Pharmacy Education, 2014; 14 (1): 16 – 20

An objective assessment of professional pharmacy programmes in the United States

DANA R. BOWERS, LAUREN LYON KAINER, KAYLA ANH MAI, VINCENT H. TAM*

Department of Clinical Sciences and Administration, College of Pharmacy, University of Houston, Houston, Texas. USA.

Abstract

Background: In order to provide a high level of pharmaceutical care, an excellent professional education is important. It can be challenging to determine and differentiate quality among the United States (US) pharmacy colleges or schools offering professional degree programmes.

Aims: To develop an objective assessment of professional pharmacy programmes in the US.

Methods: Criteria were developed to assess pharmacy school programme competitiveness, quality and availability of academic staff, as well as competency of graduates. Our approach was illustrated using 6 accredited pharmacy schools in a geographically similar region, based on publicly available data from independent sources between 2010 and 2013.

Results: Key measures identified included admission Grade Point Average (GPA), student to academic staff ratio, academic staff peer-reviewed publication records and first time North American Pharmacy Licensure Exam (NAPLEX) passing rates. The programmes were ranked using an un-weighted sum of all the domain ranks.

Conclusion: An objective system can be applied to rank professional pharmacy education programmes in the US.

Keywords: *assessment, ranking, pharmacy education*

Introduction

The United States (US) population is ageing and there is an increasing demand for more pharmacists. The proportion of adults aged greater than 65 years compared with people aged 20 to 64 will increase by 80 per cent in the coming decades (National Research Council, 2012). The projected life expectancy will increase from 78 years currently to 84.5 years in 2050 (National Research Council, 2012). To keep up with the demands of an ageing population, the practice of pharmacists is expected to take on a greater role in patient care. For example, pharmacists could be involved in the management of complicated elderly patients through medication therapy management reviews, drug-drug interaction screenings, drug use counselling, therapeutic drug monitoring, vaccination administration, and other initiatives to improve cost-effectiveness of drug therapy.

In order to provide a high level of pharmaceutical care, appropriate professional education is important to prepare future pharmacists for cognitive services. It can be challenging to determine and differentiate quality among the pharmacy colleges or schools offering professional degree programmes. Currently, the US News and World Report (USNWR) conducts surveys of professional programmes in the US, including pharmacy education, for ranking purposes (Morse & Flanigan, 2012). The survey is based on a peer-assessment completed by deans, administrators and/or academic staff. In the most recent USNWR survey conducted in September 2011, the peer-assessment survey response rate for pharmacy programmes was 39 per cent (Morse & Flanigan, 2012), decreasing from 56 per cent in 2007 (US News Staff, 2008). Unlike medical schools, quantitative measures are not a major portion of the pharmacy school survey (Flanigan & Morse, 2013). According to a recent editorial, these published rankings not only target prospective students, but also may further affect allocation of resources from federal, state or private funding sources (Ascione, 2012). Therefore, a robust and objective assessment of the quality of different pharmacy programmes is highly desirable.

The objective of this study was to develop an objective assessment of professional pharmacy programmes in the US, which could be used for ranking purposes.

Methods

To illustrate our approach, six accredited pharmacy schools located within the same geographic area with a wide range of USNWR rankings were included. In this particular jurisdiction, local laws allow for a high degree of data transparency and institution information is readily accessible to the public. Therefore, most pertinent information was publicly available for meaningful comparison. The pharmacy programmes were anonymised and designated by the letters A – F. Data were collected in February - March 2013 for the time period of 2010 – 2013. Whenever possible, data were retrieved from public databases of independent sources.

