

## Valuing the Invaluable: 2015 Update

# Detailed Methodology

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The recent report *Valuing the Invaluable: 2015 Update; Undeniable Progress, but Big Gaps Remain* estimates that there were 40 million family caregivers in 2013, providing a total of 37 billion care hours during the year (an average of 18 hours per caregiver per week), for a total economic value of \$470 billion (average hourly value of \$12.51).<sup>1</sup>

This document is divided into two sections with appendices and provides a technical description of the methodology used to estimate the number of family caregivers, total hours of care, and economic value of family caregiving at the national and state levels.

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### SECTION I: DATA SOURCES AND OVERVIEW OF METHODS

The *Valuing the Invaluable* estimates of the number of caregivers and care hours are based on a meta-analysis that synthesizes information from 11 nationally representative surveys of caregivers conducted between 2009 and 2014. Additional data sources were used to estimate the value in dollars of an hour of care.

Since the last *Valuing the Invaluable* update, for data year 2009,<sup>2</sup> a number of new surveys of caregivers were conducted that are appropriate for inclusion in the analysis. The 2015 update uses data from 11 sources, including the 2 sources used for the 2009 update. These sources are listed in table 1; they consist of 6 surveys, with multiple years of some surveys serving as separate sources.

All sources have information that can be used to estimate the prevalence of family caregiving nationally (that is, the proportion of the population who are caregivers), and about half have information about the

1 Reinhard, Feinberg, Choula, and Houser (2015).

2 Feinberg, Reinhard, Houser, and Choula (2011).

TABLE 1  
Sources of Data on Caregiver Prevalence and Hours

Survey	Years	Information Available*
American Time Use Survey (ATUS)	2011-2012	PH
Behavioral Risk Factor Surveillance Survey (BRFSS)	2009	PHS
Caregiving in the U.S. Survey (CG in US)	2009, 2014	PH
Gallup Healthways Well-Being Survey (Gallup)	2009, 2010, 2011, 2012	PS
National Study of Caregiving (NSOC)	2011	PH
Pew Research Center Health Tracking Survey (Pew)	2010, 2012	P

\* P = prevalence, H = hours, S = state-level prevalence estimates available.

number of hours of care provided (five sources) and/or sufficient sample size and design to enable state-level estimates of prevalence (five sources).

Each survey has a different definition of caregiving, defined by the survey universe, the question that identifies caregivers, and other characteristics of the survey. As has been the case for past *Valuing the Invaluable* reports, the meta-analysis adjusts the data from multiple sources to a common definition:

- caregiver age 18+;
- care recipient age 18+;
- providing assistance with activities of daily living (ADLs), such as bathing and dressing, or with instrumental activities of daily living (IADLs), such as shopping and getting to places away from home;
- providing care currently or within the past month; and
- year 2013.

For the first four elements of the common definition, adjustment factors were developed based on detailed data on the characteristics of caregivers, care recipients, and the care relationship in three sources (Behavioral Risk Factor Surveillance Survey [BRFSS] and both years of Caregiving in the U.S.) in order to convert the prevalence estimate from each source to the common definition. These adjustment factors are described in section II(b) below.

In order to adjust all estimates from the source data year to 2013, we assumed that the number of caregivers per person in a specific age group (that is, potential care recipients) remained constant over the period 2009 to 2014, when the 11 surveys were conducted. See section II(b) below for more details and derivation of data year adjustment factors.

Using detailed information on caregiving prevalence at the state level in five sources, as well as state-level estimates of the economic value per hour of care, the number of caregivers and care hours and the total economic value of family caregiving were estimated for each state. State-level estimates sum to national estimates.

## SECTION II: DETAILED CALCULATIONS

The analysis produces consistent state and national estimates of the number of family caregivers, total care hours, and economic value of caregiving.

The **number of caregivers** in each state can be expressed as:

$$NC_{state} = C * F_{state} * \sum_{ages} R_{age} * Pop_{state,age} \quad (1)$$

where

- $NC_{state}$  is the number of caregivers in each state;
- $C$  is a scale factor so that the number of caregivers nationally matches the weighted average of the 11 data sources (see section II(c) for more detail);
- $F_{state}$  is a state-specific scale factor to account for significant variation in the age-adjusted prevalence of caregiving across states;
- $R_{age}$  is an age-specific scale factor (based on the age group of the care recipient: the older the person, the more likely he or she is to be a care recipient); and
- $Pop_{state,age}$  is the state population in each age group.

The economic value of caregiving in each state in 2013 (52 weeks) was calculated by the following equation:

$$EV_{state} = H * 52 * NC_{state} * VPH_{state} \quad (2)$$

where

- $EV_{state}$  is the economic value of family caregiving in the state;
- $H$  is the number of hours per caregiver per week (data were not available to estimate the number of hours per week at the state level, so a single national estimate was used for all states); and
- $VPH_{state}$  is the economic value per hour in the state.

