LIVING WAGE CALCULATOR
User's Guide / Technical Notes

2020-2021 Update

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Introduction To Living Wage Model

Analysts and policymakers often compare income to the federal poverty threshold 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 basic food budget. The federal poverty measure does not consider expenses like childcare and health care that must be covered by a person's income even as these factors affect a person's ability to work and manage 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 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 exceeds the poverty level as measured by the poverty thresholds, but it is a modest 'step up,' which accounts for individual and family needs. The living wage model does not include funds for what the public considers the necessities enjoyed by many Americans. It does not incorporate funds for pre-prepared meals or those eaten in restaurants. It does not contain money for leisure time or unpaid vacations or holidays.

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 *minimum* income standard that, if met, draws a 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 wage covering necessary costs for persons living in the United States.

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 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, we assume the adult to be employed full-time. For two adult families where both adults are in the labor force, we assume both adults are employed full-time. For two adult families where one adult is not in the labor force, we consider one of the adults is employed full-time while the other non-wage-earning adult provides full-time childcare for the family's children. We consider full-time work 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). For families with two children, we assume there is one 'young child' and a 'child' (9 years old). We assume families with three children have a 'young child,' a 'child,' and a 'teenager' (15 years old).

Geographic Definitions

We compute the living wage at the county, metropolitan, state, regional, and national levels. Unless otherwise noted, **geographic definitions** are consistent with those published by the Office of Management and Budget, last updated in 2017.[1]

We calculate the living wage for 3142 counties, 383 metropolitan areas and all 50 states, and the District of Columbia.

We do not include residents who reside in Puerto Rico, Guam, or the Virgin Islands. Regional assignments are made by state according to Census definitions. Reported national values reflect the average of the values of the 50 states and Washington DC.[2]

Calculations and Data Sources

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 **2020 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:

Basic needs budget = Food cost + childcare cost + (insurance premiums + out of pocket health care costs) + housing cost + transportation cost + other necessities cost + civic engagement + broadband

Living wage = Basic needs budget + (basic needs budget*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 uses the USDA's low-cost food plan[3] national average in June 2019.[4] The low-cost plan is the second least expensive food plan of a set of four food plans that provide nutritionally adequate food budgets at various price points.[5] The

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

[2] The data are 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.

[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

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 Cost Estimates

Childcare cost data was collected from all counties within states in the country. We started with market rate surveys published by every state. Once these were established, we built a data base derived from local providers via either a database or contacting providers in the state directly. As far as possible the median estimates of childcare center costs were used. If median costs were not reported, the mean was used instead. Some county level market rate surveys only reported measures such as the 75th percentile of the range of childcare center costs. We converted all data to monthly rates. Unless a different rate was specified in the market rate survey publication. Next, the cheapest childcare option was identified. This was done as per the living wage user guide which states "we used the lowest cost option", as they assume lower income families will choose the cheapest available option.
As the market rate surveys were published in different years, we converted all values to 2019 dollars. Using the BLS tool[7] we chose June-June inflation rates. Values were inflated from 2019 to **2020 dollars** using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.[8]
Some states required further imputation. This was necessary in the following cases

- The survey only provided region- or zone-level estimates
- The survey only provided state-wide estimates
- Some counties were missing

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.

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 how metropolitan the county is. Missing counties were imputed by indexing by median household income, while accounting for how rural or urban the county was.

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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: Liebtag, E. S. (2007). Stretching the food stamp dollar: regional price differences affect affordability of food. Economic Information Bulletin Number 29-2.
[7] https://www.bls.gov/data/inflation_calculator.htm
[8] BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm.

If there were at least seven[9] 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.

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 medical plans. The health component of the basic needs budget includes: (1) health insurance costs for employer sponsored plans, (2) medical services, (3) drugs, and (4) medical supplies.[10] Costs for medical services, drugs and medical supplies were derived from 2017 national expenditure estimates by household size provided in the 2019 Bureau of Labor Statistics Consumer Expenditure Survey.[11] These estimates were further adjusted for regional differences using annual income expenditure shares reported by region.[12] Values were inflated from 2019 to 2020 dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.[13]

Health insurance costs were calculated using the Health Insurance Component Analytical Tool (MEPSnet/IC) provided online by the Agency for Healthcare Research and Quality.[14] 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.[15]

[9] We used 7 as an arbitrary number believing that fewer than 7 counties would produce a far too biased estimate.
[10] 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.
[11] 2019 Consumer Expenditure Survey, Table 1400, available at https://www.bls.gov/cex/2019/combined/cusize.pdf.
[12] 2019 Consumer Expenditure Survey, Table 1800, available at https://www.bls.gov/cex/2019/combined/region.pdf.
[13] BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm.
[14] Available at http://meps.ahrq.gov/mepsweb/data_stats/MEPSnetIC.jsp.
[15] 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

Values were inflated from 2019 to **2020 dollars** using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.[16]

Housing. The housing component captures the likely cost of rental housing in a given area in **2020** using HUD Fair Market Rents (FMR) estimates. The FMR estimates are produced at the sub-county and county levels.[17] 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 estimates American Community Survey published by the Census Bureau.[18] State and metropolitan area FMRs were also obtained by population weighting county FMRs. This year, HUD is replacing the national trend factor with local and regional trend factors in order to improve the accuracy of the FMRs.[19]

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 2019 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 costs of purchasing a new automobile.[20] These costs were further adjusted for regional differences using annual expenditure shares reported by region.[21] 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 2019 to **2020** dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.[22]

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. In **2020**, we established a regionalized value for Broadband and Cell Phone Service. We first discuss the procedure followed to arrive at the cost of Broadband Service followed by a discussion

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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.

