

# **Florida Birth-Related Neurological Injury Compensation Association**

**Actuarial Review of Loss Reserves as of December 31, 2019,  
Including Additional Costs of the 2020 Birth/Accident Year**

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Regulation**

**Dated September 8, 2020**

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## **Part I. General Information**

### **Overall Funding of Liabilities, Including those of 2020:**

Pursuant to s. 766.314(7)(a), Florida Statutes, the Office of Insurance Regulation (“Office”) has undertaken an actuarial valuation of the assets and liabilities of the Florida Birth-Related Neurological Injury Compensation Association (“NICA”). The results of the review pertaining to the loss and defense costs from 2019 and prior years, as well as those estimated for 2020, of NICA provide best estimates of the needed loss and defense reserves at 12/31/2019 of \$602 million and the expected 2020 claims costs of \$37 million. The 2019 and prior costs compare favorably to the approximately \$918 million that NICA carried at 12/31/2019.

The \$37 million of new liabilities does not compare as favorably to the estimated \$27 million of assessments collected or to be collected by NICA. Those results are mitigated by the best estimate anticipated investment income beyond that backing discount of \$43 million. The overall loss costs are slightly less than those of the last study.

Those results are statistically-derived predictions of NICA’s future claim payouts. The actual results should be expected to vary from those predictions. As a guide to the ability of NICA to withstand worse-than-expected losses that might materialize during the next twelve months, the 65<sup>th</sup>, 75<sup>th</sup>, 85<sup>th</sup>, 90<sup>th</sup>, 95<sup>th</sup>, 98<sup>th</sup>, and 99<sup>th</sup> percentiles of the possible costs (values which the actual costs would not be expected to exceed in 65%, 75%, 85%, etc. of all possible cost scenarios) are listed in the table below:

**Various Percentiles of Possible 12/31/2019 Unpaid Loss and Defense Costs for 2020 and All Prior Years**

Percentage	Aggregate Costs
65%	\$ 700 million
75%	\$ 800 million
85%	\$ 1,000 million
90%	\$ 1,100 million
95%	\$ 1,350 million
98%	\$ 1,600 million
99%	\$ 1,800 million

NICA’s funds at 12/31/2019 of approximately \$1.439 billion held and \$8 million in then-uncollected assessments, would anticipate funding to an approximate 96% confidence level, an improvement over the 89% level in the previous study.

It must be noted that currently a very high percentage of physicians that are eligible to participate in NICA do so. Further, the credits offered by most medical malpractice insurers for NICA participation generally suggest that the insurers perceive participation in NICA to be a bargain. Therefore, should

losses turn adverse; it is likely that some limited price increases in future years would be accepted by physicians. So, NICA has some, but not unlimited, flexibility to buttress their ability to pay claims with future price increases. This suggests that policymakers might consider at some time how they will fund any gap between receipts and costs that could arise in the future.

### **Uncertainty:**

Actuarial uncertainty is high (as noted in the difference between the percentiles and the best estimate) with any group of claims that both pay over an extended period of time and whose payments increase with inflation. This body of liabilities is a clear example of that situation. Although a diligent attempt to identify and address all current and potential cost drivers was made, it is possible that some unusual event or series of events might cause costs to vary more significantly than anticipated. Within this study, no provision has been made for such events, beyond the projections by NICA. In particular, although the staff of NICA has made a significant effort (beyond industry standards, in the opinion of the Office) to account for this, it is possible that significant additional costs will arise as the parents of children<sup>1</sup> benefiting from NICA become unable to care for the children and nursing home care becomes necessary. Further, a certain number of children are in wheelchairs and other children may have health concerns that lead to health complications which would create unexpected additional nursing care and medical expenses. As noted earlier, NICA appears to have used better-than-industry standard methods to estimate the future lifespans of the children, but it is possible the lifespans will be generally longer or shorter in the aggregate due to remaining limitations of their methodology. Those risk factors are not susceptible to actuarial analysis and as such are not reflected in the computations of the percentiles.

The OIR notes that one extreme investment event, the COVID-19 pandemic, potentially affected investment returns and also occurred between year-end 2019 and the date of this report. However, NICA's exchange-traded investments had a market value of \$1.420 billion at 12/31/2019 yet retained a value of \$1.410 billion at 5/31/2020.

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<sup>1</sup> "Children" and "child" are used herein for the persons receiving injuries at birth which lead to claims, although some of those individuals are past the age of majority at present.

### **Comparison to Reserves Estimated by NICA’s Consulting Actuary:**

As the previous item shows, there is an exceptionally wide range of possible eventual costs for NICA. Again, that uncertainty is magnified by the likely long duration (over forty years on some claims) of benefits and the consequential highly leveraged impact of inflation, interest, medical technology, and life expectancy on future claim costs. Since inflation, interest, and life expectancy must be estimated, that creates a significant uncertainty in the present value of the claim costs. Further, the impact of any changes in medical technology is not estimable at present. Because of that uncertainty, any given specific point or local range has a fairly low probability of representing the actual cost that ultimately occurs. Since NICA’s consulting actuary, George Turner, uses a different actuarial approach, it would not be unusual for him to obtain a significantly different best estimate. Due to the extreme uncertainties involved, this should not be taken as an indication that his work is improper. However, although the reserve indication in the George Turner report report is higher than that in this report, this study does suggest a significantly wider range. In light of the unexpected but possible scenarios of, say, very high inflation without matching interest rates (which were seen in the United States around roughly 1980), it would appear that the OIR range is valid.