The national average value per hour  $VPH$  was calculated by dividing the national total economic value  $EV$  (computed by summing across all states) by the national number of caregivers  $NC$  and their average hours during the year ( $H * 52$ ):

$$VPH = \frac{EV}{H * 52 * NC} \quad (3)$$

The rest of this detailed methodology document explains

- the age- and state-specific scale factors  $R_{age}$  and  $F_{state}$ ;
- the adjustment factors to align each data source with the common definition;
- the estimate of the number of caregivers nationally and the scale factor  $C$ ;
- the national hours per week estimate  $H$ ; and
- the state-level value per hour estimates  $VPH_{state}$ ;

all of which are necessary for the *Valuing the Invaluable* state and national estimates.

**Section II(a): Age- and State-Specific Factors**

Age- and state-specific scale factors account for the differing likelihood of being a care recipient for different age groups (the older the person, the more likely he or she is to be a care recipient) and for variation in the age-adjusted prevalence of caregiving between states. These scale factors are assumed to be constant between 2009 and 2014, so the only time-varying quantity that affects the number of caregivers from year to year is the state population by age group ( $Pop_{state,age}$ ).

**Age-Specific Scale Factors ( $R_{age}$ )**

Two sources with detailed data on care recipient age in 2009 (BRFSS and Caregiving in the U.S. 2009) were used to estimate the distribution of primary caregivers by the age group of the care recipient, using five age groups: 18–44, 45–64, 65–74, 75–84, and 85+. The estimate was computed as the average of the two distributions (see table 2).

**TABLE 2**  
**Distribution of Caregivers by Age of Primary Care Recipient, 2009**

Data Source	Age of Primary Care Recipient				
	18–44	45–64	65–74	75–84	85+
BRFSS	11.8%	24.0%	17.5%	26.0%	20.8%
Caregiving in the U.S.	14.0%	17.6%	16.7%	26.6%	25.1%
<b>Average (percentage of caregivers, <math>CR\%_{age}</math>)</b>	12.9%	20.8%	17.1%	26.3%	22.9%

The estimated percentage of caregivers (from table 2) was then compared with the age distribution of the Census Bureau’s 2009 resident population estimates to calculate the relative prevalence of caregivers by age of primary care recipient (see table 3).

**TABLE 3**  
**Relative Prevalence of Caregivers by Age of Primary Care Recipient, 2009**

	Age of Primary Care Recipient				
	18–44	45–64	65–74	75–84	85+
Percentage of Caregivers ( $CR\%_{age}$ )	12.9%	20.8%	17.1%	26.3%	22.9%
Percentage of Adult Population ( $Pop\%_{age}$ )	48.5%	34.5%	9.1%	5.6%	2.3%
<b>Relative Prevalence of Caregivers by Recipient’s Age, Compared to Caregivers of Recipients Age 18–44 (<math>R_{age}</math>)</b>	1.00	2.27	7.04	17.7	37.4

To interpret the relative prevalence amounts in table 3, there are approximately 7 times as many caregivers of people 65–74 per person age 65–74 as there are caregivers of people 18–44 per person age 18–44.

Relative prevalence of caregivers by recipient’s age was calculated using age 18–44 recipients as the reference group. Specifically, it was calculated by:

$$R_{age} = \frac{\left(\frac{CR\%_{age}}{Pop\%_{age}}\right)}{\left(\frac{CR\%_{18-44}}{Pop\%_{18-44}}\right)} \quad (4)$$

**State-Specific Scale Factors ( $F_{state}$ )**

Five sources (BRFSS and all 4 years of the Gallup Healthways survey) were able to provide estimates of caregiving prevalence at the state level. State prevalence estimates differ from national prevalence estimates for two reasons:

1. State populations have different age distributions. All else being equal, a state with an older population, especially the 75–84 and 85+ age groups, will have a higher prevalence of caregivers (that is, a higher percentage of people in the state will be caregivers).
2. States may have different prevalences even after accounting for the difference in the age distribution of the population. It is beyond the scope of the *Valuing the Invaluable* reports to explain the reasons for this variation, but differences in age-specific disability rates (that is, the proportion of people of a specific age who have disabilities) appear to be a key driver.

Because the age distribution is explicitly taken into account in the *Valuing the Invaluable* calculations, the state-specific scale factors  $F_{state}$  are designed to reflect only the second reason for the variation in prevalence.

In addition to calculating the number of caregivers in each state from each of the five surveys, we estimated the number of caregivers that would be in the state if the survey’s *national* prevalence estimates were applied to the state population, using the age-specific scale factors  $R_{age}$  along with the survey data to account for state-to-state differences in the age distribution of the population.

