# How Much Accumulated Savings Will I Need To
# Replace My Pre-Retirement Standard of Living?

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While the primary focus of this website is to help retired individuals develop a spending strategy for their self-managed assets,  the simple "Excluding Social Security" spreadsheet provided above can also be useful in helping those who have yet to retire develop a savings strategy to accumulate sufficient assets to adequately replace their pre-retirement standard of living both at and after retirement.

To determine how much accumulated savings (self-managed assets) you will need (in addition to Social Security and other annuity income) to generate sufficient retirement income to replace your pre-retirement income when you chose to retire, you need to perform these three steps:

1.  Determine Needed Annual Spendable Income (for first year of retirement)

    Needed Annual Spendable Income = (Desired Replacement Rate X Estimated Final Year's annual Pay) minus Estimated Social Security.

2.  Using, the "Excluding Social Security" spreadsheet on this website, find the "Accumulated Savings" that will generate the annual spendable income amount determined in Step 1.  This accumulated savings figure is sometimes referred to as your "Retirement Number."

3.  Determine how much of your pay you must save each year in order to reach the Retirement Number obtained in Step 2.

Now a brief discussion of these terms followed by a few examples.

**Desired Replacement Rate**

Your desired replacement rate is the percentage of your gross pre-retirement pay that you would like to replace in retirement from sources such as Social Security, life annuity income and income from self-managed assets.  There is no general consensus as to what this percentage should be, and it will vary from person to person because of many factors.  For example, the 2008 Replacement Ratio Study jointly released by Georgia State University and Aon Consulting indicated that replacement ratios varied from 94% by those earning $20,000 just prior to retirement to 78% for those earning $90,000 just prior to retirement.  Others argue that the replacement ratios from this study are too high.  Rather than accept estimates from researchers, you can develop your own estimate by examining how you consume your current paycheck.  For example, how much of your pay is used for taxes, savings, work-related expenses, housing, food, travel and entertainment, medical-related expenses, etc?  Some of these items might be expected to remain about the same after retirement, but some like Social Security taxes, work-related expenses and savings will probably be less.   On the other hand, some items might increase after retirement, such as medical-related expenses, travel and leisure expenses.  Note that federal and state income taxes after retirement may vary significantly depending on whether your self-managed assets

reside in a 401(k) account or in a Roth account.  For the first two examples below, we will assume the desired replacement rate is 80%.

**Estimated Social Security**

How much will you receive from Social Security per year when you plan to retire?  Once again, this may depend on many factors, including the age at which you plan to retire and commence benefits under the Social Security program, your marital status, your average wages, etc.  For purposes of solving for needed spendable income in Step 1 above, the term "Social Security" will also include any other estimated annual income expected to commence at retirement that is indexed to inflation.  Probably the best way to estimate this amount is to take the estimate that you get from Social Security (payable at full Social Security normal retirement age) and increase it by your assumption for future inflation (discussed more below).  You will also need to adjust this amount if you are planning to commence benefits before or after your full Social Security normal retirement age.  Also, since the Social Security program is currently looking at future deficits, it may be prudent to assume future Social Security benefit reductions if you are currently under age 55 or so.

**Estimated Final Year's Pay**

This is your estimate of what your gross pay will be in the year prior to your retirement.  For planning purposes, it is probably prudent to assume that your current pay will increase by at least inflation each year in the future.  In the examples below, we will assume 3% per year annual inflation.  So, if you are currently age 50 and plan to retire at age 65, your estimated pay at age 64 should be about 56% higher than your pay for last year (1.03 to the fifteenth power, or 1.03**15 equals 1.5580).

**Examples**

Example 1.  Assume Mary is currently age 50, her gross pay last year was $50,000; she is single and wants to retire at age 65.  She has $100,000 in her 401(k) account, and Social Security has given her a benefit estimate of $20,000 per year assuming she commences her benefit at age 67 and continues to work at her current earnings.  Age 67 is her full Social Security normal retirement age.  She assumes that her compensation and Social Security benefit will increase each year with 3% inflation.  She also assumes that before retirement, her self-managed assets will earn a 3% real rate of return, or about 6% per annum.  Her employer does not sponsor a defined benefit plan and she does not plan to purchase any annuity income at any time.  After retirement, she does plan to invest her assets more conservatively, so she assumes a 5% investment return and 3% inflation (2% real rate of return) for years after she reaches age 65.  Mary went to the Society of Actuaries longevity estimation website (the link for which is provided in this site) and discovered that there is between a 70% and 80% probability that she will live to age 92, so for planning purposes, she assumes her death will occur at age 92 (27 years from age 65).