### **Going Forward Adequacy of NICA—2020 Birth Year:**

As noted earlier, the review of NICA’s 2020 loss costs suggests an actuarial central estimate of approximately \$37 million of costs on a present value (discounted) basis. That compares to current assessment levels of approximately \$27 million per year. Further, NICA typically has operating, etc. expenses of approximately \$2 million. This strongly suggests that the Association is encountering an operating loss on a birth year basis. However, the strength of NICA’s assets is expected, on average, to generate approximately \$43 million of investment income beyond that needed to fund one year of the discount built into our estimates, more than offsetting the difference. It is possible, though, that the additional investment income will end at some point. Considering the adequacy of NICA’s assets, it would likely, but cannot be guaranteed to, be some time before the assets become inadequate to fund the loss liabilities. However, the data suggests that if present trends continue that may eventually happen, perhaps far in the future. It is important to consider this and plan corrective actions some time before a problem arises.

NICA provided the following response during the last review:

“Although NICA’s outside actuaries employ different methodologies than those used in your report, the difference in the estimated loss and LAE reserves is not material using similar assumptions for inflation and investment income. As mentioned in your report, we recognize that the actuarial estimate of 2018 loss costs exceeds the current assessment level of approximately \$27 million. However, to date, the actual investment income / inflation differential has exceeded the differential assumed by NICA’s actuaries to a degree that net assets have increased over time.

We recognize the potential variability in both investment income and NICA

expense inflation and NICA continues to monitor its actuarial position and investment structure closely. Claims data is reported to outside consulting actuaries and actuarial reserve evaluations are completed on a quarterly basis. In addition, a separate actuary performs a peer review of each quarterly evaluation.

NICA, with the assistance of its outside investment consultants, completes an asset allocation review and study approximately every two years. Revisions to the investment policy are made as necessary to satisfy the primary goal of earning sufficient investment return to ensure payment of all current and future liabilities. Actual investment results are monitored closely by NICA, its outside consultants and the Board of Directors.

While NICA recognizes that it may be necessary to increase the level of assessments at some point in the future, the current net assets and favorable investment results indicates that no increase is needed at present. NICA will continue to monitor its position closely.”

The Office will continue to review the adequacy of the going-forward funding of the Association in future studies.

## **Part II. Background**

### **Structure of NICA's Claim Process:**

NICA coverage is elected by obstetric physicians and midwives. Should a child meeting the eligibility requirements as set forth in Sections 766.301-316, Florida Statutes, suffer damage at birth as a result of a "birth-related neurological injury," when the treating obstetrician has elected NICA coverage the child's parents may bring a claim through NICA's protocols (via an administrative law judge system). Under the statutes, certain preconditions, such as the obstetrician having posted his/her NICA election for parents, and the timeliness of the claim presentation, must be met. An award of \$100,000, plus necessary medical and maintenance (e.g., modified vans, housing modifications) expenses for the lifetime of the claimant, may be made by a Division of Administrative Hearings ("DOAH") administrative law judge. Parties involved in the hearing may include the petitioner family, hospital and other entities involved in the birth, treating obstetrician, and NICA. The administrative law judge may determine that the claim is compensable or dismiss the claim. Potentially, the claim may be consequently appealed by any of the parties. The data shows evidence of all these scenarios. However, the data suggests that a relatively small percentage of claims are revised on appeal.

### **Claim Progression:**

Given the claim process discussed earlier, one may augment the process with the corresponding actions by NICA. A potential claim event initially occurs at the birth of a child. At that time, the claim has occurred, but has not yet been reported to NICA. So, the claim is referred to as "unreported." At some point, the claim is reported to NICA and a hearing date is presumably requested. After that, the claim is reported, but is considered a "pending" claim until it is "adjudicated" and an administrative law judge holds a hearing. During the hearing, the administrative law judge will either determine that benefits should be "awarded," or "dismiss" the claim. Subsequently, the claim moves into either awarded (NICA's terminology is "compensable") or dismissed status. Either way, it may be regarded as adjudicated. If the benefits are awarded, the costs are not always evaluated immediately, but are done as soon as practicable. Generally, after the year's end, NICA management has reviewed all the claims and projected the future payments of each one in a worksheet. Therefore, the claim is initially awarded, but is not "awarded and evaluated" or "pipeline" (both the Office's terminology) until the corresponding worksheet is prepared. Depending on the particulars of the claim and the type of dismissal, claims may be appealed. Claims are closed on either the final payout at the death of the child covered by an awarded claim, or a definite finding of dismissal and final payment of legal defense costs.

