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# Minimum Wage Increases and Oregon's Long-Term Care Sector

Mike Paruszkiewicz
*Portland State University*

Peter Hulseman
*Portland State University*

Emma Willingham
*Portland State University*

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**Northwest Economic Research Center**

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OHCA
OREGON HEALTH CARE ASSOCIATION

A statewide, nonprofit trade association, OHCA is the largest long-term care trade association in Oregon, representing more than 1,000 organizations and 90 percent of long-term care providers in the state.

NERC is based at Portland State University in the College of Urban and Public Affairs. The Center focuses on economic research that supports public-policy decision-making, and relates to issues important to Oregon and the Portland Metropolitan Area. NERC serves the public, nonprofit, and private sector community with high quality, unbiased, and credible economic analysis. Dr. Tom Potiowsky is the Director of NERC, and also serves as the Chair of the Department of Economics at Portland State University. Dr. Jenny H. Liu is NERC's Assistant Director and Assistant Professor in the Toulan School of Urban Studies and Planning. This report and accompanying research was completed by Mike Paruszkiewicz and Peter Hulseman, with research assistance from Emma Willingham.

NeRC

**Northwest Economic Research Center**

Portland State University
College of Urban and Public Affairs
PO Box 751
Portland, OR 97207-0751
503-725-8167
nerc@pdx.edu

www.pdx.edu/NERC
@nercpdx



Portland State UNIVERSITY

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## Executive Summary

Minimum wage proposals have dominated recent policy debate in Oregon, culminating in the February 2016 legislative session that included the passage of Senate Bill 1532, a three-tiered minimum wage increase to be phased in between 2016 and 2022. Barring changes in other states, the law will give Oregon the highest minimum wage in the country. While the immediate impacts of the law on workers earning near the minimum are substantial and relatively clear-cut, businesses face less certain outcomes as the delicate balance between labor costs, output prices, and hiring adjusts to the changes. The long-term care (LTC) sector, which includes nursing facilities, residential and assisted living facilities, and in-home care agencies, is comprised of many businesses that are highly exposed to minimum wage increases. In Oregon in 2014, roughly 5.3% of workers in the long-term care sector earned the state's minimum wage, but many more earn near the minimum – in the range that will be covered by the proposed increases. At the same time, the sector's ability to adjust to higher labor costs– through oft-predicted changes to prices, hiring, or service levels, is particularly constrained by multiple factors.

The Oregon Health Care Association asked the Northwest Economic Research Center to estimate the increase in labor costs that long-term care providers could experience under the new state minimum wage schedules. We develop wage distributions and labor cost estimates for representative firms operating in each LTC subsector based on public data sources and previous analysis commissioned by OHCA. Table E1 summarizes these unloaded[1] labor cost increases averaged across the three geographical tiers laid out in SB 1532, assuming that only workers earning below the new minimum receive wage raises.

[1] Throughout our analysis, we report only changes in unloaded wages, which does not account for increased payroll tax and benefit expenses.

**Table E.1 – Direct labor costs (above expected baseline) for representative firm, by LTC Subsector[2]**

| Year | Nursing | Residential | In-Home |
|---|---|---|---|
| 2016 | $ 1,067 | $ 2,522 | $ 2,464 |
| 2017 | $ 13,887 | $ 27,688 | $ 42,287 |
| 2018 | $ 26,440 | $ 49,470 | $ 83,702 |
| 2019 | $ 38,777 | $ 67,241 | $ 116,147 |
| 2020 | $ 61,344 | $ 95,540 | $ 164,496 |
| 2021 | $ 90,637 | $ 125,619 | $ 211,424 |
| 2022 | $ 126,173 | $ 157,431 | $ 257,388 |

It is also expected that statutory changes will have "spillover" or "ripple" effects on the wages of workers near (but not at) the new minimum. It has been shown that such workers will experience some increase in pay as a result of the rise in minimum pay, despite not actually being covered by the new law. We cautiously adapt cross-wage elasticity estimates from previous research to illustrate potential additional costs to LTC providers presented by ripple effects. These effects increase our cumulative estimates, particularly in the early years of the new law's phase-in.

Overall, we estimate direct labor cost increases topping 10% for a typical LTC operator by 2022. Costs will by no means be uniform across subsectors; In-home care providers will see especially high costs due to a largely direct care (and low-wage) workforce, and assisted living/residential care facilities will face higher costs as their large staffing needs amplify each incremental raise in the minimum.

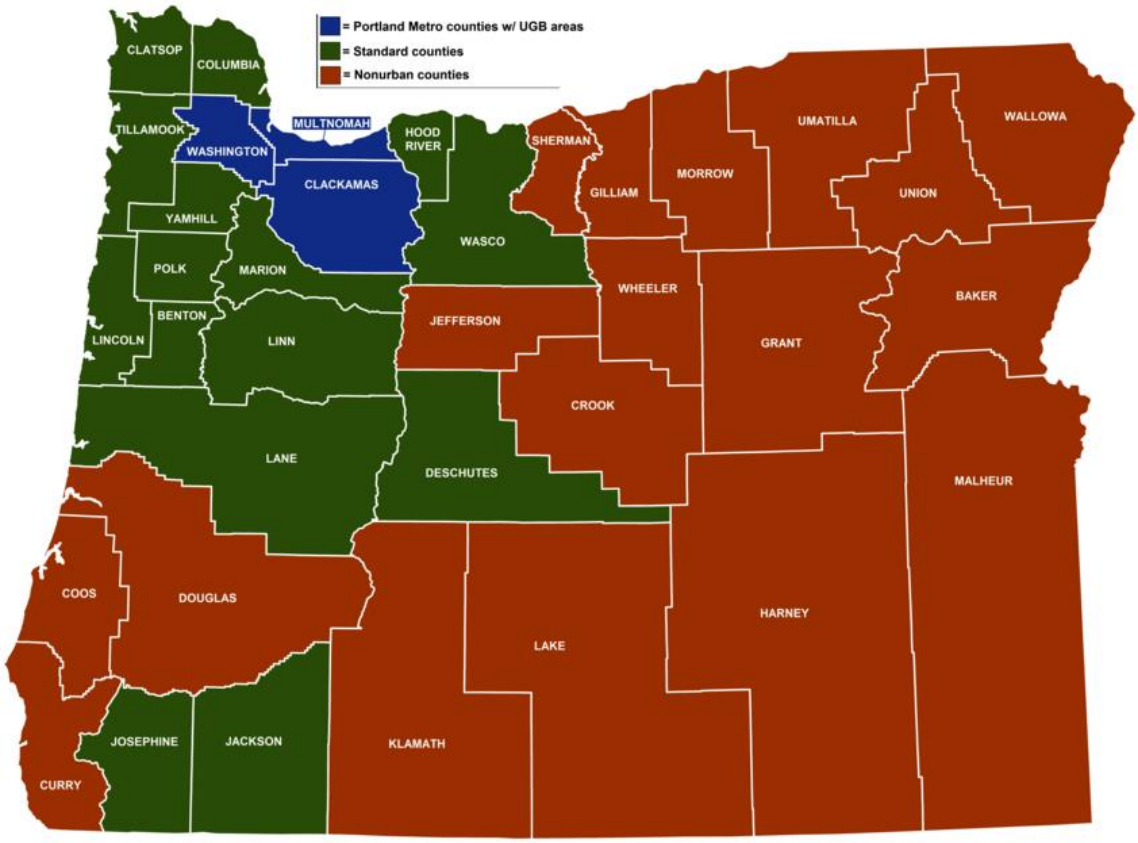
To the best of our knowledge, this report is one of a limited number of quantitative industry-level analyses of the coming wave of minimum wage increases across the country. For sensitive industries such as long-term care, navigating these changes will clearly require greater care, and possibly regulatory attention.

