATION, ADVICE, FOLLOW-THROUGH	CORNEAL CURVATURE MEASUREMENTS	RETINOSCOPY	FUSION	STEREOPSIS	AMPLITUDE OF CONVERGENCE & ACCOMODATION	REFERRALS	a. SECTION	b. CITES
North Dakota	X	X	X	X	X	X	X	X			X	X			X	X	X		X			
Ohio																						
Oklahoma																						
Oregon	X																					
Pennsylvania	X																					
Rhode Island	X																					
South Carolina																						
South Dakota	X																					
Tennessee	X																					
Texas	X																					
Utah	X																					
Vermont																						
Virginia																						
Washington																						
West Virginia																						
Wisconsin	X																					
Wyoming																						
District of Columbia	X	X																				

[1]Visual fields (confrontation) and visual fields central (after age 40).
[2]Including presbyonic findings if prescribed for.
[3]Performed on patients after age 40 unless contra-indicated.
[4]By implication/analysis.

ATTACHMENT B

LAWS AND REGULATIONS RESPECTING THE
USE OF DRUGS BY OPTOMETRISTS, 1976

Delaware optometrists may employ "topical ophthalmic drugs for diagnostic purposes only." The drugs for such diagnosis will be limited to: topical anesthetics, mydriatics, cycloplegics, and myotics. Each new applicant for licensure in Delaware will be examined on the subject of pharmacology as it relates to optometry. Practicing optometrists must complete a refresher course in pharmacology as it relates to optometry before employing these drugs. This course must be given by an institution recognized by the National Commission on Accreditation or the Delaware State Board of Examiners in Optometry.

Louisiana permits optometrists to use "topical ocular diagnostic pharmaceutical agents." In the initial examination for licensure, applicants will be tested on "general pharmacology and ocular pharmacology as it applies to optometry with emphasis on the topical use of diagnostic pharmaceutical agents to the eye."

Louisiana defines diagnostic pharmaceutical agent as "any chemical in solution, suspension emulsion, or ointment base other than a narcotic which when applied topically to the eye, results in physiological changes which permit more efficient or otherwise facilitates examination of the external eye or its adnexa or the evaluation of vision or which is necessary to determine normal physiological function as part of an examination regimen."

Prior to the employment of topical ocular diagnostic pharmaceutical agents by a licensed optometrist, that licensed optometrist must submit to the Louisiana State Board of Optometry Examiners satisfactory evidence that the optometrist has successfully completed courses, approved by the board, in pharmacology as they apply to optometry, with particular emphasis on topical application of diagnostic pharmaceutical agents to the eye.

Optometrists in Maine may use diagnostic drugs solely for "the purpose of detecting any pathological condition or functional abnormality to the eye." Prior to employing these drugs, practicing optometrists must obtain a diagnostic drug license by completing "a course in general and ocular pharmacology as it applied to optometry approved by the board." Furthermore, "each use of a diagnostic drug shall be noted in writing and shall be made part of the record of each examination and placed on file." Licensure

examinations for all new applicants will include the "subject of general and ocular pharmacology as it relates to optometry and the use of topically applied diagnostic drugs."

Every individual desiring to commence the practice of optometry in Oregon after January 1, 1976, or to use diagnostic drugs in his practice shall have satisfactorily completed "a course in pharmacology as it applies to optometry, by an institution accredited by a regional or professional accreditation organization which is recognized or approved by the National Commission on Accrediting or the United States Commissioner of Education with a particular emphasis on the topical application of diagnostic agents to the eye for the purpose of examination of the human eye and the analysis of ocular functions." The Oregon Board of Examiners must designate those diagnostic pharmaceutical agents which may be used in practice of optometry. Categories for selecting such drugs shall be cycloplegics, mydriatics, topical anesthetics, dyes such as fluorescein and, for emergency use only, miotics.

In Pennsylvania, the Secretary of Health shall determine the specific agents optometrists may use. The determination shall be made from the following categories: cycloplegics, mydriatics, topical anesthetics and miotics which are applied topically. Licensed optometrists may employ these agents only after completing "a course in pharmacology as it applies to optometry, by an institution accredited by a regional or professional accreditation organization which is recognized or approved by the National Commission on Accrediting or the United States Commissioner of Education with particular emphasis on the topical application of diagnostic pharmaceutical agents to the eye for the purpose of examination of the human eye and the analysis of ocular functions." The examination for licensure will include the subject of pharmacology as it applies to optometry.

In Rhode Island, only those presently licensed optometrists who have "(i) satisfactorily completed a course in pharmacology, as it applies to optometry, at an institution accredited by a regional or professional accreditation organization which is recognized by the National Commission on Accreditation, with particular emphasis on drugs to the eye for the purpose of detecting any diseased or pathological condition of the eye, approved by the Board of Examiners in optometry and the chief of pharmacy in the Department of Health, and (ii) have successfully completed an examination given by the Board of Examiners in conjunction with the Chief of Pharmacy of the Department of Health, shall be permitted to apply drugs topically to the eye. Said Chief of Pharmacy shall consult and advise the Board of Examiners in optometry with respect to that portion of the examination dealing

with pharmacology." The standard examination for licensure in optometry shall also include pharmacology as it applies to optometry with particular emphasis on the topical application of diagnostic drugs.

In order to employ diagnostic drugs in their practice of optometry, optometrists in Tennessee must demonstrate "professional competence and transcript credit of at least six (6) quarter hours in a course or courses in general and ocular pharmacology with particular emphasis on diagnostic pharmaceutical agents applied topically to the eye, from a college or university accredited by a regional or professional accreditation organization which is recognized or approved by the National Commission on Accrediting or the United States Commissioner of Education." It specifies, further that "the optometrists so qualified are authorized to utilize in connection therewith diagnostic pharmaceutical agents (miotics, mydriatics, cycloplegics and anesthetics), applied topically only."

West Virginia now defines optometry as "the examination of the human eye, with or without the use of drugs prescribable for the human eye, which drugs may be used for diagnostic or therapeutic purposes for topical application to the anterior segment of the human eye only and, by any method other than surgery, to diagnose, treat or refer for consultation or treatment any abnormal condition of the human eye or its appendages."

Only two of these, Maine and Rhode Island, expressly state that the diagnostic drug shall be used only for detecting any diseased or functional abnormality of the eye. All laws prohibit the use of ocular drugs or pharmaceutical agents in "treatment" of disease.

The optometric practice acts of three States amended the definition of optometry to extend the scope of vision care without the use of drugs. Alabama enlarged the practice of optometry to "(a) ascertaining the status of the human visual system, including the refractive and functional abilities thereof; or (b) ascertaining the presence of ocular disease or ocular manifestations of systemic disease and any other departure from the normal which may require referral to other health care practitioners."

Idaho permits optometrists to "employ in the examination, diagnosis, or treatment of another, any means for the measurement, improvement, or development of any or all functions of human vision or the assistance of the powers of range of human vision or the determination of the accommodative or refractive status of human vision or the scope of its functions in general."

New Mexico enacted legislation in 1973 to define practice of optometry to prohibit the use of drugs.

The State of Washington, in its definition of the practice of optometry, permits the use of any "diagnostic instruments or devices for the examination or analysis of the human vision system." It is doubtful that these four provisions extend to diagnostic pharmaceutical agents.

Other legislative authorities have addressed these changes in definition. The Rhode Island State Supreme Court Decision upheld the constitutionality of the Rhode Island amendment which was passed in 1971. This decision of Marcy 27, 1974, remitted the case to the Superior Court, where no further action was taken, thus ending the matter. Optometrists in the State of Rhode Island have utilized pharmaceutical agents for diagnostic purposes since 1974.

A recent Louisiana Attorney General's opinion held that the new law "does not illegally encroach upon the practice of medicine." Also opinions of State Attorneys General in Florida, Indiana, Nevada, and New Jersey state that there is no statutory prohibition in those States which preclude the utilization of pharmaceutical agents for diagnostic purposes by optometrists.

SUBJECT MATTER MASTERY REQUIRED FOR INITIAL STATE LICENSURE OF OPTOMETRISTS[4]

	Geometric Optics	Ocular Anatomy	Ocular Pathology	Ocular Physiology	Theoretical Optics	Practical Optics	Physiological Optics	Theoretical Optometry	Practical Optometry	Hygiene	Psychology	Optical Laboratory & Clinical Work	Visual Training/ Orthoptics	Contact Lenses	General Anatomy	Psysiology	Pathology	Mathematics (as related to O)	Physics	Optics	Ocular Examination	Refraction	Case Analysis	Prescribing & Fitting	Duplication	Clinical Optometry	Pharmacology	Physical Optics	Mechanical Optics	Psychological Optics	Tonometry	Ocular Myology	Ocular Neurology
Alabama		X	X	X	X	X	X	X	X																								
Alaska[5]																																	
Arizona	X	X	X		X	X		X	X	X	X	X	X	X	X	X		X	X	X													
Arkansas[5]																																	
California[3]	X	X	X	X		X	X	X	X				X		X	X				X													
Colorado		X	X	X	X	X	X	X	X				X	X						X		X											
Connecticut		X		X	X	X	X	X	X																								
Delaware		X	X	X		X	X	X	X	X			X		X	X	X										X						
Florida[5]																																	
Georgia	X	X	X					X	X		X		X		X	X		X		X		X		X			X		X				
Hawaii	X	X	X	X		X	X	X						X			X				X				X	X							
Idaho[2]														X									X	X									
Illinois		X	X			X	X	X	X				X			X										X				X			
Indiana[5]																																	
Iowa[2] [5]																																	
Kansas[5]																																	
Kentucky[5]																																	
Louisiana[1]		X	X	X			X				X		X	X	X	X	X		X	X		X				X	X		X			X	X
Maine[2]		X		X	X	X	X	X	X								X										X						
Maryland		X	X	X	X	X	X	X					X	X	X	X	X				X									X	X		
Massachusetts		X	X	X	X	X	X	X	X																								
Michigan[5]																																	
Minnesota[3]		X	X		X	X		X	X	X	X	X			X	X		X	X	X													
Mississippi					X		X	X	X																								
Missouri[5]																																	
Montana[2] [5]																																	
Nebraska			X		X	X		X							X	X																	
Nevada[2]	X	X	X	X			X	X	X						X	X						X											
New Hampshire[5]																																	
New Jersey[5]																																	
New Mexico[5]																																	
New York	X						X								X	X	X			X				X				X					
North Carolina[2]	X	X					X	X	X				X	X	X	X	X					X		X			X	X		X	X		

SUBJECT MATTER MASTERY REQUIRED FOR INITIAL STATE LICENSURE OF OPTOMETRISTS[4] (CONTINUED)

