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## INTRODUCTION

- Evidence-based medicine is defined as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients”<sup>1</sup>
- Practitioners must be able to proficiently evaluate and translate the results of clinical trials in order to provide patients with efficacious, safe, and cost-effective treatment
- However, the current environment surrounding scientific publications and clinical trial reporting has been complicated by issues such as:
  - Transparency and conflicts of interest
  - Perceived and real publication bias
  - Authorship
- International Committee of Medical Journal Editors (ICMJE) guidelines state that all authors must have:<sup>2</sup>
  - Added substantial contributions to design, analysis, or interpretation of data
  - Drafted or substantially revised the article
  - Granted final approval of the version to be published

## OBJECTIVES

- Evaluate the knowledge and awareness of current doctor of pharmacy (PharmD) students in regard to conflicts of interest in pharmaceutical industry-supported scientific publications
- Analyze the influence of baseline demographics on perceptions of transparency and conflicts of interest

## METHODS

- Current third and fourth professional year PharmD students from Rutgers, Pittsburgh, and Minnesota Universities were surveyed from October to November 2009 using an online survey tool, [www.zoomerang.com](http://www.zoomerang.com)
- The survey consisted of 15 items that utilized a Likert scale
- 5 items assessed background demographics:
  - Current university, professional year, prior degrees, professional experiences, career interests, and literature evaluation skills
- 10 items assessed perceptions of industry vs. academic publications:
  - Importance of funding source, overall objectivity, likelihood to publish non-significant results, adherence to ICMJE authorship guidelines, and adequacy of transparency standards
- Descriptive statistics were used to evaluate responses to the 15 individual line items, paired t-tests were used to test for statistical differences between industry and academia publication items, and unpaired t-tests to test for differences between subpopulations (i.e. 2010 vs. 2011 PharmD candidates)
- Publications were defined as either industry- or academic-supported

