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MAJOR ARTICLE

Comprehensive Assessment of Didactic Curriculum and Career Interest in Infectious Diseases Among Graduating United States Pharmacy Students

Meghan N. Jeffres,[1] Lauren R. Biehle,[2] and Conan MacDougall[3]

[1]Department of Clinical Pharmacy, University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences, Aurora; [2]Department of Pharmacy Practice, University of Wyoming School of Pharmacy, Laramie; [3]Department of Clinical Pharmacy, University of California San Francisco School of Pharmacy

Background. The growing need for clinicians with antimicrobial stewardship (AS) skills has resulted in an examination of educational methods for pharmacy and medical learners. This study explores characteristics associated with student assessment of didactic infectious diseases (ID) education quality and variables associated with a career interest in ID and/or AS.

Methods. Infectious diseases faculty from US pharmacy schools were sent a 15-question survey in September 2017. Faculty members e-mailed the survey link to graduating pharmacy students.

Results. Participants from 29 pharmacy schools, representing 21 states, resulted in 537 student responses. Quality of ID didactic education was rated as Very Good by 41%, Good by 40%, Acceptable by 14%, and Poor by 4% of participants. The mean number of faculty-provided learning resources differed by quality rating and was significantly associated with perceived educational needs. Infectious diseases was identified as a career interest by 29% of students. These students more frequently rated their ID didactic education as Very Good (52% vs 37%, $P < .01$) and were more likely to become interested in ID during or after it was taught in pharmacy school (39% vs 21%, $P < .01$).

Conclusions. In this cohort of graduating pharmacy students, the perceived quality of didactic ID education was associated with a career interest in ID and/or AS. Factors associated with quality of education were quantity and quality of faculty-provided resources. Increasing the quality of the didactic ID curriculum has potential to increase interest in ID/AS careers among pharmacy students.

Keywords. career; curriculum; education; infectious diseases; teaching.

Antimicrobial resistance is a serious threat to global public health [1]. In efforts to combat this resistance, antimicrobial stewardship (AS) programs are now required across healthcare systems in the United States [2]. The importance of pharmacists to AS programs is recognized by the Joint Commission, Center for Medicare and Medicaid Services, the Centers for Disease Control and Prevention, and the Society for Healthcare Epidemiology of America. In this role, pharmacists are the medication experts responsible for improving antimicrobial use as well as educating other professions on resistance and appropriate prescribing [2].

The growing need for clinicians trained in the optimal use of antimicrobials has resulted in an examination of educational practices [3]. A recent survey of US pharmacy schools evaluated if and how AS was incorporated into the curriculum [4]. The authors found that AS education was included in the required didactic content in 68% of schools, 37% offered elective didactic classes, and 84% of schools offered experiential rotations that focused on stewardship. A 2014 survey found that 94% of pharmacy students believed knowledge of antimicrobials was important for their careers and 89% desired more education on the appropriate use of antimicrobials [5].

Two cross-sectional surveys exploring factors influencing medical residents on their career choice were recently performed in light of the drop in applications to infectious diseases (ID) fellowships [6, 7]. This study reports a similar survey of a cohort of graduating pharmacy students. The objectives of this study were to explore characteristics associated with student assessment of the quality of their didactic ID education and identify education-related variables associated with a career interest in ID/AS.

METHODS

Design

This was a cross-sectional study of students graduating from Accreditation Council for Pharmacy Education-accredited pharmacy schools in the United States during the spring of

Received 17 July 2018; editorial decision 29 October 2018; accepted 29 October 2018.

Correspondence: M. N. Jeffres, PharmD, University of Colorado Anschutz Medical Campus, University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences, 12850 E. Montview Blvd., Mail Stop C 238, V20-1212, Aurora, CO 80045 (meghan.jeffres@ucdenver.edu).

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DOI: 10.1093/ofid/ofy284

2018. Student responses were collected in the fall of 2017. This study was reviewed and approved by the Colorado Multiple Institutional Review Board at the University of Colorado Anschutz Medical Campus.

