

67 THIS 500

HB

79

RESEARCH AND

BACK-UP ON HB79

STATEMENT ON SB 75/HB 79 FOR THE
ALASKA OPTOMETRIC ASSOCIATION

by

Boyd L. Walker, O. D.

My name is Dr. Boyd L. Walker. I am a licensed optometrist in Alaska and have been in full-time practice in the state since 1973. I am a member of the Alaska Optometric Association and the American Optometric Association.

I appreciate the opportunity to speak with you today regarding HB 79, SB 75, which pertains to the use of diagnostic pharmaceutical agents (DPAs) by qualified and licensed Doctors of Optometry.

As in any argument, there are two sides to the situation, and given the abilities of statisticians and researchers today one can find supportive evidence for any point of view on practically any subject one might wish to consider. That being the case, and since I feel that this issue is of utmost importance to the consumer of vision care in this state, I am going to state my case using only one reference. By doing so I hope to avoid the confusion and suspicion which may be created by using a myriad of references of possibly questionable integrity. This reference, which I shall place at your disposal should you wish to peruse it, is an independent report to the Congress of the United States, compiled by the U. S. Department of Health, Education and Welfare in July of 1976. This report was not in any way sanctioned by the optometric community, quite the contrary it was an investigative effort on the part of H.E.W. to determine what part an optometrist should play in the delivery of eye health care today. I believe that as elected representatives of the public, you each have a commitment to your constituents to make a decision based upon substantiated fact rather than upon emotion, heresay, or unfulfilled wishes of any special interest group. It is with that in mind that I present to you the following information.

I would like to begin by giving you a definition of the scope of optometry which is excerpted directly from page 21 of the H.E.W. Report to the Congress.

"The institute of Medicine of the National 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 principal 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."

As this points out, optometrists have an ability and a responsibility to recognize and refer pathological conditions of the eye. The diagnostic pharmaceutical agents which we are asking to use in this bill are nothing more than tools which will enhance our ability to discover possible pathology and refer the patient to the proper medical authority.

At this point I must state that it is not the intent of optometrists to use these drugs indiscriminately on all patients, but rather only upon those patients in which it cannot clearly be determined that a pathological condition does not exist. The exception to this being the use of corneal anesthetics in the measurement of intraocular pressure. Our law as it now exists prevents the optometrist from using these agents which ophthalmologists use for the exact same reasons. This clearly limits the optometrists from doing that which he is ethically and legally bound, i.e. assuring that those

patients he sees have been screened for eye disease using the highest level of technology available today.

It has been argued that optometrists do not have the professional training to allow them to administer diagnostic agents to their patients. Some would even argue the obvious and say that optometrists are not trained to detect pathological conditions of the eye. On page 95 of the H.E.W. Report to the Congress is found the following description of optometric education:

"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 abnormalities, ocular manifestations of systemic disease.
- Optics.
Light, Lenses, optical system., 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."

Following is a copy of Attachment B, Section 1; I would like to call your attention to subsections (h) and (i).

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, intra-ocular 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 aberration 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 intra-ocular 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.

As you can see there is no shortage of educational opportunity for the optometrist to become well acquainted with human ocular conditions as well as the uses, contraindications, and side effects of the use of pharmaceutical agents.

To further demonstrate this very important point regarding the quality of the education which optometrists receive on the subject of pharmacology. I would like to read the testimony given before the Oregon State Legislature by Dr. Ronald H. Winters, Assistant Dean, and Associate Professor of Pharmacology and Toxicology at Oregon State University. Before reading this, I would like to clarify Dr. Winters' title. He is a pharmacologist, any by definition is one who studies drugs in all their aspects. From pharmacologists all health care professionals, including ophthalmologists, derive information regarding all aspects of drugs. See the following pages for his testimony.

29 January 1975

In studying and evaluating the proposed legislation authorizing the use of diagnostic pharmaceutical agents (DPA's) by optometrists, three principal questions have emerged relative to my areas of expertise as an educator specializing in curricular design and as a pharmacologist: 1) is the overall curricular design utilized by the College of Optometry at Pacific University appropriate for the education and training of optometrists to use DPA's in their practice; 2) is the specific curricular component concerned with pharmacology appropriately constructed; 3) from the perspective of a pharmacologist, is the use of DPA's by optometrists a safe procedure likely to result in an overall improvement in patient care?

In the course of my efforts over the past three years to coordinate the redesign of the professional curriculum of the School of Pharmacy at Oregon State University, I have had considerable occasion to review the curricula of a large number of health profession schools, both in Oregon and elsewhere. Further, as my own graduate training in pharmacology was conducted largely at the University of Oregon Medical School in Portland, I am especially familiar with the curriculum of that institution, with emphasis on the pharmacology component. Finally, I have participated in a number of national and international meetings of professionals concerned with curricular design and implementation in many of the health-related fields. In comparing the curriculum of the College of Optometry at Pacific with the curricula of other health profession

schools utilizing a pharmacological component, I am convinced the approach developed by Pacific is both efficient and effective, and is clearly educationally sound. Moreover, that structure includes what I consider to be the sine qua non of proper instructional design--the competency of the graduate is evaluated in a series of prescribed and standardized formats (i.e., institutional, Oregon State Board of Optometry, and national board examinations) prior to the awarding of a license to practice. Thus, individuals who may have succeeded in passing individual courses but who have not adequately integrated the body of knowledge as a whole are not permitted access to the public as professionals. This safeguard, in my view, is instrumental in protecting the public, the institution, and the profession, and should stimulate your confidence in the proposal at hand.

Examination of the pharmacology component of the curriculum has also led me to a favorable conclusion. It is clear that the student is well-prepared for his first exposure to courses dealing with DPA's and other drugs, and is carried through this portion of his coursework in an effective manner. It is my judgment that a program designed to prepare practitioners to utilize DPA's must rest on a sound didactic base, capped by supervised clinical experience in the use of the agents in question. I feel strongly that a quality didactic base is offered at Pacific, and that passage of the proposed legislation will quickly result in the implementation of an appropriate clinical component as already outlined by the school.

The question of the relative safety and productivity of the proposed procedures must be addressed, and in my view, these two issues cannot be rationally separated; that is, neither safety nor efficacy are unidimensional characteristics, but instead are inter-related as a cost/benefit ratio or in medicine, a therapeutic index. Three important considerations relate to the expected safety in the use of DPA's by optometrists: 1) what agents are to be used; 2) what doses of these agents are to be employed; 3) how will these agents be administered? The four principal

categories of DPA to be used are miotics (agents that constrict the pupil), mydriatics (agents that dilate the pupil), local anesthetics (substances that reduce feeling in the cornea), and cycloplegics (agents that alter the ability of the eye to focus on near objects). The most salient pharmacological feature of these compounds is their relatively short duration of action, generally measured in minutes. If nothing else, this characteristic itself tends to minimize the likelihood of an adverse reaction simply because the drug is effectively inactivated by the body in relatively short order. Secondly, the doses to be utilized in diagnostic procedures are indeed very small. Using one to two drops of solutions of one-half to two and one-half percent strength in each eye provides the patient with a total dose far less than is obtained in many over-the-counter cold remedies readily available to the patient on only his/her discretion. Thirdly, by limiting the administration of these compounds to the topical route (dropped in the eye), it is not likely that more than twenty percent of the total dose will be absorbed into the blood for general circulation in the body. At that concentration level, these agents are essentially devoid of pharmacological activity. When coupled with the virtual absence of reported adverse reactions in states where this practice is common, one cannot help but conclude that the use of DPA's in the format proposed is extremely safe.

How much benefit is to be derived from this practice is, as I've said, the other side of the coin. In my judgment, the judicious use of DPA's will permit a substantial increase in the ability of the optometrist to detect potentially harmful diseases of the eye. By allowing this health-care professional to examine the patient more completely, the optometrist will be in a better position to refer to physicians (ophthamologists, internists, pediatricians, and family practitioners) those patients requiring further diagnosis and possible treatment. In view of the established fact that optometrists serve as the primary eye-care professionals for a majority of the population, it is apparent that the anticipated gain for the patient is large.

It would appear, therefore, that a near optimal situation prevails here: the proposed use of DPA's by optometrists is clearly both very safe and likely to be most effective in patient eye care. Further, it is evident that considerable planning has been conducted by the College of Optometry at Pacific, and that the school is ready, capable, and indeed has already begun providing educationally sound classroom instruction in the use of diagnostic pharmaceutical agents, with implementation of actual clinical instruction awaiting legislative approval. Thus, with the cost/benefit or therapeutic ratio a very favorable one to all parties concerned, I respectfully encourage the swift passage of the proposed legislation.

Ronald H. Winters, Ph.D.
Assistant Dean
Associate Professor of
Pharmacology and Toxicology

I would like to explain that Dr. Winters refers to Pacific University in his statement because it is the only optometry school in the Northwest, and therefore the one with which he has had direct experience. As the information I presented earlier indicates, all optometry schools provide similar training. It is apparent from his testimony that Dr. Winters realizes a potential risk involved with the use of any type of drug, but that with proper training this risk is far outweighed by the potential benefit to the eye care patient.

Finally and most importantly, as Dr. Winters mentioned, this bill limits the use of these DPAs to those individuals who can demonstrate by passage of a licensing examination that they are indeed capable of judicious use of the drugs. One such test of an individual's knowledge in this area is the National Board of Examiners in Optometry examination. This is a national examination which consists of eight separate subjects, one of which is Ocular Pharmacology. A discussion of this examination begins on page 91 of the H.E.W. Report to the Congress. This test will soon be a prerequisite to the taking of the Alaska State Board examination for licensure.

I am sure that much more can be said regarding the use of diagnostic pharmaceutical agents by optometrists. I have tried to avoid all but the crucial questions which are: (1) Does an optometrist have a responsibility to detect pathology of the human eye in the course of an examination? (2) Does an optometrist have an educational background that will allow him to safely administer these drugs to his patients? I feel that the answer is undeniably YES.

Apparently the consultants who collaborated to make the H.E.W. report possible, as a result of their extensive investigation of optometry reached the same conclusion. The following is excerpted from the RECOMMENDATIONS AND ADDITIONAL CONSIDERATIONS OFFERED BY STUDY CONSULTANTS of the H.E.W. Report to the Congress, page vii, second paragraph:

"During the course of the study effort, a number of additional issues and concerns were identified by the expert consultants which, although important considerations, represent matters not directly responsive to the specific legislative charge as interpreted by the Department. These recommendations and comments, made unanimously by the consultants, are presented here to provide an opportunity to bring these matters to the attention of Department Agencies and the Congress. Because the following items go beyond the requirement of this report, the Department has not fully examined them and makes no recommendation at this time.

6. ...

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

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

At the present time 24 states have identified the need for the use of DPAs *legislation* by optometrists, and to date there have been no reported incidences of malpractice arising from the use of these agents. Furthermore, no state which now permits the use of diagnostic pharmaceutical agents by optometrists has yet seen evidence that would convince them that this is not in the best interest of the public.

I therefore urge you to support Senate Bill 75 and House Bill 79 for the good of the people of Alaska.

Thank you for giving your consideration to this very important piece of legislation.

USE OF DIAGNOSTIC AGENTS

By

OPTOMETRISTS

in the

UNITED STATES ARMED FORCES

All three branches of the military, either in regulations or at local hospital options, require or allow optometrists to utilize diagnostic agents to aid them in their examinations.

1. UNITED STATES AIR FORCE

Optometrist AFM 36-1 (C13)

2. Duties and responsibilities

- a. "Conducts examinations of eye with or without the use of diagnostic drugs,". (enclosed)

2. UNITED STATES NAVY

Change # 57 of U.S. Navy Medical department manual gives optometrists the right to use drugs for taking intraocular tension.

3. UNITED STATES ARMY

(local Army post option)

Ex. Modification of regulations providing for the optometric use of diagnostic drugs at the U.S. Army General Hospital, Fort Gordon, Georgia. "to include use of diagnostic drugs such as mydriatics, cycloplegics, and topical anesthetics". (enclosed)

OFFICER AIR FORCE SPECIALTY

OPTOMETRIST

★1. SPECIALTY SUMMARY

Conducts examinations of eye to determine visual efficiency and performance by means of instrumentation and observation; prescribes corrective procedures; and applies knowledge of optics and physiology to research and teaching activities.

2. DUTIES AND RESPONSIBILITIES

★ a. *Conducts examinations of eye: With or without the use of diagnostic drugs, examines eye to ascertain presence or absence of defects or visual anomalies which can be corrected, remedied, or relieved by use of lenses, prisms, orthoptics, contact lenses, or other ophthalmic devices. Performs external and internal examination of the eyes and refers suspected and detected pathology to the appropriate medical specialties. Determines refractive errors such as myopia, hyperopia, or astigmatism and prescribes appropriate treatment for these and other visual problems. Ascertains through clinical tests, range of vision and ability and ease with which eyes maintain clear, comfortable, binocular vision at any distance of fixation.*

b. *Prescribes treatment to conserve or improve vision: Prescribes appropriate lenses to correct various errors of refraction. Prescribes and administers orthoptic or visual training in those instances where such procedures are indicated, as in ocular muscle imbalances, fusional problems, and as an adjunct in treatment of strabismus. Refers for medical treatment or surgery, those cases characterized by disease or injury. Examines and tests lenses for proper workmanship and conformance to prescription.*

c. *Conducts research: Plans and conducts research in broad areas of clinical optometry and physiological optics; such investigative studies to include, among others, physical standards, protective and corrective eye wear, examining methods and techniques, and perceptual problems associated with aeronautics and space flight.*

d. *Directs optometry personnel: Plans work assignments for optometry personnel including preparation and maintenance of optometric records. Observes and checks work of technicians to determine compliance with procedures governing optometric activities. Instructs optometry technicians in local operational procedures, and in the use and maintenance of ophthalmic instruments.*

e. *Plans and directs occupational vision programs: Plans, supervises, and participates in eye protection programs in accordance with AFR 160-112 and AFR 167-3. Identifies eye hazardous areas and occupations, and supervises visual screening of personnel in such areas. Arranges for professional services, and procurement and dispensing of safety eye wear for military personnel and civilian employees of the Department of the Air Force.*

3. SPECIALTY QUALIFICATIONS

a. *Knowledge*: Knowledge of procedures and methods used in eye examinations, and examining and testing lenses is *mandatory*.

b. *Education*:

(1) Graduate of a college of optometry approved by the Surgeon General, USAF, is *mandatory*.

(2) Master's degree or Doctor of Philosophy degree in physiological optics is desirable for research and teaching assignments.

c. *Experience*: A minimum of 12 months'

experience in optometry assignments is *mandatory*. It is *mandatory* that experience include conducting examinations of the eye to determine presence of visual defects; prescribing lenses and orthoptic therapy to correct, conserve, or improve vision; and examining and testing compliance to acceptable standards and conformance to prescription.

d. *Training*: None.

e. *Other*: State license to practice optometry is *mandatory*.

4. SPECIALTY DATA

a. *Grade Spread*: Second lieutenant through colonel.

b. *Related D.O.T. Job*:

Optometrist _____ 079.108

c. *Related DOD Occupational Group*: 6H



August 1975

OPTOMETRY PROGRESS REPORT

Optometry Seminar

Brooks AFB, Texas will host the 4th USAF Optometry Seminar from 30 September through 2 October 1975. The quotas have been allotted to the Major Air Commands, and contacts should be in process for selection of the attendees. If you have not received word about whether or not you can participate in this continuing education program, see your Administrative or Executive Officer. The TDY funding for attending is not from your organization's budget, so this should not be a deterrent for approval.

Special Pay

Special pay legislation was not completed prior to the June 30, 1975 expiration date for the \$100/mo. award to optometrists and veterinarians. The military members in these specialties on duty prior to 1 July 1975, continue to receive the special pay without interruption; however, the professionals that enter(ed) on active duty after that date will not, unless legislation authorizes it. The DOD favors the special pay legislation, and the House Committee has favorably responded with a rider to the Appropriations Bill which will make the effective date retroactive to 1 July 1975. It is expected that this authority will run to 1 October 1977.

Drug Applications

Two years ago AFR 160-12, Professional Policies and Procedures, was revised to include the following, in paragraph 3g " ... Optometrists have the knowledge and skill necessary to perform the following functions:

(1) Performs complete visual examinations with or without the use of diagnostic drugs ... " USAF pharmacies will honor prescriptions, from optometrists for ophthalmic, mydriacyl, etc., in compliance with their needs for ophthalmic drugs for diagnostic purposes.

