

## Retirement Savings Shortfalls: Evidence from EBRI's Retirement Security Projection Model<sup>®</sup>

*By Jack VanDerhei, Ph.D., Employee Benefit Research Institute*

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### A T A G L A N C E

- EBRI previously published extensive analysis that focused on the EBRI Retirement Readiness Ratings<sup>™</sup>—the probability that households will not run short of money in retirement. This *Issue Brief* expands the earlier analysis by providing similar analysis of the EBRI Retirement Savings Shortfalls (RSS)—the size of the deficits that households are simulated to generate in retirement
- The Retirement Savings Shortfalls show that for those on the verge of retirement (Early Baby Boomers), the deficits vary from \$19,304 (per individual) for married households, increasing to \$33,778 for single males and \$62,734 for single females.
- While these RSS values may appear to be relatively small considering they represent the sum of present values that may include decades of deficits, it is important to remember that less than half of the simulated lifepaths modeled are considered to be “at risk.” Looking only at those situations where shortfalls are projected shows that the values for Early Boomers vary from \$71,299 (per individual) for married households, increasing to \$93,576 for single males and \$104,821 for single females.
- RSS values are much smaller for Gen Xers with significant years of future eligibility for defined contribution plan participation. The deficit values for Gen Xers assumed to have no future years of eligibility (as if they were never simulated to be employed in the future by an organization that provides access to those plans) is \$78,297 per individual. That shortfall decreases substantially (to \$52,113) for those with one to nine years of future eligibility, and even further to \$32,937 for those with 10–19 years of future eligibility. Gen Xers fortunate enough to have at least 20 years of future eligibility in those programs could find their average shortfall at retirement reduced to only \$16,782.
- The results also demonstrate the extreme importance of longevity risk and nursing home and home health care costs in simulating Retirement Savings Shortfalls. Ignoring nursing home and home health care costs (or assuming another entity pays these costs) decreases the RSS by an average of 74 percent whereas the RSS for those in the latest relative longevity quartile average 14.8 times those in the earliest relative longevity quartile.
- The impact of Social Security retirement benefits on RSS was demonstrated in two ways. A pro rata decrease of between 22 and 27 percent starting in 2033 would increase RSS by an average of 15 percent for Gen Xers. If all Social Security retirement benefits were eliminated in 2015, the average RSS (for Boomers and Gen Xers) would increase by 90 percent.
- The aggregate national retirement deficit number is currently estimated to be \$4.13 trillion for all U.S. households where the head of the household is between 35 and 64, inclusive. When the scenario in which pro rata reductions to Social Security retirement benefits are assumed to begin in 2033 is analyzed, the aggregate deficit increases by 6 percent to \$4.38 trillion. If Social Security retirement benefits are assumed to be eliminated in 2015, the aggregate deficit increases by 88 percent to \$7.87 trillion.

Jack VanDerhei is director of Research at the Employee Benefit Research Institute (EBRI). This *Issue Brief* was written with assistance from the Institute’s research and editorial staffs. Any views expressed in this report are those of the authors and should not be ascribed to the officers, trustees, or other sponsors of EBRI, EBRI-ERF, or their staffs. Neither EBRI nor EBRI-ERF lobbies or takes positions on specific policy proposals. EBRI invites comment on this research.

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**Recommended Citation:** Jack VanDerhei. "Retirement Savings Shortfalls: Evidence from EBRI’s Retirement Security Projection Model,<sup>®</sup>" *EBRI Issue Brief*, no. 410 (February 2015).

**Report availability:** This report is available on the Internet at [www.ebri.org](http://www.ebri.org)

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# Retirement Savings Shortfalls: Evidence from EBRI's Retirement Security Projection Model<sup>®</sup>

*By Jack VanDerhei, Ph.D., Employee Benefit Research Institute*

## Introduction

Measuring retirement security—or retirement income adequacy—is an extremely important topic. EBRI launched a major project to provide this type of measurement in the late 1990s for several states concerned whether their residents would have sufficient income when they reached retirement age. After conducting studies for Oregon, Kansas, and Massachusetts, a national model—the EBRI Retirement Security Projection Model<sup>®</sup> (RSPM)—was developed in 2003, and in 2010 it was updated to incorporate several significant changes, including the impacts of defined benefit (DB) plan freezes, automatic enrollment provisions for 401(k) plans, and the recent crises in the financial and housing markets.<sup>1</sup> New versions of the model have been generated on an annual basis since then to include updates for financial and real estate market performance, employee demographics, and real-world behavior of 401(k) participants (based on a database of 24 million 401(k) participants) and individual retirement account (IRA) account holders (based on a database of 20 million unique individuals).

Last year,<sup>2</sup> EBRI published extensive analysis from the 2014 version of RSPM<sup>®</sup> that focused on the EBRI Retirement Readiness Ratings<sup>™</sup> (RRRs)—the probability that households will *not* run short of money in retirement. This *Issue Brief* expands the earlier analysis by providing similar analysis of the Retirement Savings Shortfalls (RSS)—the size of the deficits that households are simulated to generate in retirement.

The publication starts with a brief overview of RSPM<sup>®</sup> and then presents the average 2014 RSS values broken out by age cohorts, gender and family status, and years of future eligibility for participation in defined contribution (DC) plans. Distributional analysis of the RSS values is then discussed. This is followed by an analysis of the impact of nursing home and home health care costs and longevity on RSS. The impact of modification in Social Security benefits is then analyzed and aggregate deficits are provided under three different scenarios. Conclusions are offered in the final section.

## EBRI Retirement Security Projection Model<sup>®</sup>

One of the basic objectives of RSPM is to simulate the percentage of the population at risk of not having retirement income adequate to cover average expenses and uninsured health care costs (including long-term-care costs) at age 65 or older throughout retirement in specific income and age groupings. RSPM<sup>®</sup> also provides information on the distribution of the likely number of years before those at risk run short of money, as well as the percentage of preretirement compensation they will need in terms of additional savings in order to have a 50, 70, or 90 percent probability of retirement income adequacy.

VanDerhei and Copeland (2010) describe how households are tracked through retirement age and how their retirement income/wealth is simulated for the following components:

- Social Security.
- DC balances.
- IRA balances.
- DB annuities and/or lump-sum distributions.
- Net housing equity.

A household is considered to run short of money in this model if aggregate resources in retirement are not sufficient to meet average retirement expenditures, defined as a combination of deterministic expenses from the Consumer Expenditure Survey (as a function of age and income) and some health insurance and out-of-pocket, health-related expenses, plus stochastic expenses from nursing-home and home-health care (at least until the point such expenses are covered by Medicaid). This version of the model is constructed to simulate retirement income adequacy, as noted above. Alternative versions of the model allow similar analysis for replacement rates, standard-of-living calculations, and other ad hoc thresholds.

The baseline version of the model used for this analysis assumes all workers retire at age 65, that they immediately begin drawing benefits from Social Security and defined benefit plans (if any), and, to the extent that the sum of their expenses and uninsured medical expenses exceed the projected, after-tax annual income from those sources, immediately begin to withdraw money from their individual accounts (defined contribution and cash balance plans, as well as IRAs). If there is sufficient money to pay expenses without tapping into the tax-qualified individual accounts, those balances are assumed to be invested in a non-tax-advantaged account where the investment income is taxed as ordinary income. Individual accounts are tracked until the point at which they are depleted. At that point, any net housing equity is assumed to be added to retirement savings in the form of a lump-sum distribution (not a reverse annuity mortgage (RAM)). If all the retirement savings are exhausted and if the Social Security and defined benefit payments are not sufficient to pay expenses, the individual is designated as having run short of money at that point.

The EBRI Retirement Readiness Ratings™ by age cohort for 2014 show a slight improvement from 2013.<sup>3</sup> The primary differences between the values this year and those from 2013 reflect the changes in the market value of defined contribution and IRA assets, as well as the increase in housing values during that period. The RRRs increase by 1.6 percentage points (from 55.1 percent to 56.7 percent) for the Early Boomers, 1.0 percentage points (from 57.5 percent to 58.5 percent) for Late Boomers, and by 0.5 percentage points (from 57.2 percent to 57.7 percent) for Generation Xers.<sup>4</sup> Given that the primary change in RRRs from 2013 to 2014 is the above-average return in the equity markets,<sup>5</sup> it is not surprising that the older age cohorts with larger defined contribution and IRA account balances show larger improvements.

