

# More Pharmacists Needed as Demands for Health Care Services Increase

Commentary on *A Progress Report on Hospital Need and Program Capacity for Five Key Health Care Occupations in Wisconsin*

by David A. Mott, PhD

The Wisconsin Hospital Association's (WHA) report on the shortage of health care workers in Wisconsin hospitals titled *Building a Health Care Workforce for Wisconsin's Future: A Progress Report on Hospital Need and Program Capacity for Five Key Health Care Occupations in Wisconsin* is an important document, as it reinforces the need to better understand and plan for major societal trends, primarily the aging of the population, that are impacting the demand for health care services and the health care workforce. Additionally, the report highlights problems hospitals are having in maintaining a health workforce that is sufficient in number to maintain a high level of quality in the health care services provided to patients. Pharmacists are an important component of the health care workforce and the report recommends that Wisconsin take action to increase the number of pharmacists in practice. The report also provides a chance to examine some of the important trends characterizing the current pharmacist workforce, to ask some important questions related to pharmacist workforce policy and to discuss strategies to better understand and deal with the pharmacist shortage.

## CURRENT DEMAND

The level of demand for pharmacists often is discussed in relation to factors that drive the demand for pharmacists. One such factor is the demand for prescription drugs. Between 1999 and 2005, the number of prescriptions dispensed from community pharmacies in the United States increased from 2.7 billion to 3.4 billion, an increase of 20%.<sup>1</sup> Although comparable data for Wisconsin are not available readily, it is reasonable to assume that the

demand for prescriptions has increased similarly in Wisconsin. Another factor associated with the demand for prescriptions is the aging of the population: older persons use more prescription drugs and account for more hospital days. According to the U.S. Census Bureau, in 2000 the population of persons age 65 and older in Wisconsin was 702,553 and is projected to increase to 1.3 million in 2030, an increase of 85%.<sup>2</sup>

The increasing use of technology and technical personnel in pharmacy practice are two factors hypothesized to decrease the level of demand for pharmacists mainly by performing technical duties traditionally performed by pharmacists. In hospital settings, technology has diffused rapidly, especially in large hospitals.<sup>3</sup> One impact of the diffusion of technology is the expansion of the role of pharmacists in hospitals.<sup>4</sup> Relatively little is known about the expansion of technology in community settings and its impact on demand. A national survey of pharmacists conducted in 2004 reported the prevalence of pharmacists using various types of technology in community settings, but research is needed in this area.<sup>5</sup>

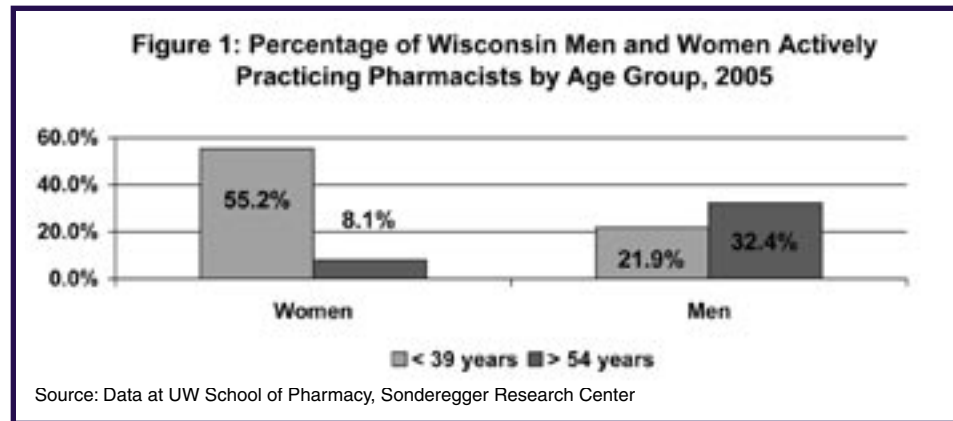
The number of pharmacy technicians employed in pharmacies across the United States increased from 196,430 in 1999

to 266,790 in 2005, a growth of 35.8%. In Wisconsin, the number of technicians employed in pharmacies increased from 4,960 in 1999 to 5,850 in 2005, a growth of 17.9%.<sup>6,7</sup> Across the United States, several modifications to pharmacy practice acts have been made to expand the use of pharmacy technicians. These approaches include changing technician-to-pharmacist ratios, technician licensing, technician registration, mandatory technician training requirements, certification and mandatory accredited technician training.

