



**ASSOCIATION OF UNIVERSITY PROFESSORS OF OPHTHALMOLOGY
FELLOWSHIP COMPLIANCE COMMITTEE**

**Program Requirements for Fellowship Education In Cornea, External Diseases
& Refractive Surgery***

I. Introduction

A. Definition and Scope of Subspecialty

Fellowship training requires more in-depth education about pathophysiology and management than can usually be obtained in residency training in ophthalmology. Fellowships include a continuous period of intense and focused training in developing and maintaining knowledge, skills, scholarship, and professionalism.

Subspecialty Fellowship training should include:

- The diagnosis and medical management of diseases of the lids, conjunctiva, cornea/sclera, and anterior ocular segment, as well as recognition and treatment of posterior segment disease that may affect the anterior segment.
- Surgery and its postoperative management of the conjunctiva, cornea/sclera, anterior segment, lens, and anterior vitreous, with special emphasis on corneal transplantation and related procedures.
- Principles and practice of keratorefractive surgery.*
- Principles of contact lens fitting and management of complications of contact lens wear.

(Programs wishing to list Refractive Surgery on their Fellowship listing and certificate must also follow the additional Refractive Surgery guidelines listed with an asterisk (*))*

B. Duration and Scope of Education

1. Any fellow entering an AUPO – FCC compliant program must be able to fully comply with the clinical requirements of the program and have completed an accredited or equivalent ophthalmology residency program for that sub-

specialty fellowship.

2. A minimum of 12 months of clinical training is required, including appropriate short periods for vacation or special assignments. In special circumstances, the 12 months do not have to be continuous as long as the aggregate training is equal to 12 months or longer.
3. Prior to application at the program, each fellow must be notified of the required length of the program, policies regarding vacation, duties, stipends, other forms of support, and any restrictions associated with the training (e.g. restrictive covenant).

II. Institutional Organization

1. Fellowship programs are often in institutions that sponsor ACGME-accredited residency programs in ophthalmology. Whenever possible, there should be coordination of the fellowship and residency programs. Affiliation of the fellowship with an ACGME- accredited residency is not required.
2. The number of fellowship positions that may be offered will be contingent on the adequacy of both clinical and surgical volume, number of faculty, and other resources.
3. All of a program's clinical positions should be offered through the San Francisco Fellowship Matching Program (SF-FMP). Positions may be filled out of the Match only for unfilled positions after the Match results. The AUPO-FCC must be notified at the time of initial application of any non-clinical fellowship positions. Prior arrangements with applicants (e.g. notifying them of their rank) is against the spirit of the Match and considered a violation of Match rules.
4. Where applicable, the fellowship program should ideally complement, support, and enhance the residency program. Where applicable, the department chair, fellowship program director, and residency program director should work together and periodically meet to assure that the presence of the subspecialty fellowship does not unduly draw learning opportunities, or funding from the residency program.

III. Faculty Qualifications and Responsibilities

A. Fellowship Program Director

There must be a single program director responsible for the program.

1. Qualifications of the fellowship program director:
 - a. Be certified by the American Board of Ophthalmology, or possess appropriate educational qualifications if from outside of the United States.
 - b. Have at least five years of clinical subspecialty experience following his/her training of which at least 50% has been dedicated to the subspecialty.
 - c. Being an active member of national or international subspecialty organizations (such as the Cornea Society).
 - d. Be engaged in ongoing academic endeavors in the area of subspecialty training, as demonstrated by regular publications in refereed journals, presentation of research material at national meetings, appointments to national or international committees in the recognized specialty, and should be a recognized expert in the field.
 - e. Clinical practice at least 50% of which is dedicated to the area of subspecialty practice.
 - f. Have an academic appointment on the faculty of a recognized JCAHO /AHA accredited institution.
 - g. Be licensed to practice medicine in the state(s) where the program is located.
 - h. Practice greater than 50% of the time in the institution(s) where the Fellow receives his training.
2. Responsibilities of the fellowship program director:
 - a. Prepare a written statement outlining the educational goals of the program with respect to knowledge, skills and other attributes, and

educational goals for each major rotation or other program assignment.