Procedures

In September 2017, ID course directors and faculty at 137 US pharmacy schools were sent e-mails and asked whether they were willing to forward a survey link to graduating pharmacy students at their respective schools. Contact information for ID faculty was obtained via an Internet search of each pharmacy school. Faculty who agreed to participate were sent a Qualtrics survey link and optional text to include in an e-mail to graduating students at their school. Two follow-up emails were sent to faculty who were asked to send as reminders to graduating students. The survey was open for 12 weeks from September 2017 to November 2017. Student responses were anonymous and no incentive was provided for participation.

Instrument

A 15-question survey was developed by the authors and distributed to the Infectious Diseases Educator Network steering committee, which consisted of 17 ID pharmacist faculty from a range of pharmacy schools. Feedback from the committee was incorporated into the final version of the survey. The final survey included quantitative and qualitative sections. The quantitative section asked respondents about the quality of their didactic ID education, methods of and time allocated to active learning in their didactic ID education, ID topics in need of more classroom hours, career interests, and factors related to career interest. The qualitative section of the survey asked respondents 3 open-ended questions about successes, concerns, and desired changes within the ID curriculum at their school.

Analysis

All quantitative data were analyzed using SPSS Statistics, version 24 (IBM, Armonk, NY). Frequencies and percentages were used to summarize categorical variables. Descriptive statistics were used to summarize continuous variables. A χ^2 analysis and Z-test was used to compare quality of education categories and categorical variables. An analysis of variance was used to compare continuous variables across quality of education categories, demographic data, and categorical variables. Multivariate conditional logistic regression analyses were performed using the outcome of a career interest in ID as the primary outcome. Factors thought to increase or decrease career interest were included in the original model; variables with P values greater than 0.2 were excluded from the final model. For all tests of statistical significance, a 2-tailed α value was set at 0.05. Qualitative free-response data were coded and analyzed by the authors (L. R. B. and M. N. J.). Authors were blind to quantitative survey responses while coding free text into categorical themes for each of the 3 comment sections in which respondents described successes, concerns, and proposed changes to their ID curriculum. A single free-text response could have multiple themes. Authors coded all responses independently and differences in coded theme(s) were reconciled.

RESULTS

The survey was completed by 537 graduating pharmacy students, which resulted in a response rate of 17%. Participants were from 29 pharmacy schools. The median number of student responses per school was 19 (range 2–51). The median class size was 108 (range 52–220).

Teaching Methods

The most common learning resource provided to students in their ID curriculum was lecture slides, whereas resources rated as most helpful was prior years' tests or quizzes and patient cases (Table 1). The resources most commonly identified as not helpful were debates and group presentations. The topics rated most frequently as needing additional time in the didactic curriculum was intravenous to oral transition, biological markers, and de-escalation (Table 2).

Quality of Didactic Education

Quality of ID didactic education was rated as Very Good by 220 (41%), Good by 219 (40%), Acceptable by 76 (14%), and Poor by 22 (4%) graduating pharmacy students (Table 3). Both the total number of provided resources and the number of helpful resources increased as quality of education increased. Students who rated their ID education as Very Good received 11 helpful resources from faculty, compared with 9 resources for Good, 7 resources for Acceptable, and 5 resources for Poor ($P < .01$). Specific resources associated with a Very Good education rating compared with other categories were concept maps, online or application-based study tool, or games. The percentage of classroom time allocated to active learning was significantly different among Very Good (32%), Good (26%), and Acceptable (24%, $P = .03$).

