



Volume 3, Issue 2, January 31, 2003, From [The University of Oklahoma College of Pharmacy](#)

From the college

Dear Friends:



The following reflective comments on the educational environment of the University of Oklahoma College of Pharmacy are divided into three main areas: what we teach, how we teach and how we assess. Within each of these areas there is concentration on our current efforts, challenges we face and opportunities for improvement.

What we teach

The first iteration of the integrated curriculum concluded in May 2002. The objectives of the module-based, integrated course content are to reduce unnecessary redundancy, maximize organization of content, promote active and self-directed learning, emphasize critical thinking and reasoning skills, and improve the ability to transfer knowledge to solve problems.

In order to know the effects of the integration, a comprehensive curricular mapping is being undertaken of all offerings to identify remaining gaps and needless repetition. Furthermore, we must recognize and harness the vast talents of the faculty and staff in order to broaden our students' opportunities and increase their knowledge and skills through electives as well as core curriculum offerings.

Thus far, one of the benefits of this integration was the facilitation of inter-and intra-departmental collaborations. A second benefit is that faculty are more aware of how their knowledge and expertise fit into the larger educational picture at the college.

How we teach

The educational environment underwent two distinct changes in the past four years. The first was the transition to an all entry-level Pharm.D. degree program; the second was an expansion that allowed for real time delivery of live content between the Oklahoma City and Tulsa campuses. Understandably, these changes were challenging and labor intensive. In order to accommodate, many faculty have embraced educational innovations within their classroom and challenged themselves to think of creative ways to enhance the educational environment. However, since the educational world is dynamic, additional challenges remain. Faculty need to be encouraged to critically evaluate their teaching beyond content and include delivery styles, questioning techniques, and use of illustrations/examples. Educational research within individual learning environments is an underutilized resource at the college; all faculty will gain from approaching their respective involvements with a mindset of inquiry, evidence-based thinking, reasoning, and peer review.

In addition to faculty members critically evaluating how they teach, a global review and objective analysis of all instruction are needed. This can be accomplished through observations and advice from recent graduates, educators from other disciplines, and experts in curriculum design and outcomes assessment from the pharmacy profession, while utilizing the results of the mapping process. All faculty will be given the opportunity to participate under the aegis of the Curriculum Committee along with active support by the Office of Instructional Sciences and Assessment. Moreover, open dialogue stimulated by peer evaluations can inspire innovations, unveil new instructional ideas, encourage collaborations and motivate higher standards.

We also need to scrutinize our ability to create opportunities for students to be actively involved in the construction of their knowledge. How well do we challenge students to transfer their problem solving skills and knowledge? How well do we stimulate creativity and inquisition? Beliefs in how educational environments should operate and the roles of faculty and students within a classroom are undergoing transition; but all faculty need to re-articulate and buy into unified objectives that promote our education mission.

Recruitment and retention of quality enthusiastic faculty to teach within our curriculum is a clear priority; and helping them to be increasingly effective in pedagogical endeavors is essential. Receptive faculty quickly learn to take advantage of consultative programs/services that support and enhance their skills. With their successes, in turn they encourage, stimulate inquiry, and listen to and learn from their students. Such environmental synergies re-enforce scholarship and foster the development of leadership, benefiting the college, the profession at large, and the public.

Lastly, many faculty are adept at ascertaining and dealing with the special requirements of students, often extending far beyond the classroom. Yet, meeting the diverse needs of our students exhausts and depletes valuable resources when all faculty are not working toward the above objectives.

How we assess

Current assessment efforts are aligned with accepted practices in education. However, with the transition of content and delivery, assessment practices should incorporate external evaluations and other enhancements to accurately and objectively measure educational effectiveness and outcomes. For example, students need to receive feedback about their learning *during* the learning process, not only *at the end* of a given timeframe. Other assessment strategies, such as milestone markers deserve serious consideration. Their inclusion will encourage students to engage in self-evaluation and reflection in smaller increments, to accept personal responsibility for learning, and allow for them to make modifications.

In summary, the college has undergone significant changes in the past several years. This has been done by a capable and committed faculty and imaginative and determined leadership. Since continued maturation and development are needed, appropriate objectives must be reaffirmed and requisite supports must continue to be offered to achieve our mission.

