

# An Overview of Education and Training Requirements for Global Healthcare Professionals

## ❖ *Pharmacist* ❖

GLOBAL KNOWLEDGE EXCHANGE NETWORK  
on Healthcare

### *Workforce and Training Task Force*



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## EXECUTIVE SUMMARY

Pharmacists play an important and varied role in healthcare, from research and manufacture of medicines to drug dispensation and patient education. The pharmacy profession continues to evolve, as pharmacists are increasingly involved in patient monitoring and consultation with other members of the healthcare team on drug decisions and patient management.

This report reviews the education and training requirements for pharmacists in seven countries: United States (US), United Kingdom (UK), France, Germany, Australia, Canada, and Singapore. In all countries reviewed, the pharmacy degree can be obtained without a prior undergraduate degree. In the US and France, pharmacy school is considered an undergraduate “professional” program that awards the Doctor of Pharmacy degree. The UK offers pharmacy study as an “undergraduate master’s” program that awards the Master of Pharmacy degree. The remaining countries offer a bachelor degree program and in some cases an advanced degree option to obtain a Master or Doctor of Pharmacy degree.

Total length of study to basic degree attainment is generally four years, with slightly longer programs in the US (six years), France (six years) and Canada (five years). An additional two to three years are generally required to specialize or obtain an advanced degree in countries where the option is available. All countries require clinical training, generally four months to one year, either during the course of study or as a post-graduation internship or residency. Specialty training is an option in the US, UK, France, Canada and Singapore.

All countries studied require licensure or certification of pharmacy graduates through a national exam before they can enter practice. However, there appears to be little standardization of re-licensure processes both within and between countries. Only Singapore enforces mandatory completion of continuing education credits for re-licensure every two years.

As the role of pharmacists expands, the topic of prescribing authority continues to be debated. The UK is the only country reviewed that allows independent prescribing by pharmacists, but only after specialty accreditation. The US, Australia, and Canada allow limited prescribing privileges under certain circumstances or for certain drugs. Singapore and France do not allow prescribing by pharmacists, with the exception of provision of emergency contraception in France.

## SPOTLIGHT ON PHARMACY EDUCATION & WORKFORCE ISSUES

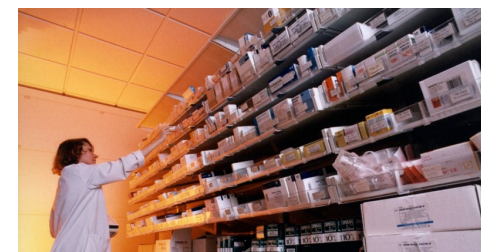
Pharmacists are the third largest healthcare professional group in the world, behind physicians and nurses. In many countries, an expansion of pharmacist responsibilities to a more consultative, patient-focused role has increased workforce demand and highlighted the need for educational reform.<sup>1</sup> Among the countries reviewed in this report, pharmacist workforce density varies from a low of 3 per 10,000 population (Singapore) to a high of 11 per 10,000 (France). The US is second to France with approximately 9 pharmaceutical personnel per 10,000. The UK, Germany, Australia and Canada ranged from 5 to 8 personnel per 10,000 population.<sup>2</sup>

The supply of pharmacists is increasing in many countries, in part due to a rise in the number of accredited pharmacy programs and other training options, such as distance learning programs. The pharmacist supply (full- and part-time) in the US is expected to grow from 226,000 in 2004 to 305,000 by 2020. However, government data showed an estimated shortfall of approximately 10,400 pharmacists (5%) in 2004, and a 10% workforce shortage is predicted by 2020.<sup>3</sup> Another estimate puts the projected shortfall of pharmacists in the US much higher, at approximately 150,000 by 2020.<sup>4</sup> Other countries are facing similar trends. A projected pharmacist shortfall of approximately 10,000 is predicted in Australia by 2010<sup>5</sup>, and Canada's shortfall was approximately 10% in 2000.<sup>6</sup> A number of factors contribute to the pharmacist workforce shortage experienced in many countries, including an aging global population, an increase in the number of prescriptions, the changing role of pharmacists, increasing administrative burdens within healthcare payment systems, and more women entering the profession only on a part-time basis. Imbalances in the distribution of pharmacists between rural and urban areas also create geographical shortages within countries.<sup>7</sup>

