**Drug Information PRN Focus Session—Drug Information Education in the Pharmacy Curriculum**

Activity No. 0217-0000-11-075-L04-P (Knowledge-Based Activity)

**Monday, October 17**
1:30 p.m.–3:30 p.m.
Convention Center: Rooms 317 & 318

*Moderator: Michael Gabay, Pharm.D., BCPS*
Clinical Associate Professor, Director, Drug Information Group and Prior Authorization Services, University of Illinois at Chicago College of Pharmacy, Chicago, Illinois

**Agenda**

1:30 p.m.  
Drug Information Education: Current Status  
*Michael Gabay, Pharm.D., BCPS*

2:30 p.m.  
Drug Information Education: Survey of Educators  
*Jennifer Phillips, Pharm.D., BCPS*  
Assistant Professor, Midwestern University Chicago College of Pharmacy, Downers Grove, Illinois

3:15 p.m.  
Effective Drug Information Education: What Works and What Doesn’t—Panel Discussion  
*Michael Gabay, Pharm.D., BCPS*  
*Jennifer Phillips, Pharm.D., BCPS*

**Faculty Conflict of Interest Disclosures**

Michael Gabay: no conflicts to disclose.  
Jennifer Phillips: no conflicts to disclose.

**Learning Objectives**

1. Describe current ACPE standards for drug information/literature evaluation.
2. Review ACCP Drug Information PRN opinion paper on drug information: from education to practice.
3. Describe current approaches to effectively teach drug information/literature evaluation.
4. Explain the development process for the survey of educators.
5. Discuss results from the survey regarding drug information/literature evaluation education at colleges of pharmacy.
6. Discuss implications of the results and steps forward to improve drug information/literature evaluation education.

**Self-Assessment Questions**

Self-assessment questions are available online at [www.accp.com/am](http://www.accp.com/am)
Learning objectives

- Describe current ACPE standards for drug information/literature evaluation.
- Review available literature on drug information education in colleges of pharmacy.
- Review the ACCP Drug Information PRN opinion paper on drug information: from education to practice.

ACPE standards

- Most recent guidelines Version 2.0 – effective February 2011
- Colleges must ensure that graduates are competent to:
  - Provide patient-centered and population-based care
  - Manage human, physical, medical, informational, and technological resources
  - Manage medication use systems
  - Promote availability of health and disease prevention services and health policy

ACPE standards

- In order to achieve the above, graduates must be able to:
  - Communicate and collaborate with patients, care givers, and other healthcare providers, etc.
  - Retrieve, analyze, and interpret the literature to provide drug information and counseling
  - Evaluate quality of evidence to appropriately apply study results to practice decisions
  - Demonstrate expertise in informatics
  - Carry out duties in accordance with guidelines
  - Maintain professional competence

ACPE standards

- Foundational areas:
  - Basic biomedical sciences
  - Pharmaceutical sciences
  - Social/behavioral/administrative sciences
  - Clinical sciences
    - Drug Information
      - Fundamentals of drug information practice
      - Application of DI skills for delivery of pharmaceutical care
      - Technology of DI retrieval for quality assurance
      - Ability to judge reliability of various information sources
ACPE standards

- Clinical sciences
  - Literature evaluation and research design
    - Fundamentals of design and methodology
    - Principles of primary literature evaluation
    - Implications of the primary literature
    - Principles of design and analysis in practicing evidence-based pharmacy
    - Levels of clinical evidence
    - Regulatory and ethical principles of research
  - Other areas: medication safety; informatics

ACPE standards

- Pre-APPE performance domains and abilities
  - Drug information analysis and literature research
    - Example performance competencies
      - Collect accurate, comprehensive DI from appropriate sources
      - Recognize types of information in various sources
      - Analyze and apply information to patient- or population-specific needs
      - Describe content in commonly used resources
      - Use effective written, verbal, and nonverbal communication skills to respond to DI questions

ACPE standards

- Required APPEs:
  - Community
  - Hospital or health-system
  - Ambulatory care
  - Inpatient/acute care general medicine
- Drug information – elective APPE
- IPPE – drug information skills