*Correspondence: Prof. Vincent H. Tam, *Department of Clinical Sciences and Administration, College of Pharmacy, University of Houston, 1441 Moursund Street, Houston, Texas 77030, USA. Tel:+1 832 842 8316; Fax: +1 832 842 8383. Email: vtam@uh.edu*

ISSN 1447-2701 online

Similar to quantitative measures used in medical school ranking, such as amount of research activity, student selectivity and faculty resources, comparable criteria were used in this study. Objective criteria were developed to assess four different domains for each professional pharmacy programme: (a) admission competitiveness; (b) calibre of academic staff; (c) student access to academic staff; and (d) competency and competitiveness of graduates. To assess programme competiveness of incoming students, admission acceptance rate and entrance grade point average (GPA) of enrolled students were collected (American Association of Colleges of Pharmacy, 2012). The calibre of the pharmacy school academic staff was evaluated by cumulative years of professional pharmacy experience, number of faculty members who are board certified specialists (National Boards of Pharmacy Specialists, 2013), peer-reviewed publication records (Hirsch Index) (Scopus, 2013) and National Institutes of Health (NIH) research funding (American Association of Colleges of Pharmacy, 2012). Student access to academic staff was measured by number of academic staff (American Association of Colleges of Pharmacy, 2012) academic staff who are licensed pharmacists and pharmacist preceptors. Cumulative years of professional pharmacy experience, academic staff who are licensed pharmacists and pharmacist preceptors were determined using data available from the state board of pharmacy. Wherever applicable, these measures were normalized to the number of enrolled students or the number of academic staff in each programme. Lastly, the competency of graduates was assessed through North American Pharmacist Licensure Examination (NAPLEX) (National Boards of Pharmacy, 2013) and Multistate Pharmacy Jurisprudence Examination (MPJE) (National Boards of Pharmacy, 2013) first time passing rates. Passing scores on both of these examinations are required before a pharmacist is able to practice in the US. For the purpose of this study, the MPJE taken had to be for the state where the examinee attended pharmacy school. Among graduates who decided to pursue post-graduate residency training (PGY-1), the percentage of graduates matching to a training programme was assessed. The rates calculated were based on the number of applicants from each school who entered the match and did not include post-match scramble results.

To provide a practical summary of all the criteria evaluated, an un-weighted ranking of all the domains was adopted. For each criterion, each programme was ranked in an ascending order (*i.e.* a lower number indicating a better ranking). In the case of a tie for any criterion, each of the schools involved was given the same ranking number, which was the mean of their ordinal ranking. Each domain was ranked separately and the sum of all domain rankings was tallied. The new ranking was compared to the latest pharmacy school rankings published by the USNWR.

Results

Admission Competitiveness

The applicant to final enrolment ratio in 2011 was used and all ratios were reported per pharmacy student. Pharmacy school D had the highest ratio (6.0 applicants for each student enrolled), followed by pharmacy school B and pharmacy school E (both tied at 5.0), then pharmacy school A (4.3), pharmacy school F (4.2) and pharmacy school C (3.6). With regards to admission GPA, pharmacy school A and pharmacy school B were tied with the highest GPA at 3.60, followed by pharmacy school C at 3.54, pharmacy school D and pharmacy school E tied with a GPA of 3.40, and finally pharmacy school F had GPA of 3.39.