It is not unusual for optometrists at some of the smaller USAF Clinics where no ophthalmologist is assigned to work in close coordination with Flight Surgeons on Sick Call and physicians in Emergency Rooms in handling ocular disease and trauma dispositions. In these circumstances therapeutic ophthalmic drugs may be recommended by the optometrist and ordered by the

medical doctor from the pharmacy. If optometrists are enjoined to order therapeutics directly, it is highly recommended that approval for this action be in writing. Capt Steiner, at Webb AFB, TX, has been accorded this courtesy by the Pharmacy and Therapeutics Committee and may order: Neosporin ophthalmic; Blephanide ophthalmic; Garamylin ophthalmic; Sodium Sulfate; Vasocin ointment; and Darvon, plain. Note that no steroid combination drugs were authorized. Dr Steiner is a former enlisted Air Force pharmacist, had a course in Pharmacology at the University of Houston Optometry College, and is well versed in drug effects, which was a major consideration in his award of direct drug therapeutic use at Webb AFB.

Contact Lenses and Occupational Vision

Air Force Regulation 161-31, Occupational Vision Program, prohibits the use of contact lenses in eye hazardous jobs except: "Special cases where persons must wear contact lenses for medical reasons will be considered on an individual basis." A request for reappraisal of this policy was made two years ago to permit the judgment of the local optometrist to weigh whether the usual eye protective device was inadequate, and the environment constituted a greater hazard to the contact lens wearer over others in the same situation, before restricting the wear of contact lens. No change in regulation resulted from this request.

A waiver of the prohibition was recently made at Kirtland AFB following advice by Lt Col Coker, Chief of Occupational Vision in the USAF Surgeon General's Office. This was a local waiver granted by the Occupational Vision Team when Maj O'Brien, Optometrist, indicated that in his professional judgment the patient's visual performance would be compromised with spectacles in climbing poles and stringing wire. The letter of waiver, forwarded through channels, concluded: "Additionally request that you take action through AFSC to request from HQ USAF/SGPA (the OPR of AFR 161-31) that AFR 161-31, para 3c(1) be amended to permit the Base Occupational Vision Team to locally authorize persons to wear contact lenses in eye hazard area when justified by particular medical reasons." The mechanism for issuing a waiver is now apparent, but the basic issue still seems unduly restrictive.

Federal Services Optometry Seminar

The AOA sponsored a Federal Services Optometry Seminar held in early April in Washington, DC. The attendees would form a "Who's Who" in AOA, AFOS, Military, Public Health and Civil Service Optometry. The issues addressed by the workshops were: Pay and Promotion; Optometry Corps; Vision Care Delivery; Clinic Evaluation; Education; Rationale for Federal Vision Care; Interprofessional Relations and Attitudes; and the Reserves.

MEDFG-HPS-S-Opt

CO, USAGH
ATTN: AJGMD-HPS

Modification of USAGH Regulation 40-102

Ch, Optometry Section 4 October 72
USAGH MAJ Nichols/wl/2381

1. Recommend that consideration be given to the following modification of paragraph 10 (Optometrist Privileges) USAGH Regulation 40-102, dated 28 September 1971.

2. Optometrist Privileges:

Permission to conduct examinations of the eyes to ascertain the presence of absence of defects or visual anomalies, and prescribe the appropriate optometric therapy to correct, remedy or relieve such visual anomalies by the use of lenses, prisms, orthoptics, contact lenses, as outlined by AR 40-3, C-25 dated September 1971, AR 40-121, and SOP of Elective Contact Lens Program, Optometry Clinic, USAGH, Fort Gordon, Georgia, or other optometric procedures (to include use of diagnostic drugs such as mydriatics, cycloplegics and topical anesthetics) commensurate with training and experience. Refer patients for medical consultation, treatment or surgery when ocular manifestation of disease is detected.

3. The above modifications are suggested in accordance with AR 611-101, ch 23, 13 April 1970, AR 40-1, ch25, September 1971, and AR 40-121, paragraph 4-6.

ALEX C. NICHOLS
Major, MSC
Chief, Optometry Section

1 Incl
SOP

DISPOSITION FORM

For use of this form, see AR 340-15, the proponent agency is TAGCEN.

REFERENCE OR OFFICE SYMBOL

DASG-HCC

SUBJECT

Optometry Policy Statement Update

THRU: ~~DASG-HC~~ 06 APR 1977

FROM DASG-HCC

DATE 4 Apr 77

CMT 1

~~DASG-ZB~~ *Rsg*

COL Biehuseñ/ms/71917

TO: DASG-ZA

1. In view of recent civilian interest in the role of the optometrist and the recent editorial addressed to The Army Surgeon General in the Journal of the AOA of which you are aware (Inclosure 1) a firm policy statement is in order setting forth the role of the Army optometrist.
2. Existing policy is stated as portions of correspondence of General Heaton (1968, Inclosure 2) and General Jennings (1971, Inclosure 3). No policy statement as such exists.
3. Your Consultants in Ophthalmology and Optometry agree that the proposed policy statement below is fair and represents the Army policy concerning the role of the optometrist.

POLICY STATEMENT

Army optometrists provide optometric patient services in accordance with accepted medical guidelines. They examine the eyes and adnexa, to include refraction and other procedures, prescribe lenses to correct refractive error and improve vision. They refer patients to physicians for diagnosis and treatment of suspected disease. They use topical anesthetics and cycloplegic drugs to perform tonometry and cycloplegic refractions. When using these drugs immediate medical care is available in the event of adverse reaction.

3 Incls
as

Frederick C. Biehuseñ
FREDERICK C. BIEHUSEN, M.D.

Colonel, MC
Chief, Consultants and Ambulatory
Care Division

APPROVED/DISAPPROVED

20 Apr 77

Richard R. Taylor
RICHARD R. TAYLOR, M.D.
Lieutenant General
The Surgeon General

EDUCATIONAL QUALIFICATION OF ALASKAN OPTOMETRISTS

1. Statement on Pharmacology Training in Optometry in Oregon, 1975

By: L. Levine, Ph.D.

2. Curriculum Comparison on Pharmacology between:

Oregon Medical School
Oregon Dental School
Oregon College of Optometry

3. Association of Schools and Colleges of Optometry (ASCO)

This study suggests pharmacology curriculum guidelines for continuing education courses for practicing optometrists. Should legislation pass, this guide would serve as a framework for setting up such a program.

4. 1973 National Board of Examiners in Optometry

All applicants for Board certification to practice optometry in Oregon must pass all of the written sections of the National Boards with a minimum score of 70%.

Enclosed copies of sections related to diagnostic agents:

Hours of Testing

Ocular Pharmacology	1.0 hr.
Ocular Pathology	2.0 hrs.

Other sections of the Boards not included but available upon request:

Hours of Testing

Ocular Anatomy	2.0 hrs.
Visual Science I	2.5 hrs.
Visual Science II	2.5 hrs.
Theory and Practice of Optometry	2.5 hrs.
Theoretical Optics	3.0 hrs.
Ophthalmic Optics	2.5 hrs.
Social, legal, ethical, economic and professional aspects of optometry	1.0 hr.
	<u>19.0 hrs. testing</u>

5. List of the United States Optometric Colleges and Schools

Statement on Pharmacology Training in Optometry in Oregon

L. Levine, Ph. D.

The most revered and the most widely used textbook in the field of pharmacology in American medical and dental colleges is Goodman and Gilman's "The Pharmacological Basis of Therapeutics". For example, during the current academic year (1974-1975), as in previous years, this "blue bible" of pharmacology is the required textbook for the pharmacology courses offered in both the University of Oregon Medical School and Dental School. (It may be noted that during the two occasions when a formal 2-hour course in Optometric Pharmacology was taught at the College of Optometry in Forest Grove, Goodman and Gilman was the required text. It may be of further interest that the senior author is a member of a long time Portland, Oregon family, and that his original professional training was in the field of Optometry.) The current (4th) edition of Goodman and Gilman identifies the scope of the field of pharmacology as embracing "...the history, source, physical and chemical properties, compounding, biochemical and physiological effects, mechanisms of action, absorption, distribution, biotransformation and excretion, and therapeutic and other uses of drugs" (p.1). It is at once apparent that the totality of the discipline of pharmacology is very large, and that students and practitioners of health-related professions must generally limit their attention to drugs that are "useful in the prevention, diag-

nosis, and treatment of human disease, or in the prevention of pregnancy..." and to "chemical agents ... commonly responsible for household poisoning as well as environmental poisoning." (p.1).

Even to achieve these admittedly limited objectives, the student must give attention to a number of the classical subdivisions of pharmacology. These are listed in Goodman and Gilman (pp. 1,2) as (a) the physical and chemical properties of drugs, (b) pharmacodynamics, (c) pharmacotherapeutics, and (d) toxicology. Of these, pharmacodynamics has reference to "the study of the biochemical and physiological effects of drugs and their mechanisms of action." It is largely based on "...the subject matter and the experimental technics of physiology, biochemistry, microbiology, and pathology." Further, in pharmacodynamics "...Many basic principles of biochemistry and enzymology and the physical and chemical principles that govern the active and passive transfer and distribution of substances across biological membranes are readily applied..." On the other hand the term "pharmacotherapeutics" deals with "...Many drugs (which) stimulate or depress biochemical or physiological function in man in a sufficiently reproducible manner to provide relief of symptoms..." or are useful "...because they have only minimal effects on man but can destroy or eliminate parasites." (All quotes from Goodman and Gilman, Ch. 1).

From the foregoing it is obvious that mastery of the subject matter of pharmacology requires appreciable prior training in a number of important areas of human biology: anatomy, physiology, biochemistry, microbiology, and pathology. Further, for a study of drugs of consequence to the field of Optometry, specialized additional preparation in ocular anatomy, neurology, and ocular pathology are essential prerequisites. Thus on the one hand, the study of pharmacology cannot properly be undertaken early in a professional program since it presupposes a command of, and builds on the background provided by, several of the basic biological sciences. On the other hand, neglect of the study of pharmacology once the lengthy prerequisite preparation has been negotiated, fails to complete a logical sequence, and is irresponsible since it prevents delivery of the highest level of professional vision care to the public.

Inspection of the current catalogs of the University of Oregon Medical School and Dental School (1974-1975) reveals that the programs of study leading to the M.D. and the D.M.D. follow a rational progression of courses in the basic preclinical disciplines, which are necessary prerequisites to beginning the study of pharmacology. In both institutions, classroom and laboratory introduction to pharmacology is deferred until the second year and awaits prior or parallel training in gross and microscopic human anatomy,

biochemistry, physiology, neuroanatomy, microbiology, and pathology. Since the medical and the dental practitioner will require clinical application of his pharmacological knowledge, it is sensible and appropriate that all of the preceding courses have practical components in the form of required laboratory work, and that the initial classroom and laboratory exposure to pharmacology is followed in succeeding terms with practical training in the use of drugs under immediate supervision of qualified faculty members.

The course of study presently required of all students in the College of Optometry in Forest Grove directly parallels and is equivalent to that of the Medical and Dental Schools as regards the number and level of the basic biological science courses relevant to the study of pharmacology. Currently, the program does not provide training in human anatomy, relegating that subject to the pre-optometry status, but provides more specialized morphological instruction in ocular anatomy and neuroanatomy. The curriculum includes core courses in physiological chemistry, physiology, neurology, microbiology, general and ocular pathology. All of these courses carry required laboratory work except physiological chemistry and microbiology, and all of these courses are completed before pursuing a required 2-semester hour lecture and demonstration class in Optometric Pharmacology.

Awaiting implementation, to complete the pharmacological

training of an optometrist, is a three-year old proposal for the development and suitable staffing of a Special Clinic in Pharmacology, which a student would enter after completion of the required two-hour lecture course. This Pharmacology Clinic would provide student clinicians with medically supervised practical experience in the use of topically-applied "eye drops", belonging to the group called Diagnostic Pharmaceutical Agents (DPA's), on themselves and on clinic patients.

Attached are (a) a synopsis of the biological science coursework offered in the Colleges of Optometry in the U.S., (b) a topical outline of the course in Optometric Pharmacology offered at the College of Optometry in Forest Grove, and (c) current curricula of Colleges of medicine, dentistry, and optometry in the State of Oregon.

The total learning experience leading to competence in optometric pharmacology is thus spread over all four years of the professional program. The faculty responsible for the teaching of the relevant basic biological science coursework all possess earned doctorates (Ph.D.'s) in the disciplines in which they provide instruction, hold memberships in the appropriate professional societies, and the majority are actively engaged in research programs in their specialized areas. The course in Optometric Pharmacology is staffed by a Ph.D. in Physiology, with extensive research experience

involving the experimental use of all classes of DPA's, with membership in the American Physiological Society and nomination for membership in the American Society for Pharmacology and Experimental Therapeutics (pending); a practicing O.D. with military experience in Viet Nam, during which he acquired extensive training in the use of all classes of DPA's from ophthalmological colleagues; and a practicing physician in Forest Grove with special interest and experience in ocular drugs. Thus the graduating O.D. is provided with all of the background and training necessary to equip him to deliver optimal vision care to his patients through the appropriate utilization of Diagnostic Pharmaceutical Agents.

CURRICULUM

COLLEGE OF OPTOMETRY 1974-1975

Courses in the Professional Curriculum

The duration of the regular professional curriculum in Optometry is four academic years and requires completion of 135 approved semester hours. This is preceded by a minimum of two years of pre-optometry.

First Professional Year

Optometry 333 Geometrical Optics	3
Optometry 334 Laboratory Geometrical Optics	1
Optometry 335 Ocular Anatomy and Physiology	3
Optometry 336 Laboratory-Ocular Anatomy	1
Optometry 337 Optometric Orientation	1
Optometry 338 Physical Optics	3
Optometry 339 Laboratory-Physical Optics	1
Optometry 340 Physiological Chemistry	3
Optometry 341 Laboratory-Physiological Chemistry	1
Optometry 342 Ophthalmic Optics	3
Optometry 343 Laboratory-Ophthalmic Optics	1
Optometry 344 Advanced Human Physiology	3
Optometry 345 Laboratory-Advanced Human Physiology	1
Optometry 346 Physiological Optics I	3
Optometry 347 Laboratory-Physiological Optics I	1
Optometry 348 Experimental Psychology	3
Optometry 349 Laboratory-Experimental Psychology	1
Optometry 399 Optometric Procedures I	3

Optometry 441 Optometry I/Theory and Methods of Clinical Refraction	3
Optometry 442 Optometry II/Basic Case Analysis	4
Optometry 444 Contact Lenses	3
Optometry 445 Laboratory-Contact Lenses	1

Third Professional Year

Optometry 518 Psychophysiology of Vision	3
Optometry 519 Psychology of Vision Laboratory	1
Optometry 520 Human Visual Perception	3
Optometry 521 Laboratory-Psychology II	1
Optometry 533 Optometry III/Advanced Case Analysis of Motor Dysfunctions	3
Optometry 534 Laboratory-Optometry III	1
Optometry 537 Visual Training I	3
Optometry 538 Laboratory-Visual Training	1
Optometry 539 Basic General Clinic I	1
Optometry 540 General Clinic II	2
Optometry 541 Optometry IV/Low Vision and Geriatrics	2
Optometry 542 Laboratory-Optometry IV	1
Optometry 545 Environmental Vision	3
Optometry 551 Optometry V/Strabismus and Amblyopia	3
Optometry 552 Laboratory-Optometry V	1

Second Professional Year

Optometry 400 Optometric Procedures II/Receiving Clinic	2
Optometry 401 Optometric Procedures III/Receiving Clinic	3
Optometry 433 Bases of Pathology	3
Optometry 434 Laboratory-Bases of Pathology	1
Optometry 435 Physiological Optics II	3
Optometry 436 Laboratory-Physiological II	1
Optometry 437 Structure and Function of the Nervous System	3
Optometry 439 General and Ocular Pathology	2
Optometry 440 Ocular Pathology Detection and Visual Fields	3

Fourth Professional Year

Optometry 633 National Problems of Health Care	3
Optometry 635 General Clinic III**	2-5
Optometry 639 Optometry VI/Advanced and Contemporary Clinical Procedures	2
Optometry 640 General Clinic IV	2-5
Optometry 641 General Clinic V	2-6
Optometry 642 Optometric Pharmacology	2
Optometry 646 Specialty Clinics	1-4
Optometry 690 Research	2-6

*During the last three years and a half a minimum of 12 hours of general clinic is required. Only 6 hours of general clinic are shown. The remaining 6 hours may be scheduled whenever is convenient.

