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Working Paper #100

**Retail Pharmacies in
Washington State:
Results of 2003 Workforce Survey**

December 2004

by

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This study was performed by the WWAMI Center for Health Workforce Studies (CHWS) and researchers in the University of Washington Departments of Geography and Neurological Surgery and Anesthesiology. The WWAMI CHWS efforts were supported by the National Center for Health Workforce Analysis (NCHWA), Bureau of Health Professions (BHP), Health Resources and Services Administration (HRSA), through grant #1 U79 HP 00007-0—a Congressional appropriation to CHWS for collection and analysis of health workforce data in Washington State.



ABOUT THE WORKFORCE CENTER

The WWAMI Center for Health Workforce Studies at the University of Washington Department of Family Medicine is one of six regional centers funded by the National Center for Health Workforce Analysis (NCHWA) of the federal Bureau of Health Professions (BHP), Health Resources and Services Administration (HRSA). Major goals are to conduct high-quality health workforce research in collaboration with the BHP and state agencies in Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI); to provide methodological expertise to local, state, regional, and national policy makers; to build an accessible knowledge base on workforce methodology, issues, and findings; and to provide wide dissemination of project results in easily understood and practical form to facilitate appropriate state and federal workforce policies.

The Center brings together researchers from medicine, nursing, dentistry, public health, the allied health professions, pharmacy, and social work to perform applied research on the distribution, supply, and requirements of health care providers, with emphasis on state workforce issues in underserved rural and urban areas of the WWAMI region. Workforce issues related to provider and patient diversity, provider clinical care and competence, and the cost and effectiveness of practice in the rapidly changing managed care environment are emphasized.

The WWAMI Rural Health and Health Workforce Research Center Working Paper Series is a means of distributing prepublication articles and other working papers to colleagues in the field. Your comments on these papers are welcome and should be addressed directly to the authors. Questions about the WWAMI Center for Health Workforce Studies should be addressed to:

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Retail Pharmacies in Washington State: Results of 2003 Workforce Survey

ABSTRACT

BACKGROUND

The nation's supply of pharmacists has not met demand in recent years. In Washington State data have been available on demand for pharmacists in hospitals since 2001, but few data were available about nonhospital pharmacist demand. For this study, researchers surveyed retail pharmacies in Washington to estimate the demand for pharmacists, as well as pharmacy technicians and administrative/clerical staff, and to describe the impact of implementation of the Health Insurance Portability and Accountability Act (HIPAA) on retail pharmacies.

METHODS

The study employed a mail survey of 1,349 retail pharmacies during the summer of 2003. The questionnaire included questions about staff employment, vacancies, and about the impact of HIPAA implementation.

MAJOR FINDINGS

Washington's retail pharmacies report that pharmacists are much more difficult to recruit than are pharmacy technicians and administrative/clerical staff. Statewide an estimated 3,332 pharmacists are employed in the retail sector, and to fill vacancies an additional 350 pharmacists are estimated to be needed. While the pharmacist vacancy rate among retail pharmacies statewide is 8.3 percent, it is much higher in rural areas than in urban areas (14.8% vs. 6.6%). The financial impacts of complying with HIPAA most commonly cited among the pharmacies are training staff in HIPAA compliance (78%), change in staff commitments or cost (75%), and increased personnel time devoted to compliance (66%).

POLICY IMPLICATIONS

Combining the results of this survey with the estimates from a survey of pharmacist vacancies in the state's hospitals, 403 pharmacists were needed statewide for retail and hospital pharmacies in 2003-2004. Pharmacy schools in Washington graduated 180 pharmacists in 2003—not enough to fill all of the vacancies across the state.

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BACKGROUND

The nation's supply of pharmacists has not met demand in recent years. Factors contributing to an expanded need for pharmacists include greater use of prescription medications, market growth and competition among retail pharmacies, expanded professional roles of pharmacists, and more health care providers being authorized to prescribe medications, at the same time the number of pharmacists in the country has not increased (Department of Health and Human Services, 2000). In Washington State, surveys of acute care hospitals found more than half of all acute care hospitals have reported licensed pharmacists to be "very difficult" to recruit since 2001. Vacancy rates reached 8.4 percent in 2002, with an estimated 111 licensed pharmacists needed to fill the state's hospital vacancies (Skillman et al., 2004; Skillman et al., 2003; Skillman et al., 2002).