The majority of pharmacists are employed in community pharmacy settings, followed by hospital, industry, research/academia, and regulatory agencies. European countries have the highest percentage of pharmacists working in community pharmacy settings; the Western Pacific and Southeast Asian regions, which include Australia and Singapore, have a higher percentage of their pharmacists working in industry settings compared to other regions.<sup>8</sup>

The International Pharmaceutical Federation has partnered with UNESCO and the World Health Organization to establish a Global Pharmacy Education Task Force with an Action Plan for promoting comprehensive education development and achievement of competencies in global pharmacy practice. The Task Force is leading a number of initiatives, including recommendations for improving academic workforce capacity and educational institutions, developing a framework for quality assurance of pharmacy education programs, and developing a competency framework for the pharmacy workforce.<sup>9</sup> Additional information about the Global Pharmacy Education Task Force can be found at <http://www.fip.org/education/>.

# EDUCATION AND TRAINING REQUIREMENTS FOR PHARMACISTS



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## *United States*

The educational path to becoming a pharmacist in the United States (US) takes approximately six years. In 1992 the colleges of Pharmacy in the US agreed to phase out the five-year Bachelor of Science in Pharmacy as a professional degree and make the Doctorate of Pharmacy (Pharm.D.) the only professional Pharmacy degree. The Doctorate of Pharmacy degree is a four-year professional program that generally follows two or more years of pre-pharmacy undergraduate education. Students in Pharm.D. programs are trained in aspects of drug therapy, as well as patient/provider communication, public health concepts, and management systems for drug dispensation. Students also spend approximately one-fourth of their time in supervised practical training in various pharmacy settings.<sup>10</sup> This helps students meet the internship requirements of the state pharmacy boards, which generally require 1500 hours of practical experience before licensure.<sup>11</sup>

Upon graduation, pharmacists may seek additional and/or specialty training through a residency or fellowship of one to two years. Residencies generally include advanced practical training and a research project if the individual wishes to work in a hospital. Fellowships train graduates in a specialized area of pharmacy such as clinical practice or laboratory research. Some pharmacy schools also offer a master of science or Ph.D. in pharmacy for students who desire additional clinical, laboratory, and research experience.<sup>12</sup>

All states in the US require licensure of pharmacists through exams administered by the National Association of Boards of Pharmacy (NABP). The first of these is the North American Pharmacist Licensure Exam (NAPLEX), a skills and knowledge exam.

Most states also require the Multistate Pharmacy Jurisprudence Exam (MPJE), a test of pharmacy law. States that do not require the MPJE have their own law exam, and some states may require additional exams. Generally a pharmacist licensed in one state may transfer licensure to another state, with certain requirements. Some states grant licenses to graduates of foreign pharmacy schools upon completion of additional equivalency and English language exams.<sup>13</sup> Most states also require completion of continuing education (CE) credits for license renewal.<sup>14</sup> The number of credits and renewal schedule varies by state – some states require annual renewal with proof of continuing education, some states have biennial renewal. The general requirement is completion of 15 hours of continuing education per year, however some states lack an official enforcement mechanism and rely on an ‘honor system’ for pharmacists to report their CE.<sup>15</sup>

In the US, pharmacists do not generally have broad prescribing privileges, however through legislation, or under certain circumstances, limited prescribing authority is allowed in some states and institutions. Limited prescribing privileges, such as protocol-based or dependent prescribing, involves collaboration with a doctor. For example, California allows dependent prescribing in institutional settings. The State of Florida allows independent prescribing, i.e. where physician oversight is not required and “the prescribing practitioner is solely responsible for patient outcomes,” for a limited number of medications such as medicated shampoo and eye ointment.<sup>16</sup> Pharmacists working in health facilities under the US Department of Veteran Affairs have some prescribing authority,<sup>17</sup> and the US Indian Health Service permits pharmacists to prescribe for certain diseases and conditions, such as ear infections, hypertension, congestive heart failure, arthritis, and others.<sup>18</sup>

### ***United Kingdom***

Pharmacy education in the United Kingdom is a four-year “undergraduate master’s” program that results in the Master of Pharmacy (MPharm) degree. The program is considered an “undergraduate” master’s degree because a bachelor’s degree is not required for entrance into the program. The UK’s program is the shortest of the European pharmacy programs, as most other European countries require five to six years of study. Beyond coursework, pharmacy students are not required to complete a clinical placement or other practicum during their studies, however it is generally expected that some clinical practice will be completed. Clinical placements may last anywhere from one week to four weeks over the four-year program.<sup>19</sup>