**Scheduled Summer between third and fourth years.

First Year

Fall Interval

*An 417, 418, 419, 421 Human Morphology	—
JiCh 411-2 Biochemistry	2.0
BeS 411 Omnibus	1.0
BeS 411 Principles of Behavior Management	1.0
CB 411 Crown and Bridge Technic	1.2
CJT 411 Cell Biology	0
*DA 411-2 Dental Anatomy	—
*DM 411 Dental Materials	—
MB 411 Microbiology	2.0
OD 411 Oral Examination Technic	1.5
*PD 411-2 Preventive Dentistry Technic	—
PD 411 Public Health Dentistry	2.0

Winter Interval

*An 417, 418, 419, 421 Human Morphology	—
BCh 411-2 Biochemistry	2.0
CB 412 Crown and Bridge Technic	2.1
CJT 412 Biology of Inflammation	2.0
*CJT 412-3 Infectious Diseases	—
CJT 412 Mineralization	1.5
DM 412 Dental Materials	—
*DA 411-2 Dental Anatomy	—
MB 412 Immunology	1.5
PD 411-2 Preventive Dentistry Technic	2.0
PD 412 Nutrition	1.0
Per 412 Periodontics Technic	1.5
*Phy 412 Physiology	—

Spring Interval

An 417, 418, 419, 421 Human Morphology	13.3
CB 413 Crown and Bridge Technic	1.2
CJT 412-3 Infectious Diseases	5.0
CJT 413 Caries	2.5
DM 413 Dental Materials	2.0
Op 418 Operative Technic Lecture	2.0
Op 419 Operative Technic Laboratory	2.0
Per 613 Periodontics Clinic	.5
Phy 413 Physiology	6.0

First Year Total 67.7

Second Year

Fall Interval

*An 421 Neuroanatomy	1.3
CB 420 Crown and Bridge Technic	3.0
DM 421 Dental Materials	1.0
Op 420 Operative Technic Lecture	1.0
Op 421 Operative Technic Lab	2.0
OS 420 Medical Emergency Procedures	1.0
*Per 620 Oral Hygiene Clinic	—
Phy 420 Physiology	3.0
Pth 420 Pathology	4.0

Winter Interval

CB 421 Crown and Bridge Technic	2.0
DM 422 Dental Materials	2.0
Op 423 Operative Technic	1.0
Op 424 Operative Technic Laboratory	2.0
Ord 423 Orthodontics	1.0
Ord 424 Orthodontics Technic	1.0
OS 421 Local Anesthesiology Exo.	1.0
OS 423 Intro Oral Surgery	1.0
Pedo 422 Child Development	2.0
*Per 621 Oral Hygiene Clinic	—
Phc 420 Pharmacodynamics I	3.0
Pth 421 Pathology	3.0
Ro 420 Oral Radiology	1.0

Spring Interval

An 421 Head and Neck Anatomy	3.0
CB 422 Crown and Bridge Technic	1.0
EmIn 423 Endodontics	2.0
OD 429 Oral Diagnosis	1.0
Op 623 Operative Clinic	0
OS 422 Local Anesthesiology Exo.	2.0
Pedo 423 Child Development	1.0
Pedo 429 Pedodontic Technic	1.0
Per 423 Principles of Periodontology	1.0
Per 622 Oral Periodontology Clinic	2.0
Pr 422-3 Prosthetics Conference Lab	2.0
Ro 421 Oral Radiology Lecture	1.0
Ro 422 Oral Radiology Lab	1.0

Second Year Total 54.3

Third Year

Fall Interval

CB 431 Principles of Crown and Bridge	1.0
CB 630 Crown and Bridge Clinic	1.0
Endo 431 Endodontics	1.0
*Endo 642 Endodontics Clinic	—
OD 430 Oral Diagnostic Treatment	1.0
Op 633 Operatives Clinic	1.0
Ord 431 Facial Growth	1.0
OS 430 Oral Surgery	1.0
Pedo 630 Pedodontics Clinic	1.0

Per 431 Periodontology Lecture	1.0
*Per 631 Periodontology Clinic	—
Pr 430 Principles of Clinical Prosthetics	1.0
Pr 633 Prosthetics Clinic	1.0
Pth 434 Pathology	2.0
*Ro 630 Oral Radiology Clinic	—

Winter Interval

CB 631 Crown and Bridge Clinic	1.0
*Endo 642 Endodontics Clinic	—
OD 437 Clinical Conference	0
Op 634 Operatives Clinic	1.0
Ord 432 Orthodontics	1.0
OS 431 Oral Surgery	1.0
PD 430 Caries Prevention	1.0
Pedo 631 Pedodontics Clinic	1.0
*Per 632 Periodontology Clinic	—
Phc 430 Pharmacodynamics II	3.0
Pr 634 Prosthetics Clinic	1.0
Pth 435 Pathology	2.0
*Ro 630 Oral Radiology	—

Spring Interval

CB 632 Crown and Bridge Clinic	1.0
*Endo 642 Endodontics Clinic	—
Med 439 Principles of Medicine	1.0
OD 438 Clinical Conference	2.0
Op 430 Principles of Clinical Operatives	1.0
Op 635 Operatives Clinic	2.0
OS 432 Oral Surgery Lecture	1.0
OS 630 Oral Surgery Clinic	1.0
PA 432 Dental Jurisprudence	1.0
Pedo 632 Pedodontics Clinic	1.0
Per 633 Periodontology Clinic	3.0
Pr 635 Prosthetics Clinic	2.0
Pth 436 Pathology	2.0
Ro 630 Oral Radiology	1.0

Third Year Total 44.0

Fourth Year

Fall Interval

CB 640 Crown and Bridge Clinic	2.0
DM 441 Dental Materials	1.0
*Endo 640 Endodontics Clinic	—
Med 440 Principles of Medicine	1.0
*Med 443 Hospital Clinic	—
OD 440 Clinical Conference	0
Op 643 Operatives Clinic	3.0
*Ord 447 Orthodontics Conference	—
PA 433 Professional Adjustment	1.0
PA 436 Professional Viewpoints	1.0
Pedo 440 Pedodontics Conference	1.0
Pedo 640 Pedodontics Clinic	0
*Per 440 Periodontology Clinic Seminar	—
*Per 641 Periodontology Clinic	—
Pr 643 Prosthetics Clinic	0
*Ro 640 Oral Radiology	—

Winter Interval

CB 441 Principles of Crown and Bridge	1.0
CB 641 Crown and Bridge Clinic	2.0
Endo 640 Endodontics Clinic	1.0
Med 442 Principles of Medicine	1.0
*Med 444 Hospital Clinic	—
OD 441 Clinical Conference	2.0
Op 644 Operatives Clinic	3.0
*Ord 442 Orthodontics Conference	—
PD 440 Public Health Dentistry	1.0
Pedo 641 Pedodontics Clinic	1.0
*Per 440 Periodontology Clinic Seminar	—
*Per 642 Periodontology Clinic	—
Pr 440 Principles of Clinical Prosthetics	1.0
Pr 644 Prosthetics Clinic	1.0
Pth 445 Pathology	2.0
*Ro 640 Oral Radiology	—

Spring Interval

CB 642 Crown and Bridge Clinic	2.0
Med 445 Hospital Clinic	1.0
OD 642 Oral Diagnosis Clinic	1.0
Op 645 Operatives Clinic	3.0
Ord 442 Orthodontics Conference	1.0
OS 440 Clinical Surgery	1.0
OS 640 Oral Surgery Clinic	1.0
OS 644 Hospital Dental Clinic	1.0
PA 401 Dental Psychology	—
PA 445 Ethics Case Study	1.0
Phc 642 Pharmacodynamics Clinic	1.0
Per 440 Periodontology Clinic Seminar	1.0
Per 643 Periodontology Clinic	1.0
Pr 645 Prosthetics Clinic	1.0
Pth 441 Oral Pathology	1.0
Ro 640 Oral Radiology Clinic	1.0

Fourth Year Total 44.0

Recapitulation

First Year	67.7
Second Year	54.3
Third Year	44.0
Fourth Year	44.0

Totals 210.0

CURRICULUM

MEDICAL SCHOOL 1974-1975

The curriculum in medicine requires a total of seven years' work beyond high school. The first three years must be satisfactorily completed before admission to the Medical School in Portland. Since facilities for instruction provide for the acceptance of only a limited number of applicants, completion of premedical studies does not guarantee admission to the Medical School.

The four years spent in the Medical School in Portland are devoted to subjects of the regular four-year curriculum in medicine required by law.

The prescribed and recommended subjects for the three premedical years are described under *Admissions and Scholastic Regulations*. In the first, second, third, and fourth years at the Medical School there are 5,044 class hours of required work. Descriptions of courses are to be found under the several departmental headings.

Prescribed Work

		Term Hours
First Year		
Con 410	Cell Organization and Function	5
Con 411	Medical Genetics	2
Con 412	Developmental Biology	2
Con 413	Introduction to Patient Evaluation	3
Con 414	Immunology	2
An 410	Gross Anatomy	12
An 411	Histology	4
An 412	Neuroanatomy	4
RCh 410	Basic Biochemistry	3
MPs 410	Medical Psychology	2
Pth 410	General Pathology	3
Phy 410	Human Physiology	7
Psy 410	The Human Context of Medical Practice	2
PH 410	Public Health and Epidemiology	3
		54
Second Year		
Con 610	Pathophysiology of Skin, Bone and Connective Tissue	3
Con 611	Patient Evaluation	5
Con 612	Cardiovascular Pathophysiology	5
Con 613	Respiratory Pathophysiology	3
Cor 614	Renal Pathophysiology	5
Con 615	Blood and Reticuloendothelial Pathophysiology	5
Con 616	Endocrine Pathophysiology	3
Con 617	Gastrointestinal Pathophysiology	5
Con 618	Reproductive Pathophysiology	5
Con 619	Pathophysiology of the Central Nervous System, Muscle and Special Sensory Organs	8
Mb 610	Microbiology	4
Phe 610	Pharmacology	3
		54
Third Year		
Con 620	Child Health	18
Con 621	Neurosciences	9
Con 630	Law and Medicine (May be taken 3rd or 4th year)	2
Med 620	Third-Year Medicine	18
RaID 620	Radiographic Diagnosis	1½
Special Programmed Instruction	9
		57½
Fourth Year		
ObG 630	Fourth-Year Obstetrics and Gynecology	9
Psy 630	Psychiatry Clinical Clerkship	9
Sur 630	Fourth-Year Surgery	18
Special Programmed Instruction	18
		54

A list of elective courses will be made available to every student.

* Includes holidays

ASSOCIATION OF SCHOOLS AND COLLEGES OF OPTOMETRY



Pharmacology Curriculum
Guidelines for Continuing
Education Courses

Prepared by the Council on Academic Affairs of the
Association of Schools and Colleges of Optometry,
Richard Hazlett, O.D.,
Chairman

December 1974

This Is The Recommended Content Of The Above Courses As Reported By The Council On Academic Affairs Of The Association Of Schools And Colleges Of Optometry

Pharmacology Curriculum Model

A Report of the ASCO Council on Academic Affairs

The role of the optometrist as a health care practitioner and a primary vision care provider has encouraged a movement in optometry to modify state optometry laws so that pharmaceutical agents can be utilized in the practice of optometry. This has also focused attention on the scope of the pharmacology programs in the schools and colleges of optometry. Sensing this attention, the Council on Academic Affairs of the Association of Schools and Colleges of Optometry (ASCO) selected a committee and prepared the following curriculum model to be utilized by the various schools and colleges in assessing the scope of their individual programs in pharmacology.

We want to thank the members of the committee who devoted considerable time and effort to this project: Dr. David Amos, private practice, Kansas City, Missouri; Dr. Freddy Chang, faculty member, School of Optometry, Indiana University; Dr. Siret Jannus, faculty member, Southern California College of Optometry; Dr. Jerry Rapp, faculty member, State University of New York, State College of Optometry; Dr. Tom Stelmuck, faculty member, Illinois College of Optometry; and Dr. Jess Boyd Eskridge, faculty member, University of Alabama in Birmingham, School of Optometry.

GENERAL PHARMACOLOGY

I. Introduction to Basic Principles of Drug Action

A. Definitions

1. General Concepts
 - a. Definition of a drug
 - b. Absorption and elimination
 - c. First order kinetics
 - d. Biological half-life
 - e. Volume of distribution
 - f. Dosing concepts

B. Sources of Drugs

1. Naturally occurring
2. Synthetic
3. Semi-synthetic

C. Drug Classification

1. Site of action
2. Functional group
3. Nomenclature

D. Dosage forms

1. Oral
2. Parenteral
3. Topical/ocular
4. Sustained release

E. Pharmacodynamics—pharmacokinetics

1. Routes of administration
 - a. Enteral
 - b. Parenteral
 - c. Rectal
2. Absorption
 - a. Passive versus active transport
 - b. Acid-base characteristics
 - c. Lipid solubility
 - d. Molecular size and charge characteristics
3. Distribution
 - a. Lipid solubility
 - b. Free versus bound
 - c. Blood-brain barrier
 - d. Protein binding (plasma, tissue)
4. Metabolism
 - a. Oxidation—reduction
 - b. Hydrolysis
 - c. Acetylation
 - d. Conjugation
 - e. Other
5. Excretion
 - a. Renal
 - b. Lungs
 - c. Skin

F. Pharmacogenetics

1. Idiosyncratic effects
2. Inborn errors of metabolism

G. Mechanisms of drug action

1. Kinetics of drug action
 - a. Michaelis—Menten
 - b. Biological half-life
 - c. Dose—response curve
 - d. Volume of distribution
 - e. Maintenance of dose, dosing interval, loading dose
2. Receptors and acceptors
 - a. Primary versus secondary
3. Agonist and antagonist
4. Drug tolerance
 - a. Tachyphylaxis
 - b. Physiological
 - c. Psychological
5. Drug—Receptor Interactions
 - a. Synergism
 - b. Additivity
 - c. Potentiation
 - d. Inhibition

H. Evaluation of Drug Action

1. Animal Studies
 - a. ED₅₀
 - b. LD₅₀
 - c. Therapeutic index
 - d. Drug efficacy
 - e. Drug potency
2. Clinical Investigations
 - a. Host factors
 - b. Placebo effect
3. Legal Regulations
 - a. Laws and Rules
 - b. Agencies (federal and state)
4. Drug Standards
 - a. Bioassays

I. Prescription Writing

1. Composition of the prescription
2. Laws governing drug dispensing

J. Ethical Factors of Drug Use

K. Psychological Factors of Drug Use

II. Drugs Acting on the Peripheral Nervous System

A. Neurochemical mediators

B. Autonomic drugs

1. Drugs acting on the parasympathetic system
 - a. Parasympathomimetics
 - 1) *n*-Acetylcholine
 - 2) Methacholine
 - 3) Carbachol
 - 4) Pilocarpine