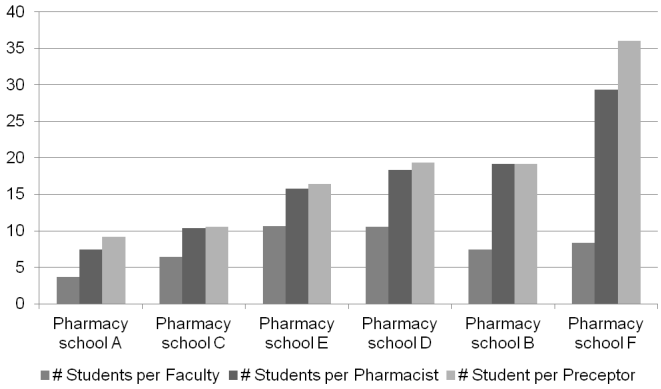
Calibre of Academic Staff

The cumulative years of professional pharmacy experience was reported using median (25-75 IQR) years since pharmacy school graduation. Pharmacy school F had the most experienced pharmacist academic staff [median years of pharmacy experience of 29.0 (11.5 – 36.5)], followed by pharmacy school A [22.5 (12.5 – 32.5)], pharmacy school B [15.5 (8.5 – 17.0)], pharmacy school E [12.0 (6 – 16)], pharmacy school C [11.0 (5.5 – 17)] and pharmacy school D [10.0 (5 – 32)]. The number of academic staff who are board certified specialists was normalized per enrolled student, which yielded the following results: pharmacy school C (17 students to 1 board certified specialist), pharmacy school A (19), pharmacy school B (33), pharmacy school D (44), pharmacy school E (49) and pharmacy school F (469). Hirsch index (H-Index) median (25-75 IQR) was 6.5 (1-17) at pharmacy school B, pharmacy school C (1, 0 – 8) and pharmacy school A (1, 1 – 13) tied, and the remaining three schools also tied [pharmacy school F (0, 0 – 2), pharmacy school E (0, 0 – 2) and pharmacy school D (0, 0 – 0)]. The amount of NIH research funding was available from 2010 to 2011 and was calculated per academic staff. Pharmacy school A received the most funding ($117,835 for each academic staff), followed by pharmacy school B ($71,824), pharmacy school C ($42,440), pharmacy school F ($34,712), pharmacy school D ($7,348) and pharmacy school E ($6,488).

Student Access to Academic Staff

The number of academic staff, pharmacist academic staff, and pharmacist preceptor academic staff normalized to enrolled students are shown in Figure 1.

Figure 1: Accessibility of Academic Staff to Students



Graduates Competency and Competitiveness

NAPLEX and MPJE first time passing rates are reported in Figure 2. The passing rates were > 90% for all the schools. Using all residency matching data available from 2011 to 2013, pharmacy school A had the highest mean percentage of PGY-1 applicants who matched (73.0%), followed by

pharmacy school C (65.3%), pharmacy school D (63.5%), pharmacy school B (62.0%), pharmacy school E (55.8%) and pharmacy school F (42.7%).

Figure 2: Average NAPLEX and MPJE First Time Pass Rates 2010 – 11

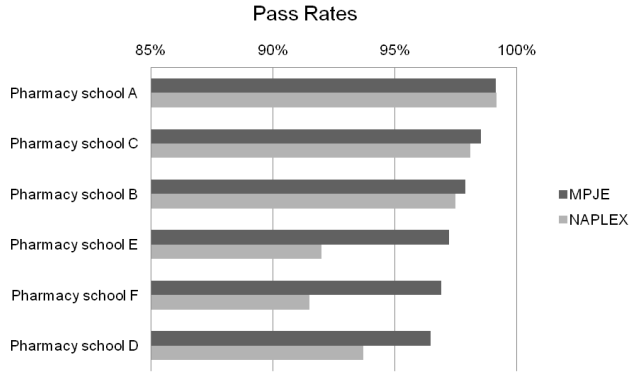


Table I is a summary of all the criteria evaluated, based on which a new ranking is generated. For comparison, the latest USNWR ranking for different professional pharmacy programmes based on their ranking within the geographic region is also included. Programmes in the extremes of ranking were reasonably well correlated, regardless of the ranking approach used. However, the perceived quality of mainstream programmes was more variable and was largely dependent on the specific assessment criteria used. A more robust assessment tool would be needed to distinguish these programmes.

Discussion

While the Accreditation Council for Pharmacy Education (ACPE) offers guidelines on the standards required for programme accreditation, there is no general consensus on how to rank the quality of professional pharmacy educational programmes. In this study, we relied on a panel of (surrogate) attributes to reflect the overall quality of education. The goal was towards a more transparent, reproducible and objective assessment of pharmacy educational programmes. Similar measures have been adopted to evaluate medical education, although the expectations between medical and pharmacy education may not always be directly correlated (*e.g.* the requirement of post-graduate training to practice).

The quality of a pharmacy educational programme can be assessed from different perspectives. We attempted to assess education quality using different domains, targeting key aspects of education that we thought were the most critical. Objective data were preferred whenever possible, but some empiric judgment had to be made. To assess programme competiveness of incoming students, admission acceptance rate and entrance GPA of enrolled students were chosen. We assumed a higher ratio of applicant to enrolee signified that a programme was more selective of incoming students and therefore, more competitive. Also, as GPA is a common metrics used to rank student academic performance, we associated a higher admission GPA to a more competitive programme, when all other applicant factors being equal.