[2] Based on the accuracy and unbiasedness of the averages presented by 2014 OHCA-administered salary surveys, which had response rates ranging from roughly 24% to 49%. Non-scientific follow-up surveys in 2015 show only small differences from the earlier surveys.

## Introduction

For many years, Oregon's minimum wage has been among the nation's highest, and has been pegged to inflation since 2004. Nevertheless, the national push for a higher minimum has had a strong regional presence. Minimum wage proposals dominated policy debate in 2015, culminating in the February 2016 legislative session that saw several competing plans pared and refined into a compromise (SB 1532) that is expected to come into force in 2016. The plan in SB 1532 consists of three tiers: one for workers within the Portland area's Urban Growth Boundary (UGB), another for medium-sized counties based on population (i.e. Deschutes and Lane counties), and a lowest tier for the state's rural areas. Figure 1 and Table 1 summarize the 6-year schedules for each tier.

**Figure 1 – SB 1532 Minimum wage increase regions**




*Source: www.oregon.gov*

**Table 1 – Planned minimum wage increases, by Oregon geography**

| Date | Inside Portland UGB | Standard Counties | Nonurban Counties |
|---|---|---|---|
| 2016[3] | $ 9.25 | $ 9.25 | $ 9.25 |
| 2016 | $ 9.75 | $ 9.75 | $ 9.50 |
| 2017 | $ 11.25 | $ 10.25 | $ 10.00 |
| 2018 | $ 12.00 | $ 10.75 | $ 10.50 |
| 2019 | $ 12.50 | $ 11.25 | $ 11.00 |
| 2020 | $ 13.25 | $ 12.00 | $ 11.50 |
| 2021 | $ 14.00 | $ 12.75 | $ 12.00 |
| 2022 | $ 14.75 | $ 13.50 | $ 12.50 |

Many questions regarding the impacts of a minimum wage increase on businesses are most realistically answered by "it depends". At the macro level, empirical studies show small overall effects, as higher wages ripple through the employment, income, spending, and price channels of the economy. For any individual business, however, results depend on its exposure to an increase – that is, how many of its employees will be subject to the new minimum, and the size of the pay increases they will receive. Businesses with many workers earning wages at or near the minimum will naturally be the most affected.

*"In Oregon in 2014, roughly 5.3% of workers in the long-term care sector earned the state's minimum wage, but many more earn near the minimum, in the range that will be covered by the proposed increases."*

The long-term care (LTC) sector, which includes nursing facilities, residential and assisted living facilities, and in-home care agencies, is comprised of many businesses that are highly exposed to minimum wage increases. In Oregon in 2014, roughly 5.3% of workers in the long-term care sector earned the state's minimum wage, but many more earn near the minimum in the range that will be covered by the proposed increases. Within the sector, minimum wage earners are further concentrated into certain subsectors of long-term care and even further concentrated into "direct care" occupations – nurse's assistants, personal care aides,

[3] Prior to July 1st, 2016

and home health aides. In the in-home care sector, direct care workers account for 87% of the hours worked and 92% of hours paid minimum wage[4].

Simple textbook treatments of minimum wage increases predict two basic effects on a labor market: a decrease in employment, and an increase in output prices[5]. These two changes stem from increased labor costs for firms – higher costs reduce the marginal profitability of hiring, so businesses reduce hiring and/or raise output prices to compensate. The long-term care sector presents an interesting special case, wherein both these responses are greatly constrained. Depending on facility type, more than three quarters of a provider's sales (by dollar amount) are to a public payer – Medicare or Medicaid, primarily – that has strong price setting power for its beneficiaries' care[6]. By law, Medicaid and Medicare payment rates are set to account for geographic differences in providers' costs (such as higher labor expenses) – at the federal level for Medicare, and at the state level for Medicaid. Payment rates are decided by a process that by no means guarantees the price adjustments available to firms with exclusively private customers, and rates a uniform within a particular state. Similarly, the staffing levels of long-term care providers are largely constrained[7], which further limits the ability of long-term care providers to respond to an increase in labor costs.

*"Textbook treatments of minimum wage increases predict higher prices and reduced hiring in a given labor market. The LTC sector presents a special case wherein both responses are greatly constrained."*

Given the sector's exposure to minimum wage increases and its relatively limited options for responding to those changes, quantifying the likely costs associated with rising minimum wages in Oregon is critical for long-term care providers. And, although the Oregon Health Care Association (OHCA) maintains a robust data and research program, wider

[4] Based on data from RTI International, OHCA provider surveys, and Public Use Microdata from the Current Population Survey. See *Methodology* below for details
[5] Naturally, more advanced models that incorporate market power, "search costs", and bargaining show more nuanced outcomes.
[6] Source: OHCA
[7] There are no federal staffing levels for residential care, assisted living care, or in-home care agencies. Oregon law does not include specific staffing/patient standards, and are instead set indirectly through "acuity based staffing models".

understanding of the industry's labor market has remained a patchwork of disparate public and private data. This report first details the process of combining numerous data sources into a cohesive picture of the LTC labor force that will be affected by Oregon's new minimum.

Once this baseline is assembled, we then summarize our methodology for estimating possible impacts of the law. We estimate that some 60.7% of worker-hours currently employed in the LTC sector will be legally affected by the forthcoming increases[8]. It is also expected that statutory changes of this magnitude will have "spillover" or "ripple" effects on the wages of workers near (but not at) the new minimum. It has been shown that such workers will experience some increase in pay as a result of the rise in minimum pay, despite not actually being covered by the new law. The behavioral and bargaining mechanisms behind ripple effects are well-studied, but quantitative research on the subject is sparse in the literature. We adapted one of the only sources of cross-wage elasticity[9] estimates for our modeling, and present the possible effects of the new minimum with and without ripple effects to provide a useful range for the sector and policymakers. Our methodology required numerous data sources, input from OHCA and industry professionals, and detailed statistical analysis.

[8] Based on statewide estimates; it is possible that this figure varies by geography, but this is not discernable from available data.

[9] "Cross-price elasticity" refers to the sensitivity of one wage to changes to another wage, i.e. the effect that a change in the minimum wage has on higher wages.

# Methodology

Estimating the expected labor costs of minimum wage increases required three major steps: developing an accurate baseline wage distribution for the sector, applying expected changes to that distribution, and calculating cost increases for a representative facility/agency. It should be noted that the resulting estimates are based on sector-level characteristics and thus more illustrative than fiscally precise for a given firm, and reflect cost increases without regard for (or reliance upon) potential or assumed responses from affected businesses.

## Baseline Wage Distributions

Assembling the wage distribution for a specific industry within a particular geographic region can be a formidable task. Wages are typically reported as aggregate sums over a time period, industry, or area in public statistics, and microdata such as those produced by the US Census Bureau and Bureau of Labor Statistics have sample sizes that preclude many sub-national analyses. Private surveys and other sources are well-designed for their intended purposes, and may provide valuable insight, but are rarely sufficient for other research. Above all, the variation in wages (and the statutes that govern them) across industries, geographies, and time greatly narrow the applicability of any single data source to a given analytical problem.

Each of these challenges is especially true for the long-term care sector and its subsectors in Oregon. As illustrated below, long-term care providers employ a disproportionate number of lower-wage workers on average, and even this average breaks down disproportionately to different provider types. Labor market dynamics within the greater health care sector diverge from the overall economy, and this particular segment is no exception. And finally, Oregon itself stands out in important ways from other states (including its historically high minimum wage). The task of developing a clear picture of the distribution of LTC workers' wages in the state thus required careful combination of numerous data sources and judicious assumptions.

