

LIVING WAGE CALCULATOR
User's Guide / Technical Notes

2021-2022 Update

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1. Introduction to living wage model

Analysts and policy makers often compare income to the federal poverty threshold in order to determine an individual's ability to live within a certain standard of living. However, poverty thresholds do not account for living costs beyond a very basic food budget. The federal poverty measure does not take into consideration costs like childcare and health care that not only draw from one's income, but also are determining factors in one's ability to work and to endure the potential hardships associated with balancing employment and other aspects of everyday life. Further, poverty thresholds do not account for geographic variation in the cost of essential household expenses.

The living wage model is an alternative measure of basic needs. It is a market-based approach that draws upon geographically specific expenditure data related to a family's likely minimum food, childcare, health insurance, housing, transportation, and other basic necessities (e.g. clothing, personal care items, etc.) costs. The living wage draws on these cost elements and the rough effects of income and payroll taxes to determine the minimum employment earnings necessary to meet a family's basic needs while also maintaining self-sufficiency.

The living wage model is a 'step up' from poverty as measured by the poverty thresholds but it is a small 'step up', one that accounts for only the basic needs of a family. The living wage model does not allow for what many consider the basic necessities enjoyed by many Americans. It does not budget funds for pre-prepared meals or those eaten in restaurants. It does not include money for unpaid vacations or holidays. Nor does it provide money income to cover unexpected expenses such as a sudden illness, a major car repair, or the purchase of a household appliance such as a refrigerator. Lastly, it does not provide a financial means for planning for the future through savings and investment or for the purchase of capital assets (e.g. provisions for retirement or home purchases). The living wage is the *basic* income standard that, if met, draws a very fine line between the financial independence of the working poor and the need to seek out public assistance or suffer consistent and severe housing and food insecurity. In light of this fact, the living wage is perhaps better defined as a minimum subsistence wage for persons living in the United States.

Updating living wage

Family Compositions

The living wage calculator estimates the living wage needed to support families of twelve different compositions: one adult families with 0, 1, 2, or 3 dependent children, two adult families where both adults are in the labor force and working with 0, 1, 2, or 3 dependent children, and two adult families where one adult is not in the labor force with 0, 1, 2, or 3 dependent children.

For single adult families, the adult is assumed to be employed full-time. For two adult families where both adults are in the labor force, both adults are assumed to be employed full-time. For two adult families where one adult is not in the labor force, one of the adults is assumed to be employed full-time while the other non-wage-earning adult provides full-time childcare for the

family's children. Full-time work is assumed to be year-round, 40 hours per week for 52 weeks, per adult.

Families with one child are assumed to have a 'young child' (4 years old). Families with two children are assumed to have a 'young child' and a 'child' (9 years old). Families with three children are assumed to have a 'young child', a 'child', and a 'teenager' (15 years old).

Geographic Definitions

The living wage is calculated at the county, metropolitan area, state, regional, and national level. Unless otherwise noted, geographic definitions are consistent with those published by the Office of Management and Budget, last updated in 2017.¹

The living wage is calculated for 383 metropolitan areas and all 50 states and the District of Columbia. It is not calculated for those who reside in Puerto Rico, Guam, or the Virgin Islands. Work is underway to calculate a living wage for Puerto Rico. Regional assignments are made by state according to Census definitions. Unless otherwise specified, regional membership is based on the four major Census regions. Reported national values are calculated as the average values of the 50 states and Washington DC.²

2. Data Sources and Calculations

The living wage is defined as the wage needed to cover basic family expenses (basic needs budget) *plus* all relevant taxes. Values are reported in 2022 dollars. To convert values from annual to hourly, a work-year of 2,080 hours (40 hours per week for 52 weeks) per adult is assumed. The basic needs budget and living wage are calculated as follows:

$$\text{Basic needs budget} = \text{Food cost} + \text{childcare cost} + (\text{insurance premiums} + \text{health care costs}) + \text{housing cost} + \text{transportation cost} + \text{other necessities cost} + \text{civic engagement} + \text{broadband}$$

$$\text{Living wage} = \text{Basic needs budget} + (\text{basic needs budget} * \text{tax rate})$$

The following is an explanation of data sources for each component of the living wage:

Food. The food component of the basic needs budget was compiled using the USDA's low-cost food plan³ national average in June 2021.⁴ The low-cost plan is the second least expensive food plan offered from a set of four food plans that provide nutritionally adequate food budgets at

¹ <https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/bulletins/2017/b-17-01.pdf>

² The data was not skewed to justify the use of the median, instead of the mean.