For each data source, we call the ratio between the state estimate and the national estimate applied to the state population the state factor  $F_{state,source}$ . That is:

$$F_{state,source} = \frac{Prev_{state,source,18+} * Pop_{state,18+}}{Prev_{us,source,18+} * \sum_{ages} \left( \frac{R_{age} Pop_{us,18+}}{\sum_{ages} R_{age} Pop_{us,age}} * Pop_{state,age} \right)} \quad (5)$$

where

- $Prev_{state,source,18+}$  and  $Prev_{us,source,18+}$  are the state and national raw (that is, unadjusted) caregiving prevalence estimates for all adults 18 and older in the specific data source;
- $R_{age}$  is the age-specific scale factor from table 3; and
- $Pop_{state,age}$  is the U.S. Census Bureau resident population estimate for the specified age group in the year applicable to the specific data source.

The state factors were remarkably consistent among the BRFSS data and the 4 years of Gallup Healthways data. Correlations among the five sets of state estimates ranged from 0.75 to 0.94. It is, therefore, clear that these reflect true state differences and are not due to sampling error or chance.

TABLE 4  
**Table of State Factors  $F_{state}$**

State	State Factor	State	State Factor	State	State Factor
Alabama	1.23	Kentucky	1.17	North Dakota	0.63
Alaska	1.30	Louisiana	1.20	Ohio	0.95
Arizona	0.94	Maine	0.89	Oklahoma	1.09
Arkansas	1.17	Maryland	1.05	Oregon	0.89
California	0.99	Massachusetts	0.92	Pennsylvania	0.88
Colorado	0.98	Michigan	0.96	Rhode Island	0.88
Connecticut	0.91	Minnesota	0.83	South Carolina	1.16
Delaware	0.99	Mississippi	1.38	South Dakota	0.73
District of Columbia	1.02	Missouri	0.99	Tennessee	1.20
Florida	0.88	Montana	0.84	Texas	1.21
Georgia	1.23	Nebraska	0.80	Utah	1.24
Hawaii	0.78	Nevada	1.08	Vermont	0.84
Idaho	1.02	New Hampshire	0.96	Virginia	1.03
Illinois	0.97	New Jersey	0.95	Washington	0.97
Indiana	1.01	New Mexico	1.05	West Virginia	1.06
Iowa	0.72	New York	0.99	Wisconsin	0.75
Kansas	0.92	North Carolina	1.05	Wyoming	0.94

The state factor ( $F_{state}$ ) used in the state estimates is the weighted average of the state factors calculated from the five data sources (BRFSS with double weight and each year of Gallup with single weight). The values for the state factors can be found in table 4.

To interpret the state factors, the age-adjusted prevalence of caregivers in Alabama is approximately 23 percent higher than the national average—in other words, even if Alabama had the same age distribution as the nation, Alabama would have a 23 percent higher caregiver prevalence than the nation because of factors other than differences in age distribution.<sup>3</sup>

**Section II(b): Adjusting Sources to a Common Definition**

There are many ways that the definition of caregivers in a data source may differ from the common definition: *caregiver age 18+, care recipient age 18+, providing assistance with ADLs or IADLs, and providing*

3 This is only approximate because the national average of the state factors ( $F_{state}$ ), using 2013 population estimates, is not exactly equal to 1. The individual source state factors  $F_{state,source}$  each have a national average of 1, but averaging across multiple years of data to arrive at a single value means that this is not necessarily true for  $F_{state}$ . The resulting small difference in the national average is accounted for in the overall scale factor C.

*care currently or within the past month.* Four ways in which sources may differ follow directly from the definition:

1. caregiver age different than 18+;
2. care recipient age different than 18+;
3. no validation that caregiver provides ADL or IADL assistance; and
4. lookback period other than currently or past month.

It is possible, using the subset of sources with detailed data on the care relationship, to rigorously estimate adjustment factors for sources that differ from the common definition. These adjustment factors are described in detail later in this section.

In addition, there are other ways in which sources may differ from the common definition, including

5. how caregivers are identified (self-identify vs. identified by care recipients);
6. wording of the question that identifies caregivers (used to determine prevalence); and
7. survey mode (e.g., phone or Internet) and question placement.

We do not adjust for these differences because of a lack of detailed data to estimate an adjustment factor with any degree of confidence. There is some evidence that the effects of these differences are substantial. However, by combining all 11 sources in a meta-analysis, extreme differences among sources are attenuated. Some discussion of these unadjusted differences follows the explanation of the adjustment factors at the end of this section. The specific questions from the surveys that were used to determine prevalence are contained in appendix A.

#### ***Caregiver Population Adjustment (G)***

The common definition considers all adult caregivers (age 18+). One source, the American Time Use Survey (ATUS), provides estimates for caregivers age 15 and older.