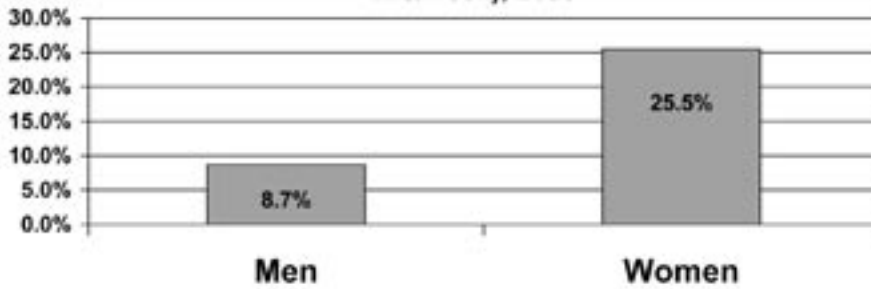
## CURRENT SUPPLY

The supply of pharmacists in Wisconsin is influenced by characteristics of the current workforce and the number of new pharmacists (i.e. pharmacy school graduates) entering the Wisconsin pharmacist workforce. In 2005, a total of 4,784 pharmacists were licensed in Wisconsin and reported a current address in Wisconsin. Survey data from 2005 maintained at the UW School of Pharmacy suggest that approximately 90% of the licensed pharmacists living in Wisconsin were actively practicing pharmacy (working as pharmacists). Also, survey data suggest that of the actively practicing pharmacists in 2005, 45.2% were women.

Pharmacist gender is an important



**Figure 2: Percentage of Wisconsin Men and Women Actively Practicing Pharmacists Working Part-time (<=30 hrs/week), 2005**



characteristic of the pharmacist workforce due to age differences between men and women pharmacists and differences in work status (i.e. full-time vs. part-time) between men and women pharmacists. In 2005, 32.4% of actively practicing male pharmacists were age 55 or older compared to 8.1% of female pharmacists (Figure 1). Conversely, 55.2% of actively practicing women pharmacists were less than age 39. In the next 10 years, the gender composition of the pharmacist workforce will change significantly, resulting in a majority of pharmacists being women. The graying of male pharmacists is an important characteristic of the pharmacist workforce as male pharmacists tend to work more hours than female pharmacists.

Figure 2 shows differences in the percentage of actively practicing pharmacists working part-time (≤30 hours per week) for men and women. Female pharmacists are more likely to work part-time relative to male pharmacists. In 2005, 26.8% of female pharmacists worked part-time compared to 15.4% of male pharmacists. Further, part-time work for female pharmacists is most common between the ages of 25 and 40. If trends in part-time work continue, an important question is whether the available supply of pharmacists (i.e. number of pharmacists) will supply the required hours to the labor market to meet the demand for pharmaceutical goods and services.

Regional location of pharmacists also is important to examine. Of particular interest is the distribution of pharmacists in urban and rural areas of Wisconsin. Since many employers in rural areas tend to be smaller and hire fewer pharmacists, a pharmacist vacancy tends to have much

more impact compared to larger settings in urban environments. Table 1 classifies Wisconsin counties using rural-urban continuum codes.<sup>8</sup> These codes have been used in physician workforce studies and distinguish metropolitan and non-metropolitan counties by population size and degree of urbanization and are useful for analyzing trends in non-metropolitan areas that include rural areas. For each county classification, the number of pharmacists and pharmacies per 10,000 county population and 2,000 county population age 65 and older are shown. The number of pharmacists per 10,000 population is an indicator of the relative distribution of pharmacists across county groups: county groups with lower values may be experiencing a higher level of unmet demand for pharmacists. Of the 4,784 licensed pharmacists in Wisconsin with addresses in Wisconsin, a total of 3,747 (78.3%) live in a metropolitan county.

