

# Minnesota Cost of Living Study

## Methodology 2015

Steve Hine, LMI director  
John Clay, principal study author  
Amanda Rohrer, database developer

**Labor Market Information Office**  
**Minnesota Department of Employment and Economic Development**

The Cost of Living Study provides a yearly estimate of the basic-needs cost of living in Minnesota, for individuals and families, by county, region, and statewide. The study examines monthly living costs in seven cost categories: food, housing, health care, transportation, child care, other necessities, and net taxes. Total costs are presented as yearly and hourly dollar amounts. Category costs are presented as monthly dollar amounts.

Rather than describing what families are spending as the Consumer Expenditure Survey does, the study estimates the cost of living. I might spend my money on one apple for my two children and split it in half if one apple is all I can afford. That's my spending. But what my family really need is two apples. That's my basic need.

And rather than looking at a percentage change in costs over time as the Consumer Price Index does, the study looks at dollar costs. We don't ask the cashier at the store how many percent higher the apple's price is today than the last time we shopped. We ask: How much does the apple cost?

The Cost of Living represents neither a poverty-level living nor a middle-class living but rather a living that meets basic needs for health and safety.

There is no money built in for savings, vacations, entertainment, eating out, tobacco, or alcohol, even though most of these elements are part of a normal healthy life. To meet the mandate of a basic-needs living, the study excludes these costs.

The full results of the study are calculated in an SQL database maintained by the state's Labor Market Information office. For ease of use, a core subset of results are presented through the Cost of Living online tool at the website of the Department of Employment and Economic Development.

## Family Types

### Database

The Cost of Living SQL database calculates results for 332,852 family compositions in 107 geographic regions of Minnesota for a total of 35,615,164 results. The regions are counties, Economic Development Regions, Planning Regions, and the state as a whole.

The large number of family and geographic options allows researchers to thoroughly examine the potential effects of family composition and geography on living costs, even though one family composition might actually be far more typical than another in Minnesota, or even though a given family composition might not actually be present in a certain county this year (though it could be next year).

Because some family compositions are more common than others and some might be outright hypothetical in a given year, we do not combine costs of different families into any kind of total or average. We instead take one family composition at a time and then compare by county or combine counties into weighted averages for larger regions.

## Online tool

The Cost of Living online tool offers a core subset of results for 24 family compositions in 107 geographic regions of Minnesota for a total of 2,568 results. As in the database, the regions are counties, Economic Development Regions, Planning Regions, and the state as a whole.

To make the online tool simple and easy to use, we define, in advance, age and gender characteristics triggered by the user's selections of partnership, work, and children.

### Family definitions

- A single adult, whether with or without children, is working full-time.
- Two adults, with or without children, are both working full-time, or one full-time and one part-time, or one full-time and one not working.
- A single adult without children is male, either age 19-50 or age 51 plus.
- Two adults without children are one female and one male, age 19-50 or age 51 plus.
- A single adult with children is female, age 19-50.
- Two adults with children are one female and one male, both age 19-50.
- Child 1 and child 3 are male.
- Child 2 and child 4 are female.
- Child 1 is age 4-5.
- Child 2 is age 9-11.
- Child 3 is age 13.
- Child 4 is age 14-18.

## A Typical Minnesota Family?

To set standards or to compare to other standardized wage data, it makes sense to ask which family composition would be most typical in Minnesota. Based on the American Community Survey (DP02, 5-Year Series, 2012) and the Current Employment Statistics (Total Private Sector, 2013), we find that a 3-person family, with 2 adults working a combined 60 hours per week (averaging 30 hours per worker) is the clear choice.

The average family size in Minnesota is 3.0 persons, the average household size is 2.5 persons. The majority of households—65 percent—are family households. Seventy-nine percent of family households have two parents, and the average weekly hours per worker is 33.7.

*Partnered, 1 full-time and 1 part-time worker, 1 child*, provides a standard yearly cost and hourly wage need for a typical family, regardless of how the weekly work hours are actually distributed between the two adults.

## Cost Calculations

For each family type for each county, we calculate monthly costs for these seven categories, then add the seven costs together for a monthly total, then multiply by 12 for a yearly total.

The hourly wage equals the yearly total divided as follows

- One full-time worker, 2,080 hours
- Two full-time workers, 4,160 hours
- One full-time and one part-time worker, 3,120 hours.

The county is the base level of measurement. For larger regions, such as Minnesota’s thirteen Economic Development Regions (EDR), or six Planning Regions (PR), or the state as a whole, we calculate a population-weighted average of all the counties that make up the region.

First we take the population of each county within the larger region as a percentage of the combined population of the larger region. Then each county’s population percentage becomes that county’s contribution percentage to each of the seven cost categories. If a county has 2 percent of the state’s population, then 2 percent of that county’s food cost for a selected family type goes into the statewide food cost for that same family type, and so on.

