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Short communication

## Medication disposal: How prepared are pharmacy students?

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## ABSTRACT

**Objective:** To evaluate the confidence and capability of Doctor of Pharmacy students in their ability to communicate appropriate medication disposal methods for various dosage forms.

**Methods:** An anonymous survey questionnaire approved by the Institutional Review Board (IRB) was created and distributed to all Doctor of Pharmacy students enrolled in Florida pharmacy programs during the 2014–2015 academic year. This tool included both Likert-type and free response format methods to assess student confidence in and capability of explaining how to dispose properly of medications.

**Results:** An estimated response rate of 11% of all Doctor of Pharmacy students in Florida programs yielded a total of 286 student responses. Of these, 65% of students reported having exposure to information about medication disposal within the classroom setting. Students reported a median confidence level of 6 out of 10 in their ability to properly counsel on appropriate medication disposal practices. Free response items for medication disposal indicated that 37–46% of students participating in this survey were “unsure” or provided no response to the question of how to dispose of various dosage forms of medications.

**Conclusion:** Medication disposal is an important medical, safety, and environmental concern. Pharmacy students reported a low level of confidence and potential weakness in their capability for correctly disposing of medications. More standardized education, in addition to a stronger emphasis on the importance of appropriate medication disposal, may be warranted in pharmacy curricula and training.

## Introduction

Appropriate medication disposal is a continual medical, safety, and environmental concern. Approximately two-thirds of prescription medications in United States (U.S.) households are reportedly unused.<sup>1</sup> The most common disposal method utilized for these medications was found to be “throwing medications in the trash.” Evaluations of environmental concerns, perceptions, and negative outcomes associated with medication disposal have identified an increase in public concern and awareness regarding this issue.<sup>2–4</sup>

In an effort to assist with promoting safe medication disposal, the Drug Enforcement Administration (DEA) hosts National Prescription Drug Take-Back Days biannually. In Fall of 2014, Florida alone hosted 138 collection sites and collected over eight tons (16,250 pounds) of medication during the one day event.<sup>5</sup> This impressive accumulation of unused medication suggests a need for additional disposal practices consistently utilized and not reserved for only a few days out of the year.

Pharmacists seem to be the most likely candidate for assistance with this process. The Food and Drug Administration (FDA) provides guidelines for proper medication disposal, but also suggests consumers should consult with their pharmacist with any

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additional concerns or questions.<sup>6</sup> Recent legislative changes have also promoted the participation of pharmacists in this role through expansion of controlled substances disposal sites to include community and hospital pharmacies.<sup>7</sup>

In order to successfully promote appropriate medication disposal, it is imperative that pharmacy students feel adequately prepared to provide these services after graduation. Studies have suggested the notable impact that student pharmacists can have in this area.<sup>8,9</sup> One study utilized student pharmacists to assist with local medication collection events in order to improve community awareness regarding best practices and the pharmacists' roles in this effort.<sup>8</sup> Another study showed how pharmacy students on Advanced Pharmacy Practice Experience (APPE) rotations within community pharmacies can assist with providing important public education on medication disposal.<sup>9</sup> However, no current studies have reviewed student confidence in and ability to provide proper education on medication disposal.

The purpose of this pilot study was to evaluate whether pharmacy students in the State of Florida are knowledgeable and confident in properly counseling patients regarding appropriate medication disposal. The primary objective was to assess the confidence level and capability of pharmacy students' to explain how to dispose of various drug formulations. The secondary outcomes evaluated whether participants were able to identify their local drug disposal locations and whether medication disposal was introduced within their curriculum. The pilot study also gathered data regarding pharmacy practice experiences and career goals.

## Methods

Institutional Review Board (IRB) exemption for this pilot study was granted from the authors' institution and shared with all additional institutions that participated in the pilot study.

### *Participants and settings*

All students enrolled in Doctor of Pharmacy programs within the State of Florida for the 2014–2015 academic year were eligible for participation in this pilot study. Approximately 100 students are enrolled per year of pharmacy school for each program. Since there are a total of six pharmacy programs in Florida, some with multiple campuses, it was estimated that over 2500 pharmacy students were invited to participate. However, due to a lack of access to specific enrollment data, an exact response rate could not be computed.

### *Study design*

In order to solicit appropriate representation from all Colleges of Pharmacy throughout the State of Florida, an anonymous electronic survey questionnaire was created. The survey questionnaires were administered via Qualtrics® Version 62200.

The electronic link for the survey questionnaire was sent through e-mail to faculty administrators at each institution, who then distributed it through campus e-mail listservs to all eligible participants. This electronic link was distributed in September 2014, with a reminder e-mail sent in January 2015 to increase participation. The survey was closed in February 2015.

### *Survey instrument*

Student confidence in the ability to provide counseling on medication disposal was evaluated through a Likert-type response format of 1–10 (1 = not at all confident and 10 = extremely confident). Free response questions were utilized to evaluate student knowledge on disposal of various dosage forms in order to avoid any bias or leading responses that could be provided with multiple-choice options. Dosage forms listed included: controlled substances, capsules/tablets, inhalers, liquids, patches, topicals (lotions, ointments, etc.), and vials/injectables.

Additional demographic information was obtained from the survey questionnaire, including student year in the program, previous pharmacy employment experiences, career goals, awareness of local drug disposal sites, and how drug disposal was presented in respective curriculums; no information was gathered regarding which institution the student attended.

### *Statistical analysis*

All data from this pilot study were stored, cleaned, and analyzed using Microsoft Excel 2013. Free response answers regarding how to appropriately dispose of each medication dosage form were reviewed and categorized. Responses that contained more than one appropriate description of drug disposal were added to each respective category identified.

## Results

A total of 278 students completed the anonymous survey questionnaire, comprising of 145 first year (52%), 49 second year (18%), 48 third year (17%), and 36 fourth year (13%) student standings. The survey questionnaire was generally completed within a 10-minute period, with a mean completion time of 6.8 minutes. It was noted that not all students who completed the demographic information questions went on to complete the remainder of the survey.

Reports of past pharmacy employment or volunteer experiences mainly consisted of community pharmacy and hospital

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