Table I: Summary of Objective Ranking and Comparison to USNWR Ranking

	Pharmacy school A	Pharmacy school B	Pharmacy school C	Pharmacy school D	Pharmacy school E	Pharmacy school F
Domain: Admission Competitiveness						
Acceptance Rate	4	2.5	6	1	2.5	5
Acceptance GPA	1.5	1.5	3	4.5	4.5	6
Domain rank	2.5	1	5	2.5	4	6
Domain: Calibre of Academic Staff						
Cumulative Years of Pharmacy Experience	2	3	5	6	4	1
Board Certified Specialists: Student	2	3	1	4	5	6
H-Index	2.5	1	2.5	5	5	5
NIH Funding	1	2	3	5	6	4
Domain rank	1	2	3	5.5	5.5	4
Domain: Student Access to Academic Staff						
Student:Faculty	1	3	2	5	6	4
Student:Pharmacist Faculty	1	5	2	4	3	6
Student:Pharmacist Preceptor Faculty	1	4	2	5	3	6
Domain rank	1	3.5	2	5	3.5	6
Domain: Graduates Competency / Competitiveness						
First Time NAPLEX Pass Rate	1	3	2	4	5	6
First Time MPJE Pass Rate	1	3	2	6	4	5
PGY-1 Matching Rate	1	4	2	3	5	6
Domain rank	1	3	2	4	5	6
Sum of all Domain Ranks	5.5	9.5	12	17	18	22
New Objective Ranking	1	2	3	4	5	6
US News and World Report Ranking	1	3.5	2	3.5	5.5	5.5

Different measures were relied upon to represent the calibre of the academic staff collectively. Theoretically, the longer a faculty member has been practising pharmacy, the more knowledge is available to impart on students. Board certification was deemed to represent one's motivation to acquire a higher competency level and it was assumed that a faculty specialist would have more advanced clinical skills to educate students. H-Index was a surrogate index for scholarship productivity. A higher H-Index score generally indicates more peer-reviewed scientific publications and a greater influence on the work of other investigators within their respective disciplines. Finally, as NIH funding is associated with a rigorous and competitive peer-review process, research projects supported by the NIH is thus deemed to be highly innovative or having a significant impact on human health. Consequently, investigators leading these

funded projects were also deemed to be the thought leaders of the respective disciplines.

Student access to academic staff was primarily based on the crude number of student and academic staff. It was assumed that student needs were not drastically variable. Furthermore, overall academic staff time dedicated to student education *(i.e.* not committed to administrative duties) was also implied to be similar in different schools, despite in reality it can be conceived that not all academic staff actively engage in precepting pharmacy students to an equal extent. Finally, NAPLEX and MPJE first time passing rates were used to reflect the competency of graduates. However, the passing rates were generally above 90%. As such, the distinction could be due to just a handful of outliers with unexpectedly poor performance. Examining the passing rates over a longer period of time could provide a more reliable trend of overall competency. Although not required for practice licensure, post-graduate training was thought to indicate the desire for a progressive career path. Since there is limited availability for training positions, among graduates who decided to pursue post-graduate (PGY-1) training, the percentage of matched candidates generally signifies the competiveness a graduate, unless geographic preference was the primary consideration for programme selection.

In this study, only professional pharmacy programmes within a limited geographic area were used to illustrate our approach, as most objective data evaluated were readily retrievable from public databases. The validity of the research findings could have been improved by including more pharmacy programmes. However, we were mindful of the potential bias if not all of the information we included from each school was retrievable without contacting each institution. Therefore, we focused on a handful of programmes to illustrate our approach. We recognize there are potential limitations with some of the criteria adopted. For example, cumulative years of professional experience may not clearly distinguish academic staff who have direct teaching responsibilities and those who are primarily involved in administration. Publications before 1996 are not captured by the H-Index, and we may have left out publications by an academic staff in previous institution(s). We also acknowledge that the NIH is not the sole source of research funding, cutting edge research can be supported by other federal agencies (*e.g.* National Science Foundation) or the private sectors. The list of criteria used was not meant to be exhaustive and there could be other reasonable objective measures. Lastly, the magnitude of difference in some criteria (*e.g.* NAPLEX passing rate) was minimal, thus the numeric ranking may have overstated the true difference (if any) among the programmes.