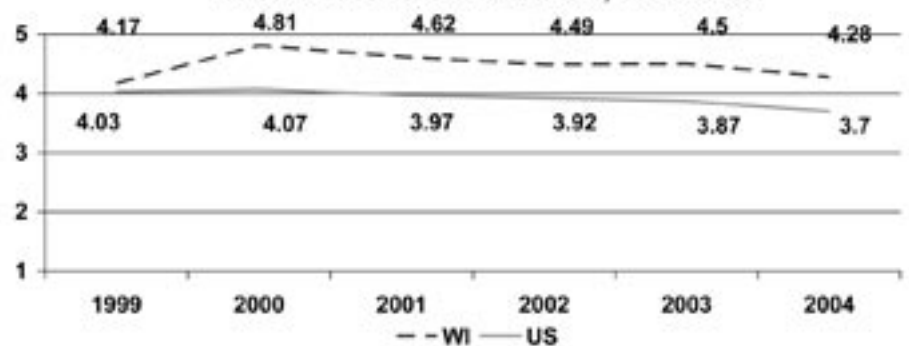
According to Table 1, 65% of Wisconsin counties are classified as non-metropolitan and 25% are completely rural.

The data in the table show that there are fewer pharmacists per 10,000 population in non-metropolitan counties as compared to metropolitan counties. The gap between non-metropolitan and metropolitan counties is larger when considering the number of pharmacists per 2,000 persons age 65 and older: 7.66 pharmacists per 2,000 persons age 65 and older in non-metropolitan counties compared to 13.52 pharmacists per 2,000 persons age 65 and older in metropolitan counties. Considering that persons age 65 and older are the highest users of health care, in general, and prescription drugs, the large difference in pharmacist supply between metropolitan and non-metropolitan areas suggests a relatively worse pharmacist workforce situation in non-metropolitan counties.

Unfortunately, we do not know what the appropriate values should be in Table 1. In other words, no study has benchmarked the number of pharmacists per 10,000 population or 2,000 population age 65 and older, suggesting appropriate ratios to meet the needs of metropolitan and non-metropolitan counties. With benchmarks, areas that are most in need of pharmacists could be targeted to expand pharmacist numbers.

The addition of pharmacists to the workforce depends on the number of graduates from schools of pharmacy. Nationally, the number of graduates entering the pharmacy workforce has increased due to expansion of existing schools and the creation of new schools of pharmacy. According to enrollment data from the American Association of Colleges of Pharmacy (AACCP), 11 new pharmacy schools