If we assume that the number of caregivers age 15–17 is the same as the number age 18–20, then 3.9 percent of caregivers age 15+ are under the age of 18 (based on detailed data from BRFSS and both years of Caregiving in the U.S.). Using this assumption, an adjustment factor of 0.961 was applied to the ATUS prevalence and total hours to estimate these amounts for the 18+ caregiver population.

#### ***Care Recipient Population Adjustment (R)***

The common definition considers all caregivers of adults (age 18+). Some surveys consider care for only the older population, typically age 65+, or consider care for all ages, including care recipients younger than 18. Prevalence estimates for such sources must be adjusted up or down to match the common definition.

In BRFSS, 5.6 percent of care recipients were younger than 18 in the three states with detailed data. Therefore, a single adjustment factor of 0.944 was applied to all states to adjust the BRFSS estimates.

Two sources limited care recipients to age 65+:

- The National Study of Caregiving (NSOC) interviews caregivers who are identified by care recipients in response to a survey of people age 65+.
- The ATUS does not limit the care recipient age in an absolute manner; however, the caregiver question requires that care be for a condition related to aging and results in a significant undercount of caregivers with younger care recipients. Therefore, to minimize this nonresponse bias, the ATUS estimates used in this analysis are for caregivers of people age 65+ only.

Based on the two Caregiving in the U.S. surveys and BRFSS, an average of 66.1 percent of adult care recipients were age 65 or older. Therefore, an adjustment factor of 1.51 ( $1/0.661$ ) was applied to data from the NSOC and the ATUS.

The 1.51 factor is likely an underestimate for both sources. The NSOC relies on care recipients to identify the caregivers; care recipient surveys tend to significantly underestimate caregiving prevalence relative to caregiver surveys (see the discussion in the unadjusted differences section below). And the ATUS may exclude some caregivers of people older than 65 whose disabling condition is not aging-related.

Analysis of the two Caregiving in the U.S. surveys and BRFSS also found the average number of hours to be nearly the same between caregivers of people age 65+ and caregivers of people age 18–64. The same adjustment factor (1.51) was therefore applied in estimating both the number of caregivers and total care hours.

#### **Validation Adjustment (V)**

The common definition requires that caregivers provide ADL and/or IADL assistance to the care recipient. In Caregiving in the U.S., about 90 percent of individuals who responded affirmatively to the initial caregiving question were validated by reporting ADL and/or IADL assistance in the detailed interview about caregiving activities, 88.5 percent in 2009 and 92.8 percent in 2014.

In addition to the 2 years of Caregiving in the U.S. data, we consider the prevalence estimates in the ATUS (validated by time diary data) and NSOC (caregivers identified by care recipient as helping with ADLs and IADLs) to be similarly validated.

The other sources used for the *Valuing the Invaluable* estimates—BRFSS, Pew, Gallup Healthways—do not contain sufficient information about caregiving activities to validate in this way. An adjustment factor of 0.9065 (the average of the validated percentages in Caregiving in the U.S. across both data years) was applied to the caregiver prevalence and total care hours estimates for these sources in order to adjust to the common definition.

#### **Lookback Period Adjustment (L)**

The common definition requires that caregivers be currently providing care, or have provided care within the past month. Most caregivers do not provide care every day, so a “current caregiver” need not have provided care the previous day, or even within the past week. We consider “currently providing care” and “providing care within the past month” to be approximately equivalent. For sources with lookback periods greater than 1 month (typically 1 year), the prevalence estimates need to be adjusted downward to account for former caregivers who have provided care within the lookback period but are not currently doing so.

The two Caregiving in the U.S. surveys use a 1-year lookback period, but caregivers are also asked if they are currently providing care (68.2 percent in 2009 and 55.8 percent in 2014). The prevalence estimates reported in *Valuing the Invaluable* reflect only current caregivers.

Both Pew surveys also use a 1-year lookback period. An adjustment factor of 0.62 (the average of the current caregiver proportion from the two Caregiving in the U.S. surveys) was applied to the prevalence estimates from the Pew sources.

The ATUS uses a 3- to 4-month lookback period (depending on when in the month the respondent was surveyed). An adjustment factor of 0.79 ( $= 0.62^{0.5}$ ) was applied to adjust to the common definition. This intermediate value (0.79) reflects the fact that people may have been caregivers in the past year but not in the past 3–4 months. The intermediate factor was chosen so that the same proportion of caregivers are “lost” when the lookback period is shortened from 1 year to 3–4 months, as between 3–4 months to 1 month.

**Unadjusted Differences**

Caregivers self-identify in all but one of the sources used here. The exception is the NSOC. Surveys of care recipients tend to result in significantly smaller estimates of the number of caregivers. Giovannetti and Wolff (2010) found on average a fivefold difference in the estimated number of caregivers. Rigorous adjustment for varying data years and definitions may attenuate this difference, but it is likely that the NSOC, relying on care recipients age 65 and older to identify caregivers, underestimates the number of caregivers of people age 65 and older to an unknown degree.