Graduates in the UK must complete a 1-year work program in the field before they can register as pharmacists. There is no time limit for graduates to complete the yearlong workplace training, therefore it is possible that a student could wait months or years before completing the requirement and applying for registration as a pharmacist. “Currency of knowledge” for pharmacists has been a discussion point in the UK, with recommendations that students should be required to complete their work training within three years of graduation; however, no policy has been implemented in this regard.<sup>20</sup>

Once the workplace program is completed, graduates must pass the national registration exam in order to be entered on the Royal Pharmaceutical Society of Great Britain’s (RPSGB) Register of Pharmaceutical Chemists. Foreign-educated pharmacists who meet

certain criteria may qualify for the Overseas Pharmacist Accreditation Program, a one-year post-graduate program that, along with the one-year workplace training requirement, permits application to the register.<sup>21</sup> Currently, pharmacists maintain their registration status through payment of an annual fee. However, in late 2008 the RPSGB announced plans to follow government recommendations in implementing a “revalidation” process by 2012 that will require pharmacists to demonstrate continued fitness to practice. Mandatory continuing professional development may be a part of the new revalidation structure.<sup>22</sup>

Unlike the US, pharmacists in the UK can obtain “supplementary” or “independent” prescribing privileges. Supplementary prescribing allows pharmacists to prescribe repeat or modified prescriptions after diagnosis by a clinician. Independent prescribing allows for diagnosis and choice of medications by the pharmacist. Currently, pharmacists must obtain additional accredited specialty training in order to receive prescribing privileges. However, the UK is in the process of incorporating training in the undergraduate pharmacy program that will allow all future pharmacists to obtain accredited prescriber status without the need for additional post-graduate training.<sup>23</sup>

## ***France***

Pharmacy education programs in France offer a six-year and a nine-year option. Beginning in 2010 as part of the Bologna Process,<sup>24</sup> French pharmacy students will start their education by taking a year of common curriculum with medical studies, midwifery, and dentistry.<sup>25</sup> After completing one year of undergraduate pharmacy study, students must pass a competitive exam to move forward in the program. Students complete coursework and receive some clinical training in the first four years of education. In year five, students complete a 12-month, half-time internship at a university hospital. Depending on a student’s area of interest, this may be followed by a six-month, full-time internship in a community pharmacy or industry in year six.

After six years of classroom and practical training, as well as completion and defense of a thesis, students receive the Doctor of Pharmacy degree and may practice in a community or industrial setting. Alternately, students may choose to pursue more specialized training in year five by applying for an *Internat*, a four-year paid internship. *Internat* slots are competitive and dependent on a student’s performance on a competitive national exam. Students who pursue the nine-year option must also defend a thesis, and in the end receive a special degree, the Diplôme d’Etudes Spécialisées (DES), as well as a Doctor of Pharmacy degree. These students are qualified to work in a hospital setting, in addition to community pharmacy or industry.<sup>26</sup>

To enter practice, pharmacists must register with the College of Pharmacists (*Ordre National des Pharmaciens*). Pharmacists who choose to apply their knowledge to work in other industries, such as cosmetics, agriculture/food, marketing, etc. are not required to register with the College.<sup>27</sup> In 2002, the government passed legislation to allow implementation of mandatory continuing education. France spent several years developing a system, including national and regional boards to oversee CE activities. However as of 2008, mandatory CE had not yet been put into practice.<sup>28</sup> Pharmacists in France do not prescribe drugs, except in the case of emergency contraception.<sup>29</sup>

## ***Germany***

Pharmacy education in Germany is a four-year program that includes coursework, clinical experience, a 12-month practical year, and a three-part state exam with written and oral components. The first two years focus on coursework, with an eight-week clinical practice (*Famulatur*) completed during the school holiday. Four weeks of *Famulatur* must be completed in a community pharmacy, and the remaining four weeks can be completed in a hospital, army pharmacy, industry, or drug control institute. After the second year of studies, students take part one of the three-part pharmaceutical exam. Each part of the exam must be passed before moving on to the next phase of studies. After two more years of coursework, including herbal medicines, students must pass part two of the exam. Students then complete one year of practical training, six months of which must be completed in a community pharmacy. Upon completion of the practical year, students must pass part three of the exam in order to receive a state license or *Approbation* to practice. A student may also choose to spend half of the practical year doing research in a university setting and may complete a thesis to earn a post-graduate diploma comparable to a master's degree.<sup>30</sup>