Perhaps the best and most detailed snapshot available of Oregon LTC workers' wages is a 2015 RTI International (RTI) report commissioned by Oregon Department of Human Services[10]. The report

[10] *Wages, Fringe Benefits, and Turnover for Direct Care Workers Working for Long-Term Care Providers in Oregon*, January 2015.

focuses on "direct care" workers, a term referring to employees who "provide direct hands-on personal care services to persons with disabilities or the elderly[11]" such as certified nursing assistants, home health aides, and personal care aides in Medicaid participating LTC providers in Oregon. Based on a survey of 2,924 LTC providers in Oregon, RTI developed categorical wage distributions for workers in several subsectors of the LTC sector. For our study, the three subsectors of interest are by far its largest employers: nursing facilities, assisted living/residential care facilities, and in-home care agencies. Table 2, reprinted from the RTI report, summarizes the 2014 wage distributions for these three subsectors.

**Table 2 – Direct care hourly wages in Oregon, by LTC subsector**

| Wage | Nursing | Residential | In-Home |
|---|---|---|---|
| Less than 9.10 | 0.01% | 0.18% | 0.00% |
| 9.10 - 9.99 | 1.62% | 30.41% | 18.47% |
| 10 - 10.99 | 4.10% | 28.70% | 51.23% |
| 11 - 11.99 | 7.80% | 14.50% | 17.33% |
| 12 - 12.99 | 16.87% | 8.16% | 3.46% |
| 13 - 13.99 | 12.95% | 5.19% | 1.40% |
| 14 - 14.99 | 9.09% | 2.44% | 0.39% |
| 15 - 15.99 | 8.31% | 2.20% | 0.01% |
| 16 - 16.99 | 5.53% | 1.09% | 0.02% |
| 17 and up | 33.71% | 7.12% | 7.68% |

*Source: RTI International, 2014*

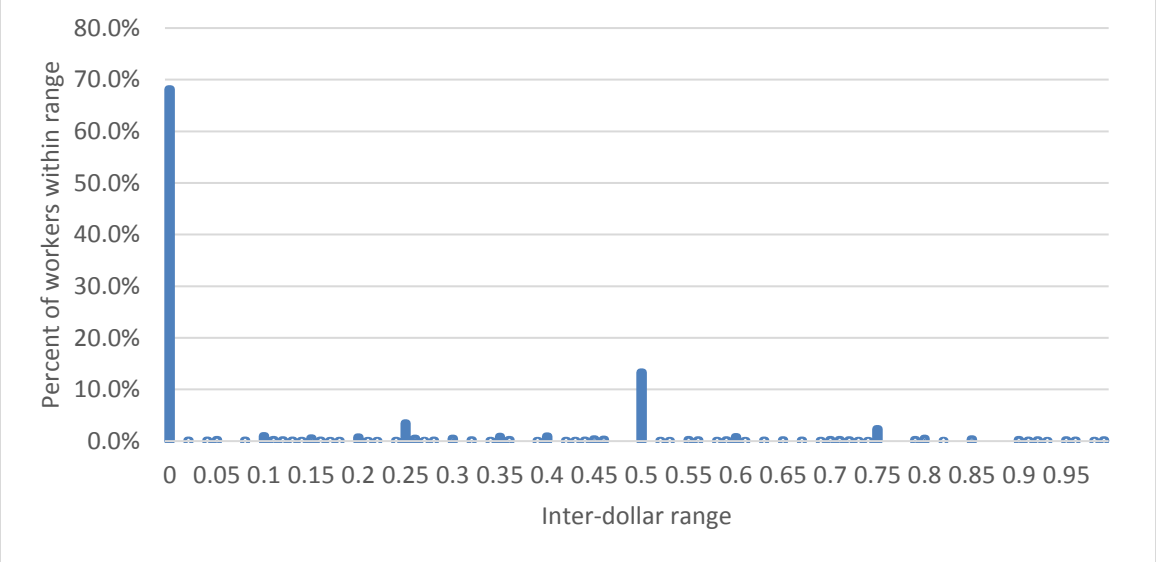
One of the most striking features of Table 2 is the marked heterogeneity across provider types, which reiterates the importance of granularity for this analysis. Direct care workers are generally higher-paid in nursing facilities, and despite the relative similarity in average wages for the assisted living/residential care and in-home care subsectors, their respective wage distributions show notable differences in the most sensitive range *vis a vis* minimum wage increases.

While it proved invaluable to our analysis, the RTI report lacks elements that are important for our purposes. The first is lost to the report's use of wage ranges (or categories) in its distributions – for example, 30% of direct care workers in the assisted living subsector earn between $9.10 and $9.99, but

[11] The phrase "direct care worker" has notably different meanings for different organizations. For this portion of our analysis, we adopt the definition used by RTI for its 2015 report.

the distribution of wages *within* that range is not reported. Particularly in the lower ranges, these details are critical to establish how many of that 30% of assisted living/residential care facility workers will be affected when the minimum wage rises to, say, $9.75 in July 2016. If wages are clustered near the bottom of the distribution, the effect will be greater than it would be if most workers in that range earned close to $9.99. To fill this informational gap, we turned to two large queries from the Current Population Survey's Public-Use Microdata Sample (PUMS) – one ten year sample of wage earners in Oregon, Washington, and California, and another three-year national sample. For each $1.00 wage range in Table 2, we estimated the penny-by-penny "inter-range" distribution using the CPS Annual Social and Economic Supplement (ASEC) hourly wage variable[12]. We found that wages follow nearly identical patterns within each one-dollar range for both samples. Figure 1 illustrates the inter-range distribution for wages between $10 and $10.99, which is highly consistent across individual ranges.

**Figure 1 – Inter-range wage distribution for $10.00 – $10.99**




*Source: National sample, 2013-2015 CPS-ASEC PUMS*

As Figure 1 shows, wages within a range are highly concentrated at the lower bound (in this case, $10.00), with a smaller concentration halfway through the range, and even smaller concentrations at

[12] For iPUMS users: HOURWAGE

the quarters of the range. A vanishingly small share of wage earners report earning an odd amount not divisible by a nickel. Again, each of the one-dollar ranges in Table 2 exhibits this consistent pattern. Across all ranges, the share of workers reporting the low end of the range hovers near 57%, with outliers of 47% (at $17.00 and $19.00) and 74% (at $15.00). The share reporting the 50-cent point is consistently close to 12%, with bounds of 6% (at $15.50) to 16% (at $12.50 and $17.50)[13]. These figures reflect economy-wide averages.

Applying these inter-range shares to the ranges/categories reported in the RTI data effectively disaggregates those categories into detailed distributions for each subsector that can be manipulated for the purposes of this analysis. The highest range ($17 and up) presents an additional challenge that fortunately is of limited relevance to our methodology, as it begins substantially higher than even the highest proposed minimum wage. While eight of the ranges cover a single dollar, this top range covers a much larger swath of wages. Higher wages are naturally not relevant to our analysis of the minimum wage. However, wages up to $18.14 are relevant despite falling outside the letter of the new minimum wage law, given the presence of ripple effects discussed in a later section of this report. Therefore, a similar technique was applied to this upper range in order to generate a useable distribution. This time, the west coast CPS-ASEC microdata sample was used to further distribute the $17 and up range into 5 one-dollar increments to match the other ranges. This implicitly assumes that the wages of LTC employees currently earning more than $17 per hour are distributed as they are for similarly-paid workers in one of the three west coast states. The method for achieving this distribution was also used to generate wage distributions for non-direct care LTC workers, and is further discussed immediately below.