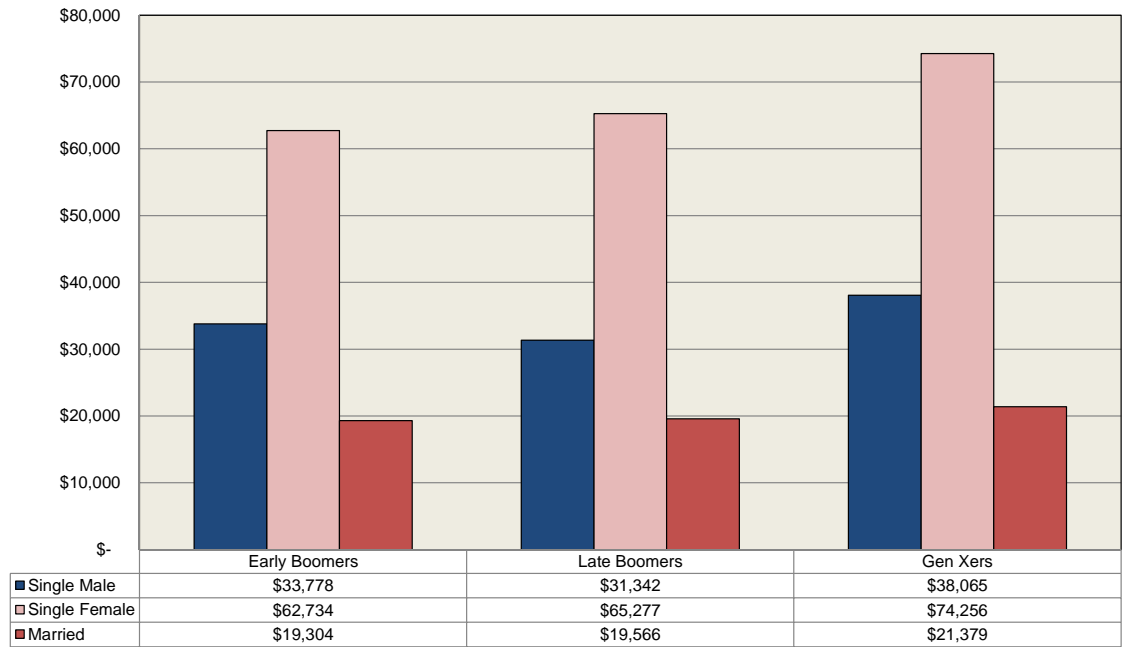
## Retirement Savings Shortfalls

While knowing the percentage of households that will be at risk for inadequate retirement income is important for public policy analysis, perhaps equally important is knowing just how large the accumulated deficits are likely to be.

Figure 1 depicts Retirement Savings Shortfalls by age cohort, as well as marital status and gender, for both Baby Boomers and Gen Xers. The RSS provide information on average individual retirement income deficits. These numbers are present values (in 2014 dollars) at age 65, and represent the additional amount that individuals will have to save by age 65 to eliminate their expected deficits in retirement (which, depending on the simulated lifepath, could be a relatively short period or could last decades). The additional savings required for those on the verge of retirement (Early Boomers) vary from \$19,304 (per individual) for married households, increasing to \$33,778 for single males and \$62,734 for single females. Even though the present values are defined in constant dollars, the RSS values are largest for Gen Xers, largely due to the assumption that health care-related costs will increase faster than the general inflation rate.

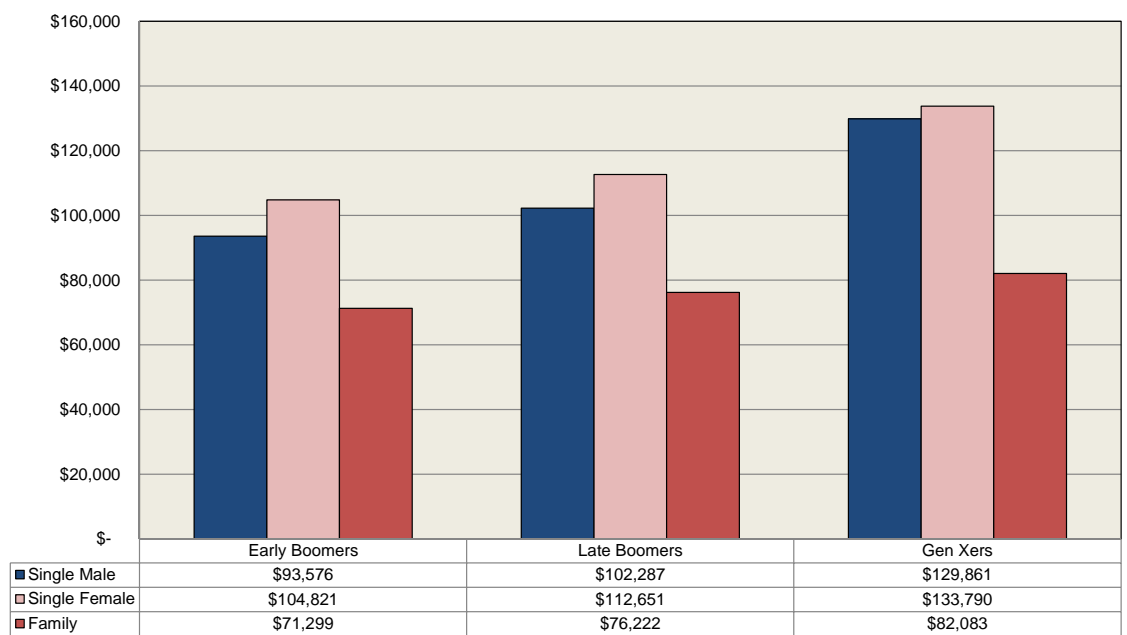
While the RSS values in Figure 1 may appear to be relatively small considering they represent the sum of present values that may include decades of deficits, it is important to remember that less than half of the simulated lifepaths modeled are considered to be "at risk." In other words, the average RSS values represented in Figure 1 are reduced by the inclusion of simulated retirement lifepaths that will not run short of money. Looking only at those situations where shortfalls are projected, Figure 2 shows that the values for Early Boomers vary from \$71,299 (per individual) for married households, increasing to \$93,576 for single males and \$104,821 for single females. Similar to Figure 1, the conditional RSS values are larger for younger cohorts.

**Figure 1**  
**2014 Retirement Savings Shortfalls,\***  
**by Age Cohort, Marital Status, and Gender**



Sources: EBRI Retirement Security Projection Model® version 2163.  
 \* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

**Figure 2**  
**2014 Retirement Savings Shortfalls,\* for Those Households**  
**With a Deficit, by Age Cohort, Marital Status, and Gender**



Sources: EBRI Retirement Security Projection Model® version 2163.  
 \* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

Eligibility for participation in a defined contribution plan can have a significant impact on reducing these savings shortfalls. Figure 3 provides information on the average individual retirement income deficits by the number of future years eligible for coverage in a defined contribution retirement plan for Gen Xers. The deficit values for those assumed to have no future years of eligibility (as if they were never simulated to be employed in the future by an organization that provides access to those plans) is \$78,297 per individual. That shortfall decreases substantially for those with one–nine years of future eligibility, to \$52,113 and even further to \$32,937 for those with 10–19 years of future eligibility. Gen Xers fortunate enough to have at least 20 years of future eligibility in those programs have their average shortfall at retirement reduced to only \$16,782.

## **Distribution of Retirement Savings Shortfalls for Gen Xers**

Figure 4 provides a more detailed way of looking at the earlier results by showing the distribution of RSS (per individual) for Gen Xers by gender and family status. For example, 68.5 percent of simulated retirement paths for single male Gen Xers do not generate deficits. However, of the 31.5 percent of simulated retirement paths for single male Gen Xers that generate deficits, approximately 1 in 3 generate RSS of less than \$50,000. This represents 10.3 percent of all simulated retirement paths for single male Gen Xers. Another 6.2 percent of this group generates RSS between \$50,000–\$100,000, while 10.4 percent have RSS between \$100,000–\$200,000. Only 4.6 percent of all simulated retirement paths for single male Gen Xers produce RSS greater than \$200,000.

Comparing the results for Gen Xer single females with single males in Figure 4 shows that females are more likely to experience a retirement deficit (57.4 percent of the simulated lifepaths for single females vs. the 31.5 percent for single males), but the conditional likelihood of having large RSS is essentially the same as for single males. For example, 15 percent of the simulated retirement paths for single males that produce deficits have an RSS value greater than \$200,000. The same value for single females is 18 percent.

The distribution of RSS values per individual for married households in Figure 4 appears to be quite different from that of single males and single females, but that is to be expected given the implicit diversification existing in a two-person household. In this case, 73.7 percent of simulated retirement paths for families have no deficits. Focusing on families with RSS values in excess of \$200,000, only 3.4 percent of simulated retirement paths with a deficit (or 0.9 percent of all family simulated retirement paths) generate a value this large. However, given that these are per-individual RSS values, a \$200,000 family shortfall would involve a sum of at least \$400,000 between the two family members.

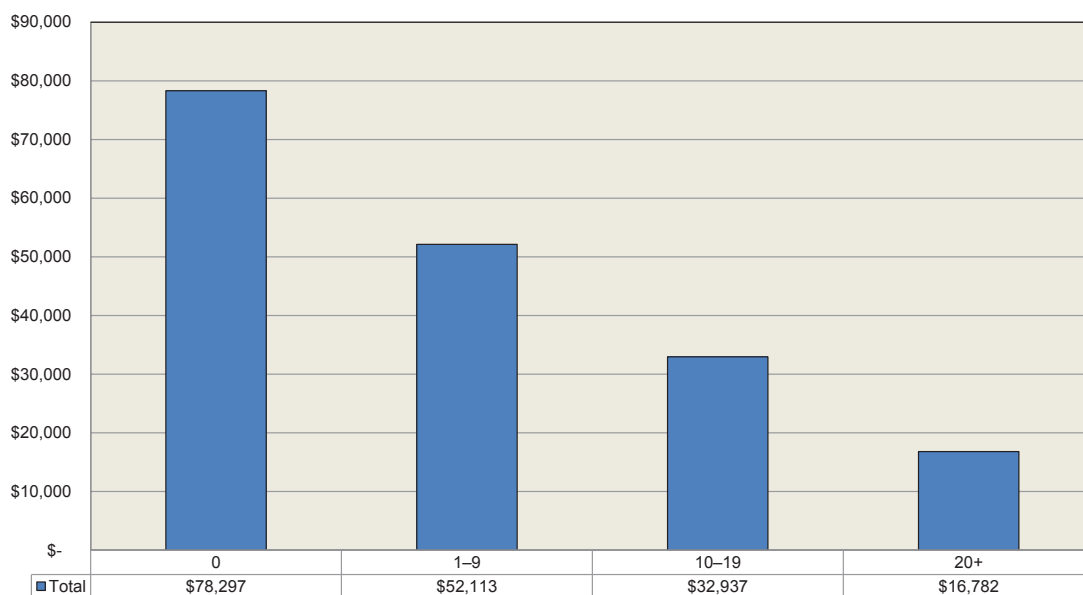
Figure 5 provides the distribution of RSS for Gen Xers categorized by the number of future years of eligibility for participating in a 401(k) plan. Approximately 40 percent of Gen Xers with no future years of 401(k) eligibility are simulated to have no shortfalls, but 13.2 percent of this group is simulated to have shortfalls of more than \$200,000. In contrast, approximately 86 percent of those with 20 or more years of future eligibility are simulated to have no deficits, while only 2.3 percent have shortfalls of \$200,000 or more.

