STATE OF WISCONSIN
Department of Employee Trust Funds
A. John Voelker
SECRETARY

Wisconsin Department
of Employee Trust Funds
PO Box 7931
Madison WI 53707-7931
1-877-533-5020 (toll free)
Fax 608-267-4549
etf.wi.gov

Correspondence Memorandum

Date: May 26, 2021

To: Employee Trust Funds Board

From: Cindy Klimke-Armatoski, Chief Trust Finance Officer
Division of Trust Finance

Subject: Sick Leave Conversion Credit Programs Actuarial Valuation

ETF requests the Employee Trust Funds Board (Board) approve the Sick Leave Conversion Credit Programs Actuarial Valuation as of December 31, 2020.

Gabriel Roeder Smith & Company (GRS) has completed the actuarial valuation of the Sick Leave Conversion Credit programs, which includes the Accumulated Sick Leave Conversion Credit (ASLCC) Program and the Supplemental Health Insurance Conversion Credit (SHICC) Program. The results of the study are summarized below (millions $):

	December 31,	
	2020	2019
Actuarial Accrued Liability	$2,796.2	$2,623.0
Actuarial Value of Assets	$2,796.2	$2,622.9
Unfunded Actuarial Accrued Liability	0.0	0.1
Funded Ratio	100.0%	100.0%

GRS is recommending the following contribution rates for 2022, which reflects a decrease in the rates for both programs.

	ASLCC Program		SHICC Program		Total	
	2022	2021	2022	2021	2022	2021
Employer Normal Cost	0.7%	0.8%	0.1%	0.3%	0.8%	1.1%

Actuaries from GRS will be at the meeting to present the report and to answer any questions.

Attachment: Wisconsin Sick Leave Conversion Credit Programs Annual Actuarial Valuation as of December 31, 2020

Reviewed and approved by John Voelker, Secretary

Electronically Signed 6/1/21

Board	Mtg Date	Item #
ETF	06.17.21	4B

Wisconsin Sick Leave Conversion Credit Programs

Presented to the Wisconsin Department of Employee Trust Funds

Annual Actuarial Valuation

December 31, 2020

800.521.0498 | P: 248.799.9000 | www.grsconsulting.com

May 28, 2021

Employee Trust Funds Board
Wisconsin Retirement System
4822 Madison Yards Way
Madison, Wisconsin 53705

Ladies and Gentlemen:

The results of the **Annual Actuarial Valuation** of benefit liabilities and costs of the Accumulated Sick Leave Conversion Credit (ASLCC) Program and the Supplemental Health Insurance Conversion Credit Program (SHICC) are presented in this report. This report should not be relied upon for any other purpose. The recommended contribution rates are shown below:

	Wiscraft	Other State Employers	Weighted Average
ASLCC Rate	1.0%	0.7%	0.7%
SHICC Rate	0.3%	0.1%	0.1%
Total	1.3%	0.8%	0.8%

The date of the valuation was **December 31, 2020**.

The valuation was based upon data, furnished by the Department of Employee Trust Funds, concerning retired and non-retired participants and pertinent financial information.

Future actuarial measurements may differ significantly from those presented in this report due to such factors as experience differing from that anticipated by actuarial assumptions, changes in plan provisions, actuarial assumptions/methods or applicable law. Due to the limited scope of this assignment, we did not perform an analysis of the potential range of future measurements.

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

The valuation was completed in accordance with standards of practice prescribed by the Actuarial Standards Board and in conformance with Chapter 40 of the Wisconsin Statutes. To the best of our knowledge, this report is complete and accurate, and the actuarial methods and assumptions produced results which are reasonable. Brian B. Murphy, Mark Buis, and James D. Anderson are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor.

Respectfully submitted,

Brian B. Murphy
FSA, EA, FCA, MAAA, PhD

Mark Buis
FSA, EA, FCA, MAAA

James D. Anderson
FSA, EA, FCA, MAAA

BBM/MB/JDA:rmn

COMBINED RESULTS AND DISCUSSION

Wisconsin Sick Leave Conversion Credit Programs
ASLCC Plus SHICC
Computed Total Employer Contribution Rates

The financial objectives of the ASLCC and SHICC Programs are to establish and receive contributions to support benefits that will remain approximately level from year to year. Combined program valuation results for the last 10 years are presented below:

Valuation Date December 31	Fiscal Year Ending December 31	ASLCC	SHICC	Total	UAAL* Amortization Years
2011	2013	0.9%	0.4%	1.3%	14
2012^	2014	0.9%	0.5%	1.4%	13
2013	2015	0.8%	0.4%	1.2%	12
2014	2016	0.8%	0.4%	1.2%	11
2015^	2017	0.9%	0.4%	1.3%	10
2016	2018	0.8%	0.4%	1.2%	9
2017	2019	0.8%	0.3%	1.1%	8
2018^	2020	0.9%	0.3%	1.2%	7
2019	2021	0.8%	0.3%	1.1%	6
2020	2022	0.7%	0.1%	0.8%	5

** Unfunded actuarial accrued liabilities.*

^ Assumption change.

Comments

- Based on the policy established at the June 2002 ETF Board meeting, the amortization period for Unfunded Actuarial Accrued Liabilities (UAAL) was closed. Therefore, the remaining period will decline one year at a time until the UAAL is fully amortized.

