STUDENT LEARNING OUTCOMES

"Whereas the Flexner[1] model (two years of basic science instruction followed by two years of clinical experience) has been rigorously maintained through the system of accreditation, medical education should now instead standardize learning outcomes and general competencies and then provide options for individualizing the learning experience for students and residents, such as offering the possibility of fast tracking within and across levels."
-- *Educating Physicians—A Call for Reform of Medical School and Residency*, Cooke[2], Irby[3], O'Brien[4], 2010

[1] In 1910, Abraham Flexner articulated the current blueprint for medical education in North America.
[2] Molly Cooke is a faculty member at the UCSF School of Medicine and leader of the Academy for Medical Education.
[3] David M. Irby is Vice Dean for education and professor of medicine at UCSF School of Medicine where he directs undergraduate, graduate, and continuing medical education programs and heads the Office of Medical Education.
[4] Bridget C. O'Brien is an assistant professor of medicine at UCSF School of Medicine and researcher in the Office of Medical Education

WASC Commission's Guiding Recommendation 4: Employ indirect methods (such as student surveys) as well as direct measures of student learning outcomes. Data from these assessments need to be collected, used in planning and resource allocation, and used to effect change. Continue to define global learning outcomes that distinguish a UCSF graduate irrespective of discipline.

A. Direct and indirect methods of measuring student learning outcomes, and evidence that they are used in planning and resource allocation, and used to effect change (Revised CFR 2.2b, Revised CFR 2.3, Revised CFR 2.7, Revised CFR 4.4, CFR 4.3).

The WASC review committee requested that UCSF better specify the connections between objectives and learning outcomes through published educational objectives and demonstrate the extent to which these data are used to effect change (see Appendix 13, previously Appendix 2c of the CPR, pages 4 and 10). Each School and the Graduate Division has addressed this recommendation. A brief description of the connections follows (Revised CFR 1.2, CFR 2.1, 4.7).

The **School of Dentistry** has a set of seventeen learning outcomes for graduates, termed competency statements, in accordance with national accreditation standards. The competency measures are linked to the specific competencies expected of graduates of the courses in the curriculum. This document has identified where the material supporting each competency statement is introduced, in what courses it is developed, and where in the curriculum it is measured. This has also given faculty the opportunity to view how the competencies fit into overall instruction. Faculty have initiated a process to review and refine the competency statements in preparation of an upcoming Commission on Dental Accreditation review in 2012. The competency grid can be viewed in Appendix 14a-c (Revised CFR 1.2).

The **School of Medicine** has its competencies benchmarked across the four years of the curriculum; these competency domains are the same as those delineated for Graduate Medical Education. The benchmarks are developed for each of the six competency domains. Students are evaluated on meeting these benchmarks using school-generated evaluations and their own selected evaluations assembled in a portfolio and reviewed with an advisor and peers. Program evaluation is structured around these competencies, which in turn drive change as needed (Revised CFR 1.2). The process is described at the link and the results are detailed in each student's individualized learning plans.

For indirect measures, there are a variety of approaches. Evaluations are completed for all courses including a focus group for each course with randomly selected students as participants. The United States Medical Licensure Examination Step 1, Step 2 Clinical Knowledge and Step 2 Clinical Skills performance is reviewed by subject areas for indications of areas requiring improvement in the curriculum (Revised CFR 2.7). Students voluntarily complete the Association of American Medical Colleges Graduation Questionnaire which allows the School to follow longitudinally changes made in the curriculum and enables comparison to all medical schools nationally. Data is also collected through an Alumni Survey and the residency program directors are surveyed for all students during their internship year to determine if the students are demonstrating the necessary competencies (Revised CFR 2.10, Revised CFR 4.4).

