

Who enters and who exits direct care jobs in long-term care settings?

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Technical appendix

This appendix documents the data sources, sample construction, variable definitions for Ruffini, Shen, and Truskinovsky (2026).

A. Data sources

The analysis combines three data sources. For each dataset, we limit the analysis to individuals ages 18–64 (inclusive).

- 1. Current Population Survey (CPS), basic monthly files, January 2010–December 2025.** Accessed through IPUMS ([Flood et al. 2025](#)). These files include information on demographic characteristics; labor force status; and industry and occupation for workers' primary jobs. Individuals are surveyed four consecutive months, are out of the sample for eight months, and then interviewed for a second four consecutive months. This structure allows us to form a year-over-year panel where individuals are tracked over time with a IPUMS longitudinal identifier. Our sample includes up to four observations for each individual, surveyed in a given calendar month of year t and the same calendar month of year $t+1$. We only retain respondents with two observations (a valid year- t / year- $t+1$ pair); singletons are dropped. All tables showing labor force variables and demographic variables are weighted using the final person weight. The extract contains 13,682,275 person-month records. After restricting to ages 18–64 and retaining only valid year- t / year- $t+1$ pairs, the year-over-year panel contains 4,407,826 linked pairs, or 8,815,652 person-year observations, of which 6,465,378 are employed and 2,350,274 are not employed. The month-to-month panel described below contains 9,336,593 linked pairs.

One well-documented shortcoming of the year-over-year longitudinal approach is that transitions measured across the seam (i.e., between the fourth and fifth survey months) are subject to independent recoding across spells. In the first and fifth months in the survey (MISH), respondents describe their usual work tasks, and coders classify individuals into occupations. In the other months, individuals are asked if they work for the same employer and if their workplace duties are the same or have changed from the previous month. This approach can result in occupation and industry misclassification, particularly when looking between MISH1-4 and MISH5-8 ([vom Lehn et al. 2022](#); [Fisher and Houseworth 2013](#); [Kambourov and Manovskii 2012](#)). We also report results using a month-over-month longitudinal approach and find similar patterns in the industries that workers transition to and from, and the demographic characteristics of workers who leave, stay, and enter LTSS DCW roles.

- 2. CPS Outgoing Rotation Group (ORG) / Earner Study.** In MISH4 and MISH8, respondents complete an earner survey (Outgoing Rotation Group, "ORG") that includes information on weekly earnings and hourly wages. We weight earnings and wage

variables by the earnings weight. Because only the outgoing rotation groups carry earnings, wage statistics are computed on the ORG subset of the panel (up to one observation per respondent). The hourly wage is collected only from workers paid by the hour, so it is observed for 826,293 of the 6,465,378 employed person-year observations (12.8 percent). Section C describes the implied and hybrid measures we use to widen this coverage to 1,454,940 observations (22.5 percent).

3. **CPS Annual Social and Economic Supplement (ASEC).** The CPS ASEC (“March supplement”) includes additional information on offers and receipt of employer-sponsored health insurance (ESI) and pensions for respondents who are surveyed between February and April. Because not all CPS respondents complete the ASEC survey, we calculate the share of workers in each industry-occupation cell that report an offer of, or receipt of, benefits using Census occupation and industry codes. These shares are then merged to individuals in the CPS basic monthly surveys at the occupation-industry level (see section C for greater detail).

B. Worker classification

Workers who report full- or part-time employment are classified by **occupation and industry** using Census 2010 occupation codes and CPS industry codes.

Occupation and industry harmonization. Occupation uses `occ2010`, recoded by IPUMS to a consistent 2010 Census basis and comparable across 2010–25. Industry uses the raw IPUMS `ind` code, which spans three Census classifications over our analysis period (2007 in 2010–13, 2012 in 2014–19, 2017 from 2020). However, the codes defining the direct care and LTSS categories—8170, 8270, 8290, 8370, and 9290—are identical across all three classifications.¹ Non-health categories are defined by code ranges (e.g., retail 4670–5790, services 8560–9190) that absorb within-range renumbering. Since CPS occupation and industry are coded from responses at each interview, part of the measured year-over-year change in detailed occupation and industry reflects coding and classification error, particularly among adjacent health-care categories. Aggregating to broader categories reduces these types of errors.

Direct care worker (DCW) definition. In the analysis, “DCW” are defined as direct care aides in occupation codes 3600 (nursing, psychiatric, and home health aides) and 4610 (personal care aides). A key reason for combining the two codes is that they cannot be separated consistently across the sample period: The CPS adopted the 2018 Census occupation classification in 2020, which merged home health aides (previously part of 3600) with personal care aides (4610) into a single category. The pooled group therefore captures low-wage direct care workers broadly. Within this group, aides in nursing or residential care facilities (8270/8290) are residential-care DCWs, those in home-health industries (8170/8370/9290) are home care (HC) DCWs, and the remainder are other DCWs.