### **Class Action on Prior Nursing Care Provided by Family Members:**

NICA officials informed the Office during a previous (2012) review that a class action had been brought against NICA. The class action related to the amount of loss that was paid or could have been paid as reimbursement to family members for care provided to children covered by NICA benefits. This case was resolved some time ago. This affected payment rates for nursing care rendered in the past and for nursing care provided in the future. In conversations with NICA staff, the Office was told that on the vast majority of the affected claims this had been resolved. Therefore, no special analysis of this issue was performed.

### **Primary Data Available for Analysis:**

The primary data provided was an inception-to-date data extract, listing key paid-to-date and incurred-to-date, adjudication date, birth (accident) year, current status at DOAH, and other relevant coding as of 9/30/2019. The report included breakdowns between loss and defense (legal other than payments to claimant attorneys). The coding in those files was used to synthesize other information such as whether adjudicated claims were then classed as awarded or dismissed.

The second primary class of data was the worksheets prepared after 12/31/2018, during 2019, on claims classed as awarded. Sufficient detail for an estimate of the stream of future payments (after 2019) by calendar year was present in the worksheets. However, it was necessary to supplement the worksheets with inflation after 2019 cost levels and discounting for the investment income to be earned between 12/31/2019 and the time each payout is to be made.

### **Reinsurance Commutation:**

Previously, the Office was informed that NICA had once purchased reinsurance on claims from the 2003 and prior years. However, NICA indicated that that all the reinsurance has now been commuted.

### **The Impact of Investment Income and Inflation:**

NICA's serious claims have a typical duration of twenty years. During this time, NICA has a significant opportunity to earn income on its investment portfolio. However, it is also affected by inflation, which erodes the impact of the investment income. Both these forces can be expected to vary randomly and unpredictably over such a long time period. Of course, the final impact that matters in each future year is the excess of the effective interest rate NICA earns less the inflation they experience.

Discussions with NICA indicate that their investment philosophy changes from time to time, so use of a formal investment benchmark index such as the NYSE composite would not be appropriate. However, a fairly detailed history of NICA's invested assets and returns was available in their financials.

That was used to measure NICA's historic returns and to compare them to historic Consumer Price Index inflation rates. Then the variance and the tendency of the excess of interest over inflation to revert back to the long term average<sup>2</sup> or "mean" from one year to the next could be computed and used to simulate the range of possible costs that NICA might experience.

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<sup>2</sup> The actual estimated year-to-next year mean reversion was very high (over 90%). However, that might not reflect effects that are longer than from just one year to the next, so a factor of 0.7 was used in the simulations. As an example of how strong the mean reversion might be, note that although asset values decreased during the first stage of the COVID-19 event, by May 31, 2020 NICA's assets totaled more than their December 31, 2019 total.

## **Part III. Highlights of Reserving Approach**

### **Claim Classes Analyzed Separately:**

Due to data limitations and the desire to provide the best estimates possible, different classes and categories of loss dollars required separate analysis. Those classes were:

1. Loss and defense dollars on awarded 2019 and prior claims (those with worksheets).
2. Loss and defense dollars on 2019 and prior birth year claims that are projected to be awarded<sup>3</sup>.
3. Defense costs on claims expected to be dismissed in the future.
4. Costs of claims anticipated during the 2020 birth year.
5. “Unallocated loss expense” or claims handling costs associated with all the claims above.

The worksheets driving much of the analysis reflect streams of future payments made in successive future calendar years (at 2019 cost levels). All the analysis was done by projecting a payments stream in future calendar years, then applying inflation to (if needed) 2020 and beyond to the payment date and the amount of inflation/investment discount offset beyond 12/31/2019.

### **Future Payments for Loss Dollars on 2019 and Prior Claims with Worksheets:**

Since the payouts are specified in the worksheets, the information in each worksheet was simply converted to the payments by the calendar year it specified. Defense costs were included at the amount of remaining defense case reserves as of the worksheet date. The average yearly payouts after adjudication across all open and awarded (worksheet) claims was prepared for use in estimating the costs and payout pattern of the other large reserve classes.

### **Future Payments for Loss Dollars Claims Awarded but not Evaluated and Claims Projected to be Awarded:**

The first step in this analysis was to estimate how many claims are projected to be in this category. That is performed in Exhibit 3 by first projecting the number of total claims that occurred in birth year 2019 and prior years on Page 5 of the exhibit. Using historical ratios of the percentages of claims awarded at adjudication, the ultimate number of claims to be awarded for 2019 and prior birth years was estimated on Page 1 of the exhibit. Then, all ultimate awarded claims are either in this category, have a current worksheet, or are closed. So, the number of claims in this category was computed as the number of ultimate awarded claims minus the number of claims with worksheets, minus the number of closed and awarded claims. For the last step, the estimated future awarded claims are separated into awarded claims from claimants dying before or soon after the award (“DA” or non-serious claims) and serious

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<sup>3</sup> Including the “pipeline” claims, where the claim has been awarded but a worksheet has not yet been set up.

claims. The projected number of serious claims in this class was multiplied by the average payout stream and cost computed in the previous section (adjusted to begin in 2021<sup>4</sup>).