## **The Impact of Nursing Home and Home Health Care Costs on Retirement Savings Shortfalls**

EBRI has gone to great lengths to model the major risks to retirement income adequacy since the initial introduction of RSPM® in 2003, including stochastic health care risks such as nursing home and home health care costs. Even though these events will not be experienced by all retired households, or experienced to the same extent, they can have catastrophic financial consequences for the future retirement income adequacy of the household. Many attempts to model retirement income adequacy either ignore this risk or make the assumption that all households purchase long-term care insurance at retirement.

Figure 6 provides the average 2014 RSS (per individual) by gender and family status similar to Figure 1; however, in this case all nursing home and home health costs in retirement are assumed to disappear or at least be borne by another entity. Comparing Figure 6 to Figure 1 provides a vivid illustration of how important the correct assumptions

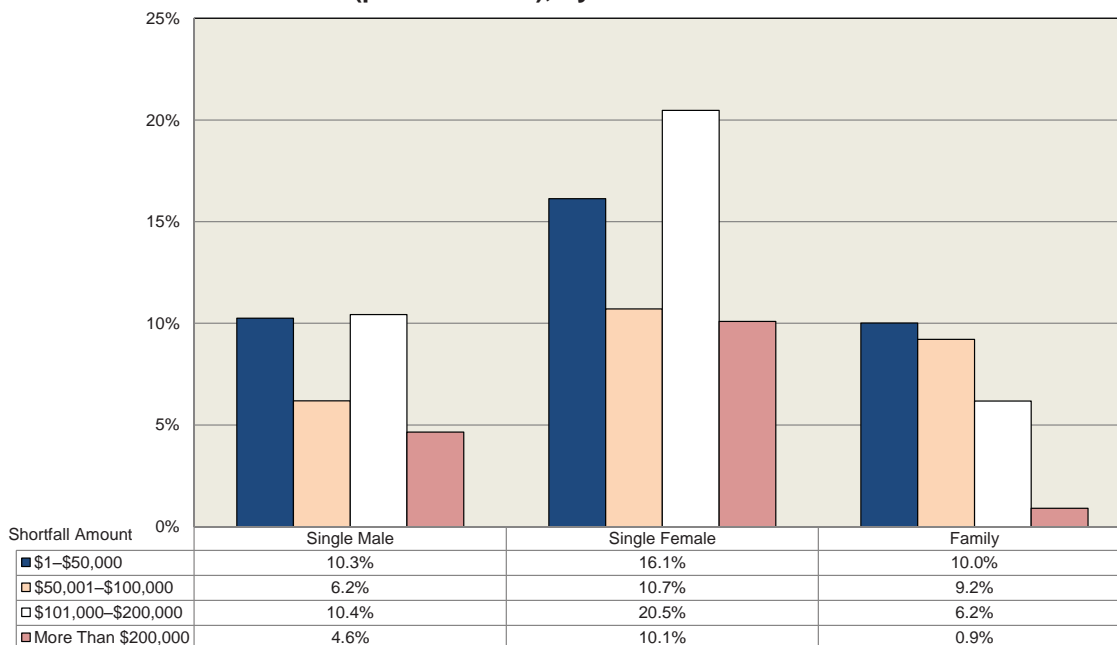
**Figure 3**  
**2014 Retirement Savings Shortfalls\***  
**for Gen Xers, by Years of Future Eligibility**  
**for Participation in Defined Contribution Plans**



Sources: EBRI Retirement Security Projection Model<sup>®</sup> version 2164.

\* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

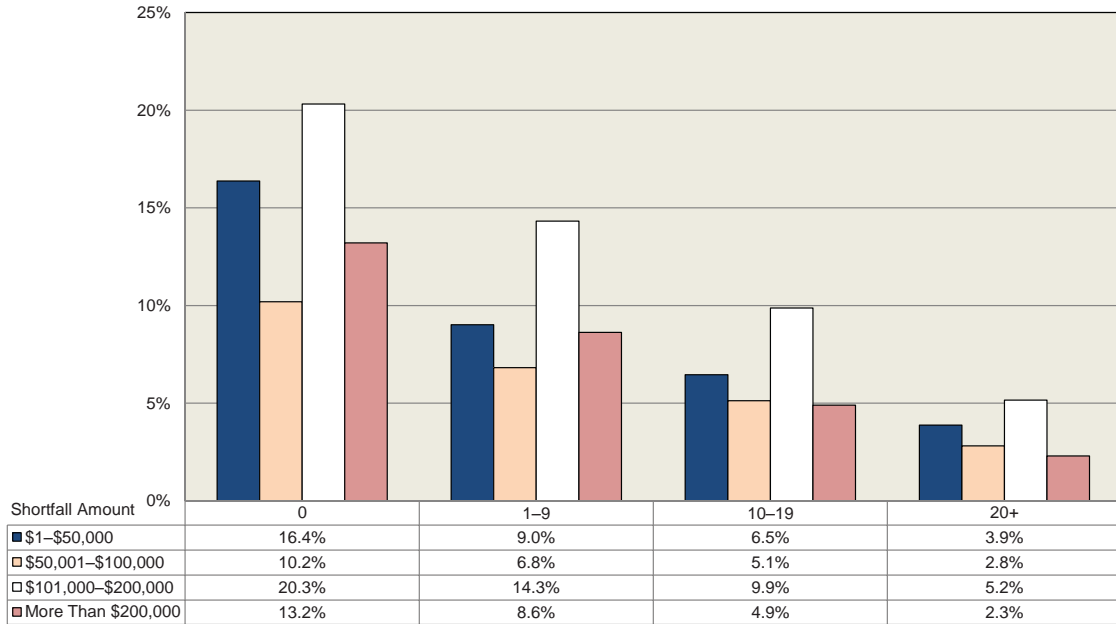
**Figure 4**  
**Distribution of 2014 Retirement Savings Shortfalls for**  
**Gen Xers (per Individual), by Gender and Marital Status**



Source: EBRI Retirement Security Projection Model<sup>®</sup> version 2162. Note the percentages in each column do not add to 100 percent because individuals *without* shortfalls are not displayed. For example, 68.5 percent of single males are simulated to have no shortfalls. This number is 42.6 percent for single females and 73.7 percent for families.

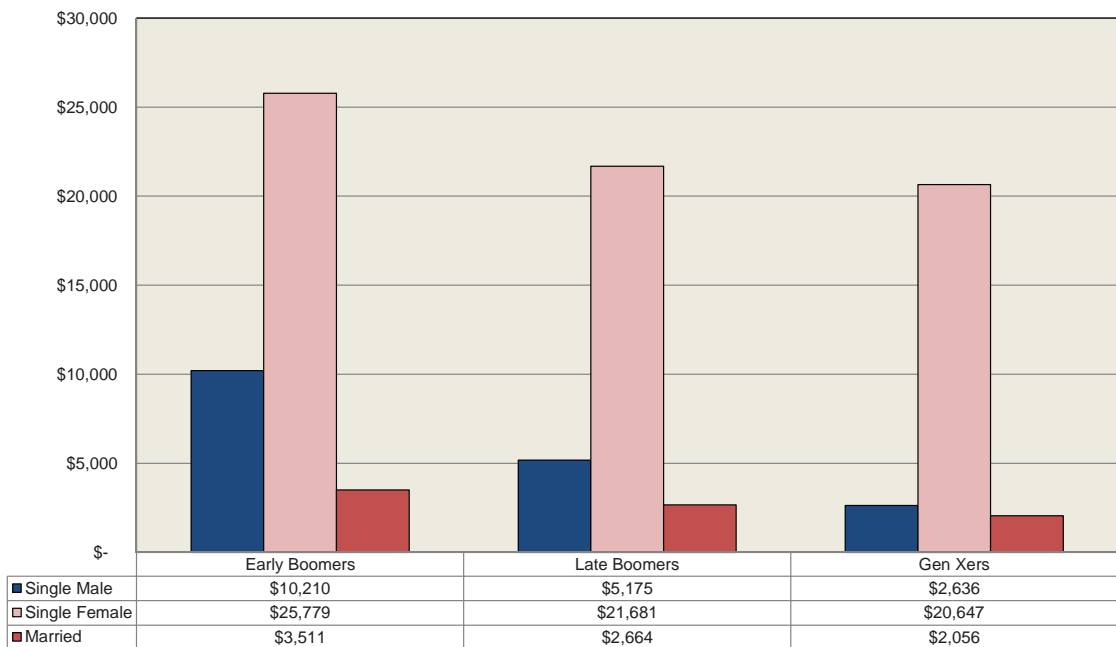


Figure 5  
**Distribution of 2014 Retirement Savings Shortfalls for Gen Xers,  
 by Number of Future Years of Eligibility for Participation in a 401(k) Plan**



Source: EBRI Retirement Security Projection Model,® version 2162. The percentages in each column do not add to 100 percent because individuals *without* shortfalls are not displayed. For example, 39.9 percent of Gen Xers with no future years of eligibility for participation in a 401(k) plan are simulated to have no shortfalls. This increases to 61.2 percent for those with one to nine years of future eligibility and 73.7 percent for those with 10–19 years. For those with 20 or more years of future eligibility, 85.9 percent have no simulated deficits.