- b. Develop and maintain documentation of the fellow selection process, patient care statistics, evaluations of faculty and the program, and assessment of the fellow's performance.
- c. Have **prior** approval by the AUPO - FCC for the following:
 - i. A change in the number of fellow positions in the training program, including any non-clinical positions.
 - ii. A change in the duration of the training period.
 - iii. Extension of individual period of training greater than three months.
- d. Select fellows in accordance with guidelines established by the San Francisco Fellowship Matching Program and where applicable any institutional and departmental policies and procedures.
- e. Designate and supervise the faculty through explicit descriptions of supervisory lines of responsibility for the care of patients.
- f. Ensure the implementation of fair procedures and due process regarding academic discipline and fellow complaints or grievances.
- g. Monitor fellow stress, including mental or emotional conditions inhibiting performance or learning, and drug or alcohol-related dysfunction. Program directors and faculty should be sensitive to the need for timely provision of confidential counseling and psychological support services to fellows. Training situations that consistently produce undesirable stress on fellows must be evaluated and modified.
- h. Prepare an accurate statistical and narrative description of the program.
- i. Report the change of the number of faculty to the AUPO-FCC if the minimal number falls below 2.

3. Any change in the Fellowship Director MUST be communicated to the AUPO FCC in writing within 30 days.

B. Faculty

Faculty members must:

1. Be highly qualified and possess appropriate clinical and teaching skills. The faculty must devote adequate time to the education of fellows.
2. Demonstrate a strong interest in the education of fellows, sound clinical and teaching abilities, support of the goals and objectives of the program, commitment to their own continuing medical education, and participation in scholarly activities.
3. Have regularly scheduled, documented meetings in order to review the program's goals and objectives, as well as the program's effectiveness in achieving them.
4. While the fellowship director will be the principal preceptor, one or more additional clinical faculty is required. Minimally, one additional faculty should have completed a year of cornea and external disease fellowship training, be certified by the ABO (or Canadian or foreign equivalent), and have at least two years of practice experience in that specialty. These additional instructors may have part-time or voluntary faculty appointments. Additional (non-clinical) faculty may include non-ophthalmologists and non-physician doctorates. The expertise of the director and/or the additional instructors must include keratorefractive surgery for fellowships desiring to list "Refractive Surgery" in addition to "Cornea & External Disease" in their postings and certificates.

C. Other Program Personnel

Programs must be provided with the additional professional, technical, and clerical personnel needed to support the administrative and educational activities of the program.

IV. FACILITIES AND RESOURCES

1. Outpatient Examination Facilities

The outpatient area of each participating program must have a minimum of one fully equipped examination lane for each fellow. There must be access to current diagnostic equipment.

2. Inpatient Facilities

Inpatient facilities must be available with sufficient space and beds for good patient care.

3. Library

Fellows must have ready access to a major medical library and facilities for electronic retrieval of information from medical databases

V. EDUCATIONAL PROGRAM

The program director is responsible for the structure and content of the educational program and must provide objectives, methods of implementation, and procedures for assessment of the program. The educational experience must be designed and supervised by the program director. The program requirements for cornea/external disease fellowship are a continuation, in depth, of the general ophthalmology residency program but extend beyond the normal requirements of a general program. A wider variety of diseases and more patients in each disease category are encountered. Fellowships may be offered in Cornea and External Disease alone or Cornea, External Disease, and Refractive Surgery. *(Programs wishing to list Refractive Surgery on their Fellowship certificate must also follow the additional Refractive Surgery guidelines listed with an asterisk (*))*

A. Clinical Components

The goal of the fellowship is to produce an ophthalmologist with subspecialty skills that allow independent medical and surgical management of cornea and external disease. The subspecialist should be able to use all of these skills in order to diagnose and treat disorders relevant to the subspecialty.

The subspecialist should at a minimum be able to:

1. Take a complete patient's history for relevant review of systems and the social history including the details of the onset and course of their ocular condition with special emphasis on anterior segment disease.
2. Complete a detailed examination of the eyelids, orbits, conjunctiva, cornea, anterior chamber, iris, anterior chamber angle, lens, vitreous, retina, and choroid.