### **Future Payments for Defense Costs on Claims Expected to be Dismissed in the Future:**

These were reserved using an average severity method. The average defense cost incurred per claim dismissed and average defense cost paid per claim dismissed in the 12/31/2017-9/30/2019 period were computed in Exhibit 5 Pages 3 and 4, along with the average defense costs of claims closed prior to that. Per the review, an ultimate defense cost per claim of \$10,000 in 9/30/2019 dollars was selected.

### **Future Payments for Loss and Defense Costs on All Other Claims (Adjudicated, Dismissed, and Closed):**

As defense costs on closed claims have historically been minor, these were not explicitly included in the analysis.

### **Payments for Claims from the 2020 Birth Year (NICA's 2020 Year of Operation):**

Claims costs and the future payment stream for this year were estimated using a frequency and severity approach. The awarded claims frequency per physician or midwife insured for 2014-2018 was calculated. NICA's staff provided the historical and 2020 numbers of physicians and midwives it covered. Multiplying the frequency by the number of professionals produced the projected numbers of awarded claims and dismissed claims for the 2020 year. A further adjustment for serious vs. "DA" (language from the NICA actuary denoting claims that only pay for a short duration) claims was performed using the claims closed during the 2009-2018 period. The computations involved computing the percentage of claims that were open in more than two calendar years and the percentage that were only open in two calendar years or fewer. That replaced the values previously provided by the NICA actuary. The loss severity and payout pattern for the serious claims used the average payout of historical claims with worksheets (essentially, those that were still open at 9/30/2019), adjusted for inflation and discount to begin paying in 2021.

### **Reinsurance Recoverable on Claims Paid and to be paid in the Future:**

Since all reinsurance has been commuted, or fully settled for a lump sum, this item was no longer part of the analysis.

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<sup>4</sup> The average adjudication and payment start date of 2021 was determined in rough (considering the dollar amount) accordance with a judgmental review of historical claim count patterns and consideration of simplicity.

## **Part IV. Highlights of Determination of Percentiles**

### **Why are Percentiles Needed?**

The best estimate reserves computed per the previous section represent an average or midrange outcome. However, the actual results will vary, at least somewhat, from that value. For a variety of reasons, it is even possible a very high number of Florida residents give birth in a year. This may lead to problems with an obstetrician's ability to serve them all, which could result in actual 2020 claims costs that are far larger than the projected 2020 costs. However, that occurrence is very unlikely. More to the point, loss cost inflation could exceed investment returns for some extended period. Since the range of all possible loss payout scenarios is virtually unlimited, it is not practical<sup>5</sup> for NICA to fund all possible costs that might emerge as claims are paid. Providing a range allows one to determine what level of funds is needed to fully cover 65%, 75%, 95%, etc. of all possible payout scenarios. Then, one may determine the level of certainty provided by a certain amount of funds. Policymakers should consider the degree of certainty provided by NICA's available funds. They should also consider the ability (although limited) of NICA to help fund any shortfall through increased assessments<sup>6</sup>.

### **Conceptual Approach:**

The general approach used is to estimate a key statistical quantity, specifically the variance of the possible discounted loss payouts. Using the best estimate as the statistical "mean" and the variance so determined, one may construct a mathematical curve of the likelihood the final loss payments on 2019 and prior birth year claims and new 2020 birth year claims will be less than various possible loss funding levels ("percentiles"). The curve used was from the most common probability distribution family with no negative values, the lognormal distribution family. The resulting percentiles then follow as standard mathematical computations.

### **Components of the Variance:**

Key items considered in estimating the variance were:

- The fact that the estimated future lifespans entered in the worksheets prepared by NICA were estimates<sup>7</sup> and the actual lifespans of the children benefitting from NICA will be different than those estimates. A judgmental estimate of the variance as 16% of the projected loss squared on each claim was used. This assumption was unchanged from the previous analysis.
- Many of the quantities included in the reserves are based on projected claim counts. The actual counts that emerge in each class are likely to be different.

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<sup>5</sup> For a detailed discussion of why this is impractical for society, see the author's dissertation at <http://proquest.umi.com/pqdlink?did=2789658261&Fmt=7&clientI d=79356&RQT=309&VName=PQD>

<sup>6</sup> As noted in Part I., participation in the Association is generally viewed favorably by many physicians and malpractice insurers. This suggests there may be some room to raise assessments if need be, but likely the amount of room is limited.

<sup>7</sup> Per standard industry practice, these were treated as averages.

## 12/31/2019 OIR Actuarial Review of Unpaid NICA Loss and Defense Costs

- The values based on claim counts use average severity, or cost per claim values. The actual average costs will likely be different.
- The values based on average severity are also affected by uncertainty in the historical severity arising from the uncertainty in the lifespans of covered children.
- The fact that inflation and investment income, especially their ratio, may vary widely from their projected values.

The contributions of each of these are shown in Exhibit 7. As one may see, the last variance source (inflation and investment uncertainty) dominates the others.