Sincerely,



Melissa Medina, Ed.M., ABD

Director, Instructional Sciences and Assessment and Clinical Assistant Professor

[Melissa Medina was recruited to the college as Director of the Office of Instructional Sciences and Assessment and Clinical Assistant Professor to provide broad support in teaching and assessment of our students' abilities. She has provided invaluable assistance to our faculty in the development and delivery of an entry-level Pharm.D. degree offered at our two campuses. During this time of growth and expansion, Melissa has provided individualized and group instruction to faculty members as the college continues its emphasis on integrating coursework, incorporating active learning techniques into the classroom, and using distance education technologies. In keeping with the current accreditation standards, Melissa has provided creative leadership and significant assistance to the faculty and students in assessing the effectiveness of our curriculum to develop contemporary pharmacy practice skills. ---Mark L. Britton, Pharm.D., C.D.E. Associate Dean for Academic Affairs]



College News

▪ **New Baby Leonard**

Jennifer and Lance Leonard, Business Manager are the proud parents of a baby girl, Sydney Elizabeth, born at 12:57 p.m on Tuesday, January 28th. Sydney weighed 9lbs., 4oz., and is 19 inches long. Congratulations Lance and Jennifer!



▪ **ASP Patient Counseling Competition Results**

Please join the college in congratulating the winner of the ASP Patient Counseling Competition 2002-03 competition, Ann Marie McCathern (Lee) and also recognizing the following finalists (listed alphabetically by last name):

Kara Davison
Brian Hughes
Rebecca McNeil
Kelsey Martens
Isaac Mitropoulos
Lesley Roth
Dena Taylor
Gretchen Williams
Kristin Williams

Ann Marie will be representing our college in the national student competition held at the APhA annual meeting March 28 – April 1, 2003 in New Orleans, LA.

Thanks also to the following individuals who assisted with organization and administration of the competition:

Tony Palmer
Nancy Ray
Lou Ann Hughes
Jill Shadid
Kevin Farmer
Melissa Medina
Lourdes Planas

▪ **Oklahoma's Poison Prevention Poster Contest Highlights National Poison Prevention Week**

Unintentional poisonings from medicines and household chemicals kill approximately 30 children and prompt more than 1 million calls to the nation's poison control centers each year. National Poison Prevention Week, March 16-22, aims to help prevent childhood poisonings through education and public awareness. For more than 40 years, National Poison Prevention Week has emphasized the responsibility of parents, grandparents, and other caregivers in preventing poisonings.

In 2002, the Oklahoma Poison Control Center received 33,417 calls for help from people exposed to poisons, with nearly 56% percent of those calls involved children ages 6 and younger. Almost 90 percent of the poisonings occurred in the home.

The Oklahoma Poison Control Center, the Oklahoma Department of Education and the Oklahoma SAFE KIDS Coalition are sponsoring a poster contest to help promote poison prevention in Oklahoma elementary schools. The contest is open to grades kindergarten through fifth grade. The state's first place winner in each grade level will have an opportunity to meet the Governor at an awards ceremony. The first place winner's poster from each grade will be sent to the American Association of Poison Control Centers (AAPCC) to compete in the 2004 National Poison Prevention Poster contest.



For information about the poster contest or to download poison prevention materials visit the Oklahoma Poison Control Center's web site www.oklahomapoison.org/preventionweek. The Oklahoma Poison Control Center is a program of the University of Oklahoma College of Pharmacy and the Children's Hospital at OU MEDICAL CENTER. Specially trained pharmacists and nurses are ready to answer calls 24 hours a day, 7 days a week.

For a free National Poison Prevention Week packet order from: Secretary, Poison Prevention Week Council, P.O. Box 1543, Washington, DC 20013. Information can also be found at <http://www.1-800-222-1222.info>, or the American Association of Poison Control Centers web site at www.aapcc.org or your local county health department.

Alumni News

▪ Agatha Nolen ('77, '86) News

Agatha reports that she is moving to Nashville as of February 10, 2003 with a corporate transfer. She will be the Director of Pharmacy at Centennial Medical Center with HCA.

▪ Bill Read ('60) Update

Bill reports that he is living in Concord, California. Friends and classmates can communicate with him via his email address, careads@astound.net.

▪ Shauna Stinnett ('99) Update

Shauna reports that she is living in Norman, Oklahoma. Her email address is ourxgirl@aol.com.

▪ David Dyer ('75) Update

David, who is currently living in Claremore, OK, recently sent along his e-mail address. Classmates and friends can communicate with David at dyerflc2@aol.com.