Germany has a voluntary system for continuing education of pharmacists. Pharmacists who complete 150 credits every three years receive a certificate of completion.<sup>31</sup>

## ***Australia***

Pharmacy education in Australia most commonly involves a four-year Bachelor of Pharmacy degree, including clinical training, followed by one year of supervised internship in pharmacy practice. Some universities now also offer an accelerated two-year graduate entry program resulting in a Master of Pharmacy degree. Applicants to the master's program already hold a bachelor's degree, generally in a related field, and they complete the same general curriculum as the bachelor candidates, albeit in half the time. (Since the implementation of national accreditation of pharmacy curricula in Australia in 1997, the number of universities offering bachelor and graduate training has increased.) The curriculum for the master's program is generally the same as the undergraduate program, and graduates of the master's program must also complete the one-year internship. All students may also pursue additional graduate study to obtain a master of clinical pharmacy, doctor of clinical pharmacy, or other graduate certification.<sup>32</sup>

Upon completion of the internship, graduates must pass a series of exams administered by regional pharmacy boards, including an oral exam, a Law and Ethics exam, a calculations exam, and a competency assessment test. Successful completion of exams allows pharmacists to become registered to practice in any setting, including hospitals.

Pharmacists renew their registration annually, however until recently pharmacists were not required to show ongoing competency for renewal. With a growing national interest in developing competency standards, some jurisdictions are implementing more rigorous requirements for re-registration, as well as tools and guidelines to assess competency.<sup>33</sup>



Pharmacists in Australia do not have prescribing privileges for most medications, however they may prescribe from a defined list of “pharmacist-only” medicines, such as certain decongestants and asthma inhalers, used to treat minor ailments or symptoms that do not require diagnosis by a physician.<sup>34</sup>

## *Canada*

In general, pharmacy study in Canada is a five-year Bachelor of Pharmacy (B.Sc.Pharm) program for entry-level professionals that includes one year of pre-pharmacy coursework, four years of pharmacy study, and clinical training (generally 16 weeks in clinical rotations).<sup>35</sup> Each university is free to develop its own curriculum and teaching philosophy, therefore program requirements vary across the ten accredited schools in Canada. In the province of Quebec, the University of Montreal decided in 2007 to eliminate the B.Sc.Pharm and offer the Doctor of Pharmacy (Pharm.D.) degree as the entry-level degree. The second pharmacy school in Quebec, the Universite Laval, switched to the Pharm.D. in 2009.<sup>36</sup>

Upon completion of the program, graduates must pass a two-part national qualifying examination of the Pharmacy Examining Board of Canada (PEBC). The PEBC issues certificates of entry-level competence, which graduates must present to a provincial or territorial regulatory authority as part of the licensing process.<sup>37</sup> Graduates must also complete an “in-service training,” or internship, which is generally three to four months and is regulated by the provincial authority.<sup>38</sup> (Some B.Sc.Pharm graduates may elect to complete a longer hospital pharmacy residency or industrial pharmacy residency, generally one year, to gain additional experience.) Each provincial authority has additional requirements for licensure, such as practical experience, language proficiency, and additional exams related to pharmacy law and standards.<sup>39</sup> The National Association of Pharmacy Regulatory Authorities (NAPRA) works to maintain consistency in standards across all of the provincial bodies. A graduate is registered/licensed to practice once all of the provincial regulatory requirements have been met. Pharmacists licensed in one province cannot necessarily practice in another province without meeting specific requirements of the province, however the country has worked to remove some of the bureaucratic barriers to improve workforce mobility.<sup>40</sup> Pharmacists renew their provincial registration through an annual fee and are generally required to demonstrate completion of continuing education credits or other professional development activities.<sup>41</sup> Canada’s mandatory Quality Assurance Program requires all pharmacists to maintain a “learning portfolio” of lifelong learning activities. However, only 20% of pharmacists are randomly selected each year to undergo a more rigorous review of continuing education activities.<sup>42</sup>