3. Evaluate a patient with acute or chronic redness of the eye.
4. Diagnose acute or chronic loss of vision due to structural changes or anomalies of the anterior segment.
5. Create a differential diagnosis for the typical corneal findings for the specific anterior segment effects of various systemic and ocular medications.
6. Recognize the various tests that are available to aid in the diagnosis of external disease patients including measurement of the tear film, use of the microbiology laboratory, information available from genetic analysis, and ophthalmic examination techniques (e.g. ultrasound, corneal topography/tomography, specular and confocal microscopy, optical coherence tomography, and other anterior segment imaging devices).
7. Delineate the risks and benefits for medical therapy and surgical procedures of the anterior segment.

The fellow should see and be responsible for approximately 2,000 patients to allow experience in the following specific areas:

1. Acute and chronic blepharitis to include both infectious and non-infectious etiologies, with emphasis on microbial blepharitis, meibomian gland dysfunction, and rosacea.
2. Acute and chronic conjunctivitis, neonatal conjunctivitis, Chlamydial disease, adenoviral conjunctivitis, allergic conjunctivitis, and bacterial conjunctivitis.
3. Acute and chronic infectious keratitis including bacterial, viral, fungal and parasitic, with special emphasis on herpes simplex, herpes zoster, adenovirus, acanthamoeba, and contact lens- associated infections.
4. Non-infectious keratitis including marginal keratitis, central ulcerative keratitis and interstitial keratitis, as well as epitheliopathies and endotheliopathies,
5. Anterior segment anomalies, including those associated with specific inherited

conditions, corneal dystrophies, and corneal degenerations.

6. Benign and malignant adnexal, conjunctival and corneal neoplasias, including corneal/conjunctival intraepithelial neoplasia, melanocytic tumors, lymphocytic tumors, papillomatous lesions, and congenital or developmental lesions.
7. Autoimmune and immunologic diseases of the anterior segment including allergy, corneal graft rejection, and cicatrizing conjunctivitis; and familiarity with oral and topical immunosuppression and anti-allergy medications.
8. Limbal stem cell deficiency, including its diagnosis and management per the guidelines from the global consensus and recent literature.
9. Fundamentals of anterior segment anatomy, chemistry, physiology, and wound healing including tear formation and function, corneal topography/tomography, endothelial cell function, and maintenance of corneal clarity.
10. Fundamentals of refractive surgery* and its complications, with special emphasis on forms of keratorefractive surgery including incisional, excisional (such as stromal removal by mechanical and laser ablation), thermal keratoplasty, and alloplastic inserts.
11. Principles of anterior segment pharmacology including antimicrobial, anti-inflammatory, ocular hypotensive, and topical/systemic chemotherapeutic and immunosuppressive agents, with emphasis on bioavailability, mechanism of actions, relative efficacy, safety, and potential complications.
12. Skill in anterior segment surgery including eyelid, conjunctival, scleral, and corneal procedures, with emphasis on corneal protective procedures (such as tarsorrhaphy), reconstruction of the ocular surface, surgical management of corneal erosions, surgical management of ocular surface tumors, and phototherapeutic keratectomy.
13. Fundamentals of ectatic disorders including diagnostic criteria and current standard of care including principles, indications, patient selection, and management of complications of collagen crosslinking.
14. Skill in penetrating and lamellar keratoplasty, with emphasis on patient

- selection, surgical technique, and postoperative care including recognition and management of graft rejection and endophthalmitis. The fellow should also be familiar with advanced techniques for lamellar and penetrating keratoplasty including full-thickness transplants and endothelial keratoplasty. The fellow should have knowledge of different techniques of Keratoprosthesis surgery.
15. Knowledge of the diagnosis, medical management, and surgical treatment of anterior segment trauma.
 16. Fundamental knowledge of contact lens physiology, design and materials, and complications for both cosmetic and therapeutic use. The application of scleral lens and PROSE device in the treatment of ocular surface diseases
 17. Understanding the role of diagnostic techniques including biomicroscopy, specular microscopy, corneal topography/tomography, vital stains of the ocular surface, corneal biopsy techniques and interpretation, and corneal pachymetry.
 18. Medical and surgical management of corneal thinning and perforation, including techniques of pharmacological manipulation, office procedures such as application of tissue glue, and therapeutic contact lenses.
 19. Medical and surgical management of complications of IOLs including, but not exclusive to, dislocated IOLs, suturing or repositioning IOLs, various techniques of secondary IOL fixation, iris suturing, and visual aberrations and complications related to single vision and multifocal IOLs.
 20. An understanding of cornea and conjunctival pathology results and interpretation of ocular cultures and pathology.
 21. An eye banking curriculum including a review of specific eye banking functions (recovery, processing, storage, evaluation and distribution of tissue, and donor eligibility), and at least one on-site visit during the fellowship to an EBAA-accredited eye bank.
 22. Skill in use of reference material, including electronic searching and retrieval of relevant articles, monographs, and abstracts. Involvement in at least one scholarly activity potentially leading to presentation at a national meeting or peer-reviewed publication.