### **Where does the data come from?**

Data sources for the seven cost categories include

- Bureau of Labor Statistics, US Department of Labor
- Census Bureau, US Department of Commerce
- Center for Nutrition Policy and Promotion, US Department of Agriculture
- Agency for Healthcare Research and Quality, US Department of Health and Human Services
- US Department of Housing and Urban Development
- Internal Revenue Service, US Department of the Treasury
- Federal Highway Administration, US Department of Transportation
- Minnesota Department of Revenue
- Minnesota Office of the Revisor of Statutes
- Child Care Aware of Minnesota, Saint Paul, Minnesota
- Council for Community and Economic Research, Arlington, Virginia
- National Bureau of Economic Research, Cambridge, Massachusetts

## **Cost Categories – Detailed Methodologies**

### **Food**

#### **Method**

Food costs are based on the US Department of Agriculture’s “Food Plans: Cost of Food at Home”, which provides monthly estimates of the average cost of four different food plans. We use the Moderate-Cost plan. As recommended by the USDA, we select June to serve as a sample month for the year.

Although restaurant meals are common in family budgets and diets, we do not include this additional cost for two reasons. First, it would violate our no-frills criteria; and, second, the nutritional value of food prepared away from home is less per unit of cost than food prepared at home.

The USDA Cost of Food applies age ranges for both adults and children and also applies gender to all persons age 12 and up because at this age the food cost differs considerably by gender. For simplicity, we disregard the USDA age category of 71 plus because the monthly cost differs by only a few dollars from the USDA category of 51-70.

According to the USDA, the cost of food per person also differs by family size, due to variations in efficiencies of food preparation and usage. The USDA Cost of Food table shows per-person costs for a family of four, and it offers guidelines on adjusting these per-person costs for families of other sizes. For a family of one, increase the per-person cost by 20 percent. For a family of two increase by 10 percent, family of three increase by 5 percent, family of five to six, decrease by five percent.

### **Example**

User enters family of one female adult, age 19-50, one child age 3 and one male child age 12.

Food cost = [female(age19–50)\*1.05]+[child(age 2–3)\*1.05]+[male child(age 12–13)\*1.05]

Finally, we adjust the total food cost for each family by county, using the groceries factor from the Cost of Living Index by County published by the Council for Community and Economic Research (C2ER), which compares county costs to US costs for a range of goods and services. Although the Cost of Living Index by County is reported by its authors to represent a baskets of costs typical for earners in the top 25th percentile of income, we have chosen, in the absence of other data sources for county-level cost indexing, to apply it as a county-level adjustment to our USDA Low-Cost Food Plan data.

### **Example**

If user entry for a family in Aitkin County yields a monthly food cost of \$500 (resulting from USDA data and calculations as above) and if the COLI by County shows a groceries index of 98.6 for Aitkin County, then we multiply \$500 by 0.986, yielding a final monthly food cost of \$493.

### **Data sources**

See Food Plans: Cost of Food, from USDA Center for Nutrition Policy and Promotion, at <http://www.cnpp.usda.gov/USDAFoodCost-Home.htm>.

Council for Community and Economic Research for county-to-US COLI comparisons at <http://www.c2er.org/>.

## **Housing**

### **Method**

Housing costs are based on the US Department of Housing and Urban Development (HUD) Fair Market Rent Survey (FMR), the most widely accepted standard for the cost of basic needs housing in the US.

According to HUD, the FMR is the "amount that would be needed to rent privately owned, decent, safe, and sanitary rental housing of a modest (non-luxury) nature with suitable amenities." FMRs are figured at the 40th percentile of rent. This cost includes utilities but does not include telephone, cable, satellite, or internet service, which is placed in our Other Necessities category.

Budget estimates are adjusted for differences in family composition. HUD's Housing Choice Voucher Program Guidebook specifies that "The dwelling unit must have a least one bedroom or living/sleeping room for every two persons. Other than very young children, children of opposite sex, may not be required to occupy the same bedroom or living/sleeping room." We assume that for any two children of different genders, if at least one is age 13 or above, the two children must have separate bedrooms.

For one adult with no children, we add a share of the FMR county studio rate to a share of the one-bedroom rate. The share equals the percentage of total statewide studio-and-one-bedroom units which are studio units and, conversely, the share which are one-bedroom units, derived from the American Community Survey 5-Year Estimates, Table DP04 Selected Housing Characteristics.

### **Example – Aitkin County, Single individual**

ACS 5-Year Estimates for 2012 shows Minnesota has 38,943 studios and 275,116 one-bedroom units.