A recent report projecting pharmacist supply and demand in Washington through 2020 found profoundly different results depending on the data and assumptions used in the model to project pharmacist supply (Patterson et al., 2004). Simply projecting the 1999 to 2004 increase in state pharmacist licenses resulted in pharmacist supply exceeding demand (pharmacist oversupply) around 2008. But the second model that took into account new graduates from in-state programs in the supply estimates, and estimated retirements based on the age of current licensed pharmacists, found that the pharmacist shortage in Washington will steadily increase over the next decade and a half. Both of these scenarios oversimplify the problem, and the report makes the case that additional data are needed to accurately project the future supply of, and demand for, licensed pharmacists in Washington.

To complement the data on Washington's hospital pharmacist workforce, researchers at the University of Washington Center for Health Workforce Studies (CHWS) sought information on the workforce of retail

pharmacies in the state. In 2003, the CHWS collaborated with researchers from the University's Department of Neurological Surgery and Anesthesiology, and its Department of Geography, on a survey of retail pharmacies, with the dual purpose of learning more about their workforce, and the availability of pain medications. Results of the workforce questions are reported here.

METHODS

This mail survey of retail pharmacies in Washington State was conducted from July through October, 2003. A mailing list of 1,349 retail pharmacies was obtained from the Washington State Pharmacy Association, and a one-page (two-sided) questionnaire (see Appendix A) was mailed to each pharmacy. The workforce questions asked for number of employees, FTEs employed, and FTEs vacant for licensed pharmacists, pharmacy technicians and administrative/clerical staff. Respondents also were asked to rate the difficulty of recruiting each occupation type, and what types of staffing changes they had made in response to implementation of the Health Insurance Portability and Accountability Act (HIPAA), which mandates procedures to protect patient confidentiality.

The questionnaire was sent to pharmacies on the mailing list as many as three times. The first two mailings included a cover letter on University of Washington School of Medicine stationery signed by the lead investigators. The third mailing's cover letter was on the University's Center for Health Workforce Studies stationery. The mailings included a letter of support from the Washington State Pharmacy Association.

After three mailings, nonresponding pharmacies were telephoned or sought on the World Wide Web to try to determine if they were, in fact, retail pharmacies. Pharmacies determined to no longer be in business or for whom the address was not functional (an unopened letter was returned by the post office), as well as respondents who gave out-of-state addresses, were dropped from the study.

Systematic data cleaning and analyses used SPSS Statistical Software v. 11.0. Statistical significance was assessed using a standard chi-square test.

RURAL AND WORKFORCE DEVELOPMENT AREAS

Many analyses of the data were conducted at the workforce development area (WDA) level. Washington State is divided into 12 WDAs that receive federal (e.g., Workforce Investment Act funding) and state funding for workforce planning.

Each WDA is composed of one or more counties (see Figure 1).

Pharmacies were classified using ZIP codes as rural or urban based on the Rural-Urban Commuting Area (RUCA) classification system (Morrill et al., 1999). RUCAs are a sub-county taxonomic system that classifies areas, using Census tracts or ZIP codes, into 30 separate codes that can be aggregated into urban and subcategories of rural areas based on the sizes of cities and towns and functional relationships as measured by work commuting patterns.

ESTIMATING VALUES FOR NONRESPONDENTS

To estimate the total number of employed staff and full-time equivalents (FTEs), and the number of vacancies in the state and within WDAs, the mean value obtained from pharmacy respondents was applied to each of the nonrespondents. Because response rates were low to these questions for pharmacy technicians and administrative/clerical staff, estimates were calculated only for employment and vacancy rates of pharmacists.

ESTIMATING NUMBER OF EMPLOYEES NEEDED TO FILL FTE VACANCIES

The questionnaire asked for the number of vacant FTEs (being actively recruited) for each occupation type. In order to estimate the number of persons needed to fill the vacant FTEs, a persons-per-FTE rate was calculated. Only the question about pharmacist FTEs received a sufficient number of responses to carry out this estimation. The number of pharmacists employed was divided by the number of pharmacist FTEs employed, using data from pharmacies that provided responses to both questions. This rate was then multiplied by the total estimated vacant pharmacist FTEs to estimate the number of employees needed to fill the FTE vacancies.

CALCULATING VACANCY RATES

Vacancy rates for pharmacists (the only occupation receiving sufficient responses to allow the analysis) were calculated by summing all vacant FTEs reported for the region being examined and dividing that number by the sum of the total reported employed FTEs plus vacant FTEs, for each pharmacy that provided data on both employed and vacant FTEs.