- The State of Wisconsin issued Pension Obligation Bonds in 2003 that paid off the majority of unfunded liabilities of the ASLCC Program.

- In computing the rates in this report, we used the Frozen Initial Liability (FIL) method. This method was used because the Pension Obligation Bond paid off unfunded liabilities for some, but not all employers, requiring separate contribution rates for some of the employers. This method is described further on page 15. For comparison purposes, we have also calculated the funded status using the Entry Age Normal method. On this basis, the ASLCC Program is 114.5% funded and the SHICC Program is 121.1% funded.

- In total, during 2020, investment return on a market value basis was above the assumed level of 7.0%. Under the asset valuation method, gains and losses are phased-in over a five-year period, resulting in a 10.5% return on an actuarial value of assets basis. Overall, contribution rates for the December 31, 2020 valuation decreased from the prior year primarily due to favorable investment performance and lower than expected premiums.

- The Market Value of Assets exceeds the Actuarial Value of Assets by approximately 10.0% as of the valuation date. The statutory asset valuation method will recognize all of the differences between actuarial value and market value over four future years. Given realization of the actuarial assumptions, including the 7.0% investment return assumption, the result will be downward pressure on contribution rates.

Wisconsin Sick Leave Conversion Credit Programs
Summary of Participant Data
December 31, 2020

Active Participants

	State Employees (Non-University)	University	University Hospital	Total
Number	33,220	31,347	9,532	74,099
Annual Payroll	$2,053,388,106	$ 2,394,918,114	$655,053,085	$ 5,103,359,305
Accrued Unused Sick Days	2,727,926 days	2,810,532 days	364,619 days	5,903,077 days
Averages: Age	44.7 years	46.2 years	40.5 years	44.8 years
Service	11.4 years	10.7 years	7.9 years	10.6 years
Sick Leave Days	82.1 days	89.7 days	38.3 days	79.7 days

Terminated Vested Participants

Number	ASLCC Sick Leave Balance	SHICC Sick Leave Balance	Total Sick Leave Balance
423	$17,193,204	$11,014,908	$28,208,112

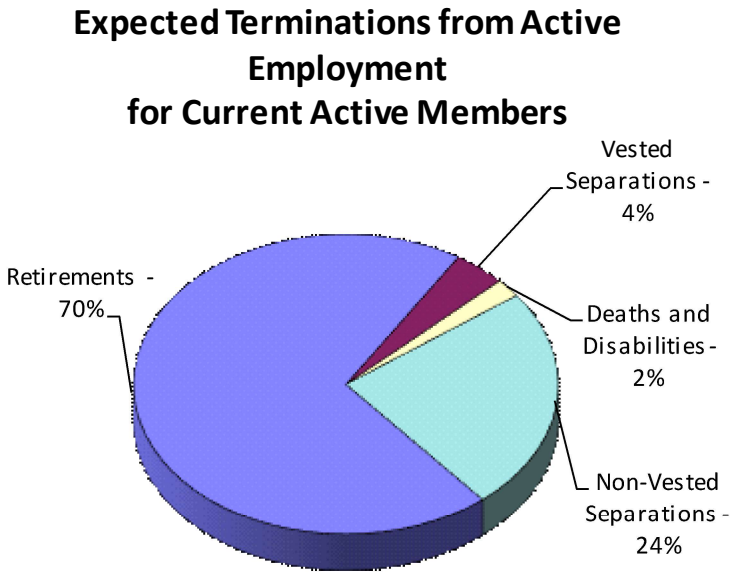
Members noted above terminated with 20 or more years of service and are eligible to begin using sick leave credits to cover health care costs upon reaching retirement age.

Retirees and Beneficiaries Provided by ETF

Status	Number	ASLCC Sick Leave Balance	SHICC Sick Leave Balance	Total Sick Leave Balance
Annuitants Actively Using Sick Leave Credits	17,979	$609,822,789	$ 988,055,617	$1,597,878,406
Escrowed/On-Hold Annuitants	5,804	262,195,771	190,539,606	452,735,377
Total	23,783	$872,018,560	$1,178,595,223	$2,050,613,783

In addition to the counts above, an additional 15,857 annuitants were excluded from the valuation due to having an account status of closed or being reported with a $0 sick leave balance.

Wisconsin Sick Leave Conversion Credit Programs
Expected Development of Present Population
December 31, 2020



The chart above shows the expected future development of the present population in simplified terms. The Sick Leave Conversion Credit Programs presently covers 74,099 active members. Eventually, 24% of the population is expected to terminate covered employment prior to retirement and forfeit eligibility for sick leave benefits. About 74% of the present population is expected to be eligible for sick leave conversion credits either by retiring directly from active service, or by retiring from vested deferred status. The remaining 2% of the present population is expected to become eligible for sick leave conversion credits due to death-in-service or disability retirement.