## **Part V. Actuarial Opinion**

### **Statement of Qualifications and Methodology of Preparer Joseph Boor:**

This report was prepared by me personally and at my personal direction. I am a Fellow of the Casualty Actuarial Society and have been so for over thirty years. I also have a Doctor of Philosophy degree in Financial Mathematics from Florida State University and am a Chartered Enterprise Risk Analyst. I have over ten years of experience in medical malpractice, especially within the Southeastern United States. Further, I have extensive experience with long term medical claims and experience with claims involving special adjudication processes such as are involved with NICA's claims. I attest that the methodologies, techniques, and assumptions employed in this study, as well as the opinions and validation of assumptions were, in my opinion, all done per or consistent with generally accepted actuarial practices, all applicable guidance and standards of practice<sup>8</sup>, and with a perspective of obtaining the most accurate estimates possible given the time and data limitations.

### **Statement of Reliance on Others:**

In the course of the analysis, explanations, data, and general perspective on the data and claims environment were provided by Tim Daughtry and Kenny Shipley, employees of NICA. Further perspective and information on the construction of the data has been provided by George Turner, FCAS, (NICA's consulting actuary) during prior reviews. The review and feedback provided by all three during this review and prior reviews was helpful in providing perspective. A previous reviewer employed by the Office, Leigh Halliwell, FCAS, expressed that, except for inflation and discounting, the cash flows projected by NICA in their claim worksheets were reasonable predictions of the ultimate losses on each claim. This review implicitly relies on a similar conclusion.

### **Limitation on Partial Dissemination from Preparer:**

To avoid the misunderstandings associated with partial disclosures, I request that a full copy of this report be provided on request to any party receiving portions of the documents.

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<sup>8</sup> These are promulgated by the Casualty Actuarial Society and the Actuarial Standards Board and should be taken to include key literature published or used by the Casualty Actuarial Society.

**Suggested Retention of Records:**

The basis for portions of this report is a set of worksheets with projected payments for a number of claims. Such individual claim reserve detail could potentially be used against NICA in court or elsewhere by claimants. Therefore, individual claim detail is not included within this report. It is recommended that the Office retain that detail in protected format for some length of time.

**Signature:**

A handwritten signature in blue ink that reads "Joseph Boor". The signature is written in a cursive style with a large initial "J" and "B".

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September 8, 2020

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Computation of Net Discounted Reserve Indication for 2020 and Prior Birth Year Claims at 12/31/2019

Category		Indicated Reserve	
Claims Awarded and Evaluated (with worksheets) (loss+defense)		\$485,465,658	(Exhibit 1)
Pipeline and Future Awarded Claims (loss+defense)			
-Ultimate awarded claims	439		(Exhibit 3 - Page 1)
-Effect of unusual closed claims (\$0)	0		Data
-Awarded and closed claims	205		Data
-Worksheet claims	191		Data
-Future and pipeline claims	43		(Exhibit 3 - Page 1)
Approx. % Claims Turner Titled "DA"	17%		(Exhibit 2)
Estimated # "DA" Claims	7		
Cost per "DA" Claim	\$236,987		(Exhibit 2)
Total Cost "DA" Claims		1,709,806	
Approx. % Claims Estimated to be Serious	83%		
Estimated # Serious Claims	36		
Cost per Serious Claim	\$2,813,423		(Exhibit 4)
Total Disc. Cost Serious Claims		100,679,013	
2020 Costs		37,452,854	(Exhibit 2)
ULAE (claims handling) (used NICA actuary's 12/31/19 value due to small size)		14,383,635	(Exhibit 1 Sheet 5 of NICA Actuary's Report)
Reinsurance Recoverable on Future Loss Payments (minus)		\$0	(Exhibit 6)
Total Indicated Reserve for Loss and Defense (incl. ULAE)		\$639,690,966	
2019 and Prior Total Indicated Reserve for Loss and Defense (incl. ULAE)		\$602,238,112	

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Confidence Levels Associated with Various Asset Levels

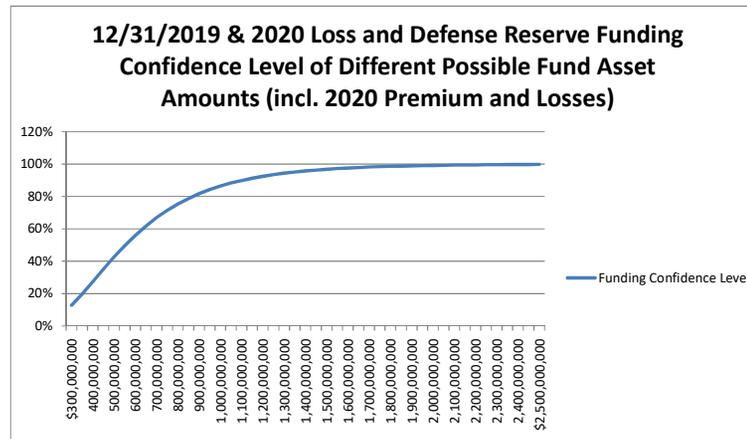
Simulation with Lognormal Distribution with Mean

\$639,690,966 and Variance

137,991,379,970,209,000

(Loss Summary and Exhibit 7)

