

Performance Update

As of October 31, 2020

Panorama Premier
variable annuity

- Not a bank or credit union deposit or obligation
- Not insured by any federal government agency
- Not FDIC or NCUA-insured
- Not guaranteed by any bank or credit union
- May go down in value

Panorama Premier

A deferred variable annuity is a long-term investment designed to help you accumulate assets for retirement. It also offers a broad array of investment choices and asset classes, fixed accounts, death benefit choices and multiple methods to turn those assets into a stream of guaranteed income at some point in the future. (Guarantees are based on the claims-paying ability of the issuing company and do not apply to the investment performance or the safety of amounts held in the variable investment choices.) Variable annuities are not appropriate for everyone. There are fees and charges associated with owning an annuity. **Variable annuities are subject to market risk, including the potential loss of principal.** Also, withdrawals of earnings will be subject to income tax and may be subject to a 10 percent federal income tax penalty if taken prior to age 59 ½.

Panorama Premier first became available (in most states) on January 23, 1996, but many of the underlying funds were established before this date. For these funds, the total returns are computed using hypothetical variable annuity unit values which are based on the underlying fund's performance less separate account expenses for the periods shown, including periods before the product was available. For periods of one year or less, the total return is not annualized and is the percentage change in an Accumulation Unit. For periods greater than one year, the average annual total return for the time periods is shown.

Past performance is no indication of future results. This update contains the most recent month-end performance. Since performance changes daily, the current performance may be lower or higher than the performance reflected in this update. The investment return and principal value of an investment will fluctuate so that an investor's shares, when redeemed, may be worth more or less than their original cost. For the most recent month-end performance information, visit our website at www.massmutual.com or call the MassMutual Customer Service Center at (800) 272-2216, Monday – Friday, 8 a.m. to 8 p.m. Eastern Time.

Investing involves risk, including the loss of principal. Each investment choice underlying the variable annuity contract has broad risks that apply to all investment choices, such as market risk, as well as specific risks inherent in particular types of investment choices that may subject your variable annuity contract to greater risk and volatility than the general market.

Investors should carefully consider the investment objectives, risks, charges and expenses of the variable annuity contract before making additional purchase payments. For this and other information, obtain the [Panorama Premier prospectus](#) from your registered representative. The prospectus should be read carefully before investing or sending money. You may also obtain the [prospectuses \(or summary prospectuses, if available\)](#) for its underlying investment choices from your registered representative.

Market Indices as of October 31, 2020

	YTD	1 Year	3 Years	5 Years	10 Years
S&P 500 Index	2.77%	9.71%	10.42%	11.71%	13.01%
Morgan Stanley Capital International World Index	-1.42%	4.36%	5.96%	8.13%	8.64%
Russell 2000 Total Return Index	-6.77%	-0.14%	2.19%	7.27%	9.64%
Bloomberg Barclays U.S. Aggregate Bond Index	6.32%	6.19%	5.06%	4.08%	3.55%

Market indices have been provided for informational purposes only; they are unmanaged and reflect no fees or expenses. Individuals cannot invest directly in an index.

The Standard & Poor's 500 Index is an unmanaged measure of common stock total return performance in the U.S.

The Morgan Stanley Capital International World Index is an unmanaged measure of total return performance in the global securities market.

The Russell 2000 Total Return Index is a broad based, unmanaged index comprised of 2000 of the smallest U.S. domiciled company common stocks (on the basis of capitalization) that are traded in the United States on the New York Stock Exchange, the American Stock Exchange, and NASDAQ.

The Bloomberg Barclays U.S. Aggregate Bond Index is an unmanaged index of U.S. corporate bond issues, U.S. Government Securities and mortgage-backed securities.

Total Returns reflect annualized separate account expenses of 1.40% and all fund level expenses. **These returns do not reflect contingent deferred sales charges, the annual maintenance charge, or premium taxes, if any.** Their inclusion would reduce the returns shown.