Two Canadian universities offer an advanced post-baccalaureate Pharm.D. degree. The Pharm.D. program is two years of advanced training in clinical pharmacy practice consisting of 8 to 12 months of coursework and approximately one year of clinical rotations. To enter the program, students must already have a B.Sc.Pharm degree and be licensed to practice in Canada. Upon completion of the program, licensure requirements are the same as for the B.Sc.Pharm degree. Most Pharm.D. graduates go on to work

in hospital settings, but there are increasing opportunities for advanced pharmacy practice in industry, government, academia, consulting, and elsewhere.<sup>43</sup>

Because pharmacists are regulated at the provincial level, prescribing privileges vary by province, and expanding scope of practice has often been controversial. One Canadian province, Alberta, gave pharmacists independent prescribing authority in April 2007. Some other provinces, such as Quebec and British Columbia, allow prescribing from defined formularies without physician authorization. In other provinces, some forms of dependent prescribing are allowed, such as prescription by protocol or medical directive, both of which still require some measure of physician oversight. Certain pharmacy-only medications used for patient self-care can also be provided independently by all pharmacists.<sup>44</sup>

### *Singapore*

Pharmacy education in Singapore is a four-year undergraduate professional program resulting in a Bachelor of Science in Pharmacy degree (B.Sc. Pharm). The pharmacy program includes coursework, practical experience, and two 6-week clinical rotations (“preceptorship”) in community pharmacy (2<sup>nd</sup> year) and hospital pharmacy (3<sup>rd</sup> year). Graduates who wish to practice pharmacy in a hospital, clinic, or elsewhere must be registered with the Singapore Pharmacy Council and first complete one year of clinical training. Graduates who wish to work immediately in the pharmaceutical industry are not required to complete the pre-registration training, however all graduates must pass a national competency exam administered by the Singapore Pharmacy Council.<sup>45</sup> Once in practice, pharmacists may seek specialty registration in areas such as oncology and pharmacotherapy by completing additional practical training and other requirements as recognized by the Pharmacy Specialists Accreditation Board.<sup>46</sup>

The National University of Singapore also offers a Master of Science degree in Pharmaceutical Sciences & Technology (M.Sc.). The M.Sc. degree is a two-year program (part-time) of coursework. The purpose of the Master’s program is to train professionals in other aspects of the pharmaceutical industry, such as formulation science, quality assurance, and regulatory compliance. Applicants are not required to have a B.Sc. Pharm degree, however graduates of the Master’s program *cannot* be a registered pharmacist with the Singapore Pharmacy Council.<sup>47</sup>

For students interested in research, a Master of Science and Ph.D. in Pharmacy are also offered. Students applying to the research graduate program must have a Bachelor’s degree in Pharmacy, Science, or Engineering related fields.<sup>48</sup> Registered pharmacists must renew their practicing certificate/registration every two years. In 2006 Singapore implemented mandatory continuing professional education (CPE) requirements, and as of 2009, fifty credits of CPE are required for each registration renewal.<sup>49</sup>

**TABLE 1: PHARMACIST TRAINING AND EDUCATION – SELECT COUNTRIES**

<b>Requirement</b>	<b>US</b>	<b>UK</b>	<b>France</b>	<b>Germany</b>	<b>Australia</b>	<b>Canada</b>	<b>Singapore</b>
<b>Previous undergraduate degree required?</b>	No , but generally 2 years of pre-pharmacy undergraduate coursework	No	No	No	No	No	No
<b>Years of pharmacy school</b>	4	4	6-9	4	4 (Bachelor's); 2 (accelerated Master's)	5 (Bachelors); 7 (PharmD)	4
<b>Degree Title</b>	Doctor of Pharmacy (PharmD)	Master of Pharmacy (MPharm)	Doctor of Pharmacy (PharmD)	Bachelor of Pharmacy	Bachelor of Pharmacy; Master of Pharmacy	Bachelor of Science in Pharmacy (B.Sc.Pharm); Doctor of Pharmacy (PharmD)	Bachelor of Science in Pharmacy (B.Sc. Pharm)
<b>Clinical/residency training</b>	Clinical training during study; Optional post-grad residencies and fellowships	Optional 1-4 weeks during study; 1 year post-grad	18 months – 4 years during study, depending on path	1 year during study	1 year post-grad	16 weeks during study; 4 months post-grad; optional 1 year residency	12 weeks during study; 1 year post-grad
<b>Specialty training</b>	Optional	Optional	Optional (by exam, extended program)	N/A	N/A	Optional	Optional
<b>Licensing/ Certification/ Registration</b>	National exams	National exam	National exams	National exams	National exams	National exams	National exam
<b>Re-licensure Requirements</b>	Requirements vary by state	Process under development for 2012.			Annual, requirements vary	Annual (fee)	Every two years
<b>Continuing education required for renewal?</b>	Generally required, varies by state	No (may be linked to revalidation process in 2012)	Policy in development	No	No	Mandatory program, but limited enforcement	Mandatory for re-licensure
<b>Prescribing authority</b>	Limited	Yes	No (except emergency contraception)		Limited	Limited to full, depending on province	No

