REVIEWS

Global Education Implications of the Foreign Pharmacy Graduate Equivalency Examination

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Although the Foreign Pharmacy Graduate Equivalency Examination (FPGEE) is not intended to measure educational outcomes or institutional effectiveness, it may be a reliable and valid criterion to assess the quality or success of international pharmacy programs. This comprehensive review describes the evolution and historical milestones of the FPGEE, along with trends in structure, administration, and passing rates, and the impact of country of origin on participant performance. Similarities between the FPGEE and the Pharmacy Curriculum Outcomes Assessment (PCOA) are also explored. This paper aims to provide a global prospective and insight for foreign academic institutions into parameters for evaluating their students' educational capabilities.

Keywords: Foreign Pharmacy Graduate Equivalency Examination (FPGEE), Pharmacy Curriculum Outcomes Assessment (PCOA), National Association of Boards of Pharmacy (NABP), global pharmacy, international

INTRODUCTION

In 1982, the National Association of Boards of Pharmacy (NABP) membership voted to support a program to aid international pharmacy graduates seeking licensure in the United States.¹ The Foreign Pharmacy Graduate Examination Committee (FPGEC) created the Foreign Pharmacy Graduates Equivalency Examination (FPGEE) as a requirement for licensure and the first administration was in April 1984.¹ In 1985, 350 candidates sat for the FPGEE in 3 different US cities.² It was predicted at the time that this program would last about 5 years, after which interest from all eligible international graduates would be exhausted. More than 27 years after its adoption, it continues to grow (Table 1).

The FPGEE was never intended to measure education outcomes or the specific strengths and weaknesses of pharmacy programs from different regions of the world; however, a group of experts suggests that the FPGEE may be considered a reliable and valid criterion to evaluate the quality or success of pharmacy programs.³ Moreover, changes in the FPGEE requirements may impact many countries' educational strategies regarding their pharmacy curricula. For example, the FPGEE guidelines that require candidates to complete at least a 5-year curricu-

lum inspired various pharmacy schools in India to develop a 5-year doctor of pharmacy (PharmD) program.⁴⁻⁷

The process for US and Canadian licensure of internationally trained pharmacists is lengthy and costly to professionals coming from less developed countries.^{8,9} While it is not the stated intent of the NABP or any academic institution in the United States to shape international education policy, this overview may help international countries strengthen their educational system and better prepare their students to meet their country's needs regarding the delivery of optimal pharmaceutical care. It may also open new opportunities for global networking and collaboration with other countries.

The FPGEC defines a "foreign pharmacy graduate" as a pharmacist whose undergraduate pharmacy degree was conferred by a recognized school of pharmacy outside the United States.¹⁰ US citizens who have completed their pharmacy education outside the United States are considered to be foreign pharmacy graduates, while international students who graduate from US schools are not.¹⁰ The current FPGEE blueprint was updated and has been utilized since June 2007. The 4 areas covered in the 2007 FPGEE blueprint include basic biomedical sciences (21%), pharmaceutical sciences (29%), social/behavioral/administrative pharmacy sciences (15%), and clinical sciences (35%).¹¹ Before 2007, the percentages of coverage of the 4 areas were different: biomedical/clinical (35%), pharmaceutical sciences (30%), social/behavioral/administrative pharmacy sciences (20%), and general sciences (15%).¹²

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Table 1. History of the Foreign Pharmacy Graduate Equivalency Examination

Year	Milestone
1982	NABP membership voted to support a program to aid international pharmacy graduates seeking licensure in the United States
1984	First administration of the FPGEE in April 1984
2000	NABP converted the FPGEE to a computer-based examination
2002	NABP's Examination Security Group discovered a security breach in the FPGEE perpetrated by a group of FPGEE candidates
2003	FPGEC initiates requirement of the 5 years program from the FPGEE applicants
2003	NABP announced that the FPGEE will be back-converted to a paper and pencil examination beginning June 2003
2003	NABP announced the introduction of the Pre-FPGEE to begin in 2004
2006	Sending credential directly to the ECE required
2007	NABP announced the introduction of PCOA
2009	The FPGEE administration resumes as a computerized examination

Abbreviations: NABP = National Association of Boards of Pharmacy; FPGEE = Foreign Pharmacy Graduate Equivalency Examination; FPGEC = Foreign Pharmacy Graduate Examination Committee; ECE = Educational Credential Evaluators; PCOA = Pharmacy Curriculum Outcome Assessment

