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# Currents in Pharmacy Teaching and Learning

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Experiences in Teaching and Learning

## Drugs of Abuse and Addiction: An integrated approach to teaching

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### ABSTRACT

**Background and purpose:** To describe the design, implementation, and student perceptions of a Drugs of Abuse and Addiction elective course utilizing an integrated teaching model.

**Educational activity and setting:** Third-year pharmacy students enrolled in the two credit hour elective. Teaching methodology included didactic lecture, journal club, simulated addiction assignment with reflection, debates, external speakers, site visit to a residential drug court program and research paper with presentation.

**Findings:** A course objective survey was administered upon course completion. All students strongly agreed that having science- and clinical-based faculty members develop and deliver course content was beneficial. Additionally, all students agree to strongly agree that their research project helped them integrate and comprehend the science and practice surrounding drugs of abuse and addiction.

**Discussion and summary:** Students enjoyed an integrated teaching approach and multiple teaching methodologies leading to increased engagement and enhancement of student learning. Course enrollment was beneficial for personalized learning, but limited student perspective.

### Background and Purpose

Drug abuse is an ongoing issue in the United States. In 2014, nearly 27 million Americans aged 12 years and older had used an illicit drug within the last month, accounting for over 10.2% of the United States population.<sup>2</sup> The National Drug Intelligence Center estimated that illicit drug use cost the United States roughly \$193 billion in 2007, with public health care costs related to treatment of illicit drug use estimated to be over three million dollars in the same year.<sup>3,4</sup> A study by Rehm et al.<sup>5</sup> showed that 3.8% of all global deaths can be attributed to alcohol, costing the United States an estimated \$249 billion each year in both direct and indirect costs.<sup>6</sup> Additionally, the Centers for Disease Control and Prevention (CDC) reported that in 2014, a record number of people died from drug overdose in the United States with a majority of deaths being related to opioid analgesics.<sup>7</sup>

Despite increased awareness of drug abuse, it has become increasingly easier to acquire illicit drugs. It is estimated that nearly 54% of persons who use illicit drugs receive them from a friend or relative for free, with an additional 16.6% buying illicit drugs.<sup>8</sup> An additional 18.1% receive these medications through one physician and another 1.9% receive them from more than one physician, a term referred to as “doctor shopping.”<sup>8</sup> The 2011 Drug Abuse Warning Network showed that oxycodone, hydrocodone,

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antidepressants, and alprazolam were among the most common prescription medications implicated in substance related emergency department visits.<sup>9</sup>

Statistics in Tennessee mimic nationwide statistics with opioid prescription drugs being the primary substance of abuse.<sup>10</sup> This is particularly alarming as the amount of prescribed opiates has increased by 25% from 2010 to 2012.<sup>10</sup> The Tennessee Department of Mental Health and Substance Abuse Service (TDMHSAS) reported that over 2000 people received opioids or benzodiazepines from more than four doctors in March 2013 alone.<sup>10</sup> This has led to a rise in drug overdose deaths in Tennessee, with nearly 1100 such deaths being reported in 2012, a 220% increase over a 13-year period of time.<sup>10</sup>

Drug abuse and diversion has infiltrated our healthcare system, both directly and indirectly. These startling statistics highlight the important role of pharmacists in fighting drug abuse. Recently, the American Association of Colleges of Pharmacy (AAPC) released updated curricular guidelines for incorporating substance abuse and addiction education into the core curriculum.<sup>11</sup> These guidelines highlight the importance for student pharmacists to have a thorough understanding of the pharmacology behind common substances of abuse and how to approach these addictions from a clinical perspective. Upon searching pharmacy school curricula, it was determined that only 19 pharmacy programs offer a complete course on drugs of abuse and/or addiction. All curricula of the 141 programs listed on the AAPC website were searched for classes which contained the keywords, or a combination thereof, “drug(s) of abuse,” “substance abuse,” “substance dependence,” “dependence/dependency,” or “addiction.”<sup>12</sup> Most curricula were available online; however, those that were not required a call to the school for clarification. Based upon our search, 120 schools offered no stand-alone course and schools provided no data. Therefore, our research indicates that less than 15% of pharmacy curricula offer a complete course on drugs of abuse/addiction.<sup>1</sup> An optimal approach is for basic and clinical science faculty working together to deliver an integrated curriculum, offering a well-rounded investigation to a very complex problem.