**Figure 3: Aggregate Demand Index (ADI) Values for Wisconsin and United States, 1999-2004**



Source: Dr. Katherine Knapp

**TABLE 1. PHARMACISTS AND PHARMACIES PER POPULATION BY URBAN-RURAL CONTINUUM CODE CATEGORY, 2005**

Rural-Urban Continuum Code and Description	# Wisconsin Counties	# Pharmacists per 10,000 population	# Pharmacies per 10,000 population	# Pharmacists per 2,000 population 65 or Older	# Pharmacists per 2,000 population 65 or Older
<b>METRO COUNTIES</b>					
1 - Counties in metro areas of 1 million population or more	7	9.81	2.08	17.08	3.68
2 - Counties in metro areas of 250,000 to 1 million population	7	7.65	2.25	13.07	3.55
3 - Counties in metro areas of fewer than 250,000 population	11	7.27	2.00	11.53	3.14
<b>TOTAL METRO COUNTIES</b>	<b>25</b>	<b>8.08</b>	<b>2.09</b>	<b>13.52</b>	<b>3.41</b>
<b>NON-METRO COUNTIES</b>					
4 - Urban population of 20,000 or more adjacent to a metro area	7	7.40	2.25	10.82	3.30
5 - Urban population of 20,000 or more not adjacent to a metro area	0	---	---	---	---
6 - Urban population of 2,500 to 19,999 adjacent to a metro area	19	6.92	2.61	8.54	3.22
7 - Urban population of 2,500 to 19,999 not adjacent to a metro area	3	8.13	3.52	9.23	4.08
8 - Completely rural or less than 2,500 urban population, adjacent to a metro area	12	3.95	1.96	4.79	2.44
9 - Completely rural or less than 2,500 urban population, not adjacent to a metro area	6	6.22	2.89	6.14	2.90
<b>TOTAL NON-METRO COUNTIES</b>	<b>47</b>	<b>6.23</b>	<b>2.49</b>	<b>7.66</b>	<b>3.04</b>
<b>TOTAL</b>	<b>72</b>	<b>6.87</b>	<b>2.35</b>	<b>9.69</b>	<b>3.17</b>

Counties in code category "1" include Kenosha, Milwaukee, Ozaukee, Pierce, Saint Croix, Waukesha, Washington.

Counties in code category "2" include Brown, Columbia, Dane, Douglas, Iowa, Kewaunee, Oconto.

Counties in code category "3" include Calumet, Chippewa, Eau Claire, Fond du Lac, La Crosse, Marathon, Outagamie, Racine, Rock, Sheboygan, Winnebago.

Counties in code category "4" include Dodge, Jefferson, Manitowoc, Portage, Sauk, Walworth, Wood.

Counties in code category "6" include, Barron, Door, Dunn, Grant, Green, Green Lake, Jackson, Langlade, Lincoln, Marinette, Monroe, Polk, Richland, Rusk, Shawano, Taylor, Vernon, Washburn, Waupaca.

Counties in code category "7" include Crawford, Juneau, Oneida.

Counties in code category "8" include Ashland, Adams, Bayfield, Buffalo, Burnett, Clark, Lafayette, Marquette, Menominee, Pepin, Trempealeau, Waushara.

Counties in code category "9" include Florence, Forest, Iron, Price, Sawyer, Vilas.

enrolled their first class of pharmacy students between 2000 and 2005.<sup>9</sup> One new school of pharmacy, Southern Illinois University, could be a source of new pharmacists for Wisconsin due to its proximity to Wisconsin.

Table 2 shows trends in enrollments in first-degree pharmacy programs between 2000 and 2005 for schools of pharmacy in Minnesota, Iowa, Wisconsin, Illinois, Indiana, Michigan and Ohio. Only data for regional states are shown, as graduates from these programs could be sources of new graduates for Wisconsin pharmacies due to their proximity. For all but three of the schools of pharmacy (Drake University, Purdue University and Wayne State University), enrollments increased between 2000 and 2005. The enrollment increase at the University of Minnesota was due to the establishment of the satellite campus at Duluth. Enrollment per 100,000 state population also increased in four of the six states. There is wide

variation among states in enrollment per 100,000 state population, suggesting certain states (i.e. Iowa and Indiana) may be better targets for attracting pharmacists to other states. Unfortunately, there is no information about the appropriate enrollment per population ratio in each state.

Table 3 contains information related to the location of first jobs for entry-level degree graduates from the UW School of Pharmacy for 2004 to 2006. Of those graduates who reported to the School of Pharmacy where their first job was located, 77% remained in Wisconsin. Of graduates staying in Wisconsin, 86% reported their first job was located in a metropolitan county of Wisconsin.