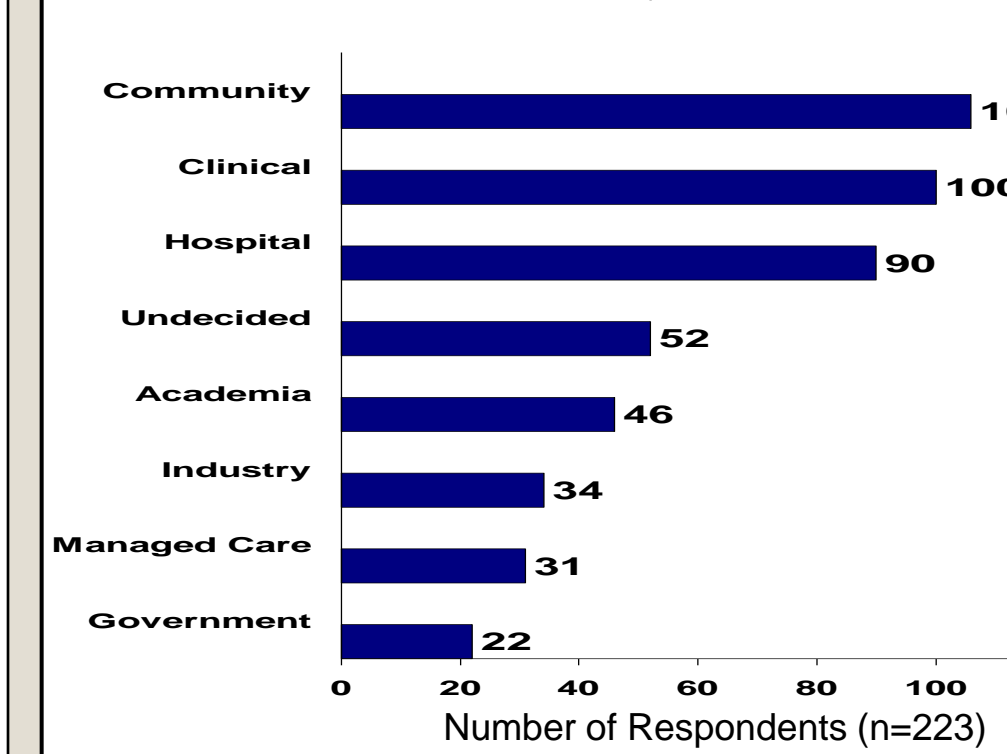
## RESULTS

**Table 1.** Survey Respondent Demographics (n=223)

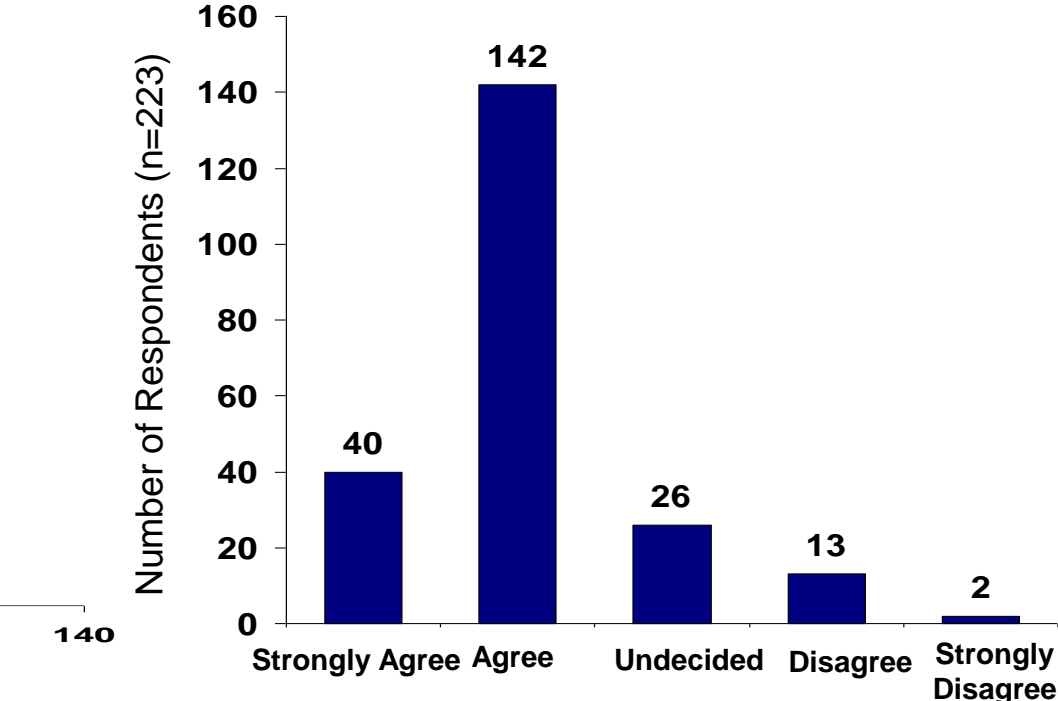
School of Pharmacy	N (%)
University of Minnesota	88 (39%)
Rutgers, the State University of NJ	70 (31%)
University of Pittsburgh	65 (29%)
Expected Year of Graduation with PharmD	
2010	126 (57%)
2011	97 (43%)
Students with Prior Degrees	
BS, MS, or PhD	76 (34%)
Professional Experiences	
Community	212 (95%)
Hospital	193 (87%)
Clinical Practice	122 (55%)
Academia (teaching and/or research)	45 (20%)
Pharmaceutical Industry	33 (15%)
Managed Care	38 (17%)
Government (i.e. FDA or State Board of Pharmacy)	12 (5%)

- University of Minnesota students more commonly had prior degrees (UM 69%, UP/RU 13%)
- Rutgers University students had more prior professional experience in the pharmaceutical industry (RU 37%, UP/UM 5%)