Asset Amounts	Confidence in Ability to Fund Loss Payouts
\$300,000,000	13%
350,000,000	20%
400,000,000	27%
450,000,000	35%
500,000,000	43%
550,000,000	50%
600,000,000	56%
650,000,000	62%
700,000,000	67%
750,000,000	71%
800,000,000	75%
850,000,000	79%
900,000,000	82%
950,000,000	84%
1,000,000,000	86%
1,050,000,000	88%
1,100,000,000	90%
1,150,000,000	91%
1,200,000,000	92%
1,250,000,000	93%
1,300,000,000	94%
1,350,000,000	95%
1,400,000,000	96%
<b>1,450,000,000</b>	<b>96%</b>
1,500,000,000	97%
1,550,000,000	97%
1,600,000,000	98%
1,650,000,000	98%
1,700,000,000	98%
1,750,000,000	98%
1,800,000,000	99%
1,850,000,000	99%
1,900,000,000	99%
1,950,000,000	99%
2,000,000,000	99%
2,050,000,000	99%
2,100,000,000	99%
2,150,000,000	99%
2,200,000,000	99%
2,250,000,000	100%
2,300,000,000	100%
2,350,000,000	100%
2,400,000,000	100%
2,450,000,000	100%
\$2,500,000,000	100%



Approximate NICA Position with Funds on Hand 12/31/2019 and 30% of 2020 Assessment Revenue uncollected at 12/31/19 is boxed

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Payout of Loss on Awarded and Evaluated Claims  
(in 2019 \$\$\$)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Loss Payout	\$18,616,642	\$24,644,741	\$25,288,340	\$25,021,830	\$24,499,207	\$24,805,200	\$25,072,812	\$25,556,454	\$25,294,973	\$23,500,428
Defense (Incl. with Loss Above)										
Total Payout	18,616,642	24,644,741	25,288,340	25,021,830	24,499,207	24,805,200	25,072,812	25,556,454	25,294,973	23,500,428
	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Total Payout	23,885,550	24,343,099	24,505,994	23,616,082	22,752,160	23,104,181	23,126,129	21,922,942	21,191,349	19,077,273
	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Total Payout	19,091,613	19,066,494	18,708,655	17,961,353	17,846,440	17,563,322	14,549,796	13,279,574	11,878,514	10,431,707
	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Total Payout	10,429,081	10,429,081	10,156,214	9,595,833	8,831,888	6,188,550	6,123,766	5,567,389	5,086,296	4,515,113
	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Total Payout	4,332,542	4,079,268	4,043,310	3,918,143	2,835,382	2,320,460	2,011,652	994,056	787,351	487,236
	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079
Total Payout	487,236	480,843	359,377	183,663	79,511	-	-	-	-	-
	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089
Total Payout	-	-	-	-	-	-	-	-	-	-
Discounted and Inflation corrected to 12/31/2019 at (Rates are from Exhibit 10)			2.2% inflation and		5.1% investment return.					\$485,465,658
Average inflation and discount effect										66%

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Computation of Anticipated Costs of Claims From 2019 Birth Year

Year	Obstetricians Participating	Midwives Participating	Total Participants	Projection of Awarded Claims	Projection of Dismissed Claims	Total Cost
2001	676	114	790			
2002	731	130	861			
2003	786	129	915			
2004	841	146	987			
2005	891	134	1,025			
2006	896	139	1,035			
2007	962	151	1,113			
2008	987	157	1,144			
2009	1,044	166	1,210			
2010	1,071	177	1,248			
2011	1,091	183	1,274			
2012	1,119	192	1,311			
2013	1,143	190	1,333			
2014	1,208	206	1,414	14	23	
2015	1,273	207	1,480	19	34	
2016	1,318	216	1,534	7	34	
2017	1,356	232	1,588	14	25	
2018	1,421	255	1,676	17	38	
2019	1,501	284	1,785			
2020*	1,484	282	1,766			

Note: 2020 data is as of 6/12/2020

5 Year Frequency 0.92% 2.00%

(OB and Midwife data per NICA)

Projected 2020 Counts	16	35	
Approx. % "DA" Claims	17%		(% of claims awarded 2009 through 2018 with the death date within 1 year of award or earlier)
Estimated # "DA" Claims	3		
Cost per "DA" Claim	\$236,987		(Average cost of above claims inflated at 2%, 1.102 factor for discounting)
Total Cost "DA" Claims	710,961		
Estimated # Serious Claims	13		(Projected Total Awarded Claims less Projected DA Claims)
Cost per Serious Claim	2,735,793		(Exhibit 4)
Total Disc. Cost Serious Claims	36,388,325		
Cost per Dismissed Claim		\$10,000	(Exhibit 5)
Total Discounted Cost (loss and defense)	\$37,099,286	\$353,567	\$37,452,854

Overhead \$2,895,875 (Copy from 2019 Income Statement)

Estimated Total 2020 Birth Year Economic Cost \$40,348,729

2020 Revenue \$26,500,000 (Estimated by T. Daughtry of NICA)

2020 Est. Investment Income Over Amount of One Year's Discount in 12/19 Costs \$43,058,636.33 (Investments Provided by T. Daughtry - Best Estimate Reserve 2019 and prior)\*0.051 (incl. 30% of 2020 assessments not then collected per NICA))