Step 1—Determine Needed Spendable Income at Retirement.

Her needed spendable income for the first year of her retirement is equal to $35,304.  This amount is determined as follows:

$50,000(her annual pay for last year) X 1.558 (inflation factor) X 0.80 (desired replacement rate factor)

 minus

20,000(current Social Security estimate payable at full Social Security Normal Retirement Age) X 1.558(inflation factor) X .867(early commencement penalty for commencement age 65).

Step 2—Determine Total Accumulated Savings Required.

Mary goes to the "Excluding Social Security" spreadsheet in this website and enters 5% for (postretirement) investment return, 3% for inflation (annual desired increases in payments), 27 years for life expectancy, $0 for life annuity amount and $0 for amount to be left to heirs (desired amount of savings at death).  She then inputs various amounts for accumulated savings until the first result for spendable amount is about $35,304.  The accumulated savings necessary to produce this amount is about $751,000.  This amount is Mary's "Retirement Number" in this example.  Note that Mary's Retirement Number under these assumptions is about 9.6 times Mary's final years' estimated pay of $77,900 ($50,000 X inflation factor of 1.558).  Also, note that this amount is expected to provide spendable income designed to increase each year after Mary's retirement by 3% per year, Mary's estimate of post-retirement inflation.

Step 3—Determine Annual Savings Rate to Accumulate Savings Required

There is a little more math involved in this step.   Mary must first reduce the result of Step 2 by the expected accumulation at age 65 of her current accumulated assets.  Mary currently has assets of $100,000 in her 401(k) account.  From age 50 to age 65, she expects those assets to grow with 6% interest per year to $239,656 [100,000 X (1.06 to the 15$^{th}$ power) = $239,656].  So, this leaves $511,344 ($751,000 minus $239,656) to be provided from future savings.  If contributions are made at the end of each year and the rate of salary increases and investment returns remain constant in the future, the formula for the accumulation of future contributions is:

$[(1 + i)**n-1$ minus $((1 + si)**n/(1 + i))]$ divided by $[ 1$ minus $((1 +si)/(1 + i))]$, where "si" is the annual expected increase in salary, "i" is the annual investment return and "n" is the number of years of contributions.

For a 6% investment return, 3% per year annual salary increases and a period of 15 years (with savings assumed to be paid at the end of each year), the formula above will produce an accumulation factor of about 27.95.  Dividing this factor into the total future savings needed of $511,344 produces a result of $18,295 (511,344/27.95 = $18,295).  This amount represents about 35.5% of Mary's expected pay for the current year of $51,500 ($50,000 X 1.03), and if Mary's pay increases by 3% per year each year in the future and she achieves a 6% investment return in her 401(k) account, her annual savings contribution will continue to be 35.5% of her pay each year until she retires.  Note that some of this 35.5% can be in

the form of employer contributions or matching employer contributions if Mary's employer provides such contributions.

Example 2. Instead of assuming that Mary will have no life annuity income, let's assume that Mary's employer sponsors a defined benefit plan and her projected annual benefit from that plan payable at age 65 is $15,000 per year. If all the assumptions are the same as in Example 1, except Mary inputs $15,000 per year for the life annuity amount in the spreadsheet, this will reduce the accumulated savings necessary to achieve an annual spendable amount of $35,304 from $751,000 in Example 1 to about $520,000, and the necessary future accumulated contributions from $511,344 to $280,344 $511,344 minus $239,656). To accumulate this amount, Mary (and/or Mary's employer) would have to contribute a total of about 19.5% of each year's pay ($280,344 divided by accumulation factor of 27.95 = $10,030. $10,030 divided by Mary's expected pay for the current year of $51,500 is 19.5%.)

Example 3. In this example, Mary decides that it is just too difficult for her to shoot for an 80% replacement rate and she is also willing to live with a greater probability that she will outlive her accumulated savings. She also decides that she will continue to invest more aggressively after retirement and will assume a 3% real rate of return both before and after retirement. She, however, still wants to retire at age 65. Unfortunately in this example, her employer decides to terminate the company pension plan, and her projected benefit at age 65 from the plan is now only $5,000 per year; the benefit she has accrued at age 50.

Step 1—Needed Spendable Income at Retirement

Since she changed her replacement rate target to 70%, she will only need $27,514 (rather than $35,304) a year in addition to Social Security to replace her revised expected pre-retirement standard of living. (($50,000 X 1.558 X .70) minus ($20,000 X 1.558 X .867) = $27,514).