Literature review

- Kirschenbaum and Rosenberg 1984
  - 72 colleges
  - 93% response rate
- Almost all provided some degree of DI education
  - 50% formal DI clerkship (baccalaureate)
  - 100% DI clerkship requirement (PharmD)

Literature review

- Davis and Krucke 1994
  - 75 colleges of pharmacy
  - Response rate: 75%
  - 84% offered drug information course
    - 0.5 to 4 credit hours
  - 91% offered DI clerkship
    - 40 to 320 hours

Literature review

- Entry-level PharmD DI course objectives
  - History/philosophy of DI services
  - Biomedical publication process
  - Systematic handling of requests
  - Primary, secondary, tertiary literature
  - Databases
  - Verbal/written communication techniques
  - Drug literature evaluation
  - Adverse drug reactions – detection, evaluation, reporting
Literature review

Entry-level PharmD DI course objectives
- Drug policy management, formulary development*
- Drug approval process
- Personal library development – keeping current
- Ethical/legal issues
- Quality assurance

Entry-level PharmD clerkship objectives
- Drug information retrieval from literature/computerized databases
- ADR reporting
- Respond to requests from public/health professionals
- Written communication
- Drug policy management
- Application of literature evaluation skills
- DI quality assurance activities
- Develop personal library

Mullins et al 1995
- 74 colleges of pharmacy
- Response rate: 89.2%
- 59.1% course director completed survey
- 85% offered stand-alone DI course
- 1 to 4 credit hours

“Strongly emphasized” course topics

<table>
<thead>
<tr>
<th>Course Topic</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Clinical importance of study design</td>
<td>72.5%</td>
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<tr>
<td>Efficient search strategies</td>
<td>61.5%</td>
</tr>
<tr>
<td>Types and functions of information resources</td>
<td>50.9%</td>
</tr>
<tr>
<td>Oral and written communication skills</td>
<td>47.1%</td>
</tr>
<tr>
<td>Statistical methods</td>
<td>44.2%</td>
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</table>

Cole and Berensen 2005
- 88 colleges of pharmacy
- Surveys conducted via phone
- 15 min interview with standard script
- Response rate: 90%
- 89% of first professional degree programs required at least 1 DI course
- 36% required 2 DI courses
Literature review

Major topics covered:
- Systematic approach
- DI resources
- Organization of biomedical literature
- Computerized searching skills
- MICROMEDEX
- Adverse drug reactions
- Critical literature evaluation
- Ethics
- Biostatistics


Literature review

- 20% of first professional degree programs required DI practice experience
- 70% offered as an elective
- 10% did not offer a DI experience
- Mean length required: 4 weeks (2.5 to 6 weeks)
- Mean length elective: 5 weeks (4 to 8 weeks)
- Reasons for not offering: lack of sites and qualified faculty


Literature review

Major efforts of practice experience

<table>
<thead>
<tr>
<th>Major efforts of practice experience</th>
<th>Percentage of first professional pharmacy degree programs</th>
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</thead>
<tbody>
<tr>
<td>Improve knowledge of references</td>
<td>100%</td>
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<tr>
<td>Improve computerized searching skills</td>
<td>99%</td>
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<tr>
<td>Staff DI center and respond to requests</td>
<td>97%</td>
</tr>
<tr>
<td>Participate in journal club</td>
<td>90%</td>
</tr>
<tr>
<td>Evaluate adverse drug reactions</td>
<td>79%</td>
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<tr>
<td>Write formulary monographs</td>
<td>75%</td>
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Literature review

If no practice experience offered or required, how are DI skills evaluated?
- DI portfolio kept and evaluated by DI faculty member – 5%
- DI portfolio kept and evaluated by non-DI faculty – 19%
- DI skills are assumed and not specifically taught or evaluated – 70%
- Unsure – 6%


Literature review

How is didactic drug information taught?