23. Knowledge in use of anterior segment imaging modalities in the diagnosis and monitoring of anterior segment diseases including but not limited to anterior-segment optical coherence tomography, in vivo confocal microscopy, specular microscopy, meibography, and cornea hysteresis graph.

B. Didactic Components

Demonstrate scholarly activity by participating in research and clinical conferences or their equivalent for a minimum of 100 hours per year of which 25 hours should be of didactic instruction, including seminars, lectures, basic science courses, and hands-on skill courses. Each fellow should be actively engaged in at least one research project during the fellowship year or be lead author of one peer-reviewed publication or presentation at a nationally recognized meeting in corneal and external disease within one year of fellowship completion.

Directly evaluate and provide diagnosis and recommended plan in the care of a minimum of 2,000 patients under direct supervision during the course of the year.

These patients must have

corneal or external diseases as described in the main body of Section 5 (“Educational Program”). The fellow must demonstrate that appropriate history was obtained, the examination was accurate, the use of supplemental laboratory testing was directed by the history and physical examination, and that the differential diagnosis and management are logical.

When applicable, corneal fellows will participate in at least two teaching programs of the cornea service and of the institution if the fellowship is affiliated with a teaching institution.

Examples of such include the following:

1. Attendance at department grand rounds. The fellow is to actively participate in case presentations and discussions of patients with corneal and external disease.
2. Attendance at monthly morbidity, pathology, and complications conferences.
3. Attendance at lectures on corneal topics given by the faculty during the resident teaching program. These must include at least 6 lecture hours per year. The fellow must prepare and present at least one of these lectures.
4. Attendance and participation in courses on anterior segment surgery, corneal transplantation, external disease, and refractive

surgery.

5. The fellow must actively participate, along with the cornea faculty, in a journal club at least quarterly. The fellow and faculty should present and critically discuss selections from the current literature.
6. The fellow should attend local and regional conferences relevant to corneal and external disease surgery.

C. Supervision

1. Faculty should be available to supervise fellows as they examine and treat outpatients and inpatients. They should be available for contemporary consultation, assistance, and review of the patients. The supervision should be direct for the majority of encounters. Direct faculty supervision occurs when the faculty reviews the findings with the fellow prior to the patient leaving the clinic or being discharged from the hospital.
2. The faculty must participate as primary surgeon or assistant surgeon to the fellow in a sufficient number of surgical procedures to confirm the fellow's surgical judgment and skill. The fellow should receive instruction and develop surgical proficiency in both full thickness penetrating keratoplasty and selective endothelial keratoplasty, and familiar with anterior lamellar keratoplasty. The fellow should participate as either primary or primary assistant in at least 70 corneal transplant cases with the fellow acting as primary surgeon in at least 15 endothelial keratoplasties cases and 15 penetrating keratoplasties cases. The fellow should participate as primary or primary assistant in at least 5 DMEK cases. The fellow should actively participate in the postoperative management in the majority of grafts where he/she is part of the surgical team. The fellow should have sufficient experience with other surgical procedures including pterygium excision with graft, corneal and conjunctival biopsies, astigmatic keratotomies, collagen crosslinking and phototherapeutic keratectomy. The fellow should participate in the surgery of more complex conditions, including extensive conjunctival reconstruction, amniotic membrane transplantation, lamellar keratoplasties, iris reconstruction, and ocular surface reconstruction. The fellow should participate in complex IOL surgery including correction of dislocated IOLs and techniques for secondary IOL fixation. The fellow should be certified for photorefractive keratectomy (PRK) and laser assisted stromal in situ keratomileusis (LASIK) for programs listing Refractive Surgery*. The fellow

should participate in the planning and implementation of other astigmatic correcting techniques including toric IOLs, surgical wound revisions, and laser enhancements. *

Primary surgeon for penetrating keratoplasty is defined as trephining and/or removing the tissue open sky and initially suturing the graft. Primary surgeon for DSEK and DMEK surgery is defined as stripping the Descemet's membrane, loading/preparing the graft, inserting the graft into the eye, and positioning the graft in the eye.