Wisconsin Sick Leave Conversion Credit Programs
Average Premium Development
December 31, 2020

	Total	Rate Category Pre-65	Rate Category Post-65
1. Number*	18,106	4,171	13,935
2. Monthly Premium Amounts for Retirees Currently in Pay Status*	$ 13,179,921	$5,250,009	$7,929,912
3. Annual Premiums for Retirees Currently in Pay Status: (2)x12	$158,159,052		
4. Reported Premiums from Financial Statements	$156,004,006		
5. Ratio of Reported to Annualized Premium Amounts: (4)/(3) not less than 1	1.0		
6. Adjusted Monthly Premiums: (2)/(1)x(5)		**$ 1,258.69**	**$ 569.06**
First Prior Year		$ 1,331.31	$ 603.99
Second Prior Year		$ 1,227.59	$ 663.64

* *Retirees with an account status of active and a premium amount populated in the data provided (some of whom have exhausted their sick leave credits). Excludes pre-65 retirees currently enrolled in a Medicare health care plan. These members were excluded from the average premium calculation because the averages are used to project future premiums of people not covered by Medicare. The number counts above were used strictly for developing average premiums and may be different from retiree counts shown throughout this report.*

For retirees provided with a premium amount, a sick leave account balance and an account status of active the premium amounts supplied in the data were used directly. In the case of individuals under age 65, they were assumed to convert to the average post-65 premium upon attainment of age 65 pro-rated for the ratio of their pre-65 premium to the average pre-65 premium. For non-retired members, the average projected pre-65 premium was applied to age 65 and the average projected post-65 premium was applied after age 65.

Wisconsin Sick Leave Conversion Credit Programs
Summary of Assets
December 31, 2020

	ASLCC Program	SHICC Program	Total
Beginning Balance	$1,591,772,775	$1,031,100,598	$2,622,873,373
Adjustment	8,513,683	(8,634,103)	(120,420)
Adjusted Beginning Balance	$1,600,286,458	$1,022,466,495	$2,622,752,953
Revenues			
Contributions	$ 45,222,516	$ 15,080,311	$ 60,302,827
Investment Income	164,760,484	105,654,833	270,415,317
Total Revenues	$ 209,983,000	$ 120,735,144	$ 330,718,144
Expenses			
Insurance Premiums	$ 106,522,088	$ 49,481,918	$ 156,004,006
Other	0	0	0
Administration	662,952	639,658	1,302,610
Total Expenses	$ 107,185,040	$ 50,121,576	$ 157,306,616
Ending Balance - December 31, 2020	$1,703,084,418	$1,093,080,063	$2,796,164,481
Internal Rate of Return	10.5%	10.5%	10.5%

The amounts shown above are based on the Market Recognition Account (MRA) and were provided by ETF.

Wisconsin Sick Leave Conversion Credit Programs
Unfunded Actuarial Accrued Liability (UAAL)
December 31, 2020

	Wiscraft
Balance December 31, 2019	$ 83,440
Balance December 31, 2020	**$ 67,948**
ASLCC UAAL	**$ 37,832**
SHICC UAAL	**$ 30,116**
Annual Payroll	$3,322,941
ASLCC Contribution Rate	
Normal Cost	0.7%
UAAL	0.3%
Total	1.0%
SHICC Contribution Rate	
Normal Cost	0.1%
UAAL	0.2%
Total	0.3%
Total Contribution Rate	**1.3%**

Annual payroll and UAAL balance for Wiscraft were provided by ETF.

ASLCC PROGRAM RESULTS

Section 40.05(4)(b)
Accumulated Sick Leave Conversion Credit Program
Summary of Accumulation and Payment Conditions

Accumulation. The average annual sick leave balance of Wisconsin State employees (other than University employees) in 2020 was 82.1 days. Based upon an average of 11.4 years of service, this would correspond to an average annual addition of 7.2 days per year to sick leave accounts for past years. For University and University Hospital employees, the average balance was 77.7 days. Based upon an average of 10.1 years of service, this would correspond to an average annual addition of 7.7 days per year to the sick leave accounts for past years. For purposes of estimating sick leave balances at retirement, each individual was assumed to continue using sick leave at the same rate as in the past but not less than 25% nor more than 75% of the person's annual accrual rate (usually 16.25 days).

Eligibility for Payment of Accrued Sick Leave. Termination of employment with 20 or more years of service or eligibility for an immediate annuity from the Wisconsin Retirement System. State elected officials and certain State administrative officials terminating before their minimum service retirement age retain eligibility for benefits at their minimum service retirement age providing they do not elect a WRS separation benefit.

Amount of Payment for Unused Sick Leave. A conversion credit is computed at the time of retirement or death by multiplying the number of days of unused sick leave by the highest basic pay rate. The conversion credit is then used to cover the cost of health insurance premiums for the employee and eligible dependents. Unused portions are carried forward from year to year without interest and when total health insurance premiums paid on behalf of the retired employee equal or exceed the conversion credit, no further payments are made under the ASLCC Program. Payments from the sick leave account may be escrowed indefinitely after retirement for participants who provide evidence of comparable health insurance coverage from another source.

Method for Calculating Active Member Sick Leave Credits. The process for projecting active members' sick leave balances to retirement and converting it to a credit is outlined below:

1. Start with the members current unused sick leave balance in the data provided.
2. Accumulate sick leave accruals from current age to retirement age using the members historical accrual rate subject to a minimum and maximum value which depends on what group they are in (See Accumulation section above).
3. Calculate total unused sick leave balance at time of retirement (1. + 2.).
4. Project pay from valuation date to retirement using actuarial assumptions.
5. Convert total unused sick leave days into sick leave credits by taking 3. x 4. where 3. is converted into hours and 4. is an hourly rate.

