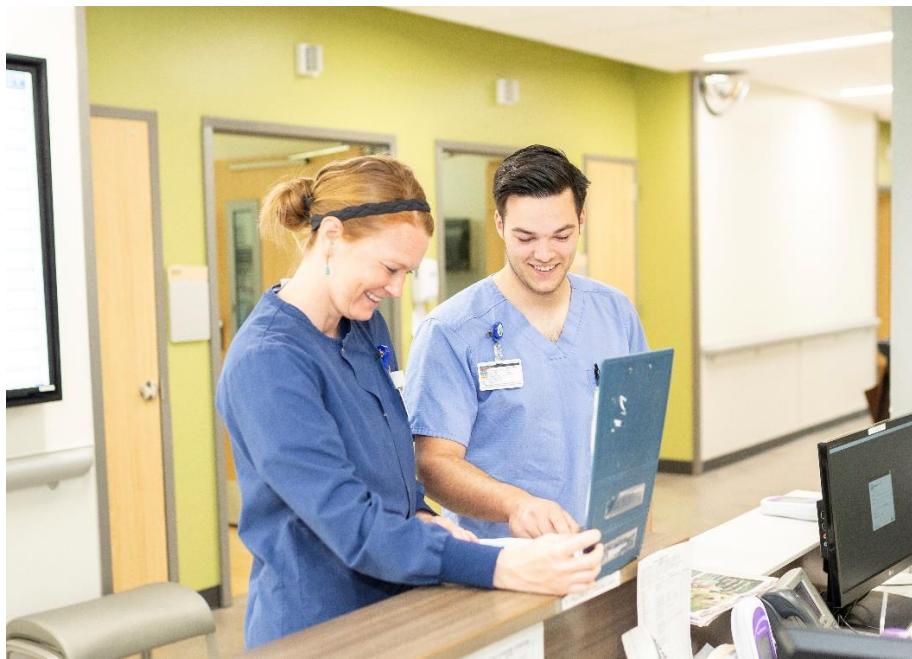


The Post-COVID Outlook for Idaho Health Care Workers



Fall 2022

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DEPARTMENT OF LABOR
BRAD LITTLE, GOVERNOR
JANI REVIER, DIRECTOR

The Post-COVID Outlook for Idaho Health Care Workers

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Matthew Warnick
Administrator

Georgia Smith
Communications and Research Bureau Chief

Report prepared by
Matthew Paskash, Labor Economist

Acknowledgements
Craig Shaul, Research Analyst Supervisor

For more information, contact Matthew Paskash at (208) 236-6710 ext. 4249 or
matthew.paskash@labor.idaho.gov

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Summary

The onset of the COVID-19 pandemic was a shock to the Idaho economy and its citizens, especially health care workers. This study analyzes the impact of COVID-19 on health care workers by comparing pre-pandemic, current and projected data in the areas of employment and wages, job postings, health care program completions and Idaho Department of Labor occupational and industry projections.

Additional insights were gained through interviews with stakeholders overseeing health care education programs, Idaho hospital and clinic administrators, and people who work for occupational and professional license boards.

A survey of health care workers measured the anticipated number of labor market and occupational exits for certain groups and, in the case of registered and licensed practical nurses, attempts to estimate what compensation level is required to retain these professionals if they are planning an exit.

Outlook and recommendations

- While the long-term outlook will likely shift back to pre-COVID trends as many pandemic shocks subside, the **near-to-medium-term outlook will be one of acute shortages for specialized health care practitioners** — like physicians and surgeons — and ongoing shortages for several critical occupations including nurses and pharmacists.
- Efforts at expanding interest in health care-related occupations are important, but **education and training programs must be able to expand**. For many, expansion will require investments into classrooms and teaching technology, increased funding to hire and retain teaching faculty, and expansion of clinical training sites at local hospitals and clinics.
- Efforts must also focus on **attracting** trained health care workers from out of state. This will come at a considerable cost, given workers generally require additional compensation to relocate and Idaho wages already trail nearby states. Rising housing costs are also a barrier to entry for many health care workers.

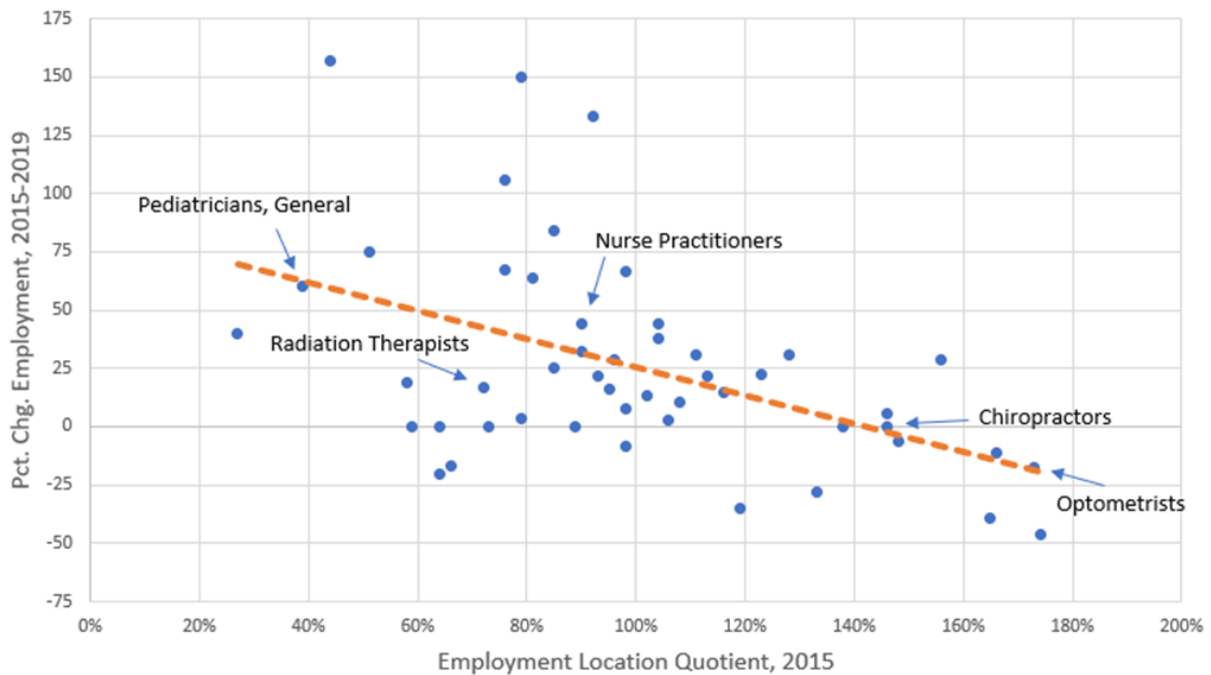
Efforts may be needed to **stem the outflow** of health care workers due to labor market exits and occupational transfers. Several references by stakeholders surrounding rising housing and education costs might help frame wider policy discussions as they constitute a set of general economic issues that closely relate to the ongoing health care worker shortage.

Pre-pandemic trends in Idaho

- Employment levels for Idaho health care practitioners, technicians and health care support workers were growing at a combined annual average rate of 8.9% several years prior to the pandemic — much faster than overall employment and population growth.

- Average annual wages for health care practitioners and technicians grew at 2.5% per year, slightly faster than Idaho’s overall wage growth of 2.4%. Wage growth for health care support workers was considerably slower than average at 1.2%.
- This aggregate trend during the pre-pandemic period did not hold for all Idaho health care occupations. Those with high employment relative to the national average, like chiropractors and optometrists, saw slower employment growth or even declines, whereas occupations underrepresented in the labor force, like nurse practitioners, saw faster employment growth, as evidenced in [Figure 1](#).

Figure 1: Employment growth vs. job concentration by occupation, Idaho 2015-2019



Source: May 2015 and May 2019 Occupational Employment and Wage Statistics Surveys, U.S. Bureau of Labor Statistics.
Notes: Location quotients expressed as a percentage. A value of 100% (an LQ of 1.0) represents Idaho’s concentration for an occupation compared to the national concentration of the same occupation. A share for Idaho at 100% would be the same as the national concentration. Values greater than 100% (an LQ greater than 1.0) indicate higher concentration compared to the nation, while values less than 100% (an LQ less than 1.0) indicate relative scarcity.

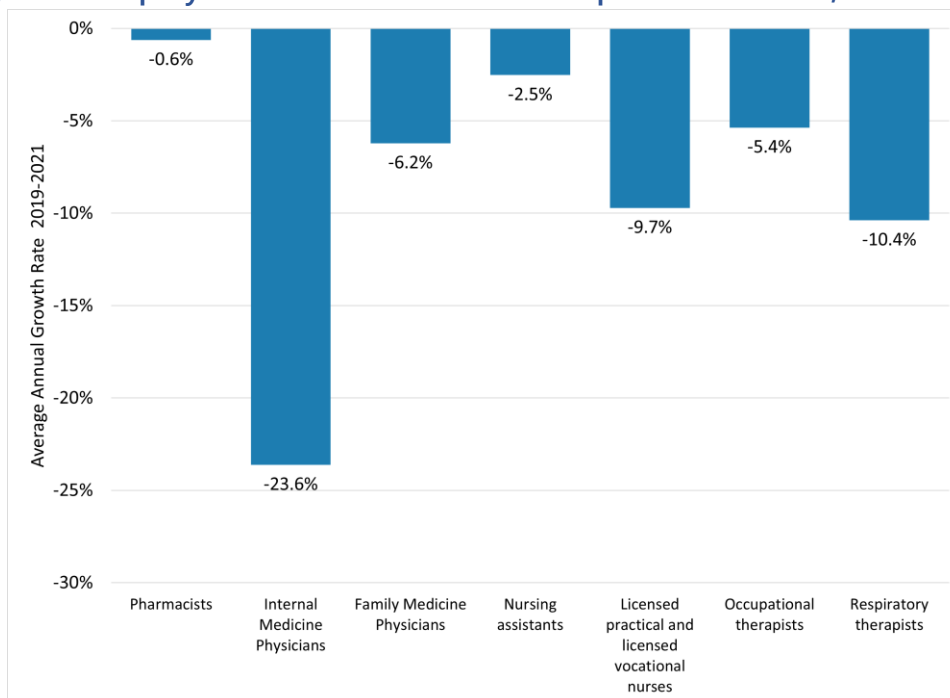
- Growth in average annual wages was stronger in occupations with slower employment growth or those where employment shrunk. Average wage growth was slower, and sometimes negative, in occupations where employment grew fastest. This negative correlation, while not necessarily causal, suggests that wage growth may be driven more by the supply of workers, as opposed to demand.
- Even though underrepresented occupations grew faster over this period, many specialized groups of workers that were relatively scarce in 2015 remained so in 2019 — including general pediatricians, magnetic resonance imaging technologists, nuclear medicine technologists, radiation therapists and nurse practitioners.

- Job postings for health care-related occupations grew between 2012 and 2017 but dipped and plateaued between 2017 and 2019 (see [Figure 7](#)). Occupations in high demand relative to the national average included critical care nurses and nurse assistants, dietitians and nutritionists, and radiation therapists.
- Health care-related education and training program completions grew at an average annual rate of 3.3% between 2015 and 2019, slower than employment growth overall. Among the fastest growing occupations were public health assistants and physical therapy assistants. Completion rates for registered nurses, on the other hand, tapered off, while pharmacy completions began to decline. Idahoans admitted to the Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI) medical program remained at 40 with an average retention rate of just over half.
- Health care occupations with the lowest projected turnover rates were generally those with the highest salaries, as occupational transfers “up the wage ladder” become increasingly less probable.

Pandemic trends

- The arrival of COVID-19 increased the demand for some occupations while the supply decreased because of accelerated retirements and occupational transfers due to burnout. These combined effects pushed wages up for health care workers and increased wage dispersion across occupations.
- Health care occupations where employment shrunk through the pandemic included general internal medicine physicians, family medicine physicians, licensed practical and vocational nurses, nursing assistants, pharmacists, and occupational and respiratory therapists ([Figure 2](#)).

Figure 2: Employment trends for select occupations in Idaho, 2019-2021



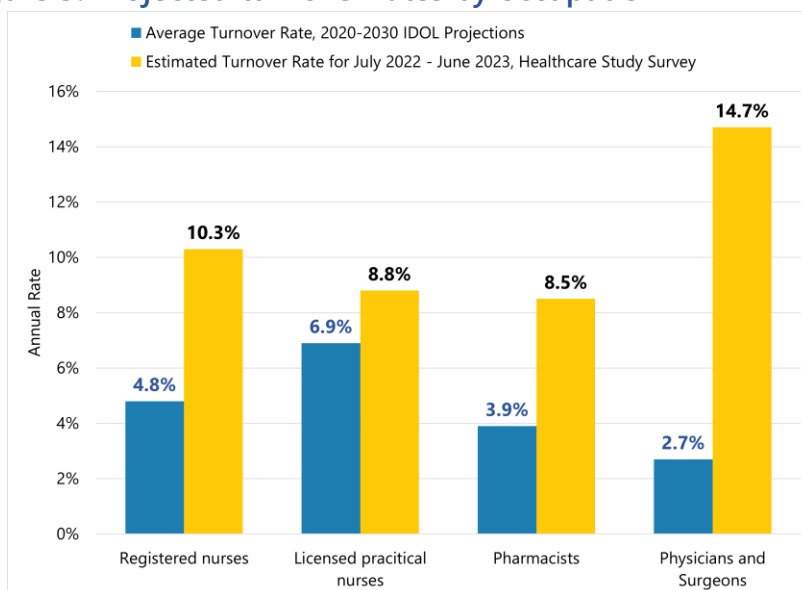
Source: Occupational Employment and Wage Statistics Surveys, U.S. Bureau of Labor Statistics.

- Job postings for health care workers more than doubled from 2019 to 2021. Registered nurses grew the most in absolute terms, with large increases for respiratory therapists, respiratory therapy technicians and mental health professionals.
- Discussions with education stakeholders revealed the pool of qualified applicants for health care occupational training programs still generally exceeds the number of available admission spots. Present challenges to program expansion include recruitment and retention of teaching faculty, costs to upgrade and expand classrooms, and the lack of available clinical training sites within Idaho. Rising education costs — and consequently student loan balances — may be a barrier to entry as many workers may find salaries in the state unattractive compared to the cost of their degree.
- Discussions with the Idaho Hospital Association and a survey of its members found a rise in employee turnover. They identified nurses, especially RNs, as the occupation in most immediate need. Rising housing costs are one of many barriers to entry for hospital and clinic workers, with some candidates having to turn down job offers due to a lack of affordable housing. The Idaho Hospital Association also noted geographic disparities in hiring difficulties as well as fiscal constraints, with rural hospitals adversely impacted by both.

Surveying Idaho health care professionals

- A direct survey of health care workers through their respective license boards points to short-term occupational turnover rates in the coming year well above long-term Idaho Department of Labor projections based in part on data from 2020, before any developing data that might explain the consequences of the pandemic was available. Assuming entrant rates for new workers held to pre-pandemic rates, this could mean an outright decline in the supply for nurses (RNs and LPNs), pharmacists, physicians and surgeons ([Figure 3](#)).

Figure 3: Projected turnover rates by occupation



Source: 2020-2030 Employment Projections, IDOL; Survey of Health Care Professionals.

- Among Idaho nurses, the most common reasons for a labor market exit or occupational transfer were retirements, career changes or advancement, and moving out of state. In their open-ended responses many cite burnout and inadequate pay relative to costs of living. Notably, young and less-experienced nurses had an elevated likelihood of an exit relative to slightly older and more experienced nurses, as evidenced in [Figures 13a and 13b](#).
- Idaho nurses who expect some form of occupational or market exit would require wages in the top 25% of their occupations to stay. The youngest and least experienced nurses (LPNs and RNs) looking for a career change would require slightly higher wages than older and more experienced nurses to stay.
- In general, young and less experienced RNs looking to move out of state would require a lower wage to stay versus older RNs looking to relocate. RNs from Utah and Wyoming may be persuaded to move at salaries comparable to their Idaho counterparts, but those in Nevada, Oregon and Washington would require considerably higher pay if they were to move to Idaho.
- For Idaho pharmacists, retirement constitutes the largest source of occupational turnover, followed by those relocating in search of career advancement as a distant second. Additional reasons cited by those anticipating a relocation are the relative ease of being a travelling pharmacist.
- According to Idaho physicians and surgeons, retirements make up the largest source of occupational exits, but relocation decisions are a close second with over half of all respondents anticipating a move.
- Among all the health care occupations surveyed, nurses, pharmacists, physicians and surgeons mentioned Idaho's cultural or political climate as a reason for a labor market exit or relocating out of state. A changing cultural and political environment are more difficult issues to tackle, with the flight of human capital as an unintended consequence of these shifts.

1.0 Pre-COVID trends in employment, wages, job postings and program completions

Idaho's health care workforce had been growing at a brisk pace prior to the pandemic, with wages rising on average for the various occupational groups. Health care practitioners and technical occupations along with health care support occupations had been initially underrepresented in the Idaho workforce but had been converging to the national average. Idaho's growing population and an increased share of Idahoans nearing or at retirement age contributed to this trend. Annual job postings — which had been growing but plateaued — began to contract right before the pandemic, indicating demand for these major occupational groups shifted from high- to low-growth. On the supply side, college program completions in health care fields were also growing during this period.

These aggregate trends were not mirrored in all occupations. Some relatively over-represented occupations experienced employment declines alongside wage declines, indicative of an initial oversupply. Other under-represented occupations experienced employment growth concurrent with wage gains, indicative of a potential excess in demand. These factors, combined with increasing specialization, may explain the widening pay dispersion among health care practitioners and technical occupations.

Several comparatively under-represented groups, including particularly specialized occupations, remained under-represented by 2019 despite employment and wage gains, possibly due to strong demand, barriers to entry or strong preferences to work elsewhere or in other fields. Job posting gains were mixed across occupations. Some occupations like nurses were starting to decline while others, like occupational therapists, saw strong growth.

Program completions at the occupational level were mixed. Based upon projected future occupational employment and turnover rates, the pipeline of entrants into key professions such as pharmacy, nursing and medicine was either just keeping pace with demand growth or falling behind. This required out-of-state professionals to fill this gap and, when that was not enough, likely contributed to upward pressure on wages for many occupations.

1.1 U.S. Bureau of Labor Statistics' Occupational Employment and Wage data

[Tables 1](#) and [2](#) provide a subset of the annual U.S. Bureau of Labor Statistics Occupational Employment and Wages (OEWS) surveys in May 2015 and 2019, specifically for health care practitioners and technical occupations and health care support occupations in Idaho. Due to the survey sample, some occupations with a Standard Occupational Code (SOC) may not be represented in either or both tables.

Confidentiality rules sometimes require values to be omitted for particularly small occupations or high-earning individuals. Despite these shortcomings, a few notable trends are discernible.

Between 2015 and 2019 (see [Tables 1](#) and [2](#)), the estimated number of workers classified under these two broad occupational groups — health care practitioners and technical workers (all occupations beginning with two-digit SOC 29) and health care support workers (all occupations beginning with two-digit SOC 31) — grew by 40.9%, or 8.9% on an average annual basis. Comparatively, the resident state

population grew 8.3% over this same period (2.0% annualized)¹ and Idaho's total nonfarm employment grew 13.2% (3.1% annualized).² Looking at broad occupational groups specifically, health care practitioner and technical occupation employment grew by 20% (4.6% annualized). Health care support occupation employment grew by an even larger 81.7% (16.1% annualized).

Employment growth in these occupational groups is due in no small part to the state's growing population. Simply put, more people living in Idaho means an increased demand for health care services and a growing need for services ranging from a rising share of high-demand populations such as older residents. Idahoans 62 years and older grew from an estimated 18.2% percent of the population in 2015 to 19.9% in 2019.³

Employment growth was attributed in part to a convergence in the share of health care practitioners and technical and health care support occupations to the national average. Given Idaho's rural character and small and youthful population, it is no surprise that health care workers historically represented a comparatively smaller share. However, with in-migration from other states and growth in urban areas, the composition of Idaho's workforce is now less of an outlier and closer to what we see nationally. One way to measure under-/over-representation of an occupation is its location quotient (LQ) – the ratio of that group's employment share in Idaho to its employment share nationally. Values of less than one indicate under-representation. Looking at the broad occupational groups in 2015, health care practitioners and technical occupations had an LQ of 0.94, whereas health care support occupations were slightly less under-represented at 0.98. By 2019 however, the former group narrowed the gap to 0.98 while the latter had grown to slight over-representation at 1.02.

Over the 2015-2019 period, the average annual wage for health care practitioners and technical occupations grew by about 10.6% (2.5% annualized). Health care support occupations experienced more subdued growth at only 5.0% (1.2% annualized).⁴ This may be due to a larger positive supply shift for the latter group of workers, as seen in the 16.1% annualized employment growth rate over the same period. Put another way, while demand for health care support occupations grew, the supply of workers appeared to keep pace, translating into a much lower rate of wage growth. Moreover, wage dispersion within health care practitioners and technical occupations — as measured by the ratio of the 75th and 25th wage percentiles — grew from 1.83 to 1.91. This may reflect divergent trends in wages between specific occupations due to increasing specialization and job differentiation.

Digging more deeply into the OEWS tables by specific occupations starts to show differences in the employment and wage trends for different health care occupations and helps illustrate how the supply-side contributes to the overall story.

[Figure 4](#) provides a scatterplot of the four-year percentage change in employment by occupation against each initial location quotient in 2015, with data points scaled to each occupation's employment level in 2015. Even more apparent than aggregate movements, there is a clear negative correlation between an occupation's initial employment concentration relative to the national average and its percentage

¹ Annual resident population estimates. [Population Estimates Program, U.S. Census Bureau.](#)

² End-of-year total nonfarm employment, seasonally adjusted. [Current Employment Statistics Program, U.S. Bureau of Labor Statistics.](#)

³ American Community Survey 1-year estimates. [U.S. Census Bureau.](#)

⁴ For a point of comparison, the statewide average annual salary in 2015 and 2019 were \$40,810 and \$44,890, respectively, with a cumulative growth rate of 10.0% (2.4% annualized).

change in employment over the medium term. This is indicative of a movement in the state workforce's occupational distribution towards the national average: Relatively abundant jobs in Idaho tend to see slower job growth or even decline while comparatively scarce jobs tend to see faster job gains.

[Figure 5](#) plots the percentage change in the average wage against the percentage change in employment by occupation. If the two outliers in the upper right quadrant are ignored (audiologists, orthotists and prosthetists), there is a negative correlation between wage growth and employment growth. (The Pearson's product-moment correlation was -0.434, which was statistically significant at the 0.005 level.) While this is only a descriptive relationship and not necessarily causal, it would appear wage growth was strongest among occupations with slow-growing or outright declining employment. This is consistent with a narrative that a declining labor supply in many health care-related occupations is driving movements in wages. In contrast, a positive correlation would point more to a demand-driven story.

Finally, [Figure 6](#) provides a scatterplot of initial job concentration measured by location quotient against subsequent job concentration, with the color scale indicating the percentage change in average annual wage and point size indicating the initial average annual wage for that occupation.

Many of the points are concentrated around the unit (45-degree) line, indicating that job concentration after four years was still correlated with an occupation's initial concentration. Contrast this with [Figure 4](#). Even though relative abundance/scarcity of jobs by occupation was negatively correlated with their percentage growth, any mean reversion to the national average was particularly slow at a four-year horizon.

Second, many of the occupations with both an initially high average annual wage and below-average representation in the Idaho workforce remained under-represented after four years. Such occupations included general pediatricians, magnetic resonance imaging technologists, nuclear medicine technologists, radiation therapists and nurse practitioners. This contrasts with the simple "Econ 101" theory that high wages should entice greater supply. The reasons why this would fail could be wages reflect compensating differentials for these occupations such as greater work risks or increased costs of entry from advanced degree requirements. Demand complementarities such as clinics and hospitals tend to have target ratios of advanced specialists to more general staff, in which case supply constraints for some occupations prevent growth in others.⁵

⁵ A textbook example of demand complementarities are shoes. Consumers typically want shoes in pairs – one left, one right. If a supplier hypothetically increased the price of only left shoes, consumers will purchase fewer of both.

Table 1: Occupational Employment and Wages Statistics, Idaho 2015

SOC Code	Occupation Title	Employment		Salary Distribution			Mean
		Level	LQ	25 th	50 th	75 th	
29-0000	Healthcare Practitioners and Technical Occupations	35,150	0.94	42,130	58,600	76,910	70,790
29-1011	Chiropractors	220	1.46	41,390	46,800	62,930	55,810
29-1021	Dentists, General	460	0.98	105,340	178,190	#	191,140
29-1023	Orthodontists	**	**	55,360	60,910	98,480	87,880
29-1029	Dentists, All Other Specialists	**	**	#	#	#	256,950
29-1031	Dietitians and Nutritionists	270	0.98	42,870	51,340	61,750	52,140
29-1041	Optometrists	290	1.73	64,010	116,340	141,930	112,670
29-1051	Pharmacists	1,410	1.02	105,610	115,900	127,040	113,560
29-1061	Anesthesiologists	100	0.75	168,640	#	#	212,770
29-1062	Family and General Practitioners	820	1.38	130,330	182,020	#	187,270
29-1064	Obstetricians and Gynecologists	70	0.79	#	#	#	#
29-1065	Pediatricians, General	50	0.39	133,550	152,250	#	185,900
29-1067	Surgeons	120	0.64	#	#	#	#
29-1069	Physicians and Surgeons, All Other	**	**	137,810	#	#	207,890
29-1071	Physician Assistants	590	1.28	84,060	93,980	108,200	101,150
29-1081	Podiatrists	40	0.82	70,060	93,270	152,890	130,710
29-1122	Occupational Therapists	400	0.76	54,840	71,220	82,190	67,800
29-1123	Physical Therapists	1,010	1.04	63,340	78,210	91,260	76,830
29-1124	Radiation Therapists	60	0.72	69,920	79,990	97,600	86,750
29-1125	Recreational Therapists	40	0.51	44,240	50,120	58,810	50,790
29-1126	Respiratory Therapists	500	0.90	47,860	54,470	60,490	54,600
29-1127	Speech-Language Pathologists	500	0.81	53,930	67,640	79,800	69,950
29-1131	Veterinarians	450	1.48	68,590	82,240	99,200	92,290
29-1141	Registered Nurses	12,140	0.95	52,650	60,960	71,490	61,280
29-1151	Nurse Anesthetists	**	**	143,600	160,170	#	196,430
29-1171	Nurse Practitioners	570	0.90	81,330	92,490	105,090	94,570
29-1181	Audiologists	40	0.79	46,080	54,200	66,650	57,100
29-1199	Health Diagnosing and Treating Practitioners, All Other	90	0.55	31,250	49,650	67,510	54,100
29-2011	Medical and Clinical Laboratory Technologists	580	0.77	53,020	60,450	70,030	60,630
29-2012	Medical and Clinical Laboratory Technicians	590	0.80	26,460	30,620	37,750	33,110
29-2021	Dental Hygienists	1,460	1.56	66,680	73,250	79,950	72,460
29-2031	Cardiovascular Technologists and Technicians	320	1.33	51,240	59,820	70,470	58,120
29-2032	Diagnostic Medical Sonographers	340	1.19	58,220	67,380	74,950	66,440
29-2033	Nuclear Medicine Technologists	60	0.66	64,840	72,250	79,920	72,100
29-2034	Radiologic Technologists	770	0.85	43,680	50,850	59,890	52,020
29-2035	Magnetic Resonance Imaging Technologists	100	0.64	55,720	65,600	75,080	66,340

SOC Code	Occupation Title	Employment		Salary Distribution			Mean
		Level	LQ	Percentile			
				25 th	50 th	75 th	
29-2041	Emergency Medical Technicians and Paramedics	1,090	0.98	25,740	33,300	41,220	34,550
29-2051	Dietetic Technicians	80	0.59	18,860	23,670	29,750	24,740
29-2052	Pharmacy Technicians	1,700	0.96	26,990	32,280	37,790	32,550
29-2053	Psychiatric Technicians	290	1.08	25,730	29,830	34,310	31,430
29-2055	Surgical Technologists	680	1.46	35,580	42,230	48,490	43,080
29-2056	Veterinary Technologists and Technicians	510	1.13	23,650	27,480	31,160	27,640
29-2057	Ophthalmic Medical Technicians	160	0.85	29,740	34,510	38,380	34,420
29-2061	Licensed Practical and Licensed Vocational Nurses	2,560	0.79	34,710	39,500	45,320	39,870
29-2071	Medical Records and Health Information Technicians	860	0.97	28,000	34,130	40,850	35,330
29-2081	Opticians, Dispensing	400	1.16	26,440	32,410	40,270	34,290
29-2091	Orthotists and Prosthetists	30	0.92	28,970	42,690	64,430	49,330
29-2092	Hearing Aid Specialists	40	1.38	39,200	49,590	59,720	49,140
29-2099	Health Technologists and Technicians, All Other	380	0.78	31,460	42,030	51,320	44,390
29-9011	Occupational Health and Safety Specialists	340	1.04	52,500	59,160	74,400	64,090
29-9012	Occupational Health and Safety Technicians	50	0.64	32,650	39,820	56,020	44,240
29-9091	Athletic Trainers	100	0.89	32,500	41,150	48,440	39,680
29-9099	Healthcare Practitioners and Technical Workers, All Other	70	0.38	38,420	49,000	74,860	57,380
31-0000	Healthcare Support Occupations	18,130	0.98	21,270	26,120	31,070	27,320
31-1011	Home Health Aides	2,800	0.73	17,610	19,770	24,860	21,710
31-1014	Nursing Assistants	7,030	1.06	20,530	23,690	27,820	24,340
31-1015	Orderlies	410	1.65	21,640	23,890	28,230	25,160
31-2011	Occupational Therapy Assistants	70	0.44	46,970	55,850	66,450	58,360
31-2012	Occupational Therapy Aides	**	**	25,260	28,550	34,730	30,310
31-2021	Physical Therapist Assistants	320	0.85	35,900	52,180	63,170	50,390
31-2022	Physical Therapist Aides	410	1.74	20,670	23,500	28,100	24,800
31-9011	Massage Therapists	310	0.73	25,240	33,630	43,500	34,760
31-9091	Dental Assistants	1,850	1.23	29,030	33,790	37,820	33,790
31-9092	Medical Assistants	3,030	1.08	26,180	29,470	34,560	30,420
31-9093	Medical Equipment Preparers	180	0.76	25,490	28,800	33,700	29,910
31-9094	Medical Transcriptionists	450	1.66	29,800	34,500	38,490	34,060
31-9095	Pharmacy Aides	50	0.27	22,820	27,200	30,660	27,330
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	390	1.11	20,550	25,440	29,250	25,010
31-9097	Phlebotomists	510	0.93	26,090	29,310	33,860	29,810
31-9099	Healthcare Support Workers, All Other	260	0.58	23,040	29,460	39,570	31,070

Source: May 2015 Occupational Employment and Wage Statistics Survey, U.S. Bureau of Labor Statistics.

