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Teaching and Learning Matters (Case Report)

## Implementation and assessment of a pulmonary diseases elective course for third-year pharmacy students

Shaunta' M. Chamberlin<sup>a</sup>, Cyle E. White<sup>b</sup>, James S. Wheeler<sup>c</sup>, Sarah T. Eudaley<sup>d,f,\*</sup>, Andrea S. Franks<sup>e,f</sup>, A. Shaun Rowe<sup>d</sup><sup>a</sup> Department of Family Medicine, University of Tennessee Graduate School of Medicine, 1924 Alcoa Highway, Box U-67, Knoxville, TN 37920, United States<sup>b</sup> Infectious Diseases Pharmacy Specialist, Department of Pharmacy, Erlanger Health System, 975 E 3rd Street, Chattanooga, TN 37403, United States<sup>c</sup> Department of Clinical Pharmacy and Translational Science, University of Tennessee Health Science Center College of Pharmacy, 193 Polk Ave, Suite 2D, Nashville, TN 37210, United States<sup>d</sup> Department of Clinical Pharmacy and Translational Science, University of Tennessee Health Science Center College of Pharmacy, 1924 Alcoa Highway, Box 117, Knoxville, TN 37920, United States<sup>e</sup> Department of Clinical Pharmacy, University of Tennessee Health Science Center College of Pharmacy, 1924 Alcoa Highway, Box 117, Knoxville, TN 37920, United States<sup>f</sup> Department of Family Medicine, University of Tennessee Graduate School of Medicine, 1924 Alcoa Highway, Box 117, Knoxville, TN 37920, United States

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## ABSTRACT

**Background:** Given the significant public health burden of pulmonary diseases and the vital role pharmacists play in management across the continuum of care (and within transitions in care), an elective course for pharmacy students focused on pulmonary diseases was developed.

**Educational activity:** A month-long elective course for third-year pharmacy students consisting of 12 class sessions delivered in two-hour periods three times per week, was implemented. The course was delivered using the team-based learning (TBL) format in addition to hands-on skills and simulation sessions. Knowledge and skills assessments were administered before and after completion of the course. Student perceptions of self-confidence and ability regarding management of pulmonary diseases pre- and post-course and their perceptions of the course and TBL as a teaching strategy for this course were evaluated upon course completion.

**Critical analysis:** Nine students completed the course. Mean scores on knowledge and skills assessment significantly improved after completion of the course (54.5% pre-course vs. 79.3% post-course;  $p < 0.05$  and 60.3% pre-course vs. 93.2% post-course;  $p < 0.05$ , respectively). Student perceptions of their ability to care for patients with pulmonary diseases significantly increased, compared to pre-assessments, in all areas taught in the course ( $p < 0.05$ ). Additionally, students' confidence in managing specific disease states significantly improved in all areas ( $p < 0.05$ ) except for spirometry ( $p = 0.06$ ). Students' knowledge, skills, and confidence regarding management of common pulmonary disease states improved following this month-long elective course delivered using a combination of TBL activities and hands-on skills sessions.

\* Corresponding author.

E-mail addresses: [schamberlin@utmck.edu](mailto:schamberlin@utmck.edu) (S.M. Chamberlin), [cylewhite@gmail.com](mailto:cylewhite@gmail.com) (C.E. White), [jwheeler4@uthsc.edu](mailto:jwheeler4@uthsc.edu) (J.S. Wheeler), [seudaley@uthsc.edu](mailto:seudaley@uthsc.edu) (S.T. Eudaley), [afanks@uthsc.edu](mailto:afanks@uthsc.edu) (A.S. Franks), [Arowe@uthsc.edu](mailto:Arowe@uthsc.edu) (A.S. Rowe).

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## Background

Common respiratory illnesses, such as chronic obstructive pulmonary disease (COPD) and asthma, continue to be significant public health burdens and are two of the leading causes of morbidity, mortality, and economic health burden worldwide.<sup>1</sup> Healthy People 2020 goals include reduction in activity limitation, emergency department (ED) visits, hospitalizations and death in patients with asthma and COPD.<sup>2</sup> A variety of other pulmonary illnesses affect patients across the continuum of healthcare, including tobacco abuse, pneumonia, cystic fibrosis (CF), drug-induced lung disease, pulmonary hypertension, and acute respiratory distress syndrome (ARDS). Pharmacists, being accessible and trusted, are well positioned to play a significant role in caring for patients with pulmonary diseases both in the inpatient and ambulatory settings.<sup>3</sup> Therefore, it is imperative for student pharmacists to learn how to optimize medication therapy for patients with pulmonary disease, best manage these patients through transitions in care, and develop practical skills needed to ensure optimal medication use. In recent years, pharmacists in varying care settings have become more involved in transitions of care. Commonly encountered challenges in which pharmacists can play a vital role include identification of medication discrepancies, providing medication therapy management and medication counseling, promoting communication with providers, and facilitating access to medications.<sup>4</sup> In fact, pharmacist involvement in the transition of care at hospital discharge has been shown to reduce hospital readmission rates for pulmonary diseases.<sup>5,6</sup> This is increasingly important for healthcare institutions as the Centers for Medicare and Medicaid Services now enforces a reduction in payment for hospital readmissions within 30 days of discharge for disease states including COPD and pneumonia.<sup>7</sup>