The caregiving prevalence question for each survey is included in appendix A. The Caregiving in the U.S. and Pew surveys used nearly identical questions for identifying caregivers, while the other four surveys used widely varying questions. Because no source used multiple question wordings, it is not possible to adjust for this factor.

There appears to be significant sensitivity to mode/placement effects. There were two places where these could be observed. The first is Caregiving in the U.S., which used a landline telephone survey in 2009 and a recruited online panel in 2014. The prevalence estimate was much lower in 2014, and it is clear that the majority of the difference is due to lower-intensity caregivers not identifying as caregivers in the online panel (the prevalence of high-intensity caregiving, greater than 20 hours per week, is nearly unchanged from the 2009 survey).

The second is BRFSS. In addition to the caregiving question in the 2009 base, there is an optional caregiving module that is used by a handful of states each year, and that has the same prevalence question that was asked in the base in 2009. The only difference is the placement of the question within the survey (middle of the base survey vs. supplemental module after the base survey). In 2010, the public-use BRFSS data included module responses for two states (Connecticut and New Hampshire), in which the prevalence observed was much lower than in the 2009 (16 percent and 20 percent, respectively, compared with 24 percent for both states in 2009). The Gallup Healthways Well-Being Survey, which provides state estimates in both 2009 and 2010 with a consistent survey instrument, showed no drop-off in either state.

**Adjusting to Year 2013**

To calculate the data year adjustment factor, we created a “baseline” from the 2009 BRFSS survey data and the age- and state-specific factors  $R_{age}$  and  $F_{state}$ . As we use only the national prevalence estimate from this survey in the baseline equation, the choice of BRFSS is arbitrary. Any other data source or an assumed total number of caregivers would yield the same data year adjustment factors in table 5.

**TABLE 5**  
**Baseline Prevalence Estimates and Data Year Scale Factors**

Data Year	Baseline # of Caregivers	Percentage of 2009	Scale Factor to Convert to 2013
2009	56,064,009	100.0%	1.080
2010	57,076,956	101.8%	1.061
2011	58,072,756	103.6%	1.043
2011-12 (combined)	58,703,772	104.7%	1.032
2012	59,334,788	105.8%	1.021
2013	60,559,607	108.0%	1.000
2014	61,781,711	110.2%	0.980

For 2009, the baseline number of caregivers in each state and primary care recipient age group is given by:

$$BaseNC_{state,age,2009} = NC_{brfss,2009} * F_{state} * \frac{R_{age} * Pop_{state,age,2009}}{\sum_{ages}(R_{age} * Pop_{state,age,2009})} \quad (6)$$

where

- $BaseNC_{state,age,2009}$  is the baseline estimate;
- $NC_{brfss,2009}$  is the BRFSS 2009 national estimate of the number of caregivers (unadjusted);
- $R_{age}$  is the age-specific scale factor from table 3;
- $F_{state}$  is the state-specific scale factor from table 4; and
- $Pop_{state,age,2009}$  is the U.S. Census Bureau resident population estimate.

For subsequent years 2010–2014, the baseline number of caregivers in each state and age group is given by:

$$BaseNC_{state,age,year} = NC_{brfss,2009} * F_{state} * \frac{R_{age} * Pop_{state,age,year}}{\sum_{ages}(R_{age} * Pop_{state,age,2009})} \quad (7)$$

This equation is the same as for the 2009 baseline except for the state population by age group estimates in the numerator. National baseline estimates for 2010–2014 were computed by summing across all states and age groups.

The national baseline estimates, as well as “data year” scale factors to convert a given data year to 2013, are given in table 5. The interpretation of these scale values is that the number of caregivers in 2013 would be 8 percent higher than in 2009, for example, if age- and state-specific prevalence of caregiving remained the same in 2013 as in 2009.

### Section II(c): Number of Caregivers

Table 6 shows the unadjusted number of caregivers from each source, the adjustments made to align with the common definition, and the adjusted number of caregivers for both the original data year(s) and 2013.

The process of aligning with the common definition dramatically reduces the variation between sources. Whereas unadjusted estimates range from 9 to 85 million family caregivers, the adjusted estimates range from 22 to 52 million, with more than half in the narrow range between 36 and 40 million.

For use in the *Valuing the Invaluable* state and national estimates, a weighted average of the 11 sources (adjusted to 2013) was computed as follows: BRFSS (4x weight); Caregiving in the U.S. (2x weight each year); and Gallup Healthways Well-Being Survey, Pew Research Center Health Tracking Survey, American Time Use Survey, and National Study of Caregiving (1x weight each year).