	Geometrics Optics	Ocular Anatomy	Ocular Pathology	Ocular Physiology	Theoretical Optics	Practical Optics	Physiological Optics	Theoretical Optometry	Practical Optometry	Hygiene	Psychology	Optical Laboratory & Clinical Work	Visual Training/ Orthoptics	Contact Lenses	General Anatomy	Physiology	Pathology	Mathematics (as related to O)	Physics	Optics	Ocular Examination	Refraction	Case Analysis	Prescribing & Fitting	Duplication	Clinical Optometry	Pharmacology	Physical Optics	Mechanical Optics	Psychological Optics	Tonometry	Ocular Myology	Ocular Neurology
North Dakota 5																																	
Ohio[1]		X		X	X	X	X	X	X								X																
Oklahoma		X	X				X				X		X		X	X			X	X		X				X					X	X
Oregon[1,2]		X																				X				X							
Pennsylvania[2]		X	X	X	X	X	X	X	X																		X						
Rhode Island		X	X	X	X	X	X	X	X																		X						
South Carolina	X	X			X	X	X	X	X	X				X			X										X						
South Dakota[1]	X	X		X	X		X				X		X	X		X	X						X	X					X				
Tennessee[1]		X	X	X	X	X	X	X	X	X						X	X							X									
Texas[1]		X	X	X	X	X	X																										
Utah[1]		X						X	X							X	X										X						
Vermont[1,2] 5																																	
Virginia[1,2]		X	X	X																													
Washington		X	X				X				X		X		X	X	X		X	X		X				X	X				X	X	
West Virginia[1]							X	X	X					X	X	X	X					X											
Wisconsin[1]		X	X	X																													
Wyoming			X		X	X		X	X	X	X	X			X	X		X	X	X													
District of Columbia		X	X	X	X	X	X	X	X				X	X																			

[1]Plus those courses the Board may require.
[2]Accepts National Board Exam.
[3]Actual course requirements.
[4]Except as specified, indicates subject/matter required to be covered in an examination
[5]Not specified

REQUIREMENTS FOR INITIAL STATE LICENSURE OF OPTOMETRISTS

State	Personal Qualifications: Age	Citizenship	Good Character	Other	Education: Preliminary	Professional	Experience	Examination: Written	Oral	Practical	Proficiency	Number of time Candidate may be reexamined
Alabama	21	X	X		H.S.	X	3 mos.	X		X		
Alaska	21		X		H.S.	X		X	X	X		
Arizona			X		H.S.	(1)		X			75%	
Arkansas	21		X			X		X[7]	X[7]			
California	18		X		H.S./60 hrs. College	2800 hrs.		X[5]		X	75%	3[2]
Colorado	21	X	X			X		X	X	X	75%	
Connecticut	18		X		H.S.	4 yrs.		X[5]		X		
Delaware			X		H.S./2 yrs. College	4 yrs.[3]	6 mos.	X[5]	X	X	75%	
Florida	18	X[4]	X			4 yrs.		X[11]				
Georgia	21		X		H.S./2 yrs. College	3 yrs.		X			75%	
Hawaii	18	X			H.S.	X		X		X	75%	
Idaho	21		X			X		X[5]	X	X		
Illinois	21	X	X		H.S./1 yr.	3 or 4 yrs.		X[5]	X	X	75-60%[8]	3[2]
Indiana	18		X		2 yrs. Coll.	4 yrs.		X				
Iowa					H.S.	4 yrs.		X[5]	X	X	75-65%[8]	2
Kansas		X	X		H.S.	4 yrs.		X	X			
Kentucky	18	X	X		H.S.	5 yrs.		X[5]	X[12]		75-60%[8]	X[2]
Louisiana		X	X		H.S.	X		X				
Maine	18		X			X		X		X		
Maryland	18		X		H.S./2 yrs. College	4 yrs.		X	X	X		
Massachusetts	18		X		H.S.	3 yrs.		X		X	70%	X[2]
Michigan	18		X		H.S./2 yrs. College	4 yrs.		X			75%	
Minnesota			X		2 yrs. Coll.	X		X[5]		X		2[6]
Mississippi	21		X		H.S.	X		X[9]		X		
Missouri	21		X		H.S./X[13]	X[13]		X	X	X		
Montana	18	X	X		H.S.	4 yrs.		X[5]	X	X	75%	
Nebraska	21	X	X		H.S./2 yrs. College	3 yrs.		X			75-60%[8]	
Nevada	21	X	X		H.S./2yrs. College	4 yrs.		X		X	75%	X[8]

ATTACHMENT D

REQUIREMENTS FOR INITIAL LICENSURE OF OPTOMETRISTS (CONTINUED)

	Personal Qualifications				Education			Examination				
State	Age	Citizenship	Good Character	Other	Preliminary	Professional	Experience	Written	Oral	Practical	Proficiency	Number of times Candidate may be reexamined
New Hampshire	18		X		2 yrs. Coll.	4 yrs.		X[3,5]	X	X		
New Jersey	21	X	X	Residency	H.S./2 yrs. College	4 yrs.		X[5]		X		
New Mexico	18	X[4]	X		H.S./College	X		X	X[7]	X	75%	
New York	21		X			X		X		X	75-60%[8]	
North Carolina	21		X			4 yrs.	X[10]	X[5]	X	X	75-60%[8]	
North Dakota	18		X		H.S.	X		X		X[7]		
Ohio	21	X	X		2 yrs. Coll.	3 yrs.		X			75%	4
Oklahoma	21		X		H.S.	X		X			75%	1[2]
Oregon	18		X			4 yrs.	1 yr.(I)	X[5]				
Pennsylvania	21					X		X		X	75%	
Rhode Island	21	X	X		H.S./2 yrs.	4 yrs.	6 mos.	X	X			
South Carolina	21		X		2 yrs. Coll	4 yrs.		X	X	X		
South Dakota	18	X			H.S.	X		X[5]	X		70%	
Tennessee	18	X	X		H.S.	4 yrs.		X[12]	X[12]		75%	
Texas	21	X	X		H.S./2 yrs.	4 yrs.		X[7]	X[7]	X[7]	75-70%	
Utah	21		X		H.S.	2000 hrs.		X		X	75-60%[8]	
Vermont	18		X		H.S./2 yrs. College	4 yrs.		X[5]	X	X		
Virginia	18		X		H.S.	X		X[5]				
Washington		X	X		H.S.	X		X[5]				
West Virginia	18		X		H.S.	2000 hrs.		X				
Wisconsin	18		X		H.S./2 yrs. College	3 yrs.		X[5]		X	75-70%[8]	X[6]
Wyoming	19		X			4 yrs.		X			75%	
District of Columbia	21		X		2 yrs. H.S.	5 yrs.		X				

1. 2 alternate methods (a) 5 year course in optometry (b) 3 year optometry course with 60 hours of college work
2. Reexamined in failed area
3. 6 month internship required after written examination and before any practical examination or receiving certificate to practice
4. Or declared intent to become a citizen
5. National Board accepted for written examination
6. Further education may be required after failure
7. At boards discretion
8. Minimum in any one subject
9. Applicant must pass a second exam after 1 year's practice
10. 2 week practice orientation
11. Exam required, form not specified
12. Either written or oral, not both
13. Must graduate from an approved school of optometry. The school must require for graduation a minimum of 5 terms of pre-optometric training in not less than 5 years.

RENEWAL OF LICENSES AND CONTINUED EDUCATION FOR OPTOMETRISTS

State	Renewal Period (yrs.)	Continuing Education		
		Required	Type	Duration
Alabama	1	X		25 hours/yr.
Alaska	2	X	(3)	24 hours/2 yrs.
Arizona	1			
Arkansas	1	X	(3)	2days/yr.
California	1	X[1]	(2)	
Colorado	1	X		24 hours/yr.
Connecticut	1	X		8 hours/yr.
Delaware	1	X	(3)	12 hours/2 yrs.
Florida	1	X	(3)	24 hours/yr.
Georgia	1	X	(3)	10 hours/yr.
Hawaii	1	X	(3)	8 hours/yr.
Idaho	1	X	(3)	12 hours/yr.
Illinois	1	X[6]	(5)	(5)
Indiana	1	X	(3)	12 hours/yr.
Iowa	1	X	(3)	12 hours/yr.
Kansas	1	X	(3)	2 days/yr.
Kentucky	1	X	(3)	8 hours/yr.
Louisiana	1	X	(3)	12 hours/yr.
Maine	1	X	(3)	20 hours/yr.
Maryland	1	X	(3)	25 hours/yr.
Massachusetts	1	X	(4)	(4)
Michigan	1	X	(3)	12 hours/yr.
Minnesota	1	X[4]	(4)	12 hours/yr.
Mississippi	1	X	(4)	20 hours/yr.
Missouri	1	X	(3)	8 hours/yr.
Montana	1	X	(3)	12 hours/yr.
Nebraska	1	X	(3)	16 hours/yr.
Nevada	1	X		24 hours/yr.
New Hampshire	1	X	(3)	25 hours/yr.
New Jersey	1	X	(3)	50 hours/2 yrs.
New Mexico	1	X	(3)	2 days/yr.
New York	2			
North Carolina	1	X	(3)	10 hours/yr.

ATTACHMENT E

RENEWAL OF LICENSES AND CONTINUED EDUCATION FOR OPTOMETRISTS

State	Renewal Period (yrs.)	Continuing Education		
		Required	Type	Duration
North Dakota	1	X	(3)	18 hours/3 yrs.
Ohio	1	X	(3)	12 hours/yr.
Oklahoma	1	X	(3)	2 days/yr.
Oregon	1	X	(3)	12 hours/2 yrs.
Pennsylvania	2			
Rhode Island	1			
South Carolina	1	X	(3)	6 hours/yr.
South Dakota	1	X	(3)	8 hours/yr.
Tennessee	1	X	(3)	18 hours/yr.
Texas	1	X	(3)	12 hours/yr.
Utah	1			
Vermont	1			
Virginia	1	X[7]	(3)	Not to exceed 16 hours/yr.
Washington	1			
West Virginia	1	X	(3)	8 hours/yr.
Wisconsin	1	X	(3)	10 hours/yr.
Wyoming	1	X	(3)	25 hours/yr.
District of Columbia				

1. Board regulations being developed.
2. Requires satisfactory proof that licensee has stayed abreast of present developments by means of Continuing Education.
3. Optometric or other scientific education, lecture, symposium or course approved by board and postgraduate study at school of optometry or course given by Optometric Association.
4. Set by board
5. Determined by examining committee
6. Effective May 1977.
7. Effective August 1976.

SECTION II-C

OPTOMETRIC EDUCATION

Compiled by
David B. Hoover, M.P.H.*

The responsibilities and function of health professionals are to a large extent defined by the basic occupational preparation for the profession. The organization of health care is such that personnel tend to be utilized to the limit of their capacities, especially in institutional settings and subject to limits and sometimes vague constraints in law. Typically, legal or other formal recognition of a responsibility or function of a particular health occupation follows its adoption by some practitioners and its incorporation into educational objectives and philosophy.

An examination of how optometrists are educated therefore contributes at least as much to understanding their functions and capabilities as does analysis of the legal basis for practice or the data that are available about practice itself.

There are thirteen schools of optometry in the United States. The oldest was established in 1870, the youngest in 1975. Seven are schools or colleges within public universities (or in one case within a State college). Five are private and independent institutions, and one is a school within a private university. All meet the accreditation standards of the council on education and professional guidance of the American Optometric Association.

Admission to a school of optometry requires at least two years of college study.[1/] The optometry professional curriculum itself is four years long, leading to the degree of Doctor of Optometry (O.D.). Seven schools also have graduate programs which grant a Master of Science degree, and six have programs leading to a Ph.D. in physiological optics. Enrollment in optometry schools ranges from 85 to 566, with an average of about 300; a class size is about one-fourth of this. A list of schools and their enrollments is found as attachment A to this section.