Notes: * indicates that a wage estimate is not available; ** indicates that an employment estimate is not available; # indicates a wage greater than or equal to \$90 per hour or \$187,200 per year.

Table 2: Occupational Employment and Wages Statistics, Idaho 2019

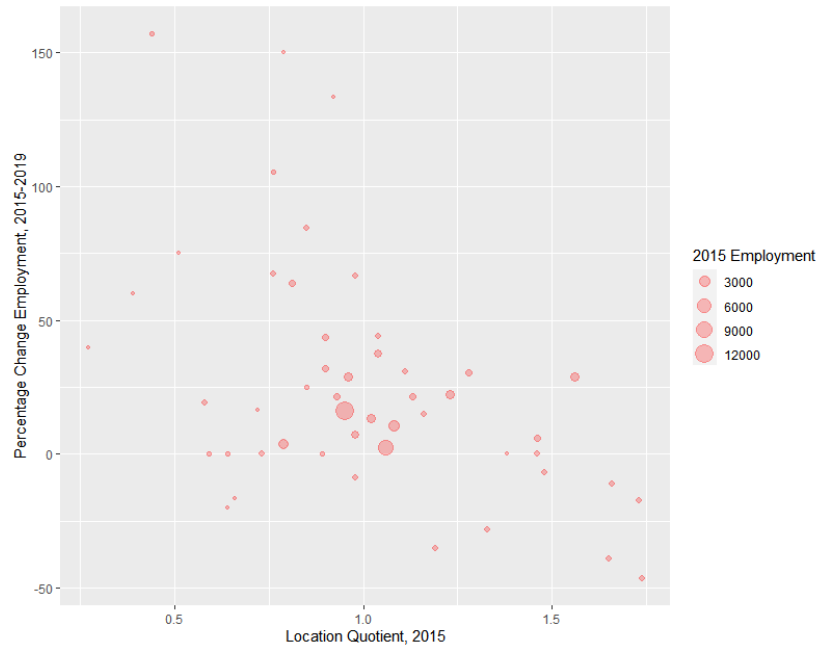
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		Level	LQ	25 th	50 th	75 th	
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29-1011	Chiropractors	220	1.29	42,600	62,790	80,490	86,210
29-1021	Dentists, General	420	0.77	136,300	190,040	#	204,060
29-1031	Dietitians and Nutritionists	450	1.36	36,090	47,590	62,910	51,050
29-1041	Optometrists	240	1.21	82,920	107,910	123,960	101,960
29-1051	Pharmacists	1,600	1.04	112,260	123,530	138,970	121,360
29-1071	Physician Assistants	770	1.30	91,500	108,180	125,830	112,000
29-1122	Occupational Therapists	670	1.02	71,000	86,550	98,770	83,980
29-1123	Physical Therapists	1,390	1.20	68,390	80,640	96,610	80,360
29-1124	Radiation Therapists	70	0.77	65,470	82,960	96,190	80,070
29-1125	Recreational Therapists	70	0.76	26,560	34,840	49,370	37,920
29-1126	Respiratory Therapists	660	1.01	53,020	58,840	64,920	59,210
29-1127	Speech-Language Pathologists	820	1.07	55,520	72,150	89,500	72,470
29-1131	Veterinarians	420	1.14	73,850	92,260	116,810	103,080
29-1141	Registered Nurses	14,110	0.96	58,720	69,320	79,540	69,480
29-1151	Nurse Anesthetists	**	**	139,620	150,630	161,630	150,670
29-1171	Nurse Practitioners	820	0.82	88,170	111,750	128,480	110,860
29-1181	Audiologists	100	1.47	63,630	73,680	86,140	74,190
29-1211	Anesthesiologists	**	**	#	#	#	267,700
29-1215	Family Medicine Physicians	830	1.53	161,640	#	#	227,160
29-1216	General Internal Medicine Physicians	120	0.55	24,040	202,230	#	173,190
29-1221	Pediatricians, General	80	0.52	138,490	161,890	#	181,210
29-1223	Psychiatrists	**	**	157,520	192,670	#	212,930
29-1228	Physicians, All Other; and Ophthalmologists, Except Pediatric	**	**	135,170	#	#	234,390
29-1248	Surgeons, Except Ophthalmologists	190	1.04	193,040	#	#	250,670
29-1292	Dental Hygienists	1,880	1.72	68,670	75,510	83,140	75,910
29-1298	Acupuncturists and Healthcare Diagnosing or Treating Practitioners, All Other	120	0.66	61,230	88,040	190,750	131,010
29-2010	Clinical Laboratory Technologists and Technicians	1,280	0.79	32,960	42,980	61,250	48,250
29-2031	Cardiovascular Technologists and Technicians	230	0.82	37,470	62,250	79,550	60,940
29-2032	Diagnostic Medical Sonographers	220	0.61	67,620	76,880	88,930	76,920
29-2033	Nuclear Medicine Technologists	50	0.60	71,970	81,670	95,160	83,260
29-2034	Radiologic Technologists and Technicians	980	0.95	51,000	60,100	70,800	60,680

SOC Code	Occupation Title	Employment		Salary Distribution			Mean
		Level	LQ	Percentile			
				25 th	50 th	75 th	
29-2035	Magnetic Resonance Imaging Technologists	100	0.54	65,510	74,990	85,870	74,040
29-2040	Emergency Medical Technicians and Paramedics	1,170	0.91	27,780	35,810	49,210	39,330
29-2051	Dietetic Technicians	80	0.58	21,580	24,320	33,680	34,130
29-2052	Pharmacy Technicians	2,190	1.06	31,420	36,150	41,860	36,600
29-2053	Psychiatric Technicians	**	**	22,650	27,330	34,420	28,850
29-2055	Surgical Technologists	720	1.34	40,970	47,820	56,700	48,500
29-2056	Veterinary Technologists and Technicians	620	1.13	26,470	30,290	35,740	32,030
29-2057	Ophthalmic Medical Technicians	200	0.68	24,720	29,270	35,490	30,910
29-2061	Licensed Practical and Licensed Vocational Nurses	2,650	0.77	39,190	45,780	52,350	46,430
29-2081	Opticians, Dispensing	460	1.29	27,350	31,910	37,890	33,550
29-2091	Orthotists and Prosthetists	70	1.39	55,210	70,800	85,110	70,790
29-2092	Hearing Aid Specialists	40	0.91	*	*	*	*
29-2098	Medical Dosimetrists, Medical Records Specialists, and Health Technologists and Technicians, All Other	1,710	1.04	32,720	41,050	50,230	42,350
29-9091	Athletic Trainers	100	0.70	40,920	47,030	57,440	51,480
29-9098	Health Information Technologists, Medical Registrars, Surgical Assistants, and Healthcare Practitioners and Technical Workers, All Other	110	0.42	35,840	44,680	61,230	57,640
31-0000	Healthcare Support Occupations	32,950	1.02	22,290	26,300	32,890	28,680
31-1120	Home Health and Personal Care Aides	16,270	1.04	20,660	23,160	26,200	24,380
31-1131	Nursing Assistants	7,210	1.03	24,740	28,470	32,340	28,950
31-1132	Orderlies	250	1.07	25,870	30,360	36,890	32,810
31-2011	Occupational Therapy Assistants	180	0.82	29,980	57,230	66,240	53,200
31-2021	Physical Therapist Assistants	590	1.22	31,310	55,360	63,300	51,170
31-2022	Physical Therapist Aides	220	0.88	21,540	24,490	30,130	34,810
31-9011	Massage Therapists	310	0.58	32,110	48,130	62,840	51,630
31-9091	Dental Assistants	2,260	1.30	29,180	34,440	39,510	34,580
31-9092	Medical Assistants	3,350	0.95	29,160	34,480	39,310	34,710
31-9093	Medical Equipment Preparers	370	1.32	26,840	30,630	36,690	31,470
31-9094	Medical Transcriptionists	400	1.45	23,410	29,990	39,280	32,390
31-9095	Pharmacy Aides	70	0.40	24,590	29,050	36,210	30,970
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	510	1.07	22,350	27,160	31,950	27,580
31-9097	Phlebotomists	620	0.97	27,940	32,360	38,010	33,110
31-9099	Healthcare Support Workers, All Other	310	0.67	25,580	32,880	45,810	36,600

Source: May 2019 Occupational Employment and Wage Statistics Survey, U.S. Bureau of Labor Statistics.

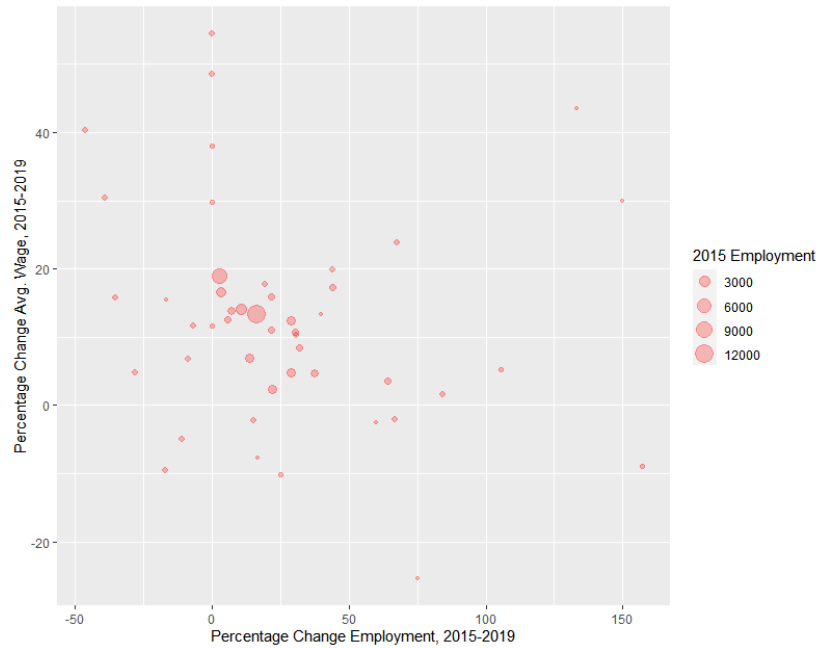
Notes: * indicates that a wage estimate is not available; ** indicates that an employment estimate is not available; # indicates a wage greater than or equal to \$100 per hour or \$208,000 per year.

Figure 4: Employment growth vs. job concentration by occupation, Idaho 2015-2019



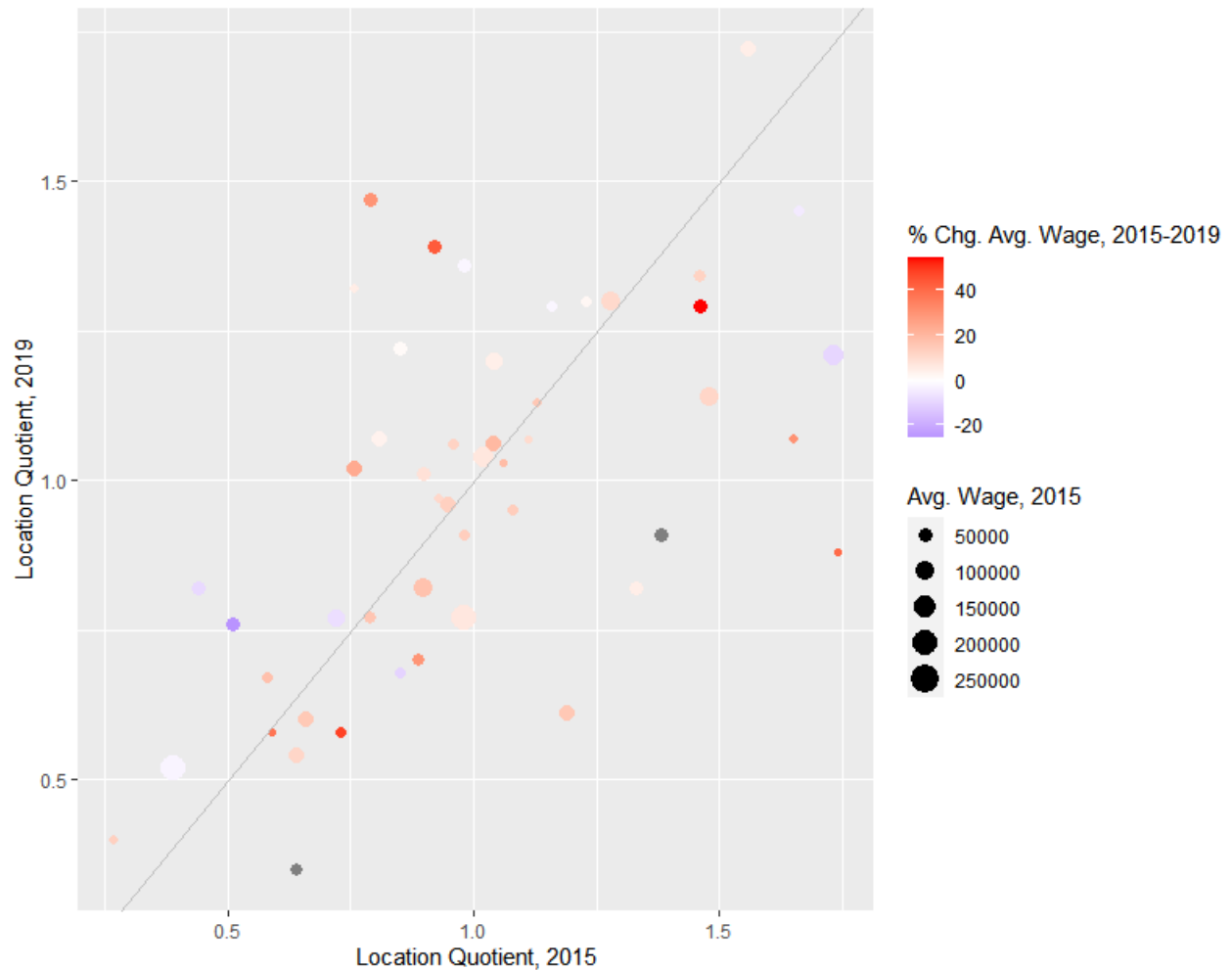
Source: May 2015 and May 2019 Occupational Employment and Wage Statistics Surveys, U.S. Bureau of Labor Statistics.

Figure 5: Employment vs. average wage growth by occupation, Idaho 2015-2019



Source: May 2015 and May 2019 Occupational Employment and Wage Statistics Surveys, U.S. Bureau of Labor Statistics.

Figure 6: Initial vs. final job concentration by occupation, Idaho 2015-2019



Source: May 2015 and May 2019 Occupational Employment and Wage Statistics Surveys, U.S. Bureau of Labor Statistics.
Notes: Black/grey data points indicate wage data was not available for that occupation either in 2015 or 2019. The unit (45-degree) line is included for comparison.

1.2 Conference Board data on job postings

Job posting data collected by The Conference Board’s Help Wanted Online database ([Table 3](#)) aggregates job listings across multiple job boards and other websites. The system removes duplicate postings and organizes them according to geography, industry and occupation among other variables. Lightcast (formerly known as Emsi-Burning Glass) provides summary data from The Conference Board. Unfortunately, occupational classifications from The Conference Board are not exactly one-to-one with the BLS Standard Occupational Classification system. A similar system put together by the Occupational Information Network (O*Net), an online database sponsored by the U.S. Department of Labor, is used instead. Note job openings account for both new positions created as well as typical turnover from job switchers and the replacement of market exits with market entrants.

[Figure 7](#) provides a time series plot of monthly Idaho job postings for the same major occupational groups for the years preceding the pandemic — health care practitioners and technical and health care

support. As the state population grew, there appeared to be a period of increasing demand for these occupations in addition to health care workers growing in share. This period of demand growth appeared to have tapered by 2017, and between 2017 and 2019 the demand declined before beginning to trend upward (if slightly). While population growth continued to increase demand, the shift in relative occupational demand converged toward the national average. Moreover, the demographic transition toward an older state population may have slowed over this period, in which case demand from a larger share of older Idahoans might have slowed.

Digging into the occupational postings highlights some of the divergent trends in labor demand. [Figure 8](#) plots percentage growth in job postings by occupation in comparison to the initial concentration based on the occupation's job location quotient. [Figure 4](#) shows that Idaho jobs in high demand in comparison to their national share of job postings experienced slower growth, and conversely, jobs low in demand experienced greater gains in job postings.

The likely explanation for this trend is a long-run convergence in the relative demand for health care professionals toward their national average. Population level and density as well as socioeconomic and demographic makeup skewed the initial demand for health care workers compared to the nation overall. With in-migration and a diversifying economy over time, the demand for various health care practitioners, specialists and support staff begin to look like the rest of the country. This explanation is worth mentioning as it would go against explanations on the demand-side centered on the unique characteristics of the Idaho economy — at least in the long-run. In short, even if Idahoans did not initially have a particularly strong demand for OB-GYNs, neurologists or pharmacy technicians relative to Americans overall, they will begin to look less unique over time and more closely parallel their national counterparts. Moreover, one might also say trends for national health care demand are informative for state demand trends over the medium-to-long term.

Table 3: Annual job postings for health care occupations, Idaho 2016 and 2019

O*Net Code	Occupation Title	Job Postings			Location Quotient	
		2016	2019	% Change	2016	2019
29-1011.00	Chiropractors	2	14	600.0	0.4	0.7
29-1021.00	Dentists, General	89	66	-25.8	0.8	0.6
29-1022.00	Oral and Maxillofacial Surgeons	2	3	50.0	0.2	0.3
29-1023.00	Orthodontists	2	2	0.0	0.6	0.3
29-1024.00	Prosthodontists	4	NA	NA	1.5	NA
29-1029.00	Dentists, All Other Specialists	2	5	150.0	0.3	0.7
29-1031.00	Dietitians and Nutritionists	449	259	-42.3	2.1	1.4
29-1041.00	Optometrists	27	32	18.5	1.1	0.6
29-1051.00	Pharmacists	461	357	-22.6	1.2	1.4
29-1061.00	Anesthesiologists	3	18	500.0	0.1	0.4
29-1062.00	Family and General Practitioners	220	181	-17.7	0.8	0.8
29-1063.00	Internists, General	160	196	22.5	0.5	0.6
29-1064.00	Obstetricians and Gynecologists	48	120	150.0	0.7	1.3
29-1065.00	Pediatricians, General	17	60	252.9	0.4	1.3
29-1066.00	Psychiatrists	164	62	-62.2	0.9	0.4
29-1067.00	Surgeons	44	38	-13.6	0.6	0.4
29-1069.00	Physicians and Surgeons, All Other	394	289	-26.6	0.9	0.8
29-1069.02	Dermatologists	22	34	54.5	0.7	0.9
29-1069.03	Hospitalists	74	53	-28.4	0.5	0.5
29-1069.04	Neurologists	14	56	300.0	0.3	1
29-1069.06	Ophthalmologists	2	7	250.0	0.3	0.8
29-1069.07	Pathologists	3	21	600.0	0.7	3.8
29-1069.08	Physical Medicine and Rehabilitation Physicians	3	1	-66.7	0.6	0
29-1069.09	Preventive Medicine Physicians	4	16	300.0	0.4	2.1
29-1069.10	Radiologists	2	6	200.0	0.2	0.2
29-1069.11	Sports Medicine Physicians	95	5	-94.7	4.3	0.3
29-1069.12	Urologists	12	12	0.0	0.5	0.4
29-1071.00	Physician Assistants	160	131	-18.1	0.5	0.8
29-1071.01	Anesthesiologist Assistants	14	11	-21.4	0.8	0.5
29-1081.00	Podiatrists	8	NA	NA	0.6	NA
29-1122.00	Occupational Therapists	796	399	-49.9	1.7	1.3
29-1122.01	Low Vision Therapists, Orientation and Mobility Specialists, and Vision Rehabilitation Therapists	4	2	-50.0	1.1	0.5
29-1123.00	Physical Therapists	926	471	-49.1	1.1	0.8
29-1124.00	Radiation Therapists	31	51	64.5	2.1	2.4
29-1125.00	Recreational Therapists	17	25	47.1	0.7	0.9
29-1125.02	Music Therapists	NA	1	NA	NA	0

O*Net Code	Occupation Title	Job Postings			Location Quotient	
		2016	2019	% Change	2016	2019
29-1126.00	Respiratory Therapists	142	168	18.3	1.1	1.1
29-1127.00	Speech-Language Pathologists	626	524	-16.3	1.1	1.3
29-1128.00	Exercise Physiologists	5	15	200.0	0.6	1.4
29-1131.00	Veterinarians	44	55	25.0	0.6	0.7
29-1141.00	Registered Nurses	6371	5391	-15.4	1	1.1
29-1141.01	Acute Care Nurses	1	1	0.0	0	0
29-1141.02	Advanced Practice Psychiatric Nurses	4	2	-50.0	0.4	0.2
29-1141.03	Critical Care Nurses	1502	909	-39.5	1.1	1.3
29-1141.04	Clinical Nurse Specialists	10	12	20.0	0.6	1.2
29-1151.00	Nurse Anesthetists	17	5	-70.6	0.4	0.1
29-1161.00	Nurse Midwives	17	6	-64.7	1.4	0.9
29-1171.00	Nurse Practitioners	602	468	-22.3	1	1
29-1181.00	Audiologists	15	20	33.3	0.7	1.2
29-1199.00	Health Diagnosing and Treating Practitioners, All Other	55	74	34.5	0.9	1.2
29-1199.01	Acupuncturists	2	3	50.0	1.2	0.7
29-2011.00	Medical and Clinical Laboratory Technologists	108	156	44.4	0.7	1.2
29-2011.01	Cytogenetic Technologists	14	2	-85.7	1.7	0.4
29-2011.02	Cytotechnologists	NA	2	NA	NA	0.3
29-2011.03	Histotechnologists and Histologic Technicians	7	15	114.3	0.3	0.6
29-2012.00	Medical and Clinical Laboratory Technicians	455	391	-14.1	1	0.9
29-2021.00	Dental Hygienists	48	48	0.0	1.2	0.8
29-2031.00	Cardiovascular Technologists and Technicians	226	210	-7.1	1.3	1.2
29-2032.00	Diagnostic Medical Sonographers	152	147	-3.3	1.2	1.1
29-2033.00	Nuclear Medicine Technologists	21	15	-28.6	1.9	1.1
29-2034.00	Radiologic Technologists	165	229	38.8	1	1.2
29-2035.00	Magnetic Resonance Imaging Technologists	102	126	23.5	1.1	1.1
29-2041.00	Emergency Medical Technicians and Paramedics	113	96	-15.0	0.8	0.7
29-2051.00	Dietetic Technicians	18	36	100.0	0.8	1.4
29-2052.00	Pharmacy Technicians	287	552	92.3	0.7	1.2
29-2053.00	Psychiatric Technicians	167	94	-43.7	3.2	1.4
29-2054.00	Respiratory Therapy Technicians	4	1	-75.0	2.2	0
29-2055.00	Surgical Technologists	158	300	89.9	0.8	1.4
29-2056.00	Veterinary Technologists and Technicians	28	38	35.7	0.7	0.8
29-2057.00	Ophthalmic Medical Technicians	20	28	40.0	0.9	1
29-2061.00	Licensed Practical and Licensed Vocational Nurses	1200	971	-19.1	1.1	1.1
29-2071.00	Medical Records and Health Information Technicians	653	513	-21.4	1	0.8
29-2081.00	Opticians, Dispensing	31	18	-41.9	1.8	0.7
29-2091.00	Orthotists and Prosthetists	4	9	125.0	0.9	1.6
29-2092.00	Hearing Aid Specialists	10	7	-30.0	1.4	0.9

O*Net Code	Occupation Title	Job Postings			Location Quotient	
		2016	2019	% Change	2016	2019
29-2099.00	Health Technologists and Technicians, All Other	357	532	49.0	1	1.1
29-2099.01	Neurodiagnostic Technologists	8	19	137.5	0.5	1
29-2099.06	Radiologic Technicians	27	32	18.5	0.8	0.7
29-2099.07	Surgical Assistants	4	9	125.0	0.2	0.4
29-9011.00	Occupational Health and Safety Specialists	77	162	110.4	0.7	1.2
29-9012.00	Occupational Health and Safety Technicians	77	56	-27.3	2.6	1.4
29-9091.00	Athletic Trainers	18	43	138.9	0.7	1.3
29-9092.00	Genetic Counselors	13	6	-53.8	1.2	0.6
29-9099.00	Healthcare Practitioners and Technical Workers, All Other	5	3	-40.0	0.8	0.6
29-9099.01	Midwives	NA	2	NA	NA	1.6
	Total, Healthcare Practitioners and Technical Occupations	18265	15525	-15.0		
31-1011.00	Home Health Aides	353	317	-10.2	1.1	0.9
31-1013.00	Psychiatric Aides	1	12	1100.0	0	1.5
31-1014.00	Nursing Assistants	1657	1453	-12.3	1.5	1.5
31-1015.00	Orderlies	35	73	108.6	0.7	1.2
31-2011.00	Occupational Therapy Assistants	149	73	-51.0	1.2	0.9
31-2012.00	Occupational Therapy Aides	49	24	-51.0	1.3	0.5
31-2021.00	Physical Therapist Assistants	197	104	-47.2	1.1	0.8
31-2022.00	Physical Therapist Aides	26	40	53.8	2.5	1.8
31-9011.00	Massage Therapists	33	113	242.4	0.6	1.1
31-9091.00	Dental Assistants	160	213	33.1	1.3	1.4
31-9092.00	Medical Assistants	502	585	16.5	0.9	0.8
31-9093.00	Medical Equipment Preparers	68	115	69.1	0.8	1.1
31-9094.00	Medical Transcriptionists	187	24	-87.2	2.4	0.7
31-9095.00	Pharmacy Aides	17	14	-17.6	1	0.5
31-9096.00	Veterinary Assistants and Laboratory Animal Caretakers	11	19	72.7	0.4	0.4
31-9097.00	Phlebotomists	143	197	37.8	0.9	1.2
31-9099.00	Healthcare Support Workers, All Other	91	41	-54.9	2.4	1.2
31-9099.02	Endoscopy Technicians	3	18	500.0	0.2	1.3
	Total, Healthcare Support Occupations	3682	3435	-6.7		
	Total	21947	18960	-13.6		

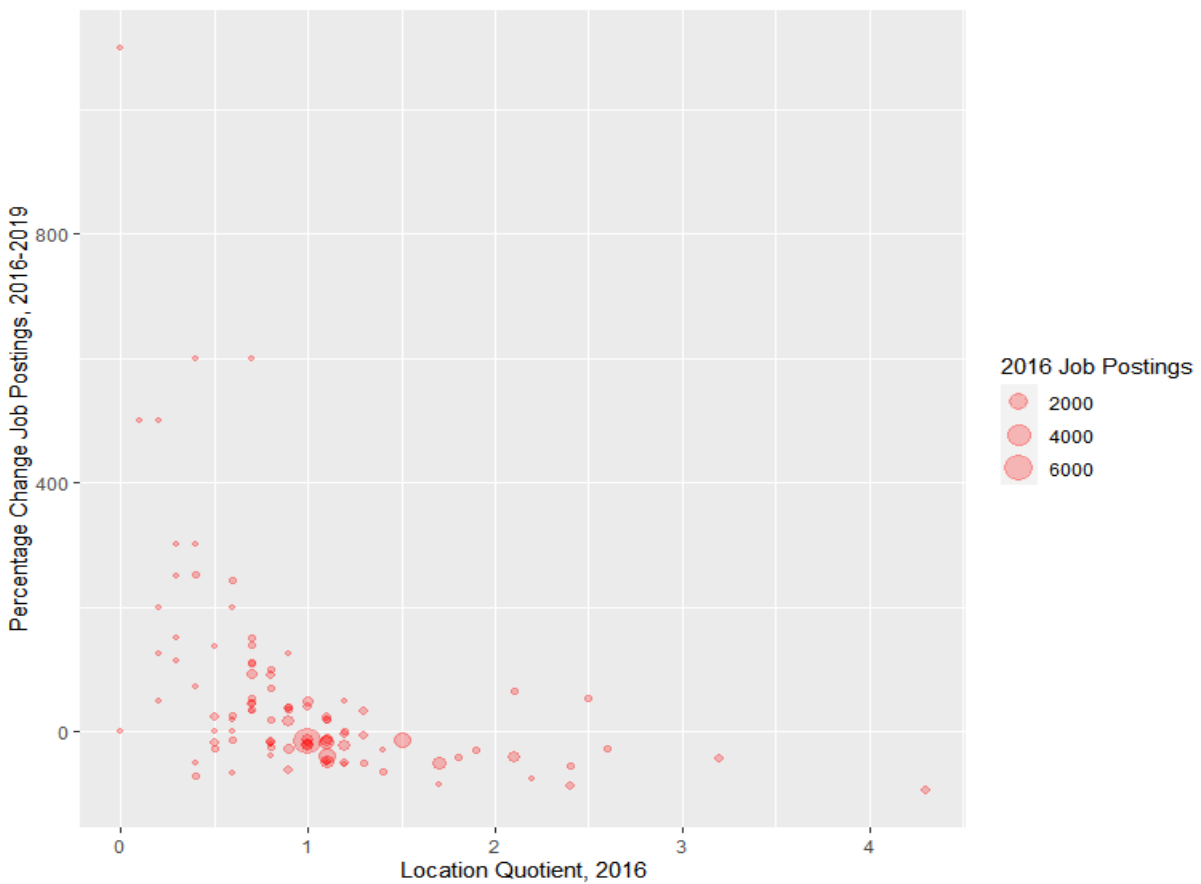
Source: The Conference Board via Lightcast (formerly Emsi-Burning Glass).