## Non-Direct Care Wages

The methodology summarized thus far generated a baseline distribution for the most relevant portion of the LTC workforce – direct care workers. Other workers in the LTC sector – administrative, food service, and maintenance staff, as well as medical personnel – were not covered by the RTI survey that served as the starting point for our model direct care wage distribution. For these workers, as well as those direct care workers earning $17 or more, we again turn to microdata from CPS-ASEC. To achieve

[13] See appendix for detailed summary

satisfactory sample size, multiple years of data (2005 to 2015) for wage earners in California, Washington, and Oregon were combined. To achieve comparability across states and years, we normalized reported hourly wage by dividing by the local minimum wage of that year[14]. For example, a California worker earning $6.75 in 2006 and an Oregon worker earning $9.25 in 2015 would both have a normalized wage of 1.00, which accounts for both temporal and geographic differences in wage structure. Once converted, these data provide a wage distribution for non-direct care employees in each LTC subsector. Once again, the implicit assumption here is that the administrative, food service, maintenance, and medical staff in this sector face similar wages to those same occupations in other industries (e.g., a building maintenance worker earns the same wage whether he or she works in buildings that house health care, finance, educational, or manufacturing activity). This assumption is generally verified by Bureau of Labor Statistics Occupational Employment Statistics (OES) data[15].

## Facility Labor Utilization Profiles

The final step in establishing a baseline for analysis involved transforming the underlying wage distributions of LTC employees into working models of the nursing care, residential/assisted living care, and in-home care labor forces. To this end, the most useful analysis is at the level of an individual facility/agency, where human resource planning occurs and most business costs are incurred. Two sources provided information about the number, type, and typical work loads of employees in each subsector. The first source is regularly-published reports on the wages and salaries paid by OHCA's constituent businesses which also include the average number of full and part-time workers employed at a given facility. We augmented the most recent information from the salary reports with non-scientific surveys (performed by OHCA) of providers in each subsector. Respondents reported monthly (or annual) hours worked by their direct and non-direct care employees per month (Table 3), providing a granular base that could then be combined with our estimated wage distributions. The end result is a detailed model of labor costs associated with each hour hired annually for each provider type.

[14] Despite similarities, this ratio should not be viewed as an attempt to calculate a "real wage". This analysis is focused solely on the distribution of nominal wages relative to a legal minimum, which influences wage structures differently than inflation.

[15] BLS OES. Note that some occupations appear to earn a slightly higher wage in the LTC sectors, while others earn slightly less. We do not believe adopting this distribution introduced any systematic bias into our estimates.

**Table 3 – Average annual labor hours, by LTC facility/agency type[16]**

| **Nursing Care** | Total Hours Worked | Percent |
|---|---|---|
| Direct Care Workers | 72,735 | 54% |
| Non-Direct Care Workers | 61,405 | 46% |
| **Residential Care** | Total Hours Worked | Percent |
| Direct Care Workers | 43,399 | 46% |
| Non-Direct Care Workers | 50,201 | 54% |
| **In-Home Care** | Total Hours Worked | Percent |
| Direct Care Workers | 84,846 | 87% |
| Non-Direct Care Workers | 12,910 | 13% |

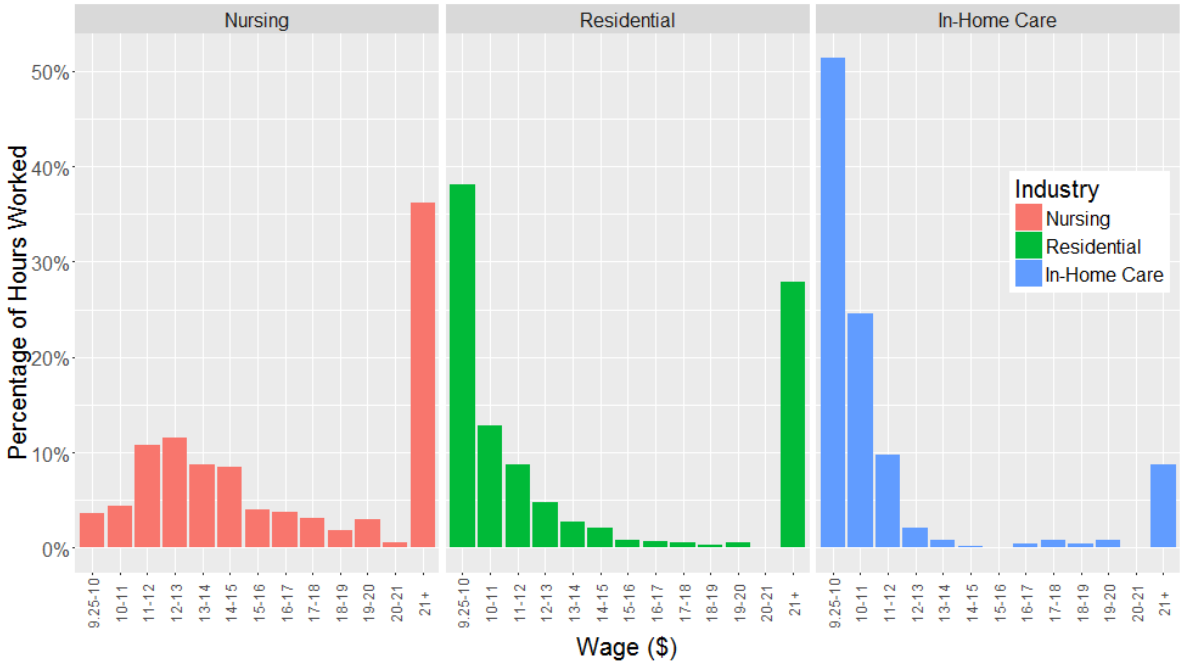
*Source: OHCA Administered Surveys of LTC Providers*

Figure 2 below illustrates the estimated wage distributions of a representative LTC facility/agency in each subsector. Note that these average metrics provide an analytically useful model, but do not necessarily reflect the actual labor costs of any single facility. As shown, even within the umbrella of LTC there is a significant variety in the distribution of wages by subsector. Nursing facilities, for example, stand out as having a higher proportion of labor hours paid high wages and lower proportion paid low wages. Residential/Assisted Living facilities and in-home care agencies show much higher concentrations near the bottom of the distribution.

A final important aspect of our methodology requires some discussion. In short, our analysis generates geography-specific estimates, but utilizes mostly statewide data. It is unclear if and precisely how this might affect the results of our analysis. Using statewide numbers in this manner implicitly assumes that LTC operations in Oregon look generally similar to one another – staffing levels and pay structure are similar regardless of location. Because OHCA compiles sector data at regular intervals, it is possible that more geographically detailed data will be available in the future.

[16] OHCA-administered Salary Surveys from 2014 show only small differences from the 2015 non-scientific follow-up surveys.

**Figure 2 – Proportion of annual labor hours, by wage paid**




## Direct Costs of Minimum Wage Increases

The most fundamental effect of an increase in the minimum wage on a firm's labor costs is that the wages of employees that currently earn below the new minimum will be legally raised to at least the new minimum. For example, an employee in the Portland metro area currently earning $9.50 per hour will see a mandated raise on July 1st, 2016, to at least $9.75. Analyzing the total direct effects for a representative firm thus entails applying the new minimum wage to all labor hours currently paid anything less - that is, bringing all employees' wages lower than the new minimum *precisely* to the new minimum. Because Oregon's minimum wage is pegged to changes in the Consumer Price Index, the baseline labor costs for our representative firm are assumed to rise by expected inflation over the study period. The effect of the new minimum wage proposal is thus the difference between our post-SB 1532 labor cost estimate and a baseline that accounts for automatic adjustments for inflation. In the results section below, we refer to this effect as "direct", because it is the portion of the overall effect attributable solely to changes in the law. Once again, the analysis is intended to illustrate the rise in labor costs holding employment levels, output prices, and other business factors constant.