Asset Category	Separate Account Sub-account	Fund Inception Date	Endnotes	Cumulative YTD	Average Annual				
					1 Year	3 Years	5 Years	10 Years	Since Inception
Asset Allocation	MML Conservative Allocation	8/31/2007	1	-0.38%	1.85%	2.87%	3.58%	4.38%	3.70%
	MML Balanced Allocation	8/31/2007	1	-0.55%	2.11%	2.98%	4.00%	5.02%	3.77%
	MML Moderate Allocation	8/31/2007	1	-2.63%	0.58%	2.51%	4.11%	5.45%	3.87%
	MML Growth Allocation	8/31/2007	1	-2.68%	1.35%	2.84%	4.85%	6.41%	4.12%
	MML Aggressive Allocation	8/31/2007	1	-4.38%	0.44%	2.65%	5.30%	7.14%	4.26%
Money Market	Invesco Oppenheimer V.I. Government Money <i>7-day yield: -1.45%</i>	4/3/1985	4	-0.94%	-0.99%	-0.28%	-0.67%	-1.02%	1.86%
	MML U.S. Government Money Market <i>7-day yield: -1.46%</i>	12/16/1981	3	-0.93%	-0.97%	-0.28%	-0.65%	-1.02%	2.31%
Fixed Income	Invesco Oppenheimer V.I. Global Strategic Income	4/3/1985		6.64%	6.26%	4.03%	3.19%	3.44%	3.99%
	Invesco Oppenheimer V.I. Total Return Bond	5/3/1993	5	-3.92%	-2.77%	-0.16%	1.23%	1.45%	3.90%
	MML High Yield	5/3/2010		-3.52%	-1.84%	0.25%	3.45%	4.57%	4.89%
	MML Inflation-Protected and Income	8/30/2002		7.14%	7.20%	3.95%	3.06%	1.81%	2.66%
	MML Managed Bond	12/16/1981	4	3.53%	3.29%	3.12%	2.32%	1.97%	5.62%
	MML Short-Duration Bond	5/3/2010		-1.16%	-0.96%	0.41%	0.46%	0.39%	0.65%
	MML Total Return Bond	8/9/2010	4	5.61%	5.16%	3.62%	2.44%	1.64%	1.48%
Balanced	Invesco Oppenheimer V.I. Conservative Balanced	2/9/1987	6	6.25%	8.19%	5.11%	4.88%	5.55%	5.54%
	MML Blend	2/3/1984		1.24%	5.64%	5.59%	6.67%	7.87%	7.27%
Large Cap Value	MML Equity	12/31/1973	7	-12.98%	-7.89%	-0.18%	3.45%	6.92%	8.09%
	MML Equity Income	5/31/2002	8	-17.57%	-12.60%	-1.53%	3.74%	6.50%	4.41%
	MML Fundamental Value	8/10/2010	4	-15.22%	-10.16%	-2.04%	2.07%	6.27%	4.48%
	MML Income & Growth	8/31/1998	8	-16.19%	-12.24%	-2.36%	3.37%	6.56%	3.83%
Large Cap Blend	Fidelity® VIP Contrafund®	1/3/1995		15.84%	23.41%	12.47%	11.89%	11.60%	9.98%
	Invesco Oppenheimer V.I. Main Street	7/5/1995		-0.40%	5.49%	6.56%	8.07%	9.96%	7.30%
	Invesco V.I. Diversified Dividend	9/20/1999	9	-13.37%	-9.48%	-0.18%	2.93%	7.67%	1.43%
	MML Equity Index	5/1/1997		1.36%	7.87%	8.46%	9.71%	10.98%	6.22%
	MML Focused Equity	12/8/2011	4	-2.47%	2.81%	9.19%	10.61%	—	10.30%
	MML Fundamental Equity	12/8/2011	4, **	4.56%	11.69%	11.65%	11.51%	—	10.88%
Large Cap Growth	MML Growth & Income	4/30/2003	8	-1.42%	5.22%	7.53%	9.03%	10.42%	6.78%
	Invesco Oppenheimer V.I. Capital Appreciation	4/3/1985		16.66%	25.70%	14.54%	11.75%	11.71%	9.04%
	MML Blue Chip Growth	5/31/2002	8	20.02%	28.39%	16.34%	15.54%	15.34%	9.25%
Small / Mid Cap Value	MML Large Cap Growth	8/31/1999	8	16.84%	25.75%	14.58%	13.39%	12.44%	4.53%
	MML Mid Cap Value	8/31/1999	8	-13.61%	-8.55%	-0.91%	4.22%	8.38%	6.67%
Small / Mid Cap Blend	MML Small/Mid Cap Value	4/30/2003	8	-16.61%	-11.94%	-4.82%	1.90%	6.39%	6.37%
	MML Small Cap Equity	6/1/1998		-4.56%	1.83%	2.01%	6.34%	9.32%	4.85%