- 2) Indirect acting
 - a) Physostigmine
 - b) Neostigmine
 - c) Edrophonium
 - d) Echothiophate
 - e) Disofluorophosphate
- b Parasympatholytic
 - 1) Anti Muscarinic
 - a) Atropine
 - b) Scopolamine
 - c) Homatropine
 - d) Cyclopentolate
 - e) Tropicamide
 - 2) Nicotinic
 - a) D-tubocurarine
 - b) Succinylcholine
- 2. Drugs Acting on the Sympathetic System
 - a Sympathomimetics
 - 1) Direct acting--alpha stimulators
 - a) Norepinephrine
 - b) Phenylephrine
 - c) Naphazoline
 - d) Tetrahydrozoline
 - e) Ephinephrine
 - 2) Direct acting--beta stimulators
 - a) Isoproterenol
 - b) Epinephrine
 - 3) Indirect acting
 - a) Ephedrine
 - b) Vasodilator--amphetamines
 - c) Parahydroxyamphetamine
 - b Sympatholytics
 - 1) Alpha blockers
 - a) Ergot alkaloids
 - b) Dibenzyline
 - c) Tolazoline
 - 2) Beta blockers
 - a) Propranolol
 - c. Neuronal blocking agents
 - 1) Guanethidine
 - 2) Bretylium
 - 3) Rauwolfia Alkaloids
- 3. Drugs Acting on Autonomic Ganglia
 - a. Ganglionic stimulants
 - b. Ganglionic blocking agents
- C. Drugs Modifying Neuromuscular Transmission
 - 1. Stimulating agents for transmission
 - 2. Blocking agents of transmission
- III. Autacoids
 - A. Histamines
 - B. Kinins
 - C. Prostaglandins
- IV. Drugs Acting on the Central Nervous System
 - A. Stimulants
 - 1. Amphetamines
 - 2. Non-amphetamines
 - B. Anti-depressants
 - 1. MAO inhibitors
 - 2. Tricyclic antidepressants
 - 3. Sympathomimetic agents
 - C. Anti-convulsants
 - 1. Barbiturates
 - 2. Phenytoins
 - 3. Miscellaneous
 - D. Anti-Parkinsonism
 - 1. Levodopa
 - 2. Anti-cholinergic
- E. Anti-spasmodic agents
 - 1. Anti-cholinergics
 - 2. Gastric antacids
- F. Sedatives and hypnotics
 - 1. Barbiturates
 - 2. Non-barbiturates
- G. Psychotherapeutic agents
 - 1. Phenothiazine derivatives
 - 2. Thioxanthene derivatives
 - 3. Benzodiazepine drugs
 - 4. Miscellaneous agents
- H. Analgesics
 - 1. Narcotics
 - 2. Non-narcotic
- I. Alcohol and Related Agents
 - 1. Alcohols
 - 2. Disulfiram
- J. Antipyretics and Anti-inflammatory (non-steroid)
 - 1. Salicylates
 - 2. Pyrazolon derivatives
 - 3. Para-aminophenol derivatives
- K. Drug Abuse
 - 1. Opiates
 - 2. Barbiturates and sedative-hypnotics
 - 3. Amphetamines
 - 4. Cannabinoids
 - 5. Psychotomimetics
- L. Drug Dependence
- V. Anesthetics
 - A. Pharmacology of General Anesthesia
 - 1. History and theory
 - 2. Signs and stages
 - 3. Mechanics
 - 4. Gas anesthetics (nitrous oxide, cyclopropane, ethylene)
 - 5. Volatile anesthetics (ether, halothane, chloroform)
 - B. Pharmacology of Local Anesthesia
 - 1. Cocaine
 - 2. Procaine
- VI. Drugs Acting on the Cardiovascular System
 - A. Digitalis and allied cardiac glycosides
 - B. Diuretics
 - 1. Thiazide derivatives
 - 2. Carbonic anhydrase inhibitors
 - 3. Osmotic agents
 - 4. Miscellaneous
 - C. Anti-arrhythmic drugs
 - 1. Quinidine
 - 2. Local anesthetics
 - 3. Miscellaneous agents
 - D. Anti-hypertensive drugs
 - 1. Hydralazine
 - 2. MAO inhibitors
 - 3. Diuretic agents
 - E. Anti-coagulants
 - 1. Heparin
 - 2. Oral anti-coagulants
 - 3. Miscellaneous agents
 - F. Vasodilators
 - 1. Nitrates and nitrites
 - 2. Theophylline compounds
 - G. Anti-atherosclerotic agents
 - 1. Hyperlipidemic drugs
 - 2. Female sex hormones
 - 3. Nicotinic acid

VII. Hormones and Drugs Modifying Endocrine Activity

- A. Pituitary Hormones and their actions
 - 1. Anterior pituitary hormones
 - 2. Posterior pituitary hormones
- B. Thyroid hormones and anti-thyroid agents
 - 1. Thyroid hormone
 - 2. Anti-thyroid drugs
- C. Insulin and other hypoglycemic agents
 - 1. Insulin
 - 2. Biguanides
 - 3. Sulfonylureas
- D. Adreno-cortical hormones
 - 1. Glucocorticoids
 - 2. Mineralocorticoids
 - 3. Androgenic steroids
- E. Gonadal hormones—oral contraceptives
 - 1. Estrogens
 - 2. Androgens
 - 3. Progesterone
- F. Parathyroid hormones
- G. Agents Affecting Immune Systems
 - 1. Corticosteroids
 - 2. Cytotoxic agents

VIII. Drugs Affecting Metabolic Activity

- A. Antianemic drugs
 - 1. Iron
 - 2. Copper
 - 3. Cobalt
 - 4. Pyridoxine
 - 5. Vitamin B12
 - 6. Folic acid
- B. Uricosuric drugs
 - 1. Colchicine
 - 2. Allopurinol
- C. Vitamins, Minerals and Other Nutrients
 - 1. Fat-Soluble Vitamins
 - 2. Water-Soluble vitamins
- D. Metals
 - 1. Heavy metals
 - 2. Heavy-metal antagonists

IX. Chemotherapeutic Agents

- A. Introduction
 - 1. History of chemotherapy
 - 2. Mechanisms of action of chemotherapeutic agents
- B. Antibiotics
 - 1. Synergism and antagonism
 - 2. Classification
 - 3. Methods of selection for clinical use
- C. Sulfonamides
 - 1. Chemistry
 - 2. Classification
 - 3. Toxicity and hypersensitivity
- D. Antiviral agents
 - 1. Idoxuridine
 - 2. Amantadine
 - 3. Miscellaneous agents
- E. Anti-fungal agents
 - 1. Nystatin
 - 2. Amphotericin B
 - 3. Griseofulvin
 - 4. Miscellaneous agents

F. Anti-parasitic agents

- 1. Ectoparasites
 - 2. Endoparasites
 - 3. Antimalarial
- ## G. Drugs used in treatment of tuberculosis and leprosy
- 1. Streptomycin
 - 2. Isoniazid
 - 3. Para-aminosalicylic acid
 - 4. Dapsone
 - 5. Ethambutol
- ## H. Drugs used in the treatment of neoplasia
- 1. Alkylating agents
 - 2. Anti-metabolites
 - 3. Hormonal agents
 - 4. Radioactive isotopes
- ## I. Antiseptics and disinfectants
- 1. Benzalkonium chloride
 - 2. Thimerosal
 - 3. Phenylmercuric nitrate

X. Over the Counter Medications

- A. Types of drugs found in OTC preparations
- B. Concentrations used
- C. Potential hazards

XI. Toxicology

- A. Adverse drug reaction
 - 1. Classification
 - 2. Frequency of occurrence
 - 3. Drug factors
 - 4. Patient factors
 - a) Age
 - b) Weight
 - c) Race
 - d) Pathological factors
 - e) Other
 - 5. Drug contraindication in pregnancy and lactation
- B. Environmental Factors
 - 1. Poisons
 - 2. Carcinogens
 - 3. Pollutants

XII. Principles of Immunopharmacology

- A. Immunosuppressive agents
- B. Cellular aspects of the immune response
- C. Effector mechanisms and mediators in immune injury
- D. Immunosuppressive and anti-inflammatory drug action

OCULAR PHARMACOLOGY

I. Properties of Ophthalmic Preparations

- A. Physical properties of ophthalmic solutions
 - 1. Tonicity
 - 2. PH
 - 3. Stability
 - 4. Sterility
 - 5. Viscosity
 - 6. Surface activity
- B. Physical properties of ophthalmic ointments
 - 1. Tonicity
 - 2. PH
 - 3. Stability
 - 4. Sterility
 - 5. Viscosity
 - 6. Surface activity

- C. Other dosage forms
 - 1. Suspension
 - 2. Time release systems
- D. Packaging
 - 1. Single dose
 - 2. Multiple dose
- II. Routes of Drug Administration
 - A. Topical
 - B. Subconjunctival injections
 - C. Retrobulbar injections
 - D. Intracameral and intravitreal injections
 - E. Iontophoresis
 - F. Other
- III. Ocular Drug Pharmacodynamics and Pharmacokinetics
 - A. Absorption and penetration
 - B. Distribution
 - C. Metabolism
 - D. Routes of removal
- IV. Techniques and Procedures in Clinical Administration
 - A. Pre-instillation
 - 1. Case history
 - 2. Ocular tissue integrity
 - 3. Angle evaluation
 - 4. Tonometry
 - B. Installation Techniques
 - 1. Solution
 - 2. Ointments
 - 3. Miscellaneous
 - C. Injections
 - D. Ophthalmic Prescription Nomenclature
- V. Drugs Affecting the Autonomic Nervous System of the Eye (Mechanisms of Action, Indications, Precautions, Contraindications, Dosage, Adverse Reaction, and Side-Effects)
 - A. Sympathomimetics (Mydriatics)
 - 1. Direct acting
 - a. Norepinephrine
 - b. Epinephrine
 - c. Phenylephrine
 - d. Isoproterenol
 - 2. Indirect acting
 - a. Cocaine
 - b. Hydroxyamphetamine
 - c. Ephedrine
 - B. Sympatholytics
 - 1. Alpha blockers
 - 2. Beta blockers
 - C. Neuronal blockers
 - D. Parasympathomimetics (Miotics)
 - 1. Direct acting
 - a. Acetylcholine
 - b. Methacholine
 - c. Pilocarpine
 - d. Carbachol
 - 2. Indirect acting (Anticholinesterases)
 - a. Reversible (short acting)
 - 1) Physostigmine
 - 2) Edrophonium
 - 3) Neostigmine
 - b. Irreversible (long acting)
 - 1) Demecarium
 - 2) Echothiophate
 - 3) Isoflurophosphate
 - E. Parasympatholytics (Cycloplegics—Mydriatics)
 - 1. Atropine
 - 2. Scopolamine
 - 3. Homatropine
 - 4. Cyclopentolate
 - 5. Tropicamide
 - 6. Oxyphenonium
- VI. Pharmacological Diagnosis and Treatment of Neuro Muscular Disorders
- VII. Local and Topical Anesthetics (Mechanisms of Action, Indications, Precautions, Contraindications, Dosage, Adverse Reactions, and Side Effects)
 - A. Cocaine
 - B. Procaine
 - C. Lidocaine
 - D. Tetracaine
 - E. Proparacaine
 - F. Benoxinate
 - G. Piperocaine
 - H. Butyn-Sulfate (Butacaine)
- VIII. Miscellaneous Ophthalmic Preparations
 - A. Hypertonic Osmotic Agents
 - B. Antihistamines
 - C. Ocular lubricants
 - D. Decongestants
 - E. Dyes
 - F. Irrigating Solutions
 - G. Vitamins
 - H. Ophthalmic Preparations in Contact Lens Wearing
 - I. Preservatives
 - J. Antiseptics
- IX. Corticosteroids and Other Anti Inflammatory Agents (Mechanisms of Action, Indications, Precautions, Contraindications, Dosage, Adverse Reactions, Side Effects)
- X. Ocular Chemotherapeutic Agents (Spectrum, Mechanisms of Action, Indications, Precautions, Contraindications, Dosage, Adverse Reactions, and Side Effects)
 - A. Antibiotics
 - B. Sulfonamides
 - C. Antiviral
 - D. Anti-fungal
 - E. Antiparasitic
 - F. Germicidal
- XI. Therapeutic Management of Ocular Disorders (Mechanisms of Action, Indications, Precautions, Contraindications, Dosage, Adverse Reactions, and Side Effects)
 - A. Diseases of the eyelids
 - B. Diseases of the lacrimal apparatus
 - C. Diseases of the conjunctiva
 - D. Diseases of the cornea
 - E. Diseases of the sclera
 - F. Glaucoma

22nd Annual Examination

NATIONAL BOARD OF EXAMINERS IN OPTOMETRY

Question Sheet for Part II, Section 6, OCULAR PHARMACOLOGY
Number of Test: 9

Tuesday, May 1, 1973

(1 hour)

9:00 - 10:00 p.m.

Instructions: Read carefully before starting. See also general instruction sheet. This examination consists of one group of 40 questions. On the answer sheet supplied with this examination, blacken the proper box to indicate the single best answer for each question. Be sure to indicate that this is test number 9.

1. The mechanism whereby neostigmine (Prostigmin) in small doses induces a pupillary constriction is because neostigmine
 - a. stimulates formation and release of acetylcholine.
 - b. reacts directly with receptor groups in the same fashion as acetylcholine.
 - c. reacts with receptor groups to block them.
 - d. blocks cholinesterase so acetylcholine can accumulate.
 - e. activates cholinesterase to destroy acetylcholine more rapidly.
2. Epinephrine and norepinephrine are both released by stimulation of the sympathetic nervous system. To distinguish between them experimentally small doses may be intravenously injected into a suitably prepared experimental animal. Which effect list below would be seen with epinephrine, but not with norepinephrine?
 - a. An increase in blood pressure
 - b. A cutaneous vaso-constriction
 - c. An increase in heart rate
 - d. A decrease in gut tone and motility
 - e. Bronchiolar dilatation
3. Which of the following mydriatics has the shortest duration of action when applied topically to the normal eye?
 - a. homatropine
 - b. atropine
 - c. epinephrine
 - d. phenylephrine
 - e. oxphenonium
4. Which of the following side-effects might result from the topical application of epinephrine preparations?
 - a. a decrease in heart rate
 - b. palpitations
 - c. rebound hyperemia
 - d. both b. and c. above
 - e. all of the above
5. Cocaine exhibits which two types of pharmacological activities?
 - a. local anesthesia and miosis
 - b. miosis and cycloplegia
 - c. local anesthesia and mydriasis
 - d. tachycardia and miosis
 - e. none of the above
6. Which of the following pharmacological activities is (are) common to phenylephrine but not to atropine?
 - a. mydriasis
 - b. conjunctival decongestion
 - c. cycloplegia
 - d. both a. and c. above
 - e. none of the above
7. When applied topically, drugs such as pilocarpine, isofluorophate and echerchiophate can be expected to produce
 - a. mydriasis
 - b. cycloplegia
 - c. mydriasis and cycloplegia
 - d. miosis
 - e. none of the above
8. Used in the management of ocular hypertension, acetazoleamide, dichlorphenamide and methazolamide are classed as
 - a. carbonic anhydrase inhibitors
 - b. anticholinesterases
 - c. direct-acting cholinergic stimulants
 - d. cholinergic inhibitors
 - e. adrenergic stimulants
9. Prolonged use of topical corticosteroids is known to
 - a. induce open-angle glaucoma in normal eyes and aggravate pre-existing glaucoma.
 - b. intensify ocular inflammation of allergic origin.
 - c. promote corneal scarring subsequent to traumatic injury.
 - d. cause corneal pitting.
 - e. none of the above

10. Which of the following drugs can be classed as a corticosteroid?
a. phenylephrine
b. tetrahydrozoline
c. dexamethasone
d. piperocaine
e. antazoline
11. Many ophthalmic solutions contain small amounts of benzalkonium chloride (Sephiran) in order to
a. solubilize the active drug.
b. buffer the preparation to pH 7.
c. render the preparation isotonic with tears.
d. inhibit the growth of contaminating microbes.
e. none of the above.
12. The term potency refers to
a. the margin of safety of a drug
b. the amount of drug required to produce a certain effect
c. the ratio between the toxicity and efficacy of a drug
d. the toxicity of a drug
e. none of the above
13. The term therapeutic index refers to
a. a classification of drugs by usage
b. a measure of drug potency
c. a measure of drug efficacy
d. the ratio between the number of times a drug is used and the toxicity observed
e. none of the above
14. Most drugs are broken down in the
a. skin
b. kidneys
c. liver
d. lungs
e. none of the above
15. The term synergism refers to
a. an effect greater than additive produced when two or more drugs are combined
b. drug antagonism
c. an additive effect produced by the combination of two or more drugs
d. a long duration of drug action
e. none of the above
16. Drugs cross biological membranes by the process(es) of
a. active transport
b. passive diffusion
c. filtration
d. all of the above
e. none of the above
17. Local anesthetics act by
a. producing an irreversible depression of neuronal conduction.
b. facilitating neuronal depolarization.
c. preventing neuronal influx of sodium ions.
d. increasing the permeability of neuronal membrane to sodium ions.
e. none of the above
18. Vasoconstrictors are often added to solutions of local anesthetics which are intended for injection in order to
a. retard absorption.
b. prolong the duration of action.
c. decrease the chance of systemic toxicity.
d. all of the above
e. none of the above
19. The absorption of excessive amounts of topical anesthetic from mucosal surfaces may lead to
a. marked sedation
b. bronchial constriction
c. hypertension
d. central nervous system stimulation
e. none of the above
20. Which of the following is not true concerning the use of tetracaine (Pontocaine) as a topical local anesthetic?
a. duration of action is 10-20 minutes
b. can produce superficial corneal epithelial lesions
c. can be safely prescribed for routine home use by patients
d. allergic reactions are known to occur
e. all of the above
21. Which of the following is not true concerning cocaine?
a. can produce marked topical anesthesia when applied to the cornea
b. topical application produces miosis
c. has been used in the differential diagnosis of Horner's syndrome
d. can produce damage to the corneal epithelium
e. all of the above
22. Drugs administered in the subconjunctival space cross through the sclera and into the eye primarily by
a. facilitated diffusion
b. active transport
c. filtration
d. passive diffusion
e. phagocytosis