38,943 studios + 275,116 one-bedroom  
= 314,059 units suitable for a single individual

38,943 /314,059  
= 0.12 share of suitable units which are studios

275,116 /314,059  
= 0.88 share of suitable units which are one-bedroom

\$514 month studio \* 0.12  
= \$61.68 month studio share of cost

\$595 month one-bedroom \* .88  
= \$523.60 month one-bedroom share of cost

\$523.60 + \$61.68  
= \$585.28 month final cost

For two adults without children, we use the one-bedroom rate. For families with one to two children, we use the two- or three-bedroom rate, depending on the age and gender rules above, and so on.

To adjust for inflation, we compare the "Table 11 Consumer Price Index for All Urban Consumers (CPI-U): Regions, by Expenditure category and Commodity and Service Group," Midwest Region, Housing expenditure category index for December two calendar years prior to the February report to the index for June, one calendar year prior to the February report.

### **Data sources**

See HUD FMR Survey at <http://www.huduser.org/portal/datasets/fmr.html> and select Schedule B FMR Tables or select County Level Data File. From Fed Register preamble: “The FY 2014 FMRs are based on 5-year, 2007–2011 data collected by the American Community Survey (ACS). These data are updated by one-year recent-mover 2011 ACS data for areas where statistically valid one-year ACS data are available. The Consumer Price Index (CPI) rent and utility indexes are used to further update the data from 2011 to the end of 2012. HUD continues to use ACS data in different ways according to the statistical reliability of rent estimates for areas of different population sizes and counts of rental units.”

For HUD guidelines see Housing Choice Voucher Program Guidebook, chapter 10, page 6, at [http://portal.hud.gov/hudportal/HUD?src=/program\\_offices/public\\_indian\\_housing/programs/hcv/forms/guidebook](http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/programs/hcv/forms/guidebook).

For the statewide proportion of studio units to one-bedroom units, see American Community Survey 5-Year Estimates, Table DP04 - SELECTED HOUSING CHARACTERISTICS for Minnesota at <http://factfinder2.census.gov/>.)

For inflation adjustment, see Bureau of Labor Statistics, CPI Detailed Report (complete text and tables), "Table 11 Consumer Price Index for All Urban Consumers (CPI-U): Regions, by Expenditure category and Commodity and Service Group," Midwest Region, Housing expenditure category, at <http://www.bls.gov/cpi/tables.htm>. Compare Table 11 index for December two calendar years prior to the February report to the index for June one calendar year prior to the February report.

## Health Care

### Method

Health Care costs include insurance premiums and out-of-pocket costs. Because historical data is not yet available for the costs of Affordable Care Act plans administered through MNsure, the Cost of Living Study uses data on the costs of private-employer or union group insurance plans.

### Employee contributions to health insurance premiums

Our data for employee contributions are based on insurance from private-sector employers. Contributions data are from Table IX.A.2, “Average total premiums and employee contributions (in dollars) for private-sector establishments for areas within States” from the insurance component of the Medical Expenditure Panel Survey (MEPS), published by the Agency for Healthcare Research and Quality at the US Department of Health and Human Services.

We use the “single” employee contribution from MEPS Table IX.A.2 for one adult without children, “employee-plus-one contribution” for two adults without children or for one adult with one child, and “family contribution” for two adults with one or more children or for one adult with two or more children.

In MEPS IC Table IX.A.2, we apply data for “Minnesota, Minneapolis-St. Paul-Bloomington, MN portion” to counties which fall within that region and apply “Remainder of state” data to all other counties

Next we adjust the annual contribution to reflect average employee contribution amounts for workers in the second lowest quartile of wage earners. From the BLS Employee Benefits Survey, Table 13 Medical Care Benefits, Family Coverage, we browse the column “Employee contribution required: Average flat monthly employee contribution” and divide the amount in the row “Average wage: Second 25 percent” by the amount in the row “All workers” to find our Second Quartile Adjustment Factor. We multiply the selected MEPS IC Table IX.A.2 contribution by this factor.

For example, for a family of four in Aitkin County, from the MEPS IC Table IX.A.2 (2012), we apply the “Family contribution, Remainder of state” annual figure of \$3,213. If the BLS Employee Benefits Survey, Table 13 “Average wage: Second 25 percent” amount is \$446.41 and “All workers” is \$442.55, we calculate  $446.41 / 442.55 = 1.008$ .

We then apply the Second Quartile Adjustment Factor.

$$\$3,213 * 1.008 = \$3,238.70$$

The result is the annual employee contribution. Next we estimate out-of-pocket costs for employer-provided health insurance, to add these to the employee contribution.

### **Out-of-pocket costs**

Out-of-pocket costs for employer-provided health insurance are from the MEPS Household Component, Full-Year Consolidated File, published by the Agency for Healthcare Research and Quality at the US Department of Health and Human Services.