Step 2—Total Accumulated Savings Required

She goes back to the Society of Actuaries life expectancy calculator and determines that she has a 50% probability of living 21 years after age 65 to her life expectancy at age 65 of about age 86. She inputs 21 years in the "Excluding Social Security" spreadsheet and also the revised life annuity amount of $5,000 per year, and she determines that an accumulated savings of about $378,000 will provide her with total spendable income in her first year of retirement of about $27,514.

Step 3—Annual Savings Rate to Accumulate Savings Required.

Under these revised assumptions and input items, Mary determines that she (and/or her employer) will need to contribute a total of 9.6% of her pay each year in the future to meet her target replacement income.

(Total accumulation needed equals $378,000 total minus accumulation of prior savings ($239,656) leaving $138,344 from future contributions. $138,344 divided by future accumulation factor of 27.95 developed above equals a first year contribution of $4,950, or about 9.6% of her projected pay for upcoming year of $51,500.]

Note that there are many ways for Mary to justify (rationalize?) making lower annual savings contributions by changing the assumptions used in her calculations. For example, she can assume even higher pre- or post-retirement investment returns (relative to inflation) or she can assume an even shorter lifetime after retirement.

There are also a number of ways for Mary to adjust her retirement plans if she decides that she cannot afford to make the necessary contributions required for her to retire at age 65 under reasonable assumptions:

She can decide to delay her retirement. She can also model scenarios involving purchases of immediate and/or deferred annuities rather than relying on managing her own assets in retirement. She can also decide that it is not necessary for her retirement income to remain relatively constant in terms of purchasing power for the rest of her life. For example, if she believes that inflation will be 3% per year, but she is willing to have part of her retirement income decline in real dollars from year to year as she ages, she can enter 2%, 1% or 0% for the desired increases in the spreadsheet.

Whatever she decides to do, however, it will be important for Mary (and all individuals concerned about having adequate income in retirement) to plan for retirement by estimating and comparing retirement needs and potential retirement income sources. Mary can either follow the three step process outlined above, find an appropriate retirement calculator on the web or consult with a financial planner who can help her with her retirement planning math.

**Even Easier Rule-of-Thumb Approach (Added October, 2012)**

Some may find the relatively simple three-step approach outlined above to still be too much work, so we've added an even simpler rule-of-thumb approach. If we assume that you will retire at age 67, plan to live 25 years (until age 92), need to replace 40% of your pre-retirement gross pay from your accumulated savings (and have no other income other than Social Security), you will need to have accumulated savings at retirement somewhere in the neighborhood of 8 to 9 times such pay. This range is based on results of the spending calculator on this website, no amount to be left to heirs and investment return of 1%-2% in excess of the desired annual increase in post-retirement withdrawals. To obtain the accumulated savings needed using this easier approach (expressed as a multiple of pre-retirement pay), simply divide 0.4 (the assumed income replacement needed) by the ratio of the first year withdrawal from the spreadsheet divided by inputted accumulated savings, using hypothetical information). For example, if we assume 5% investment return and 3% desired post-retirement increases, the denominator would be approximately 0.05 and the accumulated savings multiple of pay needed would be 8 times (0.4/.05).

Different multiples of pay required can be developed under this approach by changing the numerator (the assumed 40% replacement rate), changing the assumptions used to develop the denominator (and therefore changing the denominator) or some combination of changes to both the numerator and denominator.

As discussed in the March 2010 article contained in this website, there are many risks associated with self-insuring your own retirement. The general process described in the article and sample spending calculators in this website are made available to you as self-help tools for your independent use and are not intended to provide investment or financial advice. As with all planning tools, the reasonableness of the results (in this case, your "annual spendable amount") is a function of the accuracy of the data and assumptions that you input. Since you control these items as well as investment of your accumulated savings, we can make no claims or guarantees that you will not outlive your accumulated savings or experience significant decreases in amounts that may be spent in a future year if you follow the process described in this website. We assume no responsibility for those individuals who may outlive their accumulated savings or who may otherwise become dissatisfied in any way (or believe that they have suffered financially) by following the process described in this website as compared with some other strategy. All articles and sample spending calculators on this website are provided purely for your educational purposes. You are encouraged to seek professional advice from qualified investment/financial professionals before committing to any retirement spending plan and should not simply rely on the results you may obtain with the process and sample spending calculators described in this website.