This set of weights means that one-half of the final estimate is based on large population-based surveys with enough sample size to produce state-level estimates (BRFSS and Gallup), one-half of the estimate is based on surveys that closely or exactly match the common definition and have detailed data about the care relationship (BRFSS and Caregiving in the U.S.), and no single source or series contributes more than one-fourth of the estimate (BRFSS, Caregiving in the U.S., and Gallup each contribute exactly one-fourth).

The constant C in the *Valuing the Invaluable* state estimates (equation 1) was selected so that the total number of caregivers nationally (NC) would be equal to the weighted average of 40 million caregivers.

TABLE 6

**National Prevalence Estimates, All Sources: Unadjusted and Adjusted**

Source	Year	Unadjusted # of Caregivers (millions)*	Adjustments Required**	Adjusted # of Caregivers for Data Year (millions)	Adjusted # of Caregivers for 2013 (millions)
ATUS	2011-12	9.1	G, R1, L1	45.3	46.7
BRFSS	2009	56.1	R2, V	48.0	51.9
CG in US	2009	53.5	L2	36.5	39.4
CG in US	2014	39.8	L3	22.2	21.7
Gallup	2009	38.0	V	34.4	37.2
Gallup	2010	37.6	V	34.1	36.1
Gallup	2011	42.1	V	38.2	39.8
Gallup	2012	42.5	V	38.5	39.3
NSOC	2011	17.9	R1	27.2	28.3
Pew	2010	62.1	V, L4	34.9	37.0
Pew	2012	84.6	V, L4	47.6	48.5
<b>Weighted Average, Adjusted to 2013</b>					<b>40</b>

\* Note that these may not exactly match source reports, due to the use of Census Bureau civilian non-institutional population estimates for this table, which may not have been available at the time of the original data analyses.

\*\* G = caregiver population adjustment age 15+ to age 18+ (0.961); R1 = care recipient population adjustment age 65+ to 18+ (1.51); R2 = care recipient population adjustment all ages to 18+ (0.944); V = Validation adjustment (0.9065); L = lookback period adjustment: L1 (0.79), L2 (0.682), L3 (0.558), L4 (0.62).

With the age and state factors  $R_{age}$  and  $F_{state}$  defined as above, a value of  $C = 0.0425$  is required in equation 1.

**Section II(d): Hours of Care**

There are two common ways that surveys ask about care hours. Some ask the caregiver to estimate the number of hours of care providing per week; others use a two-step process, first asking the number of days of care in the past month or week, and then the number of hours per day. Within each type, the question wording and allowed responses may vary between surveys, and it is not possible to accurately estimate conversion factors because of the lack of any source that uses multiple methods.

Among sources that contain information on the hours of care, there appears to be an inverse relationship between number of caregivers (relative to baseline) and number of hours per caregiver. Because of this apparent relationship, for sources that did not have an hours question (specifically, all years of the Gallup and Pew surveys), the number of hours per caregiver per week was taken from the BRFSS or Caregiving in the U.S. source, which provided the most similar adjusted number of caregivers.

TABLE 7

**National Hours of Care Estimates, per Week and Adjusted Total per Year**

Source	Year	Adjusted # of Caregivers for 2013 (millions)	Hours per Caregiver per Week	Adjusted # of Care Hours for 2013 (billions)
ATUS	2011–12	46.7	6.6*	15.5
BRFSS	2009	51.9	17.9	47.3
CG in US	2009	39.4	18.9	35.9
CG in US	2014	21.7	24.5	28.2
Gallup	2009	37.2	18.9**	33.8
Gallup	2010	36.1	18.9**	33.5
Gallup	2011	39.8	18.9**	37.5
Gallup	2012	39.3	18.9**	37.8
NSOC	2011	28.3	17.3	24.4
Pew	2010	37.0	18.9**	34.3
Pew	2012	48.5	17.9**	44.2
<b>Weighted Average, Adjusted to 2013</b>				<b>37</b>

\* Based on 3.22 hours per day providing care, with 23 percent of caregivers providing care on a given day.

\*\* Survey did not ask about number of care hours. For the Gallup and the Pew 2010 sources, the amount from Caregiving in the U.S. 2009 was used because that source was the closest match for caregiving prevalence. Similarly, for Pew 2012, the amount from BRFSS was used because that source was the closest match for caregiving prevalence.

The American Time Use Survey uses a full-day time diary to record actual hours spent caring on a given day; the resulting hours per week estimate is far lower than the multiple sources that ask caregivers to recall hours in the past week or month.

Table 7 shows the hours per week estimates for each source, as well as the adjusted number of caregivers (from table 6) and the total number of care hours per year (a simple calculation from the number of caregivers and hours per caregiver per week).

We calculate a weighted average of the total number of care hours (adjusted for caregiving definition and data year) using the same weights as used to estimate the total number of caregivers above.