To estimate out-of-pocket costs, we query the MEPS Household Component, Full-Year Consolidated File by applying the following variables and values. (Note that the 2-digit ending of variable names refers to year-end data. In the current release the year is 2011. The digits will change with each new release.)

Variable PRIEU11, value 1 to capture persons covered by employer- or union-sponsored health insurance.

Variable REGION11, value 2 to capture Midwest figures.

Variable TOTSLF11 to capture annual out-of-pocket spending by self or family.

Variable MSA11, value 0 to capture rural non-MSA figures and then value 1 to capture MSA figures.

Variable AGE11X, value 0-18 to capture figures for children and then values 19-50 and 51 plus to capture figures for adults.

Sorting each of the above three age groups by the two MSA11 values of MSA and Non-MSA yields an annual out-of-pocket dollar cost for each of six user categories: Age 0-18 in MSA, age 0-18 in non-MSA, age 19-50 in MSA, age 19-50 in Non-MSA, age 51 plus in MSA, age 51 plus in Non-MSA.

We apply the population weight variable PERWT11F and then calculate the median of expenditures for each of the six user categories.

We then apply the appropriate out-of-pocket cost (from the six above) to each hypothetical Cost of Living family.

We then add the employee contribution and out-of-pocket costs for an annual total health care cost.

To adjust for inflation, we compare the "Table 11 Consumer Price Index for All Urban Consumers (CPI-U): Regions, by Expenditure category and Commodity and Service Group," Midwest Region, Medical Care expenditure category index for December three calendar years before the February report to the index for June one calendar year before the February report and apply the percentage change to the final health care cost.

Finally, we divide by 12 to get the total monthly health care cost for each Cost of Living family with employer-provided health insurance.

## Data sources

See U.S. Department of Health and Human Services (HHS). Medical Expenditure Panel Survey. MEPS HC-147: 2011 Full Year Consolidated Data File [microdata] at [http://meps.ahrq.gov/mepsweb/data\\_stats/download\\_data\\_files\\_detail.jsp?cboPufNumber=HC-147](http://meps.ahrq.gov/mepsweb/data_stats/download_data_files_detail.jsp?cboPufNumber=HC-147).

See U.S. Department of Health and Human Services (HHS). Medical Expenditure Panel Survey. "Table IX.A.2 (2011), Average Total Premiums and Employee Contributions (in Dollars) for Private-Sector Establishments for Areas Within States: United States, 2011" at [http://meps.ahrq.gov/mepsweb/data\\_stats/summ\\_tables/insr/state/series\\_9/2013/tixa2.pdf](http://meps.ahrq.gov/mepsweb/data_stats/summ_tables/insr/state/series_9/2013/tixa2.pdf).

See Bureau of Labor Statistics (BLS). Employee Benefits Survey. "Table 13. Medical Care Benefits, Family Coverage: Employer and Employee Premiums by Employee Contribution Requirement, Private Industry Workers, National Compensation Survey, March 2012" at <http://www.bls.gov/ncs/ebs/benefits/2012/ownership/private/table09a.htm>.

For inflation adjustment, see Bureau of Labor Statistics, CPI Detailed Report (complete text and tables), "Table 11 Consumer Price Index for All Urban Consumers (CPI-U): Regions, by Expenditure category and Commodity and Service Group," Midwest Region, Medical Care expenditure category, at <http://www.bls.gov/cpi/tables.htm>. Compare Table 11 index for December three calendar years before the February report to the index for June one calendar year before the February report.

For Minnesota MSA's and counties see <https://apps.deed.state.mn.us/assets/lmi/areamap/msa.shtml#metro>.

## Transportation

### Method

Transportation figures are derived from the basic costs of owning and operating a car. These basic costs include those for commuting to work, conducting necessary family and personal business, and getting to and from school and place of worship. Costs for social and recreational uses are not included. Public

transportation cost estimates are not used in our computations. According to the 2009 National Household Travel Survey, Table 9, 83.4 percent of annual person trips in the US are by private vehicle while only 1.9 percent are by public transportation. Even in large MSAs of 3 million or more persons (such as the Minneapolis-St Paul-Bloomington MSA), the share of trips by public transit is just 4 percent. The Cost of Living study does not assert whether a full-time worker should or should not use private or public transit but does assume that the cost of living for a full-time worker includes the ability to own and operate a car.

Our method captures considerable variation in miles traveled by county and by family composition and then applies a variable car operating cost per mile and fixed car ownership cost per year.