23. If a patient came to you and was lethargic and had pinpoint pupils, you might suspect that he had recently taken
- pentobarbital
 - LSD
 - marijuana
 - morphine
 - amphetamines
24. Methyl mercury, a compound which is causing great concern today as an environmental pollutant, can cause many diverse symptoms involving the eye. Which of the following has been soundly established as a characteristic of poisoning with this agent?
- pigmentary retinopathy
 - concentric constriction of visual fields
 - nystagmus
 - oculogyric crisis
 - glaucoma
25. Pilocarpine reduces intraocular pressure by the following mechanism:
- Drug inhibits the enzyme acetylcholinesterase.
 - It inhibits the formation of aqueous humour.
 - Drug acts directly on the ciliary muscles and iris sphincter. The contraction of these muscles helps to open canal of Schlemm. Hence, the pressure is reduced.
 - It inhibits choline acetylase, the enzyme involved in the formation of aqueous humour.
 - The drug causes a fall in intracranial pressure which helps to reduce IOP.
26. Miotic effect of echothiophate results from
- depletion of the neurotransmitter acetylcholine.
 - irreversible inhibition of the enzyme acetylcholinesterase.
 - short lived inhibition of the enzyme acetylcholinesterase.
 - irreversible inhibition of monoamine oxidase.
 - depletion of the neurotransmitter norepinephrine.
27. Which of the following drugs produce mydriasis without significant loss of accommodation?
- homatropine
 - scopolamine
 - tropicamide
 - eserine
 - phenylephrine
28. Side effects from the systemic absorption of atropine will include
- central nervous system stimulation, tachycardia, dry mouth.
 - diuresis, salivation, marked fall in blood pressure.
 - piloerection.
 - fall in body temperature, diarrhea and vomiting.
 - sweating.
29. Which of the following drugs acts through liberation of endogenous norepinephrine and recently was introduced for the diagnosis of Horner's pupil?
- P-OH-amphetamine
 - methacholine
 - procaine
 - neostigmine
 - D.F.P.
30. Chronic administration of which of the following drugs is reported to cause a rise in intraocular pressure?
- aspirin
 - oral contraceptive
 - epinephrine
 - isoproterenol
 - propranolol
31. All of the following groups of drugs are used in the treatment of hypertension. Which group of drugs is likely to produce miosis?
- Ganglionic blockers, like pentolinium
 - Monoamine oxidase inhibitors, like Pargyline
 - Diuretics, like chlorthalidate
 - Norepinephrine depletors, like reserpine.
 - Veratrum alkaloids, like Protoveratrine
32. Large, repeated doses of tranquilizers, like chlorpromazine used in psychiatry, can cause
- mydriasis.
 - marked rise in IOP.
 - complete loss of accommodation.
 - vasoconstriction in iris.
 - corneal pigmentation, stellate form cataract and retinopathy.
33. If 10% solution of phenylephrine is applied topically as a mydriatic in children, the systemic side effect will include
- central nervous system depression.
 - marked rise in the systemic blood pressure.
 - marked relaxation of skeletal muscle.
 - loss of hair.
 - urination, vomiting and diarrhea.

34. Acetazolamide, given orally, reduces intra-ocular pressure by
- reducing the formation of aqueous humor.
 - its vasoconstrictor action which reduces the permeability of blood aqueous barrier.
 - its action like physostigmine.
 - opening the canal of Schlemm.
 - reducing the protein content of aqueous.
35. A local anesthetic agent used in the differential diagnosis of Horner's syndrome and Raeder's paratrigeminal syndrome is
- procaine
 - Holocaine
 - cocaine
 - Pontocaine
 - Dorsacaine
36. Of the following agents, which one is not used in o-t-c ophthalmic decongestant preparations?
- naphazoline
 - phenylephrine
 - zinc salts
 - tetrahydrazoline
 - All are used for this purpose.
37. Which one of the following statements is true? Anticholinergic drugs such as Belladonna group of alkaloids used in the treatment of peptic ulcers
- have no ocular effects.
 - may cause constriction of pupil.
 - may induce spasm of accommodation.
 - may produce conjunctival congestion.
 - produce temporary loss of accommodation.
38. Which one of the following statements is not true?
- Acetazolamide or Diamox inhibits carbonic anhydrase.
 - Diamox reduces intraocular tension in a glaucomatous eye.
 - Diamox is a diuretic used in the treatment of glaucoma.
 - Diuretics are generally useful in the treatment of glaucoma.
 - Diamox produces myopia in some individuals.
39. Which one of the following statements is true?
- Chlorpromazine or thiorazine is a drug with a wide safety margin and because of this reason, it is used extensively.
 - Chlorpromazine and other drugs belonging to its group are used in the treatment of open angle glaucoma.
 - Chlorpromazine does not cause any damage to the retina.
 - Chlorpromazine is known to cause cataract.
 - Chlorpromazine is stored in the choroid and pigment epithelium of the retina and may cause irreversible retinal damage.
40. In the case of a known open-angle glaucoma being treated with miotics, which one of the following drugs should be used to dilate the pupil for ophthalmoscopy?
- cyclopentolate
 - phenylephrine
 - homatropine
 - scopolamine
 - atropine

22nd Annual Examination

NATIONAL BOARD OF EXAMINERS IN OPTOMETRY

Question Sheet for Part II, Section 4, OCULAR PATHOLOGY
Number of Test: 3

Monday, April 30, 1973

(2 hours)

3:30 - 5:30 p.m.

Instructions: Read carefully before starting. See also general instruction sheet. This examination consists solely of multiple-choice questions. There are 100 test items. On the answer sheet supplied with this examination, blacken the proper box to indicate the single best answer for each question. Each question has a point value of 1. Total value is 100 points. Be sure to indicate that the number of this test is 3.

1. Which of the following is the most valid method of detecting a glaucoma?
 - a. tonometry (indentation type)
 - b. ophthalmodynamometry
 - c. tonometry (applanation type)
 - d. visual-field testing
 - e. ophthalmoscopy
2. Magnification of a visual-field defect can be obtained by
 - a. viewing it with an indirect, binocular ophthalmoscope
 - b. increasing the testing distance
 - c. having the patient wear a +2.50 D lens
 - d. having the patient wear a meridional magnifier axis 90
 - e. none of the above is correct
3. The best biomicroscope illumination for discovery of posterior corneal endothelial opacities is
 - a. retro-illumination
 - b. direct illumination
 - c. specular illumination
 - d. indirect illumination
 - e. sclerotic-scatter illumination
4. A patient has a bilateral field defect in which the left eye field has an inferior-nasal quadrantanopia and the right eye has a nasal hemianopia. The pathology is most likely located in or near the
 - a. optic nerve
 - b. retinal ganglion cell layer
 - c. lateral geniculate body
 - d. optic chiasma
 - e. anterior optic tract
5. Which of the following is NOT a field defect associated with glaucoma?
 - a. blurring of the blind spot
 - b. nasal step
 - c. Gullstrand extension of the blind spot
 - d. Seidel scotoma
 - e. arcuate scotoma
6. A patient with a chemical burn of the eye should generally receive the following treatment: Immediate
 - a. referral to an ophthalmologist
 - b. examination with the biomicroscope
 - c. instillation of a miotic and lid closure
 - d. irrigation of the eye with water or, if available, saline
 - e. instillation of a mydriatic and anesthetic
7. Observation of the fundus with the yellow-green ophthalmoscopic filter is used for detecting
 - a. hemorrhages
 - b. drusen of the disc
 - c. macular degeneration
 - d. pigment spots
 - e. venous pulsation
8. Which of the following hemorrhages is located near the ganglion-cell layer of the retina?
 - a. circular-shaped
 - b. subhyaloid-shaped
 - c. flame-shaped
 - d. streak or circular-shaped
 - e. star or fan-shaped
9. Ptosis may occur in
 - a. myasthenia gravis
 - b. Horner's syndrome
 - c. 3rd nerve paralysis
 - d. senile patients
 - e. all of the above are correct
10. Epicanthus inversus is
 - a. an inversion of the outer canthal folds
 - b. a recessively inherited autosomal characteristic
 - c. a redundant skin fold originating from the lower lid
 - d. associated with blepharochalasis
 - e. a genetic defect of the temporal plica semilunaris
11. A hordeolum is a staphylococcal infection of which glands?
 - a. Zeis and Moll
 - b. Meibomian
 - c. Kraus
 - d. Wolfring
 - e. a and b both are correct

12. Nodular episcleritis usually
- is located deep to the conjunctiva which can be shown by movement of the conjunctiva
 - is a chronic and recurrent condition
 - doesn't affect vision even with prolonged duration
 - is bilateral
 - all of the above are correct
13. A patient with a progressive nuclear sclerosis generally will have
- iridodonesis
 - increasing myopia
 - increasing hyperopia
 - increasing astigmatism
 - increased long-wavelength absorption
14. Which of the following is characterized by retinal changes of cotton-wool patches, focal constrictions, hard exudates, retinal edema, and right-angle vessel crossings?
- arteriosclerosis
 - diabetes
 - hypertension
 - polycythemia
 - all of the above are correct
15. Asteroid hyalitis
- occurs in the posterior chamber and thus vision is not disturbed
 - consists of dark spots that move when the eye moves
 - has a dull appearance with focal illumination
 - is another name for synchysis scintillans
 - none of the above is correct
16. Cotton-wool exudates are
- pigment epithelium secretions
 - microinfarcts in the nerve-fiber layer
 - lamina vitrea changes which occur with age
 - soft arteriolar secretions
 - soft venule secretions, associated with cell-wall changes
17. Diabetic changes in the eye may include
- lens opacities
 - neovascularization of retinal vessels
 - degenerative changes in vessel walls
 - microaneurysms
 - all of the above are correct
18. There is profuse mucous discharge in
- catarrhal conjunctivitis
 - vernal conjunctivitis
 - follicular conjunctivitis
 - purulent conjunctivitis
 - allergic conjunctivitis
19. In retinal detachment
- the location is usually peripheral
 - vessels in the detached area are normal in color
 - there is usually progression in the temporal direction
 - an associated retinal tear presents a greenish color
 - all of the above are correct
20. Regarding tonography
- in normal eye the Po/C ratio will exceed 100
 - the tonometer remains on the cornea for about 2 minutes
 - a majority of untreated open-angle glaucomatous eyes will have a Po/C ratio of 140 or higher
 - tonography is performed with an applanation tonometer
 - all of the above are correct
21. Seborrhic blepharitis differs from staphylococcal blepharitis in that
- the former exhibits remissions and exacerbations
 - loss of eye lashes is present in the latter
 - the latter is associated with dandruff
 - the former is usually caused by Morax-Axenfeld bacillus infection
 - none of the above is correct
22. Dislocation of the lenses is a characteristic finding in
- Von Recklinghausen's syndrome
 - thyrotoxicosis
 - Marfan's syndrome
 - Sjogren's syndrome
 - none of the above is correct
23. Regarding Hassal-Henle bodies,
- they are present in a majority of young persons
 - they are best detected by use of the specular reflection technique in slit-lamp biomicroscopy
 - they are caused by degeneration of corneal stroma
 - they are caused by infiltration of fat droplets in Bowman's membrane
 - both a and c are correct

24. Bilateral cecocentral scotoma with no other ocular symptoms or signs of fundus pathology is most likely caused by
- pituitary tumor
 - cavernous sinus thrombus
 - posterior cerebral hemorrhage
 - tobacco amblyopia
 - multiple sclerosis
25. Fundus examination of an infant's eyes shows a whitish macular area with a cherry-red fovea and a white, atrophic disc. This appearance could be caused by
- occlusion of central-retinal artery
 - occlusion of central-retinal vein
 - Tay-Sachs disease
 - all of the above are correct
 - only a and c are correct
26. A patient 40 years old complains of blurring. Fundus examination shows the foveal reflex is missing, and the macular area is slightly elevated. Field tests show a central scotoma. The contralateral eye is normal in appearance and function. The probable pathology is
- senile macular degeneration
 - central serous retinopathy
 - retrobulbar neuritis
 - syphilitic uveitis
 - retinitis pigmentosa
27. The visual aura in migraine is
- present in about 10 percent of migraine cases
 - caused by vasodilation
 - usually accompanied by recognizable fundus changes
 - all of the above are correct
 - none of the above is correct
28. Fundus examination shows a marked narrowing of retinal arteries and veins, a yellowish disc, and scattered pigment masses resembling bone corpuscles in shape. The patient complains of poor vision at night. The probable diagnosis is
- chorioretinitis
 - retinoblastoma
 - retinitis pigmentosa
 - choroideremia
 - all of the above could cause these signs and symptoms
29. Ophthalmoscopy shows a pale fundus in which arteries and veins are distended, tortuous, pale yellow in hue, and difficult to tell apart. Hemorrhages of various sizes occur, some with white centers. The diagnosis is
- leukemic retinopathy
 - diabetic retinopathy
 - occlusion of the central retinal artery
 - nephritic retinopathy
 - none of the above is correct
30. Fundus examination shows that the disc has hazy margins, an irregular surface, and is greyish in color. Field tests show no visual loss. The retinal blood vessels and the retina appear normal. The probably cause of the abnormally appearing disc is
- papillitis
 - papilledema
 - retrobulbar neuritis
 - pseudopapillitis
 - none of the above is correct
31. A patient complains of deep pain in one eye. The eye is sensitive to palpation. The optic disc is reddish and moderately elevated with indistinct margins. Field tests show a central scotoma. The probable diagnosis is
- glaucoma
 - papillitis
 - papilledema
 - pseudo-optic neuritis
 - occlusion of central retinal artery
32. Secondary glaucoma is frequently caused by
- iridocyclitis
 - occlusion of central-retinal artery
 - papillitis
 - keratitis
 - toxoplasmosis choroiditis
33. A patient exhibits fever, general malaise, and glossy red, edematous, demarcated patches involving the eyelids and adjacent facial skin. Probable diagnosis is
- dacryocystitis
 - dacryoadenitis
 - erysipelas
 - atopic dermatitis
 - orbital cellulitis
34. After a few weeks of mild bilateral conjunctivitis, a severe conjunctivitis follows with swollen eyelids, opaque follicles on the upper palpebral conjunctiva. A vascular membrane invades the upper cornea. The patient probably has
- follicular conjunctivitis
 - swimming-pool conjunctivitis
 - vernal conjunctivitis
 - trachoma
 - syphilis
35. Sattler's veil refers to hazy vision caused by
- scratching of the corneal epithelium
 - corneal subepithelial edema resulting from oxygen deprivation
 - corneal stromal edema resulting from high intraocular pressure
 - tears in Descemet's membrane
 - Fuch's endothelial dystrophy

36. A patient complains of severe pain on one side of the face. Small vesicles are found on the skin of the upper eyelid. Corneal examination shows punctate white dots and reduced corneal sensitivity on the same side of the face. The probable diagnosis is
- chicken pox
 - small pox
 - Herpes Zoster ophthalmicus
 - Herpes simplex
 - tic douloureux
37. The Kayser-Fleischer ring
- is a circle of blood and pigment in the cornea
 - indicates a dystrophy of endothelium of the cornea
 - is caused by faulty sugar metabolism
 - indicates a hereditary excessive absorption of copper by the alimentary tract
 - all of the above are correct
38. A mature senile cataract is
- likely to cause increased intra-ocular pressure
 - appears shrunken, with soft, milky cortex
 - shows fine dust-like opacities scattered throughout the lens
 - appears opaque, dull grey, amber or brown in color
 - shows radiating opaque streaks from periphery toward the center of the lens
39. A layer of pigment granules deposited on the anterior lens surface after trauma is called
- Kayser-Fleischer ring
 - Maxwell's ring
 - Vossius' ring
 - Soemmering's ring
 - Krukenberg's spindle
40. Mittendorf's dot, situated on the posterior surface of the lens, is
- the earliest sign of posterior subcapsular cataract
 - an unimportant congenital anomaly
 - a significant sign of vitreous detachment
 - a sign of synchysis scintillans
 - a sign of retrolental fibroplasia
41. A patient has noticed for several weeks a gradual deterioration of vision. There is no ocular pain. The vitreous is cloudy; the fundus shows small yellow-grey, ill-defined foci of inflammation. The diagnosis is
- retinitis pigmentosa
 - retinitis proliferans
 - disseminated choroiditis
 - diabetic retinopathy
 - hypertensive retinopathy
42. A patient over 60 years of age has numerous white spherical bodies in the vitreous, which move when the eye moves and return to their original position when the eye is at rest. There are no signs of present or past inflammation. These bodies are
- cholesterol crystals
 - muscae volitantes
 - synchysis scintillans
 - calcium-lipid soaps
 - mutton-fat bodies
43. An aqueous flare would lead one to suspect
- glaucoma
 - iritis
 - posterior uveitis
 - cyclitis
 - brain tumor in the medulla
44. Which of the following ocular symptoms does NOT occur in multiple sclerosis?
- weak convergence
 - ptosis
 - loss of accommodation
 - diplopia
 - none of the above is correct
45. Severe deficiency of vitamin A in the diet or in intestinal absorption may cause
- Bitot spots on the conjunctiva
 - grey indolent corneal ulcer
 - xerophthalmia
 - keratomalacia
 - all of the above are correct
46. Retrobulbar neuritis often occurs as a complication of
- multiple sclerosis
 - sinusitis
 - pernicious anemia
 - acquired syphilis, secondary stage
 - all of the above are correct
47. A patient complains of seeing double, lids drooping, and difficulty in swallowing, particularly towards the end of the day. The probable diagnosis is
- Marfan's syndrome
 - myasthenia gravis
 - Graves' syndrome
 - myotonic dystrophy
 - multiple sclerosis
48. Itching eyes, stringy exudate containing eosinophiles, and many papillae on the upper tarsal conjunctiva indicate
- catarrhal conjunctivitis
 - membranous conjunctivitis
 - vernal conjunctivitis
 - gonorrheal conjunctivitis
 - epidemic keratoconjunctivitis