The **School of Nursing** regularly collects course evaluation data from current students and satisfaction data from students, alumni, and employers (Revised CFR 2.10, CFR 4.8). Methods include surveys of graduating students and alumni, group forums with employers, and analysis of administrative data such as graduation or comprehensive examination pass rates. Surveys focus on how well the didactic courses and clinical experiences helped students achieve individual student learning outcomes in courses and expected student learning outcomes of their program of study. Aggregate survey data and student outcome data are used to foster ongoing program improvement (Revised CFR 1.2).

One example of how student feedback and survey data was used to improve a specialty program of study is demonstrated in the Acute Care Nurse Practitioner (ACNP) program. To ensure that the graduates of the program are successful in passing their national certification exam, the curriculum is regularly revised to assure it remains current by including topics included on the ACNP national certification exam. Initially, ACNP faculty integrated the blueprint published for the exam as part of the curriculum. Unfortunately, pass rates for our graduates were not as high as expected (greater than or equal to 90%).

The program faculty coordinator began surveying graduates to provide feedback on the program curriculum and their experiences with the exam. Overall, student response showed that the ACNP curriculum adequately prepares the student for the exam, but some students reported that several topics tested on the exam were not covered

adequately as part of the curriculum. As a result, the areas of deficiency were examined and additional depth to the content provided in the Diagnosis and Treatment of Ill and Injured courses students take in fall and winter quarters. Subsequent to these changes the program graduate pass rate was reported as 100% on the ACNP national certification exam in 2008 and 2009.

The **School of Pharmacy** has a comprehensive assessment plan that is well documented in its recent self-study for accreditation by the Accreditation Council for Pharmacy Education (ACPE) (January 2008). Continuous quality improvement based on data garnered from multiple forms of assessment is an expectation of ACPE and a core value in the School. Included in the plan is an analysis of admissions-related data, matriculation rates, and NAPLEX and CJPE examination passage rates (Revised CFR 2.7). Graduating students are surveyed annually to determine outcomes related to securing employment and post-graduate training opportunities such as residencies and fellowships (Revised CFR 1.2). Data related to teaching and course evaluation and satisfaction of students, faculty, and alumni is collected, analyzed and reported annually to faculty and leadership for continuous quality improvement purposes. Student feedback obtained from the Graduating Senior Survey over the past five years led to several significant curricular changes, including streamlining of physical chemistry content in 2009 and microbiology content effective spring 2011 and the addition of a quarter of therapeutics in the second year curriculum effective winter quarter 2011. Changes to the curriculum are tracked utilizing student assessment and student and faculty feedback mechanisms. Annual alumni surveys allow the School to track employment as well and teaching and professional activities of its graduates (Revised CFR 4.4).

In April 2010 the **School of Pharmacy** faculty adopted revised educational outcomes that are evidenced–based and consistent with the School's educational mission and accreditation standards (Revised CFR 2.3). The revised educational outcomes are grouped by domain areas derived from the Institute of Medicine's 2003 report *Health Professions Education: A Bridge to Quality* that was written by experts across the health professions (Appendix 15). Revised assessment instruments are used to evaluate student self-assessment of achievement of competencies during the first three years and observed student performance during rotations in the experiential portion of the curriculum are mapped to the new outcomes (Revised CFR 1.2). Oral examinations, a comprehensive exam, and a student survey are used to assess student preparedness for entering the last year of the curriculum. Objective Structured Clinical Exams (OSCEs) have been developed, piloted, and are being implemented to measure student achievement of the educational outcomes in the first, second and third year immediately prior to starting advanced pharmacy practice experiences.

The Graduate Division, of which the **School of Nursing** graduate students are also a part, has developed a common set of student learning outcomes for the qualifying examination and the doctoral dissertation and these are now published on the Graduate Division website (see '[Qualifying Exams and Dissertation Student Learning Outcomes]').