To derive a total annual basic needs transportation cost, we use three key sources of data. From the American Community Survey (ACS), US Census, we find the mean travel time to work by county. From the National Household Travel Survey (NHTS), Federal Highway Administration, we find national average annual travel day vehicle miles of travel (travel day VMT) by household, the number of households reporting, and the share of travel day VMT by trip purpose. We also find average commute speed by MSA size. From Your Driving Costs, American Automobile Association (AAA), we find the variable cost per mile of operating a car (including gas, maintenance, tires, and depreciation per mile) and the fixed annual cost of owning a car (including insurance, license and registration fees, taxes, and finance charges). Following the statutory mandate to calculate a “basic needs cost of living,” we use AAA’s average figures for small, medium, and large sedans, rather than the figures for a minivan or sports utility vehicle. The figures represent a car up to five years old.

To establish fixed car ownership costs for a basic needs cost of living, we assume each family has one car regardless of family size and adult work status. We are aware that, as of 2011, there were an average of 1.95 registered light-duty vehicles per household in the U.S. according to the 2013 study "Has Motorization in the U.S Peaked?" by Michael Sivak of the University of Michigan Transportation Research Institute. However, we allow the single car to stand as a proxy for any efficient arrangement a family might find to meet basic needs for transportation, including, for example, owning and operating two older cars rather than one newer car.

Although the ACS mean travel time to work in minutes represents all modes of travel, we defend its use as a proxy for private vehicle travel by citing the 2009 NHTS Table 27 General Commute patterns by Mode of Transportation, which shows that the average commute travel time in minutes for private vehicles closely tracks the figure for all modes of travel in surveys from 1977 through 2009.

We also assume that the county-level variation in mean travel time to work is representative of variation in travel time for all trip purposes. We assume that if homes and workplaces are relatively dispersed or concentrated, then other trip destinations will be similarly dispersed or concentrated.

Using the NHTS online tool, first we query by Vehicle Miles of Travel (Travel Day VMT, annualized), VMT by Household, and Number of Workers per Household to get results for one- and two-worker households of various sizes. Then we query by Number of Households, VMT by Household, and Number of Workers per Household to get the number of households reporting. Then we query Vehicle Miles of Travel (Travel Day VMT, annualized) and VMT by Household/Trip Purpose to get share of VMT by trip purpose. From these we chart the Raw Annual VMT per Household for households with 1 to 2 adults, one or both of whom are working, with 0 to 4 children.

We then make two adjustments to the raw VMT. First, we found that the Raw Annual VMT increased from 1-child families to 4-child households but did not progress linearly for the 2-child and 3-child steps between these. To create a linear progression through all steps, for each of the three adult scenarios (1 adult working, 2 adults with 1 working, 2 adults with 2 working), we take the difference between the 1-child and 4-child Raw Annual VMT, then divide the difference by 3. We then add 1/3 the difference to the 1-child raw VMT to get the 2-child adjusted VMT and add 2/3 the difference to the 1-child raw VMT to get the 3-child adjusted VMT. This creates a linear progression for each step within the bounds of the 1-child and 4-child Raw Annual VMT.

Next, to approximate a basic-needs transportation figure, we multiply the above adjusted VMT, in each household composition, by 0.814, which represents the share of VMT remaining after we exclude trip purposes categorized as Social/Recreational, Meals, and Other Reason (based on the 2009 NHTS). This yields our Final Adjusted Annual VMT.

When assessing the cost of transportation for a given family composition, we start with the Final Adjusted Annual VMT per Household matching that family composition.

Next we create a County VMT Scaling Factor by which we will multiply each adjusted VMT. To create the County VMT Scaling Factor we first create a travel time scaling factor thus, data:

County Mean Travel Time to Work in Minutes (from 5-year ACS)  
/ US National Average Mean Travel Time to Work in Minutes (from 5-year ACS)  
= Travel Time Scaling Factor

Then we create a travel speed scaling factor thus:

Average Commute Speed for Private Vehicles by MSA Size in miles per hour (from 2009 NHTS, Table 28)  
/ US National Average Commute Speed for Private Vehicles in miles per hour (from 2009 NHTS, Table 27)  
= Travel Speed Scaling Factor

The travel time factor responds to the fact that if travel speeds are equal, higher travel time will be associated with a longer distance, while the travel speed factor responds to the fact that if travel times are equal, higher speed will be associated with a longer distance.

Next we multiply the Travel Time Scaling Factor by the Travel Speed Scaling Factor to yield the County VMT Scaling Factor.

We then multiply the Final Adjusted Annual VMT by the County VMT Scaling Factor to get our Family Annual VMT.

We then apply the formula:

(Family annual VMT \* variable cost per mile) + fixed cost per year  
= annual transportation costs

We then divide the annual figure by 12, yielding the total monthly transportation cost.

## Data sources

See US Census American Fact Finder at <http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>.

For information on possible automation of ACS data feed see <http://www.census.gov/developers/>.

See Federal Highway Administration's National Household Travel Survey at <http://www.fhwa.dot.gov/policyinformation/nhts.cfm>.

See AAA Your Driving Costs at <http://publicaffairsresources.aaa.biz/wp-content/uploads/2014/05/Your-Driving-Costs-2013.pdf>.