Traditionally, pharmacy education curriculum is designed such that basic sciences are introduced early in the curriculum with clinical experiences beginning later in the program.<sup>13</sup> However, this approach to pharmacy education is shifting to a learning environment in which the basic and clinical sciences are integrated throughout the curriculum such that the context for basic science education is apparent early in the didactic curriculum while establishing a clinical foundation through the basic sciences.<sup>13</sup> The use of this strategy will ensure that pharmacy education is in line with the current demands of pharmacy practice, healthcare, and society as a whole. Furthermore, it will enforce the concept of advanced critical thinking in clinical practice, preparing students for interprofessional collaboration.<sup>14</sup> The new Accreditation Council for Pharmacy Education (ACPE) Standards 2016 specifically address the need for innovative curricular development and the integration of knowledge in the educational experience which will continue to govern the shift in content delivery throughout pharmacy education.<sup>15</sup>

The Drugs of Abuse and Addiction elective course was designed to combine the areas of expertise from the pharmaceutical sciences and pharmacy practice faculty members in order to provide a more complete picture of substances of abuse and addiction, while directly addressing six of the 10 educational goals in two of the four content areas set forth by AAPC.<sup>11</sup> The goals of the elective and subsequent study were to deliver an integrated curriculum through various pedagogical and andragogical methods and elicit feedback regarding the students’ perception of the integrated course design.

## Educational activity and setting

### *Design*

A two-credit hour elective in Drugs of Abuse and Addiction was designed to investigate the pharmacological and psychological aspects associated with drug addiction from an interdisciplinary and interdepartmental perspective. Aspects of medicinal chemistry, pharmacology, pharmacokinetics, and toxicology were discussed for drugs of abuse in the stimulant, depressant, and psychedelic classes. Topics included concepts of neurotransmission, absorption/distribution/drug metabolism/elimination (ADME) and its relation to abuse potential, chronic drug administration and correlation to the development of tolerance and dependence, theories of addiction, patterns of abuse, and treatment of addiction. The course was developed and implemented by both a pharmaceutical sciences and pharmacy practice faculty member to evaluate the benefit of integrated teaching. The curriculum at Lipscomb College of Pharmacy is a four-year program with electives offered in the third (P3) year. Students are required to complete one elective per semester (2 credits) for a total of two elective experiences (4 credits). With a large number of elective course offerings and limited opportunities for students to engage, the cohorts for this study were relatively small, yet consistent with other elective enrollment. This course was run three independent times with P3 pharmacy students: Cohort 1 (2011; 16 students), Cohort 2 (2013; 5 students), and Cohort 3 (2016; 9 students). Course feedback from Cohort 1 and the growing epidemic of prescription opioid abuse contributed to a course redesign with a larger emphasis on prescription opioid abuse. To account for the course redesign, this paper focuses on Cohorts 2 and 3 (n=14) as the lecture schedule remained consistent. However, small variances do exist between Cohorts 2 and 3; these will be highlighted throughout the paper as appropriate.

Learning objectives for the elective course are listed in [Table 1](#). Teaching methodology included didactic lecture, discussion, journal club, debates, a research paper with formal presentation, and an addiction exercise with reflection. Two external speakers presented to the class and a site visit to a residential drug court program was arranged. The pharmaceutical sciences faculty member taught 26.7% of the lecture hours, whereas the pharmacy practice faculty member taught 20% of the lecture hours. Both faculty members facilitated 53.3% of the lecture hours.

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