The Graduate Division has also adopted three more specific sets of evaluation rubrics developed in conjunction with educational consultant Barbara E. Lovitts, author of *Making the Implicit Explicit: Creating Performance Expectations for the Dissertation* (Stylus, 2007). The evaluations are developed for the basic sciences, social sciences, and humanities. Evaluations are shared between the primary advisor, committee members and the student. Each graduate program is encouraged to tailor the rubrics specifically to the standards and requirements of their particular discipline and program. The rubrics are used to communicate more clearly the student learning outcomes required for each program. A pilot study has been initiated by representative programs from each of the three main areas (basic sciences, social sciences, humanities) in which rubrics will be completed by every student-advisor pair in the program. Data will be assessed by program and used for improvement. Upon successful completion of the pilot study, the collection and dissemination of rubric data will be extended to all of the UCSF graduate programs (Revised CFR 1.2, Revised CFR 2.3, Revised CFR 2.7).

In addition, data are gathered through a variety of graduate exit surveys and alumni surveys in order to evaluate perceptions of learning outcomes. Each School and the Graduate Division have provided examples of surveys used to gather information from students and graduates regarding their perceptions of learning outcomes (Revised CFR 2.7, Revised CFR 2.10, CFR 2.4). Data gathered from students and graduates is reflected back to Faculty Councils and curriculum committees so that changes and improvements can be incorporated in the curricula.

B. Define global learning outcomes that distinguish a UCSF graduate irrespective of discipline (Revised CFR 2.3).

The UCSF WASC steering committee, in association with the deans, associate deans, and the Academic Senate has agreed upon two global learning outcomes to be measured and met by every UCSF graduate. These expectations for all graduates are **"**knowledge" and "professionalism." "Knowledge" refers to what is known through study or experience. It encompasses the following entities: information (a collection of facts and data), learning (knowledge gained specifically by schooling and study), erudition (profound, often specialized knowledge), and scholarship (the mastery of a particular area of learning). "Professionalism" encompasses the set of skills, behaviors, methods, and standards that characterize a learned profession. An important component of professionalism is the practice of ethical conduct.

These outcomes are measured very specifically in each of the professional Schools and the Graduate Division and characterize a general expectation of every graduate. The global outcomes were proposed to the Academic Senate through its Faculty Councils and committees. The approval process has resulted in broad agreement of these concepts and permitted each school and division to articulate appropriate measures. Although it is early in this process, faculty have agreed to this change and are implementing measurement strategies. Included in Appendix 16a-c are minutes of Senate meetings discussing and approving these global outcomes. Also included in

Appendix 17 are preliminary plans and measures of the outcomes for the School of Pharmacy (Revised CFR 1.2, Revised CFR 2.3, Revised CFR 4.4, CFR 2.2, 2.4, 2.6).

In addition to the WASC Commission's Guiding Recommendations addressed above, the WASC Visiting Team asked that UCSF consider the need for alternative teaching strategies, demonstrate direct assessment of student performance, continue to foster a culture of interprofessional education, and continue to find ways to encourage graduates to pursue academic careers. These recommendations are addressed below.

C. Identify the extent to which there is a need for alternative teaching strategies beyond the dominant mode of delivering material through classroom lectures.

In general, teaching methods employed across campus include small group learning, case-based analyses, large group activities, seminars, journal clubs and clinical and laboratory learning. These activities are facilitated by lecture casting capacity, development of breakout locations for small groups and extensive use of the CLE (collaborative learning environment) to provide a breadth of educational materials for students to facilitate alternative learning strategies (CFR 4.8). A catalogue of teaching methods employed in the schools is included in Appendix 18. The teaching and Learning Center will enhance the capacity for all these.

D. Develop a demonstration of direct assessments of student performance through examination of students' work products and documented assessment of students' performance of a relevant task (Revised CFR 1.2, CFR 2.4, 2.6).