It should also be mentioned that we, as academicians, may have inherent bias about certain measures and could have different opinions amongst ourselves of what constitutes quality education. Other ways to demonstrate validity of this research would be to cross reference the results with ranking in other professional schools (*e.g.* optometry or dentistry) or elicit information from stakeholders, such as students, to determine which criteria to include in the assessment. Therefore, a national ranking of all schools might be better served if undertaken through an independent professional organization (*e.g.* American Association of Colleges of Pharmacy), with inputs from all parties at stake (*e.g.* state versus private schools). As we have emphasized, this study is meant to inspire more robust methodologies to assess quality education across the country. This research may impact the quality of education by encouraging more transparency from pharmacy schools. Increased transparency may result in increased reporting of performance data and therefore comparison of performance. Similar data have been reported to increase performance among hospitals (Fung *et al.,* 2008). It is our expectation that this communication will stimulate discussion among colleagues and encourage other investigators to examine school ranking more critically.

Conclusion

The objective system developed can be applied to rank professional pharmacy education programmes in the US, which could provide more meaningful interpretation to key stakeholders and other interested parties.

Acknowledgments

The authors would like to thank Christina Chou for her assistance with data collection and Janet Teeters, R.Ph., M.S. (Director, Accreditation Services, American Society of Health-System Pharmacists) for residency matching results.

References

American Association of Colleges of Pharmacy. (2012) Federal Grant Search (online). Available at: http://www.aacp.org/resources/research/Documents/FederalGrantSearch.htm. Accessed 5th March, 2013.

American Association of Colleges of Pharmacy. (2012) Pharmacy School Admission Requirements (online). Available at: http://www.aacp.org/resources/studentPharmacy/foryou/admissions/pages/PSAR.aspx. Accessed 5th March, 2013.

Ascione, F.J. (2012) In pursuit of prestige: the folly of the US News and World Report survey. *American Journal of Pharmaceutical Education*, **76**(6), 103.

Board of Pharmacy Specialties. (2013) (online). Available at: http://www.bpsweb.org/resources/find_bcp.cfm. Accessed 5th March, 2013.

Flanigan, S. & Morse, R. (2013) Methodology: Best medical school rankings. US News & World Report (online). Available at: http://www.usnews.com/education/best-graduate-schools/top-medical-schools/articles/2013/03/11/methodology-best-medical-schools-rankings. Accessed 13th March, 2013.

Fung, C.H., Lim, Y.W., Mattke, S., Damberg, C. & Shekelle, P.G. (2008) Systematic review: the evidence that publishing patient care performance improves quality of care. *Annals of Internal Medicine*, **148**(2), 111-23.

Morse, R. & Flanigan, S. (2012) Methodology: Graduate health rankings. US News & World Report (online). Available at: http://www.usnews.com/education/best-graduate-schools/articles/2013/03/11/methodology-best-health-schools-rankings. Accessed 12th February, 2013.

National Boards of Pharmacy. (2012) MPJE© Passing Rates for First-time Candidates per Pharmacy School from 2010 to 2012. National Boards of Pharmacy (online). Available at:

http://www.nabp.net/programmes_/examination/mpje/school-pass-rate. Accessed 3rd March , 2013.

National Boards of Pharmacy. (2012) NAPLEX© Passing Rates for First-time Candidates per Pharmacy School from 2010 to 2012 (online). Available at: http://www.nabp.net/programmes/examination/naplex/school-pass-rate. Accessed 3rd March , 2013,

National Research Council. (2012) Aging and the Macroeconomy. Long-Term Implications of an Older Population. Committee on the Long-Run Macroeconomic Effects of the Aging Washington, D.C.: The National Academies Press.

Scopus. (2013) (online). Author search. Available at: http://www.scopu.com/search/form.url?display=authorLookup&clear=t&origin=searchbasic&txGid=E03F37D7B530391C5358B07592A7F0E5.zQKnzAySRvJOZYcdfIziQ%3a9. Accessed 25th March, 2013.

US News Staff. (2008) Methodology: Graduate health rankings. US News & World Report (online). Available at: http://www.usnews.com/education/articles/2008/03/26/health-methodology. Accessed 1st March, 2013.