Occupation and industry categories

¹ The 2017 labels for 8270 and 8290 add skilled-nursing wording but keep the codes. The only relevant revision, the 2017 split of hospitals (8190 into 8191/8192), stays within the 7970–8290 range used for other health care.

Table 1 and figure 2a use an 18 category occupation-industry classification scheme, assigned hierarchically, where each worker is placed in the first category they qualify for, defined as:

#	Category	Definition
1	Residential care DCWs	Occupation: Nursing, psychiatric, and home health aides; personal care aides. and Industry: Nursing care facilities; residential care facilities without nursing.
2	Home care DCWs	Occupation: Nursing, psychiatric, and home health aides; personal care aides. and Industry: Home health care services; individual and family services; private households.
3	Other DCWs	Occupation: Nursing, psychiatric, and home health aides; personal care aides. Industry: All industries not LTSS.
4	LPN/RN (all industries)	Occupation: Licensed practical and licensed vocational nurses; registered nurses. Industry: All.
5	Other health professionals	Occupation: All occupation codes "Healthcare practitioners and technical", excluding LPNs and RNs. Industry: All.
6	Other health care support	Occupations: All those not included above. Industry: Offices of physicians; offices of dentists; offices of chiropractors; offices of optometrists; offices of other health practitioners; outpatient care centers; other health care services; hospitals.
7	Child care	Occupation: All. Industry: Child day care services.
8	Education	Occupation: All Industry: Elementary and secondary schools; colleges and universities, including junior colleges.
9	Cleaning & domestic	Occupation: Janitors and building cleaners; maids and housekeeping services. or Industry: Services to buildings and dwellings; private households (excepting HC DCWs).
10	Clerical & administrative	Occupation: All occupation codes "Office and administrative support." Industry: All.
11	Retail & sales	Occupation: All occupation codes "Sales and related" or Industry: Automobile dealers; other motor vehicle dealers; auto parts, accessories, and tire stores; furniture and home furnishing stores; household appliance stores; radio, TV, and computer stores; building material and supplies dealers; hardware stores; lawn and garden equipment and supplies stores; grocery stores; specialty food stores; beer, wine, and liquor stores; pharmacies and drug stores; health and personal care, except drug, stores; gasoline stations; clothing stores; shoe stores; jewelry, luggage, and leather goods stores; sporting goods, camera, and hobby and toy stores; sewing, needlework and piece goods stores; music stores; book stores and news dealers; department stores and discount stores; miscellaneous general merchandise stores; retail florists; office supplies and stationery stores; used merchandise stores; gift, novelty, and souvenir shops; miscellaneous retail stores; electronic shopping; electronic auctions; mail order houses; vending machine operators; fuel dealers; other direct selling establishments; not specified retail trade.
12	Food service	Occupation: All occupation codes "Food preparation and serving"

#	Category	Definition
		or Industry: Restaurants and other food services; drinking places, alcoholic beverages.
13	Managerial & professional (non-health)	Occupation: All occupation codes “Management, business, science, and arts,” “Computer and mathematical,” “Architecture and Engineering,” “Technicians,” and “Life, physical and social science.” Industry: All
14	Personal services	Occupation: Barbers; hairdressers, hairstylists, and cosmetologists; miscellaneous personal appearance workers; baggage porters, bellhops, and concierges; tour and travel guides. or Industry: Barber shops; beauty salons; nail salons and other personal care services.
15	Manual labor & production	Occupation: All occupation codes “Construction,” “Extraction,” and “Production.” or Industry: Construction; all manufacturing industries
16	Transportation & delivery	Occupation: All occupation codes “Transportation and material moving.” or Industry: Air transportation; rail transportation; water transportation; truck transportation; bus service and urban transit; taxi and limousine service; pipeline transportation; scenic and sightseeing transportation; services incidental to transportation; postal service; couriers and messengers; warehousing and storage.
17	Other non-health	Employed, remaining occupation and industries
18	Not employed	Unemployed or not in the labor force

Table 2 additionally reports characteristics by Residential/Home care stayers and leavers, where the categories are defined as:

- **Stayers**—A Residential/Home care DCW in both years. There are 8,772 residential care stayers and 12,613 home care stayers.
- **Leavers**—A Residential/Home care DCW in year t , not in year $t+1$. There are 8,983 residential care leavers, of whom 7,013 move to another job and 1,970 to non-employment, and 13,433 home care leavers, of whom 9,302 move to another job and 4,131 to non-employment.