3. The faculty must make a determination that the fellow uses sound clinical judgment in making recommendations for surgery that is in patients' best interests. The faculty is responsible to determine that the fellow has sufficient surgical skill to practice independently.
4. In programs offering training in refractive surgery, they will perform at least 8 laser refractive procedures (e.g. LASIK, PRK, LASEK) and assist and/or observe in at least 50 other cases. *

D. Duty Hours and Conditions of Work

Duty hours and night and weekend call for fellows must reflect the concept of responsibility for patients and provide for adequate patient care. Salary is left up to the discretion of the Program. It is strongly suggested that individual health benefits be included in any compensation package (even in the absence of salary). One week of approved conference time should be allotted as well as vacation time. A signed agreement between the Program Director (or institution, practice, or department) and the fellow should be in place outlining the salary and benefits prior to any formal patient contact. The Fellow must be made aware of any restrictive covenant prior to accepting the fellowship.

E. Scholarly Activity

The fellowship must take place in a scholarly atmosphere where resources are available that allow the fellow to participate in scholarly activities, such as research. Fellows should participate in the development of new knowledge and evaluate research findings. The responsibility for establishing and maintaining an environment of inquiry and scholarship rests with the faculty. While not all members of the faculty must be involved in research, the staff as a whole must demonstrate broad involvement in scholarly activity. This activity should include:

1. Active participation of the faculty in clinical discussions, rounds, and conferences in a manner that promotes a spirit of inquiry and scholarship. Scholarship implies an in-depth understanding of basic mechanisms of normal and abnormal states and the application of current knowledge to practice.
2. Participation in journal clubs and research conferences.
3. Participation as a critical reviewer for journal articles either as primary reviewer or compiling a review for a faculty reviewer.
4. Active participation in regional or national professional and scientific societies, particularly through presentations at their meetings and publications in refereed journals.
5. Participation in research leading to peer review publications or presentations at regional and national scientific meetings.
6. Offering of guidance and technical support (e.g. research design, statistical analysis) for fellows involved in research.
7. Provision of support for fellow participation in scholarly activities.
8. Adherence by faculty and fellows, who participate in research, to the Declaration of Helsinki on Rights of Research Human Subjects and to the Association for Research in Vision and Ophthalmology's Guidelines for Use of Research Animals.

F. Fellow's Research Activities

The fellow should be exposed to opportunities to develop research skills. A specific block of time may be set aside for clinical or laboratory research. When the research component exceeds 20% of the total time it may be necessary that the fellowship be extended beyond [12] months.

VI. EVALUATION

A. Program and Faculty Evaluation

The educational effectiveness of a program must be evaluated in a systematic manner. In particular, the quality of the curriculum and the extent to which the educational goals have been met by fellows must be assessed.

Teaching faculty must be evaluated on a regular basis. Documentation of faculty evaluation should include teaching ability and commitment as well as clinical knowledge. There must be a formal mechanism by which fellows participate in this evaluation. Written evaluations by fellows, through mechanisms that promote candor and maintain confidentiality, as much as possible, should be utilized in the evaluation of both the program and faculty.

B. Fellow Evaluation

There must be regular evaluation of the fellow's knowledge, skills, and overall performance, including the development of professional attitudes consistent with being a physician.

The program director, with the participation of members of the faculty, shall:

1. At least quarterly review the surgical log, evaluate the knowledge, skills, and professional growth of the fellow(s).
 2. Communicate each evaluation to the fellow in a timely manner.
 3. Advance fellows to positions of higher responsibility on the basis of evidence of their progressive development of knowledge, skills, and professionalism.
 4. Maintain a permanent record of evaluation for each fellow and have it accessible to the fellow and other authorized personnel.
 5. Participate with and allow the Fellow to participate in any program evaluations and/or reviews performed by or authorized by the AUPO - FCC.
- C. The program director must provide a written, final evaluation for each fellow who completes the program. The evaluation must include a review of the fellow's performance during the period of training and should verify that the fellow has demonstrated sufficient professional ability to practice competently and independently. This final evaluation should be part of the fellow's permanent record maintained by the Program Director.

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