³ The USDA food plans are available at <https://www.fns.usda.gov/cnpp/usda-food-plans-cost-food-reports-monthly-reports>.

⁴ The USDA low-cost food plan for June 2019 is available at <https://fns-prod.azureedge.net/sites/default/files/media/file/CostofFoodJun2019.pdf>. June costs for each year are used to represent the annual average.

various price points.⁵ The low-cost plan assumes that families select lower cost foods and that all meals (including snacks) are prepared in the home. The food component’s value varies by family size and the ages of individual family members. Adult food consumption costs are estimated by averaging the low-cost plan food costs for males and females between 19 and 50. Child food consumption costs are estimated using the various categories in the low-cost food plan based on the child age assumptions detailed in the section Assumptions about Family Composition. The regional adjustment factor is based on estimated regional differences in raw and unprepared food prices. The regional adjustment factors by region are as follows: East (1.08), Midwest (0.95), South (0.93), and West (1.11).⁶

Childcare. Childcare cost data was updated in 2019 and reflects county and state-level data collected from state market rate surveys and a survey of county-level child care provider cost data where available. If these were not available, they were aggregated from providers via either a database or contacting providers in the state directly.

The lowest cost option was used and then averaged across the toddler and newborn age groups. As far as possible the median estimates of childcare center costs were used. If median costs were not reported, the mean was used instead.

Monthly rates were calculated as follows, unless otherwise specified:

<u>Original Rate</u>	<u>Conversion Factor</u>
Hourly	50*4.33
Daily	5*4.33
Weekly	4.33
Monthly	1
Annually	1/12

Values were inflated from 2019 to 2021 dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.⁷ And, the state-wide cost was computed as the weighted average (by population) of the county cost estimates.

In Delaware, Kentucky, Montana, and South Dakota costs were reported only for the 75th percentile. In Virginia, only the 70th percentile was reported and in New York, only the 69th percentile is reported.

For those states that only provided region- or zone-level averages, the zone or region average was used for each county within that zone or region.

⁵ The Census Bureau uses the lowest cost food plan published by the USDA, the thrifty plan, in calculating the federal poverty thresholds. The use of the thrifty plan is a highly criticized because it does not provide a nutritious diet and it is only meant for temporary or emergency use (see e.g. Natale & Super, 1991). Such critiques provide compelling arguments against the use of the thrifty food plan in the living wage calculator.

⁶ USDA Economic Research Service: Liebttag, E. S. (2007). Stretching the food stamp dollar: regional price differences affect affordability of food. Economic Information Bulletin Number 29-2.

⁷ BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm.

For those states that only provided state-wide estimates, the counties estimates were calculated by multiplying the state average by the ratio of the median household income in that county to the weighted average of the median household income in the state by county population.

For the states with missing counties, the strategy depended on how many counties were missing and the characteristics of the non-missing data. Median household income data was consolidated for every county in each state with missing data. Each county also had a corresponding rural-urban continuum code, a number between 1 and 9, indicative of metropolitan population size. Missing counties were imputed by indexing by median household income, while accounting for how rural or urban the county was. If there were at least seven⁸ non-missing counties with the same rural-urban continuum code as the missing county, the missing county cost was estimated by multiplying the weighted average childcare cost of the non-missing counties of that rural-urban code with the ratio of the median household income in that county to the weighted average of the median household income in the counties of that rural-urban code. If there were fewer than seven non-missing counties, we chose to use whether the county was metro or non-metro in place of the code. This meant multiplying the weighted average childcare cost of the (non)-metro counties with the ratio of the median household income in that county to the weighted average of the median household income in the (non)-metro counties. Future plans are to utilize the Bureau of Labor Statistics Child Care Price Data, collected in 2018.

Only in the cases of Alaska and Nevada was there so much missing data that we were not able to use an urban/rural indicator and use the average of all non-missing counties as the base.