**Figure 2.** Career Interests Reported by Greater than 5% of Survey Population

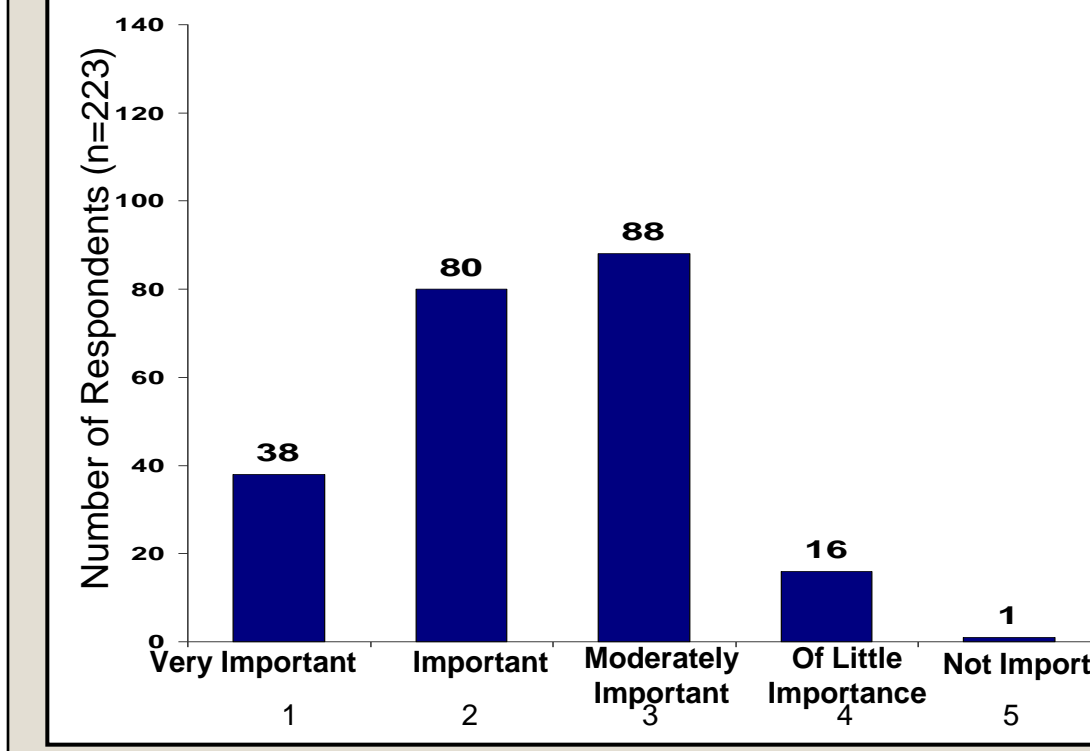


**Figure 3.** Agreement that Respondents' Ability to Evaluate Scientific Publications Equals or Exceeds a Community Pharmacist

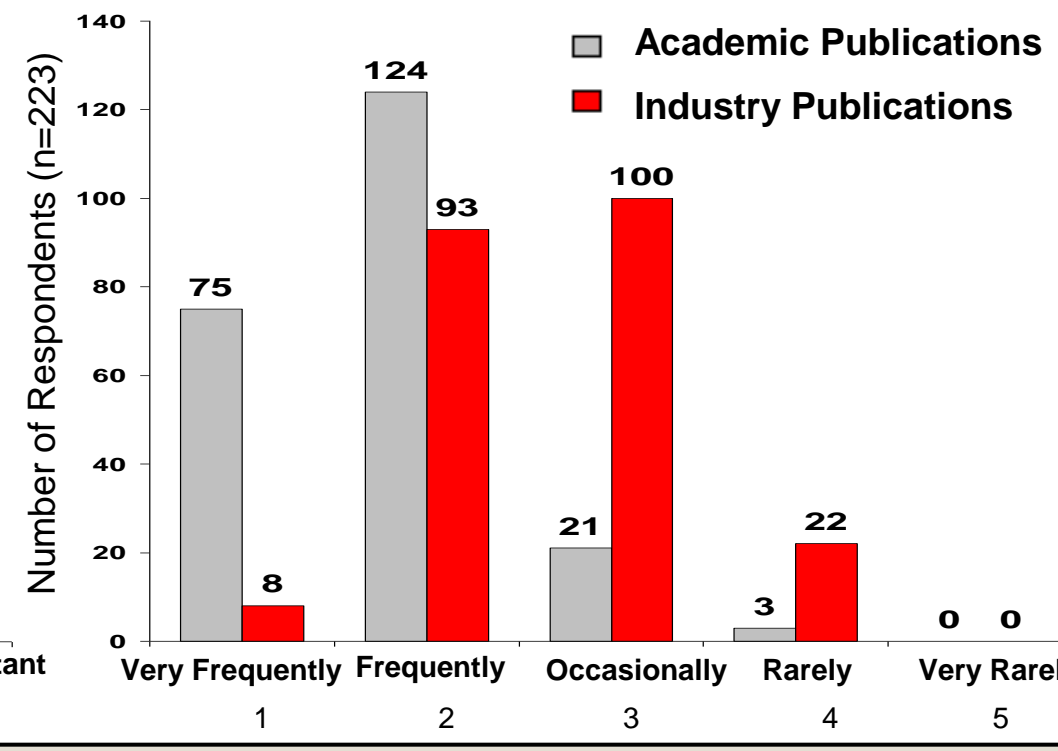


- Approximately one-third of Rutgers University students identified the pharmaceutical industry as a career interest (RU 34%, UP/UM 7%)