Asset Category	Separate Account Sub-account	Fund Inception Date	Endnotes	Cumulative YTD	Average Annual				
					1 Year	3 Years	5 Years	10 Years	Since Inception
Small / Mid Cap Growth	Invesco Oppenheimer V.I. Discovery Mid Cap Growth	8/15/1986		17.24%	24.29%	14.89%	13.64%	13.54%	8.58%
	MML Mid Cap Growth	8/31/1998	8	5.74%	12.28%	10.36%	11.01%	12.47%	10.45%
	MML Small Cap Growth Equity	5/3/1999		5.43%	13.05%	10.72%	11.31%	11.21%	7.59%
International / Global	Invesco Oppenheimer V.I. Global	11/12/1990		4.88%	12.52%	6.41%	8.62%	8.57%	8.50%
	Invesco Oppenheimer V.I. International Growth	5/13/1992		1.11%	8.87%	1.07%	3.81%	4.96%	5.51%
	MML Foreign	8/31/1999	8	-14.84%	-11.71%	-7.29%	-2.02%	0.33%	1.06%
	MML Global	8/31/1999	8	-5.85%	-0.56%	3.60%	6.21%	7.91%	2.47%
Specialty	Invesco V.I. Health Care	5/21/1997		-1.40%	10.95%	8.72%	5.18%	10.24%	7.23%
	Invesco V.I. Technology	5/20/1997		26.76%	36.06%	18.08%	16.69%	13.22%	6.35%
	MML Managed Volatility	5/1/2000	10	-2.01%	-0.02%	0.92%	2.27%	4.43%	2.10%
	PIMCO CommodityRealReturn® Strategy	6/30/2004	4	-10.14%	-7.35%	-5.17%	-3.26%	-7.09%	-3.08%
	VY® Clarion Global Real Estate	1/3/2006		-19.55%	-19.61%	-2.43%	-1.20%	2.36%	0.55%

Standardized Total Returns - With Full Surrender

For the Period Ending: September 30, 2020

These standardized returns assume a single \$1,000 purchase payment made at the beginning of the periods shown, and full surrender on the last business day of the most recent calendar quarter. Standardized Total Returns reflect total separate account expenses of 1.40%, annual maintenance charge (contract level charges) of \$30.00 allocated proportionately for each Sub-account, all fund level expenses, and Contingent Deferred Sales Charges (CDSC) –

Contract Year: 1 2 3 4 5 6 7 8+
 7% 6% 5% 4% 3% 2% 1% 0%

These returns do not reflect the charges for any premium taxes, if any. Their inclusion would reduce the returns shown.