Figure 1: Workforce Development Areas in Washington State



RESULTS

RESPONSE RATES

From the starting list of 1,349, 304 entries were determined to not be valid Washington State retail pharmacies, leaving 1,045 pharmacies of which 630 responded to the survey. The survey response rate was 60.3 percent, with 56.6 percent of urban pharmacies and 75.6 percent of rural pharmacies responding (see Table 1).

The response rate by WDA is shown in Table 2.

Of the total respondents, 96.7 percent (609) of the pharmacies provided sufficient workforce data that at least one of the variables in the questionnaire could be analyzed.

RECRUITMENT DIFFICULTY

Figure 2 shows the response to the question “How difficult is current recruitment?” for pharmacists, pharmacy technicians, and administrative/

clerical staff. Pharmacists were reported “somewhat” or “very” difficult to recruit by 89.2 percent of respondents, compared with 22.7 percent for pharmacy technicians and 29.6 percent for administrative/clerical staff.

Difficulty recruiting in urban versus rural areas for each of the three occupation types is shown in Figures 3, 4, and 5. Pharmacies in rural areas more often reported difficulty with staff recruitment than did those in urban areas, and the difficulty recruiting pharmacists was perceived to be much greater than for the other occupations: 96.4 percent of rural pharmacies reported recruitment “somewhat” or “very” difficult

Table 1: Retail Pharmacy Survey Responses by Statewide, Rural, and Urban

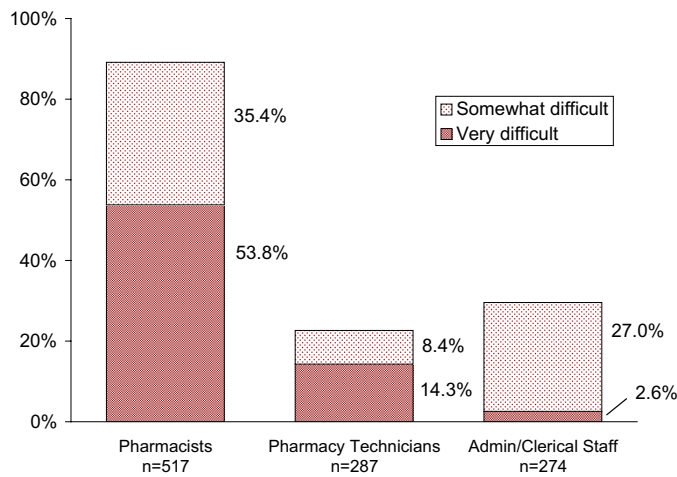
	Statewide	Rural	Urban
Number of in-scope pharmacies	1,045	201	844
Number of respondents	630	152	478
Response rate	60.3%	75.6%	56.6%

Table 2: Retail Pharmacy Survey Responses by Workforce Development Area

	Workforce Development Area*											
	1	2	3	4	5	6	7	8	9	10	11	12
Number of in-scope pharmacies	56	77	60	103	304	102	72	49	56	37	28	101
Number of respondents	39	49	38	54	162	58	38	35	41	33	11	72
Response rate	69.6%	63.6%	63.3%	52.4%	53.3%	56.9%	52.8%	71.4%	73.2%	89.2%	39.3%	71.3%

- * 1. Olympic Peninsula (Clallam, Jefferson, Kitsap Counties).
 2. Pacific Mountain (Grays Harbor, Lewis, Mason, Pacific, Thurston Counties).
 3. Northwest (Island, San Juan, Skagit, Whatcom Counties).
 4. Snohomish County.
 5. Seattle/King County.
 6. Tacoma/Pierce County.
 7. Southwest (Clark, Cowlitz, Skamania, Wahkiakum Counties).
 8. N. Central (Adams, Chelan, Douglas, Grant, Okanogan Counties).
 9. Central (Kittitas, Klickitat, Yakima Counties).
 10. Eastern (Asotin, Columbia, Ferry, Garfield, Lincoln, Pend Oreille, Stevens, Walla Walla, Whitman Counties).
 11. Benton, Franklin Counties.
 12. Spokane County.

Figure 2: Difficulty Recruiting* Pharmacists, Pharmacy Technicians, and Administrative/Clerical Staff in Washington’s Retail Pharmacies



* Among retail pharmacies that have recently recruited.

for pharmacists compared with 64.9 percent for pharmacy technicians and 35.6 percent for administrative/clerical staff.