Wang et al 2006

- 86 colleges of pharmacy
- Web-based survey
- Response rate: 73%
- Respondents: DI course coordinators (44%)
Literature review

- Team taught course – 63%
- Primary course instructor full-time faculty member – 90%
- 75% of primary instructors – some level of postgraduate training
- 54% of above completed specialized DI training


Literature review

- 35% had DI course in second year
- 19% in third year
- 11 schools offered DI didactic work integrated into 2 professional years
- 50% had a laboratory or recitation component


Literature review

- Laboratory or recitation activities
  - Advanced literature searching/analysis
  - Managing adverse drug reactions
  - Answering DI requests
  - Journal club
  - Medication use evaluation
  - Monograph preparation
  - Research projects


Literature review

- Integrated courses
  - 30% overall offered an integrated approach
  - Laboratory or recitation component often included
  - Top activities in integrated sessions:
    - Advanced literature searching and evaluation
    - Answering drug information requests


Literature review

- Experiential education
  - 23% required
  - 62% elective
  - 15% did not offer
    - Assumed to be covered in other APPEs or other experiences
    - Lack of training sites
    - Lack of faculty resources


Literature review

- Most common activities in experiential
  - Answering drug information requests
  - Advanced literature searching and analysis
  - Journal club
  - Monograph preparation
  - Primary experiential preceptor
    - 67% completed residency or fellowship
    - 41% specialized DI training

DI PRN opinion paper

2009 – ACCP DI PRN opinion paper

- “Drug information: from education to practice”
- 2 distinct sections
  - Education and training
  - Practice areas
- Purpose
  - Describe role of DI and that of the DI specialist in the training of students and advanced trainees
  - Describe role of focused training for specialization
  - Describe role of DI specialist in practice areas, identify challenges, and provide recommendations


DI PRN opinion paper

Minimum core DI concepts

- Identifying, managing, reporting, and preventing adverse drug events
- Incorporating principles and practices of evidence-based medicine into pharmaceutical care
- Locating and critically evaluating medical information on the Internet
- Preparing, presenting, and participating in journal clubs
- Providing verbal and written responses to DI requests
- Summarizing basic biostatistics and research design
- Understanding creation/management of a drug formulary
- Using electronic databases/other references in effective manner


DI PRN opinion paper

APPE recommended activities

- Participating in discussions/assignments regarding compliance
- Participating in discussions/assignments regarding drug approval process and role of key organizations in public safety and standards
- Participating in the formulary process
- Participating in quality improvement
- Participating in protocol development
- Performing outcomes analysis to support formulary recommendations and therapeutic guideline development
- Using publications in decision-making process
- Working with technology used in practice


DI PRN opinion paper

APPE recommended activities

- Accessing/evaluating/applying information to promote optimal health care
- Conducting drug use review
- Developing/analyzing clinical drug guidelines
- Identifying/reporting medication errors and adverse drug reactions
- Managing drug use system and applying systems approach to drug safety
- Managing use of investigational drug products
- Participating in discussions/assignments concerning health policy matters that may affect pharmacy


DI PRN opinion paper

DI skills should be applied/required in all APPEs

Recommendation:

- All colleges of pharmacy offer specific DI APPEs precepted by appropriately trained DI specialists

DI PRN opinion paper

- Drug information educators
  - Noticeable trend is lack of qualified educators
  - Recommendation:
    - All colleges of pharmacy devote minimum of 1 FTE for drug information specialists
    - Colleges should also provide sufficient resources to faculty and preceptors
    - Drug information educators should have substantial postgraduate training

Summary

- ACPE recent updated guidelines
- Some updates affect the area of drug information
- Over the years, variety of published literature on drug information education
- 2009 DI PRN opinion paper offered recommendations DI education and training

Where do we go from here?

- Dr. Phillips – survey
- Hope to build upon DI PRN opinion paper

Questions?
Learning Objectives

- Explain the development process for the survey of educators.
- Discuss results from the survey regarding drug information/literature evaluation education at colleges of pharmacy.
- Discuss implications of the results and steps forward to improve education on drug information/literature evaluation.