Figure 7: Monthly job postings for health care practitioners and technical and health care support occupations, Idaho



Source: Lightcast (formerly Emsi-Burning Glass) using data from The Conference Board.

Figure 8: Job posting growth vs. initial posting concentration by occupation, Idaho



Source: The Conference Board via Lightcast (formerly Emsi-Burning Glass).

1.3 Lightcast data on health care program completions

Lightcast collects data on program completions for public and private colleges and universities, organized by the Classification of Instructional Programs (CIP) coding system. [Table 4](#) provides data on program completions for 2019, the four-year growth rate of program completions, and average annual openings for health professions and related clinical sciences (CIP two-digit code 51). While CIP codes are not easily mappable to SOC and O*Net occupational codes, Lightcast provides its own estimate of annual job openings for each program using Conference Board data along with government labor force statistics. In some cases, there is a large difference between annual openings and program completions. Job openings entail both new positions created as well as the turnover, or churn, from job switchers and the replacement of market exits with market entrants. Lastly, some programs were omitted for the sake of brevity, so summing across programs will not equal the reported total value in the table.

Aggregate program completions in health professions and related clinical sciences grew 14% between 2015 and 2019 (3.3% annualized). Compare this first to Idaho Occupational and Employment Wage Statistics on employment growth of 40.9% (8.9% annualized). While there may be some discrepancy between program definitions and occupational definitions that hinder comparison, some of the employment growth is due to in-migration of health care workers as opposed to Idahoans entering these fields after completing their program studies.⁶ Discussions with individuals from several Idaho educational institutions also highlighted a nonsignificant number of health care program graduates leaving the state to practice due to competitive out-of-state pay,⁷ out-of-state personal ties⁸ and difficulties placing Idaho students in-state for their clinical training. Nevertheless, where students go for their clinicals is strongly correlated with where they land their first job out of school.

According to discussions with health care providers and individuals from the Idaho Division of Occupational and Professional Licenses, the most cited needs during this period were for registered nurses (RNs), nurse practitioners (NPs), licensed practical and vocational nurses (LPN/LVNs), registered pharmacists (RPhs), and pharmacy technicians and assistants. In the years leading up to the pandemic, gains in program completions for nurses had slowed considerably; the three-year growth rate for RNs was a mere 2%, while gains for LPNs/LVN completions had fallen 26%. For registered pharmacists, program completions fell by 10%, and for pharmacy technicians and assistants, program completions fell 41%.

⁶ While a detailed breakdown of labor force growth between growth from natural increases and migration is not available, the breakdown of population growth is informative as a point of comparison. [The U.S. Census Bureau's estimates for Idaho](#) showed 73% of growth coming from in-migration between July 2017 and July 2018.

⁷ While a national comparison was not included, a glance at the [national tables](#) would show that Idahoan health care workers (e.g., registered nurses and pharmacists) make less than their national peers on average.

⁸ For example, many cited Brigham Young University-Idaho's student population is comprised of a large number of out-of-state residents, many of whom return to their home state upon graduating.

Table 4: Health care program completions, Idaho

CIP Code	Program Description	Completions 2019	% Change 2015-2019	Avg. Annual Openings
51.0000	Health Services/Allied Health/Health Sciences, General	106	159%	1,331
51.0202	Audiology/Audiologist	8	-11%	29
51.0203	Speech-Language Pathology/Pathologist	41	-2%	142
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist	36	6%	172
51.0601	Dental Assisting/Assistant	95	-21%	397
51.0602	Dental Hygiene/Hygienist	100	1%	222
51.0701	Health/Healthcare Administration/Management	151	64%	4,013
51.0707	Health Information/Medical Records Technology/Technician	10	-50%	1,511
51.0710	Medical Office Assistant/Specialist	29	-28%	6,570
51.0714	Medical Insurance Specialist/Medical Biller	3	-84%	535
51.0801	Medical/Clinical Assistant	186	-29%	565
51.0805	Pharmacy Technician/Assistant	22	-41%	308
51.0806	Physical Therapy Assistant	92	136%	176
51.0899	Allied Health and Medical Assisting Services, Other	2	-95%	3,200
51.0904	Emergency Medical Technology/Technician (EMT Paramedic)	41	-11%	737
51.0907	Medical Radiologic Technology/Science - Radiation Therapist	23	-30%	200
51.0908	Respiratory Care Therapy/Therapist	195	95%	151
51.0909	Surgical Technology/Technologist	78	7%	251
51.0911	Radiologic Technology/Science - Radiographer	123	102%	293
51.0912	Physician Assistant	74	28%	112
51.0913	Athletic Training/Trainer	56	12%	742
51.1005	Clinical Laboratory Science/Medical Technology/Technologist	43	39%	159
51.1101	Pre-Dentistry Studies	1	-67%	137
51.1102	Pre-Medicine/Pre-Medical Studies	17	31%	1,056
51.1103	Pre-Pharmacy Studies	4	-20%	115
51.1199	Health/Medical Preparatory Programs, Other	0	0%	7,489
51.1501	Substance Abuse/Addiction Counseling	9	80%	754
51.1505	Marriage and Family Therapy/Counseling	37	12%	374
51.1508	Mental Health Counseling/Counselor	17	42%	754
51.2001	Pharmacy	79	-10%	497
51.2201	Public Health, General	15	200%	2,033
51.2207	Public Health Education and Promotion	345	117%	503
51.2299	Public Health, Other	17	-35%	2,033
51.2306	Occupational Therapy/Therapist	9	-10%	85
51.2308	Physical Therapy/Therapist	34	6%	109
51.2309	Therapeutic Recreation/Recreational Therapy	0	0%	14
51.2310	Vocational Rehabilitation Counseling/Counselor	0	0%	200
51.2706	Medical Informatics	8	700%	1,736
51.3101	Dietetics/Dietitian	30	58%	105
51.3201	Bioethics/Medical Ethics	0	0%	1,980

CIP Code	Program Description	Completions 2019	% Change 2015-2019	Avg. Annual Openings
51.3501	Massage Therapy/Therapeutic Massage	113	19%	336
51.3801	Registered Nursing/Registered Nurse	1,214	2%	1,629
51.3802	Nursing Administration	12	-8%	1,446
51.3805	Family Practice Nurse/Nursing	15	Insf. Data	1,282
51.3901	Licensed Practical/Vocational Nurse Training	159	-26%	311
	Total	4,069	14%	

Source: Lightcast (formerly Emsi-Burning Glass).

Note: Idaho graduates from the WWAMI Regional Medical Education Program are not included. The state of Idaho has supported 40 students entering the program every year, of which 51% typically go on to practice in Idaho after graduating.⁹

1.4 Idaho Department of Labor 10-year occupational projections – 2020 to 2030

Idaho’s long-term occupational employment projections cover the decade running from 2020 to 2030 and are based on six interrelated models — labor force, the aggregate economy, final demand, industry output, employment by industry and employment by occupation. These models factor out fluctuations tied to the business cycle. The projections include employment forecasts and an estimated 10-year employment growth rate for each occupation, as well as annual averages for job openings from growth and occupational turnover (i.e., the sum of labor force exits and occupational transfers). Published in 2021, the most recent set of long-term projections were based in part on data from 2020 when the pandemic and its consequences were unknown or just beginning to be understood. Therefore, Labor projections should be interpreted as a counterfactual had the pandemic not occurred. As such, these data sets can still provide a baseline for what the state expected and therefore a point of comparison for the trends we are currently observing.

Looking first at the aggregates in [Table 5](#), the department’s projections anticipated combined health care practitioners and technical and health care support occupations growing 19.7% over 10 years. Annualized, those occupations were projected to grow by only 1.8%, a fifth of the growth rate experienced between 2015 and 2019. Compare this to the growth rate across all occupations of 14.8%, or 1.4% when annualized (not reported here but found in [Table 1.06 of the Statewide Occupational Projections](#)). The projected slowdown is due to several factors. First and foremost, much of the growth in health care over the preceding years related to demographic aging of the population, principally the baby boomer generation moving into retirement, followed next by the somewhat smaller Generation X. However, the age structure of the U.S. population was expected to stabilize through the 2020s. The share of the national population 65 years and older would grow from around 13% in 2010 to 16.9% in 2020, 20.6% in 2030 and only 21.6% in 2040.¹⁰ Because the growth rate of share of older Idahoans is slowing, we would expect healthcare employment growth slow as well, though perhaps not at the same rate. While the state population was also expected to grow, high growth rates experienced in the years preceding the pandemic were not expected to continue indefinitely, with in-migration slowing and out-migration increasing as rising costs make the state less attractive. Together, these factors would subdue growth in demand for health care occupations as well as supply, thereby reducing employment growth.

⁹ [Idaho WWAMI webpage, University of Idaho](#)

¹⁰ [2017 National Population Projections Tables, U.S. Census Bureau.](#)

However, employment in health care occupations was still expected to increase faster than employment overall; therefore, health care was expected to comprise a larger share of the workforce by 2030.

The estimated turnover from workers leaving these occupations — either due to labor force exits or occupational transfers — should also be considered. Taking the midpoint between 2020 and 2030 employment levels and dividing that into total turnovers produces projected annual turnover rates of around 5.1% for health care practitioners and technical occupations and 10.8% for health care support occupations. Contrast this with the turnover rate of 10.2% computed across all occupations (not reported here but found in [Table 1.06 of the Statewide Occupational Projections](#)). This difference in turnover rates between health care practitioners and technical occupations and health care support occupations is largely reflective of higher average pay among the former group. Health care practitioners had an average wage of \$78,290 in 2019, while health care support staff had an average wage of \$28,680 (see [Table 2](#)). Higher paying occupations tend to see lower turnover because workers have fewer available options for moving up the income distribution ladder. [Figure 9](#) provides a scatterplot showing this relationship.

Looking at a few individual health care occupations including pharmacists, pharmacy technicians, nurses (including RNS, NPs and LPV/LVNs), physicians and surgeons and provides further insight. Employment growth for pharmacists was forecasted to be around 1.2% on an annualized basis, with an estimated annual turnover rate of around 3.9%. Taking these growth rates together would imply a pharmacist entrant rate for Idaho of 5.1%.¹¹ Compare this with the pre-pandemic implied entrant rate of 4.9% — 79 program completions in 2019 ([Table 4](#)) combined with 2019 employment of 1,600 ([Table 3](#)), presuming all graduating pharmacists will practice in Idaho. Of course, some graduates may move out of state, but net migration data suggests more will in-migrate. It would appear the projections are reasonable based on pre-pandemic trends; however, if the turnover rate were to increase by 1.2%, employment growth would be nil.

For pharmacy technicians, Idaho projections placed employment growth at a slightly slower pace of 11.5% over 10 years (1.1% when annualized). Combined with an average projected turnover rate of 7.4% per year, this implies an entrant rate of 8.5%, far larger than the 1% entrant rate implied by pharmacy tech program completions and employment in 2019. Absent a comparatively large inflow into the occupation from elsewhere (e.g., out-of-state pharmacy techs moving to Idaho), projections would appear to overstate employment growth, possibly projecting growth when there may in fact be a decline. Based upon discussions with the Idaho Division of Occupational and Professional Licenses, education program administrators and others, the reality was probably closer to the pessimistic story. A shortage of pharmacy techs before the pandemic was mentioned on a few occasions.

Turning to nursing, registered nurses, nurse anesthetists, nurse midwives and nurse practitioners, all were projected to have an average turnover rate of around 4.8% to 4.9%, whereas annualized employment growth was projected to be 1.8%, 2.4%, 2.5% and 1.9%, respectively. Using the same calculations for prior occupations, this would imply respective entrant rates of 6.6%, 7.2%, 7.4% and 6.8%. By comparison, data from 2019 showed 1,214 RN program completions, with 14,110 RNs employed, yielding an implied entrant rate from completions of 8.6%. It would also appear the inflow of

¹¹ The annual change in occupational employment is the sum of the negative of turnover from labor force exits and occupational transfers plus entrants: $\Delta Emp = Entrants - Turnover$. Dividing by employment level provides the growth rate as the difference in entrant and turnover rates.

new nurses would be enough to meet these projections at least for RNs. This contrasts with discussions involving several stakeholders, many of whom cited a nursing shortage prior to the pandemic. One possible explanation for this discrepancy is the implied entrant rate from program completions overstates the true number of new Idaho nurses. Nursing graduates from BYU-ID have a much higher tendency to leave the state after graduating,¹² and a nonsignificant number of RNs graduating from public Idaho universities choose to practice elsewhere, due in part to more competitive pay as well as having completed their clinical training in other states.¹³ Additionally, the occupational projections may understate the turnover rate. Whatever the reason, common reports of a nursing shortage prior to the pandemic along with an employment location quotient of 0.96 in 2019 support a nursing shortage narrative over what is implied by projections and program completions.

Moving briefly on to LPNs/LVNs, employment growth was projected at an annualized rate of 1.6% and the annual turnover rate was projected to be 6.9%, implying an entrant rate of 8.5%. This contrasts with the implied entrant rate from program completions of 6% in 2019 and conforms with stakeholder discussions which similarly noted a shortage of LPNs/LVNs in the leadup to the pandemic.

In the case of physicians and surgeons, the projected annual turnover rate from all these occupations taken together was around 2.7%, whereas the annualized employment growth rate was 1.9%, implying an entrant rate of 4.6%. By comparison, 40 Idahoans enter the WWAMI Regional Medical Education Program annually, with an average of 51% choosing to practice in Idaho. Using 2019's employment statistics, this would imply an entrant rate of only 1.6%, one-third of the projected new entrants, meaning the remaining two-thirds would need to be filled by individuals moving to Idaho to practice. Worse yet, absent growth in the program and/or increasing graduate retention in state, a growing employment level for physicians and surgeons would require an ever-growing share of out-of-state practitioners coming to Idaho to practice. This was echoed in discussions with education program administrators as well as hospital and clinic administrators.

Putting it all together, the pipeline of new health care professions was either just keeping pace with demand (pharmacists) or falling short (pharmacy technicians, nurses, physicians and surgeons) for many key occupations. One immediate consequence is that this shortfall would need to be filled by individuals relocating to Idaho from out of state, likely contributing to higher labor costs as workers typically expect to be compensated for relocating long distances. Any increase in occupational turnover from market exits or occupational transfers — say, from accelerated retirements and career changes due to burnout from a multiyear pandemic — would further exacerbate these trends, requiring a larger set of effects to correct this imbalance (e.g., a larger inflow of workers from out of state, or rising wages and benefits to retain workers considering an exit).

¹² Lightcast's estimates for 2020 had BYU-ID graduating 276 of the 1,363 registered nurses in Idaho, or roughly a fifth of all RN program completions that year. However, given the large number of out-of-state residents who attend BYU-ID, it is not surprising for a large share of graduates to return to their home state upon graduation.

¹³ Discussions with education program administrators noted ongoing difficulties placing nursing students in clinics and hospitals in-state for the clinical portion of their training, owing to limited capacity at sites in proximity to universities or students' homes. Discussions with clinic and hospital administrators also noted this limitation.

2.0 COVID trends in employment, wages, job postings and program enrollments

Since 2019, COVID-19 has contributed to many difficulties among health care workers and employers. Some of these effects only exacerbated pre-pandemic trends, such as regional disparities in recruitment and the shortage of nurses and other critical health care personnel. However, the pandemic also posed new challenges, including accelerating retirements among older workers and increasing occupational turnover as some workers no longer found their chosen line of work attractive enough to continue. In short, COVID-19 appeared to work on both sides of the labor market by shifting demand for specific occupations (some, like nurses, notably increased) as well as shifting supply as workers' opportunity costs were affected.

Program admissions and enrollment do not appear to have been significantly affected. Most programs have ample qualified applicants (pharmacy being the notable exception). Pre-pandemic difficulties including faculty recruitment and retention and a lack of clinical training sites were only aggravated by the pandemic, meaning any further increases in this pipeline will require additional investments in education, hospitals and clinics. On the demand side, employers cite increased turnover and difficulties with recruiting essential occupations — especially nursing — in addition to growing concern over affordable housing as a deterrent for many potential workers. With pandemic relief funds drying up, providers — especially in rural areas — will be in an even more difficult position to meet these challenges.

2.1 U.S. Bureau of Labor Statistics - Occupational Employment and Wage Statistics

Between May 2019 and May 2021 ([Tables 2](#) and [6](#), respectively), there was an aggregate increase in employment among health care occupations of 6.2% (3.1% annualized), 6.7% for health care practitioners and technical occupations (3.3% annualized), and 5.5% for health care support occupations (2.7% annualized). Some of this would have occurred in the absence of the COVID-19 pandemic, as previously shown in the occupational employment projections in Table 5. A 1.8% annualized growth rate was projected for health care practitioners and technical occupations as well as health care support occupations. This aggregate growth across health care occupations trailed the national trend, as evidenced by the decline in employment location quotient for both major groups. Growth of the average wage in aggregate was 7.4% (3.6% annualized), stronger than the average Idaho wage growth of 7% (3.3% annualized).

Table 5: Detail projected annual employment and openings by occupation – 2020 - 2030

SOC Code	Occupation Title	Employment			Projected Annual Openings, 2020-30				
		2020	2030	% Change	Labor Force Exits	Occupational Transfers	Total Turnover	Openings Due to Growth	Total Projected Openings
29-0000	Healthcare Practitioners and Technical Occupations	44,365	53,107	19.7%	1,241	1,242	2,483	874	3,357
29-1000	Health Diagnosing and Treating Practitioners	31,244	37,696	20.7%	842	703	1,544	645	2,189
29-1011	Chiropractors	359	469	30.6%	6	3	9	11	20
29-1021	Dentists, General	461	565	22.6%	11	4	15	10	25
29-1022	Oral and Maxillofacial Surgeons	-	-	-	-	-	-	-	-
29-1023	Orthodontists	60	74	23.3%	1	1	2	1	3
29-1029	Dentists, All Other Specialists	-	-	-	-	-	-	-	-
29-1031	Dietitians and Nutritionists	396	445	12.4%	14	12	26	5	30
29-1041	Optometrists	257	317	23.3%	5	3	8	6	14
29-1051	Pharmacists	1,522	1,714	12.6%	34	29	62	19	82
29-1071	Physician Assistants	857	1,052	22.8%	14	35	49	20	69
29-1081	Podiatrists	20	24	20.0%	1	1	1	0	2
29-1122	Occupational Therapists	796	981	23.2%	20	26	46	19	65
29-1123	Physical Therapists	1,773	2,200	24.1%	37	37	74	43	117
29-1124	Radiation Therapists	58	67	15.5%	1	2	3	1	4
29-1125	Recreational Therapists	99	114	15.2%	3	3	5	2	7
29-1126	Respiratory Therapists	743	906	21.9%	20	17	36	16	53
29-1127	Speech-Language Pathologists	756	907	20.0%	18	26	44	15	59
29-1128	Exercise Physiologists	49	61	24.5%	2	2	3	1	4
29-1129	Therapists, All Other	23	27	17.4%	1	1	1	0	2
29-1131	Veterinarians	592	659	11.3%	10	9	20	7	26
29-1141	Registered Nurses	15,352	18,402	19.9%	458	351	809	305	1,114
29-1151	Nurse Anesthetists	734	935	27.4%	15	25	40	20	60
29-1161	Nurse Midwives	43	55	27.9%	1	1	2	1	4
29-1171	Nurse Practitioners	859	1,032	20.1%	20	27	47	17	64
29-1181	Audiologists	70	88	25.7%	2	2	4	2	5
29-1211	Anesthesiologists	317	393	24.0%	6	4	10	8	17
29-1215	Family Medicine Physicians	1,206	1,463	21.3%	22	14	36	26	62
29-1216	General Internal Medicine Physicians	128	153	19.5%	2	2	4	3	6
29-1218	Obstetricians and Gynecologists	17	22	29.4%	0	0	1	1	1
29-1221	Pediatricians, General	97	120	23.7%	2	1	3	2	5
29-1223	Psychiatrists	156	194	24.4%	3	2	5	4	9
29-1228	Physicians, All Other; and Ophthalmologists, Except Pediatric	1,150	1,372	19.3%	20	14	34	22	56
29-1248	Surgeons, Except Ophthalmologists	100	117	17.0%	2	1	3	2	5

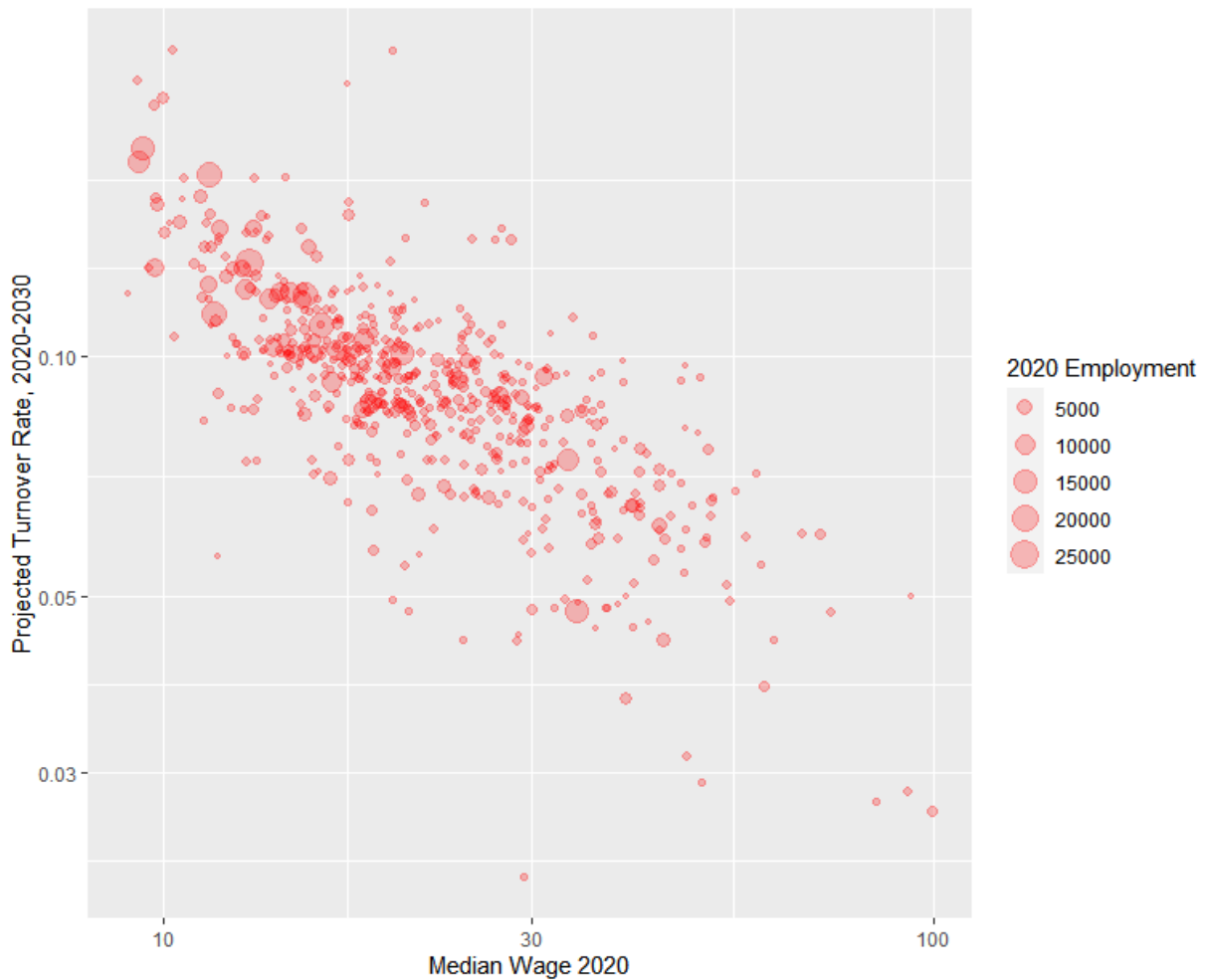
SOC Code	Occupation Title	Employment			Projected Annual Openings, 2020-30				
		2020	2030	% Change	Labor Force Exits	Occupational Transfers	Total Turnover	Openings Due to Growth	Total Projected Openings
29-1292	Dental Hygienists	2,050	2,611	27.4%	89	49	138	56	194
29-1298	Acupuncturists and Healthcare Diagnosing or Treating Practitioners, All Other	129	142	10.1%	4	2	6	1	8
29-2000	Health Technologists and Technicians	12,882	15,143	17.6%	394	532	926	226	1,152
29-2010	Clinical Laboratory Technologists and Technicians	508	625	23.0%	15	16	31	12	43
29-2031	Cardiovascular Technologists and Technicians	298	363	21.8%	8	8	16	7	23
29-2032	Diagnostic Medical Sonographers	290	363	25.2%	8	8	16	7	23
29-2033	Nuclear Medicine Technologists	73	91	24.7%	2	2	4	2	6
29-2034	Radiologic Technologists	1,030	1,257	22.0%	27	28	55	23	78
29-2035	Magnetic Resonance Imaging Technologists	182	227	24.7%	5	5	10	5	14
29-2040	Emergency Medical Technicians and Paramedics	1,112	1,233	10.9%	20	48	67	12	79
29-2051	Dietetic Technicians	83	98	18.1%	3	4	7	2	8
29-2052	Pharmacy Technicians	2,043	2,277	11.5%	61	99	160	23	183
29-2053	Psychiatric Technicians	380	440	15.8%	12	19	30	6	36
29-2055	Surgical Technologists	837	1,024	22.3%	26	43	69	19	88
29-2056	Veterinary Technologists and Technicians	688	771	12.1%	21	33	54	8	62
29-2057	Ophthalmic Medical Technicians	222	284	27.9%	7	12	19	6	25
29-2061	Licensed Practical and Licensed Vocational Nurses	2,770	3,257	17.6%	98	109	207	49	256
29-2081	Opticians, Dispensing	597	706	18.3%	27	20	46	11	57
29-2091	Orthotists and Prosthetists	96	108	12.5%	3	4	7	1	8
29-2092	Hearing Aid Specialists	44	47	6.8%	1	2	3	0	3
29-2098	Medical Dosimetrists, Medical Records Specialists, and Health Technologists and Technicians, All Other	1,629	1,972	21.1%	52	75	126	34	160
29-9000	Other Healthcare Practitioners and Technical Occupations	239	268	12.1%	5	7	13	3	15
29-9091	Athletic Trainers	150	173	15.3%	3	5	8	2	10
29-9092	Genetic Counselors	-	-	-	-	-	-	-	-
29-9098	Health Information Technologists, Medical Registrars, Surgical Assistants, & Healthcare Practitioners, AO	88	94	6.8%	2	3	5	1	5
31-0000	Healthcare Support Occupations	36,297	43,462	19.7%	2,169	2,119	4,288	717	5,004
31-1000	Nursing, Psychiatric, and Home Health Aides	25,889	30,666	18.5%	1,669	1,420	3,089	478	3,567
31-1120	Home Health and Personal Care Aides	17,399	20,638	18.6%	1,173	970	2,143	324	2,466
31-1131	Nursing Assistants	8,238	9,723	18.0%	482	437	918	149	1,067
31-1132	Orderlies	207	255	23.2%	12	11	24	5	28
31-1133	Psychiatric Aides	45	50	11.1%	3	2	5	1	5

SOC Code	Occupation Title	Employment			Projected Annual Openings, 2020-30				
		2020	2030	% Change	Labor Force Exits	Occupational Transfers	Total Turnover	Openings Due to Growth	Total Projected Openings
31-2000	Occupational Therapy and Physical Therapist Assistants and Aides	931	1,149	23.4%	42	64	106	22	128
31-2011	Occupational Therapy Assistants	198	247	24.7%	10	12	21	5	26
31-2012	Occupational Therapy Aides	21	23	9.5%	1	1	2	0	2
31-2021	Physical Therapist Assistants	493	613	24.3%	22	36	57	12	69
31-2022	Physical Therapist Aides	219	266	21.5%	10	16	25	5	30
31-9000	Other Healthcare Support Occupations	9,477	11,647	22.9%	457	635	1,093	217	1,310
31-9011	Massage Therapists	481	548	13.9%	30	22	52	7	59
31-9091	Dental Assistants	2,644	3,368	27.4%	129	172	301	72	374
31-9092	Medical Assistants	3,635	4,515	24.2%	156	249	405	88	493
31-9093	Medical Equipment Preparers	337	414	22.8%	20	20	40	8	47
31-9094	Medical Transcriptionists	559	650	16.3%	33	40	73	9	82
31-9095	Pharmacy Aides	73	83	13.7%	4	5	9	1	10
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	543	609	12.2%	28	54	82	7	89
31-9097	Phlebotomists	717	897	25.1%	30	46	76	18	94
31-9099	Healthcare Support Workers, All Other	488	563	15.4%	28	28	56	8	63
	Total	80,662	96,569	19.7%	3,410	3,361	6,771	1,591	8,362

Source: Long-Term Occupational Projections 2020-2030, Idaho Department of Labor.