#### CURRENT UNMET DEMAND

Information related to the level of unmet demand (e.g. vacancy rates, time to hire pharmacists, degree of turnover) for pharmacists in Wisconsin generally is poor due to the lack of consistent, systematic meth-

ods to measure and obtain such information. National pharmacy organizations (e.g. ASHP and NACDS) have reported pharmacist vacancy rates in settings nationally (ASHP) and within regions of the state (NACDS).<sup>3,10</sup> Also, state-level organizations have provided information about pharmacist vacancy rates. In 2003 WHA reported that 2.6% of pharmacist positions in WHA member hospitals were vacant.<sup>11</sup>

Another method of measuring the level of unmet demand for pharmacists in Wisconsin is the Aggregate Demand Index (ADI).<sup>12</sup> The index is created by asking a panel of pharmacist employers to report monthly their rating of the adequacy of the number of pharmacists to meet the demand for pharmacist positions using a five-point scale (1 = supply exceeds demand, 2 = some excess of supply, 3 = balance, 4 = moderate difficulty in filling vacancies, 5 = difficulty in filling vacancies). Figure 3 shows trends in ADI be-

tween 1999 and 2004 for Wisconsin and the United States. The ADI for Wisconsin consistently was higher than that for the United States.

One limitation of data examining the level of unmet demand for pharmacists is that an assessment of the level of unmet demand in urban and rural areas cannot be determined and compared. A recent study conducted at the UW School of Pharmacy showed that among community pharmacies in non-metropolitan counties of Wisconsin participating in the study (n = 132), 33% reported a vacant pharmacist position.<sup>13</sup> When the results were extrapolated to all community pharmacies in non-metropolitan counties (n = 279), a total of 82 FTE pharmacist positions were vacant. An expansion of this project to the entire state and all practice settings is underway to compare, for example, metropolitan and non-metropolitan areas of the state in terms of unmet demand for pharmacists.

### IMPORTANT WORKFORCE QUESTIONS

#### *Expanding the supply of pharmacists*

The WHA report notes that Wisconsin needs to increase the number of pharmacists in the state. Data related to unmet demand for pharmacists in Wisconsin supports this conclusion. An important question is how to increase the number of pharmacists in Wisconsin.

One approach that WHA advocates is increasing the number of graduates from the UW Madison School of Pharmacy. However, after expanding class sizes to the current level of approximately 130 per class, the school is at capacity. One approach to expand beyond the current level is offering the curriculum via distance education. The feasibility of such an approach is being studied.

Another approach to increase the number of pharmacists in Wisconsin is to import pharmacists from neighboring states. As Table 2 shows, Iowa and Indiana appear to be states that produce high numbers of pharmacists relative to the state population. Perhaps pharmacist employers in Wisconsin can develop mechanisms to recruit graduates from pharmacy schools in these states. Such approaches will require time and resources for employers to travel to these sites to interview future pharmacists.

**TABLE 2. TRENDS IN MIDWEST PHARMACY SCHOOL ENROLLMENT AND ENROLLMENT PER POPULATION, 2000 AND 2005**

State	2000		2000 Enrollment in all Schools of Pharmacy per 1,000 Population	2005 Enrollment in all Schools of Pharmacy per 1,000 Population
	School(s) of Pharmacy	Enrollment		
<b>Wisconsin</b>			<b>8.4</b>	<b>9.4</b>
University of Wisconsin	450	522		
<b>Minnesota</b>			<b>7.9</b>	<b>11.4</b>
University of Minnesota	391	583		
<b>Iowa</b>			<b>36.8</b>	<b>31.4</b>
Drake University	661	503		
University of Iowa	417	428		
<b>Illinois</b>			<b>6.0</b>	<b>12.1</b>
Midwestern University	137	811		
Illinois-Chicago	603	650		
Southern Illinois University	---	82		
<b>Indiana</b>			<b>16.7</b>	<b>18.6</b>
Purdue University	713	639		
Butler University	301	525		
<b>Michigan</b>			<b>10.6</b>	<b>10.2</b>
Ferris State University	407	486		
Wayne State University	441	279		
University of Michigan	206	267		
<b>Ohio</b>			<b>14.1</b>	<b>19.0</b>
Ohio Northern University	795	1002		
Ohio State University	299	459		
University of Cincinnati	199	309		
University of Toledo	312	409		