Most students (56%, n = 299) provided responses to the open-ended question prompts (Table 4). There were 256 (48%) responses describing the most successful aspect of ID education, 260 (48%) describing biggest concerns, and 250 (47%) describing how they would change how ID was taught at their school. The proportion of students in each quality category that left free-text responses was similar to that of the whole group. Categorical themes among successes, concerns, and desired changes were similar and included teaching of antimicrobial fundamentals, teaching of disease states, teaching methods or strategies, and faculty. There were no differences in the frequency of comments about ID didactic successes between students in each quality group. A higher proportion of students who rated their didactic ID education as lower quality shared

Table 1. Student Ratings of Faculty Provided Resources or Tools for Learning ID Content, n = 537[a]

Provided Resource	Provided, n (%)	Very or Somewhat Helpful, n (%)	Not Helpful, n (%)
Prior years tests or quizzes	204 (38.0)	199 (97.5)	5 (2.5)
Patient cases	529 (98.5)	513 (97.0)	16 (3.0)
Handouts or worksheets	453 (84.4)	437 (96.5)	16 (3.5)
Lecture slides	534 (99.4)	517 (96.3)	17 (3.2)
Concept maps	364 (67.8)	348 (95.6)	16 (4.4)
Simulation	201 (37.4)	190 (94.5)	11 (5.5)
Recorded lectures	447 (83.2)	421 (94.2)	26 (5.8)
Online or app-based study tool	256 (47.7)	236 (92.9)	20 (7.8)
Videos or media clips	305 (56.8)	283 (92.8)	22 (7.2)
Audience response systems	493 (91.8)	448 (90.9)	45 (9.1)
Ungraded quizzes	193 (35.9)	170 (88.1)	23 (11.9)
Muddiest point	205 (38.2)	178 (86.8)	27 (13.2)
Games	278 (51.8)	227 (87.6)	32 (12.4)
Think, pair, share	238 (44.3)	202 (84.9)	36 (15.1)
Puzzles	123 (22.9)	102 (82.9)	21 (3.9)
Flip cards, flash cards	189 (35.2)	153 (81.0)	36 (19.0)
Debates	178 (33.1)	133 (74.7)	45 (25.3)
Group presentations	241 (44.9)	169 (70.1)	72 (29.9)

Abbreviations: app, application; ID, infectious diseases.

[a]Data are presented as frequency and percentages

concerns about curriculum design/course duration and poorly performing faculty. The desired change theme that was statistically significant between quality groups was the desire to replace poor performing faculty.

Career Interest

The top 10 career interests selected by graduating pharmacy students were ambulatory care (44%), community pharmacy practice (39%), ID (29%), critical care (23%), internal medicine ([IM] 20%), emergency medicine (16%), oncology (15%), pediatrics (12%), psychiatric (12%), and cardiology (10%). The most common education-related variable that had a positive influence on career choice was curriculum in pharmacy school (69%), followed by personal experience(s) (66%), faculty member(s) or mentor(s) (56%), employment experience (56%), and patient encounter(s) (50%). Pharmacy didactic education was very influential in career choice for 28%, somewhat influential for 56%, and not influential for 17% of students.

Among the 29% of graduating pharmacy students that identified ID as a career interest, the preferred future practice settings were inpatient (87%), inpatient antibiotic stewardship (71%), inpatient ID consult service (67%), academia (36%), outpatient ID consult service (34%), outpatient antibiotic stewardship (34%), outpatient ID clinic (32%), global health (29%), human immunodeficiency virus/acquired immune deficiency syndrome (19%), and immunocompromised/solid organ transplant (19%). Students with an ID career interest were more likely to identify antibiotic stewardship and rapid diagnostics as deserving of more classroom time (AS 47% vs 31%, $P < .01$; rapid diagnostics 31% vs 24%, $P = .04$). Students interested in an ID career were more likely to rate their ID didactic education as Very Good (52% vs 37%, $P < .01$).

Differences in career decisions between graduating pharmacy students with an ID career interest and those with other career interests included timing of career influence, positive career influences, and extent of pharmacy didactic education influence (Table 5). Students with an ID career interest were more likely to become interested in ID during or after it was taught in pharmacy school (39% vs 21%, $P < .01$), whereas students with other career interests were more likely to develop their career interest before pharmacy school (27% vs 12%, $P < .01$). More students with an ID career interest found pharmacy school curriculum and faculty member(s) or mentor(s) as positive career influences. Students with other career interests were more commonly influenced by K-12 curriculum and employment experiences.