Notes: Occupational openings are defined as due to turnover or growth. Turnover openings are caused by an existing worker leaving the workforce altogether (labor force exits), such as due to retirement or by a worker leaving their job to enter a new occupation (occupational transfers). Growth openings are job openings produced when a new job is created by the economy. Labor Force Exits + Occupational Transfers = Total Turnover; Total Turnover + Growth Openings = Total Annual Openings.

Figure 9: Projected turnover rate vs. median hourly wages by occupation, Idaho



Source: Idaho Department of Labor.

Note: Horizontal and vertical axis rescaled using the base-10 logarithm. All occupations from projection table included.

Diving into individual occupations, a similar pattern as seen in the pre-pandemic period is apparent between occupational employment growth and average wage growth by occupation, as shown in [Figure 10](#). Occupations exhibiting the greatest employment growth tended to have lower — sometimes negative — growth in average earnings. Occupations that grew slower — or even declined — tended to see the highest growth in average earnings. (The Pearson’s product-moment correlation was -0.299 and was statistically significant at the 0.05 level.) This is only a descriptive relationship and should not be inferred as causal but is consistent with a supply-driven rather than a demand-driven narrative. Put another way, one might focus on supply-side factors including labor force exits and occupational transfers when explaining the change in occupational wages over this two-year period.

Notable outliers in [Figure 10](#) would include general internal medicine physicians, which experienced a decline in employment from 120 to 70 (-41.7%), and an increase in average annual wage from \$173,190 to \$280,340 (+61.9%). Another outlier was family medicine physicians, where employment declined from 830 to 750 (-12%) and average annual earnings rose from \$227,160 to \$305,960 (+34.7%). Pharmacy aides are one notable outlier at the other extreme — employment grew by 185.7% while the

average annual wage shrunk by 3.4%. Still another outlier at this extreme was general dentists with employment growing from 420 to 720 (+71.4%) and the average wage falling by 38.9%. Due to the sample-based nature of the OEWS, these outliers may reflect statistical noise and therefore the exact magnitudes should be taken with caution.

Looking at specific occupations by their location quotient, there are again a few notable groups to mention.

While the employment of registered nurses grew, this growth was by a mere 2.1% (1.0% annualized), considerably slower than employment growth overall and part of a declining share of nurses in the labor force relative to the national average. The location quotient for RNs dropped from 0.96 in 2019 to 0.88 in 2021. This was accompanied by slightly slower growth in the average wage of RNs at only 6.0% over the same two-year period (3.0% annualized). This was unexpected, given the many interviews and a survey of nurses (see [Section 3](#) below) that mentioned the financial rewards for working as a traveling nurse during the pandemic. This lack of growth in compensation may reflect the fact that surveys are conducted at the establishment level. Traveling nurses, though working in a hospital in Coeur D'Alene, for example, may be technically employed by the traveling nurses service located out of state, in which case their wages and employment may be recorded out of state instead of in Idaho. Still, the anemic growth of RNs in the Idaho labor force as measured by the Occupational and Employment Wage survey corresponds to the high frequency of mentions of RNs as being in high demand by Idaho hospitals (see [Section 2.4](#) below).

Physicians and surgeons also saw their share of the Idaho labor force shrink relative to the nation overall. The location quotient for internal medicine physicians fell from an already small 0.55 to 0.23, owing in large part to the previously mentioned 41.7% decline in employment for these occupations. Family medicine physicians, whose employment level fell 12% percent, saw their location quotient fall from 1.53 in 2019 to 1.31, though this value being above 1.0 still indicates a relative abundance in comparison to the nation overall.

There were a few other notable employment declines (either absolute or in relative terms) worth mentioning before moving on to job postings. Physical therapists' employment in Idaho contracted from 1,390 in 2019 to 980 in 2021 — a 29.5% decline — which helped drive that occupation's location quotient to 0.96 from an initial 1.2. Licensed practical and vocational nurses (LPNs/LVNs) and nursing assistants also saw employment declines over this period, contributing to their declining share of the Idaho labor force relative to the nation. LPNs/LVNs saw employment decline by 18.5% between 2019 and 2021 and their location quotient fell from 0.77 to 0.63. Nursing assistant employment, on the other hand, shrunk by 5% during this period and their location quotient fell from 1.03 to 0.97. Respiratory therapists declined in absolute and relative terms, falling from 660 to 530 persons (-19.7%) and shrinking in relative share of the labor force from an LQ of 1.01 to 0.74. Lastly, pharmacists' employment fell from 1,600 to 1,580 — a 1.3% decline — and their location quotient fell from 1.04 to 0.94.

2.2 Conference Board data on job postings

Demand for health care workers of nearly all stripes increased during the first two years of the pandemic. Job posting data from The Conference Board indicate the demand for health care practitioners and technical occupations as well as health care support occupations more than doubled

between 2019 and 2021, as seen in [Figure 11](#)'s monthly time series, which extends the time series shown in [Figure 7](#) to the present. Monthly job postings in Idaho for these two occupational groups grew from around 1,000 in the first three quarters of 2019 to around 1,500 through early- and mid-2020, then topping 2,000 throughout most of 2021 and all of 2022. Looking at job postings by occupation, however, reveals how varied the demand was for these workers (see [Table 7](#)).

Respiratory therapy technicians saw a significant increase in job postings owing to the pandemic, rising from only one in 2019 to 17 in 2021, a 1,600% increase. Demand for respiratory therapists grew 272% (168 to 625) over the same period. Nurses of nearly all types became highly sought after during this period as well because of their indispensability in hospitals and clinics. Job postings for nurse anesthetists rose by 1,560%, nurse midwives by 250%, RNs by 170%, LPNs/LVNs by 145%, critical care nurses by 120%, nursing assistants by 104% and NPs by 93%. Among the consequences of the pandemic has been a noticeable increase in demand for mental health and psychiatric services, as seen in the large increase in job postings for advanced practice psychiatric nurses (+550%), psychiatrists (+137%) and psychiatric technicians (+133%).

Registered pharmacists, whose representation in the Idaho labor force was roughly on par with the national average in 2019 — an employment LQ of 1.04 ([Table 2](#)) — found themselves in high demand as increased needs for prescriptions and other pharmacy-related services from the pandemic were accompanied by a notable decline in registered pharmacist employment numbers (see [Tables 2](#) and [6](#)). The 1.3% decrease in employment and the location quotient drop to 0.94 were likely due to a combination of market exits from early retirements and career changes from pandemic-related burnout. These adverse supply and demand shocks would have surely contributed to the 111.5% increase in job postings between 2019 and 2021.

Among physicians and surgeons, the pandemic's effects varied considerably by specialization. At one extreme were preventive medicine physicians and general pediatricians, whose job postings declined between 2019 and 2021 by 94% and 37%, respectively. At the other extreme were sports medicine physicians (+500% growth in job postings), urologists (+475%), surgeons (+337%), radiologists (+217%) and physical medicine physicians (+200%). These gains may be due in part to temporary emergency standards of care imposed during the pandemic, with many elective operations and procedures that were not time sensitive canceled or rescheduled. This would have contributed to lower-than-expected demand for some specialists and higher-than-expected demand for others. However, some of the discrepancies might also have been driven by growing demand for specialized care for a growing and aging population, making cost-minimizing economies of scale feasible for specialized staff.

Table 6: Occupational Employment and Wages Statistics, Idaho 2021

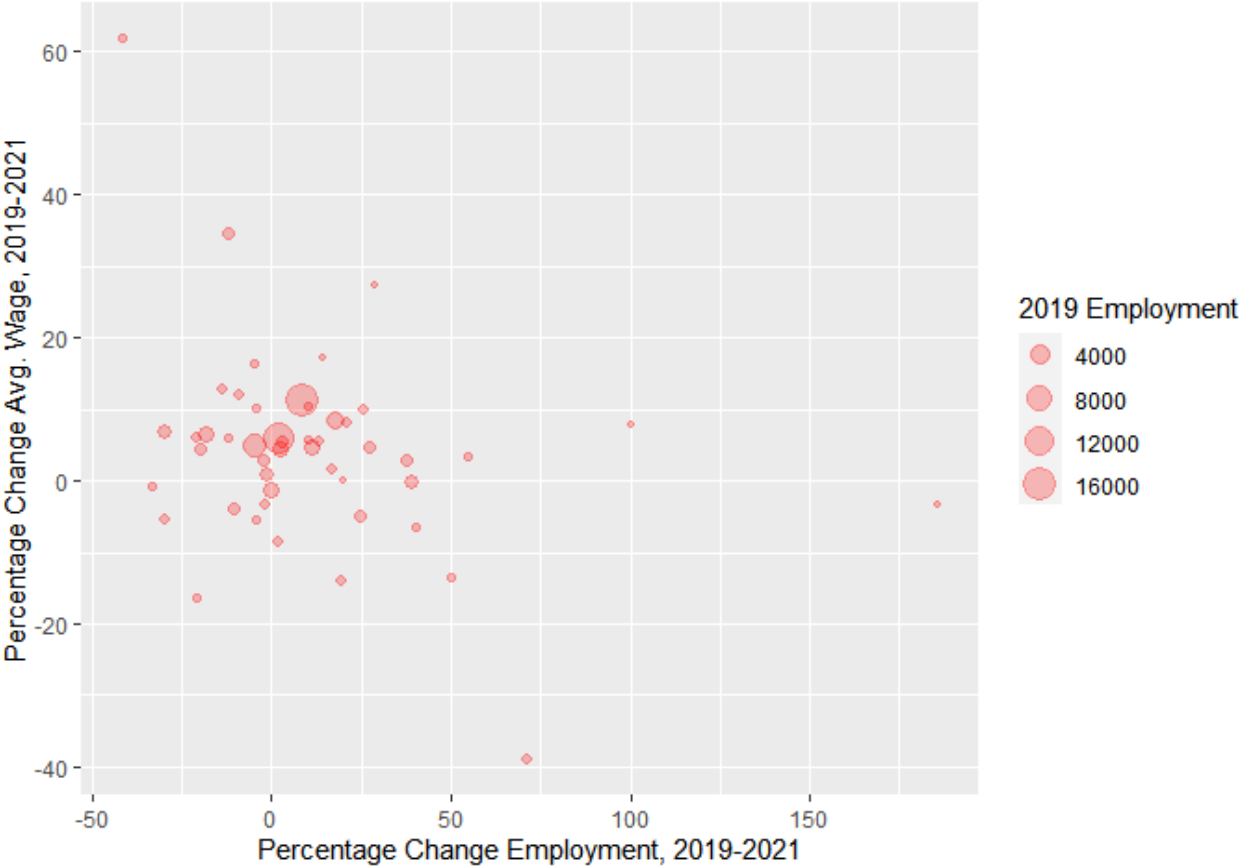
SOC Code	Occupation Title	Employment		Salary Distribution			Mean
		Level	LQ	25 th	50 th	75 th	
29-0000	Healthcare Practitioners and Technical Occupations	44,920	0.95	46,940	63,880	91,870	84,190
29-1011	Chiropractors	210	1.08	48,400	75,470	79,360	81,520
29-1021	Dentists, General	720	1.23	78,540	109,580	164,850	124,750
29-1031	Dietitians and Nutritionists	410	1.15	38,250	59,540	68,950	57,150
29-1041	Optometrists	190	0.91	49,030	78,280	105,820	85,200
29-1051	Pharmacists	1,580	0.94	121,620	127,940	131,080	122,420
29-1071	Physician Assistants	980	1.37	99,860	125,950	127,790	117,220
29-1081	Podiatrists	30	0.71	101,680	#	#	208,680
29-1122	Occupational Therapists	600	0.88	75,460	78,180	95,590	80,760
29-1123	Physical Therapists	980	0.81	77,190	80,340	99,040	85,880
29-1124	Radiation Therapists	80	0.88	79,870	99,560	102,060	93,830
29-1125	Recreational Therapists	90	1.04	36,930	47,670	57,640	48,250
29-1126	Respiratory Therapists	530	0.74	59,640	60,570	62,680	61,900
29-1127	Speech-Language Pathologists	800	1.01	58,780	76,260	96,210	74,580
29-1128	Exercise Physiologists	80	2.28	*	*	*	*
29-1131	Veterinarians	490	1.19	78,010	99,360	125,560	104,790
29-1141	Registered Nurses	14,400	0.88	61,030	75,560	79,360	73,640
29-1151	Nurse Anesthetists	490	2.07	154,440	164,860	164,900	171,790
29-1161	Nurse Midwives	110	2.63	48,000	61,410	78,480	61,740
29-1171	Nurse Practitioners	1,020	0.81	91,330	102,060	128,550	105,290
29-1181	Audiologists	140	1.97	51,880	75,660	79,250	69,460
29-1214	Emergency Medicine Physicians	**	**	#	#	#	#
29-1215	Family Medicine Physicians	730	1.31	#	#	#	305,960
29-1216	General Internal Medicine Physicians	70	0.23	60,190	#	#	280,340
29-1221	Pediatricians, General	**	**	134,620	169,660	206,800	175,750
29-1224	Radiologists	90	0.59	*	*	*	*
29-1229	Physicians, All Other	1,580	1.15	#	#	#	284,810
29-1249	Surgeons, All Other	80	0.48	#	#	#	320,740
29-1291	Acupuncturists	90	2.33	23,320	37,100	37,350	40,230
29-1292	Dental Hygienists	1,880	1.69	72,940	77,460	78,430	75,040
29-1299	Healthcare Diagnosing or Treating Practitioners, All Other	140	1.00	*	*	*	*
29-2010	Clinical Laboratory Technologists and Technicians	1,780	1.04	30,140	44,390	60,250	48,120
29-2031	Cardiovascular Technologists and Technicians	220	0.72	37,990	64,360	91,460	67,150
29-2032	Diagnostic Medical Sonographers	340	0.81	76,920	78,480	79,360	79,450
29-2033	Nuclear Medicine Technologists	60	0.67	77,030	79,360	98,030	83,360
29-2034	Radiologic Technologists and Technicians	1,350	1.16	48,360	60,570	76,600	62,370

SOC Code	Occupation Title	Employment		Salary Distribution			Mean
		Level	LQ	Percentile			
				25 th	50 th	75 th	
29-2035	Magnetic Resonance Imaging Technologists	110	0.55	77,030	78,870	94,690	81,720
29-2042	Emergency Medical Technicians	1,270	1.46	26,840	28,820	36,660	33,080
29-2043	Paramedics	590	1.14	36,750	46,460	57,680	47,630
29-2051	Dietetic Technicians	160	1.36	23,300	28,350	35,840	36,790
29-2052	Pharmacy Technicians	2,240	0.96	29,910	36,910	45,850	38,210
29-2053	Psychiatric Technicians	890	1.78	23,450	28,820	36,030	33,610
29-2055	Surgical Technologists	740	1.26	45,490	47,830	59,850	51,130
29-2056	Veterinary Technologists and Technicians	750	1.18	29,380	36,330	37,310	34,660
29-2057	Ophthalmic Medical Technicians	190	0.53	29,060	36,010	37,480	35,970
29-2061	Licensed Practical and Licensed Vocational Nurses	2,160	0.63	44,770	47,450	55,980	49,440
29-2072	Medical Records Specialists	1,390	1.43	36,930	46,480	49,520	45,400
29-2081	Opticians, Dispensing	520	1.31	29,270	30,720	37,570	35,400
29-2092	Hearing Aid Specialists	40	0.75	40,550	60,110	60,110	54,390
29-2099	Health Technologists and Technicians, All Other	550	0.73	36,750	38,860	59,380	47,380
29-9021	Health Information Technologists and Medical Registrars	90	0.43	38,090	59,120	76,600	71,300
29-9091	Athletic Trainers	110	0.81	44,260	47,850	58,900	54,420
29-9093	Surgical Assistants	**	**	35,870	37,050	46,640	38,040
29-9099	Healthcare Practitioners and Technical Workers, All Other	90	0.37	*	*	*	*
31-0000	Healthcare Support Occupations	34,760	0.98	23,420	28,870	36,070	30,740
31-1120	Home Health and Personal Care Aides	17,630	0.97	22,720	23,910	28,880	27,130
31-1131	Nursing Assistants	6,850	0.97	28,150	29,450	30,410	30,380
31-1132	Orderlies	220	0.92	28,350	28,850	37,090	34,750
31-2011	Occupational Therapy Assistants	120	0.55	30,740	60,110	63,060	52,740
31-2021	Physical Therapist Assistants	600	1.19	25,460	47,780	61,090	46,860
31-2022	Physical Therapist Aides	330	1.43	22,630	28,730	34,720	30,080
31-9011	Massage Therapists	390	0.89	36,750	47,980	60,550	56,770
31-9091	Dental Assistants	2,510	1.35	30,060	37,100	37,950	36,250
31-9092	Medical Assistants	3,950	1.01	30,160	37,120	38,990	37,650
31-9093	Medical Equipment Preparers	320	0.96	29,400	36,360	37,660	35,510
31-9094	Medical Transcriptionists	280	0.93	27,880	27,890	30,540	30,670
31-9095	Pharmacy Aides	200	0.84	23,360	28,900	37,090	29,930
31-9096	Veterinary Assistants and Laboratory Animal Caretakers	500	0.93	22,950	27,610	29,960	26,650
31-9097	Phlebotomists	490	0.69	29,940	36,020	37,660	35,120
31-9099	Healthcare Support Workers, All Other	370	0.63	28,820	28,820	31,070	31,470

Source: May 2021 Occupational Employment and Wage Statistics Survey, U.S. Bureau of Labor Statistics.

Notes: * indicates a wage estimate is not available; ** indicates an employment estimate is not available; # indicates a wage greater than or equal to \$100 per hour or \$208,000 per year.

Figure 10: Employment vs. average wage growth by occupation, Idaho 2019-2021



Source: May 2019 and May 2021 Occupational Employment and Wage Statistics Surveys, U.S. Bureau of Labor Statistics.

Table 7: Annual job postings for health care-related occupations, Idaho 2019 and 2021

O*Net Code	Occupation Title	Job Postings			Location Quotient	
		2019	2021	% Change	2019	2021
29-1011.00	Chiropractors	14	50	257.1	0.7	1
29-1021.00	Dentists, General	66	174	163.6	0.6	0.6
29-1022.00	Oral and Maxillofacial Surgeons	3	19	533.3	0.3	0.8
29-1023.00	Orthodontists	2	2	0.0	0.3	0.1
29-1029.00	Dentists, All Other Specialists	5	1	-80.0	0.7	0
29-1031.00	Dietitians and Nutritionists	259	540	108.5	1.4	1.1
29-1041.00	Optometrists	32	87	171.9	0.6	0.7
29-1051.00	Pharmacists	357	755	111.5	1.4	1.3
29-1061.00	Anesthesiologists	18	50	177.8	0.4	0.6
29-1062.00	Family and General Practitioners	181	339	87.3	0.8	1
29-1063.00	Internists, General	196	465	137.2	0.6	0.9
29-1064.00	Obstetricians and Gynecologists	120	268	123.3	1.3	1.5
29-1065.00	Pediatricians, General	60	38	-36.7	1.3	0.7
29-1066.00	Psychiatrists	62	147	137.1	0.4	0.7
29-1067.00	Surgeons	38	166	336.8	0.4	1
29-1069.00	Physicians and Surgeons, All Other	289	510	76.5	0.8	0.9
29-1069.02	Dermatologists	34	41	20.6	0.9	0.7
29-1069.03	Hospitalists	53	157	196.2	0.5	1.2
29-1069.04	Neurologists	56	64	14.3	1	0.7
29-1069.06	Ophthalmologists	7	17	142.9	0.8	0.9
29-1069.07	Pathologists	21	6	-71.4	3.8	0.4
29-1069.08	Physical Medicine and Rehabilitation Physicians	1	3	200.0	0	0.3
29-1069.09	Preventive Medicine Physicians	16	1	-93.8	2.1	0
29-1069.10	Radiologists	6	19	216.7	0.2	0.5
29-1069.11	Sports Medicine Physicians	5	30	500.0	0.3	1.1
29-1069.12	Urologists	12	69	475.0	0.4	1.1
29-1071.00	Physician Assistants	131	206	57.3	0.8	0.7
29-1071.01	Anesthesiologist Assistants	11	27	145.5	0.5	0.6
29-1122.00	Occupational Therapists	399	491	23.1	1.3	1.2
29-1122.01	Low Vision Therapists, Orientation and Mobility Specialists, and Vision Rehabilitation Therapists	2	3	50.0	0.5	0.4
29-1123.00	Physical Therapists	471	787	67.1	0.8	1
29-1124.00	Radiation Therapists	51	71	39.2	2.4	2.1
29-1125.00	Recreational Therapists	25	70	180.0	0.9	1.5
29-1125.02	Music Therapists	1	5	400.0	0	3.7
29-1126.00	Respiratory Therapists	168	625	272.0	1.1	1.5
29-1127.00	Speech-Language Pathologists	524	1021	94.8	1.3	1

O*Net Code	Occupation Title	Job Postings			Location Quotient	
		2019	2021	% Change	2019	2021
29-1128.00	Exercise Physiologists	15	45	200.0	1.4	2.1
29-1131.00	Veterinarians	55	335	509.1	0.7	1.1
29-1141.00	Registered Nurses	5391	14529	169.5	1.1	1.2
29-1141.01	Acute Care Nurses	1	2	100.0	0	0.8
29-1141.02	Advanced Practice Psychiatric Nurses	2	13	550.0	0.2	0.6
29-1141.03	Critical Care Nurses	909	1999	119.9	1.3	1.3
29-1141.04	Clinical Nurse Specialists	12	19	58.3	1.2	1.2
29-1151.00	Nurse Anesthetists	5	83	1560.0	0.1	1
29-1161.00	Nurse Midwives	6	21	250.0	0.9	1.8
29-1171.00	Nurse Practitioners	468	902	92.7	1	1
29-1181.00	Audiologists	20	40	100.0	1.2	1.1
29-1199.00	Health Diagnosing and Treating Practitioners, All Other	74	89	20.3	1.2	0.8
29-1199.01	Acupuncturists	3	5	66.7	0.7	0.5
29-2011.00	Medical and Clinical Laboratory Technologists	156	372	138.5	1.2	1.3
29-2011.01	Cytogenetic Technologists	2	4	100.0	0.4	0.4
29-2011.02	Cytotechnologists	2	22	1000.0	0.3	1.1
29-2011.03	Histotechnologists and Histologic Technicians	15	88	486.7	0.6	1.6
29-2012.00	Medical and Clinical Laboratory Technicians	391	929	137.6	0.9	0.8
29-2021.00	Dental Hygienists	48	174	262.5	0.8	0.8
29-2031.00	Cardiovascular Technologists and Technicians	210	465	121.4	1.2	1.1
29-2032.00	Diagnostic Medical Sonographers	147	320	117.7	1.1	1
29-2033.00	Nuclear Medicine Technologists	15	44	193.3	1.1	1.4
29-2034.00	Radiologic Technologists	229	473	106.6	1.2	1.2
29-2035.00	Magnetic Resonance Imaging Technologists	126	420	233.3	1.1	1.6
29-2041.00	Emergency Medical Technicians and Paramedics	96	195	103.1	0.7	0.6
29-2051.00	Dietetic Technicians	36	26	-27.8	1.4	0.6
29-2052.00	Pharmacy Technicians	552	950	72.1	1.2	1
29-2053.00	Psychiatric Technicians	94	219	133.0	1.4	1.2
29-2054.00	Respiratory Therapy Technicians	1	17	1600.0	0	1.8
29-2055.00	Surgical Technologists	300	573	91.0	1.4	1.3
29-2056.00	Veterinary Technologists and Technicians	38	199	423.7	0.8	0.8
29-2057.00	Ophthalmic Medical Technicians	28	137	389.3	1	1
29-2061.00	Licensed Practical and Licensed Vocational Nurses	971	2381	145.2	1.1	0.9
29-2071.00	Medical Records and Health Information Technicians	513	1205	134.9	0.8	1.1
29-2081.00	Opticians, Dispensing	18	100	455.6	0.7	1
29-2091.00	Orthotists and Prosthetists	9	6	-33.3	1.6	0.5
29-2092.00	Hearing Aid Specialists	7	20	185.7	0.9	1.3
29-2099.00	Health Technologists and Technicians, All Other	532	967	81.8	1.1	0.9
29-2099.01	Neurodiagnostic Technologists	19	77	305.3	1	1.6

O*Net Code	Occupation Title	Job Postings			Location Quotient	
		2019	2021	% Change	2019	2021
29-2099.06	Radiologic Technicians	32	97	203.1	0.7	1
29-2099.07	Surgical Assistants	9	33	266.7	0.4	0.6
29-9011.00	Occupational Health and Safety Specialists	162	290	79.0	1.2	1
29-9012.00	Occupational Health and Safety Technicians	56	161	187.5	1.4	1.9
29-9091.00	Athletic Trainers	43	101	134.9	1.3	1.3
29-9092.00	Genetic Counselors	6	17	183.3	0.6	1.1
29-9099.00	Healthcare Practitioners and Technical Workers, All Other	3	8	166.7	0.6	1
29-9099.01	Midwives	2	1	-50.0	1.6	0
	Total, Healthcare Practitioners and Technical Occupations	15,525	36,497	135.1		
31-1011.00	Home Health Aides	317	978	208.5	0.9	0.8
31-1013.00	Psychiatric Aides	12	12	0.0	1.5	0.7
31-1014.00	Nursing Assistants	1453	2970	104.4	1.5	1.1
31-1015.00	Orderlies	73	174	138.4	1.2	1.4
31-2011.00	Occupational Therapy Assistants	73	155	112.3	0.9	0.9
31-2012.00	Occupational Therapy Aides	24	96	300.0	0.5	1.1
31-2021.00	Physical Therapist Assistants	104	266	155.8	0.8	1
31-2022.00	Physical Therapist Aides	40	137	242.5	1.8	1.9
31-9011.00	Massage Therapists	113	253	123.9	1.1	0.9
31-9091.00	Dental Assistants	213	563	164.3	1.4	0.7
31-9092.00	Medical Assistants	585	1288	120.2	0.8	0.7
31-9093.00	Medical Equipment Preparers	115	256	122.6	1.1	1.1
31-9094.00	Medical Transcriptionists	24	15	-37.5	0.7	0.9
31-9095.00	Pharmacy Aides	14	23	64.3	0.5	0.4
31-9096.00	Veterinary Assistants and Laboratory Animal Caretakers	19	110	478.9	0.4	0.8
31-9097.00	Phlebotomists	197	423	114.7	1.2	0.8
31-9099.00	Healthcare Support Workers, All Other	41	108	163.4	1.2	1.4
31-9099.02	Endoscopy Technicians	18	57	216.7	1.3	1.5
	Total, Healthcare Support Occupations	3,435	7,884	129.5		
	Total	18,960	44,381	134.1		

Source: The Conference Board via Lightcast (formerly Emsi-Burning Glass).