During the FPGEC certification process, candidates are required to pass the FPGEE and the Test of English as a Foreign Language Internet Based Test (TOEFL iBT). The FPGEC can allow an international pharmacist to practice as an intern in a US pharmacy.^{11,12} International pharmacists who have FPGEC approval must also pass the North American Pharmacist Licensure Examination (NAPLEX) and the Multistate Pharmacy Jurisprudence Examination (MPJE), and complete approximately 1500 training hours to become licensed pharmacists in the United States. As with domestically educated pharmacists, each state has different requirement for the number of the training hours. Some states, eg, New York and West Virginia, have additional requirements for licensure.

The FPGEE requires a scaled score of 75 or greater to pass. The score is calculated by first determining the applicant's ability level on the FPGEE and then comparing this to the predetermined minimum acceptable ability level established for the FPGEE.¹³

Passing the FPGEE is only one component of the FPGEC certification process. They must also pass TOEFL. The iBT version of the TOEFL is scored on a scale of 0 to 120 points. Each of the 4 sections (reading, listening, speaking, and writing) is based on a scaled score from

0 to 30. Currently, the FPGEC requires all applicants to score a minimum of 21 on the reading component, 18 on the listening component, 26 on the speaking component, and 24 on the writing component in order to qualify for FPGEC certification.¹¹ Many candidates who pass the FPGEE have reported that they could not satisfy the TOEFL requirement for the speaking section after several attempts.¹⁴ According to the Educational Testing Service (ETS), the percent passing rate on the speaking section among all the examination takers is only 11%.¹⁵ A NABP task force met in October 2008 to investigate these claims and made the following recommendation about the speaking section: "NABP should retain 26 as the passing standard requirement for the TOEFL iBT as it is identical to the passing standard utilized by other health care professions and meets the expectations of accredited programs."¹⁶ For the NAPLEX component, the average performance among students varied based on the origin of their education. While the passing rate for US pharmacy graduates is greater than 90%, only 65% to 70% of international graduates pass the examination.¹⁷

Therefore, this review has 4 goals. First, a comprehensive background on the evolution of the FPGEE is provided, along with a brief discussion of related examinations: the pre-FPGEE and the Pharmacy Curriculum Outcome Assessment (PCOA). Next, the recent changes in the FPGEE administration because of a breach in security are discussed. Then, the trends and fluctuation regarding the number of FPGEE examinees are described. Finally, the FPGEE's standing today and recommended areas for future research are summarized.

Literature Search

Articles and reports were identified via searches of PubMed, International Pharmaceutical Abstracts (IPA), FPGEE application bulletins, FPGEE study guides, and NABP newsletters from January 2000 to October 2009. A review of the literature was conducted to address the following aspects of the FPGEE: (1) history of the examination, (2) modifications of examination structure, (3) examination participants' country of origin, (4) fluctuation in student examination numbers and passing rate, and (5) association between passing rate and applicants' countries. The review also included an examination of the description of the FPGEE-related examinations and the FPGEE blueprint, featuring a comparison between the FPGEE and PCOA.

Globalization and FPGEE

In 2000 and 2001, candidates from India and Korea comprised the largest percentage (approximately 45%) of the computerized FPGEE examinees. As in previous

years (1998-2000), the passing percentage of these candidates was lower than the passing percentage of candidates from other countries.¹⁸ The FPGEE results in 2000 and 2001 showed that 66% of candidates from India achieved a passing score, while 40% of examinees from Korea passed the examination. All candidates from Canada who sat for the computerized FPGEE achieved a passing score. Approximately 95% of FPGEE candidates from Nigeria, 79% of candidates from Egypt, and 57% of candidates from the Philippines passed the examination (Figure 1).¹⁸ Recently, India, Philippines, Korea, Egypt, and Nigeria represented 75% of candidates in 2005 and 2006^{19,20} and 60% in 2008.²¹ India has the highest number of applicants of the 5 countries, followed by the Philippines, Korea, Egypt, and Nigeria (Table 2).^{20,21}

NABP Related Examinations

NABP announced in fall 2003 that it would begin offering the Pre-FPGEE in 2004 to interested students who wanted a preparatory examination. The Pre-FPGEE is an 85-minute, Internet-based examination that consists of 66 questions. This time limit is proportional to the time allowed on the FPGEE.²² According to NABP reports, the results from the Pre-FPGEE are positively correlated with an examinee's score on the FPGEE and make the practice examination a good predictor of the outcomes expected on the FPGEE.²³