At University of Tennessee Health Science Center College of Pharmacy, student pharmacists gain knowledge and practical skills in managing common pulmonary illnesses early in the curriculum, via approximately 27 hours of didactic instruction supplemented with about four hours in select skills labs focused on above mentioned topics. Skills labs include, but are not limited to, teaching students to demonstrate proper inhaler technique. While this skill is vital for all doctor of pharmacy (PharmD) graduates, literature suggests that healthcare professionals, including pharmacists and student pharmacists, often fail to appropriately demonstrate inhaler technique, thus highlighting the importance of reinforcing this skill throughout the PharmD curriculum.<sup>8,9</sup> Because one of the primary expectations of pharmacy graduates is to provide patient-centered care as a medication expert, case-based activities completed in an elective course offer opportunities for expanding knowledge in areas not covered in the required curriculum, reapplying previously acquired knowledge, and further refining skills needed for developing and implementing evidenced-based pharmacotherapy plans.<sup>10</sup>

This course aimed to align with many of the American Association of Colleges of Pharmacy's Center for the Advancement of Pharmaceutical Education (CAPE) 2013 Educational Objectives. Specifically, we emphasized previously learned knowledge of commonly encountered diseases necessary to provide patient-centered care and built upon that to expand problem-solving and critical thinking skills. Additionally, students expanded their knowledge of medication use systems as is necessary for transitions of care.<sup>10</sup> Our course also fostered a team-approach to complex problem solving that aimed to improve communication, which is an essential skill of pharmacists.

To date, there is no pulmonary-focused pharmacy elective described in the literature, specifically targeting navigation of transitions in care for patients with pulmonary diseases. Given the significant public health burden of pulmonary diseases and the vital role pharmacists play in management across the continuum of care (and within transitions in care), this elective was developed and offered. This course was delivered using the team-based learning (TBL) format in addition to hands-on skills sessions.

## Educational activity

Development of this course was driven by specific goals. First, we wanted to develop a pharmacy elective course focusing on pulmonary-related illnesses across the continuum of healthcare that targeted navigation of transitions in care. Transitions of care education centered around important areas for pharmacist intervention, including identification of medication discrepancies, providing medication therapy management and medication counseling, promoting communication with providers, and facilitating access to medications. We also wanted to implement a TBL approach to this course with supplemental hands-on skills activities. We aimed to assess if the course improved student knowledge, skills, and self-perceived abilities and self-confidence. Lastly, we evaluated student perception of the TBL format for course delivery and overall impressions of the course. The purpose of this course was to increase student knowledge of various pulmonary disease states, in addition to providing an opportunity for application of skills (including communication skills) specifically focusing on the pharmacist's role in managing these diseases and the many care transitions pulmonary patients make throughout the course of their disease.<sup>3</sup>

The TBL format was selected for the primary method of delivery of this course because the curriculum at our college includes several courses that have successfully utilized TBL.<sup>11,12</sup> With these positive experiences using TBL, we found this format ideal, given its ability to address a variety of professional competencies including communication, interpersonal skills, teamwork, knowledge acquisition, and application of knowledge. TBL was first described in the medical education literature in 2001,<sup>13</sup> and since then has also shown very positive educational outcomes in pharmacy education.<sup>14</sup> It is important for students not only to acquire knowledge, but be able to critically analyze and apply information, as well as appropriately communicate with patients. As the vast majority of lung diseases involve medication management, effective communication between the patient and pharmacist is critical to ensuring positive patient outcomes.

Currently, our curriculum consists of 2.5 didactic years and 1.5 years of advanced pharmacy practice experiences (APPE). APPEs begin in the spring semester of the third professional year. During the months of either January, February or March, students may elect to enroll in month-long electives in place of an APPE. This course was offered as one of those month-long elective courses. Students enrolled in the course had completed the didactic portion of the pharmacy curriculum, as well as some portion of their

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