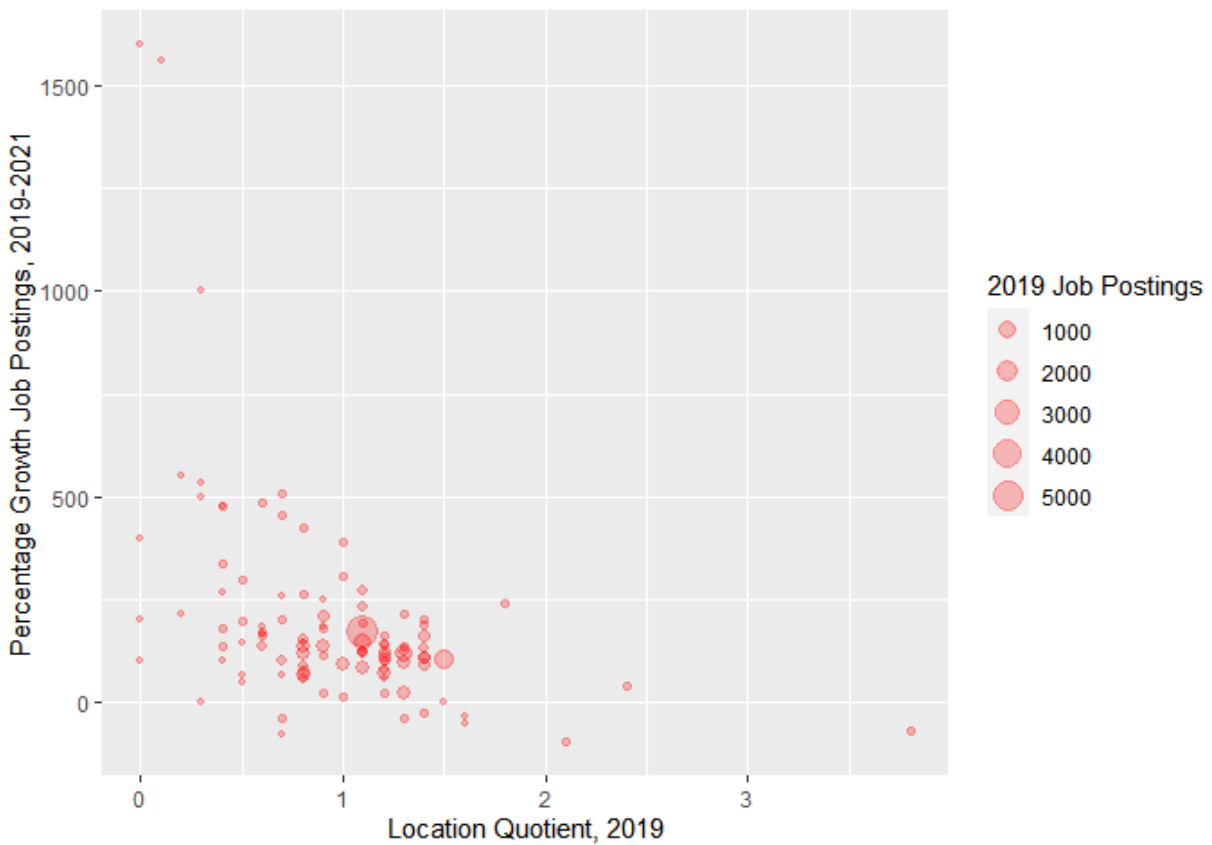
Figure 11: Monthly job postings for healthcare practitioners and technical and healthcare support occupations, Idaho



Source: The Conference Board via Lightcast (formerly Emsi-Burning Glass).

Note: This graph extends the data from [Figure 7](#) to August 2022.

Figure 12: Job posting growth vs. initial posting concentration by occupation, Idaho



Source: The Conference Board via Lightcast (formerly Emsi-Burning Glass).

2.3 Discussions with health care education program administrators

Unlike the previous sections where more current data was available, data on health care program completions and enrollments comes at a considerable lag. As such, information provided in this section relies on discussions with education administrators from several public universities including WWAMI, University of Idaho, Idaho State University and Boise State University. While not a complete picture of health care education in the state, these discussions provided qualitative information corroborated by other stakeholders.

Among the most salient pieces of information from these discussions was a common recognition that the primary constraints programs face are due to the limited capacity to expand. (Pharmacists was one notable exception where the current pool of qualified applicants had been declining and was just enough to fill available spots.) The most cited capacity constraints were (1) difficulty hiring and retaining teaching faculty, (2) insufficient training resources and (3) insufficient opportunities for students to obtain the clinical portion of their training within Idaho.

For nursing and pharmacy, WWAMI medical, occupational and physical therapy, and physician assistant programs, a lack of available instructors topped the list of capacity constraints. WWAMI additionally mentioned a 30% turnover rate over the past two years for its faculty. Simply put, the opportunity costs for teaching considerably outweigh the benefits. Chief among the issues mentioned were workloads, including classroom demands or concurrent requirements to ensure an instructor license remains active by continuing their practice; job satisfaction; and, above all else, compensation. Teaching positions typically pay less than what practitioners would otherwise earn in practice. Dovetailing with the job satisfaction factor, a few stakeholders also mentioned the increasing politicization of education in Idaho as a further deterrent, with some specifically citing public hostility towards institutions of higher education and increased scrutiny of educators for alleged political bias.

Beyond faculty-related constraints, the second and third most-cited limitations mentioned during these discussions were insufficient training resources and in-state clinical opportunities. Whether these constraints are binding vary by program. In the case of nursing, the training resource issue was less widespread. Many administrators cited increased investment in classroom technology including simulator-based learning, but growing difficulties placing nursing students for their clinicals meant many Idaho students were completing this portion of their training out of state. Discussions with hospital administrators confirmed this. Some even mentioned a growing acceptance of a future where students/programs will need to reserve paid clinical spots. This is particularly important to the “health care talent pipeline” discussion as it points to one source of “leakage.” Where students perform their clinicals correlates with where they land their first job after graduating. More Idaho students going across state lines to complete their training will mean an even poorer measure of the pipeline’s output for program completions. Among the issues cited on the hospital/clinic side of this problem are the administrative, logistical, and physical difficulties of hosting additional students. Students have a strong preference to do their clinicals near their university or home, meaning that some more remote clinical sites may have spare, underutilized capacity.

Another issue is the ongoing shift toward students paying for their own education costs as opposed to public support through state or federal programs. For many students, paying for a college degree requires incurring debt in the form of student loans. Depending on the student’s circumstances and the

amounts owed, choosing to practice in Idaho may seem unattractive — if not financially unsustainable when monthly loan payments are high and better paying opportunities can be found elsewhere.¹⁴ While the debate over private-vs-public financing of higher education is ongoing and beyond this study, it is worth mentioning one lesser-appreciated consequence of rising education costs may be a greater outflow of Idaho graduates who must chase jobs in better-paying states to cover the costs of paying off student loans. Student loan debt was also mentioned in discussions as a contributing factor to increased anxiety, depression, and suicide among health care professions. Debts were also cited as a reason students increasingly go into higher-paying specialized fields as opposed to primary care or general practice, despite the still-strong demand for the latter. If the cost of a degree is roughly equivalent for a general practitioner and a specialist, higher pay creates an incentive for more students to take a specialist degree path and pay off student loan debts faster.

2.4 Discussions with Idaho Hospital Association staff and survey results

Another set of stakeholders interviewed were in-state providers including the Idaho Hospital Association (IHA). As previously mentioned, points brought up in discussions with individuals from the education-side were corroborated or closely aligned. Additionally, IHA provided the department an opportunity to collaborate on its annual survey of members by including workforce-related questions.

The discussions with IHA could be summarized in one paraphrased sentence: “The health care workforce will either be the enabler or barrier for health care in the state.” As with services generally, quality staff are indispensable to the smooth functioning of the health care sector, and as a result, labor costs make up a significant share of provider costs. However, pre-pandemic trends best described as a comparatively manageable shortage for some critical occupations worsened due to the pandemic and its consequences. This series of events made the situation considerably more difficult for Idaho providers to manage, despite COVID-19 cases and hospitalizations falling from their peaks set between late summer 2021 and the end of winter 2022.¹⁵

Workers typically consider a host of factors when deciding between jobs — compensation and benefits, work environment, scope of work, opportunities for advancement and quality of life. COVID-19 appeared to affect nearly all those factors. For some workers, particularly those already at or nearing retirement age, concerns for their own health and safety appeared to lead to an acceleration of retirements. While many providers already saw this “silver tsunami” coming years in advance, COVID-19 effectively moved up many individual timeframes. Whereas a nurse might have expected to retire in 2025, for instance, they instead decided to call it quits sometime in 2020 or 2021 because of pandemic conditions. This first wave of exits during this health care crisis meant staffing shortages, which increased the hours and days health care workers labored without a break and further contributed to burnout from an increasingly difficult work environment. This almost certainly led to subsequent market

¹⁴ Take for example registered nurses. The 10th percentile of annual wages for Idahoan RNs is in many ways a proxy for their entry-level salary. In 2021 this was \$59,640. By comparison, the 10th percentiles in neighboring Oregon and Washington were \$76,180 and \$74,070, respectively. Source: May 2021 Occupational Employment and Wage Statistics Survey, U.S. Bureau of Labor Statistics.

¹⁵ As of Sept. 6, 2022, the seven-day average of new reported cases of COVID-19 in Idaho was 277 while the number of COVID-related hospitalizations was 126. By comparison, the seven-day case average peaked at 2,833 in January of 2022 while hospitalizations had peaked at 775 in late September of 2021. Source: Federal and state health agencies via [New York Times](#).

exits from career switchers who no longer found their original occupation attractive enough to continue. Due to the crisis standards of care imposed at times during the pandemic, many health care professionals saw an adverse change in the scope of their work as some procedures and operations were put on hold while hospitals were inundated by COVID patients. Finally, workforce gaps filled by workers contracted through traveling agencies or compact agreements made working out of state a relatively easy affair, with many health care workers taking the pandemic as an opportunity to earn more pay elsewhere.

From discussions with the IHA and its survey, recruitment is a top ongoing issue facing providers when it comes to their workforce needs. Rising housing costs as a barrier to entry was among the most mentioned issues in discussions with IHA and other stakeholders, education program administrators and licensing boards. It should come as no surprise that housing prices have been growing faster than wages,¹⁶ driven in part by an influx of new residents and a declining housing inventory¹⁷ from the dearth of new housing construction that followed the late-2000s housing crash and subsequent Great Recession.¹⁸ Several providers in major metropolitan areas — especially the Treasure Valley and some particularly remote communities — cited housing costs as one of the largest deterrents to recruitment with initial acceptance offers turned down after candidates were unable to find affordable housing. Other recruitment-related issues included cumbersome processes for licensing workers, particularly those locating to Idaho from states without license compact agreements.

Nurses and nursing aides/assistants were among the occupations hospitals were most concerned with filling now and in the future — 15 out of 19 respondents mentioned those among other occupations. Physicians were cited by three respondents, lab technicians by four, radiation and imaging technicians by three and housekeepers by two respondents.

Retention also became more difficult for Idaho providers. In the survey of IHA members, most reported an increase in employee turnover. The median turnover rate for all employees during the pre-pandemic period was 16.5%, but in the past year this rate has gone up to 24%. Nurses were among the types of workers cited as having a high turnover rate since the start of COVID-19, with 16 of the 18 respondents mentioning nurses or nursing aides/assistants as having the highest turnover. One respondent said prior to the pandemic the turnover for RNs was 7.75% but now stands at 28.7%.

The IHA is aware of the limitations on in-state clinical sites and how these limitations contributed to many Idaho graduates leaving the state, corroborating the views of education program administrators. Providers cite additional resources and staff as necessary before more in-state clinical opportunities could be offered. Urban hospitals would more likely meet this challenge given their proximity to dense populations, accompanying economies of scale and higher education institutions with students requiring such clinical opportunities. Rural hospitals, on the other hand, would be far less capable of meeting this challenge given their greater staffing difficulties and fiscal constraints. The association also cited growing

¹⁶ Sources: All-Transaction House Price Index for Idaho, U.S. Federal Housing Finance Agency; Average Weekly Earnings of All Employees: Total Private in Idaho, U.S. Bureau of Labor Statistics. A graph of both time series indexed to Jan. 1, 2010, compliments of the St. Louis Federal Reserve's FRED can be found [here](#).

¹⁷ See, for instance, the [recent IDOL housing report](#).

¹⁸ Source: New Private Housing Units Authorized by Building Permits for Idaho, U.S. Census Bureau. A time series plot compliments of the St. Louis Federal Reserve's FRED can be found [here](#).

recognition that at some point in the future health care programs and/or their students may need to move to a model that compensates providers who offer clinical training sites, contributing to rising education costs that only further reduce the supply of new entrants.

Discussions about health care investment, profitability and market consolidation were also mentioned. As previously cited, Idaho has been experiencing a high population growth rate for several years running, due largely to net in-migration. Along a balanced growth path, investments in health care infrastructure — like hospitals and clinical sites — would follow similar trends. However, for the past year and a half the pandemic has forced many providers to curtail these investments as they use available cash flows to meet immediate needs. These needs include maintaining critical staffing levels amidst a labor shortage, balancing rising costs, and operating at a loss due to federal relief funds now running out or insurance reimbursements lagging. The current situation for these providers might be characterized as an investment deficit that would need to be paid back, so-to-speak, as expected continual growth will place greater needs on scarcer infrastructure. This deficit is expected to be particularly acute for rural hospitals that were hit from both sides by greater recruitment difficulties and slimmer operating margins. According to the IHA, solutions predicated on market consolidation to eliminate redundancies and reduce overhead costs did not seem all too practical as past waves of mergers have left little room for further consolidation.

3.0 Occupational license survey results and analysis

To make up for some of the data limitations, health care professionals were surveyed in cooperation with the Idaho Division of Occupational and Professional Licenses. The primary objectives were to estimate the anticipated occupational turnover rate and estimate what salary would be necessary to retain these workers (i.e., their willingness-to-accept wages for staying as opposed to exiting). For occupations where many workers licensed in Idaho may not practice in Idaho — either due to license compact agreements or working out of state in a travelling capacity — a similar willingness-to-accept (WTA) wage estimate was made to understand how much they need to be offered to relocate to Idaho. Further details on the survey can be found in [Appendix A.1](#).

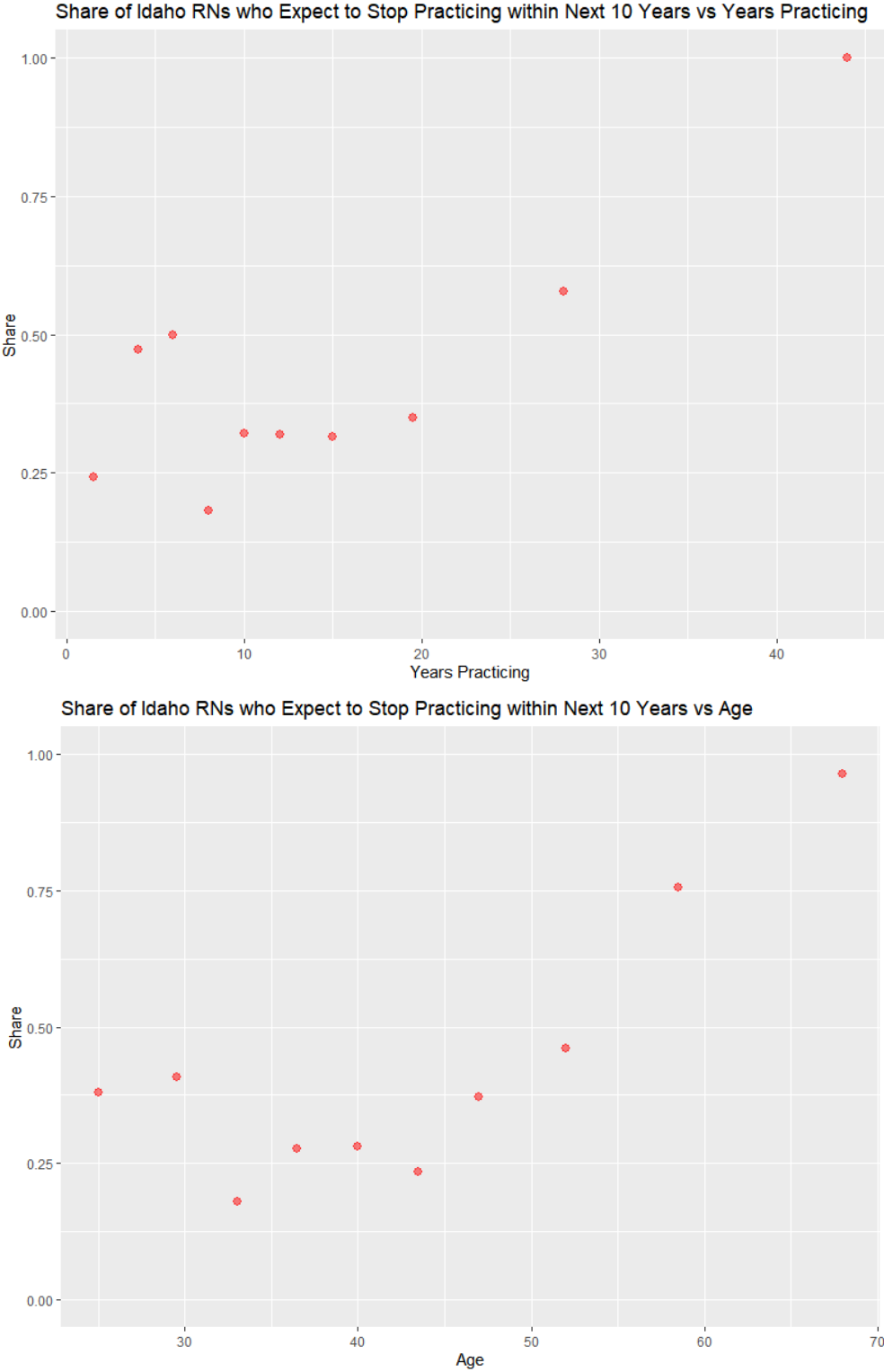
To summarize the survey results, the anticipated one-year-forward occupational turnover rates for registered nurses, licensed practical nurses, registered pharmacists, physicians and surgeons were well above the department's projections, implying greater demand growth over supply than previously expected. The types of turnover (market exits from retirement or moving out of state or occupational transfers) and reasons given varied by occupation. Among those leaving for non-retirement reasons, issues mentioned most often included burnout and workloads, compensation and rising costs of living, and issues related to the culture and state politics. Nurses (RNs and LPNs) were more likely to cite work-related stresses and compensation while physicians and surgeons frequently mentioned the changing cultural and political environment. For both groups of nurses, the estimated WTA wage to stay for those considering an occupational exit was typically in the highest quartile of their respective occupation's 2021 annual wage distribution. The estimated WTA wage for out-of-state RNs was above the 90th percentile. This estimate was not necessarily an increasing function of age or experience. Some particularly young workers have decided to leave their field and would ostensibly require a large increase in compensation to stay. In the case of RNs, however, employers may be able to attract workers from neighboring Utah and Wyoming at a lower cost.

3.1 Survey results, registered nurses (RNs)

Registered nurses are by far the largest occupational license group and therefore had the largest number of survey responses. This was beneficial to the study insofar as it provides more robust estimates because of the larger sample size (total survey size equaled 665; survey size for RNs currently practicing in Idaho equaled 503) as well as nurses cited in the IHA survey as the most difficult occupation for employers to recruit. Owing to the nursing compact agreement, many nurses not practicing in Idaho were solicited in this survey and enough participated to allow some cross-state comparisons (out-of-state survey size was 84), particularly when it came to estimating the average WTA wage to work in Idaho for out-of-state RNs.

[Figures 13a and 13b](#) plot the share of RNs currently practicing in Idaho who anticipate they will stop practicing within the next 10 years by age and years of practice, respectively. Not included in the definition of “expecting to stop practicing” was the decision to locate out of state, which will be covered in the next pair of graphs. Age and years practiced were binned by decile, meaning these data points were sorted in 10 equal subsections by percentile, with each data point corresponding to the decile average. This sorting method provides insight into how the share of expected stoppages varies by age and experience.

Figure 13: Share of Idaho RNs who expect to stop practicing by experience (a) and age (b)

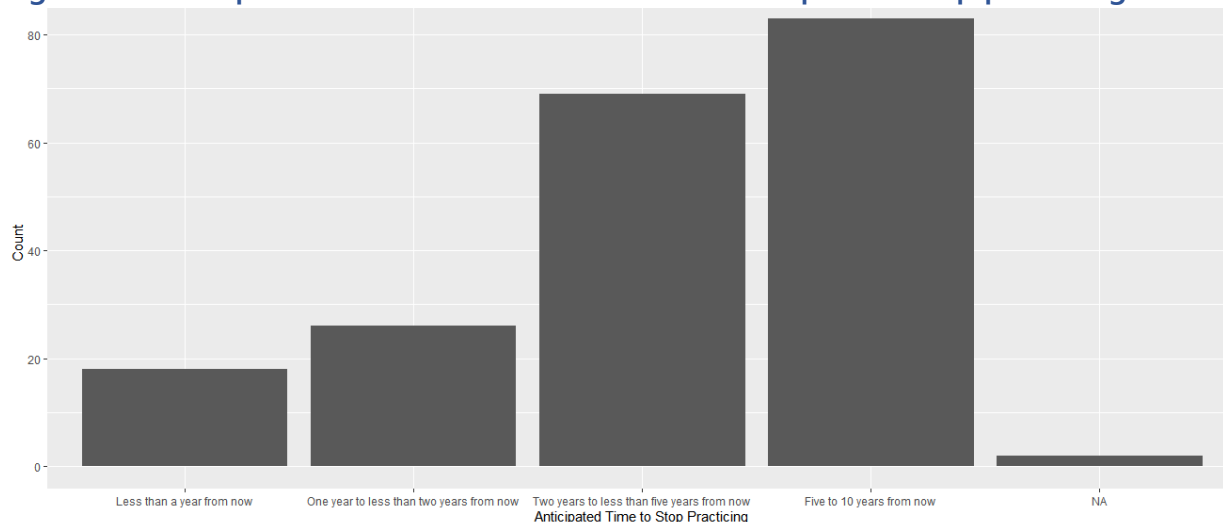


Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.
 Note: Sample size equals 503 for both figures.

Among more unexpected survey results was the noticeable increase in anticipated stoppages among the youngest nurses, as seen in both graphs. Roughly half of RNs in the second and third decile bin of years practicing — those with three to seven years of experience — said they anticipate they will stop practicing as an RN in the next decade, roughly in line with nurses with 20 more years of experience. Looking at age, roughly four out of 10 RNs in the first two age decile bins (those between the ages of 22 and 31) stated they expect to stop working as a nurse in the next decade, a proportion on par with RNs two-to-three decades older. Whether or not this is a consequence of the pandemic or a long-run phenomenon is unclear, but it does indicate many RNs early in their careers are considering leaving nursing entirely. This could pose a challenge for hospitals and clinics who might presume the current cohort of young RNs can be counted on to be around for a decade or more. Paired with older RNs who expect to leave their practice due to retirement, an estimated 39.3% expect to stop practicing in the next decade (95% confidence interval: 35.1% to 43.6%). When asked when they expect to stop practicing, the majority gave a timeframe between two and 10 years, as shown in [Figure 14](#), and an overwhelming majority said this stoppage would be permanent as opposed to temporary (170 of 198).

Retirements were the largest single reason for all Idaho RNs who said they expect to stop practicing within the next decade, followed by career changes (see [Figure 15](#)). A comparatively small number stated caring for a child or family member or did not report their reason. However, a considerable number listed “other,” and among these a majority mentioned professional dissatisfaction or stress/burnout (36 of 45) in their open-ended response. Many also cited inadequate compensation (16 of 45). Among career changers, a similar share cited professional dissatisfaction or stress/burnout (38 of 58) and inadequate compensation (22 of 58). Given these similarities, adding career changers and “others” together outnumber retirements as the largest pair of reasons for anticipated exits from nursing in the next 10 years.

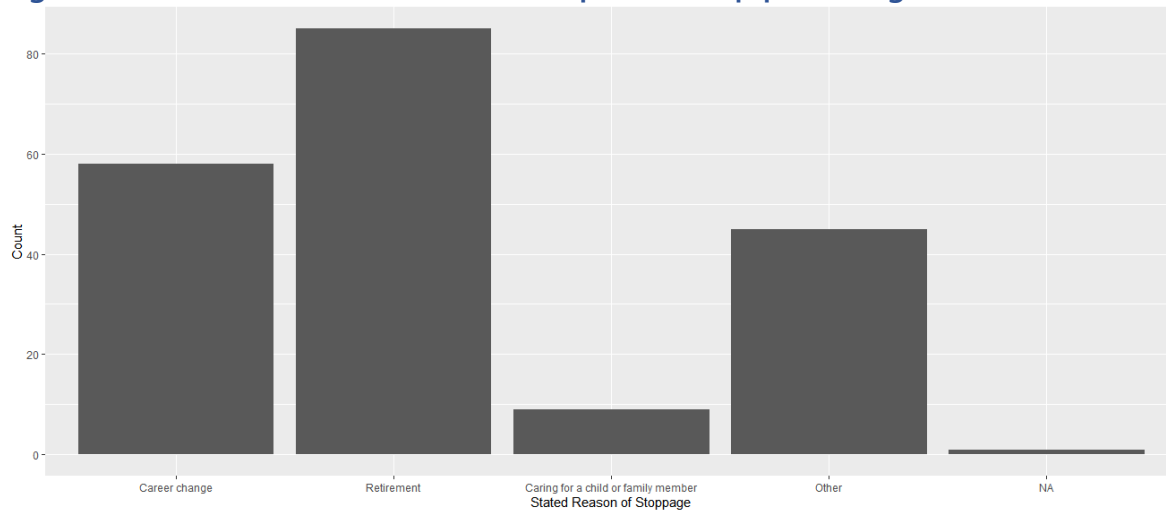
Figure 14: Anticipated timeframe for Idaho RNs who expect to stop practicing



Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size equals 198.

Figure 15: Reason for Idaho RNs who expect to stop practicing



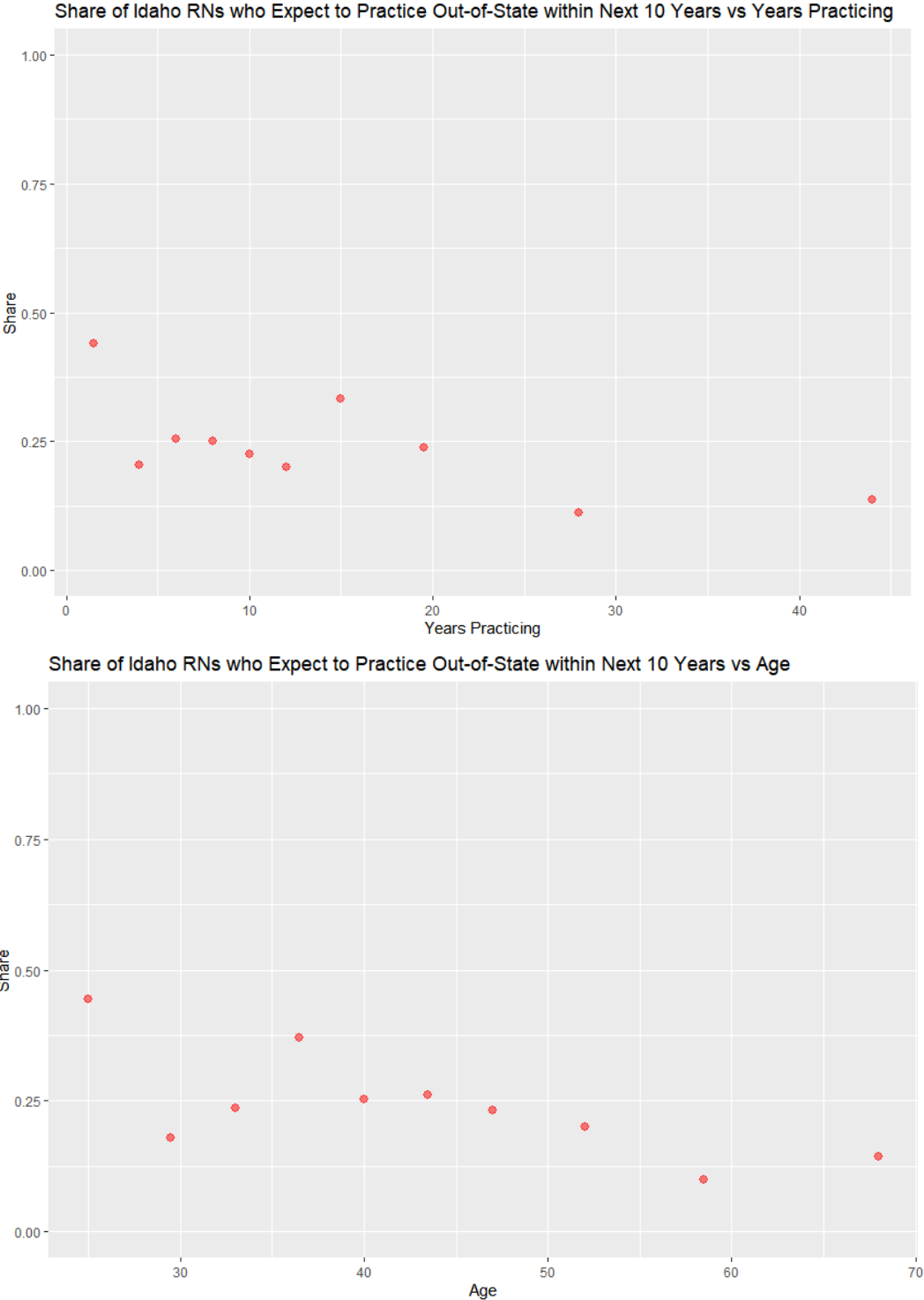
Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size equals 198.

In addition to labor market exits from occupational transfers and retirements, relocating out of state is another source of occupational turnover among nurses. As mentioned earlier, the opportunities afforded by travel nursing gigs significantly increased over the course of the pandemic. Areas hit hardest by caseloads and hospitalizations had to scramble to meet these challenges, effectively pulling in staff from other parts of the country where the virus was less severe. Some RNs might have looked at salaries offered in other states and, after weighing them against their current position, decided they preferred a permanent relocation. As with the other forms of market exits, how many of these relocations reflect long-run trends and how many are attributable to COVID-19 is uncertain, but the magnitude of these anticipated exits is nonetheless informative.

