

## BACKGROUND & OBJECTIVE

### Advances in Pharmacy Education

- Pharmacy education has significantly changed over the last four decades.
- There have been advances in educational technology, the transition from the five-year B.S. degree to the PharmD as the entry-level degree, and significant growth in the number of pharmacy schools.
- The role of the pharmacist has shifted from a primary focus on medication dispensing to a more patient-centered, clinical, and integrated approach within the healthcare system.
- Current curriculums include experiential education, objective structured clinical exams, interprofessional experiences, co-curriculums, and applied skills labs.

### Bibliometrics

- Evaluative bibliometrics is a branch of quantitative science that measures the efficacy of a study using techniques such as citation analysis.

### Objectives

- Pharmacy education has significantly changed over the past 40 years. We aim to analyze the publication trends in the most cited pharmacy education literature over the past four decades.

## METHODS

- A systematic database search was conducted in the Clarivate Analytics Web of Science Core Collection from January 1980 to December 2019.
- Relevant pharmacy education journals included the *American Journal of Pharmaceutical Education*, *Currents in Pharmacy Teaching and Learning*, and *Pharmacy Education*.

### Analysis

- The 40-year study period was divided into 2-year intervals, and the top 10 most cited articles within each interval were selected, resulting in a final dataset of 200 articles.
- Manuscripts were divided into two groups:

**Pre-Millennial**  
1980-1999  
N=100

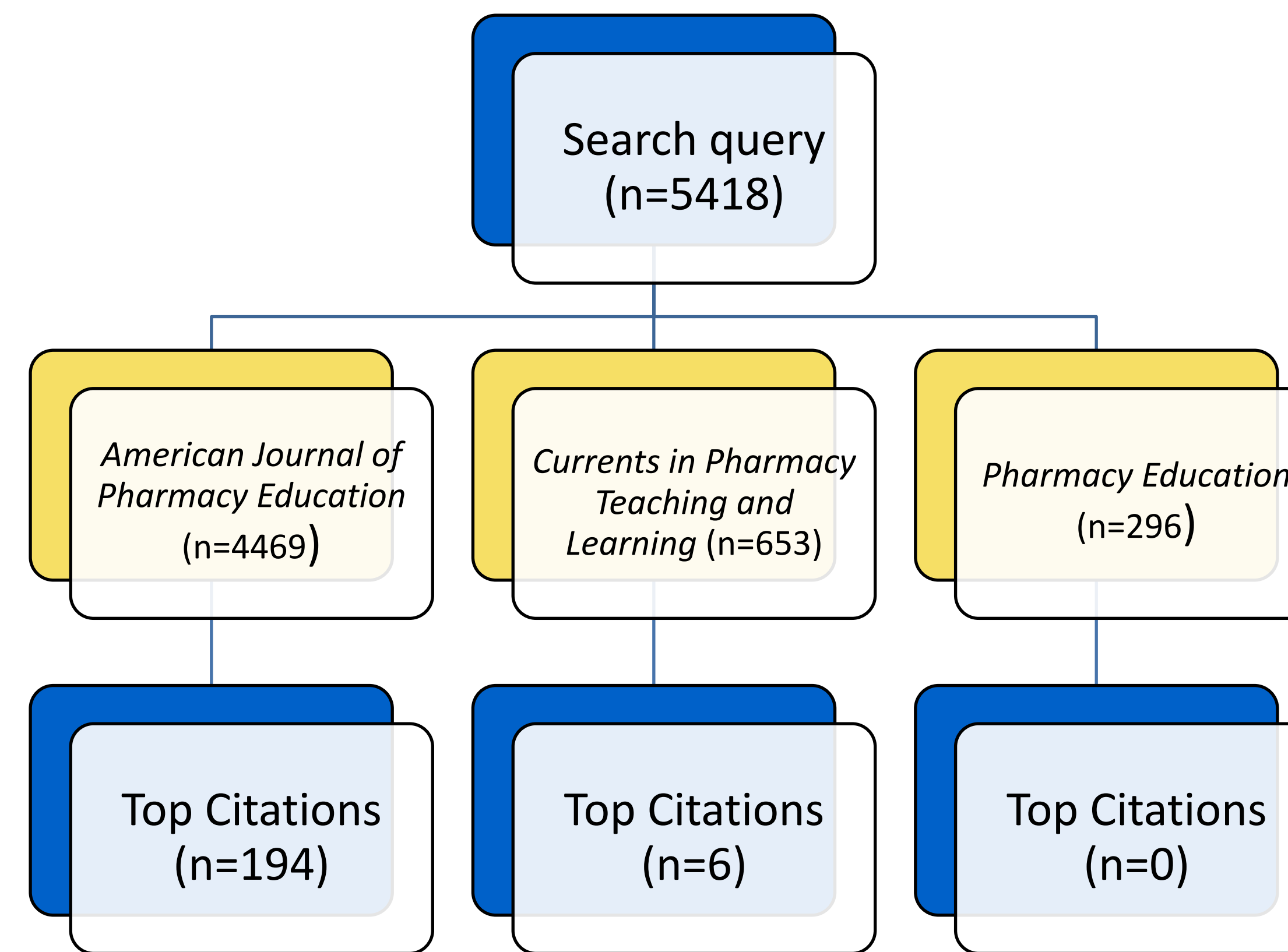
**Post-Millennial**  
2000-2019  
N=100

### Data Analysis

- Chi-squared tests were used to compare the characteristics of the two study periods.
- Descriptive statistics were utilized to analyze study data.
- P-values < 0.05 were deemed statistically significant.