▪ Email Address from Michael Bailey ('67)

Michael reports that he is working in Midwest City, Oklahoma. Friends and classmates can email him at mmdbailey@cs.com.

Oklahoma Poison Control Center News

▪ Self Reported Therapeutic Errors to the Oklahoma Poison Control Center

Drug-related morbidity and mortality is estimated to cost more than \$136 billion a year in the United States, which is higher than the total cost of cardiovascular or diabetes care in this country (1,2). Adverse drug events (ADEs) account for most of this cost and result in 140,000 deaths annually, an average fatality rate of 360 deaths per day. The national Adverse Drug Event Prevention Study (3,4) was designed to enhance current understanding of how common ADEs are and why they occur and to develop strategies to prevent them. The study found an overall rate of 6.5 events per 100 hospital admissions; 28% of these events were judged preventable. Most errors are not serious but obviously some are. Medication errors are common and preventable. Health care practitioners are aware that to insure safe medication use, one must always be mindful of the "five rights" of drug administration: "right patient, right drug, right dose, right route, and right time". The techniques for avoiding medication errors in healthcare settings can be extrapolated to improving pharmaceutical care and medication safety in the patient's home. Understanding the reasons patients make therapeutic errors in self dosing is important to developing prevention strategies.

A retrospective study of 2001 human exposures cases reported to the Oklahoma Poison Control Center was performed by examining scenario, age of patient, and pharmaceutical agent involved in each therapeutic error reported. Of the 32,886 human exposure cases reported to the Center in 2001, 8.58% of the exposures resulted from therapeutic errors.



Approximately one third of all therapeutic errors occurred within the age category for patients less than or equal to five years of age. Most of these errors were reported for children more than one year old and less than or equal to two years of age. Reports among adults grouped by decades indicated a slightly higher incidence of reported errors among patients in their fifth decade. Fewer errors were reported among patients in the eighty and ninety year old categories. Dosing cup errors accounted for 3.8% of all therapeutic errors, but was the fifth leading cause for errors in the less than 5 year-old patient group. The most common reasons for therapeutic errors in all age groups involved taking or giving the wrong formulation or concentration, inadvertently taking/giving medication twice and another incorrect dose. Typical examples of some of these errors are as follows.

Incorrect Formulation or Concentration:

1. A mother mistakenly gave 2.5 ml of lindane 1% shampoo to 6 month-old, 20 pound child instead of promethazine DM cough syrup due to similarity in the appearance of the bottle.
2. A mother gave 2 ml of a sibling's baclofen suspension instead of acetaminophen syrup to her 8-month-old son.
3. A grandparent gave 5 ml of Benadryl® Maximum Strength Itch Stopping Gel 2% to a 10 year-old child after being instructed by parents to give the girl her dose of "Benadryl® syrup". Final dose of diphenhydramine equaled 100 mg instead of 12.5 mg.
4. Four capsules of Hartz Mountain® Dog Wormer containing piperazine adipate were taken by a 42 year-old woman instead of 4 diphenhydramine 25 mg capsules for sleep. She also gave 4 capsules to her 15 year-old son as well.

Other Incorrect dose:

1. Parents misunderstood prescription directions and double dosed 10 year-old daughter's dextroamphetamine sulfate® 10 mg for two weeks.
2. Parents gave 2 year-old daughter doses of Tylenol® Syrup for Children and Dimetapp® Nighttime Flu for 3 days before checking the labels and finding acetaminophen in both products.
3. Alendronate sulfate 70 mg was taken daily for 3 days instead of once weekly for 3 weeks by 86 year-old cardiac patient.
4. Six tablets of Triphasil® birth control pills were taken at one time because 34 year-old woman has missed 6 of her doses.

Inadvertently Took/ Given Medication Twice:

Most of these therapeutic errors involve parents and/or other caregivers giving doses without realizing that some one else has already administered a dose. For the most part these are not serious errors when cough and cold preparations are involved as with younger children, but dangerous outcomes are more of a risk in persons with multiple health problems and multiple medications with narrow therapeutic windows.

1. An eighty-three year-old cardiac patient with diabetes and hypertension forgot that she had taken her doses earlier, and she double dosed her clonidine, verapamil, and glyburide.
2. A sixty-five year old woman recently began a prescription for amoxicillin. Her habit was normally to take her doses of warfarin, valsartan/hydrochlorothiazide, levothyroxine, and lansoprazole at the same time. However, administration of the amoxicillin was on different dosing intervals. She repeated all her medications with each of her amoxicillin doses.