## The "Ripple Effect"

The second major channel through which changes to the minimum wage affect labor costs is the so-called "ripple effect", wherein a change in the minimum influences higher wages beyond the reach of legal mandate. For example, on June 30th, 2017, Oregon's minimum under SB 1532 will be $9.75 per hour. An employee in the Portland metro area paid $11.25 per hour will be earning $1.50 (15.3%) above the minimum wage. When the minimum wage increases on July 1st to $11.25, this employee will not be directly affected by the new law, and without a raise would now earn the new minimum wage.

*"How large is the "ripple effect"? It is hard to overstate the empirical difficulty in developing a satisfactory answer."*

This peculiarity extends to the case of employees earning just below the new minimum wage. Consider an employee paid $11.20 in June 2017 – $1.45 (14.8%) above minimum wage. When the minimum rises to $11.25, this employee will be guaranteed a five cent raise, while her lower-paid coworkers earning minimum wage will see guaranteed raises of $1.50, thirty times larger. In the absence of any extra-legal adjustments, both of these employees will now earn the same wage – a form of the effect commonly referred to as "wage compression".

Evidence shows that "ripple" or "spillover" effects arise to at least partially offset structural changes in the wage distribution due to minimum wage increases. That is, wages slightly above the new minimum will have some sensitivity to the mandated changes, and the range of wages below the new minimum will likely not be homogenously raised precisely to the new minimum. The labor market and workplace mechanisms that produce non-mandated ripple effects are complex and beyond the scope of this analysis. Acknowledging that such effects should be considered in an estimate of labor costs, a question remains: *how large is the ripple effect*? It is difficult to overstate the empirical difficulty in attempting to develop a satisfactory answer. We discard appealingly convenient, but ultimately arbitrary approaches – for example, assuming that workers' wages rise so that their relative distance from the minimum is unchanged, or assuming that all non-mandated raises are equal in absolute or percentage terms. We instead draw from existing labor economics research for a glimpse at their likely size.

Applying other studies' ripple effect estimates to our model of LTC wages in Oregon involves several risks. First and foremost is the unprecedented magnitude of SB 1532's proposed changes. All known empirical studies on cross-wage effects consider the relatively marginal increases that are (a) historically common and (b) appropriate for regression-type statistical estimation techniques. In contrast, Oregon's new schedule entails multiple increments ranging from $0.50 to $1.50, depending on location. Second, most research has utilized samples of workers from multiple industries and often multiple locations. Clearly, the health care sector as a whole, and the subsectors of LTC specifically, face unique labor market conditions that stand out from the overall economy.

The most relevant and applicable research on ripple effects for our purposes are the oft-cited works of Neumark, Schweitzer, and Wascher[17]; Wicks-Lim[18], Autor, et al[19], and (via anecdote), Dube, et al[20] . The first three studies use individual-level wage data to estimate elasticities of wages at several points of the wage distribution to changes in the minimum of the distribution, accounting for numerous other factors. Wicks-Lim makes some methodological improvement over previous studies, and adds industry-specific results that illustrate the importance of sample differences. Although they do not specifically reflect to LTC employees in Oregon, we believe that the all-industry cross-wage elasticity estimates of Wicks-Lim (2006 and 2015) provide the best starting point for incorporating ripple effects into our labor costs estimates[21].

Wicks-Lim (2006) estimated the elasticity of wages at various distances above and below the minimum to marginal changes to the minimum. For example, workers earning roughly 115% of the minimum see a 0.25% increase in pay for every 1% increase in the minimum wage. For Oregon, this would mean that an average worker earning $10.63 per hour at the time of writing sees a 1.3% increase in her wage – 14 cents - when the minimum wage rises fifty cents from $9.25 to $9.75. Three such elasticities are

[17] *2004*
[18] *2006*, *2015*
[19] 2015
[20] 2015
[21] These results have been adapted by other authors, including those analyzing the effects of similar proposals in California and New York State. See Reich, et al 2016; Cooper 2016; Welsh-Loveman, Perry, and Bernhardt, 2014.

reported in the 2006 paper: 0.44 for workers near the minimum[22], 0.25 for workers near 115% of the minimum, and 0.14 for workers near 123% of the minimum. There was no significant effect for samples of workers above that pay range, and no specific reported endpoint for the ripple effect.

We guardedly adapted these aggregated results by interpolating between the decreasing elasticity estimates at 100% and 115% of the minimum wage, and between 115% and a zero elasticity at 123% (effectively omitting some portion of the ripple effect reported by Wicks-Lim. Thus, for example, a Portland worker making exactly the minimum wage ($9.25 before the first increase in 2016) will receive 100% of the mandated 50-cent increase to $9.75 (the new minimum), by definition. A worker earning $9.35 will receive a 49-cent raise to $9.84, a worker earning $9.45 will receive a 47-cent raise, and so on through a worker earning $11.21, who will receive a 15-cent raise (25% of the percentage increase in the minimum), per Wicks-Lim's estimated elasticity. For illustration, Table 4 summarizes the raise that an employee in the Portland UGB region making 115% of the minimum wage would earn before and after the increase.

**Table 4 – Assumed wage Increases for employees earning above-minimum wages (inside Portland UGB)**

| Year | Minimum Wage | 115% of M.W. | Amount of Increase |
|---|---|---|---|
| 2016 | $ 9.75 | $ 11.21 | $ 0.15 |
| 2017 | $ 11.25 | $ 12.94 | $ 0.50 |
| 2018 | $ 12.00 | $ 13.80 | $ 0.23 |
| 2019 | $ 12.50 | $ 14.38 | $ 0.15 |
| 2020 | $ 13.25 | $ 15.24 | $ 0.23 |
| 2021 | $ 14.00 | $ 16.10 | $ 0.23 |
| 2022 | $ 14.75 | $ 16.96 | $ 0.23 |

Once again, it is very important to recognize this approach as a highly imperfect, but best-available, solution to an analytical need. While these estimates have been adapted by other authors, and we have

[22]Wicks-Lim (2006) explains that this elasticity is not one (the intuitive prediction) because her sample of workers is *centered* around 100% of the minimum wage, rather than comprised exclusively of workers at that wage. In other words, sub-minimum workers are included in the analysis.

done so diligently, the results of this portion of the analysis should be viewed as informative but by no means exhaustive.

## Baseline Estimates

All of the results reported below are expressed relative to the anticipated labor costs of firms if there was no change in the minimum wage laws - i.e., relative to a baseline. Since the current minimum wage law pegs the minimum to the local Consumer Price Index (CPI), we assume a baseline minimum wage pegged to a forecasted[23] CPI. To maintain consistency, the estimated direct cost increase below is expressed relative to a baseline that is not further adjusted, and the estimates that account for ripple effects are expressed relative to a baseline *that is itself subject to ripple effects*. In other words, acknowledging the influence of ripple effects entails those stemming from newly-passed minimum wage increases and those occurring automatically due to CPI inflation. Applying these assumptions to the representative firm profiles developed above provides the *two* baseline labor costs summarized in Table 5 below.

