

RESEARCH ARTICLES

Documentation and Analysis of Increased Grade Point Averages at a College of Pharmacy Over 20 Years

Mark C. Granberry, Pharm.D.,^a and Kerry A. Stiegler, Pharm.D.^b

^aCooperative Pharmacy Program, The University of Texas — Pan American and The University of Texas at Austin College of Pharmacy

^bCollege of Pharmacy, University of Arkansas for Medical Sciences

Objectives. To evaluate the overall mean grade point average (GPA) of all graduates of a College of Pharmacy from 1982 through 2002, as well as the grades awarded in pharmacy science courses, pharmacy practice courses, electives, and experiential clerkships.

Methods. The grades of all students graduating from the University of Arkansas College of Pharmacy during the study period were included. GPAs used to determine each student's overall class ranking were used to calculate a mean GPA for each graduating class. Archives of final course grade reports in Pharmacy Science, Pharmacy Practice didactic, elective or experiential clerkship courses were used to determine the mean GPA within these disciplines. Correlation coefficients were used to evaluate the change in grades over time and to compare these grades to preprofessional GPA and Pharmacy College Admission Test (PCAT) scores.

Results. The overall mean GPA of over 1300 graduates, along with the grades in pharmacy science courses, pharmacy practice courses, and experiential clerkships, has consistently risen at a rate of about 1% per year over the 20-year study period. A similar increase in student performance, as assessed by PCAT scores and preprofessional GPAs did not occur.

Conclusions. A significant upward trend in grades has occurred over 20 years at the University of Arkansas College of Pharmacy. Further evaluation is warranted to determine if grades have risen nationally within pharmacy education and the reasons for any increase.

INTRODUCTION

Grade inflation is defined as a rise in academic grades not accompanied by a commensurate increase in academic achievement.¹ This trend affects all levels of education beginning in primary and secondary grades and continuing through undergraduate and graduate education. However little is known about grade inflation in professional education.

Researchers at the University of California at Los Angeles published the results of a national survey demonstrating that grade inflation in high school exists and that grades are at an all-time high. The authors reported that in 1969 only 12.5 % of entering

college freshman achieved an average grade of A-minus or higher at high school graduation and that this number skyrocketed to 31.5 % in 1996.¹ Had standardized test scores risen similarly with the grades, few would express concern. However, student academic performances on standardized tests like the American College Testing Assessment (ACT) or the Scholastic Aptitude Test (SAT) have not increased at a rate proportional to the rise in grades.¹⁻³

The trend of grade inflation continues into college and graduate education. The most frequently given grade from community colleges through Ivy League universities is an A, with only 10% to 20% of students receiving grades lower than a B-.⁴ In many instances the grading norms are even higher in graduate schools where a B has been considered "average" instead of the traditional "average" C.¹ Many academics believe that grades in rigorous programs such as law school or medical school should be approximately half B's and half

Corresponding Author: Mark C. Granberry, Pharm.D.
Mailing Address: Cooperative Pharmacy Program, The University of Texas - Pan American, 1201 West University Drive, Edinburg, Texas 78539. Tel: (956) 292-7309. Fax: (956) 292-7361. E-mail: granberry@panam.edu.

A's with few, if any, students receiving grades lower than a B.¹

Many factors likely contribute to grade inflation. Easier grading practices, supported by many elementary education teachers in an effort to boost student's self-esteem, are known to cause grade inflation.⁵ In contrast, easier grading reported in college and graduate education may stem from the desire for college faculty to report favorable course and teaching evaluations, since teaching evaluations can play a major role in raises, promotion, and tenure.^{1-3,6-9} Furthermore, the increased number of adjunct faculty within colleges has been suggested to contribute to grade inflation since adjunct faculty may not wish to give lower grades and risk student complaints that could adversely affect their faculty status.¹⁰ Institutional factors can also play a role in grade inflation. For example, many colleges and universities have lenient drop dates for courses, allow excused incompletes, or allow students to repeat a class for a higher passing grade.⁴ All of these falsely raise the reported GPA.⁷

Several other factors have also been proposed as contributing to grade increases. One possibility is that better students are simply achieving higher standards or that there have been improvements in teaching faculty. However, it is just as possible that grade inflation stems from select faculty who are unable or unwilling to discriminate the average from the exceptional students. It has also been hypothesized that grade inflation is occurring to minimize the failure rate among certain minority students, therefore lowering the standard for an "average" performance.³⁻⁷

While well documented in the literature, most reports of grade inflation are focused on elementary, high school, and college education. Within college education, documentation is most abundant in the Nursing and Education curriculum as well as within the liberal arts and humanities.^{1,4,8,11} However, there are little data available demonstrating grade inflation in graduate education and no data that document grade inflation within any pharmacy curriculum.