Go Forward Adequacy at Best Estimate \$29,209,908 (Note: Likely more than one serious claim)

### OR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019

#### Development of Awarded Claims with Projection of Ultimate Number of Awarded Claims (9/30/2019 Data)

**DOAH Awarded Claim Counts**

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>
2000										13
2001									13	13
2002								22	22	22
2003							9	9	9	9
2004						11	12	13	13	14
2005					10	13	13	13	13	13
2006				8	11	13	13	13	13	13
2007			7	12	13	14	14	14	15	15
2008		2	7	10	11	11	13	13	13	13
2009	2	5	11	14	15	15	15	16	17	17
2010	1	6	8	12	12	12	12	12	12	12
2011	0	1	8	9	11	13	14	14	14	
2012	0	2	8	13	15	16	16	16		
2013	1	5	9	10	11	11	11			
2014	1	5	8	10	13	13				
2015	0	3	9	15	17					
2016	0	3	4	5						
2017	0	4	8							
2018	0	5								
2019	0									

**DOAH Awarded Claim Count Link Ratios**

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>
2000									
2001									1.000
2002								1.000	1.000
2003							1.000	1.000	1.000
2004						1.091	1.083	1.000	1.077
2005					1.300	1.000	1.000	1.000	1.000
2006				1.375	1.182	1.000	1.000	1.000	1.000
2007			1.714	1.083	1.077	1.000	1.000	1.071	1.000
2008		3.500	1.429	1.100	1.000	1.182	1.000	1.000	1.000
2009	2.500	2.200	1.273	1.071	1.000	1.000	1.067	1.063	1.000
2010	6.000	1.333	1.500	1.000	1.000	1.000	1.000	1.000	1.000
2011	-	8.000	1.125	1.222	1.182	1.077	1.000	1.000	
2012	-	4.000	1.625	1.154	1.067	1.000	1.000		
2013	5.000	1.800	1.111	1.100	1.000	1.000			
2014	5.000	1.600	1.250	1.300	1.000				
2015	-	3.000	1.667	1.133					
2016	-	1.333	1.250						
2017	-	2.000							
2018	-								

<b>All Time Dollar Weighted Average Link Ratios</b>	7.800	2.222	1.392	1.142	1.074	1.031	1.015	1.014	1.007	1.007		
<b>Selected Link</b>	7.800	2.222	1.392	1.142	1.074	1.031	1.015	1.014	1.007	1.007		
<b>LDFs</b>	31.859	4.085	1.838	1.320	1.156	1.077	1.044	1.029	1.014	1.007		
<b>Interpolated LDFs</b>	31.859	5.223	2.131	1.420	1.193	1.096	1.052	1.033	1.018	1.009	<b>Prior Years</b>	<b>Total</b>
<b>Awarded To-Date</b>	0	5	8	5	17	13	11	16	14	12	300	401
<b>Initial Estimate Ultimate Awarded Claims</b>	0	26	17	7	20	14	12	17	14	12	300	439
<b>Estimated Future Awarded Claims (per Adjudication Page(3))</b>	15	12	6	2	2	1	0	0	0	0	0	38
<b>Selected Total Awarded Claims (sum of Current and Future)</b>	15	17	14	7	19	14	11	16	14	12	300	439

### OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019

Triangle of Incremental Claims Awarded by DOAH by Birth Year with Annual Award Percentage (9/30/2019 Data)

**Incremental DOAH Awarded Claim Counts**

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>
2000										
2001										0
2002									0	0
2003								0	0	0
2004							1	1	0	1
2005						3	0	0	0	0
2006					3	2	0	0	0	0
2007				5	1	1	0	0	1	0
2008			5	3	1	0	2	0	0	0
2009		3	6	3	1	0	0	1	1	0
2010	1	5	2	4	0	0	0	0	0	0
2011	0	1	7	1	2	2	1	0	0	
2012	0	2	6	5	2	1	0	0		
2013	1	4	4	1	1	0	0			
2014	1	4	3	2	3	0				
2015	0	3	6	6	2					
2016	0	3	1	1						
2017	0	4	4							
2018	0	5								
2019	0									
<b>Awarded in</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
	22	18	8	16	14	16	12	15	14	12
<b>Annual Awarded Percentage</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
	54%	41%	22%	32%	26%	35%	27%	33%	30%	25%

### OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019

#### Development of Adjudicated Claims and Projection of Claims to be Awarded in the Future (9/30/2019 Data)

**DOAH Adjudicated Claim Counts**

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>
2000										38
2001									40	40
2002								50	50	50
2003							21	22	23	23
2004						21	23	26	30	31
2005					29	37	38	39	41	41
2006				17	22	28	32	32	33	33
2007			11	21	26	29	31	34	36	36
2008		3	10	20	23	29	35	38	41	41
2009	2	8	17	26	32	38	43	46	48	49
2010	1	10	15	27	33	35	38	38	38	39
2011	0	5	17	28	35	38	40	42	44	
2012	0	6	20	35	41	47	50	50		
2013	3	8	14	24	27	31	32			
2014	1	7	17	29	37	44				
2015	0	4	19	36	42					
2016	3	8	12	20						
2017	0	7	21							
2018	1	9								
2019	1									