Asset Category	Separate Account Sub-account	Date Added to Separate Account	Endnotes	Cumulative YTD	Average Annual					Since Date Added to Separate Account
					1 Year	3 Years	5 Years	10 Years		
Asset Allocation	MML Conservative Allocation	1/22/2008	1	-6.42%	-3.75%	1.62%	3.71%	4.64%	3.97%	
	MML Balanced Allocation	1/22/2008	1	-6.57%	-3.28%	1.80%	4.27%	5.31%	4.20%	
	MML Moderate Allocation	1/22/2008	1	-8.37%	-4.42%	1.44%	4.57%	5.80%	4.48%	
	MML Growth Allocation	1/22/2008	1	-8.24%	-3.32%	1.95%	5.55%	6.83%	4.99%	
	MML Aggressive Allocation	1/22/2008	1	-9.65%	-3.61%	1.89%	6.26%	7.63%	5.41%	
Money Market	Invesco Oppenheimer V.I. Government Money <i>7-day yield: -1.45%</i>	1/31/1996	4, *	-7.83%	-7.87%	-2.02%	-1.34%	-1.09%	0.68%	
	MML U.S. Government Money Market <i>7-day yield: -1.46%</i>	5/1/2006	3	-7.82%	-7.86%	-2.02%	-1.32%	-1.09%	-0.51%	
Fixed Income	Invesco Oppenheimer V.I. Global Strategic Income	1/3/1996		-0.37%	-0.60%	2.42%	2.67%	3.46%	2.00%	
	Invesco Oppenheimer V.I. Total Return Bond	8/31/1999	5, *	-10.44%	-8.35%	-1.80%	0.83%	1.61%	3.73%	
	MML High Yield	5/3/2010		-10.23%	-8.80%	-1.44%	3.21%	4.80%	4.89%	
	MML Inflation-Protected and Income	4/30/2003		0.23%	0.47%	2.37%	2.52%	2.05%	2.55%	
	MML Managed Bond	9/30/1999	4	-3.59%	-3.62%	1.38%	1.74%	1.94%	3.53%	
	MML Short-Duration Bond	5/3/2010		-8.32%	-7.96%	-1.44%	-0.28%	0.34%	0.56%	
	MML Total Return Bond	5/1/2012	4	-1.37%	-1.63%	1.89%	1.83%	—	1.77%	
Balanced	Invesco Oppenheimer V.I. Conservative Balanced	4/30/2000	6	0.15%	2.57%	3.89%	5.04%	5.99%	2.72%	
	MML Blend	4/30/1999		-3.93%	1.81%	4.92%	7.55%	8.28%	4.04%	
Large Cap Value	MML Equity	4/30/1999	7	-18.23%	-12.46%	-1.29%	4.39%	7.46%	2.23%	
	MML Equity Income	5/31/2002		-22.95%	-17.93%	-2.68%	4.83%	6.80%	4.44%	
	MML Fundamental Value	5/1/2012	4	-20.71%	-14.81%	-3.22%	3.08%	—	5.49%	
	MML Income & Growth	8/31/1998		-21.46%	-16.97%	-3.29%	4.44%	6.93%	3.86%	
Large Cap Blend	Fidelity® VIP Contrafund®	8/31/1998		11.26%	22.06%	12.38%	13.59%	12.35%	8.34%	
	Invesco Oppenheimer V.I. Main Street	8/31/1999		-4.97%	2.28%	5.27%	9.61%	10.75%	4.42%	
	Invesco V.I. Diversified Dividend	4/30/2000	9	-18.91%	-15.08%	-1.52%	3.32%	7.82%	1.14%	
	MML Equity Index	4/30/1999		-3.07%	5.25%	8.35%	11.38%	11.66%	4.42%	
	MML Focused Equity	5/1/2012	4	-5.40%	-1.03%	9.06%	12.98%	—	11.44%	
	MML Fundamental Equity	5/1/2012	4, **	-0.14%	8.58%	11.96%	13.32%	—	11.84%	
	MML Growth & Income	4/30/2003		-5.92%	0.87%	7.49%	10.40%	11.06%	6.95%	
Large Cap Growth	Invesco Oppenheimer V.I. Capital	8/31/1999		11.42%	23.24%	14.43%	13.54%	12.45%	5.61%	
	MML Blue Chip Growth	5/31/2002		14.34%	24.44%	16.97%	17.52%	16.22%	9.42%	
	MML Large Cap Growth	8/31/1999		11.59%	22.10%	14.79%	14.97%	13.20%	4.65%	
Small / Mid Cap Value	MML Mid Cap Value	8/31/1999		-19.98%	-14.79%	-2.38%	4.85%	8.47%	6.67%	
	MML Small/Mid Cap Value	4/30/2003		-25.50%	-21.04%	-7.17%	1.54%	6.30%	6.14%	
Small / Mid Cap Blend	MML Small Cap Equity	8/31/1998		-13.08%	-5.75%	-0.19%	6.21%	9.47%	6.04%	