In 2007, NABP announced that it would begin offering the PCOA for pharmacy students who study at US schools and colleges of pharmacy. There are many similarities in the content and composition of the FPGEE and PCOA (Table 3). The PCOA is a 220-item multiple-choice paper-and-pencil assessment developed by NABP. It is intended to be an integral component of the process that schools use to assess their curricula.²⁴ According to the NABP, data obtained from the PCOA will provide individual colleges and schools of pharmacy with detailed

Table 2. Distribution of Foreign Pharmacy Graduate Equivalency Examination Applicants by Country of Residence

Year	Number of Countries With FPGEE Applicants	Countries With the Majority of FPGEE Applicants ^a
1998-1999	NA	India = 24%, Philippines = 8%
2000-2001	NA	India and Korea combined = 45%
2005	70	India, Philippines, Korea, Egypt, and Nigeria = 75%
2006	70	India, Philippines, Korea, Egypt, and Nigeria = 75%
2008	90	India, Philippines, Korea, Egypt, and Nigeria = 60%

^a India had the highest number of applicants, followed by the Philippines, Korea, Egypt, and Nigeria. These countries are referred to within international pharmacy education as "the big five."

feedback related to the subject matter covered throughout the professional pharmacy curriculum.²⁵ It can also provide detailed information to the individual students on their strengths and weaknesses in regard to the curriculum.²⁵ NABP stated that the results for the PCOA examination for its first 2 years of administration are both formative and summative in measuring student progress and permits comparisons to a national reference group.²⁵ However, in March 2008, a group of pharmacy academicians and experts in the Committee of Institutional Cooperation (CIC) expressed their concerns about the PCOA, including its reliability and validity.²⁶

Development of the FPGEE

The FPGEE was developed using standard test development principles and psychometrics. The content of the assessment is based upon a blueprint that was derived from the ACPE Accreditation Standards and Guidelines for the Professional Program Leading to the Doctor of Pharmacy Degree. NABP convened a select committee of 11 stakeholders who collected curriculum data from 55 accredited United States pharmacy programs.²⁵ The committee estimated the average number of curriculum hours that were allocated to the different areas of the new draft blueprint for each of the 55 schools in the sample and used those averages to estimate the number of questions for the FPGEE that should be assigned to each topic in the proposed blueprint.¹³ These results were incorporated into a survey instrument sent to all US schools and colleges of pharmacy. Constructing the survey in this way utilized the number of credit hours allocated to the topics in the pharmacy schools' curriculum and created a draft blueprint that would result in an assessment that reflected the

Figure 1. Candidates' pass rates (%) by country (November 2000 and June 2001 combined).

Table 3. Comparison Between the Content and Composition of the Foreign Pharmacy Graduate Equivalency Examination and the Pharmacy Curriculum Outcomes Assessment

Area	Foreign Pharmacy Graduate Equivalency Examination	Pharmacy Curriculum Outcome Assessment
Basic biomedical sciences, %	21	21
Pharmaceutical sciences, %	29	28.5
Social/behavioral/administrative pharmacy sciences, %	15	14.5
Clinical sciences, %	35	36
Total number of questions	250	220
Examination setting	Paper and pencil until April 2009; computerized since then	Paper and pencil
Examination scoring	Not disclosed	Rasch item response theory
Examination initiated	1984	2007

relative emphasis of the various topics.²⁵ The content of the FPGEE and PCOA follows its blueprint, which covers 4 major domains and 35 subtopics.^{11,27}

In March 2006, this survey instrument was sent to all deans of schools and colleges of pharmacy asking for their recommendation on the number of questions that should be allocated to the delineated topics. Surveys were obtained from 41 accredited pharmacy programs and the results were incorporated directly into the FPGEE blueprint.^{13,25}

Security Breach

In November 2000, NABP converted the FPGEE from a paper-and-pencil to a computer-based examination. The new format was expected to make the FPGEE more accessible to candidates through a system of testing centers that offered the examination 5 days a week throughout the year.²⁸ In June 2002, NABP staff members made an observation, via statistical data maintained in relation to the FPGEE program, that the pass rates for the examination had increased by more than 5% for the first 5 months of 2002. A comparison of candidate scores revealed that the increase was caused by the higher scores obtained from 2 particular nationalities of applicants.²⁹ This stimulated increased scrutiny by NABP of the FPGEE results for the first part of 2002 compared to those subsequent to June 2002. In October 2002, staff members identified a Web site written in Korean that contained questions related to the FPGEE.²⁹ Hence, in November 2002, NABP's Examination Security Group determined that there had been a security breach in the FPGEE perpetrated by a group of FPGEE candidates. As a result of the breach, administration of the FPGEE was halted effective November 19, 2002, until a full investigation was conducted and a secure examination established.³⁰