**TABLE 3. LOCATION OF FIRST JOB FOR UNIVERSITY OF WISCONSIN SCHOOL OF PHARMACY PHARM D GRADUATES BY COUNTY CODE: 2004-2006**

Rural-Urban Continuum Code and Description	2004	2005	2006
<b>METRO COUNTIES</b>			
1. Counties in metro areas of 1 million population or more	27	24	25
2. Counties in metro areas of 250,000 to 1 million population	19	29	23
3. Counties in metro areas of fewer than 250,000 population	17	12	8
<b>TOTAL METRO COUNTIES</b>	63 (45.3%)	65 (55.6%)	56 (43.8%)
<b>NON-METRO COUNTIES</b>			
4. Urban population of 20,000 or more, adjacent to a metro area	7	4	4
5. Urban population of 20,000 or more, not adjacent to a metro area	---	---	---
6. Urban population of 2,500 to 19,999, adjacent to a metro area	7	3	2
7. Urban population of 2,500 to 19,999, not adjacent to a metro area	1	0	0
8. Completely rural or less than 2,500 urban population, adjacent to a metro area	0	1	0
9. Completely rural or less than 2,500 urban population, not adjacent to a metro area	0	0	0
<b>TOTAL NON-METRO COUNTIES</b>	15 (10.8%)	8 (6.8%)	6 (4.7%)
<b>TOTAL IN-STATE</b>	78 (56.1%)	73 (62.4%)	62 (48.5%)
<b>TOTAL OUT-OF-STATE</b>	19 (13.7%)	19 (16.2%)	26 (20.2%)
<b>TOTAL UNKNOWN</b>	42 (30.2%)	25 (21.4%)	40 (31.3%)
<b>TOTAL</b>	139	117	128

Note: Prior to the graduation ceremony students are asked the location of their first job after graduation. A majority of the out-of-state jobs are one or two-year residencies. Where students go after the residency is unknown.

Another approach would be the creation of an additional pharmacy school in Wisconsin. Such a strategy would be an obvious source of new supply to the state. However, several issues should be considered with this approach. First, subsequent to the shortage of pharmacists in the United States, there is a national shortage of qualified pharmacy faculty to teach in pharmacy schools. The UW pharmacy school has open faculty positions that are difficult to fill. Creating another pharmacy school will further limit each school's ability to attract scarce faculty resources. Second, there is no guarantee that graduates from a new pharmacy school will stay in Wisconsin to work or go to areas of the state that are most in need of pharmacists. Strategies to keep new graduates in the state will need to be developed.

#### *Solving problems with the distribution of pharmacists across Wisconsin*

Table 1 shows an unequal distribution of pharmacists across areas of the state. Specifically, there are fewer pharmacists per 10,000 population in non-metropolitan counties of the state compared to metropolitan counties. Reallocating existing pharmacist supply to specific regions of the state may be another approach to address the unmet demand for pharmacists. For example, data in Table 3 suggest that of the pharmacy graduates between 2004 and 2006, approximately 14% accepted their first job in a non-metropolitan county. Assuming 22% of actively practicing pharmacists live in non-metropolitan

counties, roughly 28 graduates annually would have to take their first job in non-metropolitan counties to match the proportion of all pharmacists in non-metropolitan areas.

A key factor in recruiting graduates to any area, however, is increasing graduate awareness about the benefits of practicing in the area or practice setting and increasing awareness early in pharmacy school. One potential approach is to have a setting be an experiential clerkship site for students. Data from the school of pharmacy show that, overall, 13% of licensed pharmacies in Wisconsin have clerkship sites for students. Further, 16% and 6% of licensed pharmacies in metropolitan and non-metropolitan counties, respectively, have clerkship sites. There are however, several issues that should be considered when establishing a clerkship site such as student travel, student housing, pharmacy staffing to allow time for student-preceptor interaction, preceptor training, and linking preceptors.