Asset Category	Separate Account Sub-account	Date Added to Separate Account	Endnotes	Cumulative YTD	Average Annual				
					1 Year	3 Years	5 Years	10 Years	Since Date Added to Separate Account
Small / Mid Cap Growth	Invesco Oppenheimer V.I. Discovery Mid Cap Growth	8/31/1999		8.47%	16.65%	14.44%	13.84%	13.96%	4.95%
	MML Mid Cap Growth	8/31/1998		-1.29%	4.90%	9.38%	11.70%	12.85%	10.51%
	MML Small Cap Growth Equity	4/30/1999		-5.77%	3.29%	7.84%	10.66%	10.99%	7.42%
International / Global	Invesco Oppenheimer V.I. Global	8/31/1999		-0.09%	12.64%	6.64%	10.10%	9.21%	7.29%
	Invesco Oppenheimer V.I. International Growth	1/31/1996	.	-2.77%	8.89%	1.05%	5.15%	5.61%	5.54%
	MML Foreign	8/31/1999		-17.17%	-10.83%	-7.18%	-0.55%	1.10%	1.25%
	MML Global	8/31/1999		-8.81%	-2.47%	3.58%	7.95%	8.76%	2.65%
Specialty	Invesco V.I. Health Care	4/30/2000		-5.44%	12.91%	6.53%	6.09%	10.80%	6.14%
	Invesco V.I. Technology	4/30/2000		20.12%	33.98%	18.27%	18.83%	14.09%	0.28%
	MML Managed Volatility	4/30/2000	10	-7.77%	-4.90%	-0.26%	2.31%	4.76%	2.15%
	PIMCO CommodityRealReturn® Strategy	5/1/2006		-17.31%	-13.04%	-6.43%	-4.10%	-6.66%	-5.02%
	VY® Clarion Global Real Estate	5/1/2006		-22.57%	-20.90%	-3.08%	-0.17%	3.05%	2.10%

The Panorama Premier variable annuity contract contains five MML Asset Allocation Funds ("funds of funds") that are designed to help investors meet their financial goals. These funds consist of certain, but not all, underlying funds available within the Panorama Premier variable annuity contract. The percentages below represent the of assets as of the report date. The percentages may vary from the target allocation, which can be found in the corresponding fund prospectus. The percentages below are rounded so they may not total 100%.

Asset Class	MML Conservative Allocation Fund	MML Balanced Allocation Fund	MML Moderate Allocation Fund	MML Growth Allocation Fund	MML Aggressive Allocation Fund
Underlying Funds					
Fixed Income					
Invesco Oppenheimer V.I. Global Strategic Income Fund	2%	2%	1%	1%	1%
MML Dynamic Bond Fund (DoubleLine)	13%	11%	9%	4%	1%
MML High Yield Fund (Barings)	2%	2%	2%	1%	1%
MML Inflation-Protected and Income Fund (Barings)	4%	3%	2%	4%	2%
MML Managed Bond Fund (Barings)	20%	17%	13%	8%	3%
MML Total Return Bond Fund (MetWest)	11%	9%	7%	4%	1%
American Funds Insurance Series® – Bond					
Total Fixed Income	57%	49%	38%	25%	11%
Large Cap Equity					
Invesco Oppenheimer V.I. Main Street Fund	1%	1%	1%		1%
MML Blue Chip Growth Fund (T. Rowe Price)	3%	4%	5%	6%	7%
MML Equity Income Fund (T. Rowe Price)	3%	3%	4%	5%	5%
MML Equity Index (Northern Trust)	1%	1%	1%	1%	1%
MML Focused Equity Fund (Wellington)	4%	5%	6%	7%	9%
MML Fundamental Growth Fund (Wellington)	2%	4%	3%	4%	5%
MML Fundamental Value Fund (Wellington)	3%	3%	4%	5%	5%
MML Income & Growth Fund (Barrow Hanley)	3%	3%	4%	5%	6%
MML Large Cap Growth Fund (Loomis Sayles)	1%	2%	2%	2%	2%
	21%	26%	30%	35%	41%
Mid Cap Equity					
Invesco Oppenheimer V.I. Discovery Mid Cap Growth Fund	1%	1%	1%	1%	1%
MML Mid Cap Growth Fund (T. Rowe Price)	3%	4%	5%	6%	8%
MML Mid Cap Value Fund (American Century)	3%	4%	4%	5%	5%
	7%	9%	10%	12%	14%
Small Cap Equity					
MML Small Cap Growth Equity Fund (Wellington)	1%	1%	1%	1%	1%
MML Small Company Value Fund (T. Rowe Price)	1%	1%	1%	2%	2%
MML Small/Mid Cap Value Fund (AllianceBernstein)	1%	1%	1%	1%	1%
	3%	3%	3%	4%	4%
International/Global					
Invesco Oppenheimer V.I. Global Fund	1%	1%	1%	2%	3%
Invesco Oppenheimer V.I. International Growth Fund	1%	1%	1%	1%	1%
MML Foreign Fund (Templeton)	2%	2%	3%	3%	4%
MML Global Fund (MFS®)	5%	5%	8%	10%	11%
MML International Equity Fund (Harris)	2%	3%	3%	4%	5%
MML Strategic Emerging Markets Fund (Oppenheimer)	1%	1%	3%	4%	6%
American Funds Insurance Series® – International					
	12%	13%	19%	24%	30%
Total Equity	43%	51%	62%	75%	89%
Total Allocation	100%	100%	100%	100%	100%