40.05(4)(B) - ASLCC Program
Development of Normal Cost

	Actuarial Present Value of	December 31 2020	December 31 2019
(1)	Future amount to be paid on behalf of present retirees and beneficiaries currently using sick leave credits to pay for health benefits[1]	$ 375,826,907	$ 393,002,134
(2)	Future amount to be paid on behalf of present retirees and beneficiaries with sick leave credits currently in escrow[2]	80,794,149	73,138,518
(3)	Future amount to be paid on behalf of terminated vested members	12,526,840	12,018,955
(4)	Future amount to be paid on behalf of current active members	1,582,494,120	1,504,211,027
(5)	Total Actuarial Present Value	$ 2,051,642,016	$ 1,982,370,634
(6)	Assets	1,703,084,418	1,591,772,775
(7)	Unfunded Actuarial Accrued Liabilities (UAAL)	$ 37,832	$ 45,326
(8)	Present Value of Future Normal Cost: (5) - (6) - (7)	$ 348,519,766	$ 390,552,533
(9)	Present Value of Future Salary	$47,020,163,669	$47,393,481,846
(10)	Normal Cost: (8) / (9) (not to exceed last year's rate + 0.2%)	0.7%	0.8%
(11)	Actuarial Accrued Liability (EAN)	$ 1,487,122,832	$ 1,461,598,531
(12)	Funded Status (EAN)	114.5%	108.9%

(1) *Includes liability for any retirees and beneficiaries who were provided with a sick leave credit balance and a status of active in the data provided by ETF for the valuation.*

(2) *Includes liability for any retirees and beneficiaries who were provided with a sick leave credit balance and an account status of escrowed or on-hold. See the Miscellaneous and Technical Assumptions for additional details.*

40.05(4)(B) - ASLCC Program
Computed Employer Contributions
December 31, 2020

Contributions for	Computed Employer Contribution Rate as a % of Covered Payroll
Normal Cost	0.7%
UAAL*	0.0%
Total	**0.7%**

** Unfunded actuarial accrued liabilities of $37,832 were amortized over 5 years. Although this results in a 0.0% of pay contribution due to rounding, unfunded liabilities are allocated to individual employers as shown on page 7 and employers having an unfunded liability will make a separate contribution towards this unfunded liability.*

Discussion

The financial objective of the ASLCC Program is to establish and receive contributions to support benefits that will remain approximately level from year to year. In 2003, the State of Wisconsin issued Pension Obligation Bonds which paid off the majority of unfunded liabilities of the ASLCC Program. Since unfunded liabilities remained for certain employers, the funding method was changed to the Frozen Initial Liability Actuarial Cost Method. Under this method, gains and losses arising from the difference between actual and assumed experience are reflected in the determination of the normal cost. Separate amortization schedules are established for employers with unfunded liabilities (see page 7), resulting in separate contribution rates for each participating employer.

40.05(4)(B) - ASLCC Program
Comparative Statement of Results

Valuation Date December 31	No. Active	Covered Payroll $ Millions	Average Age	Average Service	Average Accr. Sick Days	$ Millions Assets	$ Millions UAAL	Average Computed Employer Rate
2001	64,510	$2,980.6	44.5	11.8	80.9	$ 611.7	$ 218.7	1.7%
2002	66,442	3,096.7	44.8	11.8	80.9	619.0	262.6	1.8%
2003^&	68,366	3,349.0	45.0	11.8	80.9	1,085.1	10.9	0.9%
2004	68,269	3,400.0	45.4	12.0	83.1	1,154.0	9.5	0.9%
2005	67,460	3,410.0	45.6	12.2	84.3	1,196.0	9.3	0.8%
2006^	67,892	3,592.5	45.8	12.2	85.5	1,272.7	9.2	0.7%
2007	68,789	3,726.4	45.9	12.2	87.1	1,394.4	7.2	0.6%
2008	69,720	3,878.0	45.9	12.1	85.1	1,402.8	8.9	0.6%
2009^	69,964	3,950.5	46.1	12.3	86.5	1,409.7	9.1	0.8%
2010^	69,920	3,962.1	46.3	12.3	86.9	1,416.1	9.0	0.8%
2011	66,533	3,905.5	45.9	11.9	86.2	1,373.1	8.8	0.9%
2012^	66,846	3,991.4	45.8	11.8	85.2	1,335.3	8.5	0.9%
2013	68,511	4,234.1	45.8	11.7	86.2	1,414.4	8.2	0.8%
2014	71,314	4,538.8	45.7	11.6	85.5	1,467.1	7.3	0.8%
2015^	71,520	4,613.4	45.5	11.4	84.5	1,490.1	0.1	0.9%
2016	71,587	4,677.2	45.2	11.0	82.0	1,517.3	0.1	0.8%
2017	71,945	4,781.0	45.0	10.9	80.7	1,565.2	0.1	0.8%
2018^	71,670	4,948.6	45.0	10.8	80.0	1,552.5	0.1	0.9%
2019*	73,159	5,177.5	44.9	10.7	78.9	1,591.8	0.0	0.8%
2020*	74,099	5,103.4	44.8	10.6	79.7	1,703.1	0.0	0.7%

^ *Assumption change.*

& *Method change.*

* *UAAL component shows $0 due to rounding.*

SHICC Program Results

Supplemental Health Insurance Conversion Credit Program
December 31, 2020

The SHICC plan provides matching credits for participants retiring with 15 or more years of State service as follows:

- Protective: Match up to 78 hours (9.75 days) per full year of service through 24 years, plus 104 hours (13 days) per full year of service over 24 years.
- Others: Match up to 52 hours (6.5 days) per full year of service through 24 years, plus up to 104 hours (13 days) per full year of service over 24 years.