Health. Typical health-related expenses are difficult to estimate due to the multitude of variables that potentially impact health care expenditures, such as the relative health of household members and the range of coverage and affiliated costs under alternative employer and non-employer medical plans. The health component of the basic needs budget includes: (1) health insurance costs for employer sponsored plans, (3) medical services, (3) drugs, and (4) medical supplies.⁹ Costs for medical services, drugs and medical supplies were derived from 2017 national expenditure estimates by household size provided in the 2020 Bureau of Labor Statistics Consumer Expenditure Survey.¹⁰ These estimates were further adjusted for regional differences using annual income expenditure shares reported by region.¹¹ Values were inflated from 2020 to 2021 dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.¹²

⁸ We used 7 as an arbitrary number believing that fewer than 7 counties would produce a far too biased estimate.

⁹ For many low-income families, the assumption that their employer provides health insurance may be overly optimistic. Indeed and as documented by the Employee Benefit Research Institute, the offer rates of health insurance vary substantially by gender, level of education, and income (EBRI Brief #370). However, we felt comfortable with the assumption that the employer subsidizes coverage because our optimism likely produces living wage estimates that are *below* the living wage needed. Considering all factors and the unavoidable granularity of any living wage estimator, we felt that this decision was justified.

¹⁰ 2019 Consumer Expenditure Survey, Table 1400, available at <https://www.bls.gov/cex/2019/combined/cusize.pdf>.

¹¹ 2019 Consumer Expenditure Survey, Table 1800, available at <https://www.bls.gov/cex/2019/combined/region.pdf>.

¹² BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm.

Health insurance costs were calculated using the Health Insurance Component Analytical Tool (MEPSnet/IC) provided online by the Agency for Healthcare Research and Quality.¹³ This tool provides state-level estimates derived from the insurance component of the 2017 Medical Expenditure Panel Survey. The criteria for cost estimation using MEPSnet/IC tool were: “Private-Sector Establishments: State Specific Data for Private-Sector Establishments”, for each individual state, “Annual Premiums and Contributions per Enrolled Employee at Private-Sector Establishments”, All Employees Combined, either (1) “Single Plans”, (2) “Employee-plus-one Plans” or (3) “Family Plans.” We assumed that a single adult family uses a “Single Plan”, a two adult family uses an “Employee-Plus-One Plan,” and all other family types use a “Family Plan.”¹⁴ Values were inflated from 2020 to 2021 (2.5%) dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.¹⁵

Housing. The housing component captures the likely cost of rental housing in a given area in 2021 using HUD Fair Market Rents (FMR) estimates. The FMR estimates are produced at the sub-county and county levels.¹⁶ County FMRs were obtained by aggregating sub-county estimates (where sub-county estimates existed) using a population-weighted average using population estimates from the 2018 5-year American Community Survey estimates published by the Census Bureau.¹⁷ State and metropolitan area FMRs were also obtained by population weighting county FMRs.

The FMR estimates include utility costs and vary depending on the number of bedrooms in each unit, from zero to four bedrooms. We assumed that a one adult family would rent a single occupancy unit (zero bedrooms) for an individual adult household, that a two adult family would rent a one bedroom apartment, and that two adult and one or two child families would rent a two bedroom apartment. We further assumed that families with three children would rent a three bedroom apartment (the adults are allocated one bedroom and the children two bedrooms).

Transportation. The transportation component is constructed using 2019 national expenditure data by household size from the 2020 Bureau of Labor Statistics Consumer Expenditure Survey including: (1) Cars and trucks (used), (2) gasoline and motor oil, (3) other vehicle expenses, and (4) public transportation. Transportation costs cover operational expenses such as fuel and routine maintenance as well as vehicle financing and vehicle insurance but do not include the

¹³ Available at http://meps.ahrq.gov/mepsweb/data_stats/MEPSnetIC.jsp.

¹⁴ An alternate method using the MEPS query tool is simply to extract the data from the appropriate ‘quick’ tables available on the MEPS website. To obtain the mean employee contribution for a single plan by state we used Table X.C.1(2019), available at https://meps.ahrq.gov/data_stats/summ_tables/insr/state/series_10/2019/txc1.htm. To obtain the mean employee contribution for a plus-one plan by state, we used Table X.D.1(2019), available at https://meps.ahrq.gov/data_stats/summ_tables/insr/state/series_10/2019/txd1.htm. To obtain the mean employee contribution for a family plan by state, we used Table X.E.1(2019), available at https://meps.ahrq.gov/data_stats/summ_tables/insr/state/series_10/2019/txe1.htm.