Credited Fixed Account Interest Rates Effective November 1, 2020

Current interest rates and guaranteed minimum interest rates vary by issue state and issue date. Credited rates will not be less than the minimum guaranteed interest rate as of a contract's issue date. Guarantees are based on the claims-paying ability of the issuing company.

The Fixed Account	Previous Rate	New Rate	Change
New Money Rate	3.00%	3.00%	0.00%
Portfolio Rate	3.00%	3.00%	0.00%
Exchange Dollars from Flex Extra	3.00%	3.00%	0.00%
DCA Fixed Accounts			
<i>Rates for all states, where available, except New York¹</i>			
6 Month DCA	3.00%	3.00%	0.00%
6 Month DCA Effective Yield	0.66%	0.66%	0.00%
12 Month DCA	3.00%	3.00%	0.00%
12 Month DCA Effective Yield	1.40%	1.40%	0.00%
DCA Fixed Accounts			
<i>Rates for New York¹</i>			
6 Month DCA - NY	3.00%	3.00%	0.00%
6 Month DCA Effective Yield - NY	0.66%	0.66%	0.00%
12 Month DCA - NY	3.00%	3.00%	0.00%
12 Month DCA Effective Yield - NY	1.40%	1.40%	0.00%

Rates listed are applicable for new sales and subsequent payments. If a contract offered a guaranteed minimum interest rate different than the current applicable base interest rate listed, the contract holder will receive the higher of the two rates. The product, certain features and/or investment choices may not be available in all states or with all firms contracted with MassMutual.

¹ Current rates on DCA Fixed Accounts are subject to change monthly. The 6-Month DCA Fixed Account rate is guaranteed for 6 months. The 12-Month DCA Fixed Account rate is guaranteed for 12 months. These rates are credited to the respective DCA Fixed Accounts and do not reflect the performance of any investment choices. Certain restrictions apply. The stated interest rate is not earned on the entire purchase payment amount due to regular transfers to the variable investment choices that will affect the daily accrual, lowering the effective yield. Additionally, any subsequent purchase payments applied to an existing DCA Fixed Account term will participate in only the remaining portion of that DCA term, lowering the effective yield further on the subsequent purchase payments. The effective yield is based on your initial deposit after the completion of your DCA Fixed Account transfers. Dollar Cost Averaging does not assure a profit or protect against loss in a declining market, and involves continuous investment in securities regardless of fluctuating prices. An investor should consider his/her ability to continue investing through periods of low price levels. See the appropriate product prospectus for complete details.