Figure 6  
**2014 Retirement Savings Shortfalls,\* by Age Cohort, Marital Status, and  
 Gender: Assumes No Nursing Home or Home Health Care Costs**



Sources: EBRI Retirement Security Projection Model,® version 2163.

\* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

are. For example, with nursing home and home health care expenses modeled, single male Early Boomers are projected to have an average present value of financial shortfall of \$33,778 in retirement. On the other hand, if these expenses are ignored, the average drops to only \$10,210. Similar results are produced for single female and married Early Boomers. Overall, ignoring nursing home and home health care costs (or assuming another entity pays these costs) decreases the RSS by an average of 74 percent.

Looking only at those situations where shortfalls are projected, Figure 7 shows that when nursing home and home health care expenses are ignored, the values for early Boomers decrease to \$34,299 (per individual) from the \$71,299 value when they were included for married households. Similar values for early Boomers drop to \$46,447 (from \$93,576) for single males and \$57,639 (from \$104,821) for single females.

Figure 8 provides information on the average individual retirement income deficits by the number of future years eligible for coverage in a defined contribution retirement plan for Gen Xers when nursing home and home health care expenses are ignored. The deficit values for those assumed to have no future years of eligibility (as if they were never simulated to be employed in the future by an organization that provides access to those plans) is now \$21,637 (compared to \$78,297 when these expenses are not ignored) per individual. That shortfall decreases substantially for those with one–nine years of future eligibility, to \$6,498 (compared to \$52,113) and even further to \$3,607 (compared to \$32,937) for those with 10–19 years of future eligibility. Gen Xers fortunate enough to have at least 20 years of future eligibility in those programs would have their average shortfall at retirement reduced to only \$883 (compared to \$16,782).

Figure 9 shows the distribution of RSS (per individual) for Gen Xers by gender and family status when nursing home and home health care expenses are ignored. For example, 68.5 percent of simulated retirement paths for single male Gen Xers do not generate deficits when these expenses are included (Figure 4) but this number jumps to 85.8 percent when they are ignored. Comparing the results for Gen Xer single females in Figure 9 with those in Figure 4 shows that females are more likely to experience a retirement deficit when these expenses are included (57.4 percent of the simulated lifepaths for single females vs. the 38.8 percent when they are ignored). The distribution of RSS values per individual for married households in Figure 4 vs. Figure 9 provide similar results: 73.7 percent of simulated retirement paths for families have no deficits when the expenses are included but this number increases to 91.4 percent when the expenses are ignored.

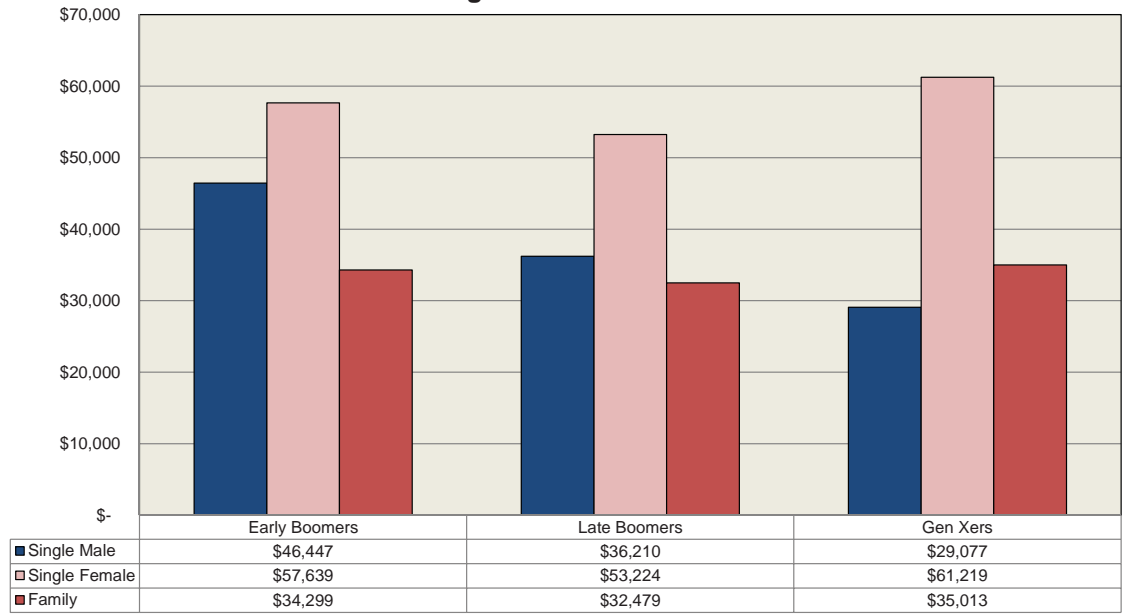
Figure 10 provides the distribution of RSS for Gen Xers categorized by the number of future years of eligibility for participating in a 401(k) plan when nursing home and home health care expenses are ignored. Approximately 62 percent of Gen Xers with no future years of 401(k) eligibility are simulated to have no shortfalls when the expenses are ignored (compared to 39.9 percent when they are included). In contrast, approximately 98 percent of those with 20 or more years of future eligibility are simulated to have no deficits when the expenses are ignored, compared to 85.9 percent when they are included.

## **The Impact of Longevity on Retirement Savings Shortfalls**

In an attempt to assess the impact of longevity on Retirement Savings Shortfalls, relative longevity quartiles are established based on family status, gender, and age cohort. It should be noted that this analysis would not matter as much if all retirement income was taken in the form of an annuity (either as a real annuity such as Social Security or a nominal annuity such as a private-sector defined benefit plan); however, given that only a very small percentage of defined contribution and IRA balances are currently annuitized (and that an increasing percentage of defined benefit accruals are eligible for a lump-sum distribution) the prospect of “out-living” this portion of their retirement wealth is a very real risk for many Baby Boomers and Gen Xers.

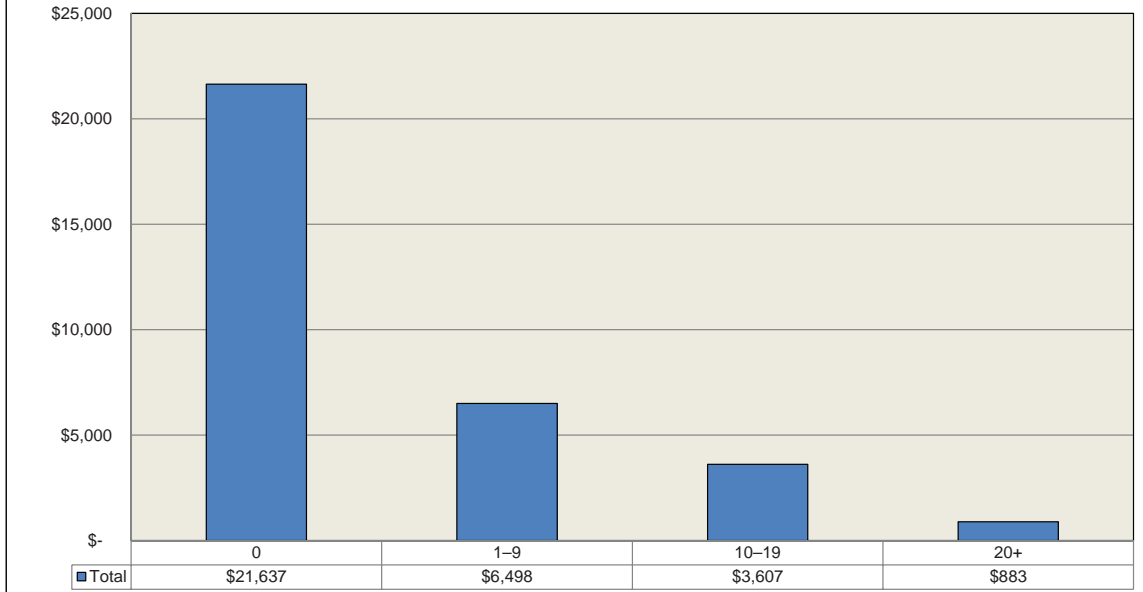
Figure 11 depicts Retirement Savings Shortfalls by age cohort and relative longevity quartile for both Baby Boomers and Gen Xers. The additional savings required for those on the verge of retirement (early Boomers) vary from \$7,188 (per individual) for those in the quartile with the earliest relative longevity to \$81,811 for those in the quartile with the latest relative longevity. Overall, the RSS for those in the latest relative longevity quartile average 14.8 times those in the earliest relative longevity quartile.