**Figure 4.** Importance of Source of Funding in Determining the Validity and Applicability of a Scientific Publication

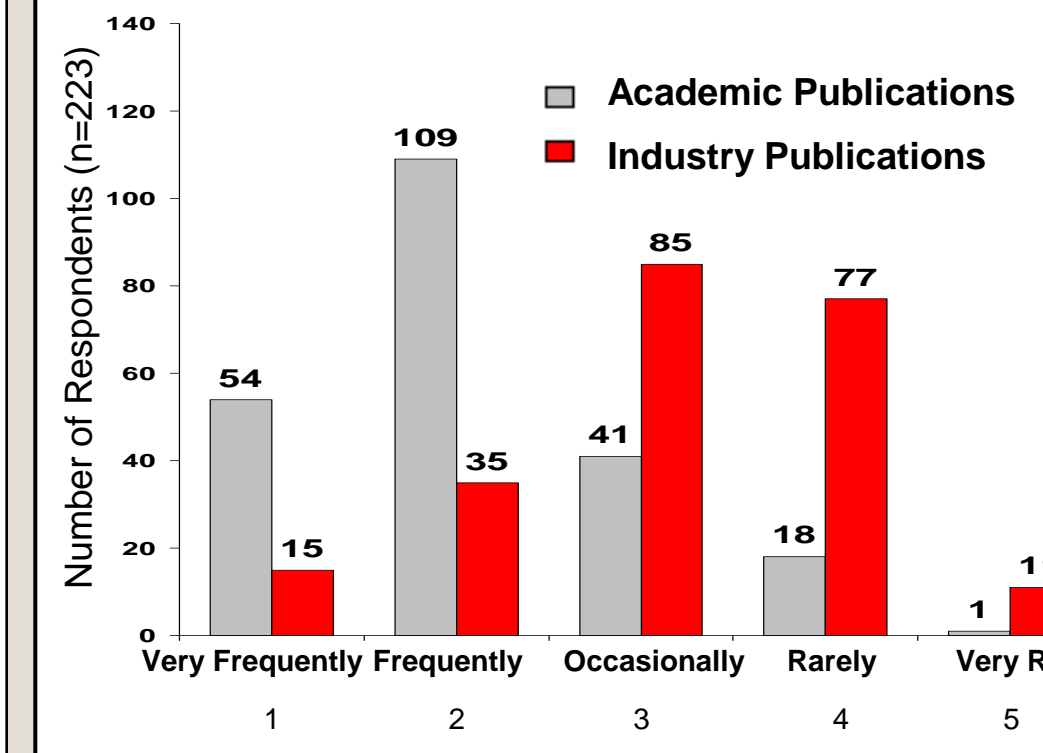


**Figure 5.** Frequency that Medications are Assessed Objectively in Scientific Publications

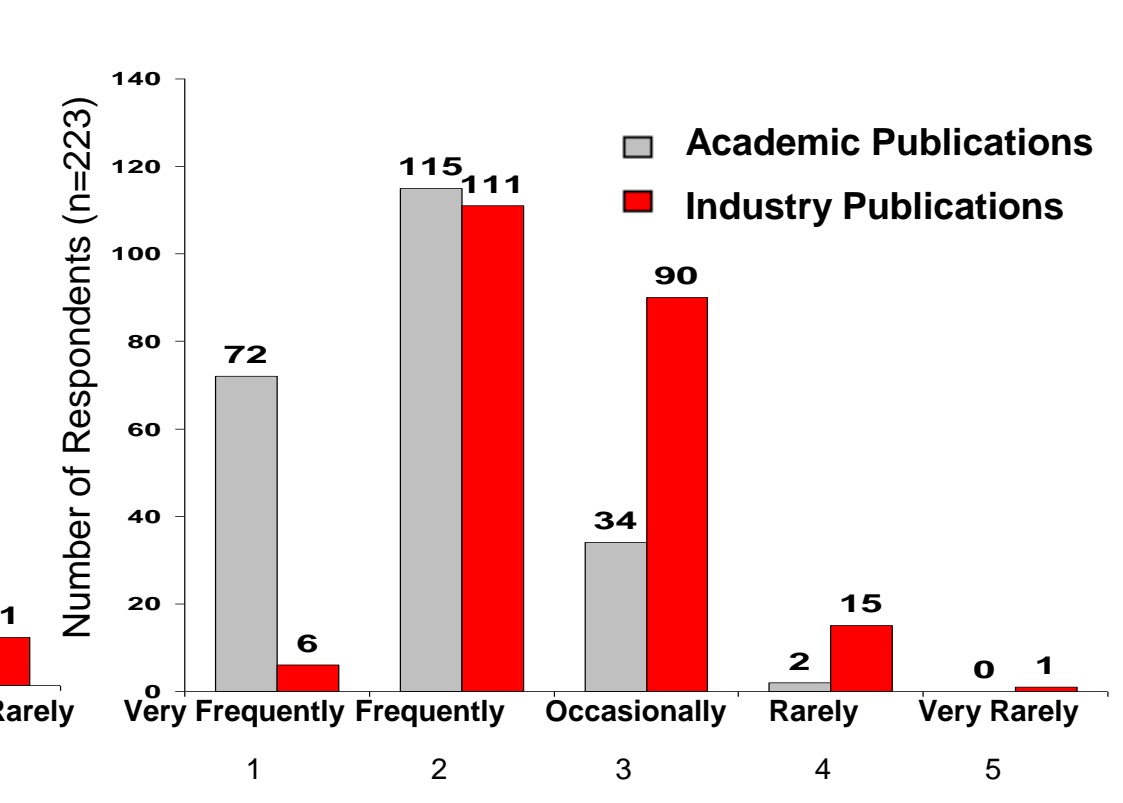


- Respondents believe that source of funding is an important factor in determining the validity and applicability of scientific publications
- Academic-supported publications are perceived to more frequently assess medications objectively compared to industry-supported publications, mean 2.1 vs. 3.2; p<0.0001

**Figure 6.** Frequency that Clinical Trial Results Without a Statistically Significant Difference Between Outcomes Will Be Published