Endnotes

1 Funds offered in a fund-of-funds structure may have higher expenses than a direct investment in the underlying funds because a fund-of-funds bears its own expenses and indirectly bears its proportionate share of expenses of the underlying funds in which it invests.

2 **An investment in the Fund is neither insured nor guaranteed by the Federal Deposit Insurance Corporation or by any other government agency. Although the Fund seeks to maintain a stable net asset value per share, it is possible to lose money by investing in the Fund.**

The yield quotation more closely reflects the current earnings of the Fund than the total return quotation. It is an annualized rate based on results over the last seven days of the period, and is net of all recurring contract fees and charges.

3 **An investment in the Fund is neither insured nor guaranteed by the Federal Deposit Insurance Corporation or by any other government agency. Although the Fund seeks to preserve the value of your investment at \$1.00 per share, it is possible to lose money by investing in the Fund.**

The yield quotation more closely reflects the current earnings of the Fund than the total return quotation. It is an annualized rate based on results over the last seven days of the period, and is net of all recurring contract fees and charges.

Although the Oppenheimer Government Money Fund/VA commenced operations on April 3, 1985, the information necessary to calculate the returns is available only for the year 1987 and subsequent periods.

- 4 The fund established a new class of shares, which is available with this contract, after it began its initial investment operations. The performance for the period prior to offering the new class shows the historical returns for the original class of shares, which were not subject to a 12b-1 fee. The performance shown from the inception date of the class available with this contract includes the fees and expenses of that share class, including a 12b-1 fee. A 12b-1 fee reduces a fund's performance.
- 5 Unavailable in contracts issued on or after May 1, 2009. For contracts issued prior to May 1, 2009, you may not allocate any new money to this fund via purchase payments or transfers.
- 6 Unavailable in contracts issued on or after April 30, 2012.
- 7 Although the MML Equity Fund commenced operations on 9/15/1971, the information necessary to calculate returns is available only for 1974 and later years.
- 8 The historical performance shown reflects a combination of the current underlying fund's performance, as well as the performance of a prior fund. The current fund's performance is reflected beginning on 5/1/06. The prior fund's performance covers the period between the date listed in the performance table and 4/30/06.
- 9 Effective April 29, 2011, Invesco V.I. Financial Services Fund merged into Invesco V.I. Dividend Growth Fund. Performance prior to that day reflects performance of the Invesco V.I. Financial Services Fund and performance on and after that date reflects performance of the Invesco V.I. Dividend Growth Fund.
- 10 Formerly known as MML Large Cap Value Fund. The Fund's name, investment objective, and investment strategy changed on April 29, 2013. The performance results prior to April 29, 2013 would not necessarily have been achieved had the Fund's current strategy been in effect during that period.
- ** Formerly known as American Century VP Income & Growth.

* Since Date Added to the Separate Account returns shown are for C.M. Life Insurance Company issued contracts. For contracts issued by MassMutual, the sub-account was added to the Separate Account on 08/31/1998. The Since Date Added to the Separate Account returns for the impacted funds of MassMutual issued contracts are listed in table below.

Separate Account Sub-account	Standardized Total Returns - w/Full Surrender
Invesco Oppenheimer V.I. Money	0.32%
Invesco Oppenheimer V.I. Core Bond	1.57%
Invesco Oppenheimer V.I. International Growth	5.26%

Panorama Premier (Contract Form #: MUVA94) variable annuity contract was issued by Massachusetts Mutual Life Insurance Company in New York and New Jersey, and by C.M. Life Insurance Company in all other states. C.M. Life Insurance Company, 100 Bright Meadow Boulevard, Enfield, CT 06082, is a subsidiary of Massachusetts Mutual Life Insurance Company, 1295 State Street, Springfield, MA 01111-0001.

We no longer offer this contract for sale to the public.

Contract owners may continue, however, to make purchase payments to their contracts.

Principal Underwriters:

MML Investors Services, LLC
MML Strategic Distributors, LLC

Subsidiaries of Massachusetts Mutual Life Insurance Company, 1295 State Street Springfield, MA 01111-0001

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