Table 2. Student Perceptions of ID Topics That Deserve More Time in the Didactic Curriculum, n = 537[a]

Topic	N (%)
Intravenous-to-oral antimicrobial transition	271 (50.5)
Biological makers (procalcitonin, C-reactive protein)	234 (43.6)
De-escalation, streamlining, or narrowing spectrum	228 (42.5)
Selecting appropriate empiric therapy	222 (41.3)
Antimicrobial fundamentals (PK, PD, spectrum, adverse reactions, interactions)	215 (40.0)
Disease-specific therapeutics (pneumonia, UTI, skin infections)	203 (37.8)
Antibiotic stewardship	191 (35.6)
Communicating with prescribers about antimicrobial recommendations	186 (34.6)
Optimal duration of antibiotic exposure	180 (33.5)
Point-of-care diagnostic tests (influenza, Group A strep, HIV)	143 (26.6)
Rapid diagnostics of pathogens (PCR, PNA FISH, molecular assays)	135 (25.1)
Calculating or measuring antimicrobial consumption	104 (19.4)
Antibiotic allergies testing and history taking	81 (15.1)
Nonhuman antimicrobial consumption (livestock feed and topical application on crops)	81 (15.1)
Concept of collateral damage	78 (14.5)
Mechanisms of antimicrobial resistance	76 (14.2)
Relationship between antimicrobial use and microbial resistance	63 (11.7)
Consequences of antimicrobial resistance	53 (9.9)
Epidemiology of bacterial resistance	53 (9.9)
Infection prevention and control precautions	40 (7.4)

Abbreviations: ID, infectious diseases; FISH, fluorescent in situ hybridization; PCR, polymerase chain reaction; PD, pharmacodynamics; PK, pharmacokinetics; PNA, peptide nucleic acid; UTI, urinary tract infection.

[a]Data are presented as frequency and percentages.

Table 3. Student Assessment of Quality of Didactic ID Education Based on Learning Resources Provided

Provided Resource	Very Good, n = 220	Good, n = 219	Acceptable, n = 76	Poor, n = 22	*P* Value
Number of resources provided, mean ± SD	11.1 ± 4.0	9.7 ± 4.3	8.6 ± 4.7	7.6 ± 4.4	<.01
Number of helpful resources provided, mean ± SD	10.6 ± 3.8	8.8 ± 3.8	7.4 ± 4.1	5.1 ± 4.3	<.01
Percentage of classroom time allocated to active learning, mean ± SD	32.3 ± 22.8	26.1 ± 21.8	23.8 ± 24.9	30.2 ± 37.9	.03
Lecture slides	220 (100.0)	218 (99.5)	74 (97.4)	22 (100.0)	.06
Patient cases	219 (99.5)	219 (100.0)	70 (92.1)	21 (95.5)	<.01
Audience response	205 (93.2)	203 (92.7)	68 (89.5)	17 (77.3)	.06
Handouts and or worksheets	193 (87.7)	189 (86.3)	57 (75.0)	14 (63.6)	<.01
Recorded lectures	187 (85.0)	183 (83.6)	64 (84.2)	13 (59.1)	.02
Concept maps	173 (78.6)	138 (63.0)	44 (57.9)	9 (40.9)	<.01
Videos or media clips	151 (68.6)	115 (52.5)	32 (42.1)	7 (31.8)	<.01
Online or app-based study tool	129 (58.6)	92 (42.0)	28 (36.8)	7 (31.8)	<.01
Games	126 (57.3)	103 (47.0)	24 (31.6)	6 (27.3)	<.01
Think-pair-share	121 (55.0)	86 (39.3)	22 (28.9)	9 (40.9)	<.01
Group presentations	114 (51.8)	95 (43.4)	26 (34.2)	6 (27.3)	.01
Simulation	103 (46.8)	68 (31.1)	26 (34.2)	4 (18.2)	<.01
Prior years tests or quizzes	96 (43.6)	76 (34.7)	25 (32.9)	7 (31.8)	.16
Muddiest point	93 (42.3)	77 (35.2)	27 (35.5)	8 (36.4)	.45
Flip cards, flash cards	91 (41.4)	75 (34.2)	18 (23.7)	5 (22.7)	.02
Debates	89 (40.5)	67 (30.6)	15 (19.7)	7 (31.8)	.01
Ungraded quizzes	89 (40.5)	76 (34.7)	24 (31.6)	4 (18.2)	.13
Puzzles	58 (26.4)	49 (22.4)	13 (17.1)	3 (13.6)	.26