The reported difficulty recruiting pharmacists by WDA is shown in Figure 6. There was regional variability in the percentage of pharmacies indicating that recruiting pharmacists was “very” difficult, but most of this variation is related to the greater reported difficulty recruiting pharmacists in rural areas. More than half (and as many as 86%) of the pharmacies in regions 1, 2, 3, 6, 8, 9, 10, and 11 responded that recruiting pharmacists was “very” difficult. Fewer than 50 percent of pharmacies in WDAs 4, 5, 7, and 12 reported recruiting pharmacists to be “very” difficult, but those areas are the most urban areas of the state:

WDA 4 (Tacoma/Pierce County), WDA 5 (Seattle/King County), WDA 7 (Southwest—which includes Vancouver and is near Portland, Oregon), and WDA 12 (Spokane/Spokane County).

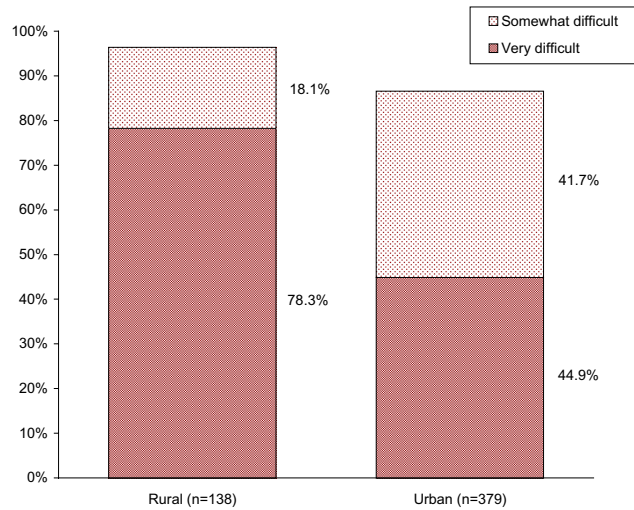
EMPLOYMENT AND VACANCY RATES FOR PHARMACISTS

The questionnaire asked each retail pharmacy to report the number of pharmacists employed, pharmacist FTEs employed, and FTEs vacant. Using the reported numbers, we estimated total pharmacist employment and vacancies in the state. This involved imputing values for nonresponding pharmacies. Because of relatively low response rates to the questions about FTEs employed and FTEs vacant, the number of imputed values exceeds the reported number of values, and should be viewed with caution. The results are shown in

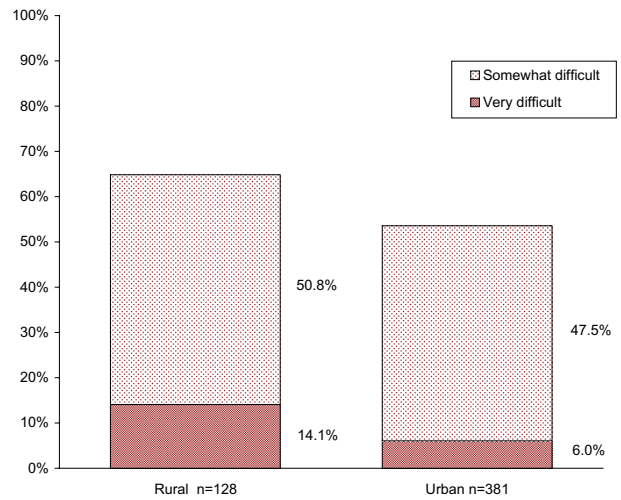
Figure 7, and rural-urban breakdowns are shown in Table 3. Statewide, there are an estimated 3,332 pharmacists employed, filling 2,693 FTE positions, and 259 FTEs are needed to fill vacancies in retail pharmacies. Using the ratio of reported number of individuals employed to number of FTEs employed (1.35), an estimated 350 pharmacists are needed to fill the 259 vacant FTE positions. Table 4 shows the estimated number of pharmacists employed, FTEs employed, and FTEs vacant, by WDA.