**Table 5 – Baseline labor costs for representative firm, by LTC subsector (no ripple effects)**

| Year | Nursing | Residential | In-Home |
|---|---|---|---|
| 2016 | $ 2,416,136 | $ 1,441,798 | $ 1,222,591 |
| 2017 | $ 2,416,868 | $ 1,443,575 | $ 1,224,228 |
| 2018 | $ 2,418,156 | $ 1,446,702 | $ 1,227,108 |
| 2019 | $ 2,419,716 | $ 1,450,489 | $ 1,230,596 |
| 2020 | $ 2,422,403 | $ 1,456,508 | $ 1,239,087 |
| 2021 | $ 2,425,971 | $ 1,464,277 | $ 1,251,469 |
| 2022 | $ 2,430,010 | $ 1,472,985 | $ 1,265,910 |

[23] From the Oregon Office of Economic Analysis' Economic and revenue forecast, released on Feb. 10, 2016

**Table 6 – Baseline labor costs for representative firm, by LTC subsector (including ripple effects)**

| Year | Nursing | Residential | In-Home |
|---|---|---|---|
| 2016 | $ 2,416,136 | $ 1,441,798 | $ 1,222,591 |
| 2017 | $ 2,419,410 | $ 1,448,456 | $ 1,233,008 |
| 2018 | $ 2,423,171 | $ 1,455,872 | $ 1,244,761 |
| 2019 | $ 2,427,217 | $ 1,463,425 | $ 1,256,769 |
| 2020 | $ 2,431,874 | $ 1,471,616 | $ 1,269,788 |
| 2021 | $ 2,437,509 | $ 1,480,942 | $ 1,284,550 |
| 2022 | $ 2,444,056 | $ 1,491,144 | $ 1,300,581 |

Having two separate baselines means that the direct cost-only and all-inclusive estimates below are counterintuitively not comparable. One may instinctively assume that the all-inclusive estimate minus the direct cost-only estimate equals the aggregate size of the ripple effect, but the necessity of two incomparable baseline estimates unfortunately precludes this convenience. An unusual result of this approach is the possibility for the direct cost-only estimate to actually be higher than the rippled wage bill. Although not intuitive, this simply arises largely due to a "rippled" baseline that rises relatively higher than its counterpart. It should be noted that, regardless of subsector, the cumulative cost of the estimate that includes ripple effects will always be higher than the cumulative cost of the direct cost-only estimate.

# Results

We present two sets of results – one set that exclusively estimates the mandated effects of SB 1532 on the labor costs of LTC providers, and another that incorporates the ripple effects discussed above. The results are reported relative to their respective baselines.

## Direct Costs

The direct costs of the forthcoming minimum wage increases stem solely from mandated changes to the wage distributions of LTC providers. These estimates effectively assume that providers increase the wages of current employees making less than the new minimum in each year to *exactly* the new minimum in that year. No further wage changes are assumed for either sub-minimum workers or those higher up the wage distribution. Note however, that raising all wages below the new minimum exactly to the new minimum presents a significant "compression" of the wage structure.

Tables 7 and 8 summarize the additional costs due to minimum wage increases for a representative firm in each LTC subsector, averaged across the three geographical tiers laid out in SB 1532. Detailed results for each tier are included in the attached appendix.

**Table 7 – Direct labor costs (above expected baseline) for representative firm, by LTC Subsector**

| Year | Nursing | Residential | In-Home |
|---|---|---|---|
| 2016 | $ 1,067 | $ 2,522 | $ 2,464 |
| 2017 | $ 13,887 | $ 27,688 | $ 42,287 |
| 2018 | $ 26,440 | $ 49,470 | $ 83,702 |
| 2019 | $ 38,777 | $ 67,241 | $ 116,147 |
| 2020 | $ 61,344 | $ 95,540 | $ 164,496 |
| 2021 | $ 90,637 | $ 125,619 | $ 211,424 |
| 2022 | $ 126,173 | $ 157,431 | $ 257,388 |

Unsurprisingly, the typical in-home care agency will see the largest cost increases in both level and percentage terms – in 2022, this would be more than 19% higher than the expected baseline, or $257,000. Nursing and residential care facilities will experience substantial increases of roughly five and ten percent above baseline, respectively, in 2022.

**Table 8 – Direct labor costs (percent change from expected baseline), by LTC subsector**

| Year | Nursing | Residential | In-Home |
|---|---|---|---|
| 2016 | 0.04% | 0.17% | 0.20% |
| 2017 | 0.64% | 1.84% | 3.40% |
| 2018 | 1.08% | 3.17% | 6.62% |
| 2019 | 1.52% | 4.23% | 9.05% |
| 2020 | 2.40% | 5.97% | 12.70% |
| 2021 | 3.55% | 7.82% | 16.15% |
| 2022 | 4.92% | 9.74% | 19.43% |

Two major factors give rise to the range of costs to LTC providers. First is a subsector's concentration of minimum wage workers. Although overall staffing levels at in-home care agencies are dwarfed by levels at nursing facilities, 6.9% of in-home care providers' (largely direct-care) workers are paid the minimum, compared to only 2.3% of employees of nursing facilities. This partially accounts for a difference of more than 100% between the two in both medium- and low-density areas outside the Portland UGB. Similarly, residential/assisted living facilities have overall staffing levels comparable to in-home care agencies, but will experience much lower direct costs by the end of the new minimum wage phase-in period in 2022.

By design, location will play a dominant role in determining a provider's costs under the new minimum wage plan. For example, in 2017, a nursing facility in the Portland urban area will face new costs that are nearly five times those in medium-density areas and more than seven times those in rural counties. By 2022, these differences will shrink as subsequent raises capture larger portions of the labor force, but will remain substantial.

## Costs Including Ripple Effects

**Table 9 – Labor costs including ripple effects (above expected baseline[24]) for representative firm**

| Year | Nursing | Residential | In-Home |
|---|---|---|---|
| 2016 | $ 3,955 | $ 7,543 | $ 12,633 |
| 2017 | $ 34,017 | $ 46,687 | $ 77,934 |
| 2018 | $ 51,207 | $ 65,837 | $ 107,832 |
| 2019 | $ 65,761 | $ 81,313 | $ 130,607 |
| 2020 | $ 93,019 | $ 108,370 | $ 170,588 |
| 2021 | $ 123,118 | $ 136,071 | $ 210,062 |
| 2022 | $ 155,747 | $ 164,491 | $ 249,284 |

Incorporating the ripple effects essentially magnifies the patterns seen in the direct cost results above. In the early years of the phase-in, ripple effects would vastly increase costs for providers in every subsector. In the extreme case of in-home care providers in rural counties, the difference between direct-only effects and total effects that include ripple effects exceeds 600% in 2016 and 400% in 2017. Including ripple effects more than doubles the cost estimates for nursing facilities in all geographies during the first two years of the phase-in, and for residential care/assisted living facilities in two of three geographies.

**Table 10 – Labor costs including ripple effects (percent change from baseline[20]) for representative firm**

| Year | Nursing | Residential | In-Home |
|---|---|---|---|
| 2016 | 0.16% | 0.52% | 1.03% |
| 2017 | 1.61% | 3.03% | 6.11% |
| 2018 | 2.08% | 4.16% | 8.33% |
| 2019 | 2.55% | 5.04% | 9.92% |
| 2020 | 3.59% | 6.68% | 12.82% |
| 2021 | 4.74% | 8.34% | 15.61% |
| 2022 | 5.98% | 10.02% | 18.31% |

[24] Note that the baseline used in our estimates of the ripple effect differs from that used for direct effect-only estimates.

An interesting pattern emerges in the out years of the phase-in. By 2022, the differences between the direct cost-only estimates and those including ripple effects substantially shrink in relative terms. Although the two results are not comparable due to different assumed baselines, this result illustrates how the ripple effect changes the underlying wage distribution.