Focal groups. Each of these is reported for three groups: LTSS DCWs (residential care and home care pooled), residential care DCWs alone, and home care DCWs alone. A worker moving between the two settings is a leaver in whichever narrower group they left but a stayer in the pooled group, so the pooled group is not the sum of the other two: 2,761 such cross-setting movers make LTSS stayers (24,146) exceed the sum of residential care and home care stayers (21,385). For the same reason, in the transition tables the LTSS stay share is the sum of the residential care and home care rows rather than a single diagonal cell.

C. Worker and job characteristic definitions

Race/ethnicity. We partition race and ethnicity into four mutually exclusive and exhaustive categories: Hispanic (any race), non-Hispanic white, non-Hispanic Black, and other non-Hispanic race.

Job quality / schedule. We examine several measures of job quality, including usually working fewer than 35 hours a week (and employed); usually working full-time hours in a week; unstable schedule (defined as usually working a different full-time, part-time status than the previous week); and holding multiple jobs in the past week. For those not working, we construct nine categories from employment status and reason for non-participation (excluding those in the armed services): unemployed, experienced; unemployed, new worker; retired; in school; ill/disabled; unable to work; homemaker/caregiver; other.

Earnings. Weekly earnings and hourly wages come from the ORG records (section A) and are weighted by the earnings weight. Weekly earnings are reported for all ORG wage and salary earners, covering 23.0 percent of employed person-year observations. The CPS hourly wage, by contrast, is collected only from workers paid by the hour, and so is observed for 826,293 observations, or 12.8 percent. Because direct care workers are overwhelmingly paid hourly, the reported wage covers them better than average—23.0 percent of residential care and 20.7 percent of home care person-years—but it systematically omits salaried workers, including direct care workers who move into salaried jobs.

Implied and hybrid hourly wages. To widen coverage we construct an implied hourly wage, equal to usual weekly earnings divided by usual hours worked per week at the main job. Usual hours are the matched denominator for weekly earnings, which refer to the main job, and are reported by salaried and hourly workers alike (95.4 and 94.3 percent of ORG earners with weekly earnings, respectively). The analysis uses a hybrid measure: The reported hourly wage wherever it is available, and the implied wage otherwise. The two measures are not nested—workers whose hours vary have a reported wage but no implied one—so the hybrid preserves the reported measure rather than replacing it. The hybrid is observed for 1,454,940 employed person-year observations (22.5 percent), of which 826,293 come from the reported wage and 628,647 from the implied wage. For direct care workers it raises coverage from 8,094 to 8,894 residential care person-years and from 10,884 to 12,443 home care person-years.

Wage cleaning and deflation. Zero-valued earnings records are treated as missing. Implied wages below \$2 per hour are also treated as missing, since these reflect hours-reporting error rather than low pay; we do not impose a higher floor, which would delete legitimate sub-minimum tipped and exempt workers. All three wage measures are winsorized at the 99th percentile and adjusted to 2025 dollars using the CPI-U.

Interpreting the hybrid measure. Weekly earnings include overtime, tips, and commissions, whereas the reported hourly wage is the base rate. The implied wage therefore sits above the reported wage where both are observed—by about \$0.50 per hour for direct care workers—

although the two agree within 2 percent for roughly 70 percent of direct care workers who have both. Hybrid wage levels are correspondingly slightly higher than reported wage levels by construction.

Measuring wage changes. Table 2 reports wage changes two ways. The as-computed change subtracts two separately weighted cross-sectional means, one for each year, each taken over whoever has an observed wage in that year; the two sides are therefore not the same workers, and the change is not a within-worker quantity. The balanced change restricts to workers with an observed wage in both years and reports the mean of their individual year-over-year changes, weighted by the year- t earnings weight; the level and the change are computed on that same sample, so the level plus the change equals the year- $t+1$ mean for those workers. Because the hybrid measure observes nearly all year- $t+1$ wages, balancing costs it little: For residential care movers the change sample falls from 1,691 to 1,679 observations under the hybrid, against 1,460 to 1,327 under the reported wage.

Job-level (cell-average) benefit measures. Benefit measures are calculated at the job (detailed occupation/industry from CPS industry and occupation codes, not the aggregated categories described in section B) level rather than the individual level, because access and receipt of employer-sponsored insurance and pensions are only asked in the ASEC (see section A). Because these questions refer to the prior calendar year, the survey year is shifted back one year, and the sample is limited to people who worked last year. We define five measures of job benefits, all weighted by ASEC weights:

- **ESI receipt:** Had health insurance in own name through an employer.
- **ESI employer-paid (some):** ESI receipt and employer paid some or all of the premium.
- **ESI offer:** ESI receipt or eligible for employer coverage. Because the offer item is asked only from ASEC 2014 onward, this measure is pooled over reference years 2013 and later while the other four cover the full window. Its denominator is all workers who worked last year in those reference years, not the narrower universe of the offer question itself: Workers reporting employer coverage in their own name are counted as offered, and among the remainder only an affirmative eligibility response counts. Roughly 59 percent of workers without own-name coverage fall outside the question's universe and are therefore counted as not offered, so this measure is best read as a lower bound on offer rates. Cells observed only before reference year 2013 carry no offer value at all (4,020 of 41,071 cells), leaving about 1 percent of employed person-years without one, concentrated in 2010–13 where occupation and industry codes from the earlier Census vintage fell out of use; no residential care or home care DCW person-year is affected.
- **Pension offered:** Has a pension plan at work and not included or included in a pension plan at work.
- **Pension receipt:** Included in a pension plan at work.

Construction of the benefit cells. The shares are computed once per occupation-by-industry cell, pooling all ASEC reference years, and carry no time dimension: The collapse is by occupation and industry only, and the resulting value is merged onto every person-year in the panel regardless of survey year. A worker observed in 2010 therefore receives a cell share estimated from the full reference-year window, and these measures cannot vary over time by

construction. Table 1 reports the cell shares at the person level. In table 2 the job-level average rows are instead those same shares averaged, person-weighted, over the aggregated categories of section B, which is why the stayer change is reported as zero: A stayer remains in the same category by definition. That zero reflects the category aggregation rather than the underlying cell—about 23 percent of residential care stayers and 47 percent of home care stayers do change their detailed occupation or industry code while remaining in the group, so a cell-level measure would move even though the category average cannot.

D. Predictors of leaving DCW work

Figure 4 shows differences in pay changes and workforce conditions for people who stay in DCW and those who leave. In order to determine the strongest predictors of staying in DCW work, we regress the demographic characteristics from table 1 on an indicator for leaving in a “kitchen sink regression” (Appendix table 1). For both residential and home care DCW workers, being older, female, born outside the U.S., as well as working full-time and having less than a four-year degree, are highly predictive of being more likely to stay in DCW work.

Appendix table 1: Predictors of leaving direct care by t+1 (LPM, year FE, robust SE)

Outcome = 1 if left direct care (to another job or non-employment) by t+1; 0 = stayed. Positive coefficient = more likely to leave.

Variable	Residential Care DCW	Home Care DCW	Combined DCW
Age (18–24 reference)			
Age 25–34	-0.1125	-0.0744	-0.0915
	(0.0145)	(0.0150)	(0.0104)
Age 35–44	-0.1261	-0.0991	-0.1111
	(0.0149)	(0.0148)	(0.0104)
Age 45–54	-0.1345	-0.1528	-0.1492
	(0.0147)	(0.0143)	(0.0101)
Age 55–64	-0.1542	-0.1183	-0.1318
	(0.0152)	(0.0144)	(0.0103)
Race (Non-Hispanic White reference)			
Black NH	0.0287	-0.0024	0.0137
	(0.0105)	(0.0091)	(0.0069)
Hispanic	0.0401	0.029	0.0337
	(0.0151)	(0.0102)	(0.0084)
Other race	0.0635	0.0265	0.0393
	(0.0186)	(0.0129)	(0.0106)

Educational attainment (< HS reference)			
HS graduate	-0.0156	0.0042	-0.0004
	(0.0150)	(0.0106)	(0.0087)
Some college	-0.0088	0.0421	0.025
	(0.0161)	(0.0119)	(0.0096)
2-year degree	0.056	0.0416	0.0524
	(0.0185)	(0.0140)	(0.0111)
4-year degree	0.1387	0.1031	0.116
	(0.0209)	(0.0135)	(0.0114)
Other demographic characteristics			
Female	-0.0345	-0.049	-0.0428
	(0.0139)	(0.0112)	(0.0087)
Foreign-born	-0.0598	-0.0832	-0.0753
	(0.0120)	(0.0088)	(0.0071)
Full-time	-0.0786	-0.009	-0.0318
	(0.0232)	(0.0174)	(0.0139)
Unstable schedule	-0.0497	0.0435	0.0113
	(0.0225)	(0.0172)	(0.0136)
Multiple jobs	0.0185	0.0073	0.013
	(0.0164)	(0.0129)	(0.0101)
Under 35 hours	-0.021	0.0079	-0.003
	(0.0226)	(0.0169)	(0.0135)
Home care indicator	—	—	0.0332
			(0.0058)
Constant	0.6208	0.5946	0.5762
	(0.0307)	(0.0245)	(0.0192)
N	17,755	26,046	43,801
R-squared	0.028	0.024	0.023

Notes: Data from CPS 2010–25. Robust standard errors in parentheses.