Abbreviations: ANOVA, analysis of variance; app, application; ID, infectious diseases; SD, standard deviation.

Data are presented as frequency and percentages unless otherwise indicated.

ANOVA was used to compare continuous data (number of resources and percentage of classroom) across 4 groups. The χ^2 test was used to compare categorical data across 4 groups. To identify where statistical significance existed between categorical variables a Z-test was used. Significantly different values have different letters assigned within each cell. Cells with the same letter are not statistically different from each other.

DISCUSSION

We assessed student perceptions of their ID education, their career interests, and the relationship between the two across multiple pharmacy schools in the United States. These results are important given pharmacists' key role in promoting appropriate antimicrobial use and limited availability of postgraduate training in ID for pharmacy graduates. Because postgraduate training is not required in pharmacy, most pharmacists will participate in AS supported primarily by their education received in pharmacy school. The cohort of graduating students surveyed in this study appeared aware of the need for knowledge and skills in ID/AS. The top 3 topics identified as needing more time in their didactic ID education are all fundamental stewardship skills (intravenous to oral antimicrobial transition, biological markers, and de-escalation of antimicrobials).

Our results regarding quality of ID education mirror findings of 2 studies investigating the relationship between ID education and fellowship choices of IM medical residents. The first was a cross-sectional mixed-methods (survey and interview) study of IM residents [6]. Of the 590 participating residents, 41% rated the ID curriculum as Very Good, 38% as Good, and 21% as either Acceptable or Poor. A similar study of 68 IM residents from military programs found that 36% rated the ID curriculum as Very Good, 31% as Good, 29% as Acceptable, and 3% as Poor [7].

It is interesting to note that both the number of resources and the number of helpful resources were associated with perceived quality of ID education. Students receiving 10 or more resources were more likely to rate their education as Very Good, regardless of the specific resource. However, some of the more innovative teaching materials such as concept maps, online or application-based study tools, and games were standouts and separated Very Good curricula from others. In the free-text responses, the most divisive variable was faculty. Although there was a trend in frequency of comments about high-performing faculty in successes of didactic ID education, significant differences were present in the concerns and desired changes where students wrote about the negative impact faculty had on their perception of their ID education. In contrast, faculty were more frequently cited as positive influence for a career interest in ID compared with other specialties.

The relatively high rate of career interest in ID may be explained by selection bias because survey completion was voluntary and this sample represents 17% of graduating students from 29 pharmacy schools. A larger survey would likely find a lower interest level; however, we are unaware of any such surveys

Table 4. Categorical Themes From Student Free-Text Responses About Successes, Concerns, and Desired Change Regarding Didactic ID Education