The Development of Optometric Education

Education for the health professions has evolved from informal apprenticeship in on-the-job types of training to the present

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*Associate Director for Program Planning and Evaluation, Division of Associated Health Professions, Bureau of Health Manpower, Health Resources Administration, Department of Health, Education, and Welfare.

elaborate, formal, and controlled systems found in medicine, dentistry, optometry, pharmacy, and other diciplines. Organized optometric education dates from the nineteenth century, beginning with schools in which students served a formal apprenticeship under a successful practitioner. Specialized educational institutions emerged rapidly as, in the latter half of the century, there were many advances in optics and in the application of optical principles to the correction of vision.[2] Ohio State University dates its education in optometry from 1870, and the independent Illinois College of Optometry from 1872.

A university program (now defunct) was established at Columbia University in 1910, and full four-year programs leading to the O.D. degree at Ohio and the University of California at Berkeley. These early university courses were usually conceived of as a division within the general study of Physics. In time, however, the emphasis in optometry shifted toward the physiological aspects of vision and the programs became distinct from physical optics.[3]

As optometry began to be recognized as an appropriate subject for university education, there was a corresponding movement within the profession to standardize the qualifications for optometric schooling and actual course offerings at the various colleges. The 1912 convention of the American Optometric Association adopted a resolution concerning educational standards of qualification for practice. The standardization and upgrading of education has continued to the present day, stimulated by new knowledge of vision disorders, technological advances in diagnosis, treatment, and rehabilitation, obvious unmet needs for optometric services, and more stringent requirements for licensure and educational program accreditation.

Development of the Accreditation Process

The International Association of Boards of Examiners in Optometry, (IAB) was created in 1922. At a "Conference to Establish Optometric Standards" held in St. Louis that same year, it was resolved that the process of accreditation should include adoption of a uniform syllabus by all the schools.[4]

During 1925 and 1926 the accreditation process, which involved on-site inspections by a committee of the IAB, was commenced. Accrediting procedures were continually refined, with the AOA's Council on Education and Professional Guidance eventually taking over the function of the IAB in this area by 1941.*

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*The Council is recognized by the Commissioner, U.S. Office of Education, as the official accrediting agency for schools of optometry.

At a 1936 meeting of representatives from the AOA, IAB, American Academy of Optometry and most of the schools and colleges, it was first proposed that a four year curriculum be implemented by all the educational institutions.5/ The Council on Education and Professional Guidance produced in 1941 a manual of accrediting which is now in its eighth (1975) edition.

The Association of Schools and Colleges of Optometry.

The Association of Schools and Colleges of Optometry was organized in 1941, with the goal of "aid in the advancement of optometry by giving attention to the problems of the education of optometrists, and by formulating and supporting desirable educational standards and policies." Today the Association represents the thirteen schools and colleges of optometry in the United States and two programs in Canada, with nearly 4,000 optometric students. The Association incorporated in 1972 and established a staffed national office in 1974, which publishes a monthly newsletter, the ASCO EDUCATOR, and a quarterly JOURNAL OF OPTOMETRIC EDUCATION (JOE).

ASCO maintains standing Councils in three major educational areas; Academic Affairs, Student Affairs, and Institutional Affairs. The Council on Academic Affairs is currently working on a major policy statement concerning curricular standards for optometry programs. The effort began in 1973 and a preliminary curriculum model was recently presented to the Board of Directors and published in the Journal of Optometric Education. The same Council has developed guidelines for optometric residency programs and post-graduate pharmacology training. Currently, the Council is developing a proposal to study the feasibility of conducting an organized and structured national program of continuing education for practicing optometrists, using the schools and colleges as a base.

The Council on Student Affairs has developed and produced the Optometry College Admissions Test. The test is administered to over 4,000 applicants yearly throughout the U.S. and Canada, and is required as part of the admissions process at each member institution.

National Board Examinations

If there is large variation from State to State in the subject matter in which a candidate is examined for licensure, and especially if some of the subjects are no longer relevant to proficiency in practice, educational programs for that occupation are faced with a dilemma. Training the student to master all of the subjects on which he may be examined becomes difficult or impossible as well as undesirable. The examinations will not represent, collectively, a suitable set of educational objectives. Optometry found itself in this position in the 1940's, with the additional complication that rapid advances in optometric knowledge were quickly making examinations obsolete. A uniform national examination that could be

adopted by States as a licensing examination seemed in order.

Both the IAB and ASCO constituted committee in 1950 to formulate proposals for a National Examining Board of Optometry, and established the National Board of Examiners in Optometry in 1951.[6] Currently the national examination is administered over a two day period in April and involves approximately nineteen hours of testing. It serves as the written examination for licensure in 18 States, currently. Candidates are examined in the areas listed below:[7]

Visual Science
Ocular Pathology
Theory and Practice of Optometry
Theoretical Optics
Ophthalmic Optics
Ocular Anatomy
Social, Legal, Ethical, Economic and Professional Aspects of Optometry
Ocular Pharmacology

During the 1950's, most of the schools adopted first a five and then a six year program of studies, including four years of professional instruction leading to a doctor of optometry degree. "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 half-time 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".[8]

The sixties had witnessed a sharp rise in the number of applicants seeking admission to colleges of optometry. As a step toward securing highly qualified candidates as potential optometrists, ASCO explored the feasibility of instituting a national entrance examination for all prospective optometry students. The first Optometry College Admissions Test (OCAT) was administered in 1971, and by 1972 the test was offered using approximately the same format in existence today.[9]

Educational Philosophy and Objectives

Although each of the individual schools and colleges has developed its own philosophy and objectives for optometric education, certain principles are stated by all of the institutions. Chief among these are: providing a high quality educational program intended to

prepare each graduate to conduct a practice which is competent, service oriented and ethical and; stimulating any research which will further existing knowledge in the visual sciences, usually through the medium of graduate programs.

In 1971 an eighteen month study was undertaken by the National Commission on Accrediting which examined all aspects of optometric education. Under the direction of Robert J. Havighurst, Professor of Education and Human Development at the University of Chicago, a report was prepared and subsequently published in 1973. "Optometric Education, A Summary Report" dealt with current trends and future goals of the professions under such topics as Manpower Needs, The Scope of Optometry, and Financing Optometric Education. The Commission recommended an ongoing review process in optometric education, a recommendation which has received endorsement from the optometric community.

Optometric education has reflected the expanding role of the optometrist as a provider of primary health care. In the last twenty-five years major modifications have taken place in the educational process. They can be measured both in additions to the curricula of the schools and in the continuing revision of the NBEO.

Among the courses that evidence the direction of optometric education are Pennsylvania College of Optometry's Environmental Optometry" and"Illinois Learning Disabilities of Children", which carry the following descriptions:

Environmental Optometry

> The student will be taught the application of standard optometric techniques as well as new and innovative procedures for the detection and correction of visual problems resulting from changes and alterations in man's environment. Special problems of illumination; seeing under condition of movement, especially high speed transport; reactions of the eye to smog and pollutants; problems of vision in the industrial setting; and classroom design to assist vision in the educational institution. This will serve to prepare the future practitioner for the role of consultant on such matters. A concurrent laboratory will give the student exposure to experiences of working in these areas in the college building as well as external training centers (schools, factories, etc.)[11]

Learning Disabilities of Children

> This seminar provides students with the opportunity of indepth discussions of issues in the complex field

of children's learning disabilities. The multidisciplinary approach is considered in an analysis of the contributions of several professional disciplines to the overall optometric evaluation of treatment of the learning-disabled child.[12]

Advanced Degrees

Ohio State was the first of the optometry schools to offer a master's degree and later a Ph.D. in physiological optics, beginning its program in 1936. At the end of Work War II, the University of California at Berkeley initiated its own graduate curriculum. A few years after its founding, Indiana conferred advanced degrees, while the College of Optometry at the University of Houston secured approval for a Master's program in 1971 and admitted students for Ph.D. study in 1975. The University of Alabama and the State University of New York are the schools with the newest programs for Graduate Study in Optometry. The schools which currently award the M.S. and Ph.D. degrees are seeking to develop qualified persons to be primarily employed in teaching and research in vision science.

The graduate degree in physiological optics is available not only to O.D.s, but also to others with professional scientific backgrounds. Also, a program at the Massachusetts College of Optometry provides individuals who presently hold a Ph.D. degree with an opportunity to receive their O.D. in only two years. In the academic year 1974-75 sixty-six students were enrolled in graduate programs.

Education For Care of the Cataract and Aphakic Patient

The proper care of the cataract and aphakic patient requires specific knowledge, skills, and attitudes by the practicing optometrist, but no anomaly can be evaluated and treated as a separate entity. Further, patients with aphakia or cataract, whether congenital, traumatic, or degenerative, are subject to a high probability that other visual, ocular, or systemic anomalies will be present. The proper optometric care of any patient whether they have cataract, aphakia, or other anomaly requires a full evaluation and analysis followed by a selection of treatment based on all of the anomalies present, the needs and characteristics of the patient, the prognosis, and the possible interrelated effects of the proposed treatment procedures. To provide this full scope of care the optometrist should not only be trained in the care of cataract and aphakic problems, but just as importantly he must be educated and trained to be concerned about all aspects of health care that may fall within his purview, and specifically to detect and manage visual and ocular problems and to enhance visual performance.

All optometry schools share certain basic curricular elements which follow at least two years (and for the majority of students four years)

of undergraduate studies, predominately in the biological sciences. The basic elements include:

- A biological science component.
  This includes gross and microscopic human anatomy, general human physiology, biochemistry, and pharmacological principles, all presented with emphasis on the visual system and related structures.

- Physiological optics.
  Vision processes, visual stimuli, accommodation mechanisms, neurophysiological mechanism, ocular motility, binocular perception.

- Pathology
  Essentials of bacteriology and virology, principles of health and disease, tissue changes in pathology, ocular diseases and abnomalities, ocular manifestations of systemic disease.

- Optics
  Light, lenses, optical systems, ophthalmic materials.

- Professional orientation (health practice)
  Epidemiological procedures, the epidemiology of specific disorders, health care organization, public health, interpersonal relations, management of practice.

- Clinical skills
  Patient history, refraction, visual performance measurement, detection and diagnosis of visual anomalies and visually-related learning and perceptual disturbances, low vision rehabilitation, care of the aging patient, contact lens fitting.

A more complete listing of this common subject matter is found in attachment B to this Section. The catalogues of the schools provide still more detail.

Some areas of the optometric curriculum have more information on or are directed more toward the care of the patient with cataract or aphakia than others, but elements of the whole curriculum are involved in preparing the optometrist to care for such patients. The understanding of the functioning and anomalies of the body as well as the eye are involved. Elements of optics, pharmacology, and visual perception, understanding of the aging process, health care delivery systems and the problems of the partially-sighted, as well as patient care skills and experience, are involved in providing care for the patient with cataract or aphakia. The entire optometric curriculum fosters the broad range of knowledge, skills and attitudes necessary to provide the needed optometric care for patients with a

developing cataract, a clinical cataract, and with the problems of aphakia.

1. Geratric consideration: The patient with cataract or aphakia is generally elderly, and consequently the care of such patients necessitates an understanding of the physiological, psychological, and sociological changes associated with aging. The decrease in mobility and activity, the increase in illness and accidents, and the psycho-social problems of the elderly pose special problems to those providing health care to such patients.