Dividing the total number of care hours by the total number of caregivers from table 6 yields an average of 930 hours per caregiver per year, or about 18 hours per week. This is used as the factor H in the *Valuing the Invaluable* state and national estimates (equations 2 and 3).

### Section II(e): Economic Value per Hour

In previous *Valuing the Invaluable* reports, the economic value per hour at the state level was a weighted average of the state minimum wage, state home health aide median wage, and state median hourly cost of hiring a home care worker, with the first two values being given 2x weight and the last value—the highest—being given 1x weight. In 2009, using this methodology, the national average value per hour was \$11.16.

Recent studies have found that caregivers are providing assistance with medical/nursing tasks at a rate far higher than previously assumed,<sup>4</sup> and this care, when provided by a paid worker, is compensated at a higher rate than personal care and homemaker services. For this reason, we have defined the economic value per hour in this report as the *unweighted* average of the state minimum wage, state home health aide median wage, and state median hourly cost of hiring a home care worker (see appendix B for sources).

This results in slightly higher estimates of the hourly economic value than in previous *Valuing the Invaluable* reports; we believe that the higher values in this report are appropriate. The hourly values assumed or calculated in three other independent economic value estimates since 2009 were all substantially higher than the \$11.16 figure in the last *Valuing the Invaluable* report, ranging from \$12.68 to \$21 per hour (both high and low values were also for year 2009).<sup>5</sup>

Table 8 contains state estimates of the economic value per hour for 2013. They range from \$10.53 in Louisiana to \$15.05 in Alaska. The national average value per hour (equation 3) is \$12.51.

TABLE 8  
Estimated Economic Value per Hour, by State, 2013

State	Value per Hour	State	Value per Hour	State	Value per Hour
Alabama	\$10.89	Kentucky	\$11.57	North Dakota	\$14.88
Alaska	\$15.05	Louisiana	\$10.53	Ohio	\$11.95
Arizona	\$12.60	Maine	\$13.41	Oklahoma	\$12.45
Arkansas	\$11.20	Maryland	\$13.09	Oregon	\$13.06
California	\$13.94	Massachusetts	\$14.75	Pennsylvania	\$12.47
Colorado	\$13.68	Michigan	\$12.21	Rhode Island	\$14.26
Connecticut	\$13.87	Minnesota	\$14.45	South Carolina	\$11.49
Delaware	\$13.86	Mississippi	\$11.53	South Dakota	\$13.12
District of Columbia	\$12.44	Missouri	\$11.52	Tennessee	\$11.24
Florida	\$11.93	Montana	\$12.97	Texas	\$11.39
Georgia	\$11.29	Nebraska	\$13.81	Utah	\$13.26
Hawaii	\$14.59	Nevada	\$13.19	Vermont	\$14.55
Idaho	\$12.06	New Hampshire	\$14.42	Virginia	\$12.36
Illinois	\$12.77	New Jersey	\$13.07	Washington	\$13.83
Indiana	\$12.17	New Mexico	\$12.19	West Virginia	\$10.62
Iowa	\$13.08	New York	\$13.02	Wisconsin	\$13.15
Kansas	\$12.01	North Carolina	\$11.27	Wyoming	\$13.27

4 Reinhard, Levine, and Samis (2012).

5 Chari, Engberg, Ray, and Mehrotra (2014); Congressional Budget Office (2013); Keckley and Freeman (2011).

## APPENDIX A: CAREGIVING PREVALENCE QUESTION WORDING

Each of the six data sources used a different question to identify caregivers (and in one survey, caregivers did not self-identify but were identified by the care recipient for follow-up). There was a very slight change in the question wording for Caregiving in the U.S. between 2009 and 2014, and more significantly, the survey mode changed from a landline phone survey to a recruited online panel. The Pew Research Center Health Tracking Survey question was almost identical to the Caregiving in the U.S. question, by design.

Below are the wordings of the prevalence question in each of the source surveys.

### **American Time Use Survey (2011–2012)**

The next set of questions are about times you may have recently spent assisting or caring for an adult who needed help because of a condition related to aging. For example, as people grow older, it sometimes becomes difficult for them to perform various activities without help—such as grooming, driving, managing the household, taking medication, or other common activities. Care may be provided in your home, their home, or at a care facility.

Not including financial assistance or help you provided as part of your paid job, since the 1st of [reference month three months prior to interview date], have you provided any care or assistance for an adult who needed help because of a condition related to aging?

### **Behavioral Risk Factor Surveillance System (2009)**

People may provide regular care or assistance to a friend or family member who has a health problem, long-term illness, or disability.

During the past month, did you provide any such care or assistance to a friend or family member?

### **Caregiving in the U.S. (2009)**

In the last 12 months, has anyone in your household provided unpaid care to a relative or friend 18 years or older to help them take care of themselves? Unpaid care may include help with personal needs or household chores. It might be managing a person's finances, arranging for outside services, or visiting regularly to see how they are doing. This person need not live with you.