The purpose of our study was to explore grading trends within the University of Arkansas College of Pharmacy. Specifically, our goal was to determine if and to what degree grades have risen between 1982 and 2002. If an increase in the mean grade point average (GPA) was recorded, an additional goal became to evaluate the area(s) where the increase was predominant within our curriculum and to present the issue in a format that could generate College-wide discussion and change. Additionally, we hoped to ex-

plore whether any increase in GPA was due to an increase in pre-professional academic performance or if grade inflation may have occurred.

METHODS

The grades of all students graduating from the University of Arkansas College of Pharmacy from 1982 through 2002 were included in this study. To determine if grades increased, GPAs used to determine each student's overall class ranking were retrieved from a list generated on each graduating class. This list was used to calculate a mean GPA for each graduating class. Policies regarding course drop dates, excused incompletes, and grade forgiveness for repeating classes were consistent throughout the study period.

Archives of final course grade reports were retrieved and the mean GPA was determined within individual courses. The mean course GPA was calculated using the traditional 4 point scale where a letter grade of "A" was assigned a numerical value of 4, and "B", "C", "D" and "F" were assigned values of 3, 2, 1, and 0, respectively. The total number of A's, B's, C's, D's, and F's were converted to numerical values and totaled. This number was then multiplied by the number of credit hours assigned to the course and labeled "credits earned." The average GPA within the course was determined by the ratio of "credits earned" to "credits possible" multiplied by 4 since all calculations are based on a 4.0 scale (ie, the maximum number of credits that would have been awarded had all students received an "A"). Grades were identified as being awarded in pharmacy science, pharmacy practice didactic, elective, or experiential clerkship courses by their respective catalog number.

Grade point averages are reported as means \pm SD. Correlation coefficients were determined to evaluate the change in grade point averages over time. Grades were analyzed by comparing the mean overall GPA to the year of graduation. Similar analyses were completed on grades earned in pharmacy science, pharmacy practice, electives or experiential clerkships. The grades in these 4 academic categories were also compared to each other by use of independent samples z test. Correlation coefficients were determined for a comparison of overall mean GPA in the professional curriculum for each class to their respective pre-professional GPA and to the yearly Pharmacy College Admission Test (PCAT) scores for students of each class. North American Pharmacist Licensure Examination (NAPLEX) rates were also collected in an effort to assess overall professional academic achievement and the potential for grade inflation. The level of significance for all comparisons was

Table 1. The Average Percent of Curriculum Devoted to Pharmacy Science, Pharmacy Practice, Elective and Experiential Clerkship Courses

	Bachelor of Science in Pharmacy Degree (101 or 103 Credits)	Doctor of Pharmacy Degree (134 Credits)
Pharmacy science	64.7 %	41.6 %
Pharmacy practice	19.3 %	28.9 %
Elective	6.0 %	5.9 %
Experiential clerkships	10.0 %	23.6 %

set at $P < 0.05$. Statistical procedures were performed using NCSS 2001 (NCSS Statistical Software, Kaysville, Utah).

RESULTS

A total of 1303 students graduated during the time encompassed by this study; 605 graduated from 1982 through 1991 with the Bachelor of Science in Pharmacy degree, while 698 graduated from 1993 through 2002 with the Doctor of Pharmacy degree. The total number of credits required were 101 for degrees awarded from 1982 to 1985; 103 credits from 1986 to 1991; and 134 credits from 1993 to 2002. Since this College of Pharmacy changed from a Bachelor of Science to a Doctor of Pharmacy program in 1989, there were no graduates in 1992. The percent of the curriculum devoted to pharmacy science courses decreased from the Bachelor of Science curriculum to the Doctor of Pharmacy curriculum while increases were observed in pharmacy practice and experiential clerkship courses with little change in elective courses (Table 1).

The overall mean GPA increased by an average of $0.92 \pm 3\%$ per year over the study period (Figure 1). The average yearly increase in GPA from 1982 through 1991 during the Bachelor of Science curriculum was $0.32 \pm 2.1\%$, while the GPA increased by $1.45 \pm 3.74\%$ per year from 1993 through 2002 in the Doctor of Pharmacy curriculum. For the 20 graduating classes from 1982 to 2002, the overall mean GPA was 3.03 ± 0.25 , with the lowest mean GPA of 2.67 ± 0.41 recorded in 1985 and the highest mean GPA of 3.41 ± 0.28 recorded in 2000.