As mentioned previously, there are instances (for in-home care agencies in 2019-2022) where the direct cost-only estimate is actually higher than its all-inclusive counterpart. In addition to the influence of a higher "rippled" baseline for the all-inclusive estimates, the distributional effects of the minimum wage phase-in process help explains this pattern. In the first years of the phase-in, the relatively large increases in the minimum have the largest weight. Recall that large shares of each of the subsectors earn between $9.25 and $11.25 (roughly 43% on average). Therefore the number of workers directly covered by the new minimums – and those potentially affected by ripple effects – is similarly large. In subsequent years, fewer workers are statutorily affected, and even fewer are affected by ripple effects. Hence, in the final years of the phase-in, the additional "reach" of the ripple effect covers relatively few employees. Additionally, the nature of a phase-in plan is to push employees into higher positions on the distribution; with ripple effects, this may occur at some distance from the new minimum. So changes to the minimum increase costs in the year they happen, and may tend to limit subsequent cost increases by pushing *next* year's affected workers ahead *this* year. In sum, ripple effects accelerate the process of pushing workers up the wage distribution, so that, by the end of the phase-in period in 2022, direct costs and all-inclusive costs appear to converge.

## Conclusion

The scheduled increases in minimum wages across Oregon will have sizeable effects on businesses in the long-term care sector. Nursing facilities, assisted living/residential care facilities, and in-home care operations are particularly exposed to rising labor costs, with minimum (or near-minimum) wage workers constituting dominant shares of their respective workforces. At the same time, these businesses' ability to respond in the familiar manner – through staff reductions and price increases – is relatively muted by public oversight and patronage.

Constructing a model of wages in the LTC subsectors from numerous published data sources, professional input, and surveys, we expect direct labor cost increases topping 10.66% for a typical operator in 2022. Costs will by no means be uniform across subsectors; In-home care providers will see especially high costs due to a largely direct care (and low-wage) workforce, and assisted living/residential care facilities will face higher costs as their large staffing needs amplify each incremental raise in the minimum.

The averaged estimates presented in this report do not reflect the expected cost increases for any individual business in the LTC sector, but provide a solid point of reference for industry operators and policymakers addressing the large impacts to come. This is particularly true of estimates that account for potential ripple effects on the wage distribution. Notably, our estimates do not account for macroeconomic effects of minimum wage increases that may further impact LTC providers. Changes to the regional labor market, business activity, and consumer demand that may unfold as the new minimum phases in will likely influence the economic landscape in ways that these purely fiscal projections do not reflect. Similarly, given the hiring and price constraints facing the LTC sector, we have not considered broader changes within the sector itself. Presumably, both the sector and policymakers will aim to minimize serious disruptions for firms and their residents and clients.

To the best of our knowledge, this report is one of a limited number of quantitative industry-level analyses of the coming wave of minimum wage increases across the country. At a broad scale, the growing consensus is that efforts to raise the bottom of the wage distribution will have very small employment effects while likely improving the circumstances of numerous workers. For sensitive industries such as long-term care, navigating these changes will clearly require greater care, and possibly regulatory attention.

# Appendix

**Figure A.1 – Evolution of direct effect wage distribution (inside the UGB), 2016-2022**

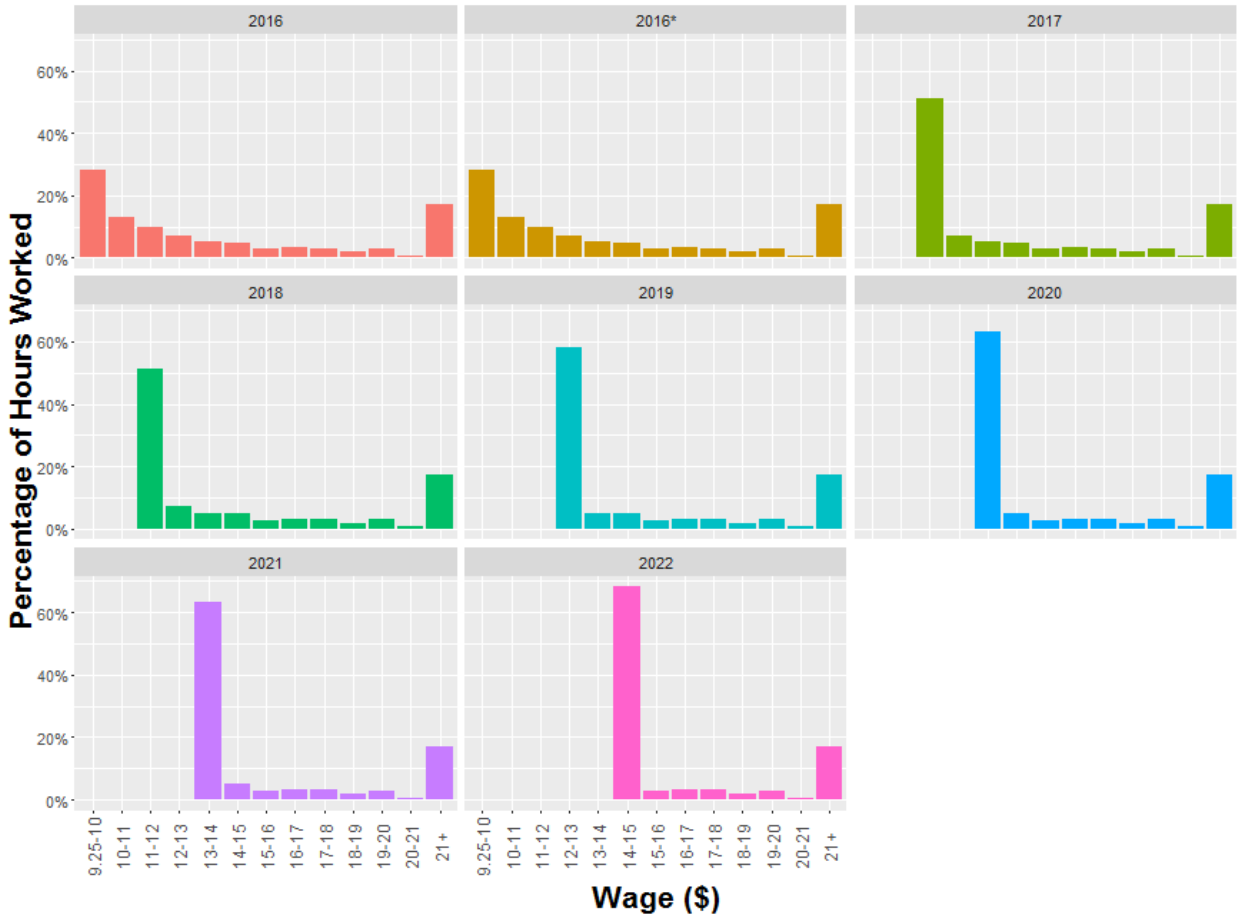


**Figure A.2 – Evolution of ripple effect wage distribution (inside the UGB), 2016-2022**

**Table A.1 – Count of facilities/agencies by area[25]**

| Care Type | Inside UGB | Outside UGB | Rural Counties | **Total** |
|---|---|---|---|---|
| Nursing | 63 | 56 | 18 | 137 |
| Residential | 200 | 216 | 85 | 501 |
| In-Home | 64 | 66 | 12 | 142 |
| **Total** | 327 | 338 | 115 | 780 |

**Table A.2 – Direct labor costs (above expected baseline) for representative firm – outside UGB**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.75 | $ 1,165 | $ 2,828 | $ 2,604 |
| 2017 | $ 10.25 | $ 5,181 | $ 12,577 | $ 11,583 |
| 2018 | $ 10.75 | $ 13,460 | $ 29,726 | $ 44,625 |
| 2019 | $ 11.25 | $ 21,833 | $ 45,422 | $ 74,175 |
| 2020 | $ 12.00 | $ 38,607 | $ 73,105 | $ 122,123 |
| 2021 | $ 12.75 | $ 64,613 | $ 103,895 | $ 169,992 |
| 2022 | $ 13.50 | $ 97,497 | $ 136,799 | $ 217,163 |