From the results of this survey, we calculated that the statewide vacancy rate for pharmacists in retail pharmacies is 8.3 percent. The vacancy rate in rural

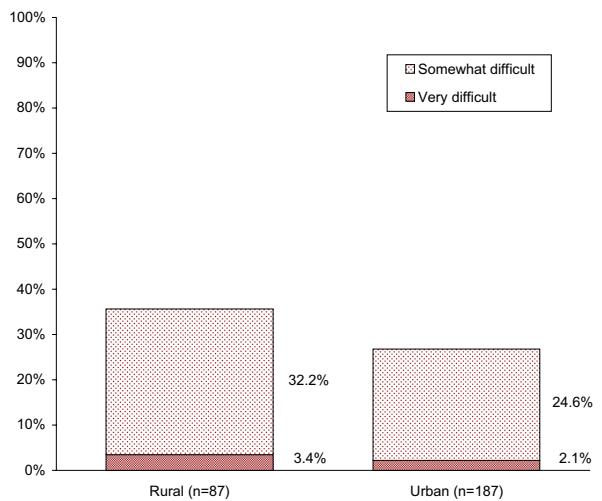
**Figure 3:
Difficulty Recruiting*
Pharmacists in Urban
and Rural Retail
Pharmacies in
Washington**



**Figure 4:
Difficulty Recruiting*
Pharmacy Technicians in
Urban and Rural Retail
Pharmacies in
Washington**

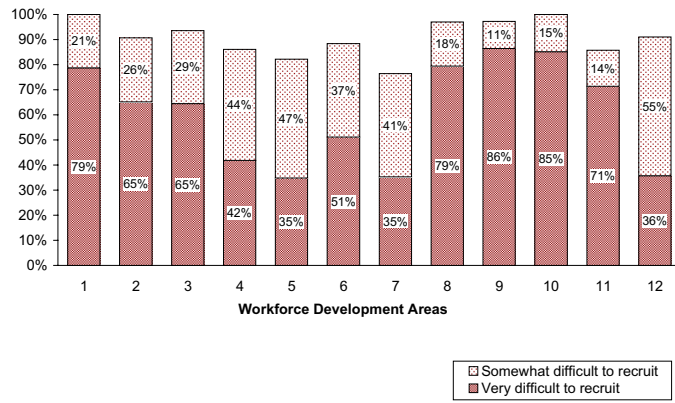


**Figure 5:
Difficulty Recruiting*
Administrative/Clerical
Staff in Urban and Rural
Retail Pharmacies in
Washington**



* Among retail pharmacies that have recently recruited.

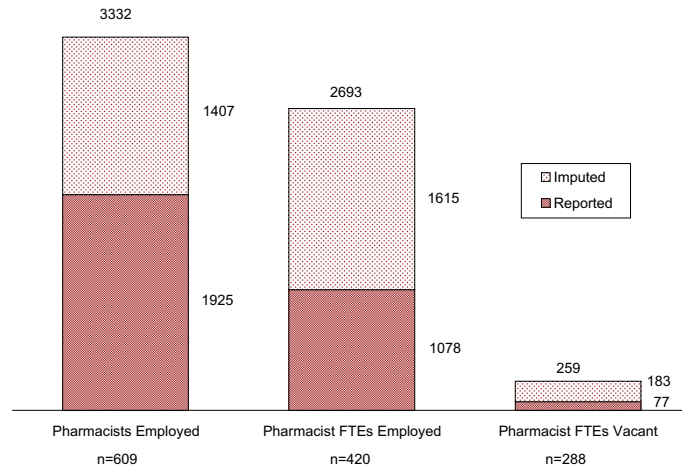
**Figure 6:
Difficulty Recruiting*
Pharmacists, by
Washington Workforce
Development Area†**



* Among retail pharmacies that have recently recruited.

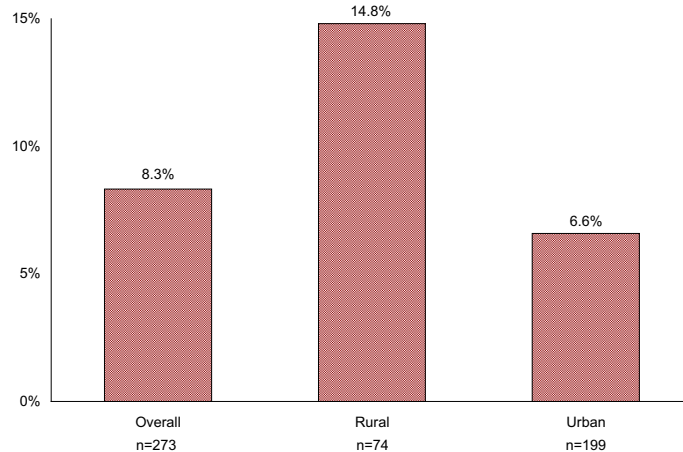
- † 1. Olympic Peninsula (Clallam, Jefferson, Kitsap Counties).
- 2. Pacific Mountain (Grays Harbor, Lewis, Mason, Pacific, Thurston Counties).
- 3. Northwest (Island, San Juan, Skagit, Whatcom Counties).
- 4. Snohomish County.
- 5. Seattle/King County.
- 6. Tacoma/Pierce County.
- 7. Southwest (Clark, Cowlitz, Skamania, Wahkiakum Counties).
- 8. N. Central (Adams, Chelan, Douglas, Grant, Okanogan Counties).
- 9. Central (Kittitas, Klickitat, Yakima Counties).
- 10. Eastern (Asotin, Columbia, Ferry, Garfield, Lincoln, Pend Oreille, Stevens, Walla Walla, Whitman Counties).
- 11. Benton, Franklin Counties.
- 12. Spokane County.