¹⁵ BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm.

¹⁶ HUD provides sub-county data and defines the corresponding metropolitan area for sub-county data as a “HUD Metro Fair Market Rent Areas,” (HMFAs) when revised OMB definitions encompass area that is larger than HUD’s definitions of housing market areas. More information can be found in HUD’s Fair Market Rent Overview documentation <https://www.huduser.gov/portal/datasets/fmr.html#2020>.

¹⁷ The 2018 American Community Survey geographic definitions are available at <https://www.census.gov/programs-surveys/acs/geography-acs/geography-boundaries-by-year.2018.html>

costs of purchasing a new automobile.¹⁸ These costs were further adjusted for regional differences using annual expenditure shares reported by region.¹⁹ Expenditures were selected by household size, instead of as a share of household income because transportation cost (i.e. gas, repairs, etc.) are roughly the same for all persons regardless of income. Values were inflated from 2020 to 2021 (23.9%) dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.

Other necessities. The basic needs budget includes cost estimates for items not otherwise included in the major budget components such as clothing, personal care items, and housekeeping supplies. Expenditures for other necessities are based on 2020 data by household size from the 2020 Bureau of Labor Statistics Consumer Expenditure Survey including: (1) Apparel and services, (2) Housekeeping supplies, (3) Personal care products and services, (4) Reading, and (5) Miscellaneous.²⁰ These costs were further adjusted for regional differences using annual expenditure shares reported by region.²¹ Values were inflated from 2020 to 2021 (12.3%) dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.²²

Civic The civic engagement component is constructed using 2020 national expenditure data by household size from the 2020 Bureau of Labor Statistics Consumer Expenditure Survey including: (1) Fees and admissions, (2) audio and visual equipment and services, (3) pets, and (4) toys, (5) hobbies, and playground equipment, (6) other entertainment supplies, (7) equipment, and services, (8) reading, and (9) education. Civic engagement costs cover expenses related to participating in and engaging in civic activities.²³ These costs were further adjusted for regional differences using annual expenditure shares reported by region.²⁴ Expenditures were selected by household size, instead of as a share of household income because civic engagement costs are roughly the same for all persons regardless of income. Values were inflated (5.1%) from 2020 to 2021 dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.²⁵

Broadband First, a preliminary analysis of the broadband sector in the United States was conducted by looking at the types of connections (cable, fiber, ADSL, and satellite), geographic coverage, services available, and subscription plan costs of the ten largest broadband providers. Next, in order to obtain geographic data of the cost of broadband, we randomly selected three states from each of the major geographic regions (Northeast, South, Midwest, and West), listed the major broadband providers for each of those states, and obtained the lowest cost plan in an urban, suburban, and rural zip code. In order to acquire this data, we used the BroadbandNow tool, which lists available providers and prices by zip code. We also noted the top firms in each

¹⁸ 2019 Consumer Expenditure Survey, Table 1400, available at <https://www.bls.gov/cex/2019/combined/cusize.pdf>.

¹⁹ 2019 Consumer Expenditure Survey, Table 1800, available at <https://www.bls.gov/cex/2019/combined/region.pdf>.

²⁰ 2019 Consumer Expenditure Survey, Table 1400, available at <https://www.bls.gov/cex/2019/combined/cusize.pdf>.

²¹ 2019 Consumer Expenditure Survey, Table 1800, available at <https://www.bls.gov/cex/2019/combined/region.pdf>.

²² BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm

²³ 2019 Consumer Expenditure Survey, Table 1400, available at <https://www.bls.gov/cex/2019/combined/cusize.pdf>.

²⁴ 2019 Consumer Expenditure Survey, Table 1800, available at <https://www.bls.gov/cex/2019/combined/region.pdf>.

²⁵ BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm

of the selected states and any additional costs associated with each plan, including monthly modem rental prices.