Dosing Cup Errors:

1. A grandparent used an adult sized dispensing cup to measure 2 teaspoonsful of Tylenol® Children's Syrup instead of giving one-half teaspoonful to a 13 month- old child.
2. A twelve year-old child misread a dispensing cup and took 8 teaspoonsful of Tussend® DM instead of 2 teaspoonsful.

Incorrect Dosing Route:



1. A relative gave 10 ml of viscous lidocaine 2% by mouth to a 2 year-old child instead of applying sparingly and topically to gums.
2. A parent gave promethazine rectal suppository to 13 year-old son, and he ate it.
3. A parent applied Auralgan® otic drops to 11 month-old child's eyes.
4. A parent gave albuterol solution for nebulization by mouth to a 13 month-old daughter.

Ten Fold Dosing Error:

Although relatively infrequently reported, these therapeutic errors commonly had a higher risk for patient complications.

1. A mother injected her child with 34 units of regular human insulin and 4 units of NPH insulin instead of the 34 units of NPH and 4 units of regular insulin that were prescribed for the 2 year old boy.
2. Both parents gave 8 droppersful of Levsin® Elixir 0.125 mcg/5ml to 11 month old boy instead of 8 drops.
3. Both parents gave 7 ml of metoclopramide syrup to 5 month old son instead of 0.7 ml for a total of 14 ml. The doses were only one hour apart.

Other/ Unknown Therapeutic Error:

1. A caregiver applied 2-inch nitroglycerin 2% ointment patch to chest of 99 year old woman without removing old patch from her back.

Drug categories implicated most often in ages from birth throughout the twenties were analgesics and cough and cold preparations. These pharmaceuticals also tended to be mostly over the counter products purchased for self-medication. Serious outcomes from these therapeutic errors were generally not observed unless the therapeutic error was made repeatedly over a period of time. Therapeutic errors involving newer antihistamines such as cetirizine or loratadine produced fewer symptoms than older ones such as diphenhydramine. Therapeutic errors in pediatric patients involving prescription products such as opiates, metoclopramide, baclofen, digoxin frequently required emergency interventions. Therapeutic errors for children in the 6 to 12 year-old age groups also reflected increased usage of prescription drugs for attention deficit disorder in this group including methylphenidate, dextroamphetamine, clonidine as well as antipsychotic medications such as risperidone.

Therapeutic errors involving analgesics and antidepressants were most frequently reported for the individuals in their third, fourth, and fifth decades. The analgesics for these age groups were more likely to include prescription medications including narcotic analgesics than in younger age groups. Therapeutic errors involving antihypertensive agents began to increase the fourth and fifth decades as reflective of increasing cardiovascular disease in these age groups that continue to predominant in the last decades of life. Patients in the sixties, seventies, eighties, and nineties age groups frequently have multiple health problems and take more than three prescription drugs. More pharmaceutical agents involved in therapeutic errors reported by the elderly population had a narrower therapeutic range that those reported in younger age groups.

Discussion:

Analysis of scenarios associated with therapeutic errors leads to some common reasons mistakes are made by laypersons with over the counter medications as well as prescription drugs. The basic scenarios previously discussed all included some element of either administration of the wrong dose of a drug, or administration of the wrong drug to the wrong patient, or giving/taking the drug at the wrong time, or giving/taking the drug by the wrong route. It is more important to consider how these errors occurred in order to improve pharmaceutical care and medication safety.

Many errors involved proper identification of the medication. Not wearing one's glasses, taking medications in the dark, not checking the label of over the counter products for like ingredients, not checking the patient's name on the prescription vial, relying shape of containers or colors of medications to identify the product are all contributing factors in giving or taking the wrong medication. Many people remove medications from their original labeled containers and combine them in



vials or daily dose organizers. All of these actions make proper identification of drugs and for whom the drug is intended impossible particularly for persons requiring multiple drug regimens.