For Minnesota MSA's and counties see <https://apps.deed.state.mn.us/assets/lmi/areamap/msa.shtml#metro>.

## Child Care

### Method

Child Care rates are provided by Child Care Aware Minnesota (CCA-MN). CCA-MN maintains an extensive, county-by-county database on child care providers drawn from a survey of all licensed child care centers and licensed in-home child care facilities in the state. Each report must specify the rates charged, whether full- or part-time, and the number as well as the ages of all clients served. From these reports, the CCA-MN then compiles average hourly childcare rates for each county, weighted by the proportional contribution of care center and in-home child care facilities to the total care delivered, for the following age ranges: Toddler age 1, Preschooler age 2-5, School-age 6-12. CCA-MN's database is updated annually, with updates typically available as of May each year.

In all two-parent families with one full-time (40 hours per week) worker, we assume that the non-working parent provides all child care services. If the second parent works part-time (20 hours per week), we assume the part-time worker provides child care services when not working. Home care by relatives is not included because it is not an option consistently available to working parents.

We do not use CCA-MN's weekly averages because those are based the care needs of a mix of part-time and full-time working parents. Our estimates are based on precise calculations of the child care needs of a second parent working 20 hours per week or a second parent working 40 hours per week. In both cases we include county-level travel time to and from work.

The Child Care Aware (CCA) age ranges are mapped to Cost of Living ages as follows: CCA 1-2 = 1, CCA 2-5 = 2-5, CCA 5 plus = 6-12. We do not use the infant category.

From the American Community Survey (ACS), US Census, we find the mean travel time to work by county. We multiply this by 2 for a round-trip commute and add it to the length of an 8-hour workday. We assume 230 workdays per year. We divide 2,080 hours per year by 8 hours per day to yield 260 days. We then subtract 30 days paid leave, which is the 2012 average for full-time employees with five-year tenure. (See Robert W. Van Giezen, "Paid leave in private industry over the past 20 years," Beyond the

Numbers: Pay & Benefits, vol. 2, no. 18, US Bureau of Labor Statistics, August 2013,  
<http://www.bls.gov/opub/btn/volume-2/paid-leave-in-private-industry-over-the-past-20-years.htm>.)

For school age children we assume 165 days in the school year and at least 935 hours per year for grades one through six, as required by Minnesota statutes. We divide 935 school hours by 165 school days to yield 5.66 school hours per school day. We assume that all school days fall on workdays—a conservative cost assumption since school days that fall on workdays reduce the hours of child care.

### **Calculation: Child age 1 or age 2-5, one or both parents working full-time**

8 hour day + (2 \* county mean travel time to work)  
= child care hours per workday

child care hours per workday \* 230 workdays  
= annual child care hours

annual child care hours \* child care hourly rate  
= annual child care cost

### **Example: Hennepin County, age 2-5, one or both parents working full-time**

8 hour day + (2 \* 22.6 county mean travel time to work in minutes)  
= 8.75 child care hours per workday

8.75 hours \* 230 workdays  
= 2,012.5 annual child care hours

2,012.5 annual child care hours \* \$7.35  
= \$14,791.88

\$14,792 / 12 = \$1,233 month

### **Calculation: Child age 1 or age 2-5, one parent working full-time and one part-time**

(8 hour day + (2 \* county mean travel time to work in minutes)) / 2  
= child care hours per workday

child care hours per workday \* 230 workdays  
= annual child care hours

annual child care hours \* child care hourly rate  
= annual child care cost

### **Calculation: Child age 6-12, one or both parents working full-time**

#### **Non-school workdays**

8 hour day + (2 \* county mean travel time to work in minutes)  
= child care hours per workday

230 workdays – 165 school days  
= 65 non-school workdays

child care hours per workday \* 65 non-school workdays  
= annual child care hours for non-school workdays

Annual child care hours for non-school workdays \* child care hourly rate  
= Annual child care cost for non-school workdays

### **School workdays**

935 school hours / 165 school days  
= 5.66 school hours per school day

8 hour day + (2 \* county mean travel time to work in minutes)  
= preliminary child care hours per workday

Child care hours per workday – 5.66 school hours  
= final child care hours per school day

Final child care hours per school day \* 165 school days  
= annual child care hours for school workdays

Annual child care hours for school workdays \* child care hourly rate  
= Annual child care cost for school workdays

### **Combined**

Annual child care cost for non-school workdays + annual child care cost for school workdays  
= Total annual child care cost for school age child

### **Example: Hennepin County, school age**

#### **Non-school workdays**

8 hour day + (2 \* 22.6 county mean travel time to work in minutes)  
= 8.75 child care hours per workday