Further analysis showed that the mean GPA earned in each of the separate academic categories also increased over the study period (Table 2). For each of the academic categories, the lowest mean GPAs were recorded in the mid 1980s and the highest were recorded from 1999 through 2002. The increases in GPA were highest in courses from pharmacy practice and pharmacy science, followed by experiential clerkships and electives. Table 3 contains correlation coefficients for GPA in pharmacy science, pharmacy practice, elective, and experiential clerkship courses over the study interval. Correlation coefficients were positive for all curricular areas and were highest for pharmacy practice and pharmacy science and lowest for electives.

Our second objective was to determine if the GPAs from the different areas of the curriculum increased in a similar manner. Stated in another way, we wished to determine if there was a difference in the strength of relationship between GPA over time for the 4 areas of the curriculum. Table 4 shows the results of a comparison of the correlation coefficients from pharmacy science, pharmacy practice, electives, and experiential clerkships. Differences were observed when grades from elective courses were compared to grades from pharmacy practice and experiential clerkship courses.

Our third objective was to try to determine if grades were being inflated or merely reflected an improvement in student performance. Because the assessment scales of both the national PCAT and calculation of pre-professional GPAs by the College of Pharmacy changed during the study period (1991 and 1995, respectively),

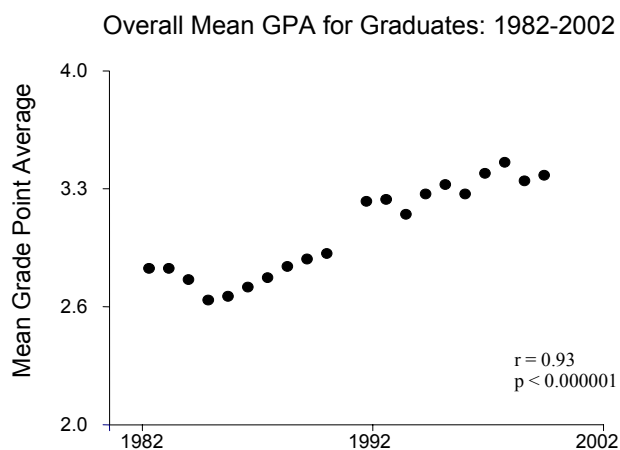


Figure 1. The change in mean grade point average (GPA) over time for graduating pharmacy students.

Table 2. Yearly Mean Grade Point Average Increases By Discipline, With Highest And Lowest Values And Years Of Occurrence

Discipline	Mean Yearly Increase (%)	Lowest Mean GPA (year)	Highest Mean GPA (year)	Mean GPA: 1982-2002
Pharmacy science	1.3 ± 4.7	2.29 (1985)	2.96 (2000)	2.64 ± 0.2
Pharmacy practice	1.4 ± 5.4	2.63 (1986)	3.36 (2002)	3.0 ± 0.24
Elective	0.15 ± 4.6	3.33 (1986)	3.81 (1999)	3.63 ± 0.16
Experiential clerkship	1.1 ± 3.2	3.05 (1984)	3.90 (1999, 2000)	3.63 ± 0.28

Table 3. Correlation Coefficients For Comparison Between Grade Point Average And Time For Courses In Pharmacy Science, Pharmacy Practice, Electives And Experiential Clerkships

	GPA in PS	GPA in PP	GPA in EL	GPA in EC
Time	0.81*	0.90*	0.59*	0.92*

* $P < 0.01$

GPA = Grade Point Average; PS = Pharmacy Science; PP = Pharmacy Practice; EL = Elective; EC = Experiential Clerkship

Table 4. Comparison of Correlation Coefficients Between Grade Point Average and Time for Courses in Pharmacy Science, Pharmacy Practice, Electives and Experiential Clerkships with Two Independent Samples z Test

	PS	PP	EL	EC
PS	--	1.01	1.31	1.35
PP	--	--	2.31*	0.34
EL	--	--	--	2.66**
EC	--	--	--	--

* $P < 0.05$

** $P < 0.01$

PS = pharmacy science; PP = pharmacy practice; EL = elective; EC = experiential clerkship

correlation coefficients had to be done for scores before and after the respective change. The correlation coefficient for the comparison of PCAT score to GPA for the years 1982 through 1991 was 0.14 ($P = 0.69$), and for the years 1992 through 2002 was -0.02 ($P = 0.96$). The correlation coefficient for the comparison of pre-professional to professional GPA for the years 1982 through 1995 was 0.53 ($P = 0.06$) and for the years 1996 through 2002 was 0.11 ($P = 0.81$).