The results below are for the SHICC Program only. (The results on page 9 are for the ASLCC Program only.) The SHICC plan accrued liabilities are offset by SHICC plan assets which are accounted for separately by ETF.

Contributions for	Computed Employer Contribution Rate as a % of Covered Payroll
Normal Cost	0.1%
UAAL*	0.0%
Total	**0.1%**

* *Unfunded actuarial accrued liabilities of $30,116 were amortized over 5 years. Although this results in a 0.0% of pay contribution due to rounding, unfunded liabilities are allocated to individual employers as shown on page 7 and employers having an unfunded liability will make a separate contribution towards this unfunded liability.*

The contribution rate shown above was developed based upon the active participant data as shown on page 5. This is the same data that was used in the development of the ASLCC plan rates.

Development of SHICC Program Present Value of Future Benefits (PVFB)

For purposes of developing the PVFB associated with the SHICC program, the PVFB was first calculated in total then the PVFB associated with the ASLCC program was calculated and subtracted from the total to develop the PVFB for the SHICC program.

40.05(4)(B) – SHICC Program
Development of Normal Cost

	Actuarial Present Value of	December 31 2020	December 31 2019
(1)	Future amount to be paid on behalf of present retirees and beneficiaries currently using sick leave credits to pay for health benefits[1]	$ 429,486,183	$ 440,585,886
(2)	Future amount to be paid on behalf of present retirees and beneficiaries with sick leave credits currently in escrow[2]	41,411,702	35,941,356
(3)	Future amount to be paid on behalf of terminated vested members	6,731,218	6,660,764
(4)	Future amount to be paid on behalf of current active members	678,730,657	667,919,152
(5)	Total Actuarial Present Value	$ 1,156,359,760	$ 1,151,107,158
(6)	Assets	1,093,080,063	1,031,100,598
(7)	Unfunded Actuarial Accrued Liabilities (UAAL)	$ 30,116	$ 45,326
(8)	Present Value of Future Normal Cost: (5) - (6) - (7)	$ 63,249,581	$ 119,961,234
(9)	Present Value of Future Salary	$47,020,163,669	$47,393,481,846
(10)	Normal Cost: (8) / (9) (not to exceed last year's rate + 0.2%)	0.1%	0.3%
(11)	Actuarial Accrued Liability (EAN)	$ 902,497,255	$ 904,662,640
(12)	Funded Status (EAN)	121.1%	114.0%

(1) *Includes liability for any retirees and beneficiaries who were provided with a sick leave credit balance and a status of active in the data provided by ETF for the valuation.*

(2) *Includes liability for any retirees and beneficiaries who were provided with a sick leave credit balance and an account status of escrowed or on-hold. See the Miscellaneous and Technical Assumptions for additional details.*

SHICC Plan
Comparative Statement of Results

Valuation Date December 31	No. Active	Covered Payroll $ Millions	Average Age	Average Service	Average Accr. Sick Days	$ Millions Assets	$ Millions UAAL	Average Computed Employer Rate
2010^	69,920	$3,962.1	46.3	12.3	86.9	$ 782.3	$ 7.2	0.4%
2011	66,533	3,905.5	45.9	11.9	86.2	771.5	7.4	0.4%
2012^	66,846	3,991.4	45.8	11.8	85.2	774.3	7.3	0.5%
2013	68,511	4,234.1	45.8	11.7	86.2	837.7	7.4	0.4%
2014	71,314	4,538.8	45.7	11.6	85.5	887.0	6.5	0.4%
2015^	71,520	4,613.4	45.5	11.4	84.5	919.7	0.1	0.4%
2016	71,587	4,677.2	45.2	11.0	82.0	951.5	0.1	0.4%
2017	71,945	4,781.0	45.0	10.9	80.7	993.3	0.1	0.3%
2018^	71,670	4,948.6	45.0	10.8	80.0	999.0	0.1	0.3%
2019*	73,159	5,177.5	44.9	10.7	78.9	1,031.1	0.0	0.3%
2020*	74,099	5,103.4	44.8	10.6	79.7	1,093.1	0.0	0.1%

^ *Assumption change.*

* *UAAL component shows $0 due to rounding.*

ACTUARIAL METHODS AND ASSUMPTIONS

Actuarial Valuation Method

The actuarial funding method prescribed in the statute for WRS is the **Frozen Initial Liability Actuarial Cost Method**. This funding method is also used for the Wisconsin Sick Leave Conversion Credit Programs valuation. Under this method, the amount of remaining unfunded actuarial accrued liabilities at any valuation date is affected only by the monthly amortization payments, compound interest, the added liability created by new employer units, and any added liabilities caused by changes in benefit provisions.

