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Research

## Three-year review of pharmacy students' interventions and activities in an outpatient teaching family medicine center

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### Abstract

**Objective:** Additional justification of the value of pharmacy students in outpatient settings is needed, as interventions have primarily been documented in the acute care setting. This study describes the clinical interventions and activities of fourth-year pharmacy students working under the supervision of one pharmacy practice faculty member in an outpatient teaching family medicine setting over a three-year period.

**Methods:** Students at this site see patients for individual appointments with the pharmacist, see patients with resident physicians, and perform medication reconciliation activities. All clinical interventions and activities documented by pharmacy students in a web-based system under the supervision of one pharmacy faculty member from 2011–2013 were analyzed.

**Results:** In the three-year study period, 5439 interventions and 1645 activities were documented at this practice site by 39 pharmacy students. The average number of interventions per student was 139.5 and the average number of activities was 42.2. The most commonly documented interventions were patient medication histories, patient counseling, and drug therapy adjustments/discontinuations/initiations. The total estimated potential cost savings/avoidance was \$602,022, which equates to \$15,436 per pharmacy student.

**Conclusion:** Pharmacy students performed a wide range of clinical interventions and activities in an outpatient family medicine center. Pharmacy students can have a significant impact on patient care in this setting and may contribute to significant cost avoidance. These data may be useful to schools of pharmacy, as they pursue the development of additional outpatient training sites.

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**Keywords:** Outpatient pharmacy; Clinical interventions; Student pharmacists; Advance practice experience

### Introduction/background

Pharmacists and pharmacy students provide care to patients in many different practice settings. It has been well documented that the clinical interventions of pharmacists can positively impact patient care, prevent adverse drug reactions, and decrease costs.<sup>1–8</sup> Documentation of clinical

interventions by pharmacy students can be used by schools of pharmacy to justify the presence of students at experiential training sites.

Data documenting interventions by pharmacy students have been primarily described in acute care settings<sup>9–15</sup>; and often interventions in outpatient and inpatient settings are reported together.<sup>16–19</sup> Sweeney et al.<sup>20</sup> described interventions by pharmacy students in a family medicine residency program, but did not differentiate between inpatient- and outpatient-based interventions. A review article of studies assessing pharmacy student interventions and the value to experiential practice sites published in 2012 specifically

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noted that publications describing student interventions in outpatient/primary care settings are limited.<sup>21</sup>

Studies describing pharmacy student interventions in outpatient settings have generally been small, with only a few students (2–18) reporting and only over short periods of time (six weeks to ten months).<sup>22–26</sup> Some of the common interventions reported are laboratory monitoring, medications initiated or dosage changed, patient education, and provision of drug information. Woolley et al.<sup>27</sup> reported interventions by an entire student pharmacy class over a 36-week time period. Of the 735 advanced pharmacy practice experience (APPE) placements, 134 (18%) were in ambulatory care. Overall, 44% of the total interventions were documented in an outpatient setting. The most common interventions in ambulatory care were patient education, health promotion and disease prevention, and drug information.

### Rationale and objectives

Auburn University Harrison School of Pharmacy previously reported school-wide interventions for pharmacy practice faculty and fourth-year pharmacy students over a 3.5-year period.<sup>28</sup> The practice site for this current study was included in that report, but results in the previous publication were aggregate for all practice sites within the school's experiential program. The objective of this current study was to describe the clinical interventions and activities by fourth-year pharmacy students working under the supervision of one pharmacy practice faculty member in an outpatient teaching family medicine setting from 2011–2013. Results of this study may be helpful in securing additional training sites in the outpatient setting for the school in the future.

### Materials and methods

The practice site is a large family medicine outpatient clinic and is staffed by approximately 36 family medicine residents and eight attending physicians with an average of approximately 2200 patient encounters per month. On a typical day, between six and ten medical residents and attending physicians are seeing patients in the clinic. The patient population is varied and includes obstetric, pediatric, and adult patients. The insurance mix consists of 35% Medicaid, 34% Medicare, 28% private insurance, and 3% uninsured. Fourth-year pharmacy students are assigned to the pharmacy practice faculty member for five-week primary care APPEs. The faculty member usually has two pharmacy students in each rotation block. The faculty member and pharmacy students perform three different types of patient care activities at the site. The first is a referral-based pharmacotherapy clinic for chronic disease management of individual patients. This service is offered two half-days per week, and patient appointments are scheduled in 30- or 60-minute increments. The second clinical activity is medication reconciliation as patients are triaged for physician

appointments. Pharmacy students interview patients, conduct medication histories, and reconcile medications and medication allergies in the electronic health record. Patient counseling is often performed concurrently with this activity, which also occurs approximately two half-days per week. The third clinical activity is collaboration or “rounding” with medical residents as they see patients in the clinic. Pharmacy students perform comprehensive medication assessments, medication histories, patient counseling, and provide pharmacotherapy recommendations to the medical resident under direct supervision by the pharmacy faculty member. This activity occurs approximately two to three half-days per month. The pharmacy students spend approximately five half-days per week in direct patient care activities. The other 50% of their time on the rotation is often spent preparing to make interventions by conducting chart reviews and discussing patient cases with the preceptor. The pharmacy faculty member and pharmacy students are also available continually for drug information questions and informal drug therapy consults.

All fourth-year pharmacy students at Auburn University Harrison School of Pharmacy document clinical interventions and activities in a single, web-based documentation system (Pharmacy OneSource, Quantifi, Bellevue, WA).<sup>29</sup> Upcoming fourth-year students are trained in a two-hour session that includes an overview of the Pharmacy OneSource software program and patient care scenarios. In addition, pharmacy students are individually trained at this practice site during rotation orientation and are given written instructions describing how to document interventions. The instructions are very specific and address how to document each type of activity during the rotation, and how to avoid over-documentation or mis-classification of interventions or activities. At this site, pharmacy students are responsible for entering all interventions that are performed in collaboration with the preceptor into the documentation system. The preceptor rarely documents interventions independently, as pharmacy students are present the majority of the time. Students are required to document interventions in the web-based system daily at this practice site. Data for the pharmacy students working under the supervision of one pharmacy practice faculty member at the site were analyzed for a three-year period (January 1, 2011–December 1, 2013).

For the purposes of this study, data were divided into “interventions” and “activities.” Interventions were defined as immediate changes in a patient's treatment regimen, orders for laboratory monitoring, potential prevention of medical errors (i.e., detailed medication history through patient interview), or improvements in patient safety (i.e., drug allergies clarified). Activities were defined as something that pharmacy students spend time doing, but may not result in immediate changes to a patient's treatment regimen or medical care, such as a detailed chart review to prepare for a patient visit. [Table 1](#) provides a full description of the interventions and activities. Estimated potential cost

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