As a result of determining that a security breach of the FPGEE had occurred, NABP announced in February 2003 that the FPGEE would be administered only as a paper-and-pencil examination beginning in June 2003.³¹ In the same year, FPGEC began to require candidates who take the FPGEE to be graduates of 5-year pharmacy programs. This followed the American Council for Pharmacy Education's (ACPE) decision to revise the standards for the first-professional pharmacy degree in the United States from a 5-year baccalaureate degree to the 6-year PharmD degree. All accredited US colleges and schools of pharmacy had to meet the ACPE requirement by 2004.³² According to the NABP, approximately 40% of international pharmacy programs offered a 5-year curriculum in 2002. NABP hoped that more educational institutions would expand their programs to meet the United States' standard.³²

Beginning with the April 2009 administration, candidates taking the FPGEE resumed taking the computerized version of the examination. The FPGEE lasts for 6½ hours and is administered once in the spring and once in the fall. However, instead of only having 3 testing sites to choose from, applicants now can choose from more than 200 testing sites in the United States. A summary of the changes in administration are provided in Table 4.

"Globalization" of the FPGEE refers to making testing platforms available in countries overseas so that candidates can take the FPGEE in their home countries. The FPGEE security breach in 2003, however, may have undermined the NABP's confidence that it can administer tests in controlled conditions outside of the country. Therefore, in 2003, the Advisory Committee on Examinations and Executive Committee decided that FPGEE overseas testing was no longer an option for NABP. If security procedures and control can be improved, overseas testing may be an option in the future.³³

Table 4. Summary of Changes in Administration of the Foreign Pharmacy Graduate Equivalency Examination

Change (Timeframe)	Before	After
Nature of the examination (effective April 2009)	Paper and Pencil based	Computerized based
Frequency of the examination (effective April 2009)	Twice per year (June and December)	Twice per year (April and October)
Test administration (effective April 2009)	3 sites only (NY, IL, CA)	200 Pearson VUE testing sites
Number of questions (effective April 2009)	300 (100 are pretest questions)	250 (pretest questions are NA)
Minimum requirements for language competency (effective April 2007)	TOEFL CBT (213 or 550) & TSE (50)	TOEFL iBT; The minimum for each section is: reading: 21, speaking: 26, listening: 18, writing: 24
ECE requirement (effective April 2006)	NABP was doing the credential evaluation	The credential should be send to ECE directly
Five year pharmacy program requirement (effective January 2003)	Four- year curriculum program was accepted by the NABP.	NABP requires applicants who graduated after 2003 to earn their degree from a 5-year curriculum programs
Expiration of the FPGEE (effective 2006)	2 years	There will no longer a 2-year time limit on validity of a candidate's last passing FPGEE score

Abbreviations: NA = not available; TOEFL = Test of English as a Foreign Language; CBT = computer based test; TSE = Test of Spoken English; iBT = internet based test; ECE = Educational credential evaluators; NABP = National Association of Boards of Pharmacy; FPGEE = Foreign Pharmacy Graduate Equivalency Examination

Reduction in the FPGEE Examinees and the Pass Rate

Three thousand forty-five applicants sat for the FPGEE in 2008, a decrease of 20.7% compared to the 3,841 applicants who sat for the examination in 2007.²¹ Moreover, the number of applicants who took the examination in 2009 was 217, which reflects a reduction of 33.8% from 2008 (Table 5).³⁴ This decrease may be the result of 1 or more of the following reasons: (1) the FPGEC requirement that internationally educated pharmacists earn their professional degrees from 5-year curriculum programs, (2) the difficulty of obtaining a visa, and (3) the decrease in recruiting of international pharmacists by chain pharmacies as the pharmacist shortage in the United States has leveled off.²¹