[Figures 16a and 16b](#) plot the share of Idaho RNs who anticipate they will practice out of state within the next 10 years by years practicing and age binned by decile, respectively. Unlike the share of RNs who expect to stop practicing, which generally increased with age, the general trend for the likelihood of relocation is negatively related to age. Among the groups most likely to relocate are the youngest nurses by age and experience; roughly nine out of 20 nurses between the ages of 22 and 28 and nurses with less than three years of experience were anticipating an exit. Additionally, there was a bump in the share of Idaho RNs expecting relocation around the seventh decile by experience and fourth decile by age, with roughly four out of 10 RNs with 13 to 17 years of experience and between the ages of 35 and 38 also expecting to relocate. In all, an estimated 25.4% of Idaho RNs expected to relocate out of state within the next decade (95% confidence interval: 21.6% to 29.3%).

Figure 16: Share of Idaho RNs who expect to practice out of state by experience (a) and age (b)

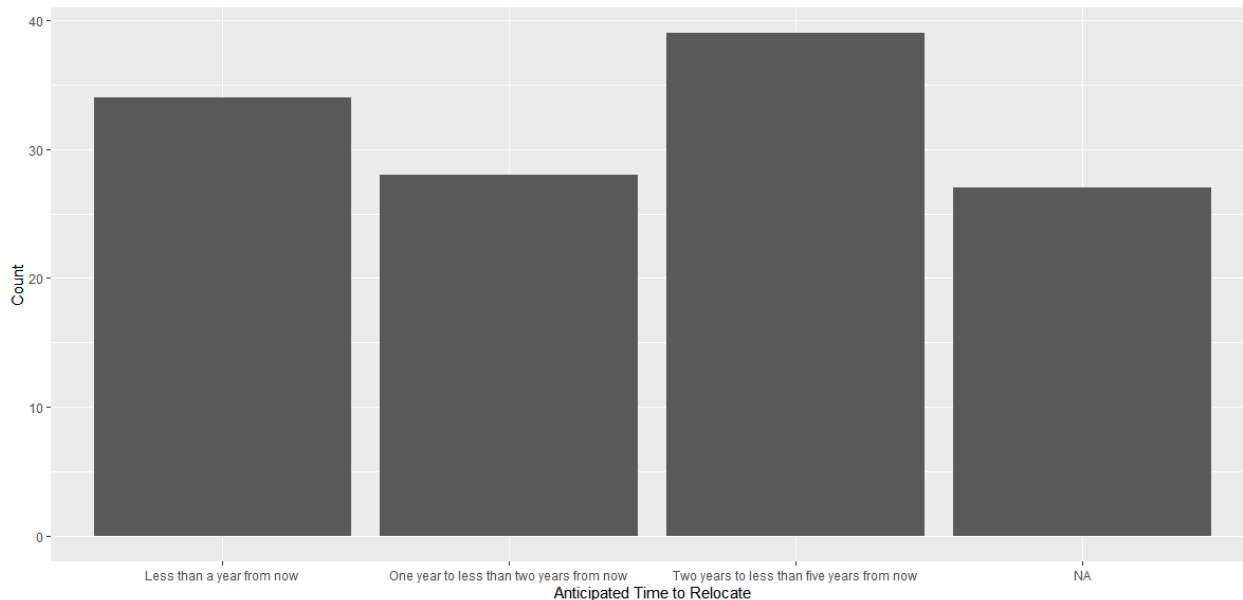


Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size equals 503 for both figures.

Unlike what was seen in [Figure 14](#) for RNs who expect to stop practicing, Idaho RNs choosing to relocate out of state have a much shorter anticipated timeframe for this decision ([Figure 17](#)). Almost half stated they will move within the next two years (62 of 128), and more than three-quarters stated this will occur within the next five years (101 of 128). None reported an intention to move between five and 10 years from now. A plurality stated their relocation would be permanent (55 of 128), whereas just over a quarter anticipated their exits to be a temporary duration of five years or less (37 of 128).

Figure 17: Anticipated timeframe for Idaho RNs who expect to relocate out of state within the next 10 years



Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

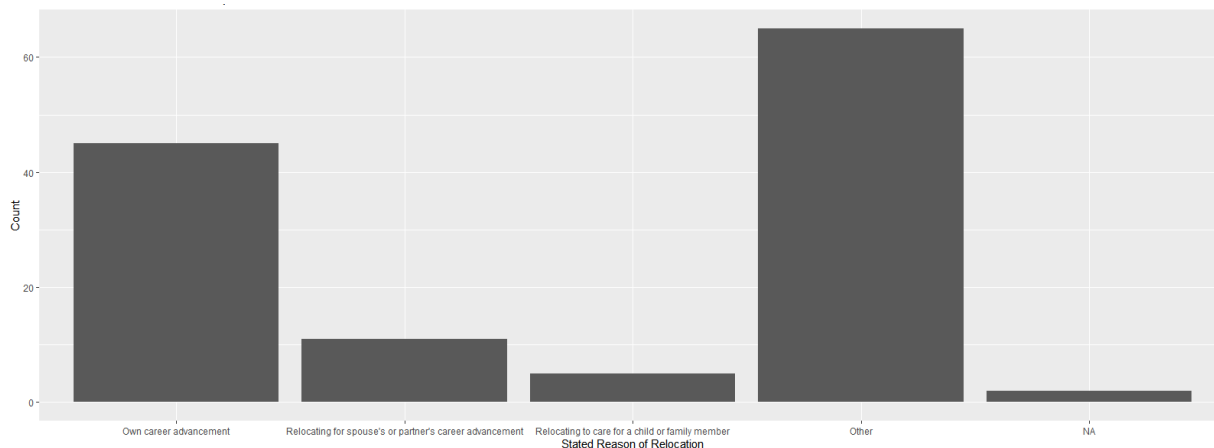
Note: Sample size equals 128.

When it came to survey respondents’ stated reason for their anticipated relocation, an overwhelming majority fell under advancing one’s own career (45 of 128) or “other” (65 of 128). The total breakdown is presented in [Figure 18](#). Among “others,” about half mention inadequate compensation or the cost of living as their reason (33 of 65). Some specifically mention neighboring Washington as their likely destination. Almost a quarter cited Idaho’s current cultural and political environment as a factor in their reason (15 of 65) with mentions of bigotry, hostility to health care workers and public health initiatives (e.g., vaccinations, mask-wearing), and lack of support for working parents.

Combining all labor market exits and occupational transfers together, the estimated percentage of RNs currently practicing in Idaho who expect to leave in some form over the next 10 years was 56.7% (95% confidence interval: 52.3% to 60.1%). Looking at just Idaho RNs who expect to leave within the next year, the expected turnover rate is 10.3% (95% confidence interval: 7.7% to 13.0%). In other words, an estimated one out of every 10 Idaho RNs is expecting to no longer practice in the state one year from now. This is more than double the implied turnover rate for this occupation based on the Idaho Department of Labor’s 2020-2030 projections. Assuming the entrant rate of new RNs in the state continues its pre-pandemic trend, employment growth for RNs may turn negative, and further excess demand will continue to put upward pressure on wages. Whether or not IHA members were aware of

this coming out-flow of registered nurses, their high frequency of references to RN hiring difficulties certainly appears to be a justified concern.

Figure 18: Reason for Idaho RNs anticipating a relocation



Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size equals 128.

Concluding this section on RNs are the results of a regression-based estimation of RNs’ willingness-to-accept (WTA) wage for practicing in Idaho. Three samples were considered for this analysis: RNs currently practicing in Idaho who expect to stop practicing, RNs currently practicing in Idaho who expect to relocate out of state, and finally RNs licensed in Idaho but currently practicing out of state. Different models were estimated for each sample, ranging from the simplest estimated WTA wage for the entire sample to more flexible models that allowed variability by certain worker characteristics, such as years of experience, stated reason for exiting, rural/urban county status and state of residence. Note also that the WTA wage is estimated in current dollars and salary, i.e., it answers the question “What salary would an RN need to earn *today* if they are to remain practicing in or locate to Idaho?” The results and a brief discussion are included here, whereas a more thorough explanation of the econometric method behind these estimates can be found in [Appendix A.2](#).

[Table 8](#) presents the estimates from each double-bounded dichotomous choice model (defined in [Appendix A.2](#)) and corresponding WTA wage for Idaho RNs who expect to stop practicing. For the sake of brevity this focuses on the estimates for a WTA wage, which are found in the highlighted right column for each model in the table.

Model 1 simply looked at all Idaho nurses who expect to stop practicing and estimated what the average WTA wage is for them to continue practicing. This turned out to be \$88,137. For a point of comparison, this was above the 75th percentile of annual wages reported in the 2021 OEWS survey. This should not be surprising given a considerable share of these nurses reported they were leaving due to retirement and would likely require substantial compensation to convince them to work beyond that.

Model 2 broke this estimate down by the stated reason for leaving. Unsurprisingly, those exiting for retirement reasons — the single largest group in the sample — had the largest WTA wage estimate at

\$104,944. This was followed by the “others” at \$88,798; career changers at \$74,089; and finally, those leaving to care for a child or family member at \$66,138. The discrepancy between career changers and “others” was unexpected, given an initial hypothesis of their similarity based on open-ended survey responses.

Table 8: Estimated willingness-to-accept (WTA) wage for Idaho RNs expecting to stop practicing

	Model 1		Model 2		Model 3		Model 4	
	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)
Intercept	31.781 (1.547)	88,137 (4,072)						
Career change			32.501 (1.041)	74,089 (5,744)				
Retirement			33.510 (1.062)	104,944 (5,377)				
Care for child/family			32.172 (1.152)	66,138 (13,841)				
Other			33.026 (1.041)	88,798 (6,531)				
Experience (<6)					32.829 (1.687)	80,584 (6,898)		
Experience (6-12)					32.389 (1.691)	69,249 (5,813)		
Experience (12-24.25)					33.641 (1.709)	106,546 (9,702)		
Experience (>=24.25)					33.651 (1.746)	106,924 (10,384)		
Urban							31.353 (2.299)	89,198 (4,575)
Rural							31.150 (2.358)	82,857 (9,827)
ln(Salary)	2.791 (0.137)		2.899 (0.091)		2.906 (0.149)		2.751 (0.203)	
Sample Size		188		188		188		188
Log Likelihood		-467.2		-460.8		-458.5		-467.0
Akaike Inf. Criterion		938.4		931.7		926.9		940.0
BFGS iterations		21		28		58		40

Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Optimization method was the Broyden-Fletcher-Goldfarb-Shanno (BFGS) algorithm without box constraints. Number of iterations until convergence are reported in the final row of the table.

Model 3 looked at WTA wages by years of experience binned by quartile, meaning these data points were sorted and grouped together into four equivalent groups by percentile so that their WTA wages could be estimated as a group. While it seems more experienced workers have a larger WTA wage due to their proximity to retirement age, the discrepancy between first and second quartile bins was surprising. The youngest RNs in terms of experience were estimated to have larger wage expectations than slightly more experienced RNs, though this was not a statistically significant difference. However, this parallels what was seen in [Figure 13](#); a large share of these nurses expected to stop practicing, more so than those slightly older or more experienced. This could point to a troubling trend ahead: many RNs who otherwise might be counted on to remain practicing in the state for many years may be looking for

a career change, while the compensation necessary to keep them in nursing is high in comparison to that of Idaho RNs overall.

Model 4 looks at the difference in WTA wages based upon the county where RNs practice. Counties considered to be urban include Ada, Bannock, Bonneville, Canyon, Kootenai, Nez Perce and Twin Falls; all remaining counties were classified as rural. Surprisingly, there did not appear to be a significant difference in WTA wages between Idaho RNs working in urban and rural areas. While mentions of affordability were more common among urban nurses, this did not appear to factor much into the wages they were willing to accept. In short, both urban and rural Idaho RNs who expect to stop practicing would seem to require similar compensation to convince them to continue practicing.

Next, [Table 9](#) provides the estimates from each model and corresponding WTA wages for RNs currently practicing in Idaho who expect to relocate out of state. Again, for the sake of brevity the focus is on the estimates in the highlighted right columns for each model.

Model 1 presents the simplest approach, pooling together all RNs practicing in Idaho anticipating a relocation and estimating the aggregate WTA wage for remaining in the state. This estimate came in at \$86,403, not far off from the Model 1 estimate in [Table 8](#). Put another way, \$86,000 to \$88,000 was the average salary range all Idaho registered nurses who expect a labor force exit or occupational transfer would accept to remain in Idaho. This is well above the 75th percentile annual wage for Idaho RNs in 2021.

Breaking this estimate down first by respondents' stated reason for leaving Idaho (Model 2 in [Table 9](#)), those classified as "others" as well as those seeking their own career advancement would appear to demand the highest compensation if they are to remain in the state. "Others" require an estimated salary of \$91,587, whereas career advancers would require \$87,592. This could support the view made earlier that own career advancers and "others" are similar groups when it comes to relocation decisions. At the other extreme were those relocating to care for a child or family member, whose estimated required wage was \$63,699, and those leaving for their spouse's career advancement, which was estimated at \$71,099.

Model 3 looked at preferred wages based on a nurse's experience and generally shows the compensation necessary to dissuade them from relocating is increasing with experience. The two quartile bins of Idaho nurses with the least experience that were anticipating an out-of-state move had an estimated WTA salary of \$74,790 and \$82,679, respectively. The third and fourth quartiles, on the other hand, appear to require much more compensation if they are to remain in Idaho: \$110,043 and \$95,338, respectively. Except for the differences in the third and fourth quarters of the distribution, WTA estimates increase with experience. This positive relationship should not be surprising, given that salaries generally increase with experience.

Finally, urban vs. rural differences among Idaho RNs expecting to relocate were significant (see Model 4). Those nurses currently working in Idaho's urban counties would require an estimated \$90,634 on average if they are to continue practicing in Idaho; those in rural counties, on the other hand, would require an estimated \$67,503 on average. Contrast this with what was seen in [Table 8](#), and urban RNs who are looking to relocate have a much larger opportunity cost of employment than their rural counterparts. Perhaps these salary differences between urban and rural areas are based in costs of living and workloads (i.e., compensating differentials) or greater diffusion of information on outside

employment opportunities in densely populated areas (e.g., working in Lewiston or Coeur D’Alene makes it easier to learn of job openings in neighboring Washington).

Table 9: Estimated willingness-to-accept (WTA) wages of Idaho RNs expecting to relocate

	Model 1		Model 2		Model 3		Model 4	
	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)
Intercept	32.440 (0.848)	86,403 (4,785)						
Own career adv.			33.050 (0.860)	87,592 (7,877)				
Spouse career adv.			32.444 (0.951)	71,099 (15,578)				
Care for child/family			32.125 (1.003)	63,699 (20,059)				
Other			33.179 (0.804)	91,587 (6,810)				
Experience (<6)					33.967 (1.006)	74,790 (6,045)		
Experience (6-12)					34.271 (1.031)	82,679 (8,144)		
Experience (12-24.25)					35.136 (0.967)	110,043 (11,442)		
Experience (>=24.25)					34.702 (1.235)	95,338 (20,931)		
Urban							33.222 (2.109)	90.634 (5,421)
Rural							32.365 (2.106)	67,503 (8,956)
ln(Salary)	2.854 (0.076)		2.904 (0.072)		3.027 (0.087)		2.911 (0.186)	
Sample Size		123		123		123		123
Log Likelihood		-309.6		-307.9		-305.2		-307.6
Akaike Inf. Criterion		623.2		625.7		620.4		621.1
BFGS iterations		26		48		42		36

Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Optimization method was the Broyden-Fletcher-Goldbarb-Shanno (BFGS) algorithm without box constraints. Number of iterations until convergence are reported in the final row of the table.

The last sample of RNs considered were those licensed to practice in Idaho but who are currently practicing in another state. Due to the smaller sample size and correspondingly larger standard errors, the results presented here should be taken with a grain of salt. As before, attention will be made to the computed WTA wage estimates in the highlighted right columns for each model in [Table 10](#).

The Model 1 estimate for this sample of RNs was considerably high at \$105,896, placing it above the 90th percentile of annual salaries for Idaho RNs in 2021.¹⁹ Taking even the lower bound of the 95% confidence interval for this estimate (\$84,048), this would still be in the upper quarter of the earnings distribution. In other words, the compensation necessary to attract out-of-state RNs to Idaho appears to be high relative to the compensation of current Idaho RNs. Given this cost and the potential morale

¹⁹ From the May 2021 OEWS Survey, the 90th percentile annual wage for Idaho RNs was \$98,030.

problems associated with wide pay discrepancies — several survey respondents cited such discrepancies in regard to traveling nurses — it would seem the solutions to the RN shortage based on attracting out-of-state talent will come at considerable costs (direct and indirect) unless they are targeted.

Model 2 estimated nurses' WTA wage to relocate to Idaho by the state where RNs are currently practicing. The large standard errors made the estimates statistically indistinguishable from one another. However, if one takes the point estimates at face value, it would appear Washington and Oregon RNs require significant compensation to move to Idaho, whereas Utah and Wyoming RNs could be convinced at salaries comparable to their Idaho colleagues. There may be several reasons for this. First and foremost, RNs can expect to earn higher salaries in neighboring Oregon and Washington and comparable salaries in Utah and Wyoming.²⁰ Another factor workers consider in their location decisions is the value they place on local amenities, including community relations and cultural and political ways of life. For workers to leave these amenities behind for a job elsewhere, they would either require the same amenities in their new location or to be compensated for their loss. This explanation could be corroborated in part by several mentions of the cultural and political environment as a deciding factor among Idaho nurses expecting to move. Individuals may have different preference for locations, of course, and given the similarities of Utah and Wyoming to Idaho, this might help to explain the comparatively lower WTA estimates for those states.

Last among the models considered WTA wages by years of experience binned by quartile (Model 3). Again, the large standard errors in the model meant that each bin's estimate was statistically indistinguishable from another. Taking the point estimates at face value would paint a picture similar to what was shown in Model 3 of [Table 9](#): The more experienced the RN, the more they would need to be compensated to relocate to Idaho. This again should not be surprising, as wages generally increase with experience. Where this might be informative is in policies or programs aimed at attracting younger and less experienced nurses from out of state as a less expensive proposition versus attracting an older and more experienced nurse.

²⁰ Average annual salaries for registered nurses in Idaho and adjacent states were as follows:

- Idaho: \$73,640
- Montana: \$73,610
- Nevada: \$88,800
- Oregon: \$98,630
- Utah: \$72,790
- Washington: \$95,350
- Wyoming: \$73,130

Source: May 2021 Occupational Employment and Wage Statistics (OEWS) Survey, U.S. Bureau of Labor Statistics.

Table 10: Estimated willingness-to-accept (WTA) for RNs practicing outside Idaho

	Model 1		Model 2		Model 3	
	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)
Intercept	21.022 (2.171)	105,896 (11,147)				
Nevada			20.977 (1.706)	87,356 (49,388)		
Oregon			21.442 (1.587)	112,437 (32,981)		
Utah			20.342 (1.725)	61,914 (29,391)		
Washington			21.583 (1.555)	121,410 (21,455)		
Wyoming			20.640 (2.015)	72,770 (65,761)		
Other			21.281 (1.542)	103,064 (16,585)		
Experience (<7)					21.193 (7.531)	92,159 (22,020)
Experience (7-13)					21.285 (7.555)	96,821 (17,295)
Experience (13-26)					21.713 (7.637)	121,985 (25,201)
Experience (>=26)					21.640 (7.629)	117,268 (25,893)
ln(Salary)	1.817 (0.188)		1.844 (0.132)		1.854 (0.652)	
Sample Size		84		84		84
Log Likelihood		-215.9		-214.6		-215.2
Akaike Inf. Criterion		435.7		443.3		440.5
BFGS iterations		27		27		26

Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Optimization method was the Broyden-Fletcher-Goldfarb-Shanno (BFGS) algorithm without box constraints. Number of iterations until convergence are reported in the final row of the table.

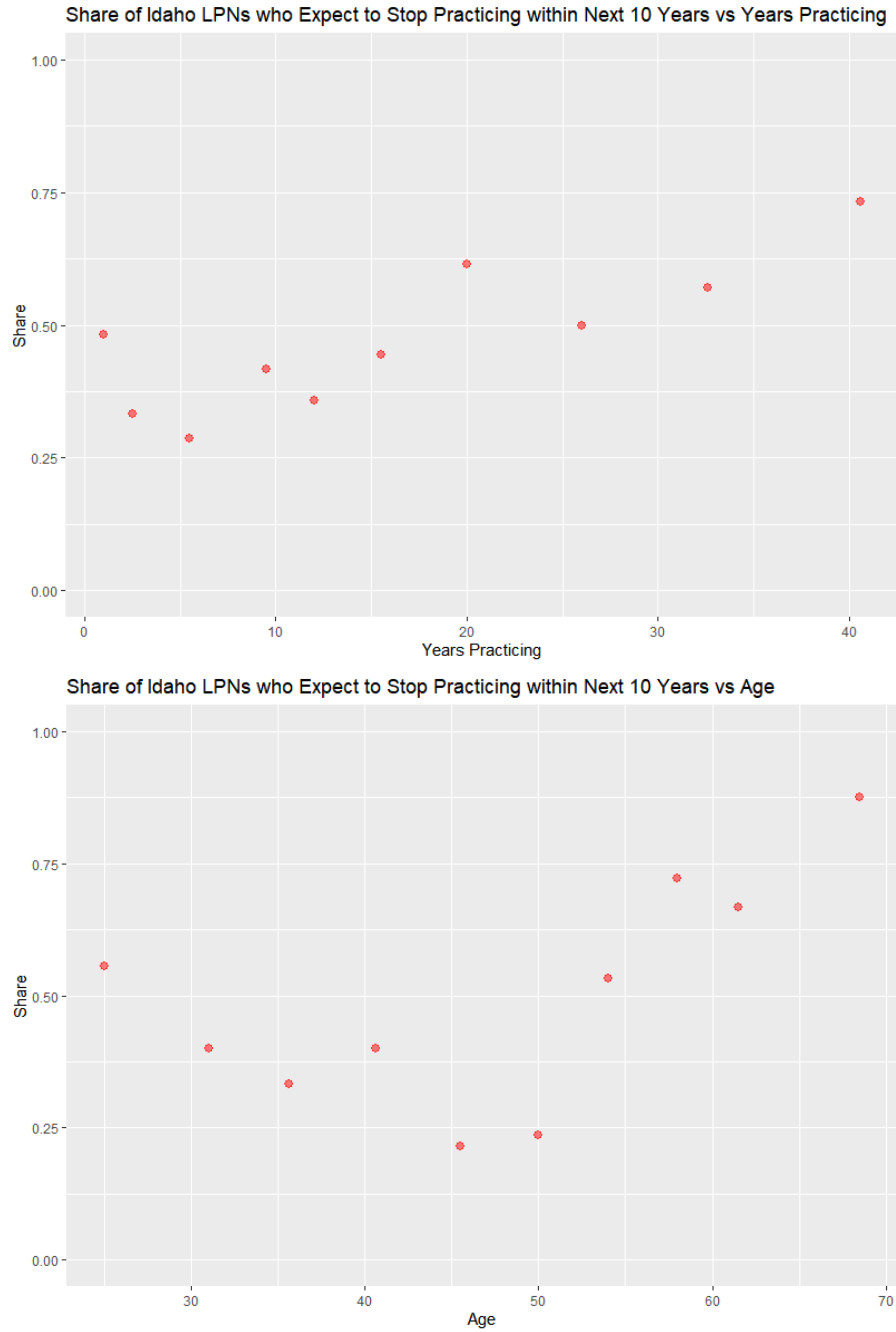
3.2 Survey results, licensed practical nurses (LPNs)

Given the large number of mentions of licensed practical nurses (LPNs) in the IHA survey, the results of the LPN occupational survey were considered next. The occupation’s smaller employment level relative to RNs (2,160 from the May 2021 OEWS Survey vs. 14,400 for RNs) meant a smaller number of survey respondents (176), smaller still for those currently practicing in Idaho (147). Given that expected occupational turnover for LPNs was by and large not due to relocations out of state, the only regression-based analysis in this section will be for Idaho LPNs who are expecting to stop practicing as an LPN.

[Figures 19a and 19b](#) provide plots of the share of Idaho LPNs who expect to stop practicing within the next 10 years by years of experience and age, both binned by decile. The pattern is similar to what was presented in [Figures 13a and 13b](#), i.e., an initially higher share of expected stoppages for the youngest decile bin which drops and eventually begins rising again as workers near retirement age. It would seem the youngest and least experienced LPNs are like RNs, with many considering career changes. Whether this is a consequence of the pandemic or a long-term trend is unknown, but as with RNs, it should

caution employers and policymakers who might otherwise count on these workers to remain in their occupation for a decade or more. In all, an estimated 47.6% of Idaho LPNs expect to stop practicing within the next 10 years (95% confidence interval: 39.5% to 55.7%).

Figure 19: Share of Idaho LPNs who expect to stop practicing by experience (a) and age (b)



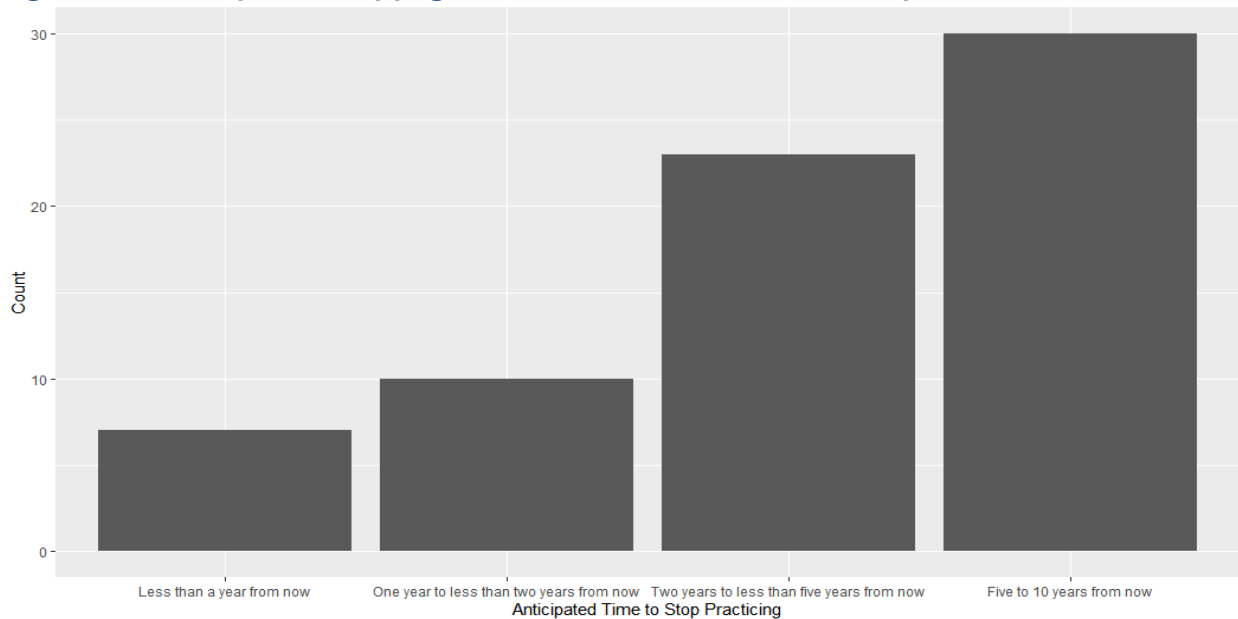
Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size 147 for both figures.

A majority of Idaho LPNs who expect to stop practicing indicate they will do so anywhere between two and 10 years from now, with the largest group between five and 10 years from now (see [Figure 20](#)). An overwhelming majority of those stating they will stop practicing at any point in the next decade indicated a permanent stop rather than a temporary one (53 of 70 respondents). Retirements represented a majority (40 of 70) of the reasons for ending their practice, followed by career changes (16 of 70) as a distant second. For a complete breakdown, see [Figure 21](#) below. Among “others,” the most common reason stated in their open-ended response was completion of their RN or other more advanced degree (seven of 11).

Looking at all anticipated occupational exits for LPNs, an estimated 54.4% expect to stop practicing or move out of state within the next decade (95% confidence interval: 46.4% to 62.5%), similar to the rate for RNs. The estimated occupational turnover rate for LPNs over the next year was 8.8% (95% confidence interval: 4.3% to 13.4%), which is not far off from the implied turnover rate of 6.9% based on Idaho Department of Labor projections, though slightly higher. Still, this turnover rate is larger than the estimated entrant rate of 6% based on program completions. This points to expected continued constraints on the supply of LPNs in the state and, therefore, upward pressure on wages as demand outpaces supply.