All schools and the graduate division utilize direct assessments. The **School of Dentistry** provides extensive learning activities in clinical simulation environments and under supervision in the patient care clinics. These activities include both learner-directed practice and supervised clinical practice. Faculty use a variety of formative and summative evaluations to assist students in mastering these skills. Common assessments are a) evaluation of technical performance in the simulation environment, b) assessment of patient care activities on the clinic floor, and c) overall assessment of student performance by assigned faculty members done quarterly. In addition, mastery of knowledge covered in each course is a requirement for successful completion of courses, and professionalism is a component of the academic evaluation of each student (Revised CFR 1.2). Knowledge is transmitted through classroom and study activities and is measured using written tests and performance evaluations if appropriate. Professionalism has been defined by the faculty as "the level of ethical, legal and moral conduct in one's field that an individual must adhere to in order to gain and maintain the trust of others." Specific objectives are defined in the courses and student behavior is monitored. Students who do not adhere to the learning objectives receive professional evaluation reports and are subject to academic sanction, remediation, and possible disciplinary action.

The **School of Medicine** has an ongoing assessment of the six competencies both within and independent of courses. Independent of the courses there are annual benchmarks. In the first year, all students complete a performance assessment in a

three station mini objective structured clinical examination (OSCE). The student receives professionalism, history, physical examination, and communication scores. Students also complete a portfolio assessing and reflecting on evidence related to actual performance in four of the six competency domains. At the end of year two all students complete another performance assessment in a six station OSCE and receive scores as described above. They also submit a portfolio detailing the remaining two competencies and reviewing the previous ones. At this same stage, all students sit for the first of the examinations for licensure, USMLE Step1; passing this exam is required for progression through clinical training (Revised CFR 2.7).

Early in third year, students participate in a formative clinical skills performance examination of three cases, and receive feedback in history taking, physical examination, and physician-patient communication from faculty observers as well as standardized patients. Midway through the third year, students participate in a formative practice exam for the required Clinical Performance Examination (CPX) which is administered at the end of the third year. This eight-station standardized patient performance assessment is developed and administered by UCSF as one of the consortium of eight California medical schools to undertake this standardized clinical skills assessment. UCSF students must demonstrate mastery at this level in order to graduate. Students in their fourth year must complete USMLE Step 2 Clinical Knowledge and Step 2 Clinical Skills.

This system provides a longitudinal assessment of student performance. Faculty members have created direct observation of skills that reflect other than medical knowledge within each course and clinical rotation. Examples of these range from peer assessment of anatomy presentation to brief structured clinical observation. Course-content requirements are not specified except to ensure that across the curriculum the range of competencies are covered so as to address the previously described milestones.

The **School of Nursing** provides over 540 hours of clinical direct patient care with clinical faculty or clinical preceptor faculty on a one-on-one or two-on-one basis for 90% of students (all in clinical graduate programs) (Revised CFR 3.2). Additionally, clinical simulation is used for students who are in clinical programs. Students in non-clinical programs of study, such as Health Policy and Leadership, also have residency hours performed with a clinical faculty mentor. Clearly identified individual student learning outcomes developed by the student and faculty, prior to setting up the residency, are developed and monitored (Revised CFR 2.3). Student projects such as quality assurance projects and drafting of a policy brief are evaluated by the clinical faculty and faculty mentor. Doctoral students not only develop scholarly papers related to their modal doctoral curriculum, but they are expected to write three papers for a qualifying exam, a research proposal, and a dissertation. The qualifying exam, proposal and dissertation are all completed working closely with faculty committees.