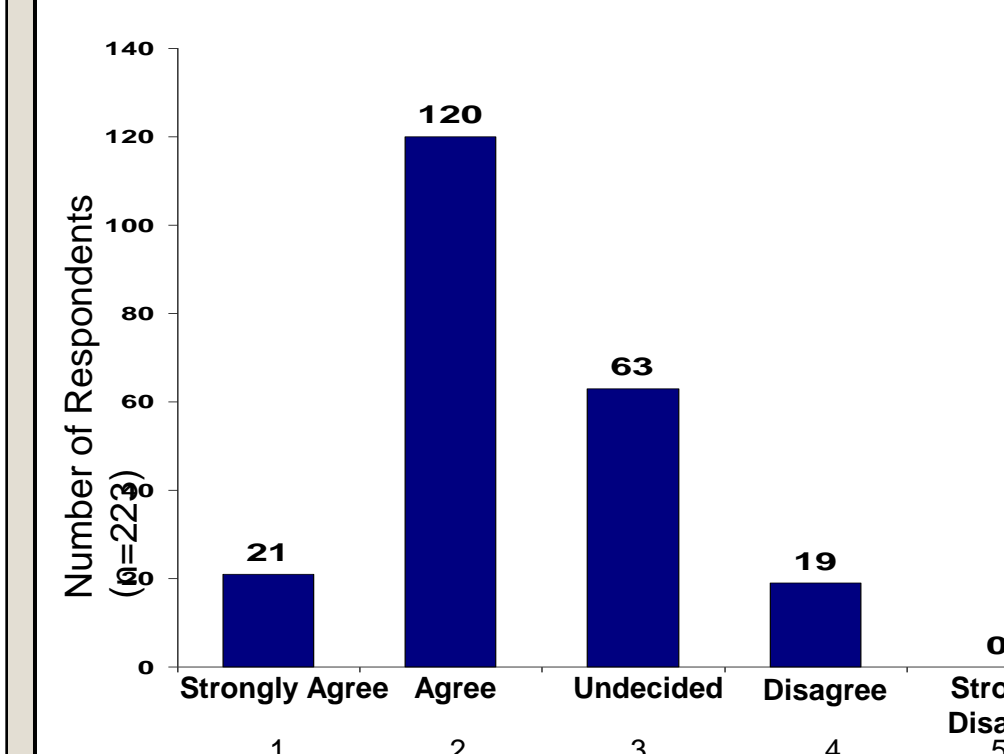


**Figure 7.** Frequency that Authors of Scientific Publications Have Satisfied All ICMJE Criteria

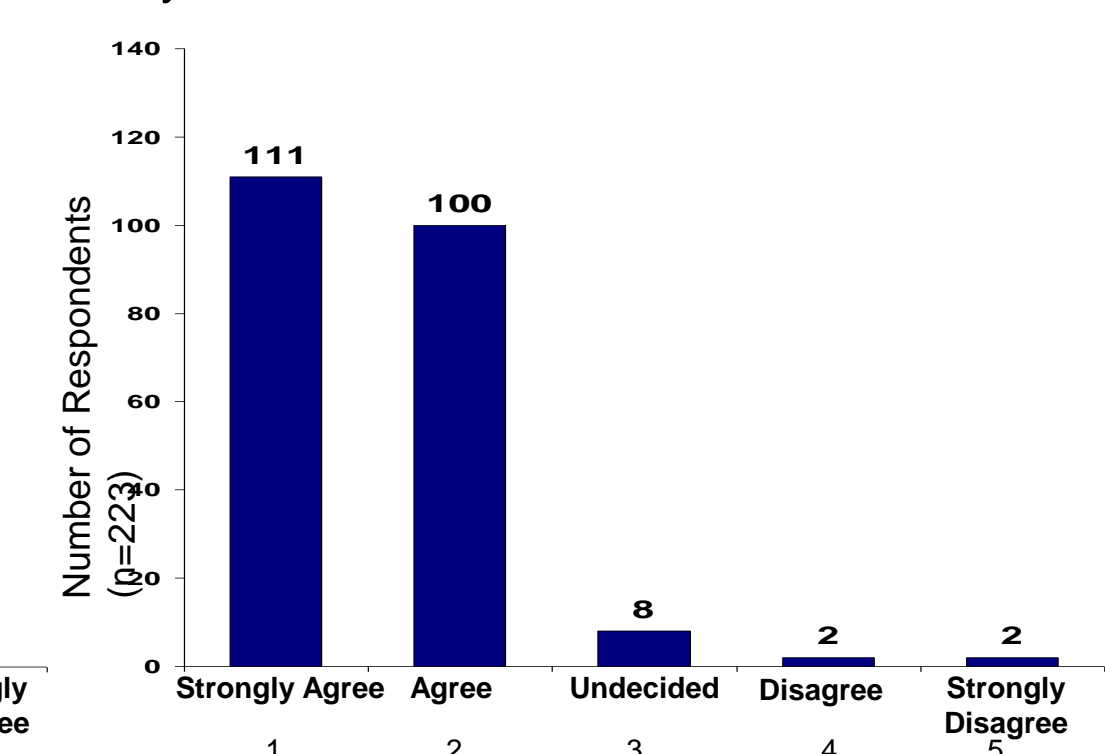


- Academic researchers are perceived to more frequently:
  - Publish results of clinical trials if there is not a statistically significant difference compared to pharmaceutical companies, mean 2.1 vs. 3.2; p<0.0001
  - Adhere to ICMJE guidelines for authorship compared to pharmaceutical industry-supported publications, mean 1.9 vs. 2.5; p<0.0001