Actuarial gains or losses arising from the difference between actual and assumed experience are reflected in the determination of the normal cost. In this manner, experience gains or losses in any year are amortized (spread) over the average future working lifetime of the active participant group.

Asset Valuation Method

The asset valuation method used for Wisconsin Sick Leave Conversion Credit Programs valuation is referred to as the "Market Recognition Account" or MRA. It is a statutory method. The MRA recognizes assumed returns fully each year. Differences between actual and assumed returns are phased-in over a closed 5-year period. The objective is to give recognition to long-term changes in asset values while minimizing the effect of short-term fluctuations in the capital markets. In accordance with its smoothing objective, the MRA will tend to exceed the market value when the markets are doing poorly, and will fall short of the market value when markets are doing well.

Actuarial Methods and Assumptions Used in Valuations

The principal areas of risk assumption are:

- Long-term ***rates of investment return*** likely to be generated by system assets;
- ***Rates of mortality*** among participants, retirees and beneficiaries;
- ***Rates of withdrawal*** of active participants;
- ***Rates of disability*** among participants;
- ***Patterns of salary increases*** to be experienced by participants;
- The age and service ***distribution of actual retirements; and***
- Future ***rates of sick leave usage*** by plan participants.

In an actuarial valuation, the actuary projects the monetary effect of each risk assumption for each distinct experience group, for the next year and for each year over the next half-century or longer.

Once actual risk experience has occurred and been observed, it will not coincide exactly with assumed risk experience, regardless of the skill of the actuary, the completeness of the data, and the precision of the calculations. Each valuation provides a complete recalculation of assumed future risk experience and takes into account all past differences between assumed and actual risk experience. The result is a continual series of small adjustments to the computed contribution rate. From time to time it becomes necessary to adjust the package of risk measurements to reflect basic experience trends -- but not random year to year fluctuations.

Annual Actuarial Valuations
Assumptions Adopted by ETF Board After Consulting with Actuary

Economic Assumptions

The rationale for these assumptions is based upon an experience study covering the period 2015-2017.

The long-term rates of investment return used in making the valuation was 7.0% a year, compounded yearly.

The **Wage Inflation Rate** assumed in this valuation was 3.00% per year. The wage inflation rate is defined to be the portion of total pay increases for an individual that is due to macro-economic forces including productivity, price inflation, and labor market conditions. The wage inflation rate does not include pay changes related to individual merit and seniority effects.

No specific **Price Inflation** assumption is required to perform this valuation. The price inflation assumption used to evaluate the investment return assumption is 2.5%.

Trend Rate. The adjusted premiums shown on page 5 were the basis for the development of liabilities for both the ASLCC and SHICC programs. An increase of 10% was applied to those premiums to account for secular trend, aging, etc. In addition, premiums were assumed to increase 3.0% in each future year. Because of the nature of this program and the objectives of this report, a more refined development of aging and trend assumptions was not deemed appropriate.

Salary adjustment factors used to project earnings for each participant between the valuation date and the participant's retirement age are shown below for sample years of service. This assumption is used to project a participant's current earnings to the earnings upon which benefits will be based.

Sick leave extracts were provided for State employees, University and University Hospital units of government. These extracts were then matched to our pension valuation data where assumptions are developed for the groups shown below:

% Merit and Longevity Increase Next Year						
		Exec. &	University	Public School	Protective	
Service	General	Elec.	Teachers	Teachers	With S.S.	W/O S.S.
1	3.5 %	2.5 %	3.0 %	5.6 %	4.8 %	5.5 %
2	3.5 %	2.5 %	3.0 %	5.6 %	4.8 %	5.5 %
3	3.1 %	2.0 %	2.9 %	5.2 %	4.1 %	4.7 %
4	2.8 %	1.6 %	2.8 %	4.7 %	3.5 %	3.8 %
5	2.5 %	1.1 %	2.7 %	4.3 %	2.8 %	3.0 %
10	1.5 %	0.2 %	2.2 %	2.6 %	1.1 %	0.9 %
15	1.1 %	0.2 %	1.7 %	1.4 %	0.8 %	0.5 %
20	0.9 %	0.2 %	1.2 %	0.6 %	0.7 %	0.4 %
25	0.6 %	0.2 %	0.9 %	0.3 %	0.6 %	0.3 %
30	0.4 %	0.2 %	0.7 %	0.2 %	0.5 %	0.2 %

If the number of active participants remains constant, then the total active participant payroll will increase 3.0% a year, the base portion of the individual salary increase assumptions. This increasing payroll was recognized in amortizing unfunded actuarial accrued liabilities.

Decrement Probabilities

The mortality table used was the Wisconsin 2018 Mortality Table adopted by the Board in connection with the 2015-2017 Experience Study. The rates in this table were based on actual WRS experience adjusted for future mortality improvements using the MP-2018 fully generational improvement scale. In accordance with the experience study's in-depth review of Wisconsin-specific mortality experience, the MP-2018 fully generational improvement scale was multiplied by a 60% factor. This approach will be reviewed in the next experience study covering 2018-2020. Sample retirement values from this table are shown below. This assumption is used to measure the probabilities of participants dying before retirement and the probabilities of each benefit payment being made after retirement.