Goals of Study

- Assess the extent to which opinions expressed in the 2009 DI PRN paper have been incorporated by pharmacy schools in the U.S.
- Characterize qualifications of faculty members involved in drug information education
- Identify types of methodology used to deliver drug information education
- Identify recent changes in drug information education

Recruitment

- After IRB approval, a description letter and survey link was sent to:
  - Deans of Pharmacy
  - AACP Directory
  - ACCP DI PRN
- Survey recipient was asked to forward to the appropriate individual at their institution
- Completion of survey implied consent to participate in the survey

Survey Development Process

- Initial discussion at 2010 ACCP DI PRN Business Meeting
- Several phone meetings with survey team
  - Find and discuss relevant background information
  - Determine question(s) of interest
  - Determine feasibility of the project
  - Develop survey instrument
- Survey instrument refined & piloted by survey team
- IRB application submitted and approved
- Survey distributed (3 week response time)
- Data analysis

Survey Overview

- Information collected in this survey was organized into 4 sections:
  - Demographics
  - Methodology of instruction
  - Content of curriculum
  - Recent changes (content or methodology)
Survey Results

Response Rate
- Survey distributed to Deans of Pharmacy (n=128) and ACCP DI PRN
- 72 completed surveys
  - 4 excluded (duplicates from same institution)
  - 2 excluded (experiential preceptors)
  - 1 excluded (student on a DI rotation)
- Response rate: 64 (50%)

Demographics

Survey Responders

- Assistant, Associate, or Full Professor: 72%
- Course Director: 8%
- Instructor: 24%
- Other: 8%
- Assistant/Associate Dean: 4%
- Chair / Vice Chair: 4%

Age of pharmacy program
- Mean: 53 years (range 1-152 years)

Class size
- 2010 class
  - Mean 119 (range: 51-250)
- 2011 class
  - Mean 124 (range: 52-287)

Geographical Region
- Northeast (25%)
- Midwest (15%)
- South (25%)
- West (25%)
- Other (25%)

- 4-year PharmD program: 46 (72%)
- 6-year PharmD program: 15 (23%)
- Non-traditional PharmD program: 2 (3%)
- Other: 5 (8%)
  - 7-year PharmD program (n=1)
  - 3-year accelerated program (n=3)
  - 1 combination MS, PhD program (n=1)
Demographics

Pre-requisite Classes for Admission

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Computer Literacy</th>
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<tbody>
<tr>
<td>53%</td>
<td>69%</td>
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- Yes
- No
- I don't know

- Length of Term (n=62)
  - Semester system: 54 (87%)
  - Quarter system: 5 (8%)
  - Other: 3 (5%)
    - One had both quarter and semester and two utilized a block schedule

- Laptops (n=62)
  - Required: 33 (53%)
  - Not required: 26 (42%)
  - Unknown: 3 (5%)

Drug Information FTEs

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<thead>
<tr>
<th>1 FTE or more</th>
<th>Mean</th>
<th>Range</th>
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<tbody>
<tr>
<td>Overall</td>
<td>61%</td>
<td>(39/62) 1.8</td>
</tr>
<tr>
<td>Class size ≥100</td>
<td>68%</td>
<td>(21/31) 2.29</td>
</tr>
<tr>
<td>Class size &lt;100</td>
<td>47%</td>
<td>(10/21) 1.45</td>
</tr>
<tr>
<td>New schools</td>
<td>78%</td>
<td>(7/9) 1.14</td>
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Methodology

Drug Information Education in the Pharmacy Curriculum (n=61)

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<tbody>
<tr>
<td>DI alone</td>
<td>39%</td>
</tr>
<tr>
<td>DI + Lit Eval + Stats</td>
<td>11%</td>
</tr>
<tr>
<td>DI + Lit Eval</td>
<td>11%</td>
</tr>
<tr>
<td>Throughout Program</td>
<td>8%</td>
</tr>
<tr>
<td>Other Course</td>
<td>6%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
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Literature Evaluation in the Curriculum (n=37)

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<tbody>
<tr>
<td>Lit Eval alone</td>
<td>51%</td>
</tr>
<tr>
<td>Lit Eval + Biostats</td>
<td>27%</td>
</tr>
<tr>
<td>Another Course</td>
<td>11%</td>
</tr>
<tr>
<td>Throughout Program</td>
<td>5%</td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
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</table>
Biostatistics in the Curriculum (n=34)