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

[17] 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.

[18] 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

[19] https://www.huduser.gov/portal/elist/2019-Sept_19.html

[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 athttps://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

of the calculation of Cellphone service. We followed a three step-process to create a combined average cost for both services.

In 2020, based on changes in communications technologies, phone service based on a landline is no longer considered the primary means of telecommunication. After consultation with users and a review of the Consumer Expenditure Survey, we made a determination to add a cost element for broadband and cell phone service.

We first calculated the cost of Broadband. A preliminary analysis of broadband 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.[23] We also noted the top firms in each 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 Broadband plan available, including an additional equipment fee was approximately $60 per month.

Research from other sources corroborated 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 $50.[22] A report from 2010 by the FCC found that the average broadband bill for those whose plans were not part of a bundle was $46.25.[23]. 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.

The next step was to calculate the cost of Cell Phone Service. We calculated the cost of a cell phone service plan based on a typical prepaid plan with unlimited call and text and 10 GB of data per month. We chose to include plans with up to 15 GB of data because there was no significant difference in cost between 10 GB plans and 11-15 GB plans.

We included a factor representing the taxes and fees that customers would typically pay on a prepaid plan. We identified the average cumulative state and local sales tax by state and then found the weighted average of that tax by population for an average US sales tax of 7.39%.[24],[25] A monthly rate of $40 with 7.39% tax resulting in $42.96 as the typical amount someone would pay for a

[23] https://broadbandnow.com

[24] While it would be possible to adjust this sales tax calculation by location in the Living Wage Tool, the small influence of changes in sales tax on phone cost (less than a few dollars) suggests that this laborious process would not be worth the effort.

[25] https://taxfoundation.org/sales-tax-rates-2019/

prepaid plan with unlimited text and call and 10 GB of data. We added an additional $204.50 for the purchase of a low-price cell phone with minimal smart phone features. We assumed that a consumer would purchase a new cell phone approximately once every three years.

Expenditures for other necessities are based on 2019 data by household size from the 2019 Bureau of Labor Statistics Consumer Expenditure Survey including: (1) Apparel and services, (2) Housekeeping supplies, (3) Personal care products and services, (4) Miscellaneous. (5) Broadband and Cell Phone Service.[26] These costs were further adjusted for regional differences using annual expenditure shares reported by region.[27] Values were inflated from 2019 to **2020** dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.[28]

Civic In 2020, after considerable investigation and consultation with long standing users, we developed an element of the tool that reflects of the cost of engaging in basic activities that enrich the lives of Americans. The civic engagement component is constructed using 2019 national expenditure data by household size from the 2019 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.[29] These costs were further adjusted for regional differences using annual expenditure shares reported by region.[30] 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 from 2019 to 2020 dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.[31]

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)[32] 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 14.0% in 2017.

[26] 2019 Consumer Expenditure Survey, Table 1400, available at https://www.bls.gov/cex/2019/combined/cusize.pdf.
[27] 2019 Consumer Expenditure Survey, Table 1800, available at https://www.bls.gov/cex/2019/combined/region.pdf.
[28] BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm
[29] 2019 Consumer Expenditure Survey, Table 1400, available at https://www.bls.gov/cex/2019/combined/cusize.pdf.
[30] 2019 Consumer Expenditure Survey, Table 1800, available athttps://www.bls.gov/cex/2019/combined/region.pdf.
[31] BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm
[32] 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.

The state tax rate is taken from the state income tax rate, as reported by the CCH State Tax Handbook 2015, which reports 2016 tax rates.[33] The tax rate tier applied is determined by the pre-tax living wage, and includes deductions.[34] The 2016 tax rate has been inflated on an annual basis in succession and updated to 2020. The gap between 2016 and 2020 is due to the irregular printing of the State Tax Handbook.

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 was obtained from the United States Department of Labor as of July 1, 2019.[35] The federal minimum wage is used for states where the state minimum wage is less than the federal minimum of $7.25.[36] The weighted 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 2019.[37] 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 2019.[38] Values were inflated to from 2019 **to 2020** dollars using the Consumer Price Index inflation multiplier from the Bureau of Labor Statistics.[39]

[33] 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 2019 values were not freely available at the time of publication.
[34] 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.
[35] Minimum wage data are available at https://www.dol.gov/whd/minwage/america.htm.
[36] Federal minimum wage data are available at https://www.dol.gov/whd/minimumwage.htm
[37] Poverty data are available at https://aspe.hhs.gov/poverty-guidelines.
[38] 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.
[39] BLS inflation calculator, using June values, is available at http://www.bls.gov/data/inflation_calculator.htm.