Single Life Expectancy
Wisconsin 2018 Mortality Table

Sample Attained Ages in 2020	Future Life Expectancy (Years)*	
	Males	Females
40	45.4	48.3
45	40.3	43.2
50	35.3	38.2
55	30.4	33.2
60	25.8	28.4
65	21.4	23.7
70	17.1	19.2
75	13.2	15.0
80	9.7	11.1
85	6.8	7.9

** Based on retirements in 2020. Retirements in future years will reflect improvements in life expectancy.*

The values shown above are for non-disabled participants.

Active Participant Mortality Rates

Sample Attained Ages in 2020	Mortality Rates*	
	Males	Females
20	0.000135	0.000081
25	0.000165	0.000091
30	0.000214	0.000124
35	0.000380	0.000224
40	0.000500	0.000310
45	0.000621	0.000462
50	0.000805	0.000668
55	0.001873	0.001205
60	0.002713	0.001760
65	0.004161	0.002634
70	0.006737	0.004356
75	0.011283	0.007870
80	0.020691	0.014823

** Based on mortality improvements to 2020. Future years will reflect improvements in mortality.*

This assumption is used to measure the probability of participants dying while in service.

Rates of Retirement for Those Eligible to Retire

Normal Retirement Pattern

Age	General		Exec. &	University		Public School		Protective*	
	Males	Females	Elected	Males	Females	Males	Females	With S.S.	W/O S.S.
50								6%	2%
51								8%	4%
52								10%	4%
53								25%	17%
54								20%	23%
55								20%	25%
56								20%	25%
57	19%	17%	8%	12%	15%	33%	27%	20%	25%
58	19%	17%	8%	12%	15%	29%	27%	20%	33%
59	19%	17%	8%	12%	10%	24%	27%	20%	33%
60	19%	17%	20%	12%	12%	25%	27%	20%	20%
61	19%	17%	12%	12%	16%	25%	27%	20%	20%
62	26%	27%	12%	12%	15%	35%	37%	30%	40%
63	29%	27%	12%	12%	20%	32%	30%	30%	40%
64	28%	27%	15%	12%	20%	29%	28%	30%	40%
65	30%	30%	15%	15%	20%	29%	37%	40%	40%
66	35%	35%	15%	20%	24%	35%	39%	40%	100%
67	30%	30%	15%	20%	20%	33%	33%	40%	100%
68	19%	25%	15%	18%	17%	27%	30%	40%	100%
69	19%	25%	20%	16%	17%	23%	28%	40%	100%
70	19%	25%	20%	20%	18%	25%	38%	100%	100%
71	19%	20%	20%	18%	18%	20%	20%	100%	100%
72	19%	20%	20%	16%	18%	15%	20%	100%	100%
73	19%	20%	20%	16%	15%	15%	20%	100%	100%
74	19%	20%	20%	16%	15%	15%	20%	100%	100%
75	100%	100%	100%	100%	100%	100%	100%	100%	100%

* *Includes reduced retirements.*

Reduced Retirement Pattern

Age	% Retiring Next Year						
	General		Exec. &	University		Public School	
	Males	Females	Elected	Males	Females	Males	Females
55	8.0%	7.0%	3.0%	3.0%	5.0%	13.0%	12.0%
56	8.0%	7.0%	3.0%	3.0%	5.0%	13.0%	12.0%
57	4.8%	5.5%	3.0%	3.0%	5.0%	12.0%	12.0%
58	5.7%	6.5%	3.0%	3.0%	5.0%	13.0%	12.0%
59	6.8%	7.0%	3.0%	4.0%	5.0%	14.0%	13.0%
60	8.5%	9.5%	5.0%	5.5%	9.0%	14.0%	17.0%
61	9.0%	9.5%	5.0%	5.5%	9.0%	15.0%	17.0%
62	17.0%	16.0%	2.0%	7.4%	12.0%	21.0%	23.0%
63	18.0%	18.0%	2.0%	7.4%	12.0%	21.0%	23.0%
64	17.0%	18.0%	2.0%	10.0%	15.0%	21.0%	23.0%

The assumed rates of separation from employment prior to service retirement due to disability and other causes are shown below for sample ages. For other terminations it was assumed that a percentage, depending on age of participants terminating after age 35 with 5 or more years of service, will leave their contributions on deposit and be paid a benefit at normal retirement age and that the remaining participants would take a separation benefit. The percentage taking a separation benefit is 25% at age 35, grading downward to 0% at retirement eligibility. All participants terminating prior to normal retirement age with less than 5 years of service were assumed to take a separation benefit.