49. The patient exhibiting bilateral congruent inferior hemianopia probably has a lesion in the
- ventral fibers
 - upper lip of both calcarine fissures
 - area between proximal parts of both optic nerves
 - posterior communicating artery
 - optic chiasma
50. Simple chronic glaucoma
- occurs most frequently in individuals whose IOP varies diurnally by 3-4 mm/Hg
 - causes loss of vision by pressure on the fovea
 - occurs in all individuals who have an IOP over 30 mm/Hg
 - all of the above are correct
 - none of the above is correct
51. In optic nerve atrophy associated with Leber's disease, the expected field defect is
- peripheral field contraction
 - ring scotoma
 - bitemporal hemianopia
 - concentric blind spot enlargement
 - centrocecal scotoma
52. One of your elderly patients complains of the transient loss of vision in one eye. His blood pressure is normal. His fundus appears normal on examination. The loss of vision
- was probably imaginary
 - can be ignored
 - was probably due to infarction
 - may be a warning of possible central-retinal artery occlusion
 - may be a warning of possible retinal detachment
53. You see a central-retinal artery occlusion a day after it occurred. The statement that "there is no need to refer this case because the damage has been done and nothing can be done for the patient" is
- true because a referral would be a waste of time and money
 - false because vision may return with treatment
 - false because with care the patient's other eye and perhaps life may be saved
 - true because treatment is only effective if given within one hour
54. Bacterial conjunctivitis is most likely cause
- profuse tearing
 - purulent discharge
 - marked itching
 - follicular formations
 - membrane formations
55. A contact-lens patient telephones to say that his left eye is red, sore, and blurred. The right eye is without symptoms even though both lenses were overworn by six hours at a party. You should recommend
- leaving the lenses out a day before trying again
 - rest, aspirin, closer adherence to the wearing schedule
 - an eye exam to rule out iritis or glaucoma
 - a refitting of the left lens
 - none of the above is correct
56. Optic neuritis results in
- central scotoma
 - peripheral constriction of the visual field
 - cecal scotoma
 - enlarged blind spot
 - both a and b are correct
57. Your patient says he sees better in bright sunlight than indoors. He is also having increased difficulty reading. Which of the following cataracts is most likely to produce these symptoms?
- coniform cataract
 - nuclear cataract
 - cupuliform cataract
 - nuclear sclerosis
 - posterior polar cataract
58. A patient says he sees sparks and flashes in the lower field of the right eye. He also says that everything is cloudy in that area. If both symptoms are of recent origin, you would suspect
- retinitis
 - Coats' disease
 - angiospastic retinopathy
 - retinal detachment
 - atypical migraine
59. On fundus examination you notice whitish spots edged with pigment clumps scattered about the fundus. Visual-field examination shows multiple scotomas that are absolute. Your diagnosis is
- drusen deposits
 - old, inactive disseminated chorioretinitis
 - active, central choroiditis
 - old, inactive central choroiditis
 - active, disseminated chorioretinitis

60. The grayish or yellowish coloration of the lens seen using oblique illumination in most eyes in old age is due to
- discoloration of lens capsule
 - sclerosis of lens fibers
 - nuclear cataract
 - reflection from the iris
 - all of the above are correct
61. Diabetic retinopathy and retinal vein occlusion are alike in that both
- occur following hypertension
 - result in blindness in 50% of the cases
 - are the first signs of systemic diseases
 - may result in neovascularization of the fundus and rubeosis iridis
 - all of the above are correct
62. Using the direct ophthalmoscope and viewing through a red lens you would enhance which item in the fundus the most?
- hemorrhages
 - edema
 - pigment
 - blood vessels
 - optic nerve fibers
63. The prognosis of a retinal detachment is best if the cause of the detachment is
- vitreous detachment and traction on the retina
 - retinal tear
 - edema from toxemia of pregnancy
 - diabetic retinopathy
 - choroidal tumor
64. Which tumor primarily occurs before the age of 6 years?
- malignant melanoma
 - lid epithelioma
 - retinoblastoma
 - all of the above are correct
 - none of the above is correct
65. A conjunctival nevus should be referred for consideration of removal if it
- enlarges and becomes vascular
 - produces irritation
 - is chronically inflamed
 - is cosmetically poor
 - all of the above are correct
66. Which of the following is NOT true of choroidal nevi?
- frequently becomes malignant
 - the retinal area appears flat
 - often cause a field defect
 - all of the above are correct as none are true statements
 - none of the above is correct as all are true statements
67. Which of the following is NOT seen in absolute glaucoma?
- optic atrophy
 - iris atrophy
 - corneal edema
 - vitreous hemorrhage
 - intense pain
68. A lid pathology including hyperemic and swollen lid margins, foamy secretion, and which yields yellowish fluid with pressure on lid margin, indicates
- meibomianitis
 - hordeolum
 - angioneurotic edema
 - tarsitis
 - acute blepharitis
69. Occlusion of the central retinal vein may result in
- blanching of the retina
 - pain at the onset
 - hemorrhagic glaucoma
 - all of the above are correct
 - none of the above is correct
70. The most significant ophthalmoscopic finding in chronic simple glaucoma is the
- depth of the cup
 - vessel displacement
 - clarity of the disc margins
 - size ratio between arteries and veins as they cross the disc margin
 - width of the cup
71. The major cause of diplopia in the over 60 age group is
- orbital tumor
 - multiple sclerosis
 - cerebrovascular accident
 - diabetes mellitus
 - luxation of the lens
72. A patient has recently experienced a severe infection of an upper molar tooth. He now has swelling of the eyelids, exophthalmos, impaired ocular motility, and high fever. The probable diagnosis is
- thyrotoxicosis
 - tenonitis
 - iritis and secondary glaucoma
 - orbital cellulitis
 - scleritis
73. Aqueous flare, photophobia, and keratic precipitates indicate
- posterior uveitis
 - anterior uveitis
 - scleritis
 - intraocular parasitic infestation
 - angle-closure glaucoma

74. According to the Keith-Wagener-Barker classification of hypertensive retinopathy
- edema residues are first seen in group 2
 - arteriovenous ratio may be 1:3 in group 2
 - hemorrhages are present in group 1
 - papilledema is present in group 3
 - all of the above are correct
75. The usual first arteriovenous crossing defect in arteriosclerotic retinopathy is
- depression or elevation of the vein
 - deviation of the vein
 - concealment or tapering of the vein
 - ~~banking of the vein distal to artery crossing~~ *concealment of lumen* ^C
 - increased arterial tortuosity near the crossing
76. Administration of large doses of corticosteroids over an extended period may cause
- nuclear cataract
 - posterior subcapsular opacities in lens
 - fine, superficial cortical lens opacities
 - dense, disc-like opacity of the lens
 - stromal opacities of the cornea
77. Which of the following may be a sign or symptom of malignant melanoma?
- hyperopic shift of refraction error
 - relative scotoma
 - metamorphopsia
 - both a and b are correct
 - all of the above are correct
78. The fundus reveals hemorrhage, edema, cotton-wool patches, generalized attenuation of the arterioles and papilledema. The diagnosis is
- hypertensive retinopathy grade IV
 - arteriosclerotic retinopathy grade III
 - diabetic retinopathy stage III
 - hypertensive retinopathy grade III
 - diabetic retinopathy stage IV
79. Retinal arterial pulsation seen in the fundus
- may be a normal variation
 - may be associated with aortic regurgitation
 - occurs when intraocular pressure is less than diastolic pressure
 - occurs with retinal vein occlusion
 - none of the above is correct
80. With regard to pseudo-optic neuritis
- the eye is usually highly myopic
 - venous engorgement is present
 - the blind spot is enlarged
 - the cause is excessive glial tissue in the disc
 - all of the above are correct
81. Disciform degeneration of the macula
- occurs most frequently in young people
 - is caused by degeneration of the neuroglia cells of the retina
 - does not affect visual acuity
 - causes progressive contraction of the peripheral field
 - none of the above is correct
82. Retinitis proliferans often occurs in
- syphilitic retinopathy
 - diabetic retinopathy
 - recurrent retinal hemorrhage
 - all of the above are correct
 - none of the above is correct
83. A patient has moderate conjunctival inflammation, with the greatest injection in the lower fornix region. There is a nonprofuse watery or mucoid discharge, tearing, and itching. This is most likely
- bacterial conjunctivitis
 - viral conjunctivitis
 - fungal conjunctivitis
 - chronic atopic (allergic) conjunctivitis
 - ocular pemphigoid
84. Which of the following is true of perforated detachments of the retina?
- result from penetration of fluid from the vitreous space into the subretinal space
 - rarely occur in a healthy eye, but do occur in an eye suffering from degenerative changes of myopia or aging
 - only rarely occur at the macula even when a hole in the macula exists
 - all of the above are correct
 - only a and c are correct

85. Bitot's spots
- are found primarily in children as a result of malnutrition
 - appear to be hard, dark masses deep to the conjunctiva in the episclera
 - may be followed by marked corneal changes of softening, exfoliation of the epithelium, development of ulcers, and loss of transparency
 - all of the above are correct
 - only a and c are correct
86. Which of the following is NOT true of keratoconus?
- usually becomes manifest in youth
 - is usually unilateral
 - slit-lamp observation shows marked corneal thinning at the apex
 - there is often a ring (Fleischer's ring from deposition of iron) around the cone
 - none of the above is correct as all are true statements concerning keratoconus
87. Which of the following is NOT a senile or aging change of the cornea?
- Hassall-Henle bodies
 - lipid arcus
 - white limbus girdle
 - all of the above are correct as none are aging changes
 - None of the above is correct as all are aging changes
88. The patient's eye shows conjunctival swelling with considerable red hyperemia near the fornices; has a watery discharge mixed with mucus and leucocytes; and small papillae in the tarsal region of the lids. The patient reports a "foreign body" sensation. The probable diagnosis is
- acute catarrhal conjunctivitis
 - chronic catarrhal conjunctivitis
 - purulent conjunctivitis
 - pseudo-membranous conjunctivitis
 - acute angle-closure glaucoma
89. A vitreous detachment
- causes the patient to see floaters and occasional light streaks, usually in the temporal field
 - ophthalmoscopically may appear as a hole in a membrane floating in front of the retina
 - leads to retinal detachment in a majority of cases
 - both a and b are correct
 - a, b, and c are all correct
90. Vitreous detachment most commonly occurs
- anteriorly separating the vitreous from the lens
 - posteriorly separating the vitreous from the posterior pole of the eye
 - laterally separating the vitreous from the temporal ora
 - superiorly separating the vitreous from the superior ora
 - inferiorly separating the vitreous from the inferior ora
91. Which of the following is true of cataracts with diabetic patients?
- senile cataracts occur more frequently and at an earlier age as compared to nondiabetics
 - the specific diabetic cataract occurs primarily in young persons
 - the specific diabetic cataract typically shows opacities in the anterior and posterior cortex
 - both a and c are correct
 - a, b, and c are all correct
92. An early choroidal tumor or early serous pigmentary epithelial detachment is most likely to be revealed by a
- peripheral field loss detected by perimetry examination
 - relative scotoma detected with the multiple pattern screener
 - relative scotoma detected by tangent screen examination
 - relative scotoma detected on the Amsler grid
 - metamorphopsia detected on the Amsler grid
93. With regard to the swinging light test
- it is also called the pupillary release test
 - a flashlight beam, in a dark room is passed alternately before the two eyes
 - dilation of the pupil of the right eye as the light is shown into the right eye indicates that the direct light reflex for the right eye is weaker than the consensual light reflex from the left eye
 - dilation of the pupil of the right eye as the light is shown into the right eye indicates that the retina or optic nerve of the right eye is deficient and possibly undergoing pathological changes
 - all of the above are correct

94. With regard to topical anesthetics,
- the use of anesthetics retards repair of the corneal epithellum
 - corneal anesthesia is produced by blockage of impulse conduction at nerve synapses
 - while uncommon, allergic reactions are severe and require medical treatment
 - both a and b are correct
 - a, b, and c are all correct
95. Congenital ptosis is
- often associated with superior rectus palsy
 - often associated with a miotic pupil
 - usually unilateral
 - all of the above are correct
 - none of the above is correct
96. The Schirmer test measures
- corneal sensitivity
 - corneal sensibility
 - rate of aqueous production
 - rate of aqueous outflow
 - rate of tear formation
97. A chalazion
- is a painless swelling of the lid without gross inflammatory signs
 - may disappear upon massage of the lids
 - requires immediate removal if secondary infection is to be avoided
 - a and b are both correct
 - a, b, and c are all correct
98. Which of the following is true of closed-angle glaucoma?
- is most likely to occur in hyperopic eyes with a shallow anterior chamber
 - may occur either as the result of an iris bombe or as the result of mydriasis bunching the iris into the filtration angle
 - acute attacks usually occur suddenly without prodromal symptoms
 - both a and b are correct
 - a, b, and c are all correct
99. Studies by Armary and other investigators indicate that there is a genetic basis for
- ~~high increase in intraocular pressure from topical steroids~~ *topical steroids*
 - the cup-disc ratio of the optic nerve
 - open-angle glaucoma
 - both a and b are correct
 - a, b, and c are all correct
100. Which of the following would counterindicate the use of neosynephrine for facilitating ophthalmoscopy?
- an aqueous space at the limbus equal to the corneal thickness
 - an aqueous space at the limbus less than one-half of the corneal thickness
 - a family history of open-angle glaucoma
 - both a and b are correct
 - a, b, and c are all correct

UNITED STATES
OPTOMETRIC COLLEGES

1. University of Alabama in Birmingham (School of Optometry at the Medical Center)
2. University of California (School of Optometry)
3. University of Houston (College of Optometry)
4. Illinois College of Optometry
5. Indiana University (Division of Optometry)
6. Southern California College of Optometry
7. Massachusetts College of Optometry
8. Pacific University (College of Optometry)
9. Pennsylvania College of Optometry
10. Southern College of Optometry
11. State College of Optometry (State University of New York)
12. Ohio State University (College of Optometry)
13. Ferris State College (College of Optometry)



CORVALLIS, OREGON 97331

OREGON STATE UNIVERSITY

SCHOOL OF PHARMACY
Reply to: OFFICE OF THE DEAN
Area code 503; telephone 754-3191; 754-3283

Statement of
Charles O. Wilson
Dean Pharmacy
Oregon State University

My interest in this bill is in the provision which it provides for a health professional, in this case the optometrist, to utilize his special knowledge to the fullest extent in order to benefit the patient.

As a pharmacist, and Dean of Pharmacy at Oregon State University, I have observed a primary service of a pharmacist lies in his ability to recognize disease states and to urge his ill customers to see a physician.

The need for services of a physician is not always known by an individual. This is the reason for today's mass testing for diabetes, hypertension, heart disease, and the reason why women are instructed to check themselves for breast cancer. These activities are all designed to bring the patient into the health-care system.

Optometrists can, through this legislation, offer a diagnostic service to eye patients and facilitate their entrance into the health-care system. There must be many people who, having a pathological eye condition unknown to them, seek the services of an optometrist for the fitting of glasses.

This Bill will make it possible for optometrists to carry out diagnostic procedures to identify any pathological condition during

Statement of the Dean
School of Pharmacy
Oregon State University
Page 2

the course of the examination for the fitting of glasses. On those occasions when a pathological condition is identified, the patient will be referred to an ophthalmologist for treatment.

I see in this Bill a very positive effect upon the practice of optometry and another means of mass eye examination for the prevention of blindness.

Charles Wilson

IV.
TESTIMONY
BY

PETER P. LAMY, PH.D., F.C.P.
Professor and Director
Institutional Pharmacy Programs
Chairman, Department of Pharmacy
Practice and Administrative Science

UNIVERSITY OF MARYLAND
SCHOOL OF PHARMACY
SENATE ECONOMIC AFFAIRS COMMITTEE

March 8, 1979

I am pleased to support the request by the Maryland Optometric Association for legislation which would allow board certified optometrists to use certain specified classes of topically administered pharmaceutical agents for diagnostic purposes.