#### *Monitoring the workforce situation*

Although the WHA workforce report suggests specific issues related to the adequacy of pharmacist supply in Wisconsin, it also stresses that health care providers, professional organizations, and policymakers need to continually monitor the health workforce situation. For pharmacy, this means a systematic, continuous approach to assess supply and demand trends to better understand how the supply of pharmacists is being impacted by societal trends. It seems important to increase dialogue between important pharmacy stakeholders to determine relevant issues and questions, what information is needed to answer issues and questions, and how to obtain information; design and implement mechanisms to collect information; and share information with stakeholders. Questions/issues that seem relevant include identifying areas of the state that are most in need of pharmacists, developing mechanisms to predict the level of need for pharmacists in the state, determining how pharmacists and patients are impacted by the shortage of pharmacists, understanding pharmacists' motivations for work decisions, evaluating how technology impacts the work pharmacists perform and developing mechanisms that

employers can use to connect with pharmacy students. This is by no means an exhaustive list, and I welcome your input.

Importantly, a dialogue has been started by a group of pharmacy stakeholders representing professional organizations, practice sites, the Pharmacy Examining Board (PEB) and the UW School of Pharmacy. The group met March 6, 2007 to begin to address some of the issues and questions that are important to the pharmacy workforce.

#### **CONCLUSION**

The WHA workforce report identified some key issues related to the pharmacy workforce. The report has generated dialogue among key stakeholders that hopefully will translate into actions that will help begin to solve some of the workforce issues in the state. ●

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#### **REFERENCES**

1. National Association of Chain Drug Stores Foundation. "Prescriptions by Type of Store, 1995-2005". The Chain Drug Industry Profile 2006. National Association of Chain Drug Stores Foundation: Alexandria, VA, 2006.
2. US Census Bureau, Population Division, Interim State Population Projections, 2005, <http://www.census.gov/population/projections/PressTab4.xls>, accessed February 12, 2007.
3. Pedersen CA, Schneider PJ, Scheckelhoff DJ. "ASHP National Survey of Pharmacy Practice in Hospital Settings: Dispensing and Administration - 2005." *Am J Health-Syst Pharm* 2006; 63:327-345.
4. Pedersen CA, Schneider PJ, Scheckelhoff DJ. "ASHP National Survey of Pharmacy Practice in Hospital Settings: Monitoring and Patient Education - 2003." *Am J Health-Syst Pharm* 2004; 61:457-471.
5. Kreling DH, Doucette WR, Mott DA, et al. "Community Pharmacists Work Environments: Evidence from the 2004 National Pharmacists Workforce Survey". *J Am Pharm Assoc* 2006; 46:e23-e31.
6. 1999 Occupational Employment and Wage Estimates, Pharmacy Technicians, <http://www.bls.gov/oes/1999/oes292052.htm>, accessed February 12, 2007.
7. Occupational Employment and Wages, May 2005, Pharmacy Technicians, <http://www.bls.gov/oes/current/oes292052.htm>, Accessed February 12, 2007.
8. Measuring Rurality: Rural-Urban Continuum Codes, <http://www.ers.usda.gov/Briefing/Rurality/RuralUrbCon/>, accessed February 12, 2007.
9. First Professional Degree Enrollments 1990-2005, <http://www.aacp.org/IDV/Enrollment/FPD05/FPDegeenroll05.htm>, accessed February 12, 2007.
10. NACDS July 2006 Chain Pharmacy Employment Survey Results, <http://www.nacds.org/user-assets/pdfs/2006/2006JulSummary.doc>, accessed February 12, 2007.
11. Hospital Workforce Report, [http://www.wha.org/workforce/pdf/2004workforce\\_report.pdf](http://www.wha.org/workforce/pdf/2004workforce_report.pdf), accessed February 12, 2007.
12. Aggregate Demand Index, <http://www.pharmacymapower.com/index.html>, accessed February 12, 2007.
13. Gadkari A. "The Unmet Demand For Pharmacists: Exploring Associated Factors in Non-Metropolitan Community Pharmacies of Wisconsin." Unpublished Master's Thesis, University of Wisconsin, School of Pharmacy, 2006.

## **\*WANTED\***

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