Assumed Termination Rates
by Attained Age and Years of Service

		% of Active Participants Terminating								
		General		Exec. &	University		Public Schools		Protective	
Age	Service	Males	Females	Elected	Males	Females	Males	Females	With Soc. Sec.	Without Soc. Sec.
	0	17.0%	20.0%	14.0%	16.0%	14.5%	18.5%	15.0%	16.0%	4.0%
	1	12.3%	15.0%	13.0%	15.0%	14.0%	11.0%	11.0%	9.5%	3.5%
	2	9.3%	11.5%	12.0%	13.0%	13.0%	8.0%	8.0%	6.0%	1.5%
	3	7.6%	10.0%	10.0%	11.0%	10.0%	6.5%	6.0%	5.0%	1.3%
	4	7.5%	9.5%	10.0%	9.0%	9.5%	5.5%	5.5%	4.5%	1.2%
	5	5.8%	7.8%	5.0%	8.0%	9.0%	4.0%	5.0%	4.0%	1.1%
	6	4.8%	7.0%	5.0%	7.5%	7.0%	3.5%	4.0%	3.8%	1.0%
	7	4.7%	6.0%	5.0%	6.0%	6.0%	3.2%	3.7%	3.5%	0.9%
	8	4.1%	5.7%	5.0%	5.5%	5.0%	3.0%	3.3%	3.0%	0.8%
	9	4.0%	5.3%	5.0%	5.0%	4.0%	2.8%	3.0%	2.5%	0.7%
25	10 & Over	4.0%	5.0%	5.0%	5.0%	4.0%	2.5%	2.5%	2.5%	0.7%
30		3.7%	4.7%	5.0%	4.7%	4.0%	2.2%	2.4%	2.3%	0.7%
35		3.0%	3.9%	5.0%	4.2%	4.0%	1.8%	1.9%	2.0%	0.7%
40		2.4%	3.2%	5.0%	3.4%	3.7%	1.5%	1.5%	1.6%	0.6%
45		2.0%	2.7%	4.7%	2.7%	3.2%	1.4%	1.3%	1.4%	0.6%
50		1.7%	2.2%	4.2%	2.2%	2.7%	1.3%	1.2%	1.2%	0.5%
55		1.6%	2.0%	4.0%	2.0%	2.5%	1.3%	1.2%	1.2%	0.5%
60		1.6%	2.0%	4.0%	2.0%	2.5%	1.3%	1.2%	1.2%	0.5%

Disability Rates

	% of Active Participants Becoming Disabled									
	General		Exec. & Elected		University		Public Schools		Protective	
Age	Males	Females	Males	Females	Males	Females	Males	Females	With SS	W/O SS
20	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.03%
25	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.03%
30	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%	0.03%
35	0.01%	0.02%	0.01%	0.01%	0.00%	0.02%	0.00%	0.01%	0.01%	0.03%
40	0.02%	0.03%	0.01%	0.01%	0.00%	0.02%	0.01%	0.01%	0.02%	0.04%
45	0.04%	0.04%	0.01%	0.01%	0.01%	0.02%	0.02%	0.04%	0.02%	0.08%
50	0.09%	0.06%	0.02%	0.02%	0.01%	0.04%	0.06%	0.07%	0.04%	0.46%
55	0.17%	0.12%	0.09%	0.09%	0.04%	0.06%	0.12%	0.10%	0.61%	0.34%
60	0.30%	0.16%	0.11%	0.11%	0.06%	0.09%	0.19%	0.15%	1.02%	0.10%

Miscellaneous and Technical Assumptions

Active Member Data: For purposes of determining eligibility for the sick leave conversion credit programs, the active member data provided for the sick leave valuation was compared against the data provided for the active lives valuation. Only members with a corresponding record in the active lives data were included in the sick leave valuation. For each member, date of birth, gender and service credit were used as provided in the active lives data. Pay rate and sick leave specific information (sick leave balance, accrual rate, average usage) were used as provided in the sick leave data extract for purposes of calculating active member sick leave credits at retirement. For any members who did not have an accrual rate in the data provided, an assumed accrual rate of 16.25 days per year was used for non-University members and 9.00 days per year was used for University members. It was assumed that all active members would being using sick leave credits to pay for retiree health care immediately upon becoming eligible to do so.

Decrement Operation: Disability operates during the retirement pattern.

Decrement Relativity: Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Timing: Decrements of all types are assumed to occur mid-year.

Eligibility Testing: Eligibility for benefits is determined based upon the age nearest birthday and total service (in all benefit groups) nearest whole year on the date the decrement is assumed to occur.

Escrowed Liabilities: The actuarial accrued liability for annuitants with a sick leave account balance and an account status of escrowed or on-hold provided in the data was calculated by taking the balance on deposit for these annuitants multiplied by the ratio of the present value of future benefits for active status annuitants to the balance on deposit for active status annuitants multiplied by fifty percent. The fifty percent corresponds to the portion of the escrowed population that is assumed to begin using sick leave credits to pay for health insurance at some point in the future. This methodology was utilized for both the ASLCC Program and SHICC Program escrowed liabilities.

Liability Adjustments: Active liabilities were loaded by 4% to account for general unknowns, including but not limited to, potential missing data, the possibility of continuation to a spouse after death of the retiree, etc. SHICC plan retiree and deferred liabilities were loaded by 3% to account for potential continuation to a spouse after death of the retiree and other unknowns.

Miscellaneous and Technical Assumptions

Missing Premiums:	For any active annuitants with a sick leave balance but no premium in the data, the average premiums were used to develop liabilities.
Terminated Vested Members Usage:	For purposes of developing the present value of future benefits for terminated vested members, it was assumed that 100% of the members would begin using their sick leave credits to cover health care costs immediately upon reaching eligibility to do so.