2016 Review of Actuarial Methods and Assumptions

The 2016 full year review of actuarial methods and assumptions resulted in an increase in insurance and investment contract liabilities of $655 million, net of reinsurance, and a decrease in net income attributed to shareholders of $453 million.

For the year ended December 31, 2016 ($ millions)	Change in gross insurance and investment contract liabilities	Change in net insurance and investment contract liabilities	Change in net income attributed to shareholders
JH Long Term Care triennial review	$ 696	$ 696	$ (452)
Mortality and morbidity updates	(12)	(53)	76
Lapse and policyholder behavior			
U.S. Variable Annuities guaranteed minimum withdrawal benefit incidence and utilization	(1,024)	(1,024)	665
Other lapses and policyholder behaviour	516	431	(356)
Economic reinvestment assumptions	459	443	(313)
Other updates	719	162	(73)
Net impact	**$ 1,354**	**$ 655**	**$ (453)**

JH Long Term Care triennial review

U.S. Insurance completed a comprehensive long-term care experience study. This included a review of mortality, morbidity and lapse experience, as well as the reserve for in-force rate increases filed as a result of the 2013 review. In addition, the Company implemented refinements to the modelling of future tax cash flows for long-term care. The net impact of the review was a $452 million charge to net income attributed to shareholders for the year ended December 31, 2016.

Expected future claims costs increased primarily due to claims periods being longer than expected in policy liabilities, and a reduction in lapse and mortality rates. This increase in expected future claims costs was partially offset by a number of items, including expected future premium increases resulting from this year's review and a decrease in the margin for adverse deviations related to the rate of inflation embedded in our benefit utilization assumptions.

The review of premium increases assumed in the policy liabilities resulted in a benefit to earnings of $1.0 billion for the year ended December 31, 2016; this includes future premium increases that are due to our 2016 review of morbidity, mortality and lapse assumptions, and outstanding amounts from our 2013 state filings. Premium increases averaging approximately 20% will be sought on the vast majority of the in-force business, excluding the carryover of 2013 amounts requested. Our assumptions reflect the estimated timing and amount of state approved premium increases. Our actual experience obtaining price increases could be materially different than we have assumed, resulting in further increases or decreases in policy liabilities, which could be material.

Mortality and morbidity updates

Mortality and morbidity assumptions were updated across several business units to reflect recent experience, including updates to morbidity assumptions for certain medical insurance products in Japan, leading to a $76 million benefit to net income attributed to shareholders for the year ended December 31, 2016.

Updates to lapses and policyholder behaviour

U.S. Variable Annuities guaranteed minimum withdrawal benefit incidence and utilization assumptions were updated to reflect recent experience which led to a $665 million benefit to net income attributed to shareholders for the year ended December 31, 2016. We updated our incidence assumptions to reflect the favourable impact of policyholders taking withdrawals later than expected. This was partially offset by an increase in our utilization assumptions.

In Japan, lapse rates for term life insurance products were increased at certain durations which led to a $228 million charge to net income attributed to shareholders for the year ended December 31, 2016. Other updates to lapse and policyholder behavior assumptions were made across several product lines, including term products in Canada, which led to a $128 million charge to net income attributed to shareholders for the year ended December 31, 2016.

Updates to economic reinvestment assumptions

The Company updated economic reinvestment assumptions for risk-free rates used in the valuation of policy liabilities which resulted in a $313 million charge to net income attributed to shareholders for the year ended December 31, 2016. These updates included a proactive 10 basis point reduction to our URR assumptions and a commensurate change in our calibration criteria for stochastic risk-free rates. These updates reflect the fact that interest rates are lower than they were when the current prescribed URR and calibration criteria for stochastic risk-free rates were promulgated by the Actuarial Standards Board ("ASB") in 2014. The ASB has indicated that it will update the promulgation periodically, when necessary. We expect the promulgation to be updated in 2017 and, if required, we will make further updates to our economic reinvestment assumptions at that time.