**Figure 7**  
**2014 Retirement Savings Shortfalls,\* for Those Households With a Deficit, by Age Cohort, Marital Status, and Gender:**  
**Assumes No Nursing Home or Home Health Care Costs**



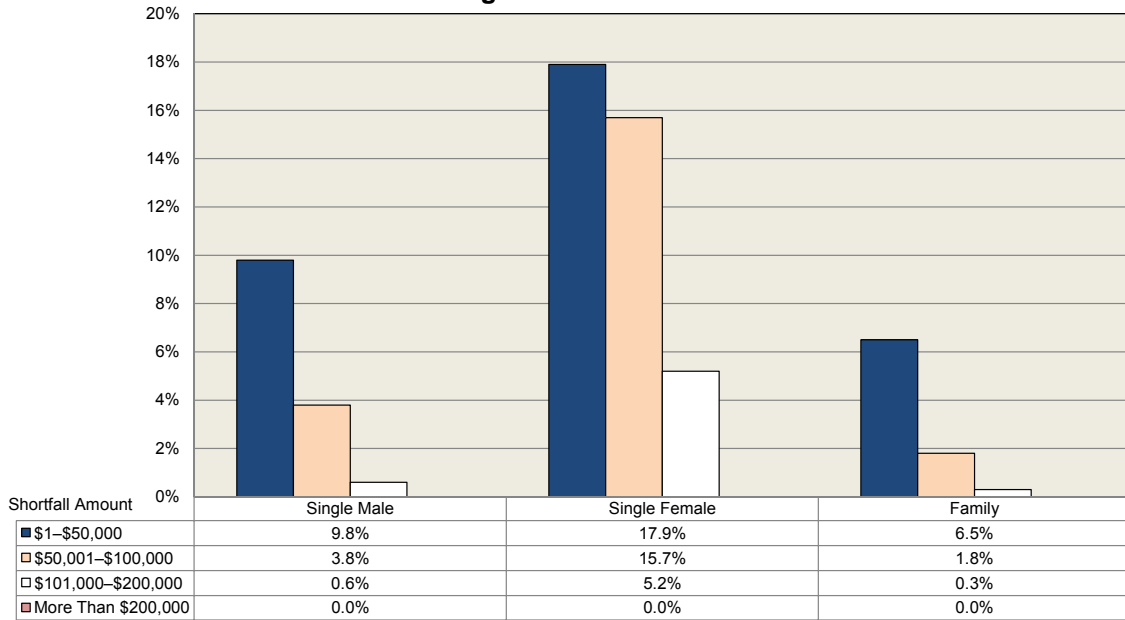
Sources: EBRI Retirement Security Projection Model® version 2163.  
 \* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

**Figure 8**  
**2014 Retirement Savings Shortfalls\* for Gen Xers, by Years of Future Eligibility for Participation in Defined Contribution Plans:**  
**Assumes No Nursing Home or Home Health Care Costs**



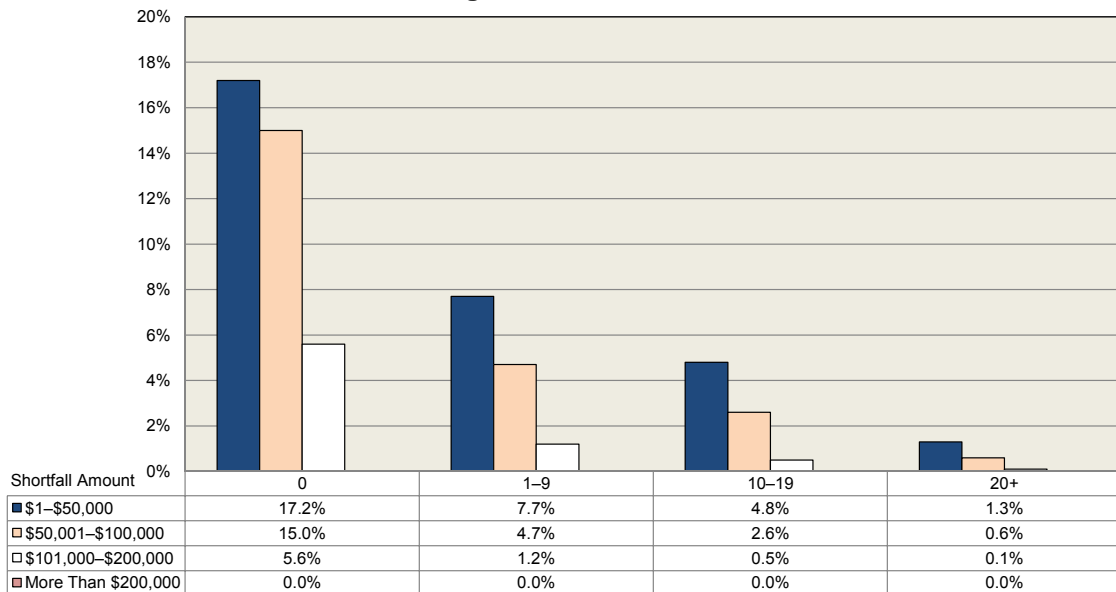
Sources: EBRI Retirement Security Projection Model® version 2164.  
 \* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

**Figure 9**  
**Distribution of 2014 Retirement Savings Shortfalls**  
**(per Individual), by Gender and Family Status:**  
**Assumes No Nursing Home or Home Health Care Costs**



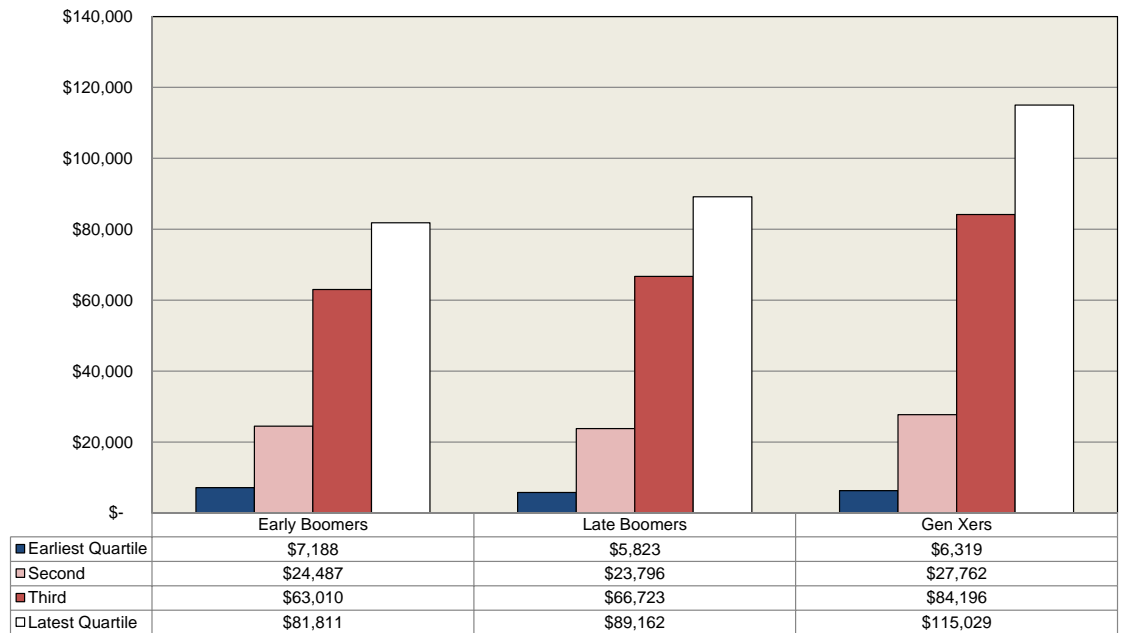
Source: EBRI Retirement Security Projection Model,® version 2162. Note the percentages in each column do not add to 100 percent because individuals *without* shortfalls are not displayed. For example, 85.8 percent of single males are simulated to have no shortfalls. This number is 61.2 percent for single females and 91.4 percent for families.

**Figure 10**  
**Distribution of 2014 Retirement Savings Shortfalls for Gen Xers,**  
**by Number of Future Years of Eligibility for Participation in a 401(k) Plan:**  
**Assumes No Nursing Home or Home Health Care Costs**



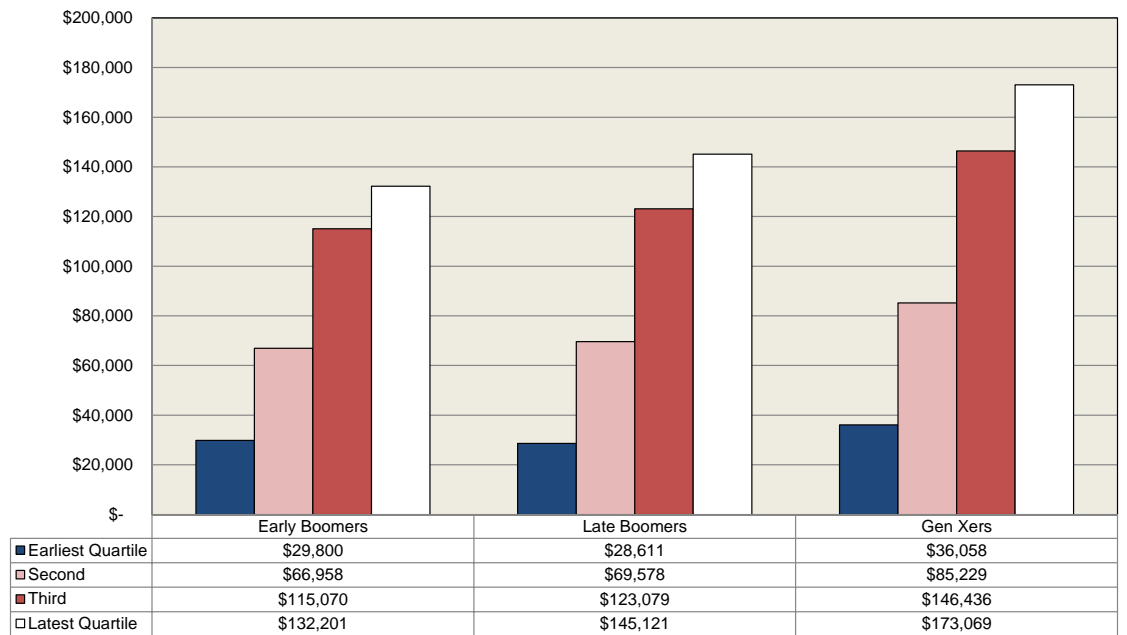
Source: EBRI Retirement Security Projection Model,® version 2162. The percentages in each column do not add to 100 percent because individuals *without* shortfalls are not displayed. For example, 62.3 percent of Gen Xers with no future years of eligibility for participation in a 401(k) plan are simulated to have no shortfalls. This increases to 86.4 percent for those with one to nine years of future eligibility and 92.1 percent for those with 10–19 years. For those with 20 or more years of future eligibility, 97.9 percent have no simulated deficits.