- Stats alone: 56%
- Another course: 12%
- Other: 8%
- Throughout program: 3%
- Not taught: 3%

Stand-alone Courses

- Drug Information (n=26)
  - Most (62%) offered one class
  - Mean credit hours: 2.7 (range: 1-6)
  - Most (73%) offered in the 1st professional year

- Literature Evaluation (n=20)
  - Most (70%) offered one class
  - Mean credit hours: 2.6 (range: 1-6)
  - Most offered in the 2nd (48%) or 3rd (33%) professional years

Stand-alone Courses

- Biostatistics (n=19)
  - Most (95%) offered one class
  - Mean credit hours: 2.4 (range: 1-3)
  - Most offered in 1st (44%) or 2nd (44%) professional years

Combination Courses

- DI + Lit Eval (n=5)
  - All offered one class
  - Mean credit hours: 2.8 (range: 2-3)
  - Most (60%) offered in the 2nd professional year

- DI + Lit Eval + Biostats (n=19)
  - Most (68%) offered one class
  - Mean credit hours: 3.6 (range: 2-6)
  - Most offered in 1st (37%) or 2nd (42%) professional years

Combination Courses

- Lit Eval & Biostats (n=8)
  - Most (75%) offered one class
  - Mean credit hours: 2.9 (range: 2-4)
  - Most (75%) offered in the 3rd professional year

Instructional Methodology

- Time devoted to didactic lectures
  - 44% used this format for 26-50% of course hours
  - 25% used this format for 51-75% of course hours
  - 19% used this format for >75% of course hours

- Time devoted to small-group activities
  - 49% used this format for 26-50% of course hours
  - 39% used this format for <25% of hours
Instructional Methodology

- Internet-based activity
  - 44 (76%) used this format
    - 53% used this format for <25% of course hours
    - 17% used this format for 26-50% of course hours
  - Content covered:
    - Internet resources, Pubmed, plagiarism, research ethics, biostats support, guidelines, on-line journal club

- Didactic Instructors
  - Mean: 4 (range: 1-15)
  - No apparent relationship between the number of instructors and the class size

- Small-group facilitators
  - Mean: 3.8 (range: 1-20)
  - No apparent relationship between the number of facilitators and class size

- Technology used:
  - On-line course management: 95%
  - Audience response systems: 61%
  - Youtube: 13%
  - On-line blogs: 9%
  - Twitter: 4%
  - Wikis: 4%
  - Facebook: 0%
  - Others: Captivate, discussion boards, APhA counseling videos

- 100% had at least one mandatory assignment
  - Mean: 8.7 (range: 1-35)
  - Top assignments:
    - DI references (individual): 45 (74%)
    - Pubmed search (individual): 44 (72%)
    - Journal club (group): 42 (69%)
    - DI paper/consult (individual): 39 (64%)
    - DI references (group): 28 (46%)

- Faculty Qualifications

Instructional Methodology

- 56 (93%) of institutions used small-group activities in their course
  - Literature Evaluation/Journal Club: 48 (86%)
  - DI References: 42 (75%)
  - Other: 15 (27%)
    - Guidelines, Pubmed, Endnote, plagiarism, peer review, team-based learning, consults, level of evidence, verbal responses to DI questions
Course Director Qualifications

Small-group Learning

- Activities performed by faculty:
  - Facilitation: 50 (89%)
  - Workshop writing/development: 17 (30%)
  - Workshop grading: 35 (63%)
  - Other: 6 (11%)
    - Journal club evaluation, computer-based activities, self-study DI questions, designing in-class activities

Content

Content of Curriculum

- A total of 19 criteria described as "essential" in the DI PRN Opinion paper were evaluated
- 10/19 of the criteria (52.6%) were covered in the curriculum by all colleges of pharmacy
- 14/19 of the criteria (73.6%) were covered by all by one college of pharmacy
- 5/19 of the criteria (26%) were identified as "not taught" by a number of colleges of pharmacy