The **School of Pharmacy's** introductory pharmacy practice experiences (IPPEs) introduce students to various practice settings and provide them with opportunities to

learn, apply and demonstrate knowledge and skills related to pharmacy practice, patient care, critical thinking, problem solving, and communication. The School is in the process of implementing objective structured clinical exams (OSCEs) during the first three years of the curriculum. For core advanced pharmacy practice experiences (APPEs), students are assigned patients in actual patient-care settings and, under the supervision of preceptors, manage their drug therapy (Revised CFR 3.2). Students are required to evaluate and assess patient therapy regimens for appropriateness and accuracy. Students provide therapy recommendations based on efficacy and toxicity on a "patient-monitoring form " (see Appendix 19 Patient Monitoring Form --General Medicine). Beginning in 2010-2011, evaluation and assessment of student performance for IPPEs and APPEs will be documented by preceptors on new evaluation forms that include competencies that are mapped back to the educational outcomes of the PharmD curriculum (Revised CFR 3.2). As part of the evaluation process, students and preceptors meet to discuss the performance evaluations. Student senior research projects are evaluated by faculty mentors and serve as examples of student work demonstrating learning and achievement of competencies related to conducting hypothesis-driven scholarship (Revised CFR 3.2).

The **Graduate Division** defines the acquisition of the global learning outcome of "knowledge" at two stages of the student's development. The qualifying examination provides measurable evidence that the student is able to: a) critically read, understand, and evaluate current literature in the discipline; b) integrate and synthesize ideas within the field; c) demonstrate comprehensive knowledge of the literature in the field; d) critically evaluate empirical evidence; and e) demonstrate a comprehensive understanding of techniques critical to scholarship in the field.

The dissertation provides measurable evidence the student is able to: a) identify/define problems; b) generate questions and/or hypotheses; c) review and summarize the literature; d) apply appropriate research methods; e) collect data systematically; f) evaluate, interpret, and analyze a body of empirical data and evidence; g) discuss findings in the broader context of the field; and h) develop and sustain an evidence-based argument (Revised CFR 2.3).

In terms of the global learning outcome of "professionalism," Graduate Division students demonstrate that they are able to: a) conduct research responsibly and ethically; b) communicate clearly and effectively to specialist and non-specialist audiences; and c) produce publishable results (Revised CFR 1.2, Revised CFR 2.3).

Every graduate academic student is evaluated for his/her demonstration of achieving the global learning outcomes (knowledge and professionalism) at several stages of the academic career. First, in addition to completing a sequence of courses to fulfill the curricular requirements for the acquisition of knowledge relevant to the field, all academic graduate students take courses in research methods and ethical research practices to learn the standards of professionalism. Doctoral students take qualifying exams mid-way through their program (in the second, third, or fourth year). A

committee of at least four faculty members review these written and/or oral exams (see Appendix 20a-b for examples of evaluation reports).

As discussed above, the dissertation provides the direct evidence that the student has mastered the learning outcomes that collectively indicate his/her understanding and incorporation of the global learning outcomes of knowledge and professionalism (see Appendix 21 for examples of UCSF PhD dissertations). And, finally, many students get a head start on their professional careers by getting their scholarly work published in academic journals (see Appendix 22 for examples of students' journal publications).

E. Continue to foster a culture of interprofessional education (Revised CFR 2.2b). From the moment of its inception as a campus solely devoted to health care and research in the late 1800's, UCSF has nurtured the concept of interprofessional education. As the campus grew from two to four health profession schools, cross and interdisciplinary teaching as well as jointly taught classes became commonplace across the many decades. Indeed many of the major changes that took place within professional education, particularly pharmacy, medicine, and nursing, came about as a result of joint efforts of interdisciplinary teams and took place in multidisciplinary settings.

UCSF has continued to expand its interprofessional activities and has now completed the fourth introductory interprofessional day, held on September 30, 2009. In addition, groups participate in a continuing exercise where students blog online about discussion questions. The September interprofessional day was attended by 465 students, 97% of the first year students enrolled in dentistry, medicine, nursing, pharmacy and physical therapy. Students evaluated the experience and 84% of the 352 attendees who evaluated the program agreed or strongly agreed that the program was effective (Revised CFR 1.2, Revised CFR 2.3, Revised CFR 2.7, CFR 2.4, 2.5).

First year interprofessional activities were expanded in 2009-2010 to include a second interprofessional experience, held on January 25, 2010 to review and discuss patient communication issues in small groups in reaction to a UCSF produced video. In preparation for this gathering, first year students were assigned questions monthly on the IPE and developed lively blogs among mixed groups of professional students. 445 students attended the second IPE day in January. Of the students who submitted evaluations, 88% agreed or strongly agreed with the statement, "Overall I feel this was an effective session." Samples of student evaluations and the script for the event can be found in Appendix 23 and 24a-b. A pre-survey on attitudes regarding working together in interprofessional teams was completed and will be followed up with a post survey at the end of the students' first year of study. These data will provide information regarding longer-term attitude development following these interventions.

The UCSF Library recast its instructional improvement grants to incorporate interprofessional education activities (full description on page 5). In 2009 three grants were awarded for meritorious proposals that reached across disciplinary lines. Proposals were evaluated based on their interprofessional focus, innovation,

sustainability, implementation, high impact, evaluation and cost efficiency. The titles of the successful proposals are listed in the report on page 5-6.

One IPE curriculum development project that 101 students completed utilized an interprofessional standardized patient. The students were pre and post tested on a previously validated attitude survey. Results indicated that the experience was associated with a significant improvement of attitudes toward team value and team efficiency. Another such project focused on geriatrics education during patient care, GeriWard, which is being piloted 2009-10. Selected third-year medical students, pharmacy students, and nursing students were enrolled in the curriculum over the course of the academic year. The general course objectives include: 1) identify, learn and teach key geriatric competencies pertaining to the hospital setting; 2) implement clinical assessment tools in evaluating the elderly hospitalized patient on the wards; 3) work as a team consisting of interprofessional students to complete a clinical exercise; and 4) work as a team consisting of interprofessional students and demonstrate the ability to communicate effectively and collaborate with other healthcare professionals.

In addition to these continued efforts, several other notable advances have been made. This summer, six students, representing all four schools and Physical Therapy, are working with a staff and faculty leadership in the Curriculum Ambassador Program to advance the interprofessional learning experience and activities. Finally, the IPE team is in the early stages of working with a group of faculty to develop an interprofessional course on health policy to further engage students on this set of issues that is common to all the professions.

As part of the ongoing efforts to emphasize interprofessional education, the deans met with the IPE team on February 27, 2009. They charged the Interprofessional Task Force to identify metrics to measure success (Revised CFR 2.7), further communicate the advantages of the common academic calendar, connect with the Academic Senate and Academic Affairs regarding the scholarship of teaching for academic advancement (Revised CFR 2.8), and explore how IPE efficiencies could save resources for the schools (Revised CFR 2.2b, Revised CFR 2.8, Revised CFR 3.5). Continued efforts described above have begun to address this charge. Also of note, Chancellor Susan Desmond-Hellmann has created a Chancellor's Task Force on Interprofessional Education chaired by the Vice Provost of Student Academic Affairs (CFR 1.3). The task force has developed a report that formulates a vision for interprofessional education for the next five years. The report was submitted to the Chancellor in July 2010. The final report and Context Map are included in Appendix 5.

In addition, the Vice Provost for Academic Affairs and the academic affairs associate deans have discussed the inclusion of faculty interprofessional education efforts as elements for promotion (Revised CFR 2.8). With the concurrence of the Academic Senate Committee on Academic Personnel, a statement was added to the 2009 Annual Call, the document that highlights the changes to the academic review and advancement processes. It now states that "substantial teaching contributions that

enhance interprofessional education (in particular, the development/enhancement of interprofessional curriculum) are encouraged and given recognition in the evaluation of a candidate's qualifications for advancement" (CFR 1.3).

Students have responded well to the interprofessional elements of their education and understand and value the benefits to them as professionals and to their patients:

> *"*We feel it was much more a reward than a burden. The fact that we had members of our team with at least a year's worth of experience in nursing, medicine, pharmacy and public health allowed us to approach our tasks with a greater confidence than one or more of us had experience with the task at hand…because we are new to the field we probably approached our team with a greater willingness to learn from one another*."*
> *– Team Kenya*

> "We deepened our insight into a totally different culture and learned to become more culturally competent. Living and working together as an inter-disciplinary team provided an opportunity to learn about the various aspects of health care, which would help us collaborate with other health professionals in our future practices."
> *– Team Tanzania*

In sum, interprofessional education is enjoying a great deal of momentum at UCSF. Adopting the common academic calendar in 2009 has cleared a number of hurdles for planning programs. Faculty and the IPE team are working to identify and expand curricular offerings that meet the needs of professional students, and evaluation efforts are ongoing. This momentum has set the stage for defining and measuring endpoints that highlight the benefits for learners, faculty, patients, and the institution (Revised CFR 1.2, Revised CFR 2.3, Revised CFR 2.7, CFR 2.5, 4.6, 4.8).

F. Continue to identify ways to encourage graduates to pursue academic careers.
UCSF recognizes the critical role of preparing future faculty members. Each schools' plans have been enacted and have identified ways of recruiting young faculty and encouraging students to consider academic careers. The faculty mentoring program has flourished and now provides a variety of regular programming along with individual mentoring experiences for both tenure and non-tenure track faculty (Revised CFR 3.2, CFR 3.1). In addition, efforts continue in each school to offer opportunities to students that prepare them for academic careers. These efforts include teaching electives, the curriculum ambassador program, and particular mentoring programs (CFR 2.9).

The **School of Dentistry** has developed a number of elective activities to prepare students for academic careers. Faculty provide both elective teaching and tutoring opportunities and faculty-sponsored dental student organizations create activities that stimulate interactions between interested students and research-intensive and teaching-intensive faculty. In 2008, the School of Dentistry was awarded a T32 training grant by the NIDCR/NIH (National Institute for Dental and Craniofacial Research and the National Institutes for Health) to develop a combined DDS-Masters in Clinical Research degree track. This program is analogous to the Pathways program offered through the School of Medicine. In addition, the American Dental Education Association (ADEA) sponsors a national program to train and mentor future faculty members. The

fellowship's components include a day and a half summer fellow/mentor training session, biweekly collaborative meetings between fellows and mentors, faculty/administrator interviews, teaching practicum in four settings, career reflection essays, research practicum, and a poster presentation at the 2011 ADEA Annual Session. In 2010, two of the seven dental students from around the country selected for the year-long fellowship are at UCSF. Each of these opportunities serves to assist students in understanding the responsibilities of an academic career and to gain experience in the aspects of academic life that distinguish it from a practice career.

Within the **School of Medicine** the fundamental motivation for developing and implementing the Pathways to Discovery Program was specifically to deepen inquiry and scholarship on the part of learners, and thus foster academic careers. The Health Professions Education Pathway provides one good example. It has become a well-developed course of study in medicine and students from other disciplines are now participating. Much of the learning activity is done independently and online which enhances opportunities for students from the other schools to participate. Currently the curriculum covers learning theory, teaching strategies, curriculum development, assessment, and leadership. Participants also complete a mentored legacy project. UCSF has established an extremely advanced academic and professional environment and as a result, serves as a model for those potentially interested in academics. The most recent SOM data, tabulated for the 2008-2009 year, indicates that 22% of graduates pursue academic careers.

The **School of Nursing** received a significant five-year grant from the Gordon and Betty Irene Moore Foundation to enroll and graduate doctorally prepared nurses, with a three-year course of doctoral study, to assume nurse faculty roles in California upon graduation. Students were provided a generous stipend of $60,000 per year of study which allowed students to reduce their outside professional work and study full-time while in the doctoral program. Specific academic teaching courses and seminars were designed to support the students' development of academic teaching skills and expertise. Currently two classes of Moore fellows are completing their doctoral education, one in spring 2010 and the other in spring 2011. At the end of the program over 55 new nursing faculty will have graduated from this initiative. The courses and mentoring received by the Moore fellows were offered to all interested nursing doctoral students, and will remain long after the Moore fellows have graduated.