**Figure 8.** Peer-Reviewed Journals Have Implemented Sufficient Transparency and Disclosure Standards

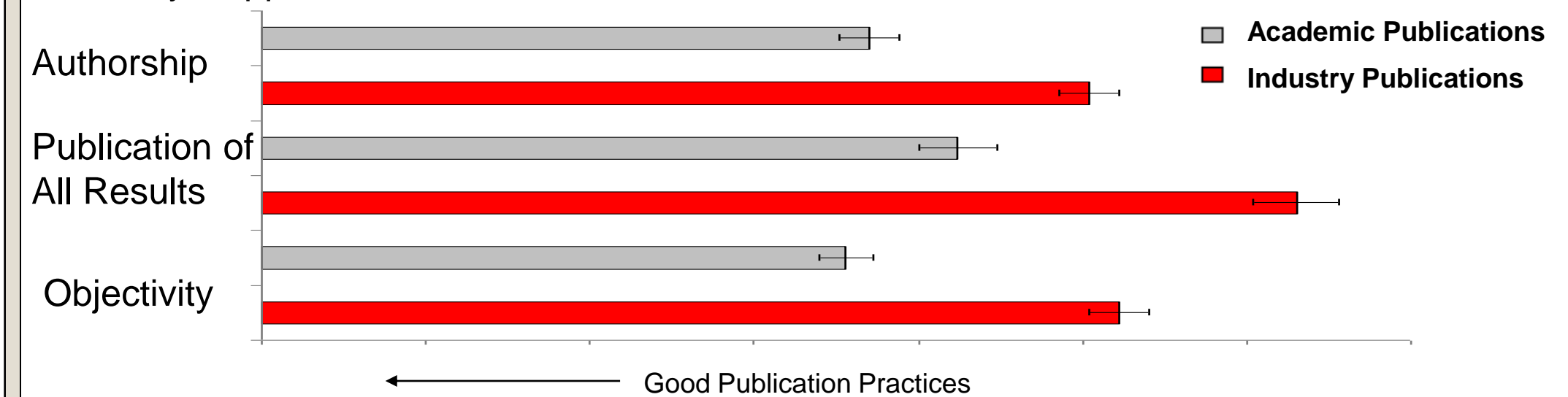


**Figure 9.** Pharmaceutical Companies and Academic Institutions Should Be Evaluated by the Same Ethical Standards



- Responses indicated that PharmD students believe:
  - Sufficient transparency and disclosure standards have been implemented
  - All publications should be held to the same standards

**Figure 10.** Qualitative Summary of PharmD Student Perceptions of Academic and Industry-Supported Scientific Publications



- Overall findings:
  - 95% confidence intervals of mean scores for each line item indicate that there is a statistically significant difference between perceived publications practices of industry- and academic-supported publications
  - Responses stratified by subpopulations including geographic location, year of graduation, prior degrees, professional experiences, and career interests did not differ significantly from the general survey population

## CONCLUSIONS

- Pharmacy students have different perceptions of industry and academic-supported publications
- Respondents believe that academic institutions more frequently:
  - Assess medications objectively
  - Publish negative trial results
  - Adhere to ICMJE authorship guidelines
- Respondents feel that academic- and pharmaceutical industry-supported publications should be evaluated by the same ethical standards

## DISCUSSION

- PharmD student perceptions indicate that academic-supported publications are more objective, likely to publish negative trial results, and adhere to authorship guidelines
- However, recent regulations and data conflict with this perception:
  - Food Drug Administration Amendment Act (FDAAA) mandates registration and reporting of all clinical trial results in a timely fashion<sup>3</sup>
  - Studies have shown that both academic and industry-supported publications have demonstrated issues with ICMJE authorship criteria<sup>4,5</sup>
  - Industry-supported trials were found to be of superior methodology and equally likely to publish negative results as other studies<sup>6</sup>
- Respondents also believe that all scientific publications should be held to the same ethical standards; however:
  - Multiple scientific journals have begun to exclude all pharmaceutical industry-supported publications
  - Journal of the American Medical Association (JAMA) mandates a review by an “independent statistician at an academic institution” for all industry-sponsored studies<sup>7</sup>
- Current misconceptions may begin to restrict the flow of rigorous, scientific information to healthcare professionals, which may interfere with the practice of evidence-based medicine
- Future analyses should focus on the differences between real and perceived conflicts of interest in scientific publications

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## DISCLOSURES & ACKNOWLEDGEMENTS

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Zachary Cain and Rachel Anhorn are paid employees of Rutgers University participating in post-doctoral fellowships in the Medical Affairs department of Bristol-Myers Squibb  
 Evelyn Hermes-DeSantis has nothing to disclose  
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