2. Low vision consideration: If the patient is a surgical high risk patient and the cataractous lens is left in place, attempts are made to improve the visual performance with the use of low vision devices and/or modification of the visual environment. In some patients (7% to 16%) who have the crystalline lens removed, the corrected visual acuity is reduced, due to prior problems or surgical complications. Low vision services may be helpful to these patients, and therefore are often utilized in the care of patients with cataract or aphakia. Optometry specializesin low vision aids, and all students are taught to understand their function and application and to recognize situations in which they will be of benefit.

3. Pathology consideration: Patients with cataract or aphakia are generally elderly and have a high incidence of systemic and ocular pathological conditions with much use of therapeutic drugs. The association of systemic disease and cataract (diabetic cataract, thyroid cataract, tetany cataract) and of ocular disease and cataract (irodocyclitis, intraocular tumor, glaucoma) and the cataractogenic character of some drugs (steriods, miotics, antimitotics) needs to be understood by the practitioner for assistance in the early detection and care of such patients, and these subjects have received emphasis in the optometric curriculum and in supervised clinical experience.

   An understanding of ocular pathology, its causes, symptoms and detection, and treatment is provided students to enable them to make early detection of and prompt referral for complications of cataracts and cataract surgery such as secondary glaucoma, corneal edema, retinal detachment, and the like. Effective optometric practice in this area requires integration and synthesis of many basic elements in the optometric curriculum, through supervised clinical training.

4. Optical consideration: Optometrists must be skilled in the fitting of contact lenses and ophthalmic lenses (spectacles) on patients with aphakia, who present special problems. The prescription of ophthalmic lenses induces several optical complications such as ring scotoma, increased peripheral prismatic effects and

aberrations, increased magnification of the field, decreased field, decreased field of view, thick lenses, convergence problems, etc. If there is a unilateral aphakia there is the additional problem of aniseikonia (a difference in image size between the two eyes). The capability of the elderly patient for the physical management of contact lenses must be a factor in prescribing. Students call upon knowledge of basic optical principles, physiologic optics, and optical anatomy, among other subjects, to deal with these problems. An objective of education and training is to have the practitioner skilled in the fitting of contact lenses and ophthalmic lenses on patients with aphakia, understanding the sources of the optical problems, and able to select the most appropriate lens design.

5. Visual performance consideration: The ultimate aid of visual rehabilitation is to maximize visually-dependent functions, not merely to obtain a particular correction of refractive error. Visual performance is dependent upon many factors other than acuity. For providing service to elderly and, especially, aphakic patients the optometry student is taught this broad view of rehabilitation and the underlying concepts of health and health services.

   The use of vision to relate the patient to his environment is directly related to the characteristics of the patient's retinal images. When an elderly patient has had good clear vision for several years, followed by a period of dim cataractous vision, and then suddenly following cataract surgery has clear but magnified and somewhat distorted retinal images, significant consequences can occur in his visual performance. Older patients often have mobility problems, and the change in their perception of space brought about by the magnification and other optical problems of aphakic lenses can aggravate the mobility problem and produce a significant obstacle to their moving about effectively in their environment. Since falling is the major cause of accidents in the elderly, and most of them are aware of it, this changed perception of space can have a profound impact on their activity. A visual rehabilitation to the new visual system must occur before the patient can return to somewhat near his pre-cataractous life style. Optometry students obtain understanding of visual perception, visual performance, lens design, and the problems of aging so they will be equipped to design the best correction lens and to assist the patient with the necessary rehabilitation.

Faculty

The nature of the faculty is recognized as a principal determinant of educational experience in the health professions. In Schools of Optometry the great majority of faculty are optometrists, as is to be expected. Many of these advanced degrees are in optometry or other

fields. At the University of Alabama, for example, among 33 faculty 20 hold higher degrees other than or in addition to the O.D.s including 12 Ph.D.s (7 in physiological optics, two in neurophysiology, and one each in biomedical science, physics, and experimental psychology). Three faculty hold degrees in public health. At the Illinois College of Optometry, 21 faculty have advanced degrees other than the O.D., including 10 Ph.D.s (psychology, pharmacology, microbiology, and biochemistry), 2 M.D.s (ophthalmology and anatomy), and 2 Ed.D.s.

At the Pennsylvania College of Optometry 30 faculty members hold advanced degrees other than the O.D., including 18 Ph.D.s, 8 Master's degrees excluding the M. Opt., and 2 M.D.s. The Ph.D. in physiological optics is becoming recognized as an appropriate point of entry into optometric education, but the faculty of the schools shows a diversification that is consonant with the broad range of subject matter taught.

Optometrists are primary providers of health care and as such are responsible for determining whether the problem of the patient is within his scope of treatment or whether the patient should be referred to another health provider. Optometric education includes specific curriculum and clinical training related to the detection and diagnosis of ocular disease and ocular manifestation of systemic disease. All schools include on their faculty and in their clinical programs physicians, and particularly ophthalmologists, in the training of optometric students. Particular attention is paid to the detection and diagnosis of cataract, the complications following cataract surgery and the procedures for the selection of therapy, management and proper followup of aphakic patients. Optometry students in their clinical training rotate through affiliated clinics in hospitals, nursing homes, and other community health facilities. Here they examine patients with cataract and aphakia, and detect and diagnose ocular diseases related to these conditions as well as other ocular abnormalities.

On the basis of this educational and clinical experience the optometric student must demonstrate a mastery of the skills and knowledge necessary for the diagnosis and management of the cataract and aphakic patient for both graduation and licensure.

The training provides the capability to diagnose complications of cataract surgery such as shallow anterior chamber, secondary glaucoma, cystoid maculopathy, intraocular infection, Elschnig Pearls, etc.; and the appropriate use of techniques such as biomicroscopy, gonisoscopy, tonometry, direct and indirect ophthalmoscopy perimetry, etc., as well as the skilled use of standard optometric techniques applicable to patients with cataract or aphakia. (Such knowledge and skills on the part of optometrists are recognized by ophthalmologists in the regular referral patterns between individual optometrists and ophthalmologists in the care of cataract and aphakic patients.).

Footnotes and Bibliography

1/ According to The Association of Schools and Colleges of Optometry, 53% of the 1975 entering class had baccalaureate degrees, and an additional 6% had a higher degree. Of applicants to optometry schools, 15% have also applied to medical schools and 14% to dental schools, and 16% and 15% have taken the respective admissions tests for these schools.

2/ Hofstetter, Henry W., Optometry: Professional, Economic and Legal Aspects. St. Louis: The C.V. Mosby Company, 1948, p. 295.

3/ Gregg, James R., American Optometric Association: A History. St. Louis: American Optometric Association, 1972, pp. 51-52.

4/ Hofstetter, Henry W., Optometry: Professional, Economic and Legal Aspects, p. 298.

5/ National Academy of Sciences, Report of a Study: Costs of Education in the Health Professions, Parts I and II, Washington: Department of Health, Education, and Welfare, 1974.

6/ Carter, Darrell B. and Uglum, John R., "The History, Activities and Present Status of the National Board of Examiners in Optometry," Journal of the American Optometric Association. 37:2 (February, 1966) pp. 130-131.

7/ National Board of Examiners in Optometry, Topical Outline, 1976 Revision. New York: NBEO, 1976.

8/ Havighurst, Robert J., Optometric Education: A Summary Report. Washington: National Commission on Accrediting, 1973, p. 32.

9/ Optometry College Admission Test, Handbook. New York: The Psychological Corporation, 1974, p. 1.

10/ Havighurst, Robert J. (Op. Cit.)

11/ Pennsylvania College of Optometry 1975/1976, Philadelphia: Pennsylvania College of Optometry, 1975, pp. 50-51.

12/ Illinois College of Optometry Catalog 1973-1975, Chicago: Illinois College of Optometry, 1973, p. 61.

Currently Active Professional Programs in Optometry

School or College Name*	City	State	Public/ Indepen.	Year Estab.	Degree (s) Offered	Total Enrollment[1]
ICO	Chicago	Illinois	Indepen.	1872[2]	O.D.	532
IU	Bloomington	Indiana	Public	1951	O.D.,M.S.,Ph.D.	266
MCO	Boston	Mass.	Indepen.	1894[3]	O.D.	285
PCO	Philadelphia	Penn.	Indepen.	1919	O.D.	533
PU	Forest Grove	Oregon	Private	1921[4]	O.D.,M.S.	294
SCCO	Fullerton	Cal.	Indepen.	1904[5]	O.D.	307
SCO	Memphis	Tenn.	Indepen.	1932[6]	O.D.	566
SUNY	New York	NY	Public	1970	O.D.,M.S.,Ph.D.	85
TOSU	Columbus	Ohio	Public	1870[7]	O.D.,M.S.,Ph.D.	218
UAB	Birmingham	Alabama	Public	1969	O.D.,M.S.,Ph.D.	98
UCB	Berkeley	Cal.	Public	1923[8]	O.D.,M.S.,Ph.D.	231
UH	Houston	Texas	Public	1952[9]	O.D.,M.S.,Ph.D.	264
Ferris State	Big Rapids	Michigan	Public	1975	O.D.	20[10]

1 1974-75 Annual Survey of Optometric Institutions, Council on Optometric Education, American Optometric Association.

2 Began as Northern Illinois College of Ophthalmology and Otology, later the Northern Illinois College of Optometry.

3 Began as Klein School of Optics, adopted the name Massachusetts College of Optometry in 1909, will change to New England College of Optometry in 1976.

4 Operated as North Pacific College until 1945, when its charter was transferred to Pacific University.

5 Founded in 1904 under the name Los Angeles College of Optometry, the present name was adopted in 1972.

6 Founded by J.J. Horton, changed to non-profit status in 1944.

7 First established as a division of the Physics Department, became a separate school in 1952.

8 Founded as a division of the Physics Department. In 1941 a separate school was established.

9 Originally a private school, the school became state supported in 1963.

10 Presently only the first year class is enrolled.

* See attached page for full names.

Attachment

ICO - Illinois College of Optometry
IU - Indiana University, School of Optometry
MCO - Massachusetts College of Optometry
PCO - Pennsylvania College of Optometry
PU - Pacific University, College of Optometry
SCCO - Southern California College of Optometry
SCO - Southern College of Optometry
SUNY - State University of New York, College of Optometry
TOSU - The Ohio State University, College of Optometry
UAB - University of Alabama in Birmingham, School of Optometry
UCB - University of California, Berkeley, School of Optometry
UH - University of Houston, College of Optometry
Ferris State - Ferris State College, College of Optometry

ATTACHMENT B

BASIC ELEMENTS OF THE CURRICULUM OF SCHOOLS OF OPTOMETRY

1. Biological science knowledge base.

   a. Gross human anatomy and microscopic anatomy, with emphasis on head, neck, and thorax.

   b. Embryology, gross and microscopic anatomy of the human nervous system - concentrating on the central nervous system.

   c. General human physiology, including the study of the fundamental organ systems and the mechanisms which regulate body function. Emphasis is on the sensory, motor and cardiovascular systems.

   d. Basic concepts of general and cellular biochemistry, with study of nomenclature, structure, and reactions of organic molecules. Emphasis is on the visual system - tears, intraocular fluids, lens, retinal photochemistry, and actions of drugs upon these.

   e. Concepts of human genetics and genetic disorders, including the frequency and distribution of genetic disease, inheritance patterns, polygenic inheritance, chromosomal abberration syndromes, multifactorial genetics, and principles of genetic counseling.

   f. Gross and microscopic anatomy of the lids, orbit, orbital content, globe, muscles, nerves, and vessels, and embryology of the eye.

   g. Vegetative physiology of the eye, extraocular and intraocular fluids, corneal and lens metabolism, ocular circulation, retina and optic nerve metabolism.

   h. General pharmacological principles, methods of administration, various systemic drugs and their pharmacological action and side effects with emphasis on those that affect the visual system, such as cataractogenic and glaucoma producing drugs.

   i. Pharmacology; uses, doses, contraindications, and adverse effect of drugs producing miosis, mydriasis, cycloplegia, accommodation, and ocular anesthesia. The pharmacology, use contraindications, and adverse effect of drugs commonly used in treating visual and ocular problems.