# PROFESSIONAL ORGANIZATIONS AND RESOURCES

## *United States*

- Accreditation Council for Pharmaceutical Education, <http://www.acpe-accredit.org/>.
- American Association of Colleges of Pharmacy, [www.aacp.org](http://www.aacp.org).
- National Association of Boards of Pharmacy, <http://www.nabp.net/>.
- American Pharmacists Association, <http://www.pharmacist.com/>.

## *United Kingdom*

- Royal Pharmaceutical Society of Great Britain, <http://www.rpsgb.org/>
- National Pharmacy Association, <http://www.npa.co.uk/>
- British Pharmaceutical Students' Association, <http://www.bpsa.co.uk/>

## *France*

- The National Council of the Order of Pharmacists <http://www.ordre.pharmacien.fr/>
- French Society of Pharmacology, <http://www.pharmacol-fr.org/>
- LEEM (Les Entreprises du Medicament), the French Pharmaceutical Companies Association, <http://www.leem.org/medicament/version-anglaise-751.htm>
- French Pharmacy Associations, as compiled by Cornette, C., Jolivet I. Pharmaceutical Associations in France: Meeting a Diverse Set of Needs. 2007. 13: 62 -63, [www.eahp.eu/content/download/25379/.../CountryFocus62-63.pdf](http://www.eahp.eu/content/download/25379/.../CountryFocus62-63.pdf)

## *Germany*

- Federal Union of German Associations of Pharmacists (ABDA), <http://www.abda.de/1774.html>
- German Association of Hospital Pharmacists (ADKA), <http://www.adka.de/> ; <http://www.adka.de/daten/pdf/englisch.pdf>
- German Pharmaceutical Society (DPhG), <http://www.dphg.de/>

## *Australia*

- Pharmaceutical Society of Australia, <http://www.psa.org.au/>
- National Australian Pharmacy Students' Association, <http://www.napsa.org.au/>

### ***Canada***

- Association of Faculties of Pharmacy of Canada (AFPC), <http://www.afpc.info/>
- Canadian Association of Pharmacy Students and Interns (CAPSI), <http://www.capsi.ca/>
- Canadian Pharmacists Association, <http://www.pharmacists.ca/>
- National Association of Pharmacy Regulatory Authorities,  
<http://napra.ca/pages/home/default.aspx>
- Canadian Council for Accreditation of Pharmacy Programs (CCAPP), <http://www.ccapp-accredit.ca/>
- Canadian Council on Continuing Education in Pharmacy, <http://www.cccep.org/>

### ***Singapore***

- Singapore Pharmacy Council, [http://www.spc.gov.sg/html/SPB\\_Home.html](http://www.spc.gov.sg/html/SPB_Home.html)
- Pharmaceutical Society of Singapore, <http://www.pss.org.sg/>

### **Other Resources:**

- International Pharmaceutical Federation. *Global Pharmacy Workforce and Migration Report*. 2006. [http://www.fip.org/www/index.php?page=menu\\_resourcesforhealth](http://www.fip.org/www/index.php?page=menu_resourcesforhealth)
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- <sup>3</sup> U.S. Department of Health and Human Services, Health Resources and Services Administration, *The Adequacy of Pharmacist Supply: 2004-2030*, December 2008, <ftp://ftp.hrsa.gov/bhpr/workforce/pharmacy.pdf>.
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- <sup>11</sup> American Pharmacists Association, “Getting Your License,” [http://www.pharmacist.com/AM/Template.cfm?Section=Career\\_Resources&Template=/CM/ContentDisplay.cfm&ContentID=11570](http://www.pharmacist.com/AM/Template.cfm?Section=Career_Resources&Template=/CM/ContentDisplay.cfm&ContentID=11570).
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