Errors made in the amount of drug administered involved misunderstanding units of measurements on labels, misreading dosing devices, and use of improper measuring devices. Examples include mistaking fractions such as $\frac{1}{2}$ for 2, decimals such as 0.7 ml for 7 ml, droppersful for drops, teaspoons for tablespoons, mistaking 15 to 30 ml adult dosage cups for 5 to 10 ml cups for children. In this study several cases involved children older than 6 years of age administering their own medications. Children may increase their own doses because the medicine tastes good or they believe as some adults do that more is better. In some cases households were under stress with several sick children on multiple medications and the wrong child received the other child's dosage amount in the confusion. Indeed, any environment that is disruptive contributes to medication errors and the more variables introduced in to this environment such as multiple drugs, multiple dosing intervals, and multiple patients (even if the patient is a pet) result in more opportunities for mistakes. Double dosing of medications to small children frequently results from a lack of communication between parent or parents and caregivers. Finally, many laypersons are simply not aware of the dangers of improper dosing of acetaminophen.

Wrong routes of administration often were associated with storage problems such as placing topical preparations near oral preparations or ear drops next to eye drops in the medicine cabinet. Again careful reading of labels would have prevented the error but proper storage would have also helped. Other reasons for wrong routes of administration involved similarly appearing bottles, and label directions that were unclear such as "use as directed".

Therapeutic errors among elderly patients were under reported in this study. The data collected in this study is self-reported by persons calling the poison center. People with young children or grandchildren are more likely to have the telephone number of a poison center available and are more likely to have utilized poison center services previously for other exposure events related to childhood poisonings. Elderly persons may not be as aware of poison center services. Bias of poison center data is always a consideration because information about events not reported for whatever reasons are not included in the study. Reports from many other sources indicate that therapeutic errors are a concern in the elderly population due to the larger numbers of drugs prescribed for this population. This study did observe that when the elderly reported therapeutic errors, these errors were generally more serious due to the narrow therapeutic index of many of the medications and the general health condition of the patient.

Conclusion:

Patients must clearly understand what their medications are intended to do, what their side effects may be, how much drug is to be taken, and at what intervals. Directions provided in writing as well as verbally have been shown to be most effective as well as reducing the number of drugs, simplifying dose administration schedule and providing devices to help patients with accurate administration. (6) Healthcare professionals must be aware of over the counter drugs being self administered by the patient and education of patients in appropriate administration of over the counter products especially acetaminophen containing products.

Parents should be counseled and shown proper use of measuring devices. Some authors believe that the oral dosing syringe is the best device for delivery of liquid medications. (7) Parents should be instructed not to use household teaspoons for measuring liquid medications. (8)

Helping patients to develop a plan or strategy for administering can improve pharmaceutical care and medication safety. Household with multiple individual taking multiple medications on multiple dosing schedules may best benefit from a written calendar for recording medication usage. (5)

A well-informed patient is safer. Patient education is the key to preventing therapeutic errors. Pharmacists can play an important role in this education. A medication tips sheet for patients may be downloaded from www.oklahomapoison.org as well as other poison prevention information.

Poison Prevention Week is March 16-22 this year. You can help prevent poisonings by participating in prevention programs and distributing poison prevention literature. Contact Tracy McKeown at (405) 271-5062 to order literature and to learn more about poison prevention programs.



The Oklahoma Poison Control Center is a program of the University of Oklahoma College of Pharmacy in The Children's Hospital at OU MEDICAL CENTER.

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OUPharmTech News

▪ What is Microsoft .NET?

Microsoft® .NET is simply a set of software technologies for connecting information, people, systems, and devices. .NET technologies and XML Web services are inseparable. The wide variety of .NET tools, services, clients, and servers empowered developers to build powerful software and systems through XML Web services.

Microsoft Visual Studio .NET and the Microsoft .NET Framework are the main tools needed for developing .NET applications and services.

For more .NET information, see <http://www.microsoft.com/net/basics/whatis.asp>

See also [What is Web Services?](#)

▪ TEACH Act of 2002

The President signed into law the Technology, Education and Copyright Harmonization Act of 2002 on November 2, 2002. The TEACH Act amends the Copyright Act of 1976 by rewriting Section 110(2) and adding a new Section 112(f). Together, these revisions give instructors at accredited nonprofit educational institutions and governmental bodies teaching via interactive digital networks on campus and at a distance enhanced capability to employ most third party copyrighted works in electronic courseware without the need to secure permission from copyright owners. These changes bring into closer congruity an instructor's rights to use copyrighted works in face-to-face and remote teaching settings.

The new flexibility accorded to instructors, however, requires significant actions and investment by institutions to protect the integrity of the copyright works used in the courseware and to promote respect for the rights of copyright owners.