2. Physiological optics knowledge base:

   a. Introduction and orientation to physiological optics, anatomical and physiological processes associated with responses to light; vision and the processes of vision.

   b. Measurement and specification of visual stimuli, light sources, radiometry, photometry, colorimetry. The eye as an image forming mechanism, the optical role of the pupil, the retinal image and its evaluation. Nature, classification, and etiology of ametropia. Physiological mechanism and optical aspects of accommodation.

   c. Monocular sensory mechanism of vision, photoreception and retinocortical transmission, spatial and temporal interaction and resolution, adaptation, brightness discrimination, color vision and their possible neurophysiological mechanisms.

   d. Ocular motility. Intra- and extra-ocular muscle systems with regard to their anatomy, physiology, pharmocology, and neurology. Measurement, characteristics, and control of ocular movements.

   e. Binocular vision and space perception. Visual direction, theory of correspondence, mapping of ninocular space. Modifications of space perception. Binocular eye movements, fusion, rivalry, ocular dominance, steropsis. Neurophysiological mechanisms.

   f. Perception and information processing. Theories of perception. The perception of time, size, shape, distance, motion. Perceptual and sensory deprivation, and perceptual adaptations.

3. Pathology knowledge and skills base:

   a. The essentials of bacteriology, virology, and immunology and the biological properties of micro-organisms, processes of infection and chemotherapy. Flora of the anterior segment of the eye and adnexa and the anatomical and physiological features which favor or inhibit their activity.

   b. Principles of health and disease. A survey of disease, disease processes, and disease manifestations. A study of tissue changes in inflammation, tumor formation, allergies, disturbances of metabolism and circulation, and injuries.

c. The etiology, epidemiology, symptoms, signs, and course sequelae of ocular disease and anomalies. Disease and anomalies of lids, orbit, conjunctiva, cornea, sclera, iris, ciliary body, lens, vitreous, retina, choroid, and optic nerve.

d. Ocular manifestations of systemic disease and anomalies. The etiology, epidemiology, symptoms, signs and course sequelae of visual and ocular neurological anomalies, lid and pupillary anomalies, paralytic strabismus, and visual field problems.

e. The etiology, epidemiology, symptoms, signs and course sequelae of the major and/or more common health problems in the U.S.A.. Principles of emergency care.

4. Optics knowledge and skills base:

a. Light and light rays, the formation of images, reflection, spherical mirrors, refraction, spherical refracting surfaces, thick lenses, thin lenses, cenrered systems, theory of stops, fields of view.

b. Cylindrical lenses, prisms, aberrations, aspherical mirrors and lenses, magnification, microscopes, telescopes. Nature of light, interference, diffraction, polarization, resolving power, dispersion, spectra, thin films. Principles of optical systems, optics of keratometer, lensometer, radioscope, retinoscope, ophthalmoscope, slit-lamp, NCT tonometer, tropscope, eikonometer, stereoscopes, fundus camera.

c. History of ophthalmic materials; physical characteristics of lenses, lens aberrations, lens design; ophthalmic prisms, multifocal lenses, lens specifications; physical characteristics of frames; lens and frame specification, elements of a prescription, lens and frame inspection and verification; fitting and dispensing concepts.

d. Special lenses and frames, protective eyewear, unique designs, low-vision aids, aniseikonic lenses, fitting and dispensing. Optics and design of contact lenses, contact lens specification, fabrication, verification, and modification of contact lenses.

5. Professional orientation knowledge and skills base:

   a. National, State and local development of the optometric profession. Opportunities available in the eye care and vision research fields.

   b. A review of descriptive statistics, probability, sampling, correlation, prediction, and their use in optometry and vision research. The essentials of epidemiological study procedures and their significance in health care. Epidemiology of major systemic disorders and disorders of the visual system.

   c. Introduction to health care. Health care and sick care. Health care systems. Health care professions, their numbers and distribution. Role of optometry in health care. What an optometrist is and what he does.

   d. Principles of human interpersonal relationships. The development of patient-doctor, technician-doctor, staff-doctor, and community-doctor relationships. Emphasis is on preparing the student to understand and deal with the many human interpersonal relationships necessary in the practice of optometry.

   e. History of public health, sociological aspects of health care, the financing of health care, organizations of health care. Methods of payment. Evaluating an optometric practice.

   f. Local, State, Federal organizations involved in health care, comprehensive health planning and new trends in health care delivery, health and patient-community education, organization of health services.

   g. The development and management of an optometric practice from a patient and community service point of view--office design, office routine, patient care administration, personnel management, recall systems, developing patient and interprofessional relationships through effective communication.

   h. The establishment, development, and management of an optometric practice from a business point of view. Legal development, governmental relationships, legislation and the legislative process, licensing procedures, State boards and laws, malpractice, professional ethics, taxes, fee structures, insurance, and accounting methods.

6. Clinical patient care knowledge and skills base:

   a. Introductory clinical optometry, patient orientation, essentials of case history, clinical testing of inter-pupillary distance, versions, accommodation, and pupillary reflexes.

   b. Development of clinical skills necessary for patient care in the areas of refraction, ocular motility, binocular intergration, and visual performance.

   c. Correlation, evaluation and analysis of optometric data. The process of patient care--diagnosis, prognosis, therapy--relating to the needs of the patient. Preview discussion of optometric specialty areas.

   d. Historical development of the contact lens and its use. Basis theories and methods of fitting. Contraindications for fitting. Fitting of hard and soft contact lenses and their modification, post fitting care and problems, care and treatment of contact lenses. Contact lens solutions.

   e. Advanced contact lens fitting, theories and clinical methods for meridional, prism segment, bifocal contact lenses. Fitting keratoconus, astigmatic corneas, aphakic eyes, and high refractive errors. Use and fitting of haptic lenses, cosmetic shells, and prosthetic eyes.

   f. The etiology, epidemiology, symptoms, signs, and course sequelae of the obstacles of binocular vision--sensory, integrative, motor--and the detection, diagnosis, prognosis, and orthoptic treatment of such anomalies. Clinical care of aniseikonia.

   g. The etiology, epidemiology, sysmptoms, signs, and course sequelae of learning, perceptual--motor, and other vision performance problems, and their detection, diagnosis, prognosis, and therapy. Study of the psychology, unique examination procedures, and care of pediatric patients and their problems and needs.

   h. The etiology, epidemiology, symptoms, signs and course sequelae of low vision. Methods of testing, prognosis, and selection of therapy, design of environmental and optical aids, problems of rehabilitation. Agencies, laws, public and social assistance for the partially sighted and blind.

i. The physiological, psychological, and sociological changes with age. Disease and aging. Visual and ocular problems of the elderly. Unique examination procedures and care of the geriatric patients.

j. The principles of efficient illumination, vision requirements in homes, schools, business, industry, and vision safety in the environment. Vision screening in schools, industry, community, motor vehicle examinations. Visual aspects of job analysis, the relationship between vision and vocational and avocational efficiency. The roles of patient care and human engineering in maximum visual performance.

k. Presentation and discussion of interesting clinical patients. Additional clinical testing techniques and concepts. Further discussion of patient data analysis--the process of determining diagnosis, prognosis, and therapy. Further discussions in the optometric specialties. Recent information that relates to the process of vision and the clinical practice of optometry.

7. Patient care experience:

a. The clinical examination and care of patients in the general optometry clinic, along with the design, fitting, evaluation, and dispensing of opthalmic lenses and frames.

b. The clinical examination and care of special patient populations in hospitals, nursing homes, schools for blind, visual screening, etc.

c. The clinical examination and care of patients in the optometric specialty areas--contact lenses, low vision, aniseikonia, analysis, etc.

SECTION II-D

SUPPLY AND DISTRIBUTION CONSIDERATIONS: ACCESS

Compiled by
Stuart Bernstein, B.A. *

In 1973, there were 10,496 active ophthalmologists and 19,265 active optometrists in the United States, a ratio of nearly one to two.

Sources of Data

The data on ophthalmologists are from the records of the American Medical Association.[1/,2/,3/] The AMA defines ophthalmologists as any physician in practice who declares ophthalmology as a primary specialty. This includes ophthalmologists in private practice as well as those active in clinics, hospitals or other institutions. However, this self declaration implies neither board certification in ophthalmology nor full time commitment to the practice of ophthalmology. Any physician reporting practicing ophthalmology as a secondary or tertiary specialty is also, therefore, not included in the number of ophthalmologists reported by AMA.

Data on active optometrists are from the 1972-73 inventory of optometrists conducted by the American Optometric Association through State Licensure Boards and with the cooperation of the International Association of Boards of Examiners in Optometry.[4/] The inventory supported by the Bureau of Health Manpower, HRA, took place between October 1972 and December 1973, following the licensure renewal cycle of the Boards.

Of the total number of active ophthalmologists, 9,568, or 91 percent are classified by the AMA as non-Federal practitioners in patient care activities.[5/] About 95 percent or 18,300 of the active optometrists are comparably classified as being non-Federal practitioners in patient care activities.

A count of Board Certified Ophthalmologists from the 1974-75 Directory of Medical Specialists indicated that 6,600 or about three-fifths of all ophthalmologists are Board Certified.[6/]

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*Statistician, Manpower Analysis Branch, Office of the Director, Bureau of Health Manpower, Health Resources Administration, DHEW.

Differences Between States

In terms of the medicare eligible population, age 65 and over,[7] there were 45 active non-Federal ophthalmologists and 90 active optometrists per 100,000 resident population in 1973. Table 1 shows the number of active non-Federal opthalmologists and optometrists in each State and geographic division as well as the ratio to 100,000 resident population age 65 and over. Although the same two States, California and New York, have the largest numbers of both ophthalmologists and optometrists, careful examination of the table will show that in the Nation, as a whole, there is no apparent correlation between the ratios of ophthalmologists and optometrists to the medicare eligible population in a given State. This has been demonstrated by other studies as well.[8] On a regional basis, it can be said that in the Pacific States for both ophthalmologists and optometrists the highest ratios of practitioners to the over 65 population occur. Conversely, the lowest ratios for both disciplines occur in the East South Central States.

The relationship between optometrists and ophthalmologists that exists on a national basis (2 to 1) is exceeded or approximated in most States. However, notable exceptions exist. Only in Maryland and the District of Columbia does the number of active ophthalmologists actually exceed the number of active optometrists. Louisiana has only 20 percent more optometrists than ophthalmologists and New York, Florida and Utah have fewer than 50 percent more optometrists than ophthalmologists. In seven States, (Maine, Rhode Island, Indiana, Illinois, North Dakota, South Dakota, and Nebraska) there were greater than three times as many optometrists as ophthalmologists. It should be noted that, proportionately, the distribution of all active ophthalmologists by State approximates the State Distribution of Board Certified Ophthalmologists.