**Figure 11**  
**2014 Retirement Savings Shortfalls,\***  
**by Age Cohort and Relative Longevity Quartile**



Source: EBRI Retirement Security Projection Model® version 2163.  
 \* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

**Figure 12**  
**2014 Retirement Savings Shortfalls,\* for Those Households**  
**With a Deficit, by Age Cohort and Relative Longevity Quartile**



Source: EBRI Retirement Security Projection Model® version 2163.  
 \* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

Looking only at those situations where shortfalls result, Figure 12 shows that the values for Early Boomers vary from \$29,800 (per individual) for those in the quartile with the earliest relative longevity to \$132,201 for those in the quartile with the latest relative longevity.

Figure 13 depicts Retirement Savings Shortfalls by gender, family status and relative longevity quartile for both Baby Boomers and Gen Xers. The additional savings required for single males vary from \$4,402 for those in the quartile with the earliest relative longevity to \$86,055 for those in the quartile with the latest relative longevity.

Looking only at those situations where shortfalls are projected, Figure 14 shows that the values for single males vary from \$32,198 for those in the quartile with the earliest relative longevity to \$153,300 for those in the quartile with the latest relative longevity.

## The Impact of Modifications in Social Security on Retirement Savings Shortfalls

The baseline RSPM<sup>®</sup> runs assume that future Social Security retirement benefits under current law will not be modified. However, the current Social Security Trustees Report projects that the funds for Old-Age, Survivors and Disability Insurance (OASDI) will be exhausted by 2033.<sup>6</sup> While this would not result in Social Security retirement benefits being eliminated, left unaddressed it might well require a reduction in benefits for at least some cohorts of retirees. Figure 8 in VanDerhei (February 2014) shows the pro rata reductions applied to Social Security retirement benefits for the sensitivity analysis in which no future funding enhancements are incorporated and aggregate shortfalls are converted into a pro rata reduction for all retirees on an annual basis. This would result in a reduction of 21.9 percent in 2033 and would eventually reach a level of 27.0 percent in 2090.<sup>7</sup>

Figure 15 depicts Retirement Savings Shortfalls by age cohort, as well as marital status and gender, for both Baby Boomers and Gen Xers assuming pro rata reductions in Social Security retirement benefits starting in 2033. The additional savings required for Gen Xers (the cohort most impacted by the proposed change) vary from \$27,025 (per individual) for married households (compared to \$21,379 without the proposed reduction in Social Security benefits), increasing to \$42,775 for single males (compared to \$38,065) and \$79,341 for single females (compared to \$74,256). This pro rata decrease starting in 2033 would increase RSS by an average of 15 percent for Gen Xers.

Figure 16 further demonstrates the importance of Social Security benefits by simulating the counterfactual situation where Social Security benefits would be completely eliminated in 2015. The additional savings required for Gen Xers would vary from \$46,276 (per individual) for married households, increasing to \$75,216 for single males and \$123,525 for single females. Assuming all Social Security retirement benefits were eliminated in 2015, the average RSS (for Boomers and Gen Xers) would increase by 90 percent.

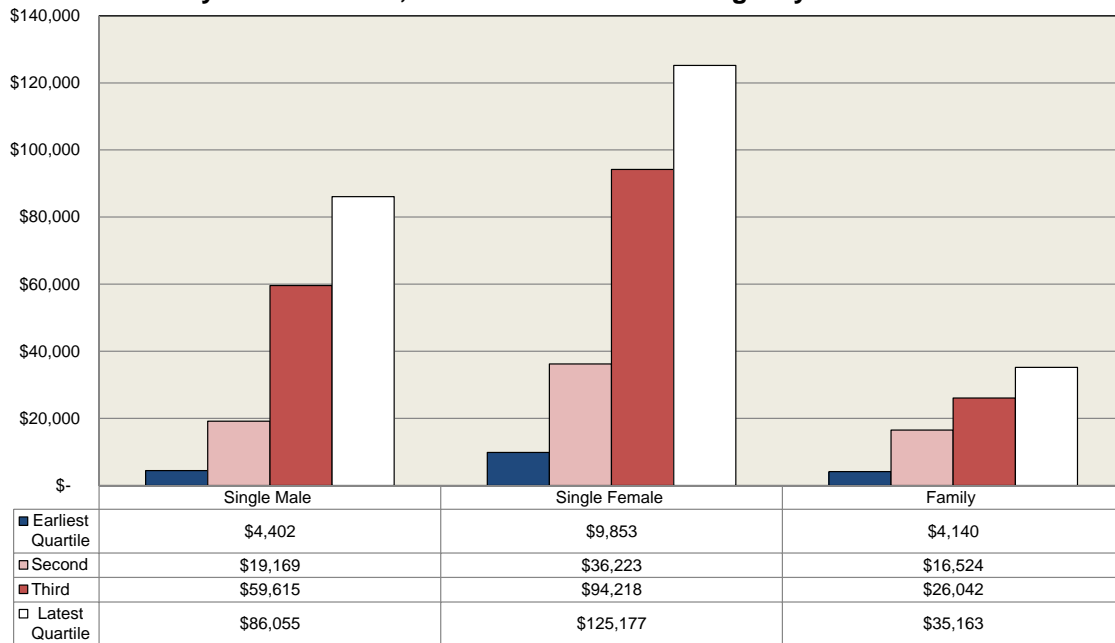
## Aggregate Deficits

The aggregate deficit number, taking into account current Social Security retirement benefits and the assumption that net housing equity is utilized "as needed," is currently estimated to be \$4.13 trillion for all U.S. households where the head of the household is between 35 and 64, inclusive.<sup>8</sup> When the scenario (described above) in which pro rata reductions to Social Security retirement benefits are assumed to begin in 2033, the aggregate deficit increases by 6 percent to \$4.38 trillion. In the counterfactual scenario in which Social Security retirement benefits are assumed to be eliminated in 2015, the aggregate deficit increases by 88 percent to \$7.87 trillion.

## Conclusion

The EBRI Retirement Readiness Rating<sup>™</sup> was developed in 2003 to provide an assessment of national retirement income prospects and was updated in 2010 to incorporate several significant enhancements, including the impacts of defined benefit plan freezes, automatic enrollment provisions for 401(k) plans, as well as the crises in the financial and housing markets from 2007–2009. New versions of the model have been generated on an annual basis since then to

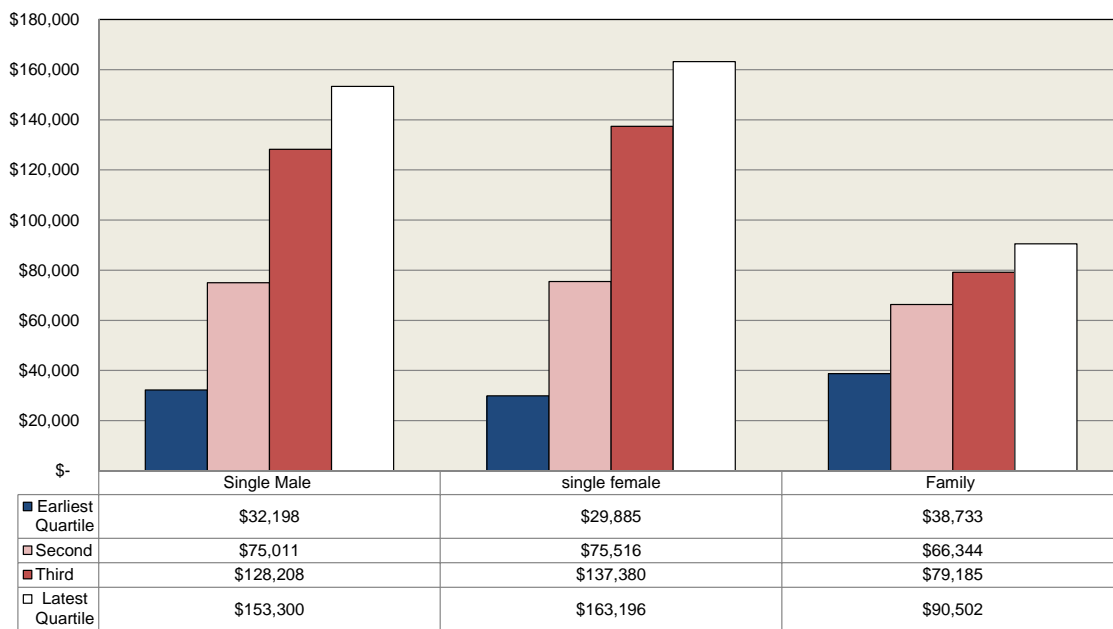
**Figure 13**  
**2014 Retirement Savings Shortfalls,\***  
**by Marital Status, Gender and Relative Longevity Quartile**



Source: EBRI Retirement Security Projection Model® version 2163.

\* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

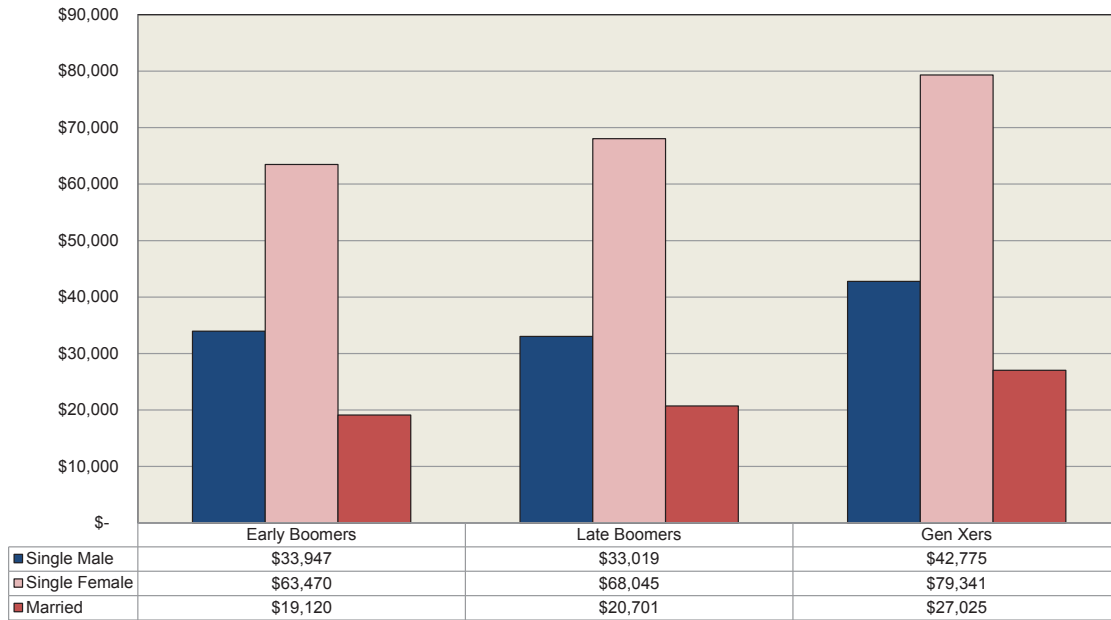
**Figure 14**  
**2014 Retirement Savings Shortfalls,\* for Those Households With a Deficit, by Marital Status, Gender and Relative Longevity Quartile**



Source: EBRI Retirement Security Projection Model® version 2163.

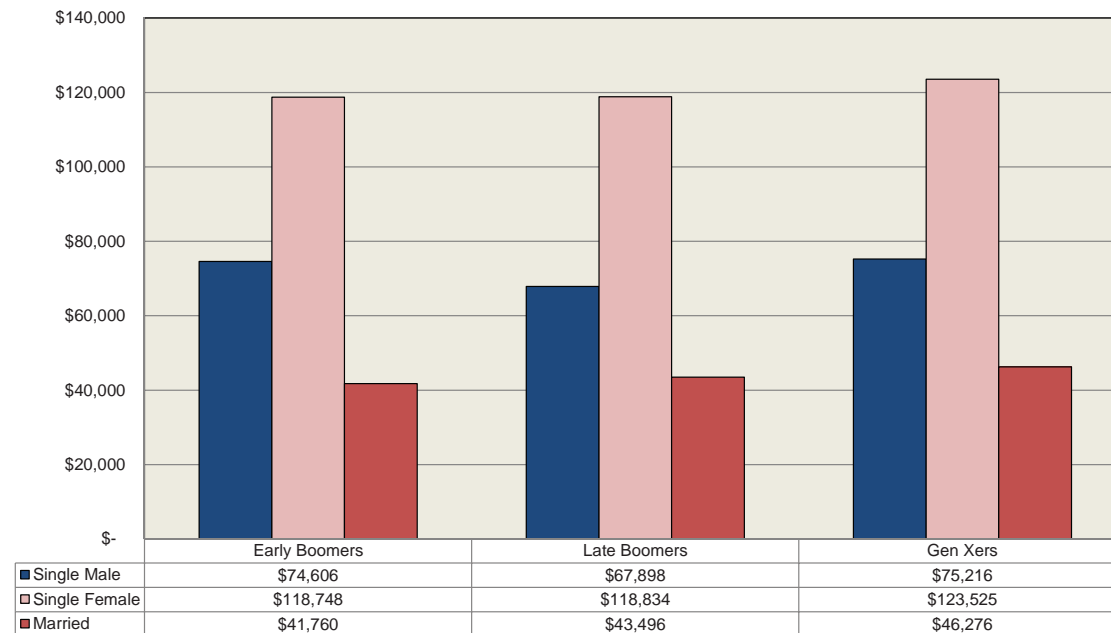
\* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

**Figure 15**  
**2014 Retirement Savings Shortfalls,\* by Age Cohort, Marital Status, and Gender:**  
**Assumes Pro-rata Reductions in Social Security Retirement Benefits (Starting in 2033)**



Sources: EBRI Retirement Security Projection Model® version 2166.  
 \* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

**Figure 16**  
**2014 Retirement Savings Shortfalls,\* by Age Cohort, Marital Status,**  
**and Gender: Assumes No Social Security Retirement Benefits**



Sources: EBRI Retirement Security Projection Model® version 2168.  
 \* The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.



include updates for financial and real estate market performance, employee demographics, and real-world behavior of 401(k) participants (based on a database of 24 million 401(k) participants) and IRA account holders (based on a database of 20 million unique individuals).

The Retirement Savings Shortfalls show that for those on the verge of retirement (Early Boomers), the deficits vary from \$19,304 (per individual) for married households, increasing to \$33,778 for single males and \$62,734 for single females. The averages (in 2014 dollars) are slightly larger for Gen Xers: \$21,379 (per individual) for married households, increasing to \$38,065 for single males and \$74,256 for single females

Of course, these values are based on results for all households in a particular cohort, regardless of whether they work for an employer that sponsors a qualified retirement plan or not. The deficit values for Gen Xers assumed to have no future years of eligibility (as if they were never simulated to be employed in the future by an organization that provides access to those plans) is \$78,297 per individual. That shortfall decreases substantially for those with one–nine years of future eligibility, to \$52,113 and even further to \$32,937 for those with 10–19 years of future eligibility. Gen Xers fortunate enough to have at least 20 years of future eligibility in those programs could find their average shortfall at retirement reduced to only \$16,782.

The results also demonstrate the extreme importance of longevity risk and nursing home and home health care costs in simulating Retirement Savings Shortfalls. Ignoring nursing home and home health care costs (or assuming another entity pays these costs) decreases the RSS by an average of 74 percent whereas the RSS for those in the latest relative longevity quartile average 14.8 times those in the earliest relative longevity quartile.

The impact of Social Security retirement benefits on RSS was demonstrated in two ways. In the first, a pro rata decrease of between 22 and 27 percent starting in 2033 would increase RSS by an average of 15 percent for Gen Xers. Under the counterfactual simulation of assuming all Social Security retirement benefits were eliminated in 2015, the average RSS (for Boomers and Gen Xers) would increase by 90 percent.

## Appendix: Brief Chronology of the EBRI Retirement Security Projection Model<sup>®</sup>

- EBRI's Retirement Security Projection Model<sup>®</sup> (RSPM) grew out of a multi-year project to analyze the future economic well-being of the retired population at the state level. The Employee Benefit Research Institute (EBRI) and the Milbank Memorial Fund, working with the office of the governor of Oregon, set out in the late 1990s to see if this situation could be evaluated for the state. The resulting analysis (VanDerhei and Copeland, September 2001) focused primarily on simulated retirement wealth with a comparison to ad hoc thresholds for retirement expenditures.
- The April 2001 *EBRI Issue Brief* (VanDerhei and Copeland, April 2001) highlighted the changes in private pension plan participation for defined benefit (DB) and defined contribution (DC) plans and used the model to quantify how much the importance of individual-account plans was expected to increase because of these changes.
- With the assistance of the Kansas Insurance Department, EBRI was able to create the EBRI Retirement Readiness Rating<sup>™</sup> (RRR) based on a full stochastic, decumulation model that took into account the household's longevity risk, post-retirement investment risk, and exposure to long-term nursing-home and home-health-care risks. The first state-level RSPM<sup>®</sup> results were presented to the Kansas' Long-Term Care Services Task Force July 11, 2002 (VanDerhei and Copeland, July 2002), and the results of the Massachusetts study were presented Dec. 1, 2002 (VanDerhei and Copeland, December 2002).
- RSPM<sup>®</sup> was expanded to a national model—the first national, micro-simulation, retirement-income-adequacy model, built in part from administrative 401(k) data. The initial results were presented at the EBRI December 2003 Policy Forum (VanDerhei and Copeland, 2003).
- The basic model was subsequently modified for testimony for the Senate Special Committee on Aging to quantify the beneficial impact of a mandatory contribution of 5 percent of compensation. (VanDerhei, January 2004).
- The model was enhanced to allow an analysis of the impact of annuitizing defined contribution and individual retirement account (IRA) balances at retirement age (VanDerhei and Copeland, 2004).
- Additional refinements were introduced to evaluate the impact of purchasing long-term care insurance on retirement income adequacy (VanDerhei, 2005).
- The model was used to evaluate the impact of DB freezes on participants by simulating the minimum employer-contribution rate that would be needed to financially indemnify the employees for the reduction in their expected retirement income under various rate-of-return assumptions (VanDerhei, March 2006).
- Later that year, an updated version of the model was developed to enhance the EBRI interactive Ballpark E\$imate<sup>®</sup> by providing Monte Carlo simulations of the replacement rates needed for specific probabilities of retirement income adequacy under alternative-risk-management treatments (VanDerhei, September 2006).
- RSPM<sup>®</sup> was significantly enhanced for the May 2008 EBRI Policy Forum by allowing automatic enrollment of 401(k) participants with the potential for automatic escalation of contributions to be included (VanDerhei and Copeland, 2008).
- Additional modifications were added for a Pension Research Council presentation that involved a "winners/losers" analysis of DB freezes and the enhanced employer contributions provided to defined contribution plans at the time the DB plans were frozen (Copeland and VanDerhei, 2010).
- Also in 2009, a new subroutine was added to allow simulations of various styles of target-date funds for a comparison with participant-directed investments (VanDerhei, June 2009).
- In April 2010, the model was completely re-parameterized with 401(k)-plan design parameters for sponsors that had adopted automatic-enrollment provisions (VanDerhei, April 2010).
- A completely updated version of the national model was produced for the May 2010 EBRI Policy Forum and used in the July 2010 *EBRI Issue Brief* (VanDerhei and Copeland, 2010).