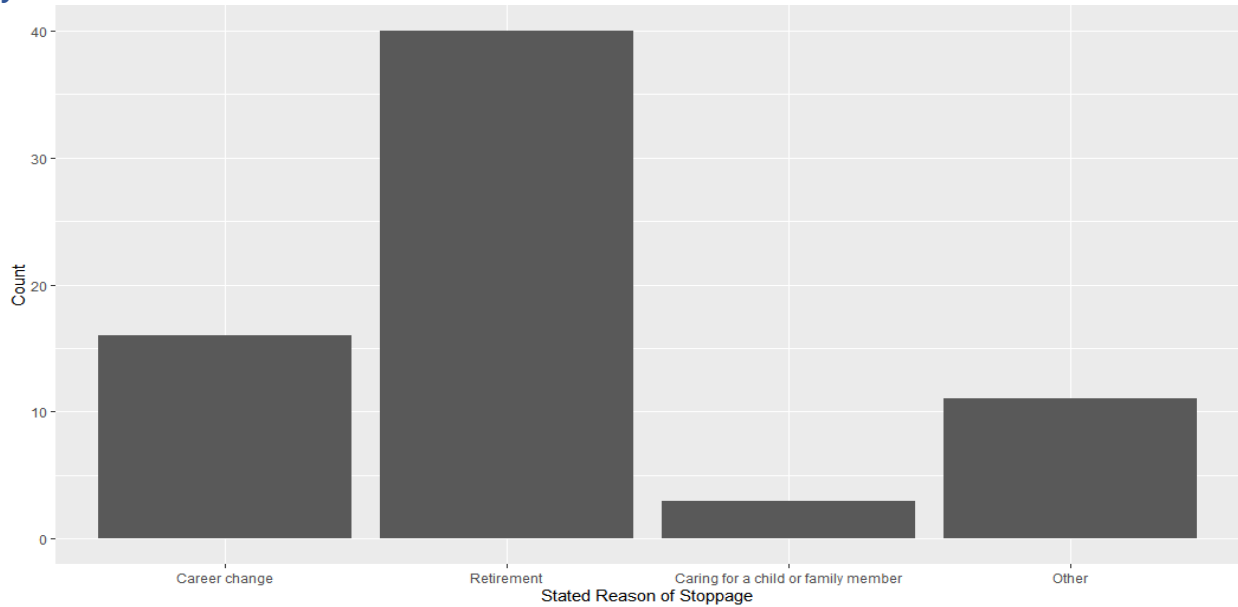
Figure 20: Anticipated stoppage timeframe for Idaho licensed practical nurses LPNs



Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size equals 70.

Figure 21: Reason for Idaho LPNs who expect to stop practicing within the next 10 years



Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size equals 70.

[Table 11](#) provides the regression-based estimates for WTA wages among Idaho LPNs expecting to stop practicing within the next year. Quickly summarizing these results, the estimated WTA wage for all LPNs surveyed was \$60,856 (highlighted column under Model 1), which was above the 75th percentile of annual wages for LPNs/LVNs in the May 2021 OEWS survey. Among the stated reasons, “other” and retirements had the largest estimated WTA wages — \$66,813 and \$63,418, respectively — while caring for a child or family member was the lowest at \$40,771. However, these estimates were statistically indistinguishable given their large standard errors. By years of experience (Model 3), there appeared to be a hump shape with the least- and most-experienced requiring the least compensation to keep practicing; however, given their large standard errors, these estimates were also not statistically distinguishable from one another. Last, those in counties classified as urban appeared to have a slightly smaller WTA compared to their rural counterparts (Model 4), in contrast to what was seen in the previous RN analyses, but large standard errors again meant they were statistically identical.

Table 11: Estimated willingness-to-accept (WTA) wage for Idaho LPNs expecting to stop practicing

	Model 1		Model 2		Model 3		Model 4	
	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)	Estimate (Std. Err.)	WTA (Std. Err.)
Intercept	54.789 (6.678)	60,856 (2,858)						
Career change			56.675 (6.890)	56,803 (4,617)				
Retirement			57.245 (6.988)	63,418 (3,595)				
Care for child/family			54.958 (6.567)	40,771 (13,986)				
Other			57.515 (7.034)	66,813 (6,978)				
Experience (<4)					57.584 (6.976)	55,755 (4,731)		
Experience (4-17)					58.762 (7.091)	69,719 (5,956)		
Experience (17-29)					58.126 (7.034)	61,796 (5,231)		
Experience (>=29)					57.523 (6.975)	55,113 (5,516)		
Urban							54.790 (4.205)	60,624 (3,166)
Rural							54.887 (4.190)	61,828 (6,629)
ln (Salary)	4.974 (0.607)		5.177 (0.631)		5.269 (0.637)		4.975 (0.382)	
Sample Size	65		65		65		65	
Log Likelihood	-126.9		-124.6		-124.7		-126.8	
Akaike Inf. Criterion	257.7		259.2		259.3		259.7	
BFGS iterations	27		54		52		41	

Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

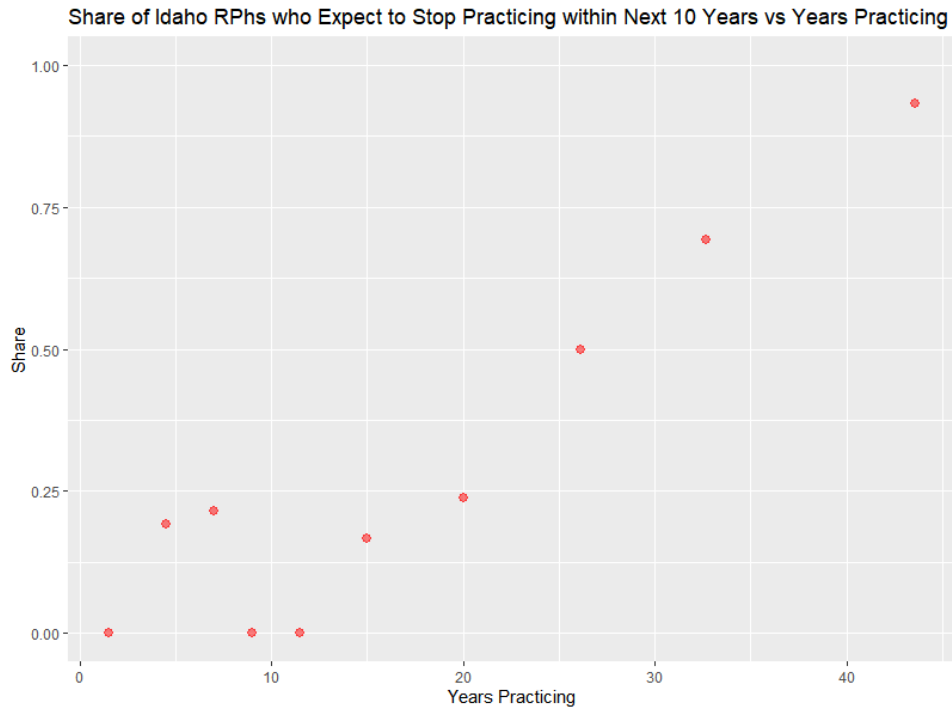
Note: Optimization method was the Broyden-Fletcher-Goldfarb-Shanno (BFGS) algorithm without box constraints. Number of iterations until convergence are reported in the final row of the table.

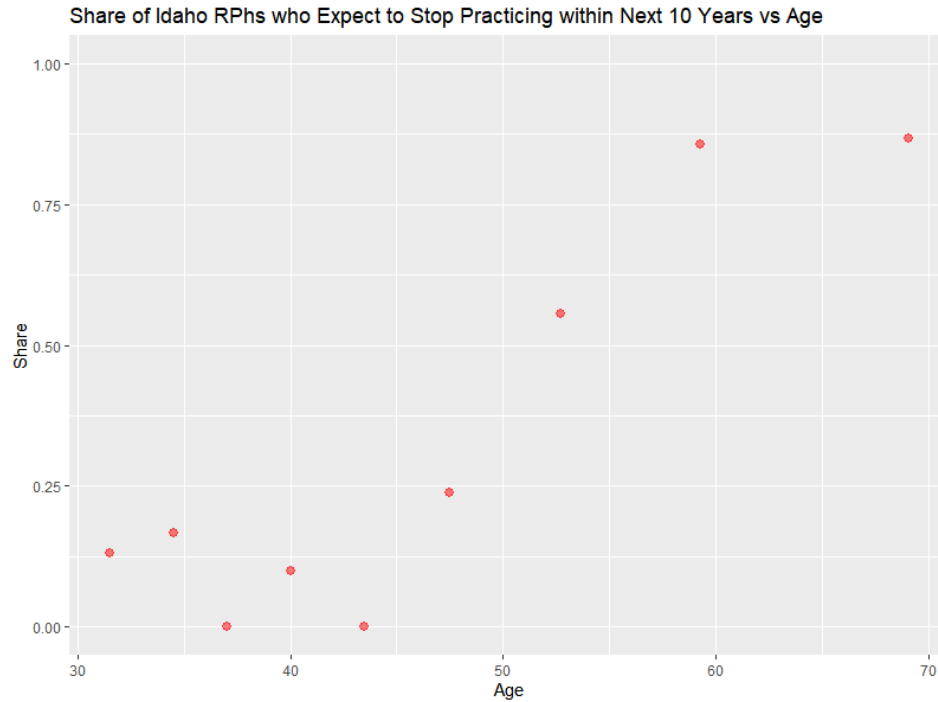
3.3 Survey results, registered pharmacists

The next occupation considered was registered pharmacists. While not mentioned in the Idaho Hospital Association discussions and survey, this occupation was brought up in discussions with both education program administrators as well as the Idaho Division of Professional Licensing. To recap, estimates of occupational entrant and turnover rates for pharmacists based on Idaho Department of Labor projections and program completions pointed to balanced supply growth of registered pharmacists relative to demand during the pre-pandemic period. Since 2019, however, their employment has declined. The pipeline of qualified applicants for pharmacy programs in the state is now roughly equal with the number of available slots, pointing to the possibility that demand may outstrip supply. Total survey responses for registered pharmacists were a bit larger than LPNs though considerably less than RNs at 242, as was the sample size for those currently practicing in Idaho (177).

Figures 22a and 22b plot the share of Idaho registered pharmacists who expect to stop practicing within the next 10 years against years of experience and age, binned by decile. Generally, the share of registered pharmacists who expect to stop practicing increases with experience and age as those nearing retirement are more likely to stop. However, like nurses, there is a notable elevation in this share among some of the least experienced and youngest pharmacists. Those in the second and third experience decile bins and first two age decile bins had an elevated share of respondents who said they will stop practicing relative to more experienced and older pharmacists. While these shares were not as high for registered pharmacists as they were for RNs and LPNs, they do perhaps point to a similar, though less severe, turnover problem going forward. In all, an estimated 27.1% of registered pharmacists currently practicing in Idaho expect to stop practicing within the next decade (95% confidence interval: 20.6% to 33.7%). Since a majority of occupational exits are due to retirements (38 of 48), the majority of these exits will occur over a medium- to long-term horizon between two and 10 years (see Figure 23).

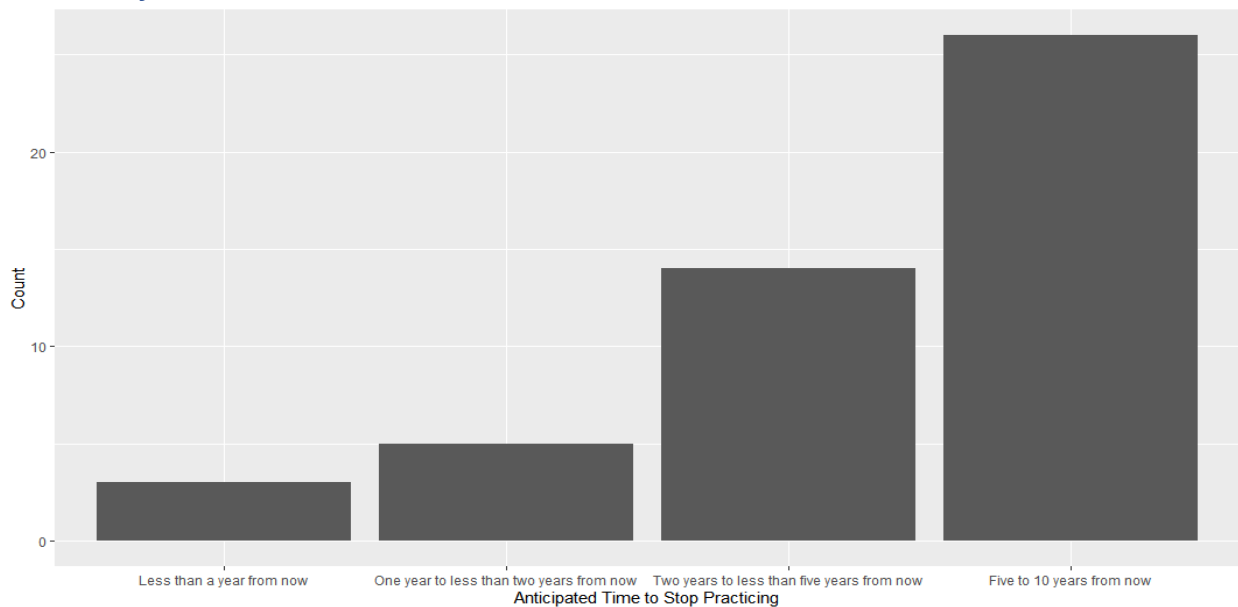
Figure 22: Share of registered pharmacists who expect to stop practicing in Idaho by experience (a) and age (b)





Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.
Note: Sample size equals 177 for both figures.

Figure 23: Anticipated timeframe for registered pharmacists to stop working in Idaho within 10 years



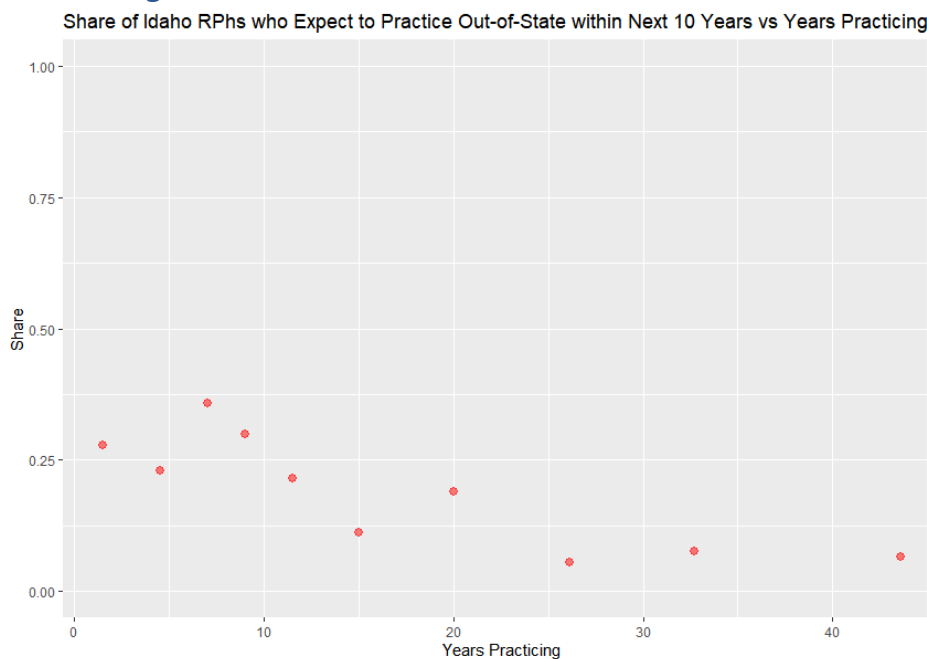
Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.
Note: Sample size equals 48.

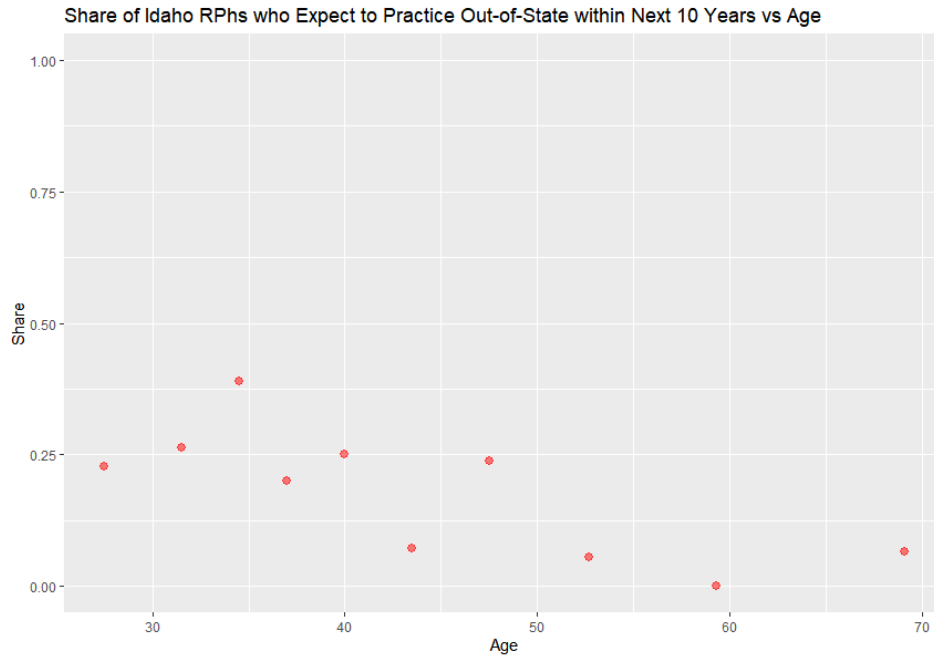
Of those expecting to move out of state, the least experienced and youngest pharmacists represent a larger share (see [Figures 24a and 24b](#)) — a similar pattern as seen with nurses. Somewhat like RNs,

those expecting to relocate plan on doing so in the near-to-medium term of five years or less. Unlike RNs, there was a U-shaped distribution with an equal number of pharmacist respondents (each 12 of 34) reporting they would relocate within the next year and between two and five years. Among the reasons given, the overwhelming majority listed their own career advancement (11 of 34) or “other” (18 of 34) as the primary reason. Looking at the open-ended responses provided under “other,” the most common reasons mentioned were being licensed in multiple states and the ability to be a traveling pharmacist (five of 18). Idaho’s cultural and political environment were also mentioned (four of 18). In all, an estimated 19.2% of registered pharmacists in Idaho anticipate they will move out of state within the next 10 years (95% confidence interval: 13.4% to 25.0%).

Pooling all labor market exits and occupational transfers together, 43.5% of registered pharmacists expect an exit over the next decade (95% confidence interval: 36.2% to 50.8%), whereas the expected turnover rate over the coming year is 8.5% (95% confidence interval: 4.4% to 12.6%). This turnover rate is significantly larger than the 3.9% implied by Idaho Department of Labor projections. Additionally, it is larger than the implied entrant rate of around 5% based on both program completion and the projections. Assuming the occupational entrant rate stays at this level, this would imply future expected declines in the supply of registered pharmacists in Idaho; worse still, if the pool of qualified program applicants were to fall further, this would only constrict the pipeline of entrants and further exacerbate this supply problem. It would appear, then, that pharmacists will continue to be in relatively short supply in the near term. Given expected demand growth from the department’s occupational projections, this will translate into continued upward wage pressures for registered pharmacists.

Figure 24: Share of registered Idaho pharmacists who expect to relocate by experience (a) and age (b)





Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

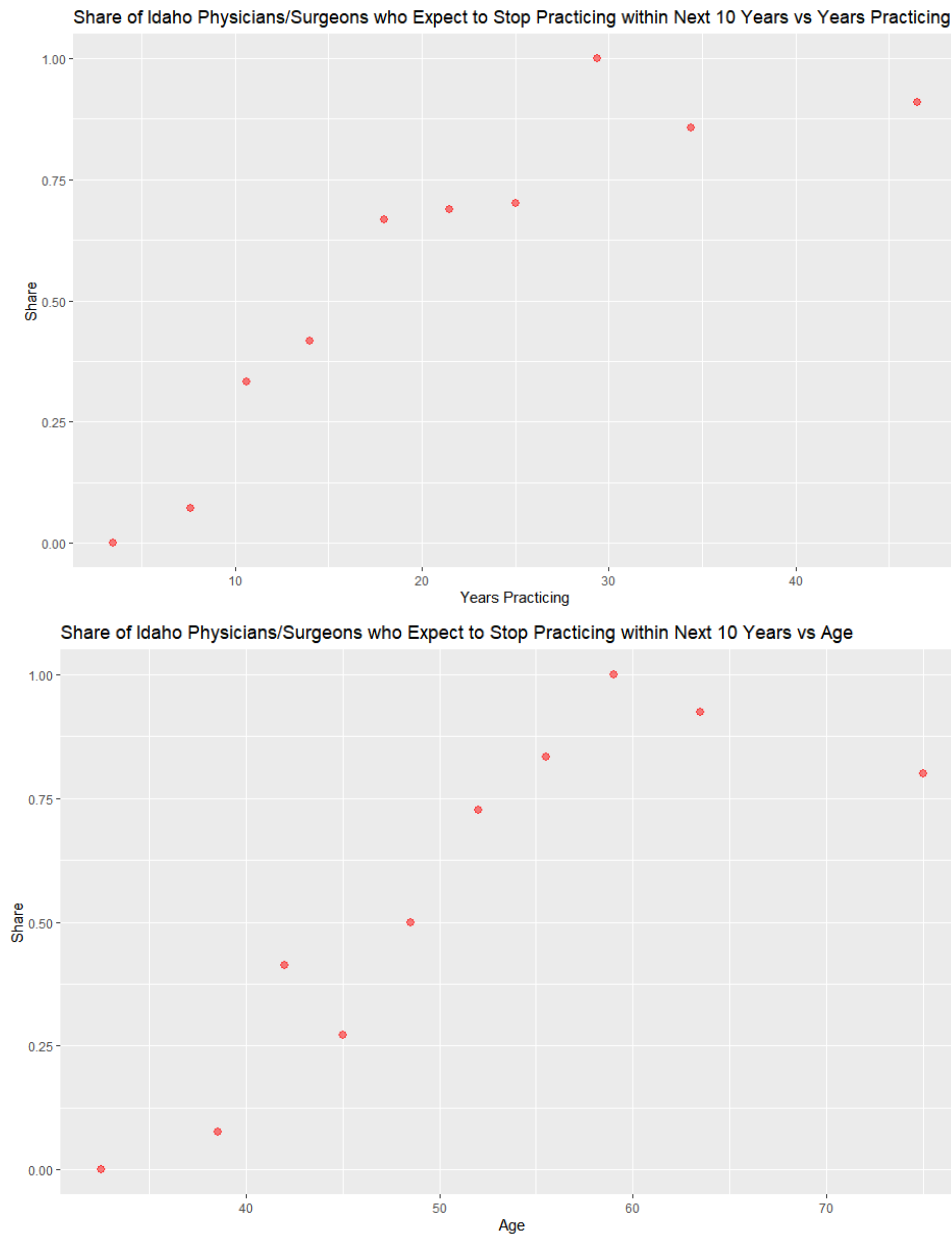
Note: Sample size equals 177 for both figures.

3.4 Survey results, physicians and surgeons

Last among the occupational groups whose survey results will be discussed are physicians and surgeons taken as a single group. Treating this cohort as a single group does have its limitations; their degree of specialization makes apples-to-apples comparisons difficult. Given the sample size (full sample, 265; those currently practicing in Idaho, 190), it was hard to match many respondents to others of comparable specialty. As a result, no regression-based estimates of WTA wages for those anticipating a labor market exit or occupational transfer were performed. The descriptive analysis to follow will mirror the approach with pharmacists in only focusing on anticipated exits, respondents’ timeframe and reason for such exits, and the aggregate estimated occupational turnover rate.

Turning first to the share of physicians and surgeons who expect to stop practicing within the next 10 years, there is an expected positive relationship between this proportion and experience as well as age, as shown in [Figures 25a and 25b](#). Notably, however, the seventh decile bin by experience and age both appear to have elevated shares anticipating they will stop practicing relative to more experienced and older colleagues. The cause of this pattern is not apparent, but one possible explanation is a division at this career stage between those who place greater value on a non-employment option later in life (and who would therefore be more likely to retire from medicine early) and those who place comparatively less value on such an option (and who would therefore work much longer into old age before deciding to retire).

Figure 25: Share of Idaho physicians and surgeons who expect to stop practicing by experience (a) and age (b)



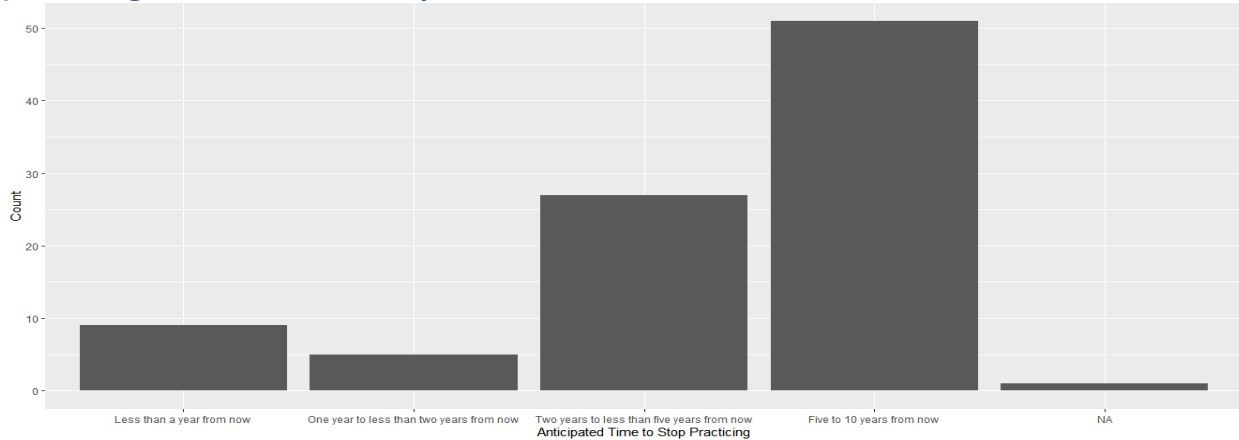
Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size equals 190 for both figures.

Among the reasons given for no longer practicing, retirements were by far the largest (70 of 93) whereas career changers and those who gave responses under “other” were equal in size (11 of 93 each). The open-ended responses tagged as “other” were varied, with a few mentioning bureaucratic and administrative/management grievances (four of 11) as well as the cultural and political environment of Idaho (three of 11). A majority of physicians and surgeons say they will stop practicing in the medium-to-long term, between two and 10 years from now (see [Figure 26](#)). However, there is a notable discrepancy

between individuals planning to stop less than a year from now and those planning to stop one and two years from now. In all, an estimated 48.9% of physicians and surgeons currently practicing in Idaho expect to stop practicing within the next decade (95% confidence interval: 41.8% to 56.1%).

Figure 26: Anticipated timeframe for Idaho physicians/surgeons who expect to stop practicing within the next 10 years

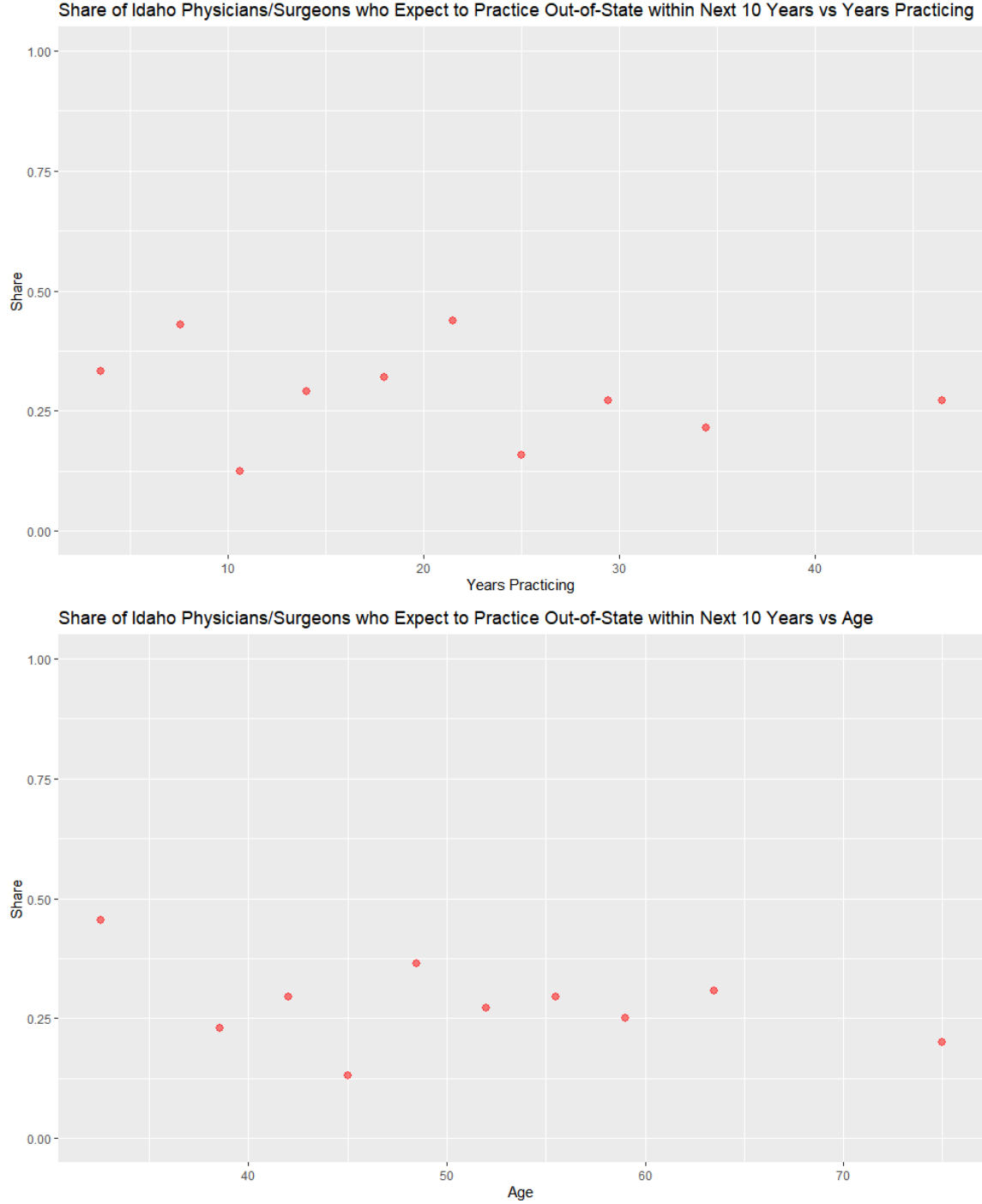


Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size equals 93.