Some Background Information:

I think it will be helpful to review very briefly the professional practice of optometrists in at least one other country:

In Britain, optometrists have been trained in and accustomed to the use of certain drugs in eye examinations for more than 50 years. In 1949, a select Committee under Lord Crook, a committee which included five physicians, unanimously concurred in the use of certain specified drugs by optometrists for eye examinations. British optometrists perform over 80% of the eye examinations in that country. The British position was reviewed in 1970 by a joint committee of ophthalmologists and optometrists and they concluded that "it is proper for an optometrist to use appropriate drugs for eye examinations."

What is Needed:

The citizens of Maryland are entitled to a continuum of care, ranging from primary to specialized care, delivered in the best and most cost-efficient manner. As far as eye examinations are concerned, it is reasonable to envision a cycle with optometrists providing initial examination and triage, ophthalmologists having the opportunity to exert the full range and benefit of their extensive medical education in the treatment of eye diseases. As a matter of fact, a similar course of events is already taking place, with the great majority of patients already seeking out optometrists for an initial eye evaluation. Passage of this bill would give optometrists the opportunity to deliver more careful and valuable care to our citizens.

As a health professional greatly interested in the fields of geriatrics and gerontology, I might point out that the National Center for Health Statistics, in 1975, reported that approximately 50% of our elderly citizens suffer from impaired vision. Many of these do not seek help, often owing to economic constraints. As a matter of fact, the Central Maryland Health Systems Agency has reported that in Baltimore City, approximately 25% of the population would be classified as "gray area" persons, that is those who do not qualify for medical assistance but are simply too poor to look for adequate health care. An enlarged role for optometry which does not encroach on the role of ophthalmology would probably be greatly helpful to those citizens.

What Questions Must Be Answered?

It is clear that this bill must be viewed from a benefit-risk point of view. What would be patient benefit, what would be patient risk? As already outlined the benefits would seem to be large, both from an economic point of view and a health care point of view.

What about risk? The eye is a very sensitive organ. Blindness, precipitation of angle-closure glaucoma, and infection are probably the greatest risk when eye preparations are administered. YET, very few cases of glaucoma precipitated by dilation of the pupil are reported, in the range of 1:15,000 patients. It is difficult to envision blindness caused by a one-time application of the classes of drugs which are being discussed.

Sodium fluorescein solution, which is known to support the proliferation of bacteria easily, was routinely used by optometrists as well as ophthalmologists without causing a high incidence of eye infections.

On the other hand, the benefits from the topical use of drugs for diagnostic purposes far outweigh the risk to vision. There is simply no good way to obtain a satisfactory view of the interior of the eye unless the pupil is dilated. In addition, it is highly probable that optometrists, properly trained, and being able to practice in a more efficacious manner, will be able to recognize more eye abnormalities, which can and will then be referred to ophthalmologists, increasing public benefit and the level of public health.

Is This Bill Reasonable?

I believe it is.

The bill asked only that certain drugs could be used by optometrists in eye examinations. It does not ask that optometrists be granted the right to treat eye diseases.

The bill asked that only properly trained, and qualified optometrists be given this professional privilege. It specifically does not ask for a grandfather clause and, indeed, asks that optometrists can only be qualified after they have been trained and educated in the pharmacological action and proper use of these drugs.

Thus, weighing risks and benefits, I must believe that the benefits to the citizens of Maryland far outweigh the risks, and that is the reason why I support this bill.

Sincerely,

Peter P. Lamy, Ph.D., F.C.P.

STATEMENT

ALASKA BOARD OF EXAMINERS IN OPTOMETRY

ALASKA STATE

MANPOWER

regarding

VISION AND EYE HEALTH CARE

The optometrists of Alaska are geographically more evenly distributed so as to meet the needs of the people. Ophthalmologists are primarily concerned with eye surgery and, therefore, are concentrated around larger population areas where more extensive hospital facilities are available.

As the National Health Care program emerges, along with other increasing group insurance programs, the need for better referral channels must be established. Diagnostic agents can make pathology detection more effective and those referrals more accurate.

Enclosed are:

1. Alaska Distribution Map on Vision and Eye Health Care.
2. 1979 listing on:
 - a. Resident Optometrists in Alaska (32)
 - b. Resident Ophthalmologists in Alaska (17)



PRIVATE PRACTITIONERS

OPTOMETRISTS

by cities (32)

FAIRBANKS

Hammond
Johnson
LeFevre
Lounsbury
Schmidt

ANCHORAGE

Bach, E.
Bach, P.
Bigelow
Falconer, M.
Falconer, J.
Faulkner
Hall
Harbour
Miller
Roelius
Sternberg
Walker
Albert
Gonnason

JUNEAU

Box
Kemp
Matson

KENAI

Swarner
O'Connell

NORTH POLE

Cobbett

KETCHIKAN

Craig
Smith
Swearingen

BETHEL

Demskey

EAGLE RIVER

Keene

SITKA

McLaughlin

VALDEZ

Mastolier

KODIAK

Swank

Through branch offices, these communities are served by optometrists:

Petersburg
Wrangel
King Salmon
Naknek
Galena
Seward
McGrath
Unalakleet
Kotzebue
Barrow
Cordova
Haines
Skagway
Kake
Yukutat
Nome
Prudhoe
Deadhorse
Delta Junction
Homer
King Cove
Sand Point
Wasilla
Dillingham
Yakutat

OPHTHALMOLOGISTS

by cities (17)

ANCHORAGE

Skille
Dippe
Harrison
Patterson
Grendahl
Richardson
Nyboer
Rigg
Sheisl
Shoff

FAIRBANKS

Kinn
Wolf
Dicksheet
McConkey

JUNEAU

Page

SOLDOTNA

Canava

ANCHOR POINT

Fritz

KETCHICAN

Tokar

PROBABLE OBJECTION

Based on experience elsewhere opposition will probably come from ophthalmologists based on the alleged:

1. Adverse side effects of drugs and the incapacity of optometrists to deal with them.
2. Lack of qualification of optometrists in the use of these diagnostic agents.

AMERICAN ASSOCIATION OF OPHTHALMOLOGY

PUBLIC RELATIONS PAMPHLET "WHY DROPS"

Typically this pamphlet is displayed in ophthalmologists offices or handed out to other interested persons or groups.

1. The pamphlet states that drops must be used in order to perform an adequate visual and eye health examination.

The following are quotes from the pamphlet:

DROPS TO ENLARGE THE PUPILS:

- "to look through the open door instead of through the keyhole".
- "drops make it possible for him to study not only the lens through which the light must pass, but also the retina where the image is formed, and the optic nerve which transmits the picture to the brain."

RELAX THE FOCUSING MUSCLE:

- "This is often necessary to determine the TRUE degree of refractive error that has to be corrected by glasses."
- "The use of these drops is especially important when examining children."
- "When a physician examines a young child with strabismus (crossed eyes), it is essential..."

ANESTHETIZE THE EYE:

- "They are required for the all-important testing for glaucoma."

2. The pamphlet alleges that drops can not be used by optometrists but only by an ophthalmologist.

The following quotes make their points:

- "Of course, all drops are medicine and they can be prescribed only by a physician..."
- "You should never let anyone else put anything in your eye."

3. The final statement from this pamphlet says: Drops..."are often the key to the prevention of blindness and even the saving of the eye itself."

If the American Association of Ophthalmology feels strongly about all those points made in this pamphlet, and is able to recognize that 70% of the people in the United

States are seen by optometrists for eye care, what conclusions must have been reached? Are all those 70% seen by optometrists receiving poor eye care? Are plans being made to train more ophthalmologists? What positive efforts has ophthalmology made to correct this? If the answers to those questions are disheartening, is the only basis for this pamphlet one of economics, self esteem, or P.R.?

Alaskan optometrists are sincerely interested in improving the scope of their eye care to Alaskan residents. They are prepared to encompass quality educational standards as insurance that the usage of diagnostic agents by Alaskan optometrists will result only in improved vision and eye health care for the people of Alaska.



Why drops?

A second common use of drops is to relax the focusing muscles in the eye. This is often necessary to determine the true degree of refractive error that has to be corrected by glasses. Because the focusing muscles in the eye are relaxed by these drops, the eye cannot focus and the vision is blurred until the effect of the drops wears off. These drops also cause the pupil to dilate; however, it is not the dilated pupil but the relaxed focusing muscle that causes blurring of vision. The use of these drops is especially important when examining children. When a physician examines a young child with strabismus (crossed eyes), it is essential to use drops that relax the focusing muscles in order to determine what corrective glasses are required.

A third use of drops is to anesthetize the eye, to permit the physician to perform certain diagnostic tests without discomfort to the patient. These drops cause little or no blurring of vision. They are required for the all-important testing for glaucoma. Anesthetic drops are also necessary for the relief of pain resulting from injury.

Finally, there are several ways in which drops are used in the treatment of the eye. Some drops are used to destroy bacteria, some to relieve inflammation within the eye, others to relieve a bloodshot condition, and still others to make the pupil small in order to lower the pressure within the eye. Drops to dilate the pupil are used in certain diseases to keep the muscles resting while the eye recovers, or to prevent complications which might develop if the muscles controlling the focus and the pupil were not kept at rest.

Patients sometimes ask their eye physician, "Why do you use 'drops' when you examine my eyes?"

A clear answer to this question will help one understand the fundamentals of medical eye care and the relationship of his eyes to the health of his body.

"Drops" are of several kinds and they serve several important medical purposes.

One of the commonest uses of drops is to enlarge the pupils, so that the physician may examine more thoroughly the interior of the eye—to "look through the open door instead of through the key-hole." There, for the trained medical man to see, may be the first sign of disease elsewhere in the body. Drops make it possible for him to study not only the lens through which the light must pass, but also the retina where the image is formed, and the optic nerve which transmits the picture to the brain.

Such drops are particularly important in examining older people, who are prone to eye diseases, and often have a small pupil that becomes even smaller under the light of the examining instrument. Dilation of the pupil is necessary in examining the eye for suspected cataract, diabetes, hardening of the arteries, high blood pressure—to name a few examples. The effect of drops used merely to dilate the pupils lasts only a matter of hours, and frequently causes little or no blurring of vision.

Of course, all drops are medicine and they can be prescribed only by a physician, who is licensed to practice medicine and surgery, and administered only by him or someone acting on his order. You should never let anyone else put anything in your eye. Sometimes drops are prescribed by your family doctor, to whom you can always turn for advice about your eyes. He or any other Doctor of Medicine can also tell you of a Doctor of Medicine who specializes in the eye—an ophthalmologist.

Whether or not drops of any kind are to be used is a decision for the attending physician. Only the Doctor of Medicine who examines your eyes can say whether drops are needed.

Why drops? Because they are useful medicines in the modern scientific care of the eyes—as useful in their place as any other drug or instrument that physicians have at hand for the relief of pain and the restoration of health. They are often the key to the prevention of blindness and even the saving of the eye itself.

SUPPOITIVE LETTERS

from

MEDICAL DOCTORS OUTSIDE OF ALASKA

These letters speak directly to the minimal adverse side affects and maximal benefit to the patient.

JAMES B. JORDAN, M. D.
SUITE 209-210
1225 NO. WASHINGTON AVENUE
SCRANTON, PENNSYLVANIA 18503

May 8, 1973

Senator Robert J. Mellow
Mears Building
Scranton, Pennsylvania

Dear Senator Mellow:

I have been in practice as a Board Certified Ophthalmologist for 39 years. In all this time, I have never seen, nor have I read about, cardiac arrest due to the application of topical anesthetics, mydriatics, cycloplegics, atropine or miotics. In all my 39 years, I have never seen an Angle Closure Glaucoma due to the use of any of the dilator drugs, when used properly.

In doing some research, I have found the arguments against the use of drugs cannot possibly hold any truth with the exception of Angle Closure Glaucoma. However, with proper training in the educational requirements currently in effect at Optometric Colleges, the risk is minimal. The risk to the undetection of Glaucoma, however, is sizable when anesthesia is not used. If any Ophthalmologist were to be called to the stand to testify under oath, I am certain that he in all honesty would have to say that there are no risks to the topical use of these drugs.

Occasionally an eye may become injected, but the injection leaves within a matter of half an hour or so and I can't help but wonder how the test for Glaucoma can be performed comfortably and accurately without the use of topical anesthesia. I also wonder how you can get a very thorough look at the Fundus without the use of mydriatics in very small pupils. This is significant when one considers the fact that optometrists see 70% of the population.

In consulting Cardiologists, they are unaware of any incidents after the application of any of the above drugs wished to be used by the Optometrists. In researching the education of Optometrists, I have found out that they have had a Pharmacology course for many years and were taught the effect of drugs on the eye. They have been taught in most instances by Medical Doctors. An additional safety factor is written into the bill which will necessitate any

Optometrist who wishes to use these drugs routinely to take a transcript quality course in Pharmacology and Gonioscopy to "bone up" on their past training.

In the last year's entering class, approximately 80% of the Optometric students have had four years of college education with a Bachelor's or Master's degree before entering the Optometric College, which is in itself a four year program. Their program consists of General Anatomy, Ocular Anatomy, Physiology, General Ocular with a minimum of three years training in recognition of referral of pathological cases plus Histo Pathology. At present, the Pathology courses are taught by two Board Certified Ophthalmologists, Dr. Herbert Nevyas and Dr. Joseph Towland.

The Pennsylvania Academy of Ophthalmology and Otolaryngology has raised some opposition regarding Senate Bill 570 which provides for the use of diagnostic pharmaceutical agents by optometrists.

This opposition is not well founded, nor in my opinion for the general public's welfare. Patients, not individual or group self-esteem, should come first.

I would like to re-emphasize once again that there has never been a single death reported in the entire world's literature of a fatal reaction in a diagnostic office procedure of the type we are requesting in this legislature to my knowledge.

Sincerely,

James S. Jordan, M. D.

JSJ/jmf

cc: Donald H. Evans, O.D.
Patrick Kennedy, M.D.
Alfred C. Lucier, M.D.

JAMES S. JORDAN, M. D.
SUITE 205-210
228 NO. WASHINGTON AVENUE
SCRANTON, PENNSYLVANIA 18503

In 1931, I received my Medical Degree from Jefferson Medical College. While at Jefferson, I was a member of the Alpha Omega Alpha Honor Society and upon graduation I received the HENRY M. PHILLIPS Award for the highest honors and excellence in medicine.

While serving my internship at Scranton State Hospital, I first became interested in diseases of the eye and pursued my interest at the University of Pennsylvania. I finished my residency at Wills Eye Hospital in 1935 and was President of the Wills Eye Hospital Society in 1948.

I was the founding President of the Diocesan Council of Catholic Men and have been on the executive committee of the National Council of Catholic Men at Washington, D. C. For my many accomplishments in this capacity, I was given the ST. THOMAS MORE Award by the national council, the 11th man to be so honored in the United States.

I was made a Knight of the Equestrian Order of the Holy Sepulcher of Jerusalem by the late Pope John XXIII and in June of 1972 I was invested into the Order of Malta by Pope Paul VI.

In 1956, I was named Chief of Surgery at Mercy Hospital in Scranton and served in that capacity until 1965. I am Chief of Ophthalmology at Mercy Hospital. In 1962 I was awarded the honorary degree of DOCTOR OF LAWS by the University of Scranton, in 1966 was elected President of the Advisory Board of Marywood College. Since 1969 I served as a member of its Executive Committee.

I am a member of the American Academy of Ophthalmology and Otolaryngology, a fellow of the American Board of Ophthalmology, the American Medical Association, and the Lackawanna Medical Society.

On February 2, 1973, I was presented with THE SILVER TRAY by Wills Eye Hospital on the occasion of the 25th silver anniversary of the annual clinical conference by the staff and society of Ex-Residents of the Wills Eye Hospital Society.

On April 30, 1973, I was awarded and admitted into the ALPHA SIGMA NU HONOR SOCIETY at the University of Scranton

M. M. GOLDSTEIN, M.D.

EYE AND EAR BUILDING

WILLOW AND FLORAL

VIBALIA, CALIFORNIA

July 29, 1974

The Honorable Howard Way
California Legislature
State Capitol
Sacramento, California

Re: Senate Bill 1989

Dear Mr. Way:

This letter concerns Senate Bill 1989. Since you have had cataract surgery in your family in the past I feel you will have more than passing interest in this bill.

As I understand this bill permits optometrists to instill certain drops into their patients' eyes for diagnostic purposes only. I am strongly in favor of this bill; as a matter of fact several years ago on my own initiative I wrote to Assemblyman Gordon Duffy about proposing such a bill but apparently there was not much interest at the time.