Differences Between Metropolitan and Non-Metropolitan Areas

The major concern as related to access of the medicare eligible population to the services of ophthalmologists and optometrists is the gross difference in distribution of the two disciplines within States, namely between metropolitan and non-metropolitan areas.

Table 2 shows that in metropolitan areas of the United States, there were approximately 1.7 optometrists for every ophthalmologists, while in non-metropolitan areas the ratio was two and a half times as great, 4.2 optometrists for every ophthalmologist. In terms of persons 65 and over with medical insurance coverage,[9] there were 55 ophthalmologists and 99 optometrists per 100,000 persons in metropolitan areas while there were 19 ophthalmologists and 79 optometrists in non-metropolitan areas. Clearly, the medicare eligible population in non-metropolitan areas has greater access to the service of optometrists in that approximately 27 percent of the optometrists and 13 percent of

the ophthalmologists are in non-metropolitan areas potentially serving 32 percent of the medicare eligible population. Within metropolitan areas, available data indicate that there are a somewhat higher ratio of both ophthalmologists and optometrists to medicare eligible population in areas of 500,000 population or more than in smaller metropolitan areas.

Only 6 of the 69 metropolitan areas of 500,000 or more population had more active ophthalmologists than optometrists in 1973.[5/] The largest of these metropolitan areas were Baltimore and New Orleans. The Chicago metropolitan area had the greatest difference, more than three times as many optometrists than ophthalmologists.

The distribution of ophthalmologists and optometrists between metropolitan and non-metropolitan areas differs throughout the Geographic Divisions of the United States (Table 3). In non-metropolitan areas of the North Central States there are between six and seven optometrists for every ophthalmologist. In non-metropolitan areas of the South (South Atlantic, East South Central and West South Central Divisions) there are between four and five optometrists for every ophthalmologist. The remainder of the non-metropolitan areas of the Nation has approximately three optometrists for every ophthalmologist.

There is substantially less difference between the numbers of optometrists and ophthalmologists in metropolitan areas of the United States than non-metropolitan areas. Only in the New England East North Central Divisions are there more than two optometrists for every ophthalmologist. In the remainder of the metropolitan areas of the Nation, there are approximately 1.6 optometrists for every ophthalmologist.

The highest ratio of ophthalmologists to 100,000 medicare eligible population is in the metropolitan areas of the Mountain States; the lowest ratio is in non-metropolitan areas of the West South Central States. The highest ratio of optometrists to 100,000 medicare eligible population is in the metropolitan areas of the Pacific States; the lowest ratio is in non-metropolitan areas of the East South Central States.

Distribution Within Counties

The most recent data on the distribution of ophthalmologists within counties of the United States is from the 1968 Survey of Ophthalmologists condicted by the National Center for Health Statistics.[10/] However, more recent data in a number of States indicate that there has been little change in the number of counties with and without the services of ophthalmologists since this time. In 1968, only one-third of the counties in the United States had active ophthalmologists.[5/] This is in sharp contrast to the fact that two-thirds of the counties in the United States in 1973 had the services of optometrists. The proportion of counties with and without the

services of ophthalmologists and optometrists varies in the different regions of the Nation.

In the Northeast (New England and Middle Atlantic States) in contrast to the Nation as a whole, four-fifths of the counties had active ophthalmologists in 1968. One-half of the counties in the Pacific States had active ophthalmologists. In contrast, five of the six remaining Divisions in the United States had fewer than 30 percent of the counties with active ophthalmologists in 1968. To substantiate this, a study by the Southern Regional Education Board showed that there were only 19 percent of the counties of the South with Board Certified Ophthalmologists in 1973.[11/] Also, data used in a study by the Institute of Medicine, National Academy of Sciences[12/] showed that in the States of Georgia, Michigan and Oregon there was little difference in the number of counties with ophthalmologists in 1974 as compared to 1968.

Only four States (Massachusetts, New Hampshire, Rhode Island and New Jersey) had fewer counties without ophthalmologists than without optometrists. Broken out by region, the following table illustrates the proportion of counties without the services of ophthalmologists in 1968 or without optometrists in 1973.

	Counties Without Ophthalmologists	Counties Without Optometrists
United States	67%	32%
Northeast	19	13
South	73	38
North Central	69	26
West	65	37

It should be noted that in the non-metropolitan counties with the smallest population, a far greater proportion of optometrists are located than are ophthalmologists.[5/] Eleven percent of ophthalmologists are located in counties with total population of under 25,000 in contrast to 22 percent of optometrists in the same county size group. Fewer than 1,000 ophthalmologists were located in such counties in contrast to nearly 4,200 optometrists, a number more than four times as great.

In comparing 1968 ophthalmologist data with 1973 optometrist data by county, 1,251 or 40 percent of the counties have one or more optometrists but no ophthalmologists, 33 or 1 percent have one or more ophthalmologists but no optometrists, 1,009 or 32 percent of the counties have both optometrists and ophthalmologists and 851 or 27 percent have neither optometrists nor ophthalmologists.

On a regional basis, the break-out follows:

	All Counties	Optometrists Only	Ophthalmologists Only	Both	Neither
Northeast	100%	16%	1%	80%	3%
South	100%	39%	2%	26%	33%
North Central	100%	48%	1%	30%	21%
West	100%	32%	1%	34%	33%

Future Supply and Other Considerations

Between 1968 and 1973, active non-Federal ophthalmologists in patient care grew from 8,300 to 9,600, an annual growth rate of 2.8 percent compounded. At the same time, active optometrists grew from 18,400 to 19,300, an annual growth rate of 0.9 percent compounded. The Bureau of Health Manpower projects the number of active ophthalmologists in the United States to grow from 13,300 in 1980 to 18,400 in 1990.[5/] The number of active optometrists are projected to grow to 22,000 in 1980 and 28,200 in 1990. The proportion of ophthalmologists as a percent of total professional vision care manpower is projected to grow from 35 percent in 1973 to 38 percent in 1980 and 39 percent in 1990.[13/]

The number of active ophthalmologists per 100,000 population age 65 and over is projected to grow from 49 in 1973 to 54 in 1980 and 64 in 1990. The number of active optometrists per 100,000 population age 65 and over is projected to be about level at 90 between 1973 and 1980 and grow to 97 in 1990.

The greatest growth in the number of active ophthalmologists over the period from 1968 to 1973 was in the South.[5/] However, during the same period the greatest growth in ophthalmology residencies as reported by AMA was in the West.[14/] No data exists relating place of ophthalmology residency to place of eventual practice. However, a study published by AMA indicated that for interns and residents who were 1960 graduates of medical schools, 51.7 percent were practicing in the same State in 1975 as the final year of graduate training.[15/] The same study showed that 42.7 percent were practicing in the same State in 1975 as where they graduated from Medical School in 1960. However, no conclusions can be drawn as to whether ophthalmologists in practice followed a similar pattern.

Optometrists experienced a much smaller growth than did ophthalmologists between 1968 and 1973.[16/] However, it is notable that the South and West experienced a far greater growth in optometrists in this time interval than did the Northeast and North Central States.

More than four out of five optometrists under age 45 practicing in States where Schools of Optometry are located are graduates from the school(s) within their State. Little difference in this statistic exists between metropolitan and non-metropolitan areas.

In States with long-standing Schools of Optometry, the relationship is even more marked. The proportion of all active optometrists who are graduates from schools within their State of practice are more than 92 percent in Illinois, 86 percent in Pennsylvania, 81 percent in California and 77 percent in Massachusetts.

It should be noted that in two States where there has been a substantial growth in the over 65 population, Florida and Arizona, also show substantial growth in the numbers of both ophthalmologists and optometrists between 1968 and 1973. In neither of these States is located a School of Optometry.

In regard to the relationship between location of school and State of Practice, it is notable that in Illinois which has the greatest concentration of optometrists also has the most prolific School of Optometry. (Illinois College of Optometry and its predecessors, the Northern Illinois College of Optometry and Chicago Monroe College of Optometry), accounting for nearly one-third of all active optometrists in the United States.

The American Medical Association in its "Directory of Approved Residencies" reports that only 2.3 percent of the approved residencies offered in ophthalmology in 1975-76 were located in non-metropolitan areas. Little change in this statistic is evident over the last decade as three percent of the approved residencies in 1964 and two percent of the approved residencies in ophthalmology in 1969 were located in non-metropolitan areas. There have been no studies relating metropolitan status of residency location to metropolitan status of practice location for ophthalmologists. However, several studies support the thesis that hometown size and specialty choice are interrelated predictors of the community in which physicians practice.[17/] Physicians with non-metropolitan backgrounds were two to three times as likely to select non-metropolitan practice as physicians with urban backgrounds.

Overall, 27.4 percent of the active optometrists in the United States are located in non-metropolitan areas. This statistic varies somewhat by age of the optometrist. Older optometrists, those age 55 and over, are somewhat less likely to be practicing in non-metropolitan areas than those under age 45.

Data from the most recent inventory of optometrists show that schools of optometry make a varied contribution of optometrists to non-metropolitan areas. Two schools, the Southern College of Optometry and the Pacific University College of Optometry have contributed 48 and 43 percent of their graduates to non-metropolitan areas, respectively. Three other schools have contributed more than 30 percent of their graduates to these areas - (Illinois, Houston, and Indiana). Together, these schools account for three out of four optometrists practicing in non-metropolitan areas.

Based upon existing trends and without other intervention, little change in the proportion of either ophthalmologists or optometrists practicing in non-metropolitan areas can be expected. The proportion of recent graduates from schools of optometry, age 30 and younger, practicing in non-metropolitan areas is about the same or slightly lower for nine out of ten established optometry schools as compared to the proportion of total graduates practicing in these areas. In comparing 1968 to 1972 data, a lower proportion of ophthalmologists were practicing in non-metropolitan areas in 1972. While 16 percent of ophthalmologists were practicing in non-metropolitan areas in 1938, only 13 percent were practicing in such areas in 1972.

Volume of Services

If reimbursement coverage under Part B of Medicare were extended to optometrists, the workload of practicing optometrists may increase. This is especially true in sections of the country where the medicare eligible population has not had access to the services of an ophthalmologist but may now be eligible for reimbursement of optometric services. To get an understanding of possible increases in volume of services rendered by optometrists, one must look at existing data on productivity of optometrists. One such measure for which data are available relates to vision analyses performed by optometrists in 1973. Such data shows little overall difference between metropolitan and non-metropolitan areas in average vision analyses per optometrist.

However, within non-metropolitan areas for optometrists practicing in very small communities, there is a sharp drop off in this statistic.

This data becomes more significant when one relates utilization of full time auxiliary personnel, other than secretaries or receptionists, to the average number of vision analyses performed by optometrists. While non-metropolitan optometrists showed a somewhat greater average number of vision analyses than did optometrists in non-metropolitan areas utilizing auxiliaries. In fact, within non-metropolitan areas, for these optometrists utilizing full time auxiliaries, there was also a sharp drop in average vision analyses in the very smaller communities. The data show that in all areas, optometrists employing full time auxiliaries were able to perform about 28 percent more vision analyses, on the average, than were optometrists not utilizing auxiliaries.