**Figure 7:
Estimated* Number of
Retail Pharmacists and
Pharmacist FTEs
Employed, and FTEs
Vacant in Washington**



* Number reported plus number imputed.

**Figure 8:
Estimated Pharmacist
FTE Vacancy Rates* in
Washington's Retail
Pharmacies**



* Calculated using data from respondents providing responses for both "FTEs employed" and "FTEs vacant."

retail pharmacies is 14.8 percent compared with 6.6 percent in urban pharmacies, as shown in Figure 8.

STAFFING CHANGES IN RESPONSE TO HIPAA

Most providers of health care-related services in the United States must comply with the federal Health Insurance Portability and Accountability Act (HIPAA) of 1996, implemented in 2003 and 2004. Washington's retail pharmacies were asked in this survey about activities related to HIPAA implementation that had financial impact on their business. As shown in Figure 9, the financial impacts of complying with HIPAA most commonly cited by Washington pharmacy respondents were "training staff in HIPAA compliance" (78%), "change in staff commitments or cost" (75%), and "increased personnel time devoted to compliance" (66%). Across all measures of HIPAA compliance, with the exception of "hired new personnel," rural respondents indicated financial impact more often than did urban respondents (chi square $p < 0.02$).

Table 3: Estimated* Number of Retail Pharmacists Employed, FTEs Employed, and FTEs Vacant by Rural and Urban Areas of Washington

	Rural	Urban
Employed		
Number of pharmacies responding	n=149	n=460
Reported	377	1,547
Imputed	132	1,275
Total estimated pharmacists employed	509	2,822
FTEs employed		
Number of pharmacies responding	n=103	n=317
Reported	211	867
Imputed	200	1,414
Total estimated pharmacist FTEs employed	411	2,281
FTEs vacant		
Number of pharmacies responding	n=80	n=208
Reported	31	46
Imputed	46	137
Total estimated pharmacist FTEs vacant	77	183

* Number reported plus imputed.

DISCUSSION

This survey found that pharmacists are difficult to recruit to work in retail pharmacies in most areas of Washington State. There is a pharmacist shortage in rural areas, with nearly 15 percent of retail positions vacant. There appears to be adequate supply of pharmacy technicians and administrative/clerical staff to fill positions in retail pharmacies across the state.

While the estimates of pharmacist vacancies derived from this survey should be used cautiously because of the somewhat low response rate to some survey

Table 4: Estimated* Number of Retail Pharmacists Employed, FTEs Employed, and FTEs Vacant by Workforce Development Area

	Workforce Development Area†											
	1	2	3	4	5	6	7	8	9	10	11	12
Employed	175	224	173	283	1,001	272	385	119	186	94	84	321
FTEs employed	145	191	133	240	795	255	364	114	98	64	45	265
FTEs vacant	20	13	17	11	78	20	13	18	33	13	11	19

* Number reported plus imputed.

† 1. Olympic Peninsula (Clallam, Jefferson, Kitsap Counties).