An analysis of the lowest cost broadband plan in urban, suburban, and rural zip codes in each geographic region (Northeast, South, Midwest, and West) confirmed no major geographic trends. The base cost of the cheapest plan available is typically \$50 per month plus an additional equipment fee of approximately \$10 per month.

Research from other sources seems to corroborate our findings that \$60/month is a proper national estimate. The website cable.co.uk did a report on global broadband costs per country and found the average cost of broadband in the US as of 2020 was \$50². A report from 2010 by the FCC found that the average broadband bill for those whose plans were not part of a bundle was \$46.25³. None of those costs include equipment for a modem however which from our data collection usually ranged around \$10/month. That extra cost brings those estimates close to our \$60/month estimate for internet cost.

To estimate cell-phone service cost, we conducted a geographic analysis using the aforementioned steps applied to broadband service. Cell-phone service programs are similarly configured with a base cost that reflects an average of \$60, plus additional charges related to service usage.

We combined broadband and cell-phone service into one cost estimate of \$120.00. For both broadband and cell phone service an inflation rate of 2.6% was applied.

Taxes. Estimates for federal and state taxes are included in the calculation of a living wage. Property taxes and sales taxes are already represented in the budget estimates through the cost of rent and other necessities.

Federal taxes are taken from the Urban-Brookings Tax Policy Center Microsimulation Model (version 0217-1)²⁶ and include: individual income taxes (after tax credits including the refundable portion of earned income and child tax credits), payroll taxes (including both the employee and employer portion of social security and medicare taxes), corporate income tax, estate tax, and excise tax. The federal tax rate for the middle quintile was 13.95% in 2017.

The state tax rate is taken from the state income tax rate, as reported by the CCH State Tax Handbook 2021 published by Wolters Kluwer State Tax Handbook, which reports 2021 tax rates.²⁷ The tax rate tier applied is determined by the pre-tax living wage, and includes deductions.²⁸

²⁶ Federal tax data for 2017 are available at <http://www.taxpolicycenter.org/model-estimates/baseline-average-effective-tax-rates-march-2017/t17-0042-average-effective-federal>.

²⁷ The CCH State Tax handbook is available at <https://www.cchgroup.com/store/products/state-tax-handbook-2015-prod-10034384-0006/book-softcover-item-1-10034384-0006>. The 2017 values were not freely available at the time of publication.

²⁸ For example, if the living wage before taxes is \$25,000 and the second tier rate is for incomes \$10,000 to \$20,000 and the third tier rate is for incomes \$20,001 and \$30,000, the third tier is applied.

Comparisons to the Minimum Wage, Poverty Threshold, and Wages by Occupation

Minimum Wage: The minimum wage estimates the lowest threshold an employer can legally pay employees for certain types of work. For comparison, we used state minimum wage data obtained from the United States Department of Labor as of July 1, 2021.²⁹ The federal minimum wage is used for states where the state minimum wage is less than the federal minimum of \$7.25.³⁰ The average minimum wage of all fifty states and the District of Columbia is used to estimate the national minimum wage.

Poverty Wage: The poverty threshold is defined by the Department of Health and Human Services. It is an administrative threshold to determine eligibility for financial assistance from the federal government. For comparison, we use the poverty thresholds for the 48 contiguous states, Washington DC, Alaska, and Hawaii, as of 2021.³¹ The average poverty wage of all 50 states and the District of Columbia is used to estimate the national poverty wage.

Wages by Occupational Group: For comparison, we use the median hourly wage rates for 22 major occupations in the nation, all 50 states and Washington DC, and 381 metropolitan areas, as defined by the Bureau of Labor Statistics as of 2020.³² Values were inflated to from 2020 to 2021 dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.³³

²⁹ Minimum wage data are available at <https://www.dol.gov/whd/minwage/america.htm>.

³⁰ Federal minimum wage data are available at <https://www.dol.gov/whd/minimumwage.htm>

³¹ Poverty data are available at <https://aspe.hhs.gov/poverty-guidelines>.

³² BLS publishes state and metropolitan level occupational employment and wage estimates based on data collected from employers in all industry divisions for two digit Standard Occupational Coded occupations. These estimates are available at <http://www.bls.gov/bls/blswage.htm>.

³³ BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm.