

1. Name your teaching activity(ies):

Didactic and clinical teaching of pharmacy students and residents; nursing, physical therapy and medical students; and medical residents and infectious diseases fellows in antimicrobial pharmacology, infectious diseases pharmacotherapy and epidemiology/biostatistics.

2. Your role(s):

---Lecturing on antimicrobial pharmacology for pharmacy students in PCOL--131 (Pharmacology) and infectious diseases therapeutics in CP--131 (Therapeutics), nursing students in N--232 (Antimicrobial Pharmacology), physical therapy students in PT--211 (Pharmacology) & medical students in I--3; lecturing on epidemiology/biostatistics to pharmacy students in CP--124 (Study Design) and BPS--112 (Biostatistics)

---Small group facilitation on infectious diseases therapeutics for an interprofessional exercise for medical students in I--3 and pharmacy students in PCOL--131; for epidemiology/biostatistics for pharmacy students in CP--124 and for pharmacy and medical students and residents in Epi--202 (Designing Clinical Research) and EPI--203 (Epidemiologic Methods)

---Clinical teaching and preceptorship of pharmacy students on Infectious Diseases clerkship

---Clinical teaching and preceptorship of pharmacy residents on Infectious Diseases clerkship

---Clinical teaching and lectures in ID Boot Camp and Core Curriculum for Infectious Diseases fellows

3. Learners and amount of contact:

---1st/2nd/3rd year pharmacy students: ~120 students in PCOL--131 (4 hours of lecture), CP--131 (7 hours of lecture), BPS 112 (2 hours lecture/discussion), CP--124 (2 hours lecture, 20 hours small group)

---3rd/4th year pharmacy students: preceptor for approximately 10 weeks per year, 20 students/year

---PGY--1 & PGY--2 pharmacy residents: preceptor for approximately 10 weeks/year, 20 residents/year

---Nursing students: lecturer for ~130 students yearly for 2 hours lecture

---Medical students: small group facilitation for ~8 students (2 hours), lecture (~3 hours) to ~150

---Medical students/residents: small group facilitation for 8--12 learners for 2 hours/week for 7--11 weeks

---ID fellows: clinical teaching on service, 2--4 hours/year of lecture (~4 fellows/year)

4. Builds on best practice/evidence:

---My teaching focus has evolved from focusing on providing clear explanations to learners to creating situations where learners actively engage with the material through exercises targeted to their level of understanding, and I help to fill in the gaps in their understanding. This evolution has been informed by my exploration of the scientific literature on effective classroom instruction, and especially through the knowledge and experience I gained through the Teaching Scholars Program at UCSF. This has led me to redesign my course sessions around active learning and student engagement. I developed exercises for students to complete during class sessions, and relocated information into topic readers where students could review the information in greater detail on their own time.

5. Goals and learning objectives:

Revising the learning objectives to produce measurable, behaviorally--oriented learning objectives linked to assessments has been an important component of my instructional design. Some examples include:

---Based on a patient's signs, symptoms, laboratory findings, comorbidities, and age, decide whether to treat a patient with antimicrobials (as opposed to symptomatic therapy alone), and recommend an appropriate regimen (drug, dose, route, duration) for influenza.

---Given a patient scenario including the known or suspected pathogens and the patient's medical history (including relevant concomitant medications), select an appropriate antifungal or antimycobacterial for therapy based on its spectrum of activity, pharmacokinetics, drug interactions, and adverse effect profile.

6. Methods:

---To provide a link to students' existing knowledge, each section of the session or reading material is preceded by a framework slide or page that outlines: 1) What you (should) already know about this topic

[with reference to where in the curriculum students learned this information]; 2) What we will discuss today; 3) What you should be able to do after completion of this lecture/module.

---To allow for adequate in--class time for active learning exercises, I now provide most content in a reader for each session. The readers include links to prior fundamental material and review questions to provide immediate feedback on learning. Some of the readers have been migrated to iBooks format to allow students to use with digital learning devices and to provide a platform for expansion and interactivity.

---Classroom sessions begin with a review of the structure of the learning session, key concepts that I expect students to have previously learned (and thus to review if necessary), and the objectives for the session. Then students work on exercises in small informal groups for 3--5 minutes, followed by a report back to the larger group (sometimes through polling software, sometimes through random selection of students). Then key concepts related to the exercises are reviewed.

---For clinical teaching, I have attempted to reorganize my sessions with learners using models such as the One Minute Preceptor to increase learner engagement and reduce monologuing.

7. Results and impact:

Learner ratings of my instruction on (5--point scale unless otherwise noted):

---Lectures to pharmacy students: PCOL--131: 4.5--4.8, CP--131: 4.3--4.8, BPS--112 4.5--4.6, CP--124 4.5.

The departmental lecturer average is 4.2--4.3.

---Lecture to medical students: I--3: 2.9 (block average 4.1)

---Lectures to nursing students (4--point scale): 3.4--3.6

---Small group instruction for an interprofessional exercise (CP--131/I--3): 4.3 for medical students and 4.8 for pharmacy students (instructor means 4.3 and 4.5, respectively); for pharmacy students (CP--124): 4.8

---Small group instruction to medical/pharmacy students/residents: EPI--202: 4.5--4.8; EPI--203: 4.6

---Clinical teaching of pharmacy students: 4.4--4.9.

---Clinical teaching of pharmacy residents (1 highest): 1.0--1.25

Since 2006, I have received the Long Award for Excellence in Teaching for the School of Pharmacy eight times; one award is given per year by each pharmacy class. Until 2013, graduating pharmacy students selected the winner of the Long Prize for Excellence in Teaching over the entire four years; I was selected for this award four times. In 2009 I received the Academic Senate Award for Distinction in Teaching for faculty at UCSF fewer than five years.

8. Dissemination:

---My focus on the distillation of antimicrobial pharmacology to key clinically relevant concepts has been disseminated nationally and internationally through a handbook I serve as co--author for, Antibiotics Simplified (Gallagher and MacDougall, Jones & Bartlett, 3rd edition). This course has become a required or recommended text in more than 60 health professions training programs across a variety of disciplines (pharmacy, medicine, nursing). It has received a 98 point, 5--star rating by Doody's review service and an average 4.6/5 star review on Amazon (>100 reviews across three editions).

9. Reflective critique:

---My teaching approach was initially driven by student feedback but now is also guided by pedagogical science. With this approach I have been able to maintain learner satisfaction while shifting more responsibility to learners for constructing their own understanding. My biggest failure to meet my standards (I--3 didactic teaching) taught me about the preeminence of understanding your audience's expectations and of challenges with interprofessional education. Looking ahead, I am interested in further incorporating evidence--based teaching techniques, advancing interprofessional education, and applying rigorous measures of teaching quality, such as learner performance (as opposed to learner ratings).