DISCUSSION

Similar to reports of grades awarded to students in other disciplines, a significant increase in grades was observed in the graduates of the University of Arkansas College of Pharmacy from 1982 to 2002. The increase GPA was observed in all areas of the curricu-

lum and the rate of increase averaged over 1% per year in pharmacy science, pharmacy practice and experiential clerkships. The GPA increase observed in elective courses, though significant, did not increase at the rate observed in the other curricular areas.

The reasons for the increase in GPA cannot be determined from this study but many of the same reasons speculated in earlier publications might apply. Increased experiential clerkship hours in the Doctor of Pharmacy curriculum necessitated use of additional adjunct faculty and may have contributed to the increase in experiential clerkship GPA. The conversion to an entry level Doctor of Pharmacy curriculum also dictated an expansion of the core faculty, especially clinical faculty, which may

have resulted in more inexperienced or non-tenured faculty evaluating student's performances.

However, because of the unique nature of pharmacy education and the changes over the last 2 decades, additional contributing factors are likely. An interesting finding of this study is the apparent acceleration of the increase in GPA from the Bachelor of Science curriculum to the Doctor of Pharmacy curriculum. The nearly 5-fold increase in the rate at which grades were rising may reflect an increase in knowledge and skill resulting from the increased number of credit hours without a commensurate change in assessment. The 10% GPA increase from the last Bachelor of Science year to the first Doctor of Pharmacy year provides support for that possibility. Pharmacy practice courses and experiential clerkships had larger coefficients of determination than did pharmacy sciences courses and electives, and in addition they were an increased proportion of the curriculum after the conversion from the Bachelor of Science to the Doctor of Pharmacy degree. Taken together, these 2 factors indicate that pharmacy practice and experiential clerkship courses are areas where the examination of grading practices should begin. Alternately, the increase in pharmacists' salaries over the last decade may have increased the high-achieving student's awareness of the potential for a pharmacy career and thus increased the quality of student admitted to the program, although this is not supported by analysis of pre-professional GPA and PCAT scores.

An accurate assessment of whether grades were being inflated or documented an increase in student performance proved difficult. Our only terminal outcome measurement of academic achievement was NAPLEX pass rate, which measures minimum competencies. Over the last 20 years at our College of Pharmacy, students consistently achieved pass rates >95%; therefore, the NAPLEX test scores are not relevant for noting trends in increased academic achievement at our institution. Assessment of the PCAT scores of enrolled students may offer the best possible means of evaluating increased quality of students admitted to the College. While the PCAT scores did rise over the study period, they did not correlate

well with the rise in professional GPA. Thus, increased professional grades are most likely not due to better student performance and the potential for grade inflation still exists.

There are limitations to this study. First, the rise in mean GPA cannot be defined as grade inflation since we could not exclude the possibility of contributing increase in student performance during the professional program. Second, the trends observed at the University of Arkansas College of Pharmacy cannot be assumed to exist in other pharmacy programs. However a subsequent study is currently underway that will supply information on national trends.

In conclusion, a significant upward trend in grades has occurred over 20 years at the University of Arkansas College of Pharmacy. Further evaluation is warranted to determine if grades have risen nationally within Pharmacy education and the reasons for any increase.

REFERENCES

1. Zirkel PA. Grade inflation: a leadership opportunity for schools of education? *Teachers College Record*. 1999;101:247-60.
2. Landrum RE. Student Expectations of Grade Inflation. *J Res Dev Educ*. 1999;32:124-8.
3. Hardy L. Grade inflation. *Am School Board J*. 1997;184:28-30.
4. Farley BL. "A" Is for Average: The Grading Crisis in Today's Colleges. New Jersey; 1995-06-00. Eric Database # ED384384.
5. Stanley G, Baines L. No More Shopping for Grades at B-Mart. *Clearing House*. 2001;74:227-30.
6. McSpirit S, Kopacz P, Jones K, Chapman A. Faculty Opinion on Grade Inflation: Contradictions About Its Cause. *Coll Univ*. 2000;75:19-25.
7. Compton DM, Methany B. An assessment of grade inflation in higher education. *Percept Motor Skills*. 2000;90:527-36.
8. Loustau A, O'Connor AB. Commentary. *J Nurs Educ*. 1999;38:398-9.
9. Krautmann AC, Sander W. Grades and Student Evaluations of Teachers. *Econ Educ Rev*. 1999;18:59-63.
10. Sonner BS. A is for "Adjunct": Examining Grade Inflation in Higher Education. *J Educ Bus*. 2000;76:5-8.
11. Bearden J, Wolfe RN. Reaction to Compton and Metheny (2000): assessment of grade inflation in higher education. *Perceptual and Motor Skills*. 2001;92:263-4.