Another reason for the reduction in number of examinees may be because the pass rate on the FPGEE has decreased during the past few years. For example, in 2006, the pass rate on the FPGEE was less than 50%,²³ compared to 70% in 1998.³⁵ These pass rates also compare unfavorably with the pass rates of 80% for 2001 and 2002.³⁰ Some international pharmacists who took the FPGEE reported that they struggled with passing the social/behavioral/administrative pharmacy sciences section.³⁶ Anecdotal information from those who have taken the examination has spread via various educational Web sites, blogs, etc, and also reports difficulty with the

social and administrative pharmacy section. This is plausible because many of the pharmacy education programs in developing countries are deficient in the area of pharmacy administration and it is difficult for students even to obtain resources to prepare for this section of the FPGEE.³⁷

FUTURE RESEARCH

This review has identified several knowledge gaps where research would be valuable related to the FPGEE. Studies are needed to investigate the association between student demographics (eg, gender, age, country of origin, year of graduation, and type of pharmacy degree) and the overall pass rate (ie, general score and per section) for the FPGEE. Sectional analyses of FPGEE results also merit a closer look, particularly for social and administrative pharmacy. Research regarding the lagging scores in this section can be approached from several different directions including examinations of total dedicated curricular time, qualifications, and experience of educators teaching these courses compared to those teaching content in other sections, and the impact of perceived relevance by administrators, faculty members, and students of the social and administrative aspects of pharmacy compared to basic, life, and clinical sciences. Educational initiatives should also be explored for social and administrative pharmacy given the dearth of preparatory tools for this area.

Table 5. Applicant Numbers and Pass Rates on the Foreign Pharmacy Graduate Equivalency Examination by Submission, Qualification, and Preparation

Year	No. of Applicants Who Submitted Application	No. of Applicants Who Were Qualified to Sit	No. of Applicants Who Took the FPGEE ^a	Pass Rate, %	No. of Applicants Who Took Pre-FPGEE
1998	1662	NA	879	70	-
1999	2042	1350	1106	68	-
2000	2074	NA	NA	75.19	-
2001	NA	1404	757	80	-
2002	NA	2725	1739	80	-
2003	NA	2789	4002	NA	-
2004	3894	NA	3869	NA	1148 ^b
2005	4049	3290	3665 (- 5.3%)	NA	701 (- 39%) ^b
2006	3885	3182	3483 (- 5.0%)	43.0	659 (- 6%)
2007	3541	NA	3841 (+10.0%)	57.5	Suspended
2008	NA	NA	3045 (- 20.7 %)	NA	487
2009	NA	NA	2017 (- 33.8.0%)	NA	516 (+ 6%)

Abbreviations: FPGEE = Foreign Pharmacy Graduate Equivalency Examination

^a Applicants have 2 opportunities to test and therefore the number qualified in a year may be lower than the number who actually takes the examination

^b This reduction in the number of applicants was due to only 1 form of the pre-FPGEE being available in 2005 and after compared to the 2 forms that were available in 2004.

Another fertile area for research involves measuring the short- and long-term repercussions in each respective country that is allowing the FPGEE, in part or wholly, to drive programmatic change. Prioritizing which countries to conduct this type of research in could be dictated by factors such as those that have indicated their move to a 5-year curriculum was influenced by the FPGEE requirements (eg, India) and those countries with the greatest number of FPGEE candidates. The adage of “teaching to the test” takes on a much greater magnitude when an entire curriculum is tailored to help students successfully navigate an examination from a different country. Whether the resulting curricular change improves the quality of the graduate or compromises the integrity of an individual school and educational system is largely determined by the choices made during revision of the respective program. Determining the results of those choices and the localized effects are worthy research pursuits.

Other avenues of research might examine the psychometric parameters that are used to qualify and determine the inclusion of each item in the test bank and to describe the nature of the FPGEE (ie, real vs. experimental questions). Comparing international pharmacy graduates’ performance on the NAPLEX with that of US pharmacy graduates (eg, general score and per section) also bears investigation. Finally, assessing the benefits and drawbacks of offering the FPGEE as a pure computerized adaptive testing (CAT) model like the NAPLEX and the MPJE might prove fruitful.

CONCLUSION

This review provides insight for international academic institutions regarding useful parameters for evaluating their students’ educational capabilities. It also may guide curricular revisions, leading to a more broadly educated pharmacist who is better prepared for the increasingly global healthcare stage. The result of more closely aligned educational goals may be more international pharmacists passing the FPGEE/qualified to practice in the United States, thereby easing the current pharmacist shortage.

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