Free-text Response Categorical Themes	Comments	Comparison of Frequency of Theme Among Students Rating Overall ID Education as				*P* Value
		Very Good	Good	Acceptable	Poor	
Successes of didactic ID education	n = 256	n = 129	n = 89	n = 26	n = 12	
Teaching of antimicrobials fundamentals (spectrum, PK/PD, AE)	95 (37.1)	48 (37.2)	36 (40.4)	8 (30.8)	3 (25.0)	.65
Variety in teaching activities, patient cases, active learning	69 (27.0)	38 (29.5)	20 (22.5)	9 (34.6)	2 (16.7)	.43
Teaching of disease state therapeutics	49 (19.1)	23 (17.8)	19 (21.3)	5 (19.2)	2 (16.7)	.93
High-performing faculty	44 (17.2)	29 (22.5)	11 (12.4)	3 (11.5)	1 (8.3)	.16
Concerns about didactic ID education	n = 256	n = 113	n = 93	n = 35	n = 18	
Poor teaching of antimicrobials fundamentals (spectrum, PK/PD, AE)	62 (23.9)	24 (21.2)	26 (28.0)	9 (25.7)	3 (16.7)	.60
Poor teaching of disease state therapeutics	60 (23.3)	29 (25.7)	19 (20.4)	8 (22.9)	2 (22.2)	.85
Too much information, material not retained	60 (23.2)	26 (23.0)	25 (26.9)	6 (17.1)	3 (16.7)	.60
Lacks experiential or real-world application	50 (19.3)	25 (22.1)	18 (19.4)	5 (14.3)	2 (11.1)	.59
Curriculum design and duration	41 (15.8)	10 (8.8)	20 (21.5)	8 (22.9)	3 (16.7)	.05
Lack of learning activities, patient cases, active learning, too much emphasis on memorization	34 (13.1)	10 (8.8)	13 (14.0)	9 (25.7)	2 (11.1)	.08
Poor-performing faculty	14 (5.4)	1 (0.9)	5 (5.4)	3 (8.6)	5 (27.8)	<.01
Desired change for didactic ID education	n = 107	n = 91	n = 33	n = 19	n = 18	
Increase variety of teaching and learning methods and strategies	92 (36.8)	32 (29.9)	35 (38.5)	17 (51.5)	8 (42.1)	.13
Curricular/course design or duration	67 (26.8)	24 (22.4)	30 (33.0)	11 (33.3)	2 (10.5)	.11
Increase preparation for experiential rotations and real-world application	47 (18.8)	21 (19.6)	15 (16.5)	6 (18.2)	5 (26.3)	.78
Increase time and/or resources toward learning antimicrobials fundamentals (spectrum, PK/PD, AE)	43 (17.2)	15 (14.0)	17 (18.7)	9 (27.3)	2 910.5)	.28
Increase time and resources toward learning therapeutics	35 (14.0)	10 (9.3)	14 (15.4)	6 (18.2)	5 (26.3)	.18
Replace poor-performing faculty	16 (6.4)	2 (1.9)	4 (4.4)	5 (15.2)	5 (26.3)	<.01

Abbreviations: AE, adverse events; ID, infectious diseases; PD, pharmacodynamics; PK, pharmacokinetics.

Data are presented as frequency and percentages.

The χ^2 test was used to compare categorical data across 4 groups. To identify where statistical significance existed between categorical variables a Z-test was used. Significantly different values have different letters assigned within each cell. Cells with the same letter are not statistically different from each other.

of pharmacy trainees. In the Bonura et al [6] and Barsoumian et al [7] studies of medical residents cited above, 7% of respondents reported interest in a career in ID. In both studies, medical residents cited low salary as a deterring factor for a career in ID. A potential explanation for the difference in career interest between pharmacists and physicians is the lack of salary difference between an ID pharmacist and any other clinical specialty. Respondents in this survey were also earlier in their training than in the physician studies, which were performed among medical residents in their third year of residency. It is unknown whether residency would increase or decrease career interest in ID for pharmacy students.

How ID was taught influenced both quality rating and career interest in our study as well as both medical resident studies. Bonura et al [6] found that residents who indicated an interest in ID at the end of residency were more likely to rate their medical school curricula as Very Good (53%), compared with only 33% of those never interested in ID. In addition, residents who experienced case-based learning and nonmemorization learning had an increased likelihood of choosing ID (relative risk ratio, 3.7–3.9). The majority of military residents did not think the quality of education was influential on their interest in ID. However, learning ID through a curriculum primarily using active learning was different among residents who applied for or planned to apply for ID fellowships (80%), residents who considered ID (35%), and residents uninterested in ID (18%) [7].