**Table A.3 – Direct labor costs (above expected baseline) for representative firm – inside UGB**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.75 | $ 1,165 | $ 2,828 | $ 2,604 |
| 2017 | $ 11.25 | $ 24,626 | $ 52,282 | $ 80,460 |
| 2018 | $ 12.00 | $ 42,854 | $ 82,911 | $ 134,102 |
| 2019 | $ 12.50 | $ 60,319 | $ 104,543 | $ 170,620 |
| 2020 | $ 13.25 | $ 91,873 | $ 139,022 | $ 223,307 |
| 2021 | $ 14.00 | $ 129,655 | $ 174,701 | $ 273,216 |
| 2022 | $ 14.75 | $ 173,420 | $ 211,751 | $ 321,760 |

[25] Source: OHCA

**Tables A.4 – Direct labor costs (above expected baseline) for representative firm – rural counties**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.50 | $ 422 | $ 1,024 | $ 943 |
| 2017 | $ 10.00 | $ 3,386 | $ 8,221 | $ 7,571 |
| 2018 | $ 10.50 | $ 9,375 | $ 20,959 | $ 29,833 |
| 2019 | $ 11.00 | $ 16,097 | $ 34,919 | $ 56,475 |
| 2020 | $ 11.50 | $ 25,226 | $ 50,241 | $ 83,893 |
| 2021 | $ 12.00 | $ 35,038 | $ 65,335 | $ 109,741 |
| 2022 | $ 12.50 | $ 50,024 | $ 82,047 | $ 135,306 |

**Tables A.5 - Labor costs including ripple effects (above expected baseline) – outside UGB**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.75 | $ 4,267 | $ 8,301 | $ 13,244 |
| 2017 | $ 10.25 | $ 16,263 | $ 28,634 | $ 45,774 |
| 2018 | $ 10.75 | $ 26,051 | $ 41,667 | $ 66,035 |
| 2019 | $ 11.25 | $ 38,127 | $ 56,083 | $ 87,673 |
| 2020 | $ 12.00 | $ 63,378 | $ 83,882 | $ 127,981 |
| 2021 | $ 12.75 | $ 92,328 | $ 112,735 | $ 168,113 |
| 2022 | $ 13.50 | $ 124,382 | $ 142,564 | $ 208,144 |

**Table A.6 - Labor costs including ripple effects (above expected baseline) – inside UGB**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.75 | $ 4,267 | $ 8,301 | $ 13,244 |
| 2017 | $ 11.25 | $ 56,567 | $ 78,063 | $ 120,107 |
| 2018 | $ 12.00 | $ 82,829 | $ 106,782 | $ 161,949 |
| 2019 | $ 12.50 | $ 100,659 | $ 124,171 | $ 186,257 |
| 2020 | $ 13.25 | $ 133,864 | $ 155,791 | $ 229,414 |
| 2021 | $ 14.00 | $ 169,605 | $ 187,889 | $ 271,765 |
| 2022 | $ 14.75 | $ 207,724 | $ 220,662 | $ 313,750 |

**Table A.7 - Labor costs including ripple effects (above expected baseline) – rural counties**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.50 | $ 1,894 | $ 3,831 | $ 6,012 |
| 2017 | $ 10.00 | $ 10,328 | $ 18,737 | $ 29,887 |
| 2018 | $ 10.50 | $ 18,796 | $ 30,912 | $ 49,093 |
| 2019 | $ 11.00 | $ 29,593 | $ 44,580 | $ 69,943 |
| 2020 | $ 11.50 | $ 42,279 | $ 59,017 | $ 91,193 |
| 2021 | $ 12.00 | $ 56,203 | $ 73,445 | $ 111,698 |
| 2022 | $ 12.50 | $ 71,406 | $ 88,045 | $ 131,733 |

**Table A.8– Direct labor costs – outside UGB total (percent change from baseline)**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.75 | 0.05% | 0.20% | 0.21% |
| 2017 | $ 10.25 | 0.21% | 0.87% | 0.95% |
| 2018 | $ 10.75 | 0.56% | 2.05% | 3.64% |
| 2019 | $ 11.25 | 0.90% | 3.13% | 6.03% |
| 2020 | $ 12.00 | 1.59% | 5.02% | 9.86% |
| 2021 | $ 12.75 | 2.66% | 7.10% | 13.58% |
| 2022 | $ 13.50 | 4.01% | 9.29% | 17.15% |

**Table A.9 – Direct labor costs – inside UGB (percent change from baseline)**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.75 | 0.05% | 0.20% | 0.21% |
| 2017 | $ 11.25 | 1.02% | 3.62% | 6.57% |
| 2018 | $ 12.00 | 1.77% | 5.73% | 10.93% |
| 2019 | $ 12.50 | 2.49% | 7.21% | 13.86% |
| 2020 | $ 13.25 | 3.79% | 9.54% | 18.02% |
| 2021 | $ 14.00 | 5.34% | 11.93% | 21.83% |
| 2022 | $ 14.75 | 7.14% | 14.38% | 25.42% |

**Table A.10 – Direct labor costs – rural counties (percent change from baseline)**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.50 | 0.02% | 0.07% | 0.08% |
| 2017 | $ 10.00 | 0.14% | 0.57% | 0.62% |
| 2018 | $ 10.50 | 0.39% | 1.45% | 2.43% |
| 2019 | $ 11.00 | 0.67% | 2.41% | 4.59% |
| 2020 | $ 11.50 | 1.04% | 3.45% | 6.77% |
| 2021 | $ 12.00 | 1.44% | 4.46% | 8.77% |
| 2022 | $ 12.50 | 2.06% | 5.57% | 10.69% |

**Table A.11 - Total labor costs including ripple effects – outside UGB (percent change from baseline)**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.75 | 0.18% | 0.58% | 1.08% |
| 2017 | $ 10.25 | 0.67% | 1.98% | 3.71% |
| 2018 | $ 10.75 | 1.07% | 2.86% | 5.30% |
| 2019 | $ 11.25 | 1.57% | 3.83% | 6.97% |
| 2020 | $ 12.00 | 2.60% | 5.70% | 10.08% |
| 2021 | $ 12.75 | 3.78% | 7.61% | 13.08% |
| 2022 | $ 13.50 | 5.08% | 9.56% | 16.00% |

**Table A.12 - Total labor costs including ripple effects – inside UGB (percent change from baseline)**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.75 | 0.18% | 0.58% | 1.08% |
| 2017 | $ 11.25 | 2.34% | 5.39% | 9.74% |
| 2018 | $ 12.00 | 3.42% | 7.33% | 13.01% |
| 2019 | $ 12.50 | 4.14% | 8.48% | 14.81% |
| 2020 | $ 13.25 | 5.50% | 10.58% | 18.06% |
| 2021 | $ 14.00 | 6.95% | 12.68% | 21.15% |
| 2022 | $ 14.75 | 8.49% | 14.79% | 24.12% |

**Table A.13 - Total labor costs including ripple effects – rural counties (percent change from baseline)**

| Year | New Minimum | Nursing | Residential | In-Home |
|---|---|---|---|---|
| 2016 | $ 9.50 | 0.08% | 0.27% | 0.49% |
| 2017 | $ 10.00 | 0.43% | 1.29% | 2.42% |
| 2018 | $ 10.50 | 0.78% | 2.12% | 3.94% |
| 2019 | $ 11.00 | 1.22% | 3.04% | 5.56% |
| 2020 | $ 11.50 | 1.74% | 4.01% | 7.18% |
| 2021 | $ 12.00 | 2.30% | 4.96% | 8.69% |
| 2022 | $ 12.50 | 2.92% | 5.90% | 10.13% |