Given the potential of expanded reimbursement coverage for optometrists under Part B of Medicare, it could be expected that the effects in terms of increased demands for vision care services would be felt, particularly, in areas served by optometrists but not by ophthalmologists. This chapter has sought to demonstrate that a substantial part of the country, particularly in non-metropolitan areas, is being served by optometrists only. Such optometrists, as the data have shown, by a basic measure of productivity,

mav be seeing fewer patients on the average than optometrists not in these areas. Yet, the data have also shown that the use of full time auxiliary personnel mav potentially relate directly to growth in productivity. In fact, on a national basis, a U.S. Department of Labor survey has demonstrated that more than 9 out of 10 optometric practices have room for additional growth and that optometrists can care for 30 percent or more patients under their present structure.18/ Particularly, in areas where the growth in demand for vision care services may be the greatest is there potential for additional growth in optometric practice through the increased use of auxiliaries or by other means.

Table 1 Number of Active Ophthalmologists and Optometrists and Ratio to 100,000 Resident Population Age 65 and Over by Division and State: 1973

Division and State	Active Non-Federal Ophthalmologists	Active Optometrists	Resident Population 65+ (000's)	Ophthalmologists per 100,000 Resident Population 65+	Optometrists per 100,000 Resident Population 65+
U.S. Total	9,568	19,265	21,329	45	90
Division					
New England	625	1,381	1,322	47	105
Maine	39	124	121	32	102
New Hampshire	32	72	84	38	86
Vermont	18	44	50	36	88
Massachusetts	333	749	652	51	115
Rhode Island	36	126	109	33	116
Connecticut	167	266	306	55	87
Middle Atlantic	2,065	3,393	4,044	51	84
New York	1,132	1,590	1,987	57	80
New Jersey	342	675	734	47	92
Pennsylvania	591	1,128	1,323	45	85
East North Central	1,555	4,262	3,967	39	107
Ohio	396	974	1,037	38	94
Indiana	180	538	523	34	101
Illinois	438	1,569	1,125	39	139
Michigan	340	745	787	43	95
Wisconsin	201	436	495	41	88

Table 1 (Cont'd.) - Number of Active Ophthalmologists and Optometrists and Ratio to 100,000 Resident Population Age 65 and Over by Division and State: 1973 (Con't)

Division and State	Active Non-Federal Ophthalmologists	Active Optometrists	Resident Population 65+ (000's)	Ophthalmologists per 100,000 Resident Population 65+	Optometrists per 100,000 Resident Population 65+
West North Central	689	1,654	1,984	35	83
Minnesota	188	361	425	44	85
Iowa	114	314	357	32	88
Missouri	222	422	583	38	72
North Dakota	17	74	70	24	106
South Dakota	15	87	83	18	105
Nebraska	50	149	189	26	79
Kansas	83	247	277	30	89
South Atlantic	1,422	2,204	3,306	43	67
Delaware	20	38	47	43	81
Maryland	227	210	326	70	64
District of Columbia	77	68	71	109	96
Virginia	198	326	398	50	82
West Virginia	59	135	204	29	66
North Carolina	183	336	456	40	74
South Carolina	84	179	212	40	84
Georgia	158	291	402	39	72
Florida	416	621	1,190	35	52
East South Central	436	893	1,368	32	65
Kentucky	112	225	355	32	63
Tennessee	154	363	414	37	88
Alabama	104	181	357	29	51
Mississippi	66	124	242	27	51

Table 1 (Cont'd.) - Number of Active Ophthalmologists and Optometrists and Ratio to 100,000 Resident Population Age 65 and Over by Division and State: 1973 (Con't)

Division and State	Active Non-Federal Ophthalmologists	Active Optometrists	Resident Population 65+ (000's)	Ophthalmologists per 100,000 Resident Population 65+	Optometrists per 100,000 Resident Populatic 65+
West South Central	816	1,489	1,992	41	75
Arkansas	67	163	258	26	63
Louisiana	182	225	329	55	68
Oklahoma	95	273	321	30	85
Texas	472	828	1,084	44	76
Mountain	437	786	778	56	101
Montana	35	101	71	49	142
Idaho	33	85	74	45	115
Wyoming	18	40	32	56	125
Colorado	136	208	200	68	104
New Mexico	42	80	82	51	98
Arizona	97	149	196	49	76
Utah	51	75	85	60	88
Nevada	25	48	38	66	126
Pacific	1,523	3,203	2,577	59	124
Washington	167	385	344	49	112
Oregon	131	305	245	53	124
California	1,169	2,421	1,929	61	126
Alaska	12	18	8	150	225
Hawaii	44	74	51	86	145

Sources: American Medical Association, Distribution of Physicians in the U.S., 1972, Volume 2

Bureau of Health Manpower, 1972-73 Inventory of Licensed Optometrists conducted under contract by American Optometric Association

Bureau of the Census Current Population Reports, Series P-25, No. 518, June 1974

TABLE 2- NUMBER OF ACTIVE OPHTHALMOLOGISTS AND OPTOMETRISTS AND RATIOS TO 100,000 PERSONS 65 AND OVER COVERED UNDER MEDICARE MEDICAL INSURANCE: 1973

	Active Non-Federal Ophthalmologists 1/	Active Optometrists	Persons 65+ With Medical Insur. Coverage (100,000's)	Ophthalmologists per 100,000 Persons 65+ Covered	Optometrists per 100,000 Persons 65+ Covered
UNITED STATES	9,510	19,265	207.8	45.8	92.7
Metropolitan, Total	8,270	13,987	141.0	58.7	99.2
Metro - 500,000 or More	6,152	10,527	103.8	59.2	101.4
Metro - Less than 500,000	2,118	3,460	37.2	57.0	93.0
Non-Metropolitan	1,240	5,278	66.8	18.6	79.0

1/ 1972 estimate of active ophthalmologists in patient care. 1973 estimate - 9,568

Source: AMA Distribution of Physicians in the United States, 1972, Volume 2

Bureau of Health Manpower, 1972-73 Inventory of Licensed Optometrists

DHEW, Social Security Administration, Medicare - 1973, Section 2 - Enrollment, 1975

Table 3 Distribution of Active Ophthalmologists and Optometrists for Metropolitan and Non-Metropolitan Areas and Ratios of Practitioners to 100,000 Population 65 and Over Covered Under Medical Insurance Program of Medicare By Geographic Division: 1973

Geographic Division	Active Ophthalmologists (1972)		Active Optometrists (1973)		Ophthalmologists Ratio to 100,000 65+ Medicare Eligible Pop.		Optometrists Ratio to 100,000 65+ Medicare Eligible Pop.	
	Metro	Non-Metro	Metro	Non-Metro	Metro	Non-Metro	Metro	Non-Metro
United States	8,270	1,240	13,987	5,278	59	19	99	79
New England	531	75	1,141	240	52	26	112	83
Middle Atlantic	1,954	147	2,963	430	58	26	87	76
South Atlantic	1,147	225	1,484	720	57	20	74	83
East South Central	331	104	442	451	56	14	75	60
West South Central	669	113	968	521	62	13	90	61
East North Central	1,417	163	3,159	1,103	52	14	115	97
West North Central	507	170	643	1,010	63	15	80	87
Mountain	304	120	412	374	74	34	100	108
Pacific	1,410	123	2,774	429	66	33	129	115

NOTE: Entries may not add to totals due to rounding in computational process

Sources: Bureau of Health Manpower 1972-73 Inventory of Optometrists conducted under contract by American Optometric Association
American Medical Association, Distribution of Physicians in the United States, 1972
DHEW, Social Security Administration, Medicare: Health Insurance for the Aged and Disabled, 1973. Section 2 - Persons Enrolled

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SECTION II-E

COST IMPLICATIONS

Compiled by Larry W. Lacy, M.A.*

Issues and Difficulties

In judging the question of whether optometrists should be reimbursed for the services they provide to cataract and aphakic enrollees under Part B of Medicare, consideration must be given to how much such an extension of coverage would increase Medicare program costs. The estimate of this cost increase can then be compared with the benefits provided Medicare enrollees. Extension would benefit those enrollees who now use an optometrist and who would, under extension of coverage enjoy greater security from high health costs as well as those who are now deterred from seeking diagnosis of their clinically significant cataracts by the cost of optometric services.

A lack of reliable information on the current use of optometrists by enrollees, uncertainty of how much enrollees would increase their utilization of optometric services after coverage extension, and uncertainty of what would be the exact rules for reimbursement under extension, prevent exact estimation of the costs to the Medicare program of the proposed coverage change. Therefore, the results of the calculations below can only be illustrative of the actual amounts likely to be realized. Under the assumptions of this section's analysis, it is estimated that extension of Medicare coverage for the services in question would result in Medicare payments for optometrists' services of from $2 million to $5 million a year. This excludes any higher payments to surgeons and hospitals from a possibly higher rate of cataract surgery resulting from greater numbers of diagnoses of cataracts after extension.

Method of Analysis

There are three basic steps in the estimation of the cost to the Medicare program of extending coverage to include services provided by optometrists to enrollees with cataracts or aphakia.[1/] First was estimation of the existing volume of such services. Second was determination of what would be the probable charge to the Medicare program for both a single diagnostic visit and the volume of services estimated in the previous step. The last step was an attempt to judge the possible magnitude of the increase in the use of optometrist

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services which might follow coverage extension as well as the added charge to the program for these visits.[2/] Because the first and third steps suffered from a lack of reliable information, two different estimates of the possible cost increase were made. The calculations below use 1975 as the base year. To aid understanding, the flow chart which follows outlines the 3 steps of the analysis.

Derivation of Estimate of Cost to the Medicare Program of Coverage of Optometrists' Services Provided to Cataract and Aphakic Enrollees

Step 1: Estimation of the current volume of optometric services which would be reimbursable under extension of coverage.

A. Estimated number of Medicare reimbursed cataract operations in 1975 - 245,000

B. American Optometric Association estimate of the fraction of surgical cases originally referred by optometrists - 2/3

C. Study advisor's estimate - 1/3

D. High estimate of current number of reimbursable pre-surgical diagnostic visits to optometrists (A x B) - 163,000

E. Low estimate (A x C) - 82,000

F. American Optometric Association estimate of the fraction of surgical cases returning to optometrists for care - 1/3

G. Estimate of current number of reimbursable post-surgical diagnostic visits to optometrists (A x F) - 82,000

Step 2: Estimation of the cost to the Medicare program of providing coverage for the current volume of reimbursable optometric services only.

H. Estimate of average charge to Medicare program of single diagnostic visit to optometrist under extension - $14

I. High estimate of the cost to Medicare program of current volume of reimbursable visits ((D + G) x H) - $3,400,000

J. Low estimate ((E + G) x H) - $2,300,000

Step 3: Estimation of the additional cost to the Medicare program of an increase in the number of reimbursable visits after coverage extension.

K. High estimate of the increase in the number of reimbursable visits to optometrists which might occur after cover extension - 82,000

L. Low estimate - 0

M. Added cost to Medicare program of high estimate of increase in volume of reimbursable visits (K x H) - $1,100,000

N. High estimate of total cost to Medicare program for current and expanded volume of reimbursable visits (I + M) - $4,500,000

O. Low estimate - $2,300,000

Step 1

Little data exist on the current number of visits by enrollees with cataracts or aphakia to optometrists' offices. Even more uncertain is the number of these examinations which would be labelled "routine" and hence would not be covered under the Supplementary Medical Insurance program. Several sources of information, however, do offer some help in this regard.