### **Caregiving in the U.S. (2014)**

At any time in the last 12 months, has anyone in your household provided unpaid care to a relative or friend 18 years or older to help them take care of themselves? This may include helping with personal needs or household chores. It might be managing a person's finances, arranging for outside services, or visiting regularly to see how they are doing. This adult need not live with you.

### **Gallup Healthways Well-Being Survey (2009, 2010, 2011, and 2012)**

Do you currently help care for an elderly or disabled family member, relative, or friend, or not?

### **National Study of Caregiving (2011)**

Caregivers are identified by care recipients in the National Health and Aging Trends survey:

In the last month, did anyone ever help you eat, for instance, by cutting up food or feeding you?

In the last month, did anyone ever help you shower?

... and so on, individually, for many ADLs and IADLs.

Persons so identified, and not being paid for providing care, are eligible to be included in the National Study of Caregiving.

### **Pew Research Center Health Tracking Survey (2010 and 2012)**

In the past 12 months, have you provided unpaid care to an adult relative or friend 18 years or older to help them take care of themselves? Unpaid care may include help with personal needs or household chores. It might be managing a person's finances, arranging for outside services, or visiting regularly to see how they are doing. This person need not live with you.

## APPENDIX B: REFERENCES AND FULL CITATIONS FOR SOURCES

## Data Sources for Estimates of the Number of Caregivers and Care Hours

Source	Citation
<b>American Time Use Survey</b>	Bureau of Labor Statistics. (2013). <i>Unpaid ElderCare in the United States 2011-2012 Summary</i> . <a href="http://www.bls.gov/news.release/elcare.nr0.htm">http://www.bls.gov/news.release/elcare.nr0.htm</a> .
<b>Behavioral Risk Factor Surveillance System</b>	AARP Public Policy Institute (2015). Unpublished analysis of 2009 BRFSS survey data. Data available at <a href="http://www.cdc.gov/brfss/annual_data/annual_2009.htm">http://www.cdc.gov/brfss/annual_data/annual_2009.htm</a> .
<b>Caregiving in the U.S.</b>	AARP Public Policy Institute (2015). Unpublished analysis of <i>Caregiving in the U.S.</i> survey data. 2009 report available at <a href="http://www.aarp.org/relationships/caregiving/info-12-2009/caregiving_09.html">http://www.aarp.org/relationships/caregiving/info-12-2009/caregiving_09.html</a> ; 2015 report (2014 data) available at <a href="http://www.aarp.org/caregivingintheus">http://www.aarp.org/caregivingintheus</a> .
<b>Gallup Healthways Well-Being Survey</b>	MIT AgeLab. (2015). Unpublished analysis of the 2009-2012 Gallup Healthways Well-Being Survey data.
<b>National Study of Caregiving</b>	B.C. Spillman, J. Wolff, V.A. Freedman, & J.D. Kasper. (2014). <i>Informal Caregiving for Older Americans: An Analysis of the 2011 National Study of Caregiving</i> . Washington, DC: Assistant Secretary for Planning and Evaluation, Department of Health and Human Services. <a href="http://aspe.hhs.gov/daltcp/reports/2014/NHATS-IC.cfm">http://aspe.hhs.gov/daltcp/reports/2014/NHATS-IC.cfm</a> .
<b>Pew Research Center Health Tracking Survey</b>	S. Fox & J. Brenner. (2012). <i>Family Caregivers Online</i> , <a href="http://www.pewinternet.org/2012/07/12/family-caregivers-online/">http://www.pewinternet.org/2012/07/12/family-caregivers-online/</a> ; S. Fox, M. Duggan, & K. Purcell. (2013). <i>Family Caregivers Are Wired for Health</i> , <a href="http://www.pewinternet.org/2013/06/20/family-caregivers-are-wired-for-health/">http://www.pewinternet.org/2013/06/20/family-caregivers-are-wired-for-health/</a> .

All online sources were accessed March 2015.

## Data Sources for Estimates of the Economic Value per Hour

Source	Citation
<b>State Minimum Wage</b>	Department of Labor, Wage and Hour Division. Changes in Basic Minimum Wages in Non-farm Employment under State Law: Selected Years 1968 to 2013, <a href="http://www.dol.gov/whd/state/stateMinWageHis.htm">http://www.dol.gov/whd/state/stateMinWageHis.htm</a> .
<b>Home Health Aide Median Wage</b>	Bureau of Labor Statistics. Occupational Employment Statistics, May 2013 Data, occupation code 31-1011 Home Health Aides, <a href="http://www.bls.gov/oes/tables.htm">http://www.bls.gov/oes/tables.htm</a> .
<b>Home Care Worker Cost</b>	Genworth Financial. (2013). Genworth 2013 Cost of Care Survey.

All online sources were accessed March 2015.

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