230 workdays – 165 school days  
= 65 non-school workdays

8.75 child care hours per workday \* 65 non-school workdays  
= 568.75 annual child care hours for non-school workdays

568.75 annual child care hours for non-school workdays \* \$6.69 hourly rate

= \$3,804.94 annual child care cost for non-school workdays

### **School workdays**

8 hour day + (2 \* 22.6 county mean travel time to work in minutes)  
= 8.75 preliminary child care hours per workday

935 school hours / 165 school days  
= 5.66 school hours per school day

8.75 child care hours per workday – 5.66 school hours  
= 3.09 final child care hours per school day

Final child care hours per school day \* 165 school days  
= 509.85 annual child care hours for school workdays

509.85 annual child care hours for school workdays \* \$6.69 hourly rate  
= \$3,410.90 annual child care cost for school workdays

### **Combined**

\$3,804.94 annual child care cost for non-school workdays + \$3,410.90 annual child care cost for school workdays  
= \$7,215.84 total annual child care cost for school age child

\$7,216 / 12 = \$601 per month

### **Calculation: Child age 6-12, one parent working full-time and one part-time**

#### **Non-school workdays**

(8 hour day + (2 \* county mean travel time to work in minutes)) / 2  
= child care hours per workday

230 workdays – 165 school days  
= 65 non-school workdays

child care hours per workday \* 65 non-school workdays  
= annual child care hours for non-school workdays

Annual child care hours for non-school workdays \* child care hourly rate  
= Annual child care cost for non-school workdays

#### **School workdays**

935 school hours / 165 school days  
= 5.66 school hours per school day

$(8 \text{ hour day} + (2 * \text{county mean travel time to work in minutes})) / 2$   
= preliminary child care hours per workday

Child care hours per workday – 5.66 school hours  
= final child care hours per school day

Final child care hours per school day \* 165 school days  
= annual child care hours for school workdays

Annual child care hours for school workdays \* child care hourly rate  
= Annual child care cost for school workdays

### **Combined**

Annual child care cost for non-school workdays + annual child care cost for school workdays  
= Total annual child care cost for school age child

CCA-MN rate data generally will be current as of June one calendar year prior to the February report and so does not require adjustment for inflation.

### **Data sources**

Child Care Aware Minnesota has provided hourly rate data to the Labor market Information office for this study. For general information on child care costs in Minnesota, see <http://childcareawaremn.org/families/paying-for-child-care/child-care-costs-in-minnesota>.

For minimum days and hours of school, see 2013 Minnesota Statutes, Chapter 120A, Section 41, “Length of School Year; Hours of Instruction,” at <https://www.revisor.mn.gov/statutes/?id=120A.41>.

For inflation adjustment when necessary, see Bureau of Labor Statistics, CPI Detailed Report (complete text and tables), "Table 11 Consumer Price Index for All Urban Consumers (CPI-U): Regions, by Expenditure category and Commodity and Service Group," Midwest Region, All Items expenditure category, at <http://www.bls.gov/cpi/#tables>. Compare Table 11 index for May one calendar year prior to the February report to the index for June one calendar year prior to the February report.

### **Other Necessities**

#### **Method**

The cost of Other Necessities covers basic costs not covered by any of the other cost categories. These costs include apparel, personal care products and services, reading, education, and miscellaneous items.

We calculate these other costs as a proportion of food and housing costs, by the following method. Using the US Bureau of Labor Statistics’ Consumer Expenditure Survey (CES), Table 1101, “Quintiles of income before taxes: Annual expenditure means, shares, standard errors, and coefficient of variation”, we find the mean figure for food and for housing for the second lowest quintile of income. (We use only

the top-level “Food” category and “Housing” category, not the subcategories beneath these.) We then add together the mean for food and the mean for housing.

Second, we find the mean for the second lowest quintile for apparel and services, personal care products and services, reading, education, and miscellaneous products and services. Excluded are CES amounts for entertainment, tobacco products and smoking supplies, and alcoholic beverages. We then add together these “other necessities.” Then we divide the other necessities sum by the food and housing sum in order to find other necessities as a percentage of food and housing. As of the 2013 CES, showing 2012 data, other necessities was 16 percent of food and housing.

Finally we take the food category cost and housing category cost (see food methodology and housing methodology) for a given family composition in a given Minnesota county, add these together, and multiply the sum by the other necessities percentage (16 percent as of 2012 data) to yield the cost of other necessities.

## **Data sources**

See US BLS Consumer Expenditure Survey at <http://www.bls.gov/cex/tables.htm>.

## **Taxes**

### **Method**

The tax amount included in each family budget represents the net effect of taxes and tax credits. The taxes included are FICA payroll taxes (Social Security and Medicare) and federal and state income taxes. Property taxes are not included here because they are built into housing (rental) costs. State and local sales taxes are recognized as being passed on to the consumer in the cost of items already categorized.