The reason I am so strongly in favor of this bill is briefly this: fifth to sixty percent of all patients consult optometrists regarding their eyes and the fitting of glasses. In order to do a thorough examination of the retina, i. e. the posterior portion of the eye which is the all important anatomical segment, it is necessary to have a wide pupil so that the examining doctor can look around the corners, etc. It permits them to do as thorough an examination as the ophthalmologist can do. There are several conditions of the retina, which if recognized early can prevent serious sequela.

The ophthalmologists are of course opposed to this bill. However, I wish to go on record as saying that such opposition must be based on human frailties of jealousy and monetary consideration rather than the welfare of the

M. M. GOLDSTEIN, M.D.

EYE AND EAR BUILDING

WILLOW AND FLORAL

VISALIA, CALIFORNIA

The Honorable Howard Way
July 29, 1974
Page #2

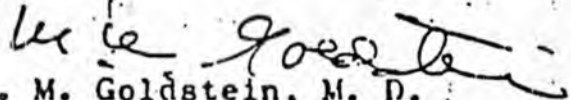
Re: Senate Bill 1989

patient. I know they will state that if you dilate certain eyes it is possible to produce an acute attack of glaucoma. In my thirty eight years of dilating tens of thousands of eyes I have never had this occur. Furthermore, if it did occur, it would be a blessing in disguise because such a patient would undoubtedly develop an acute attack of glaucoma later on under certain circumstances. Besides, this is no catastrophe because recognized reasonably early it can be corrected with medication and then surgery.

After all, optometrists are licensed by the State of California to perform certain aspects of eye examinations and why not help them do the best examination possible. It just makes good common sense.

If there is any further information you desire please let me know.

Very sincerely,


M. M. Goldstein, M. D.

MNG:kh

ROBERT E. ROWELL, M.D.

LEXINGTON PROFESSIONAL ARCADE BLDG.

10728 E. RAMONA BLVD.

EL MONTE, CALIFORNIA 91731

448-8884

August 1, 1974

George N. Zenovich
State Capitol
Sacramento, California

Dear Senator Zenovich:

As a practicing M.D., I would like to voice my support for SB 1989. Optometrists are members of a highly trained profession and at this time are doing an excellent job without the use of topically applied diagnostic drugs. Their diagnostic capabilities, however, would be greatly enhanced with the use of the above mentioned diagnostic drugs.

Prohibiting Optometry this addition to their diagnostic capabilities is in some respects similar to denying a dentist the use of X-rays in his daily routine.

I urge serious consideration and passage of this bill. It is for the public benefit that the optometrist be able to use whatever he needs to diagnose ocular problems and refer to the proper medical practitioner. It should be remembered that approximately 70% of all visual examinations in California are done by optometrists and that the optometrist is many times the only Health Care Professional that is regularly seen.

Sincerely,

Robert E. Rowell, M.D.

GLYER MEDICAL GROUP

Founded by R. T. Glycer, M. D.

280 Hope Street, Mountain View, California 94040 (415) 967-5701

Offices of

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John L. Anderson, M.D.
Victor M. Eisman, M.D.
Joachim K. Buchholz, M.D.
Howard L. Nadelman, M.D., F.A.C.S.

William L. McDonald, M.D.
Frank R. Wilton, M.D.
James B. LeRoy, M.D.
Douglas E. Downey, M.D.
Gert E. Peterny, M.D., F.A.C.O.G.

John R. Young, M.D.
George J. Kricunlov, M.D.
Seymour A. Rapoport, M.D.
S. B. Fox
Administrator

June 3, 1974

Senator George N. Zenovich
State Capitol
Sacramento, CA 95814

Dear Senator Zenovich:

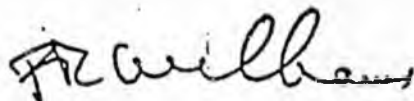
I have been asked by an optometrist acquaintance of mine to write you concerning SB 1989 (definition of optometry).

I support SB 1989. I am particularly interested in their ability to use pharmaceutical agents topically to assist in diagnosing disease. They should be permitted to do this. They do an excellent and professional job at the present time without the capability of using these pharmaceutical agents and permitting them the use of these agents would enable them to do their job even better. This is for the benefit of society and any argument that this bill could be construed to benefit optometrists and harm ophthalmologists or physicians is, to my mind, ridiculous.

Limiting optometrists from diagnosing disease by the use of topical pharmaceutical agents in the eyes would be like asking dentists to diagnose disease without x-ray. The optometrists are highly trained professionals and certainly have a great deal more knowledge about the eye plus much more sophisticated equipment than the average non-ophthalmologist physician who is permitted to use all sorts of agents in both diagnosis and treatment of eye disease, and I therefore cannot see why optometrists should not be permitted the use of pharmaceutical agents for diagnosis.

In summary, for the above reasons I support SB 1989.

Sincerely,



F. R. Williams, M.D.
FRW:st

cc. Senate Health & Welfare Committee; California Optometric Association

JOSEPH C. TOLAND, M.D.
PROFESSIONAL CORPORATION

3327 N. FIFTH STREET
PHILADELPHIA, PA. 19120

LIVINGSTON 8-2523

1270 MILL ROAD
MEADOWS ROCK, PA. 19046

June 15, 1973

Dear Representative:

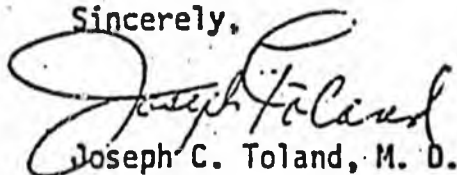
I would appreciate it if you would support Senate Bill 570, Printers No. 810. This bill would amend the Optometry Act to permit optometrists the use of diagnostic pharmaceutical agents when examining the patients' eyes.

I have been trained both as an optometrist and an ophthalmologist. As such, I am well informed as to the training of both eye care practitioners. I can assure you that the present-day trained optometrists are well qualified, by virtue of their training in pharmacology and practical therapeutics, in the use and effects of diagnostic drugs.

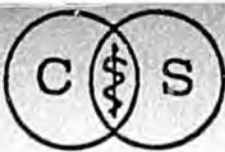
By being permitted to use diagnostic pharmaceutical agents, optometry will be enabled to join with the other health care professions, such as dentistry and podiatry, to provide a more complete service to the citizens of the Commonwealth.

Please ask your friends to support this bill.

Sincerely,


Joseph C. Toland, M. D.

JCT:js



CEDARS-SINAI MEDICAL CENTER

Reply to:

Mount Sinai Hospital Division
Box 48750
Los Angeles, California 90048

July 19, 1974

Preston B. Ervin, O.D.
138 South Golden Mall
Burbank, Calif.

Dear Dr. Ervin:

I am writing to you in support of Senate Bill # 1989 presently being considered by the legislatures in Sacramento. It is my hope that you will pass on my views to whomever you deem appropriate.

Because of my experience in the treatment and epidemiologic aspects of high blood pressure control I have had the opportunity to work closely with optometrists trying to guide their efforts in detecting and referring patients with high blood pressure. The information gained from our recent experience as well as from the medical literature strongly demonstrates the importance of a fundusoscopic examination by whomever examines the patient's eyes. High blood pressure which is often not associated with any physical symptoms can be detected early on by changes in the retinal vessels. It is essential that optometrists who have the knowledge and experience in fundusoscopic examination be allowed to examine retinal vessels in the most appropriate way possible. Often this necessitates the use of medication for dilation of the pupils.

I will not mention the numerous other medical conditions that can be diagnosed through proper examination of the fundus, I will leave this for other authorities on the subject. It is obvious to all interested observers and those with knowledge of systemic disease that early detection for many conditions, hypertension being a prime example, often can delay or prevent the development of complications. It is essential, therefore, that those providing professional services for the patients be able to use all the available tools at their disposal.

Sincerely, yours,

Andrew J. Lewin, M.D.
Deputy Director
Hypertension Detection and Follow-Up Program
Assistant Professor of Medicine
UCLA



COMMONWEALTH OF PENNSYLVANIA
OFFICE OF THE GOVERNOR
HARRISBURG

April 27, 1973

Donald H. Evans, OD
Administrative Director
Pennsylvania Optometric Association, Inc.
218 North Street
Box 3312
Harrisburg, Pennsylvania 17105

Dear Dr. Evans:

Thank you very much for sending me a copy of Senate Bill 570. I have also been asked to analyze this bill by Lieutenant Governor Kline.

I believe that Senate Bill 570 is in the best interest of the people of Pennsylvania and have suggested to the Governor and Lieutenant Governor Kline that they support this legislation.

Best personal regards.

Sincerely,

Leonard Bachman, M.D.
Governor's Health Services
Director

LB/sjs

SPENCER I. RICHMOND, M.D.
64 NO. HANOVER STREET
POTTSTOWN, PENNSYLVANIA 19404

Telephone 328-9308

April 27, 1973

Elmer S. Friedberg, O.D.
130 King St.
Pottstown, Pa. 19464

Dear Elmer:

This is to inform you that I have no objection to Senate Bill 570 P. N. 599. I support its passage.

I certainly do believe that optometrists should be permitted to use diagnostic drugs provided they have the proper training. Otherwise many types of ocular pathology could go undetected to the great detriment of the patient. This, I feel, makes passage of the bill definitely in the public interest.

Allergic or anaphylactic reactions to local anesthetics, mydriatics or cycloplegics are so rare that when it does occur, it is reported as an interesting case in the ophthalmological journals.

Naturally, I strongly maintain that the medical and surgical treatment of any and all types of pathologic conditions should remain in the domain of the ophthalmologist by virtue of his training in these fields.

Cordially,

Spencer I. Richmond, M.D.

Spencer I. Richmond, M. D.

SIR/jsd

WILLIAM R. NELSON, M.D. F.A.C.B.
1400 Florida
Modesto, California 95350

Telephone: 524-3726

July 5, 1974

Senator George N. Zenovich
State Capitol
Sacramento, CA 95814

Dear Senator Zenovich:

This letter is in support of SB 1989 which would give optometrists the right to use topical pharmaceutical agents for the sole purpose of the examination of the human eye or for any disease or pathological conditions. I am an ophthalmologist, certified by the American Board of Ophthalmology and a fellow of the American College of Surgeons, and I have been in private practice in California for twenty years.

In my experience, optometrists do a conscientious job in examination of the eye and do the best that they can, considering the fact that they are not allowed to use diagnostic medications, in the recognition of present pathological conditions that might require treatment. I think that the commongood would be served if they were allowed to use topical pharmaceutical agents for diagnostic purposes. One of the main benefits would be in the recognition of glaucoma which causes more irreversible blindness than any other condition in this country. Although optometrists now have instruments to test for glaucoma; nevertheless, this test is ordinarily uncomfortable or slightly painful unless a topical anesthetic is used on the cornea. The accuracy of the test is considerably improved if the patient cannot feel it and is therefore relaxed.

In my opinion, the possible benefits to the population from the use of dilating drops for diagnostic purposes by optometrists would far outweigh the dangers. There are a number of pathological conditions of the eyes as well as some ocular manifestations of systemic conditions which in many cases cannot be satisfactorily visualized and recognized without the use of dilating drops. I would be remiss, however, not to mention the fact that there would be an occasional adverse reaction in the form of an acute congestive glaucoma which can occur from the use of such drops. Due to the specialized nature of my practice, I have seen ten such cases during my twenty years of practice. I am sure this is far more than the ophthalmologist with the average type of practice would see. Of these ten cases, the vision was lost completely in one eye and two others required emergency surgery. The other seven all responded satisfactorily to medical treatment. Although thousands of cases would benefit for each possible adverse reaction; nevertheless, adverse reactions do occasionally occur and therefore adequate training of optometrists in prevention of such adverse reactions and in other recognition of them, so a prompt referral to an ophthalmologist could be made, would be a must. I am sure that there would be several hundreds of thousands of people benefitted by the use of this and other types of diagnostic eye medications. There are some risks with the use of all types of drugs or medications, and in this case, the possible benefits would far outweigh the possible adverse reactions.

July 5, 1974

SB 1989

Page 2

In summary, it is my opinion that the citizens of California would materially benefit, if optometrists were allowed to use topical pharmaceutical agents for the sole purpose of examination of the human eye for disease or pathological conditions and that the benefits from such use would far outweigh the danger of occasional adverse reactions.

Sincerely yours,

William P. Nelson, M.D.

WRN:sm

cc: Senate Health & Welfare Committee
Dr. Stanley Hinkley

H. JAMES WALL, M.D.

PHYSICIAN - SURGEON

TELEPHONE
DAY OR NIGHT
479-7400

2400 LAS GALLINAS AVENUE
CR. LAS GALLINAS & MILLER CREEK ROAD
MARINWOOD, SAN RAFAEL
CALIFORNIA 94903

July 12, 1974

Honorable Randolph Colier, Senator
California Legislation
State Capitol
Sacramento, California 95814

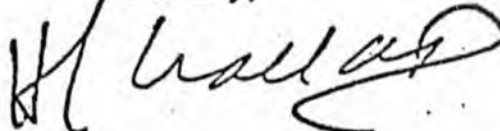
Dear Senator Collier,

As a member and chairman of the Senate Finance Committee, I would like to urge you to give favorable consideration to Senate Bill 1989 (Zenovich). This bill would permit, under careful regulation and administration, the use of topical pharmaceutical agents by optometrists in the examination of the eye for any pathological condition.

This bill would allow more comprehensive eye evaluation by optometrists and appropriate referrals for further definitive study and treatment by the appropriate provider. I understand only those optometrists who have satisfactorily completed the appropriate courses will be eligible to use the topical pharmaceuticals.

I ask your support for SB 1989.

Sincerely,



H. J. Wall, M.D.

Fellow of the American College of Emergency Physicians- candidate
to the American College of Surgeons

VI.
THE TOPICAL USE OF DRUGS FOR
DIAGNOSTIC PURPOSES BY OPTOMETRISTS

ALBERT N. LEMOINE, JR., M.D., F.A.C.S.

My opinions and conclusions, as you will read, are not those of most ophthalmologists or organized medicine. These opinions are based on more than thirty years of experience in the practice of ophthalmology and medical education. Since 1950, more than half of my time has been devoted to academic ophthalmology as Professor and Chairman of the Department of Ophthalmology at the University of Kansas School of Medicine, with the remainder of the time in the private practice of ophthalmology, but involving a medical school environment. I do feel that it is important to realize that I have not limited my practice to a subspecialty in ophthalmology and that my associates and I have been more than ninety five (95) percent self supporting, receiving no federal funds and very little state monies. I am well aware of the problems of private practice, earning an income from patient care and not being limited to an Ivory Tower. Since 1971, I have not performed surgery nor had a private practice, but have devoted full time to administration, primarily in ophthalmology, and teaching. My teaching of ophthalmology over the past thirty years, has involved direct contact with paramedical students, nurses, undergraduate medical students, residents in ophthalmology and other specialities that relate to ophthalmology. I have also been involved in continuing education of physicians and ophthalmologists. I have had somewhat limited but direct experience in undergraduate and continuing education of optometrists.

It should be obvious that with this background my perception of the issues and problems of health care, health care delivery systems and the use of drugs by optometrists may be quite different from those of the average ophthalmologist in private practice. The opinions and conclusions that are expressed concerning the use of drugs for diagnostic purposes by optometrists are mine and should not be interpreted as those of the University of Kansas, the University of Kansas College of Health Sciences or any other organization of which I am a member.

Based on the testimony of previous hearings concerning the use of drugs by optometrists, and articles that have been published, there are in general seven areas that are repeatedly considered. I will list these areas and express my opinions and conclusions in each area followed by a brief summary.

I. THE TYPE OF DRUGS USED AND THE REASONS FOR THE USE OF THE DRUGS: I am in favor of the topical use of anesthetics, mydriatics and cycloplegics by optometrists for diagnostic purposes. I am unequivocally opposed to the topical or systemic use of drugs for therapeutic purposes by optometrists. In my opinion, there should not be a "grandfather clause" in legislation permitting the use of drugs by optometrists for diagnostic purposes. All optometrists who use such drugs should pass an examination that encompasses both the pharmacological action of the drugs, but in particular the clinical effects and side effects.

II. THE RISK TO THE PATIENT WHEN OPTOMETRISTS USE TOPICAL DRUGS FOR DIAGNOSTIC PURPOSES TO LIFE AND VISION: In my personal experience, involving over one million outpatient and hospital patients, the majority involving the direct supervision of medical students and residents, I have never seen nor heard of a death or critical side effect when topical drugs were used for diagnostic purposes. In addition, I have talked to many private practitioners and colleagues who are directors of ophthalmology training programs and have been unable to find anyone who has seen or heard of a verified death from the topical use of anes-