Content of Curriculum

- Areas taught by 100% of respondents
  - Literature searching
  - Literature evaluation
  - Statistical vs. clinical significance
  - Using print resources effectively
  - Medication safety (ADRS, med errors, quality improvement)
  - Journal clubs
Content of Curriculum

- Areas taught by 100% of respondents (cont.)
  - Verbal & written responses to DI questions
  - Summarizing basic biostatistics
  - Discerning & communicating essential health information for patient education

Content of Curriculum

- Top areas identified as “not taught” in the curriculum:
  - Counter-detailing industry (n=22)
  - Evaluating marketing materials (n=14)
  - Pharmacy informatics (n=10)
  - Drug use policies/procedures (n=6)
  - Formulary management (n=6)

Content of Curriculum

- Top areas taught in another course:
  - Drug approval process (n=43)
  - Medication safety (n=39)
  - Communicating information for patient education (n=36)
  - Drug use policies/procedures (n=33)
  - Formulary management (n=31)

Recent Changes

Recent Changes to Content

- Other responses included:
  - Increased focus on the internet & on-line resources
  - Medication Usage Evaluations
  - Increased focus on writing
  - Increased focus on more “real world” topics
  - Increased focus on statistics
  - Increased focus on non-inferiority studies
Recent Changes to Methodology

- More active learning: 76%
- More workshops: 42%
- Incorporating technology: 25%
- Other: 15%
- No changes: 14%

Other responses included:
- Increasing the number of credit hours
- Making class more "learner-centered"
- Creating a DI lab
- Making information more pertinent to practicing pharmacists

Top Areas Students Struggle With

- Top 3 topics students struggle with:
  - Critically evaluating medical literature (n=44)
  - Summarizing basic biostatistics and research design (n=27)
  - Creating effective and efficient literature search strategies (n=25)

Strategies to Help Students

- More practice opportunities for students (n=32)
  - More active learning opportunities
  - More assignments
  - More small-group learning
  - OSCEs
- Reinforcing drug information skills throughout the curriculum (n=4)

Strategies to Help Students

- Changing Curriculum (n=4)
  - Allocating more time for these topics (n=2)
  - Changing the order of the curriculum (n=1)
  - Combining courses (n=1)
- Making examples more patient-specific (n=2)
- Creating interactive tutorials/modules (n=2)
- Allocating more human resources to help students (n=1)

Conclusions

- Original goals of study:
  - Assess the extent to which DI PRN recommendations have been incorporated
    - Progress is being made with regard to content covered
      - 53% of core DI concepts were covered by all colleges responding to survey
      - 74% of core DI concepts were covered by almost all colleges responding to survey
    - Still room for improvement
      - 26% of core DI concepts were not taught by a number of colleges of pharmacy

Drug Information Education in the Pharmacy Curriculum
Conclusions

- Characterize qualifications of faculty members
  - Most faculty teaching DI (96%) and literature evaluation (90%) have a PharmD degree
    - Most (64% and 56%, respectively) have completed a DI residency
    - 58% of faculty teaching biostatistics have a PharmD degree
  - Most (63%) had at least 1 FTE for DI
    - 78% of new schools had at least 1 FTE

Conclusions

- Identify types of methodology used to deliver drug information education
  - A variety of different formats are used to deliver drug information education
    - 100% had mandatory assignments
    - 93% used small-group activities
    - 76% used internet-based activities

Conclusions

- Identify recent changes in drug information education
  - Content:
    - More focus on EBM, informatics, med safety
    - Less emphasis on print resources
  - Methodology:
    - More active learning, workshops, technology

Lessons Learned

- Summer months may not be the best time for surveying
- Identifying a contact person from each institution may be more optimal
- Having responder choose their institution helped eliminate duplicate responses

Thank you to my co-investigators!

- Cathy Ficzere, PharmD, BCPS (Belmont University School of Pharmacy)
- Michael Gabay, PharmD, JD, BCPS (University of Illinois at Chicago College of Pharmacy)
- Kristina Ward, BS, PharmD, BCPS (University of Rhode Island College of Pharmacy)

Questions