## RESULTS

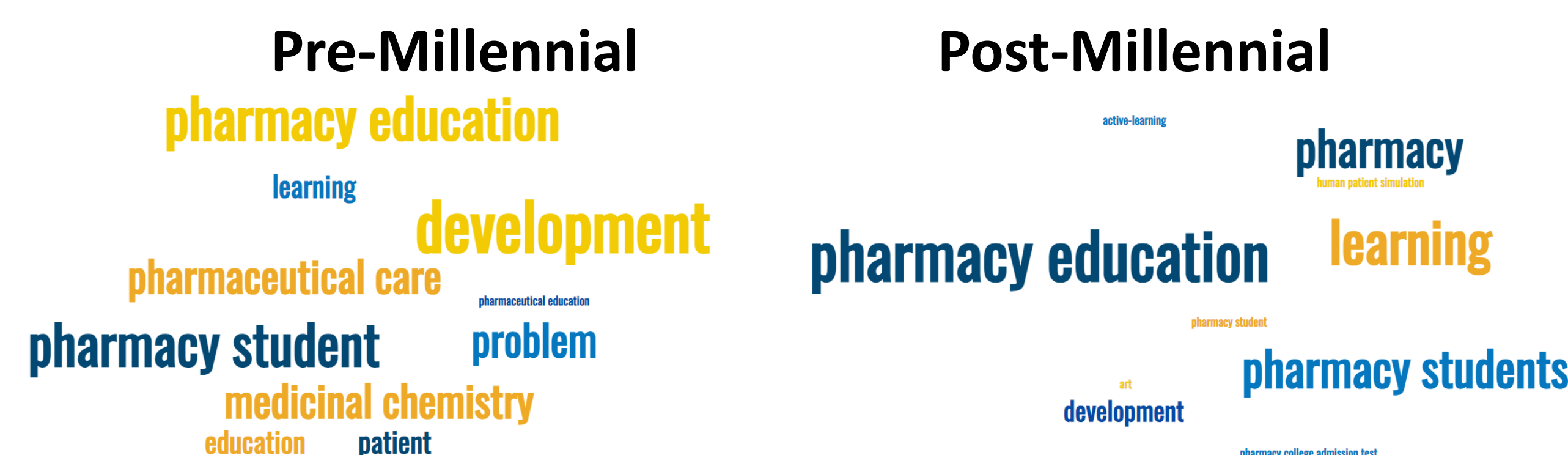
### Flowchart of Articles Included



### Article Topics Pre- vs Post-Millennial

|   | Pre        | Post       | Total      | P-value |
|---|------------|------------|------------|---------|
| Academic performance and predictors                 | 10         | 9          | 19         | NS      |
| Communication skills and patient centered care      | 3          | 1          | 4          | NS      |
| Conducting and analyzing research                   | 3          | 9          | 12         | NS      |
| Faculty development                                 | 7          | 7          | 14         | NS      |
| Pharmacy education and curriculum development       | 24         | 13         | 37         | 0.042   |
| Professionalism and ethical considerations          | 4          | 12         | 16         | 0.037   |
| Role of the pharmacist                              | 20         | 2          | 22         | <0.001  |
| Scientific review                                   | 1          | 4          | 5          | NS      |
| Student well-being and resilience                   | 4          | 6          | 10         | NS      |
| Teaching and learning methods in pharmacy education | 24         | 37         | 61         | 0.046   |
| <b>Total</b>  | <b>100</b> | <b>100</b> | <b>200</b> |         |

### Article Title Word Cloud



### Characteristics of Top Citations by Study Period

|  | Pre | Post | P-value |
|--|-----|------|---------|
| First author gender (male)             | 67  | 49   | 0.004   |
| Last author (male)                     | 44  | 34   | NS      |
| Region                                 |     |      | NS      |
| Midwest                                | 29  | 18   |         |
| Northeast                              | 8   | 19   |         |
| Southeast                              | 38  | 28   |         |
| Southwest                              | 14  | 14   |         |
| West                                   | 13  | 8    |         |
| Outside the United States              | 5   | 13   | NS      |
| First author from a school of pharmacy | 92  | 92   | NS      |
| Multi-school collaboration             | 36  | 32   | NS      |

### Results

- Highly cited publications related to pharmacy education and curriculum development, as well as the role of the pharmacist, were more prevalent before 2000. After 2000, there was a shift to professionalism/ethical considerations and teaching and learning methods in pharmacy education.
- There has been an increase in the number of female, first authors in pharmacy education.
- The southeast region emerged as the most prolific in publishing highly cited pharmacy education articles, while the northeast region doubled its publication rates in this study period.

## DISCUSSION AND CONCLUSIONS

### Limitations

- The articles included in the analysis were limited by their inclusion in the Clarivate Analysis Web of Science Core Collection database.
- Citation rate is one factor that may influence scientific impact.

### Conclusions

- This research highlights influential themes, an increase in female authorship, and productive regions within the field of pharmacy education.
- This analysis provides insights into the areas that have been researched most intensively and how research interests have evolved over time.

### Future Recommendations

- The research reflects on past achievements while also highlighting several forward-looking aspects. Despite the groundbreaking successes of the past 40 years, we still face significant unanswered questions.

## REFERENCES