The first is the 1975 American Optometric Association Senior Citizens Survey. Based on results from a national sample of about 3,000 respondents, AOA staff inferred that "optometrists initially refer to the ophthalmologist two-thirds of those persons for whom cataract surgery is performed, although such surgery may not be performed for several years after referral."[3/] The AOA also found that about one-third of those over 65 who have had cataract surgery went to an optometrist for the last diagnostic examination they had before the time of the survey. If it is assumed that (1) only visits for cataracts which are severe enough to warrant an operation are of a nonroutine nature and hence would be reimbursable under extension and (2) only one pre-surgical and one post-surgical examination by an optometrist would be reimbursable for a single patient, these fractions (2/3 for pre-surgical and 1/3 for post-surgical) can be multiplied by the estimated number of Medicare reimbursed cataract operations in 1975 to obtain a very rough measure of the current volume of optometrist services that would be reimbursable under the proposed extension. Since probably some cataracts would be judged nonroutine but would not be surgically removed, the resultant estimate would probably be somewhat smaller than what would actually be reimbursed under extension.

Unfortunately, the AOA did not obtain a random sample of the entire over-65 U.S. population. Probably underrepresented are the poor, minority groups, and residents of rural areas. Such problems may reduce the reliability of the survey's results. Also, study advisors indicated that probably considerably fewer than two-thirds of Medicare patients who have cataract operations were referred by optometrists. The advisors felt that one-third corresponds more closely to the true figure.

The next part of Step 1 was to estimate the number of Medicare reimbursed operations in 1975. On the basis of claims gathered by the various Medicare intermediaries, the Social Security Administration has provided for this study unpublished estimates of the numbers of Medicare reimbursed cataract operations for the years 1967 through 1972.

Calendar Year	Number of Medicare Reimbursed Cataract Operations[4/]
1967	155,000
1968	159,000
1969	161,000
1970	172,000
1971	172,000
1972	202,000

The upward trend of the SSA figures suggest a 1975 total of from 220,000 to 245,000 cataract operations. Other sources indicate that the higher number may be more accurate. In unpublished data the National Eye Institute estimates there were 332,000 annual operations for cataracts for people of all ages in 1972. According to unpublished data from the 1971 National Health Interview Survey, 74 percent or 245,000 of all cataracts occur in the over 65 population. Therefore, this latter figure will be used as a rough estimate of 1975 cataract operations reimbursed by Medicare.

Applying the AOA inference that two-thirds of cataract surgical cases for those over 65 were initially referred by optometrists to the 245,000 figure yields high estimate of 163,000 (2/3 x 245,000) pre-surgical visits to optometrists which would have been reimbursable under the stated assumptions. For purposes of obtaining a lower estimate, the study advisors' suggestion of one-third referrals from optometrists to ophthalmologists is multiplied by 245,000 which reduces the estimate of pre-surgical covered visits to 82,000 (1/3 x 245,000). If one-third of all those enrollees who have a cataract operation, upon recovery, seek the services of an optometrist, there would have been 82,000 (1/3 x 245,000) post-surgical visits to optometrists which would have been covered under extension. Addition of this amount to the first result above produces 245,000 (163,000 + 82,000) as a high estimate of pre- and post- surgical examinations which would have been covered under extension. The corresponding low estimate is 163,000 (82,000 + 82,000 with correction for rounding).

Step 2

To obtain the cost to the Medicare program for these two volumes of covered visits, each must be multiplied by the average charge to the Medicare program for each such examination. Unfortunately, the American Optometric Association does not collect data on the average fees charged by its members, and neither does the Bureau of Labor

Statistics collect the needed information. Several other sources including the California Medical Program, the National Eye Institute, and a survey for the Optical Manufacturers Association suggest that the average fee for an office visit to an optometrist is from $20.00 to $26.00.[57] For the purposes of the calculations below, $23.00 serves as the average fee. Not all of this fee, however, would be chargeable to the Medicare program under extension of coverage. First, 20 percent must be deducted to reflect enrollee cost-sharing under Supplementary Medical Insurance regulations which also require that a second 20 percent must be deducted for the non-reimbursable refraction portion of an examination. This leaves about $14 (60% x $23) as the average charge to the Medicare program per visit.

Multiplying this by 245,000 yields $3,400,000 (245,000 x $14) as a rough high estimate of the cost of covering only the existing (1975) volume of services of optometrists which would be reimbursable under extension. Multiplying by 163,000 produces $2,300,000 (163,000 x $14) as a rough low estimate.

Step 3

It is probable that an extension of coverage would change the extent and nature of cataract care of the over 65 population. For instance, if Medicare enrollees who had cataract operations in 1975 had been covered for services of optometrists, a larger proportion of those originally referred by an optometrist might have returned to one immediately after recovery from their operations. The AOA Senior Citizens Survey suggests that one-third of those who have had cataracts surgically removed use their optometrists for diagnostic examinations and glasses. If this fraction rose to two-thirds -- the estimated proportion originally referred by optometrists according to the AOA -- it would have meant perhaps 82,000 (1/3 x 245,000) additional reimbursable visits to the optometrist in 1975. This would have added about $1,100,000 (82,000 x $14) to Medicare program costs. This would raise total costs of reimbursement extension to $4,500,000 ($1,100,000 + $3,400,000) using the high cost figure above. If no additional enrollees returned to optometrists after surgery, program payments would remain at the levels estimated for the existing (1975) volume of services only.

The most unpredictable and potentially most important effect on Medical program costs would be an increase in the number of enrollees who seek diagnosis of cataracts by optometrists, who subsequently have surgery, but would not otherwise have obtained any services. These would primarily be people with limited access to an ophthalmologist and who would not have been willing to pay the full cost of service by an optometrist. This is probably a small group because its members would be deterred from

obtaining services by the relatively small cost of an optometrist's visit. The members of this group would also have to be well informed of Medicare reimbursement policies, otherwise their behavior would not change.

Even if this group is very small, it could have large effects on Medicare program costs. Unpublished figures provided for this report by the National Eye Institute give a basis for estimating the current average reimbursable cost to the program of a single operation for cataracts to be about $1,500.[6] If there are 3,000 additional operations as a result of reimbursement extension, Medicare program costs would rise $4,500,000. Ten thousand additional operations would mean $15,000,000 in increased costs. It seems possible, therefore, that the chief cause of higher charges to the program would be a rise in surgical rates. It should be noted that nearly all of such increased payments resulting from surgery would not be for optometrists services but for surgical and hospital services.

Relation to Medicaid Program

A small portion, perhaps 5-10 percent of the Medicare program cost increases would be offset by a decrease in Federal Medicaid payments. Thirty-two States, with perhaps 80 percent of the U.S. population, provide Medicaid coverage for optometrists' services with the Federal government assuming about 60 percent of total payments. About 17 percent of all Medicare enrollees are also eligible for Medicaid benefits. Multiplying all these percentages together produces 8 percent as a rough estimate of the Medicare cost increase which would be offset by a reduction in Federal Medicaid payments.[7]

Payments to Ophthalmologists

Under prevailing medical billing practice there would have been no off-setting decrease in charges for ophthalmologic services. Since ophthalmologists generally include the cost of post-surgical care in their surgical fee, there is generally no separate charge for post-surgical examination and prescription of lenses.

Optometric Malpractice Insurance

It has been suggested that an extension of coverage would change the nature of optometric practice sufficiently to raise the cost of malpractice insurance for optometrists. This seems improbable because the over 65 are only a fraction of an optometrist's practice and cataract services constitute only a part of the vision care of enrollees. Also, optometrists would still not perform surgery, the major source of malpractice claims. Conversations with the Chairman of the AOA Committee on Insurance and an associate

of the major carrier of malpractice insurance for optometrists support the conclusion that no significant effects on insurance rates would result from extension.

Summary of Findings

The following chart summarizes this section's cost analysis. As explained above, these figures are only illustrative due to the lack of reliable information. The results indicate that extension of coverage would result in annual Medicare payments for optometrists' services of from $2 million to $5 million. A potentially larger cost to the Medicare program would result if some enrollees, who under existing reimbursement policy would not receive any cataract care, react to extension by going to optometrists for diagnoses which would in turn lead to increased rates of surgery. On average, each of these surgical procedures would add $1,500 to Medicare expenses. A lack of information prevents estimating the number, if any, of additional operations which would result from such extension.

Summary of the Estimated Cost to the Medicare Program of Coverage of Optometrists' Services Provided to Cataract and Aphakic Enrollees[8/]

A. Number of visits to optometrists which would be reimbursable under proposed reimbursement change if enrollees do not increase rate of visits

Low estimate	163,000
High estimate	245,000

B. Additional number of visits to optometrists which would be reimbursable under proposed reimbursement change if enrollees increase rate of visits

Low estimate	-0-
High estimate	82,000

C. Total number of visits to optometrists which would be reimbursable under proposed reimbursement change (A + B)

Low estimate	163,000
High estimate	327,000

D. Estimated average charge to Medicare program for each reimbursable visit to an optometrist - $14

E. Estimated annual total increase in Medicare program cost (D x C)[9/]

Low estimate	$2,300,000
High estimate	$4,500,000

Suggestions for Further Study

The calculations reported above rest upon many simplifying assumptions. The first is that only diagnostic visits associated with surgery would be covered. Another is that only one visit to an optometrist before surgery and only one after would be covered. A third assumption is that the AOA Senior Citizens Survey produced data representative of all enrollees. It was also assumed that Medicare enrollees under 65 years of age would not have cataract operations. Still another assumption is that all people who have cataract operations have met the SMI deductible and have not exceeded hospital day limitations of the Hospital Insurance program.

These assumptions, which were necessary to produce a rough estimate of program costs implications under time constraints, make the results of the calculations only illustrative.

Sources:

Many people and organizations were consulted during the preparation of this section of the report. In particular, an unsuccessful attempt was made to find a source with useful economic analysis of the demand for vision services. Those organizations that provided the unpublished data on which this section is based are listed as follows:

-- American Optometric Association

-- California State Department of Health

-- National Center for Health Statistics, DHEW

-- National Eye Institute, DHEW

-- Social and Rehabilitation Service, DHEW

-- Social Security Administration, DHEW

Footnotes and Bibliography

1/ This section will deal only with those enrollees 65 years of age or older.

2/ If the increase in the use of optometric and ophthalmologic services were much broader, it could contribute to rises in the unit price of vision care. Consideration of this last question, however, lies outside the scope of this paper.

3/ Internal American Optometric Association memorandum of March 1, 1976.

4/ Source: unpublished SSA figures based on 5 percent samples of beneficiaries.

5/ California and NEI data are unpublished. The Optical Manufacturers Association figures are from "The Impact of National Health Insurance on the Use and Spending for Sight Correction Service," Gordon R. Trapnell, Consulting Actuaries, 1976.

6/ This includes an initial diagnostic visit to an optometrist plus a total ophthalmologist fee of $580. Of this total, $480 would be reimbursable. Fully reimbursable would be five days in the hospital at $840. Deducting 20 percent for cost-sharing leaves about $120 as the charge to the Medicare program for post-surgical examination by an optometrist, prescription, and provision of lenses ($14 + $480 + $840 + $120 = $1,454).

7/ .8 x .6 x .17 = .081

8/ Numbers refer to 1975 data.

9/ Excludes possible higher payments to physicians and hospitals resulting from increasing rates of cataract surgery.