2. Pacific Mountain (Grays Harbor, Lewis, Mason, Pacific, Thurston Counties).

3. Northwest (Island, San Juan, Skagit, Whatcom Counties).

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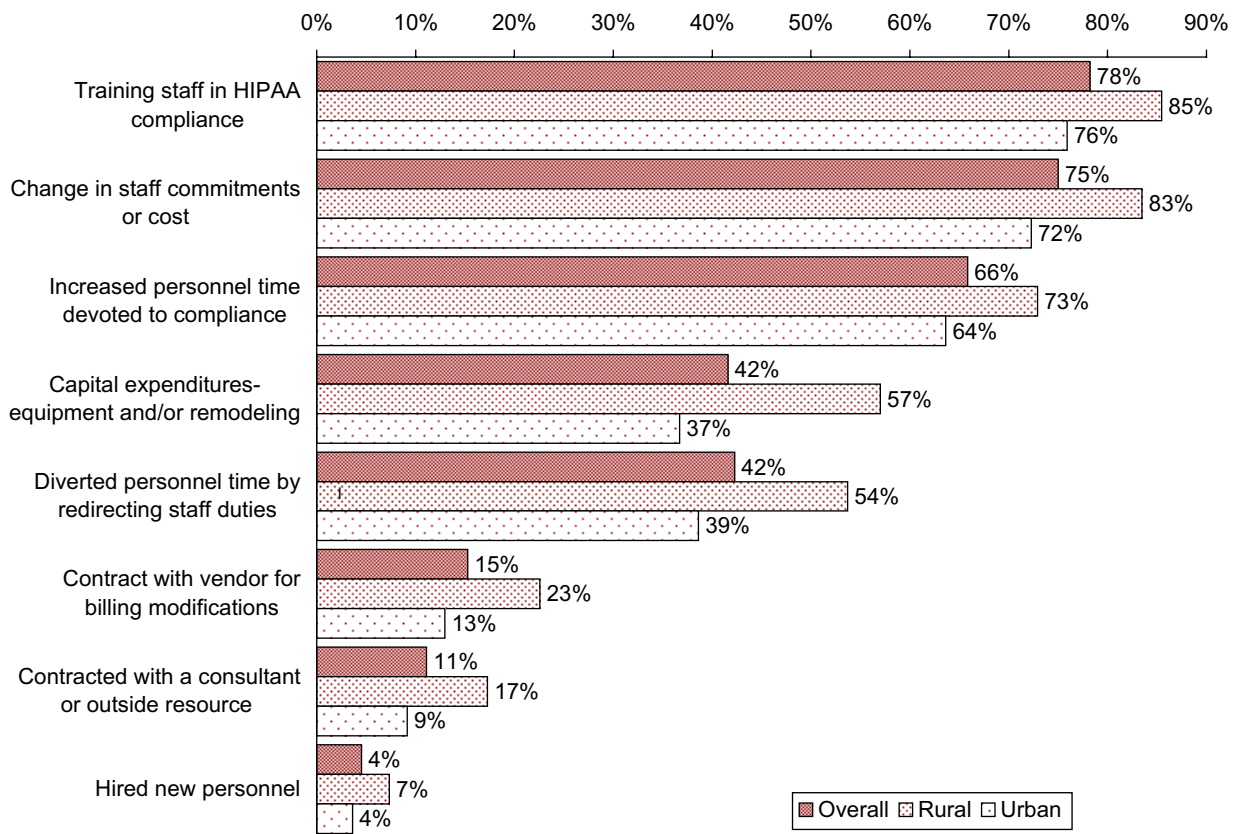
9. Central (Kittitas, Klickitat, Yakima Counties).

10. Eastern (Asotin, Columbia, Ferry, Garfield, Lincoln, Pend Oreille, Stevens, Walla Walla, Whitman Counties).

11. Benton, Franklin Counties.

12. Spokane County.

Figure 9: Financial Impacts of Complying with HIPAA for Washington's Retail Pharmacies



Number of respondents: 623 (151 rural and 472 urban)

questions, the results were relatively consistent among the rural and among the urban areas of the state. This consistency strengthens the evidence that the results are reasonably representative of the state's retail pharmacies.

This study estimated a need in late 2003 for 350 pharmacists to fill the 259 FTE vacancies in the state's retail sector. A 2004 survey of acute care hospitals in Washington estimated that 53 pharmacists were needed to fill vacancies in those facilities (Skillman et al., 2004). Combined, the estimates from these two surveys show need for 403 pharmacists statewide in 2003-2004. This number is likely to be an underestimate of demand, because these two surveys do not capture pharmacist vacancies in federal and specialty hospitals, educational settings, and pharmacies in institutions that do not have a retail function (such as long-term care facilities).

New graduates and migrants into the state are the two main sources of workers to fill pharmacist vacancies.

In 2003, pharmacy education programs in Washington graduated 180 students (Patterson & Skillman, 2004), fewer than would be required to fill statewide vacancies if new in-state graduates were the only source of pharmacist supply (the 180 graduates could fill at most 45% of the statewide vacancies) and there were no attrition of currently-practicing pharmacists (e.g., retirement, death, and migration). No data are available to estimate the number of pharmacists entering the state to fill vacant positions. Planners and policy makers should consider whether Washington can continue to attract pharmacists into the state from other states that may be facing growing shortages, and whether students trained in this state are likely to stay here to work. Research to track where current licensees were educated, as well as where pharmacists who are educated in Washington work, would help improve the accuracy of future projections of the licensed pharmacist workforce in Washington.