Our results support the Infectious Disease Society of America Preclinical Curriculum Committee notes that traditional lecturing and curriculum does not stimulate participation or enthusiasm for ID [8]. Their recommendations include the use of active learning to stimulate participation, collaborative learning, and 2-way communication with the instructor. Utilizing active learning techniques at one institution led to a substantial increase in student interest in an infectious disease rotation [8]. Faculty providing varied types of resources for learning ID was associated with a higher category of education quality. In addition to active learning in the didactic setting, providing resources of concept maps, online or application-based study tools, and games were specifically associated with a Very Good education. These active learning techniques can also serve as study tools for independent learning.

A key limitation to the study is its representativeness of pharmacy students. Faculty identified as teaching ID at various schools of pharmacy were encouraged to share the survey with their students; it is possible that those faculty most engaged in teaching ID are likely to participate in the

Table 5. Career Interest Variables Between Students Interested in a Career in ID vs Other Areas

Career Interest Influences	ID Career Interests, n = 157	Other Career Interests, n = 380	*P* Value
Timing of career interest area			
Before pharmacy school	19 (12.1)	101 (26.6)	<.01
During or after an experiential rotation (IPPE or APPE)	62 (39.5)	147 (38.7)	NS
During or after a topic was taught in pharmacy school	61 (38.9)	79 (20.8)	<.01
Undecided	11 (7.0)	41 (10.8)	NS
Other	4 (2.5)	12 (3.2)	NS
Positive career influences			
Curriculum K-12	19 (12.1)	76 (20.0)	.03
Curriculum in undergraduate college	42 (26.8)	110 (28.9)	.67
Curriculum in pharmacy school	127 (80.9)	244 (64.2)	<.01
Employment experience	72 (45.9)	226 (59.5)	<.01
Faculty member(s) or mentor(s)	106 (67.5)	194 (51.5)	<.01
Patient encounters	78 (49.7)	192 (50.5)	.92
Peer influence	24 (15.3)	64 (16.8)	.70
Personal experience(s)	93 (59.2)	259 (68.2)	.06
Other	2 (1.3)	11 (2.9)	.36
Pharmacy didactic education			
Very influential	61 (38.9)	88 (23.2)	<.01
Somewhat influential	78 (49.7)	220 (57.9)	NS
Not influential	18 (11.5)	72 (18.9)	<.01

Abbreviations: APPE, Advanced Pharmacy Practice Experiences; ID, infectious diseases; IPPE, Introductory Pharmacy Practice Experiences; K-12, kindergarten to 12th grade; NS, not significant.

Data are presented as frequency and percentages.

The χ^2 test was used to compare categorical data between 2 groups.

study and send the survey link to their graduating students. Participation in the survey was voluntary and titled, "Student survey of ID didactic curriculum." Students with an opinion on the topic, positive or negative, would be more likely to participate, leading to a greater polarity of opinion than may be actually present.

CONCLUSIONS

In conclusion, in our study of graduating pharmacy students, we discovered that the quantity and innovation of faculty-provided resources was positivity associated with quality of didactic ID education and that the perceived quality of didactic ID education influenced career interest in ID and/or AS. Thus, an engaging and creative didactic ID curriculum has potential to increase interest in ID/AS careers among pharmacy students.

Acknowledgments

We thank all survey respondents for contributions and acknowledge the members of the Infectious Diseases Educators' Network for support.

Financial support. This work was funded by the Associate Dean of Research Educational Research Seed Grant Program at the University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences.

Potential conflicts of interest. M.N.J. served as a consultant for Shionogi. C.M. served as a consultant for Allergan and Shionogi and has received grant support from Merck. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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