Turning to relocation decisions, an estimated 27.9% of Idaho physicians and surgeons are considering moving to another state in the next 10 years (95% confidence interval: 21.5% to 34.3%). While there is a general negative relationship between the share expecting a move and their experience as well as age, this relationship is weaker and somewhat noisy (see [Figures 27a and 27b](#)). Moreover, the timeframe these physicians and surgeons identify for their anticipated relocation falls largely between less than one year and five years (see [Figure 28](#)). Furthermore, a majority stated this relocation would be permanent as opposed to temporary (33 of 53).

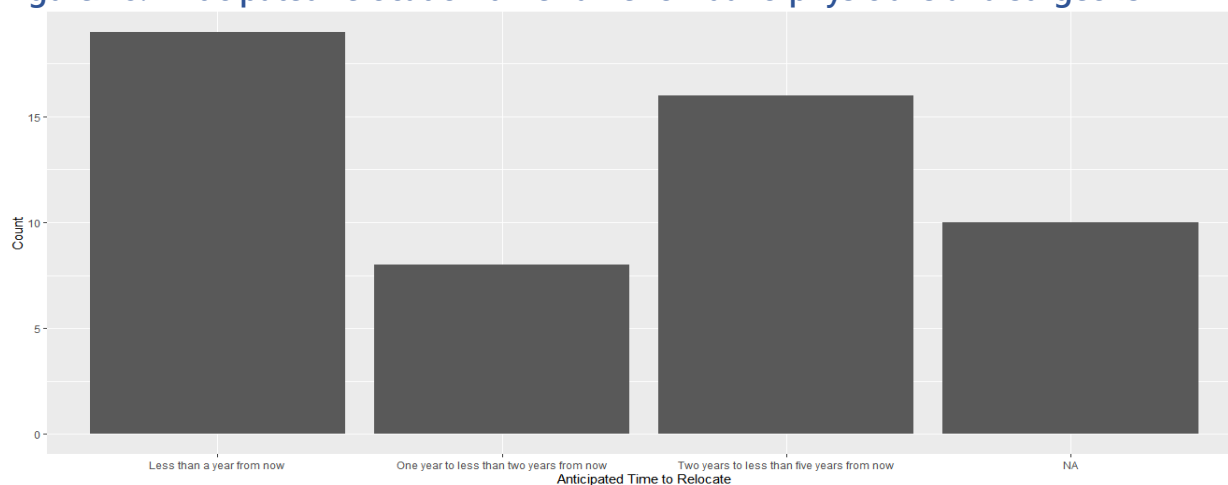
Figure 27: Share of Idaho physicians and surgeons who expect to relocate by experience (a) and age (b)



Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size equals 177 for both figures.

Figure 28: Anticipated relocation timeframe for Idaho physicians and surgeons



Source: Survey of Health Care Professionals, Idaho Department of Labor, 2022.

Note: Sample size equals 53.

Of Idaho physicians and surgeons considering moving to another state, most gave reasons falling under “other” (41 of 53). Those seeking to advance their own careers came in at a distant second (7 of 53). Looking at the open-ended responses provided under “other,” the majority spoke to Idaho’s cultural and political environment (26 of 41). Among the specific issues raised were the embrace of misinformation and disregard for evidence-based standards of care, often cited together with abortion restrictions and hostility to mask and vaccine policies; lack of support for education; as well as bigotry and threats of violence. Considering all anticipated relocations and not just the “other” category, a majority cited the current cultural and political environment in their open-ended responses (29 of 53).

Taking all labor market exits and occupational transfers together, an estimated 63.2% of Idaho physicians and surgeons do not expect to be practicing in Idaho within the next 10 years (95% confidence interval: 56.3% to 70.0%). Looking at the near term of one year or less, the estimated turnover rate was 14.7% (95% confidence interval: 9.7% to 20.0%), over five times larger than the 2.7% occupational turnover rate implied by the Idaho Department of Labor projections and more than three times larger than the 4.6% occupational entrant rate implied by those same forecasts. Using the 1.6% entrant rate implied by WWAMI program completions and retention rate of graduates who stay in Idaho, this difference grows even larger, with nine exits for every new entrant over the next year. Given the expected growth in demand, this will almost certainly translate into upward wage pressures as employers are forced to pay dearly to retain these practitioners and/or attract others to relocate to the state. Moreover, this supply shock might come as a surprise to Idaho hospitals and clinics, given its magnitude and the comparatively fewer mentions of physicians and surgeons in IHA’s survey.

4.0 Outlook and recommendations

The consequences of the COVID-19 pandemic have been strong, persistent and pervasive. In the two years since the first set of public health orders were given — measures many expected would only be a temporary and mild disruption to life — almost every corner of the Idaho economy has felt the impact of COVID-19, with many still feeling its aftershocks. Health care is one of those areas most affected.

However, as these shocks and aftershocks subside, affairs are likely to begin returning to something closer to pre-pandemic times. People will always need medical care and assistance, but fewer will be needing it for COVID-related reasons. Similarly, people will continue to go into health care fields based upon the compensation afforded as well as individuals' own intrinsic motivations. In that regard the outlook for the remainder of the decade will probably be similar to, though not the same as, the Idaho Department of Labor projections for 2020-2030, albeit with adjustments as some aftershocks persist. In the long-term, the pandemic's effects will become distant, their size measured more by the number of peer-reviewed articles in scientific journals than people's day-to-day experiences.

For the present and immediate future, however, these consequences will still be felt by health care workers who have lived, worked and — above all else — survived this public health crisis; by hospitals and clinics with far fewer resources available to them as they try to fill vacancies created by retirements and career changes due to increased stress and work-related hazards; and by patients who will continue to require care from specialized staff and resources, the former less available from the ongoing staffing shortages and the latter becoming harder to acquire due to financial constraints. Against those who might take solace in the long-term view that COVID-19 and its consequences will fade away, one might retort the now-century-old quote by John Maynard Keynes: "In the long run we are all dead." Like a sailor whose ship is navigating through a tempest, the present-day problems will generally outweigh the hopeful expectations of eventual safe arrival to port.

Going forward, Idaho policymakers and stakeholders interested in tackling the health care worker shortage would benefit from looking at these issues as interrelated rather than trying to tackle them in isolation.

On the education pipeline, a common refrain has been to promote these career paths to young Idahoans, thereby creating interest and increasing enrollment in training programs. Depending on how this effort is conducted, it may be the least expensive prescription, but taken by itself it will also likely have a small impact. Except for pharmacy programs whose admissions are roughly matched with the pool of qualified candidates, most programs already have excess applicants relative to capacity. Additionally, the expansion capacity for many health care programs is either limited or becoming increasingly expensive for several reasons: Teaching faculty are becoming harder to recruit and retain; expansion will require investments in brick-and-mortar classrooms as well as learning technology; and for many programs, there already is a dearth of clinical training sites within the state. If these additional issues are not tackled, the "leakage" in this supply pipeline will likely increase as Idahoans trained in-state leave to find work elsewhere for any number of reasons — e.g., they perform their clinical training at an out-of-state hospital only to be hired by the hospital upon graduating, or they find pay within the state not commensurate with the costs of servicing their student loans.

Another set of prescriptions include attracting out-of-state workers to Idaho. Idaho has a fast-growing population owing to what had been its relative affordability and many local amenities. These are selling points for many Americans, though they are by no means the only factors individuals consider in choosing where to live and work. As found in the occupational surveys, many Idaho health care professionals were either leaving their field or the state altogether as a result of inadequate pay in comparison to costs of living. A number of hospitals surveyed by the IHA specifically cited housing costs as a barrier to entry for many would-be candidates, with some workers having to turn down job offers after an unsuccessful search for affordable housing. Paired with wages in Idaho trailing some of its

nearby neighbors like Nevada, Oregon and Washington — in addition to increasing ease to transfer professional licenses across state lines — this strategy may prove to be expensive unless it is targeted at certain workers. As seen in the willingness-to-accept wage estimates for RNs, such a strategy may work best if focused on the youngest health care workers and workers from states with similar prevailing wages. However, if targeted at neighboring states like Wyoming and Utah, this could lead to a “beggar thy neighbor” situation that becomes a cross-state bidding war.

Last among the set of policy prescriptions would be those aimed at increasing retention and reducing labor market exits or occupational transfers. Some of these prescriptions were mentioned in discussions with stakeholders including IHA survey responses: increasing the availability of affordable housing in many areas, offering some form of student loan forgiveness for those who remain practicing in the state, etc. These issues, while related to health care, are often framed within a wider economic policy discussion. As such, the potential for a consensus perhaps already exists. These ideas are a comparatively blunt tool for tackling the health care worker shortage as they are much more general in their impact and, consequently, will be hard to measure their success in alleviating this specific issue. Alternatively, more precise prescriptions may be to address specific occupational exits, provide greater work flexibility, reduce workloads, increase pay and provide more opportunities for career advancement.

However, some factors in health care professionals’ exit decisions seem much more insurmountable, most especially those relating to the current cultural and political climate in Idaho as evidenced by their disproportionate mention among physicians and surgeons. The many mentions among survey respondents of the proliferation of misinformation, growing acceptance of non-evidence-based standards of care, bigotry and violence, and the potential of legal jeopardy from new health care restrictions being passed into law are hard to overlook. If turnover rates pan out as estimated, this human capital flight could prove to be a much longer-term challenge as such ideological shifts tend to occur over generations as opposed to a comparatively fleeting pandemic.

A.0 Appendix - Methodology

A.1 Occupational license survey overview

Surveys of Idaho occupational license holders were conducted online using a set of occupational-specific Snap Surveys between July 8, 2022, and 17 Aug. 17, 2022. Active license holder rolls were provided under a joint agreement between the Idaho Department of Labor and the Idaho Division of Occupational and Professional Licenses. License holders were contacted via email and provided a brief explanation of the survey purpose and a confidentiality guarantee, together with a link that would take them to the survey. Additionally, the survey allowed partial completions if the respondent did not wish to disclose specific information such as their salary.

The general survey format used by each occupational license survey included a panel of demographic and socioeconomic variables in addition to occupational-specific questions. These include the respondent's current practicing status, where they are practicing, job title, number of years practicing, current and future expected salary, expectations of a possible market exit (e.g., stopping practicing entirely or practicing out of state), and a series of hypothetical questions concerning their willingness to practice in Idaho if they anticipated a market exit or are currently practicing out of state (more on that later).

To minimize each participant's time spent completing the survey and thereby maximize the survey response rate, redundant questions were removed by making the survey structure conditional. The complete survey would have been 50 questions otherwise, with the respondent having to skip over many questions and thereby increasing the chance they fail to complete the survey. Depending on how certain questions were answered earlier in the survey, subsequent panels of questions were changed or omitted entirely. For example, if the respondent answered "No" to "Are you currently practicing in Idaho?", they were subsequently asked where they are practicing. Had they responded "Yes"; they were asked which Idaho county they are primarily practicing in. As a result, the average survey completion time across occupations was less than 10 minutes, well within the goal of keeping the average completion time to 15 minutes or less.

Additionally, the conditional structure of the survey served as a basis for the estimation of workers' average WTA wage for continuing to practice in or relocating to Idaho. This worked as follows. If the respondent responded "Yes" to either anticipating a market exit or are currently practicing out of state, they were asked a series of hypothetical questions to gauge if they might choose to stay on or relocate to the state, respectively. Survey participants would first be asked if a 20% raise would convince them to continue practicing/relocate to practice in Idaho. Depending on whether they answer "Yes" or "No," they would be asked a second hypothetical question. If they answered "Yes," the same question was posed but with a 10% raise. Had they answered "No," the same question was posed but with a 30% raise.

A.2 Estimating average willingness-to-accept (WTA) wage using a double-bounded dichotomous choice model

The problem: for health care workers of a specific occupation who anticipate they will stop practicing in Idaho within the next several years (e.g., looking to relocate to a new state, switch careers or retire), how high of a salary in current dollar terms would they need to be offered to convince them to stay?

The economic theory behind the model

Assume a random utility model of discrete choice²¹ with utility from salary weighted by $\beta > 0$ and additively separable disutility from continuing to practice in Idaho denoted by $\alpha > 0$. Denote the currently observed salary by $w > 0$ and percentage raise offered by $x \geq 0$. Utility is further assumed to be increasing logarithmically in salary to better account for outliers owing to the right-skewness in the observed salaries distribution. Finally, each worker has a set of idiosyncratic preference shocks over their options, $\varepsilon \equiv (\varepsilon_0, \varepsilon_1) \in \mathbb{R}^2$, with shocks assumed to be continuous as well as independent and identically distributed (i.i.d.). Preference shocks are the private information of the worker and capture variability in the value workers place on practicing in Idaho as well as their outside option and therefore affect their opportunity cost of employment. According to the model, the utility from each option the worker can choose between is given by

- Utility from outside option: $u_0(\varepsilon) = \varepsilon_0$
- Utility from practicing in Idaho: $u_1(x, w, \varepsilon) = -\alpha + \beta \ln((1+x)w) + \varepsilon_1$

Since this utility model aims to represent an individual's preference ordering over these options (i.e., *ordinal* as opposed to *cardinal* utility), the utility from a worker's outside option less their preference shock is an arbitrary number and so is normalized to zero by convention.

Workers observe (w, x, ε) and their preference ordering between options $u_0(\varepsilon)$ and $u_1(x, w; \varepsilon)$ follows. For example, a worker with current salary w will prefer continuing to practice in Idaho with percentage raise x provided that their utility from continuing working is greater than that from their outside option:

$$u_1(x, w, \varepsilon) > u_0(\varepsilon) \Leftrightarrow -\alpha + \beta \ln((1+x)w) > \varepsilon_0 - \varepsilon_1.$$

We as the econometricians, on the other hand, only observe (w, x) and the worker's preference ordering, and therefore must make inferences about (α, β) based upon this information together with distributional assumptions about ε , but for now assume (α, β) are known values.

Since ε_0 and ε_1 are i.i.d. and therefore $\mathbb{E}[\varepsilon_0 - \varepsilon_1] = 0$, the average WTA salary is obtained from identifying the wage that leaves the average Idahoan expecting a market exit indifferent between staying on and leaving:

$$WTA = \{W \in \mathbb{R}_+ : -\alpha + \beta \ln W = 0\} = \exp\left(\frac{\alpha}{\beta}\right).$$

Note this estimate is in current dollars and salary and is therefore a *static* model of discrete choice. In other words, estimates answer the question, "How much would you need to be paid *today* to continue

²¹ The general class of qualitative choice models considered here follows McFadden (1974) with Chapter 2 in Train (2009) providing a more contemporary overview of the subject.

working in Idaho as opposed to leaving or stop practicing?”. This does not factor in future salary expectations and expected changes in working conditions, features that unfortunately require a *dynamic* discrete choice (DDC) model.²²

The next issue is to estimate the parameters α and β to compute an estimate and appropriate sampling distribution for WTA. This is achieved using a specific type of survey design and estimation method known as the *double-bounded dichotomous choice method*.

Survey design

Health care workers with active Idaho licenses were surveyed between July 8, 2022, and August 17, 2022. In addition to a panel of demographic and socioeconomic questions, they were asked a series of occupation-related questions including current practicing status, county/state where they practiced, current and future expected salary, and whether they anticipated a market exit (e.g., relocation out of state or quitting their profession entirely) within the next 10 years. Survey respondents who said they anticipated a market exit were presented with two series of offers, the second depending on their response to the first:

1. Continue practicing in Idaho with a raise of $R = 20\%$
2. If respondent replied no to (1), offer $R^u = 30\%$ raise; if respondent replied yes to (1), offer $R^d = 10\%$ raise.

This choice of survey design is the crux of the double-bounded dichotomous choice method. Unlike self-reported reservation salaries, this model-based econometric method is based upon individuals’ stated preferences, i.e., which of the options they prefer. The first benefit is that by restricting respondents’ choice to a simple “Accept/Reject” answer to an offer (the “dichotomous choice” part of the definition), the model mitigates the potential bias of having respondents report their own reservation salary. By asking a follow-up question to the respondent with an amount based upon their response to the first offer (the “double-bounded” part of the definition), the statistical efficiency is further improved (Hanemann et al., 1991), helping to mitigate small sample issues.

Estimating willingness-to-accept (WTA) wage via maximum likelihood

Denote by $d \equiv (d^{yy}, d^{yn}, d^{ny}, d^{nn}) \in \{0,1\} \times \{0,1\} \times \{0,1\} \times \{0,1\}$ the observed response to the offers made where

$$d^{yn} = \begin{cases} 1, & \text{Yes to offer 1, No to offer 2} \\ 0, & \text{otherwise} \end{cases}$$

and so on and so forth. The probability that the respondent answered d^{yy} is then

$$\Pr(d^{yy}) = \Pr(u_1(R, w, \varepsilon) > u_0(\varepsilon) \ \& \ u_1(R^d, w, \varepsilon) > u_0(\varepsilon)).$$

After a bit of algebra and exploiting the fact that $R > R^d$ and $-\alpha + \beta \ln((1 + R^d)w) > \varepsilon_0 - \varepsilon_1$ imply $-\alpha + \beta \ln((1 + R)w) > \varepsilon_0 - \varepsilon_1$, this reduces to simply

²² While not considered in this report due to the data requirements, a DDC model of occupational entry/exit would make for an interesting follow-up study.

$$\Pr(d^{yy}) = \Pr\left(-\alpha + \beta \ln\left((1 + R^d)w\right) > \varepsilon_0 - \varepsilon_1\right).$$

Similarly for the other choice probabilities, we have

$$\Pr(d^{yn}) = \Pr\left(-\alpha + \beta \ln\left((1 + R)w\right) > \varepsilon_0 - \varepsilon_1 > -\alpha + \beta \ln\left((1 + R^d)w\right)\right),$$

$$\Pr(d^{ny}) = \Pr\left(-\alpha + \beta \ln\left((1 + R^u)w\right) > \varepsilon_0 - \varepsilon_1 > -\alpha + \beta \ln\left((1 + R)w\right)\right),$$

$$\Pr(d^{nn}) = \Pr\left(\varepsilon_0 - \varepsilon_1 > -\alpha + \beta \ln\left((1 + R^u)w\right)\right).$$

To close the model, the distribution of $\varepsilon_0 - \varepsilon_1$ would need to be specified. Preference shocks are assumed to follow a Type-I extreme value (Gumbel) distribution with standardized location 0 and scale 1:

$$\Pr(\varepsilon_0 < y) = \Pr(\varepsilon_1 < y) = \exp(-\exp(-y))$$

Given the assumptions of the utility function and distribution of preference shocks as well as reported salary and offer responses, the log likelihood function for a single observation (d, w) given the parameter $\theta \equiv (\alpha, \beta) \in \mathbb{R}_+^2$ takes the form

$$\begin{aligned} \ln \mathcal{L}(\theta) = & d^{yy} \ln\left(F(R^d, w; \theta)\right) + d^{yn} \ln\left(F(R, w; \theta) - F(R^d, w; \theta)\right) \\ & + d^{ny} \ln\left(F(R^u, w; \theta) - F(R, w; \theta)\right) + d^{nn} \ln\left(1 - F(R^u, w; \theta)\right) \end{aligned}$$

where

$$F(x, w; \theta) \equiv \left[1 + \exp(\alpha - \beta \ln((1 + x)w))\right]^{-1}.$$

Note that the difference of two i.i.d. Type-I extreme value random variables with location 0 and scale 1 is distributed as logistic with location 0 and scale 1, and the model is essentially a variation of a logit regression. This distribution choice is motivated by the fact that the logistic distribution is the maximum entropy distribution for a binary outcome model like “accept/reject” a wage offer. Maximum entropy distributions are to be preferred insofar as they minimize the amount of prior information contained in the distribution — i.e., more prior information makes the distribution and corresponding statistical model more restrictive. Additionally, the logistic distribution has fatter tails compared to, say, the normal distribution and corresponding probit regression (i.e., it exhibits greater excess kurtosis), making model estimates less sensitive to outliers in the data. Lastly, the logistic cumulative distribution function has a convenient closed-form expression that doesn’t require integration.

Indexing respondents now by $i = 1, \dots, N$ the log likelihood function for the observed sample is

$$\begin{aligned} \ln \mathcal{L}_N(\theta) = & \sum_{i=1}^N \left[d_i^{yy} \ln\left(F(R^d, w_i; \theta)\right) + d_i^{yn} \ln\left(F(R, w_i; \theta) - F(R^d, w_i; \theta)\right) \right. \\ & \left. + d_i^{ny} \ln\left(F(R^u, w_i; \theta) - F(R, w_i; \theta)\right) + d_i^{nn} \ln\left(1 - F(R^u, w_i; \theta)\right) \right] \end{aligned}$$

where

$$F(x, w_i; \theta) \equiv \left[1 + \exp(\alpha - \beta \ln((1 + x)w_i))\right]^{-1}.$$

Since θ is unknown, we estimate it by maximizing the log likelihood function with respect to the argument $\tilde{\theta} \in \mathbb{R}_+^2$ to produce the maximum likelihood estimate

$$\hat{\theta} \equiv \arg \max_{\tilde{\theta} \in \mathbb{R}_+^2} \{\ln \mathcal{L}_N(\tilde{\theta})\}.$$

Stated another way, we choose a $\tilde{\theta}$ in the parameter space \mathbb{R}_+^2 so that the probability we observe the sample $\{d_i, w_i\}_{i=1}^N$ as a function of $\tilde{\theta}$ is greatest.²³ (While the model restricts parameters to \mathbb{R}_+^2 , in practice the maximum likelihood estimator did not require this nonnegativity constraint to be imposed on the parameter space; all model estimates $\hat{\theta}$ were positive and statistically distinguishable from zero at conventional significance level.) Provided the model is correctly specified, the maximum likelihood estimator is consistent as well as efficient, and the asymptotic covariance of $\hat{\theta}$ is obtained from the Cramer-Rao lower bound:

$$V(\hat{\theta}) = \mathcal{J}(\theta)^{-1}$$

where

$$\mathcal{J}(\theta) \equiv -\mathbb{E} \left[\frac{\partial^2 \ln \mathcal{L}(\theta)}{\partial \theta \partial \theta'} \right]$$

is the Fisher information matrix. Since $\mathcal{J}(\theta)$ is a population moment and therefore unobserved, we estimate the asymptotic covariance using the sample analogue based on the inverted negative Hessian matrix of the maximized log likelihood function:²⁴

$$\hat{V}(\hat{\theta}) = \left[-\frac{\partial^2 \ln \mathcal{L}_N(\hat{\theta})}{\partial \theta \partial \theta'} \right]^{-1}.$$

The estimate and corresponding sampling distribution for the average WTA wage is mainly its consistency, efficiency and asymptotic normality. Taken together, these properties imply the limiting distribution of $\hat{\theta}$ is

$$\sqrt{N}(\hat{\theta} - \theta) \xrightarrow{d} N(0, \mathcal{J}(\theta)^{-1}).$$

Provided the sample size N is large enough, the approximated sampling distribution for $\hat{\theta}$ is normal with

$$\hat{\theta} \sim N(\theta, \hat{V}(\hat{\theta})).$$

Denote by $g(\tilde{\theta})$ the formula for *WTP* as a function of $\tilde{\theta}$:

$$g(\tilde{\theta}) \equiv \exp\left(\frac{\tilde{\alpha}}{\tilde{\beta}}\right).$$

²³ Note the distinction between θ , the parameter value to be estimated; $\tilde{\theta}$ with a tilde, which is an arbitrary value in the parameter space, any value of which is a potential estimate for θ ; and $\hat{\theta}$ with a hat, that value in the parameter space which is the preferred estimate of θ based on some optimality criterion (maximizing the likelihood function in this case).

²⁴ Provided the Hessian matrix of $\ln \mathcal{L}_N(\tilde{\theta})$ is negative definite at $\hat{\theta}$, its negative is invertible and $\hat{V}(\hat{\theta})$ exists. If $\hat{\theta}$ is reached using the standard first-order necessary conditions based on the score (gradient) of $\ln \mathcal{L}_N(\tilde{\theta})$, negative definiteness of the Hessian matrix at $\hat{\theta}$ distinguishes $\hat{\theta}$ as an isolated local maximum as opposed to an isolated local minimum.

We have via the delta method that

$$\sqrt{N} \left(g(\hat{\theta}) - g(\theta) \right) \xrightarrow{d} N \left(0, \nabla g(\theta)' \mathcal{J}(\theta)^{-1} \nabla g(\theta) \right)$$

where $\nabla g(\tilde{\theta})$ is the gradient of $g(\tilde{\theta})$:

$$\nabla g(\tilde{\theta}) \equiv \begin{pmatrix} \frac{\partial}{\partial \tilde{\alpha}} g(\tilde{\theta}) \\ \frac{\partial}{\partial \tilde{\beta}} g(\tilde{\theta}) \end{pmatrix} = \begin{pmatrix} \frac{1}{\tilde{\beta}} \\ -\frac{\tilde{\alpha}}{\tilde{\beta}^2} \end{pmatrix} g(\tilde{\theta}).$$

Provided the sample size N is large enough, the approximated sampling distribution for the estimated WTA wage is similarly normal:

$$\widehat{WTA} \sim N \left(g(\hat{\theta}), \nabla g(\hat{\theta})' \hat{V}(\hat{\theta}) \nabla g(\hat{\theta}) \right).^{25}$$

Since this is a normal approximation, the distribution will take values across the entire number line (positive as well as negative). In most of the models considered, the 95% confidence interval was nonetheless positive, but in a few models with heterogeneity in willingness-to-accept (see below) the estimated variance of \widehat{WTA} was large enough for certain groups to generate confidence intervals that extended into the negatives. This may reflect potential bias and large variance of $\hat{\theta}$ in finite samples, making approximations based on the asymptotic properties of $\hat{\theta}$ unsuitable. With larger survey response rates and correspondingly larger survey samples, however, one might alleviate this issue.

Heterogeneity in willingness to pay (WTP) by extending the model with covariates

Consider the above model, only now there are a vector of covariates $Z \in \mathbb{R}^m$ to be included in the intercept term. This vector could include years of experience, stated reason for leaving, urban/rural county status of the county they primarily work in, etc. Including different panels of covariates allow us to see how the estimated mean WTA wage varies across groups. The model largely remains as before only now with the intercept term consisting of the dot product of Z and a vector of parameters $\alpha \in \mathbb{R}^m$.

- Utility from outside option: $u_0(\varepsilon) = \varepsilon_0$
- Utility from Idaho option: $u_1(x, w, Z, \varepsilon) = -\alpha'Z + \beta \ln((1+x)w) + \varepsilon_1$

The parameter vector to be estimated by maximum likelihood is $\theta \equiv (\alpha, \beta) \in \mathbb{R}^m \times \mathbb{R}_+$ and the estimation procedure remains more-or-less the same provided that the design matrix of regressors is not rank deficient. The WTA estimate is now evaluated at a specific Z

$$\widehat{WTA}(Z) \sim N \left(g(\hat{\theta}; Z), \nabla g(\hat{\theta}; Z)' \hat{V}(\hat{\theta}) \nabla g(\hat{\theta}; Z) \right)$$

where

²⁵ Note that the standard error of \widehat{WTA} , which is the square root of the variance of its sampling distribution, is proportional to the point estimate of \widehat{WTA} . This may be a desirable consequence of treating salary in logs insofar as it shrinks confidence intervals when the point estimate approaches zero but may be undesirable for large values of the point estimate when the covariance matrix $\hat{V}(\hat{\theta})$ is already large.

$$g(\tilde{\theta}; Z) = \exp\left(\frac{\tilde{\alpha}'Z}{\tilde{\beta}}\right),$$

$$\nabla g(\tilde{\theta}; Z) = \begin{pmatrix} \frac{Z}{\tilde{\beta}} \\ \tilde{\alpha}'Z \\ -\frac{\tilde{\alpha}'Z}{\tilde{\beta}^2} \end{pmatrix} g(\tilde{\theta}).$$

By varying Z , different sampling distributions for the estimated WTA wage for workers anticipating a market exit can be generated and compared.

In the models with covariates considered, continuously distributed variables such as years of experience were binned by quartile as opposed to, say, imposing a particular polynomial order on them (e.g., a linear or quadratic relationship). This decision was motivated by a desire for model flexibility as well as easier interpretation of the fitted model and corresponding estimate for WTA since Z would simply be a vector of exhaustive and mutually exclusive dummy variables.

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