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APPENDIX A: QUESTIONNAIRE

Pharmacy Survey

Instructions

This survey will help to better understand some of the issues affecting pharmacies in Washington, including access to medications, and pharmacy workforce shortages. Please answer the following questions to the best of your ability. If you have any questions, please feel free to contact Dr. Jonathan Mayer (206-543-7110) or Dr. John Loeser (206-543-3570).

A. Pharmacy Characteristics

The questions in this section will help us understand the size and complexity of your pharmacy.

- 1) What is the floor space of your store? (including all retail and storage space) _____ square feet
- 2) Does your store carry goods other than health-related items (such as food, magazines, etc.)? Yes No
- 3) What is the ZIP code of your pharmacy? _____

B. Pain Medication Availability

Please answer the following questions about the medications as they relate to your retail pharmacy.

Medication (any strength)	Is this medication regularly available for patients with prescriptions?		If no, how long does it take to acquire this medication for a patient?
	Yes	No	
1) Hydrocodone/APAP	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
2) Oxycodone/APAP	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
3) Oxycodone	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
4) Oxycodone, sustained release (OxyContin)	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
5) Oral morphine, immediate release	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
6) Oral morphine, sustained release (MS-Contin)	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
7) Fentanyl patches (Duragesic)	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
8) Hydromorphone (Dilaudid)	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
9) Methadone	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
10) Meperidine (Demerol)	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
11) Tramadol (Ultram)	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
12) Codeine	<input type="checkbox"/>	<input type="checkbox"/>	_____ days
13) Acetaminophen with codeine	<input type="checkbox"/>	<input type="checkbox"/>	_____ days

Please turn the page to continue ⇨

C. Pharmacy Staffing Levels

Please answer the following questions about current staffing to support your pharmacy services.

Staff Employed to Support Pharmacy Services	Not Applicable: we do not employ job category	# <u>Persons</u> currently employed	# <u>FTEs</u> currently employed	# <u>FTEs</u> Vacant for which you are currently recruiting
1) Licensed Pharmacists	<input type="checkbox"/>			
2) Pharmacy Technicians	<input type="checkbox"/>			
3) Administrative/Clerical Staff	<input type="checkbox"/>			
4) Other (specify _____)	<input type="checkbox"/>			

D. Staff Recruitment

Pharmacy Staff Recruitment	How difficult is current recruitment?				
	Not Difficult	Somewhat Difficult	Very Difficult	Not Applicable: we do not employ job category	Not Applicable: we have not recently recruited
1) Licensed Pharmacists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Pharmacy Technicians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Administrative/Clerical Staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Other (specify _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E. Staffing Changes in Response to HIPAA

What has been the financial impact of complying with HIPAA (Health Insurance Portability and Accountability Act) regulations? (check all that apply)

- 1) No change in staff commitments or cost
- 2) Increased personnel time devoted to compliance
- 3) Hired new personnel
- 4) Diverted personnel time by redirecting staff duties
- 5) Contracted with a consultant or outside resource
- 6) Capital expenditures—equipment and/or remodeling
- 7) Contract with vendor for billing modifications
- 8) Training staff in HIPAA compliance
- 9) Other: _____)

THANK YOU! Please return this questionnaire in the enclosed postage paid envelope.

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Larson, E. H., Palazzo, L., Berkowitz, B., Pirani, M. J., Hart, L. G. (2003). The contribution of nurse practitioners and physician assistants to generalist care in Washington State. *Health Services Research*, 38(4), 1033-1050.

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Baldwin, L.-M., Fay, M. M., Larson, E. H., Lishner, D. M., Mauksch, L. B., Katon, W. J., Walker, E., Hart, L. G. (2003). *Modeling the mental health workforce in Washington State: using state licensing data to examine provider supply in rural and urban areas*. Working Paper #80. Seattle, WA: WWAMI Center for Health Workforce Studies, University of Washington.

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Skillman, S. M., Hutson, T., Andrilla, C. H. A., Berkowitz, B., Hart, L. G. (2002). *How are Washington State hospitals affected by the nursing shortage? Results of a 2001 survey*. Working Paper #68. Seattle, WA: WWAMI Center for Health Workforce Studies, University of Washington.

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