Ordinarily one calculates tax liability by starting with the income to be taxed. The challenge in our case is to calculate an income sufficient to pay taxes and then pay for the remaining costs of living. To find our way to this target income, we will calculate, for each family, first a lower-bound income and tax rate and then an upper-bound income and tax rate. We will then calculate a weighted average of these two rates which will serve as our final tax rate. The family's lower bound income multiplied by (1 plus the tax rate) will yield an income sufficient to pay taxes and then pay for the remaining costs of living.

For the lower bound and upper bound, a simulated tax return is prepared for each family composition in each Minnesota county.

### **Lower bound income**

For each family, we calculate a lower bound income which is the sum of all other cost of living components (food, housing, transportation, child care, health care, other necessities). Assuming that each family will have some amount of tax liability even after exemptions and credits, this preliminary summed income will fall slightly short of needs because it excludes the amount necessary to pay the tax liability.

## Upper bound income

For each family, we then establish an upper bound income by multiplying the 1-worker family lower bound income by 1.15 and the 2-worker family lower bound income by 1.35.

## Simulated tax returns

Next we prepare simulated tax returns first for the lower bound set of incomes and then for the upper bound set of incomes and input them (first the lower bound set and then the upper bound set) into the National Bureau of Economic Research's Internet TAXSIM Version 9.2 with ATRA to calculate tax rates and liabilities.

For each run, we create a spreadsheet of 22 columns representing the 22 fields required by TAXSIM. Our data entry in each row of the spreadsheet simulates each family's tax return. Fields not used in our calculations must be given an entry of "0" in order for the TAXSIM software to run.

The 22 fields (columns in the spreadsheet) are:

1. Case ID (arbitrary, but must be a non-negative numeric)
2. Tax year (4 digits)
3. State (SOI code for Minnesota is 24)
4. Marital status (Enter 1. single, for a single adult without children; 2. joint, for two working adults, with or without children and with full-time or part-time second worker; or 3. head of household, for all 2-adult-1-worker families, with or without children. We do not use option 8. dependent taxpayer.)
5. Dependent exemptions (children under age 17)
6. Number of taxpayers over 65 years of age
7. Wage and salary income of taxpayer
8. Wage and salary income of spouse
9. Dividend income (Always enter zero)
10. Other property income (Always enter zero)
11. Taxable Pensions (Always enter zero)
12. Gross Social Security Benefits (Always enter zero)
13. Other non-taxable transfer income (Always enter zero)
14. Rent paid (used for calculating state property tax rebates)

15. Real estate taxes paid (Always enter zero)
16. Itemized deductions that are a preference for the Alternative Minimum Tax (Always enter zero)
17. Child care expenses
18. Unemployment compensation received (Always enter zero)
19. Number of dependents under age 17 (for child credit, not more than item 5)
20. Deductions not included in item 16 and not a preference for the AMT, including (on Schedule A for 2009) Deductible medical expenses in excess of 10% of AGI (only 1990+) (Always enter zero)
21. Short Term Capital Gains or losses (Always enter zero)
22. Long Term Capital Gains or losses (Always enter zero)

If the family has two working adults, divide the family annual income by 2 to yield the “income of taxpayer” and “income of spouse” in TAXSIM columns 7 and 8.

Once all fields are entered for all families, we then upload the spreadsheet in CSV file format to TAXSIM and select “calculate”.

For each tax record (each row of the spreadsheet), TAXSIM calculates the federal, state, and FICA tax liability. Because TAXSIM calculates FICA liability as the full 15.3 percent tax from both the employer and employee side, we cut this in half to more accurately represent the typical taxpayer.

### **Calculation of a total tax rate for each family**

The TAXSIM run of lower bound incomes provides a lower bound tax liability for each family, and the run of upper bound incomes provides an upper bound tax liability. Each family, at this step, has two tax records: an upper bound and a lower bound record.

For each tax record, we add the federal, state, and FICA liability together. The result is the total tax liability for that record.

Next we calculate the average of the upper and lower bound tax liability for each family. The average serves as the family's final tax liability and is the annual Net Taxes cost. We divide by 12 to yield a monthly Net Taxes cost.

We then add the annual Net Taxes cost (final tax liability) to the post-tax family income to yield the family's annual Cost of Living income. This completes the final step of the Cost of Living income calculation.

### **Data sources**

See NBER's online TAXSIM calculator at <http://users.nber.org/~taxsim/taxsim-calc9/index.html>.

See Renter's Property Tax Refund guidelines at [http://www.revenue.state.mn.us/individuals/prop\\_tax\\_refund/Pages/Renters\\_Property\\_Tax\\_Refund.aspx](http://www.revenue.state.mn.us/individuals/prop_tax_refund/Pages/Renters_Property_Tax_Refund.aspx).