The Section 110(2) amendments that expand instructor rights include:

- transmission of the performance via digital networks of an entire non-dramatic literary or musical work; and reasonable and limited portions of all other performances, including those incorporated in any type of audio-visual work, such as videotapes and films, and any dramatic musical work.
- transmission of displays of works via digital networks, including still images, in amounts comparable to typical face-to-face displays in live classroom session.
- transmissions made to students officially enrolled in the class wherever they are located, whether a classroom, a library, a dorm room, at work, or at home.

The counterbalancing limitations and restrictions include:

- the transmitting institution must be accredited and nonprofit
- the transmission of the performance or display must be
 - part of the systematic "mediated instructional activities" of an accredited nonprofit institution or governmental body;
 - "mediated instructional activities" consist of the use of works (1) as an integral part of the class experiences controlled by or under the direct supervision of the instructor; and (2) analogous to a live classroom performance or display
- directly related and of material assistance to the teaching content; and made solely for and, to the extent technologically feasible, limited to reception by students officially enrolled in the class for which the transmission is made or to officers or employees of governmental bodies
- password access or similar authentication systems are sufficient, as opposed to a general requirement of network security
- works primarily produced or marketed for the digital distance education market, works not lawfully acquired or made, and works such as textbooks and coursepacks typically purchased by students individually are not covered under Section 110(2).



- the transmitting institution must employ technological measures that "reasonably prevent" the students receiving the transmissions from retaining the works beyond the "class session" and from redistributing the works to others;
 - this does not constitute an institutional guarantee that the technology selected will be infallible; nor does it require monitoring of recipient conduct.
 - the length of an asynchronous "class session" varies from student to student. It generally is the period during which a student is logged onto the institution's server.
 - the material may not remain in accessible form on the student's computer, but it may remain on the institution or governmental body's server for use in one or more courses, and may be accessed by a student each time he or she logs on to participate in a particular class session.
 - not interfere with any technological protection measures incorporated by the copyright owner to defeat retention and distribution; and
 - provide students, faculty and affected staff with information that describes and promotes compliance with copyright laws, provide notice that the material contained in the course may be copyrighted, and adopt and maintain institutional policies on copyright.

Section 112(f) gives eligible transmitting institutions the right to make copies of digital works and digitize portions of analog works in order to make the performances and displays authorized by Section 110(2) provided that:

- the copies are retained by the institution and used only for the authorized transmission; and
- the digitizing of the needed portion of the analog work is the result of the fact either that no digital version of the work exists or the existing digital version incorporates technological protection measures that prohibit its use as authorized by Section 110(2).

Summary

The TEACH Act represents a major improvement from prior law, which severely limited the types of works that could be transmitted and required that the transmissions be intended primarily for reception by students in classrooms and similar places devoted to instruction. While all types of works are now covered and the location restriction has been eliminated, the TEACH Act nevertheless includes very real limits on how much and how copyrighted works can be incorporated into online courses. It is therefore important to recognize that if an instructor's intended use is not permitted under the TEACH Act, it may nevertheless be sanctioned as a fair use under the Copyright Act.

▪ EDUCAUSE, NLII, and MERLOT Announce Alliance

The National Learning Infrastructure Initiative (NLII), a program of EDUCAUSE, and the Multimedia Educational Resource for Learning and Online Teaching (MERLOT) formed an alliance to share information and to develop joint programs that advance online learning.

The alliance will support national and campus-based initiatives in faculty development, technology use in teaching and learning, shared learning tools, and online community facilitation. EDUCAUSE Vice President Carole Barone, who leads the NLII, said, "This alliance will result in an extension of expertise and focused action plans between two programs singularly dedicated to the transformative role that technology plays in education."

For more information visit: <http://www.educause.edu/nlii/>



Job Openings

OU MEDICAL CENTER, Children's Hospital

- Clinical Assistant Professor

The University of Oklahoma College of Pharmacy, Oklahoma City

- Nuclear Staff Pharmacist
- Clinical Pharmacist

The University of Oklahoma College of Pharmacy, Schusterman Center, Tulsa

- Clinical Assistant Professor
- Clinical Assistant Professor

Eckerd Drug Company

- Pharmacist

Wal-Mart Stores, Inc

- Staff Pharmacist and/or Assistant Pharmacy Manager
- Staff Pharmacist