- The new model was used to analyze how eligibility for participation in a defined contribution plan impacts retirement income adequacy in September 2010 (VanDerhei, September 2010), and was later used to compute Retirement Savings Shortfalls for Baby Boomers and Generation Xers in October 2010 (VanDerhei, October 2010a).
- In October testimony before the Senate Health, Education, Labor and Pensions Committee on “The Wobbly Stool: Retirement (In)security in America,” the model was used to analyze the relative importance of employer-provided retirement benefits and Social Security (VanDerhei, October 2010b).
- The November 2010 *EBRI Issue Brief* expanded upon earlier work by EBRI to provide the first results of a new simulation model that estimated the impact of changing 401(k) plan design variables and assumptions on retirement income adequacy. Until recently however, there was extremely limited evidence on the impact of automatic contribution escalation (VanDerhei and Lucas, 2010).
- In February 2011, the model was used to analyze the impact of the 2008–2009 crisis in the financial and real estate markets on retirement income adequacy (VanDerhei, February 2011).
- An April 2011 article introduced a new method of analyzing the results from RSPM<sup>®</sup> (VanDerhei, April 2011). Rather than simply computing an overall percentage of the simulated life-paths in a particular cohort that would not have sufficient retirement income to pay for the simulated expenses, the new method computed the percentage of households that would meet that requirement more than a specified percentage of times in the simulation.
- As explored in the June 2011 *EBRI Issue Brief*, RSPM<sup>®</sup> allowed retirement income adequacy to be assessed at retirement ages later than 65 (VanDerhei and Copeland, June 2011).
- In a July 2011 *EBRI Notes* article (VanDerhei, July 2011), RSPM<sup>®</sup> was used to provide preliminary evidence of the impact of the “20/20 caps” on projected retirement accumulations proposed by the National Commission on Fiscal Responsibility and Reform.
- The August 2011 *EBRI Notes* article (VanDerhei, August 2011) used RSPM<sup>®</sup> to analyze the impact of DB plans in achieving retirement income adequacy for Baby Boomers and Gen Xers.
- In September of that year, it was used to support testimony before the Senate Finance Committee (VanDerhei, September 2011) in analyzing the potential impact of various types of tax-reform options on retirement income. This was expanded in the November 2011 *EBRI Issue Brief* (VanDerhei, November 2011).
- A March 2012 *EBRI Notes* article (VanDerhei, March 2012) used new survey results to update the analysis of the potential impact of various types of tax-reform options on retirement income.
- The May 2012 *EBRI Notes* article (VanDerhei, May 2012) provided 2012 updates for the previously published RRRs as well as RSS.
- The June 2012 *EBRI Notes* article (VanDerhei, June 2012) introduced severity categories in the RSS projections for Gen Xers.
- The August 2012 *EBRI Notes* article (VanDerhei, August 2012) provided additional evidence on whether deferring retirement to age 70 would provide retirement income adequacy for the vast majority of Baby Boomers and Gen Xers.
- The September 2012 *EBRI Notes* article (VanDerhei, September 2012) analyzed the impact of increasing the default-contribution rate for automatic enrollment 401(k) plans with automatic escalation of contributions.
- The November 2012 *EBRI Notes* article (VanDerhei, November 2012) reclassified the RRRs to provide additional information on those substantially above the threshold; close to the threshold; and substantially below the threshold.

- The March 2013 *EBRI Notes* article (VanDerhei and Adams, March 2013) used a modified version of RSPM<sup>®</sup> to assess the probability that respondent households would not run short of money in retirement if they did, in fact, accumulate the amount they said would be required in the 2013 Retirement Confidence Survey.
- The June 2013 *EBRI Issue Brief* (VanDerhei, June 2013a) used RSPM<sup>®</sup> to provide a direct comparison of the likely benefits under specific types of DC and DB retirement plans.
- The June 2013 *EBRI Notes* article (VanDerhei, June 2013b) used RSPM<sup>®</sup> to show that 25–27 percent of Baby Boomers and Gen Xers who would have had adequate retirement income under return assumptions based on historical averages were simulated to end up running short of money in retirement if today’s historically low interest rates were assumed to be a permanent condition.
- The August 2013 *EBRI Issue Brief* (VanDerhei, August 2013) used RSPM<sup>®</sup> to analyze the Obama administration’s fiscal year (FY) 2014 budget proposal to include a cap on tax-deferred retirement savings that would limit the amounts accumulated in specified retirement accounts to that necessary to provide the maximum annuity permitted for a tax-qualified DB plan under current law.
- The December 2013 *EBRI Notes* article (VanDerhei, December 2013) used RSPM<sup>®</sup> to expand the analysis in the June 2013 *Issue Brief*. Rather than trying to reflect the real-world variation in DB accruals, the previous baseline analysis used the median accrual rate in the sample (1.5 percent of final compensation per year of participation) as the stylized value for the baseline counterfactual simulations. The new research computed the actual final-average DB accrual that would be required to provide an equal amount of retirement income at age 65 as would be produced by the annuitized value of the projected sum of the 401(k) and IRA rollover balances.
- The January 2014 *EBRI Notes* article (VanDerhei, January 2014) used RSPM<sup>®</sup> to model the likelihood that 401(k) participants currently ages 25–29 would have sufficient 401(k) accumulations that, when combined with Social Security benefits, could replace 60, 70 or 80 percent of their preretirement income on an inflation-adjusted basis.
- The February 2014 *EBRI Issue Brief* (VanDerhei, February 2014) focused on how the probability of not running short of money in retirement varies with respect to longevity, investment return, and potential long-term health care costs in retirement (e.g., nursing home costs).
- The June 2014 *EBRI Notes* article (VanDerhei, June 2014a) provided new results showing how many years into retirement Baby Boomer and Gen Xer households were simulated to run short of money, by preretirement income quartile.
- The simulation results for the June 2014 ERISA Advisory Council testimony (VanDerhei, June 2014b) suggested that, assuming no participant behavior change for participation, contribution or asset allocation resulting from reduced access to 401(k) balances, retirement balances from 401(k) plans, and IRA rollovers originating in 401(k) plans may be increased substantially for young employees with 30 or more years of eligibility if cashouts at job turnover, hardship withdrawals (and the accompanying suspension of contributions) and plan loan defaults were substantially reduced or eliminated.
- One of the major findings in each of the last five annual retirement income adequacy studies by EBRI was that the retirement income adequacy prospects for Gen Xers were approximately the same as Baby Boomers. However, recent studies by other organizations suggest Gen Xers will fare much worse than the Boomers. Unfortunately, these studies appear to be plagued by either explicitly ignoring future contributions to defined contribution plans or failing to account for the recent changes in many defined contribution plans to incorporate automatic enrollment features (including automatic escalation of contributions). The August 2014 *EBRI Notes* article (VanDerhei, August 2014) analyzed the likely impact of this error and concluded that ignoring future contributions exaggerates the percentage of Gen-X workers simulated to run short of money in retirement by roughly 10 to 12 percentage points among all but the lowest-income group.

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## Endnotes

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<sup>1</sup> A brief chronology of the EBRI Retirement Security Projection Model® (RSPM) is provided in the appendix. See VanDerhei (February 2011) for additional detail on the impact of the 2007–2009 crises in the financial and real estate markets on retirement income adequacy.

<sup>2</sup> VanDerhei (February 2014).

<sup>3</sup> See VanDerhei (February 2014) for details.

<sup>4</sup> In this analysis, Early Boomers are defined as those born between 1948 and 1954; Late Boomers as born between 1955 and 1964; and Gen Xers as born between 1965 and 1974.

<sup>5</sup> Standard & Poor's 500 Index increased 31.3 percent in 2013.

<sup>6</sup> Social Security Administration (2013).

<sup>7</sup> It should be noted that there are alternative modifications possible that would result in the same aggregate financial situation for the Social Security Trust Fund but would have different distributional consequences (e.g., adding a new bend point in the Primary Insurance Amount (PIA) formula that would result in a larger reduction for those with a larger average indexed monthly earnings value).

<sup>8</sup> This number is somewhat smaller than the \$4.3 trillion reported in VanDerhei (May 2012); however the 2012 number was generated prior to the time the stochastic rate of return assumptions for RSPM were reset in 2013 (see VanDerhei June 2013a for more detail). Both the 2012 and 2014 aggregate deficits are smaller than the \$4.6 trillion reported in VanDerhei (October 2010b); however, the baseline assumptions used in the 2010 analysis did not provide for the utilization of net housing equity to ensure retirement income adequacy. When the 2012 analysis is repeated with the same assumptions as used in 2010, the aggregate deficit actually increases to \$4.8 trillion.



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