Through role modeling and coursework the **School of Pharmacy** encourages its students to consider roles in academe. Virtually all students teach others as part of the curriculum. They teach peers, other health professional students, the public, and children in the public school systems. Surveys of alumni indicate that over 60% are involved in teaching pharmacy students (62%), pharmacy residents (38%), pharmacists (30%), and other health professionals (35%). The School's success in this regard can be measured in many ways, including the fact that its graduates hold a substantial number of faculty positions across the nation. In addition, 781 of the School's volunteer clinical faculty, approximately 50% are alumni (Revised CFR 3.2). Over the last three

years, roughly 64% of the School's graduates have sought and been placed in residencies which are not required as a part of pharmacy education but serve as major sources for replenishing and building the clinical pharmacy faculties of the nation. Typically 0-30% of graduates from other pharmacy schools pursue postgraduate training.

WASC Commission's Guiding Recommendation 5: The Graduate Division must incorporate into the academic degree program review process both student learning objectives together with appropriately aligned assessments and the use of these assessments in program improvement, in much the same way that such assessments inform the accreditation process of the professional degree programs.

Each program in the Graduate Division undergoes external review every five years. Incorporated into the review is an assessment of student learning outcomes. In preparation for the review, each program is asked to identify specific learning outcomes for students at key stages of the program (e.g., qualifying exam, dissertation prospectus, research presentations, dissertation defense) and to explain the methods used to assess achievement of these student learning outcomes (e.g., aggregate annual reports of qualifying exam completions, acceptance of abstracts at national meetings, grants awarded, papers published, dissertations completed). The review team is then asked to evaluate the assessment methods and the outcomes data presented and to comment on how well the student learning outcomes align with both the discipline's standards and the institution's goals. Programs then incorporate this feedback into refining the curriculum, student support and advising services, and resource allocation (Revised CFR 1.2, Revised CFR 2.2b, Revised CFR 2.3, Revised CFR 2.7, Revised CFR 2.10, Revised CFR 2.13, CFR 2.1, 2.4, 2.5, 2.6, 4.6, 4.8).

WASC Commission's Guiding Recommendation 6: Contribute to the generalizable knowledge through the development of rigorous design and assessment of its many initiatives, thereby learning from our own best practices and contributing to the literature in health professions education.

Faculty at UCSF are engaged in research and dissemination of knowledge related to education, curriculum, interprofessional education and many other topics specifically related to the professions. The publication and presentation of the knowledge gleaned through this process provides convincing evidence that UCSF faculty are active participants in fostering improvements in education (Revised CFR 2.2b, CFR 4.7). A listing of publications, abstracts, and presentations by UCSF faculty is included in *Contributions of UCSF Faculty and Staff to the Scholarship of Teaching* (Appendix 10) (Revised CFR 2.8).

As described above, the schools and Graduate Division are actively employing various methods of identifying and measuring student learning outcomes (Revised CFR 1.2, Revised CFR 2.3, Revised CFR 2.7). The data from the direct and indirect assessments is used for planning and has provided a stimulus for positive change (CFR

4.3). Supportive of these global learning outcomes of “knowledge” and “professionalism,” the schools and the Graduate Division continue to foster interprofessional education through jointly taught classes, student projects and grants, patient rounds, and special activities such as the campuswide Interprofessional Day events. Finally, the emphasis on professional competency is balanced by a strong commitment to preparing students for academic careers. Mentoring activities, elective courses, the Pathways program, and other similar efforts provide support and encouragement for students to consider academic careers. In sum, UCSF has made significant progress in standardizing learning outcomes and general competencies, while still allowing for the individualization of the learning experience.