**DOAH Adjudicated Claim Count Link Ratios**

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>
2000									
2001									1.000
2002								1.000	1.000
2003							1.048	1.045	1.000
2004						1.095	1.130	1.154	1.033
2005					1.276	1.027	1.026	1.051	1.000
2006				1.294	1.273	1.143	1.000	1.031	1.000
2007			1.909	1.238	1.115	1.069	1.097	1.059	1.000
2008		3.333	2.000	1.150	1.261	1.207	1.086	1.079	1.000
2009	4.000	2.125	1.529	1.231	1.188	1.132	1.070	1.043	1.021
2010	10.000	1.500	1.800	1.222	1.061	1.086	1.000	1.000	1.026
2011	-	3.400	1.647	1.250	1.086	1.053	1.050	1.048	
2012	-	3.333	1.750	1.171	1.146	1.064	1.000		
2013	2.667	1.750	1.714	1.125	1.148	1.032			
2014	7.000	2.429	1.706	1.276	1.189				
2015	-	4.750	1.895	1.167					
2016	2.667	1.500	1.667						
2017	-	3.000							
2018	9.000								

											<b>Implied by Reported Tail Factor</b>	
<b>All Time Dollar Weighted Average Link Ratios</b>	6.545	2.455	1.750	1.209	1.167	1.087	1.046	1.046	1.008	1.023		
<b>Selected Link</b>	6.545	2.455	1.750	1.209	1.167	1.087	1.046	1.046	1.008	1.023		
<b>LDFs</b>	48.670	7.436	3.029	1.731	1.432	1.227	1.128	1.079	1.031	1.023		
<b>Interpolated LDFs</b>	60.000	9.434	3.556	1.939	1.496	1.272	1.151	1.091	1.043	1.025	<b>Prior Years</b>	<b>Total</b>
<b>Adjudicated To-Date</b>	1	9	21	20	42	44	32	50	44	39	810	1112
<b>Estimated Ultimate Counts</b>	60	85	75	39	63	56	37	55	46	40	810	1364
<b>Selected Ultimate Counts (above and page 5)</b>	55	55	52	32	53	48	34	51	44	40	810	1274
<b>Implied Adjud. Pattern</b>	0.00%	10.60%	28.12%	51.58%	66.83%	78.61%	86.85%	91.66%	95.89%	97.54%		
<b>Implied Unadjud. Claims</b>	54	46	31	12	11	4	2	1	0	1	0	162

**Estimated % of Unadjudicated to be Awarded (Page 7)**

Note: Above figure is from incremental awarded to Adjudicated page

	15	12	6	2	2	1	0	0	0	0	38
<b>Estimated Claims Occurred to be Awarded in the Future</b>											

Note: Above = Unadj. Claims times % to be Awarded

	39	34	25	10	9	3	2	1	0	1	124
<b>Estimated Claims Occurred to be Dismissed by DOAH in the Future</b>											

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Triangle of Incremental DOAH Adjudicated Claims (9/30/2019 Data)

Incremental DOAH Adjudicated Claim Counts

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>	
2000											0
2001											0
2002								0	0		0
2003							0	1	1		0
2004						0	2	3	4		1
2005					0	8	1	1	2		0
2006				0	5	6	4	0	1		0
2007			0	10	5	3	2	3	2		0
2008		0	7	10	3	6	6	3	3		0
2009	0	6	9	9	6	6	5	3	2		1
2010	1	9	5	12	6	2	3	0	0		1
2011	0	5	12	11	7	3	2	2	2		
2012	0	6	14	15	6	6	3	0			
2013	3	5	6	10	3	4	1				
2014	1	6	10	12	8	7					
2015	0	4	15	17	6						
2016	3	5	4	8							
2017	0	7	14								
2018	1	8									
2019	1										
<b>Adjudicated in</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	
	41	44	36	50	53	46	45	45	47	48	

### OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019

#### Development and Estimation of Ultimate Number of All Claims by Birth Year (9/30/2019 Data)

**Reported Claim Counts**

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>
2000										38
2001									41	41
2002								50	50	50
2003							21	23	23	23
2004						29	30	30	31	31
2005					35	39	40	41	41	41
2006				24	28	32	32	32	33	33
2007			22	26	31	32	33	36	36	36
2008		9	18	24	29	37	37	41	42	42
2009	5	15	26	34	39	47	48	48	50	50
2010	4	13	25	32	36	39	39	39	40	40
2011	6	14	24	37	38	40	40	44	44	
2012	5	17	36	44	46	50	50	50		
2013	5	12	23	27	31	32	32			
2014	2	14	32	38	44	44				
2015	0	13	34	41	44					
2016	7	13	19	23						
2017	3	21	28							
2018	7	18								
2019	4									

**Reported Claim Count Link Ratios**

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>
2000									
2001									1.000
2002								1.000	1.000
2003							1.095	1.000	1.000
2004						1.034	1.000	1.033	1.000
2005					1.114	1.026	1.025	1.000	1.000
2006				1.167	1.143	1.000	1.000	1.031	1.000
2007			1.182	1.192	1.032	1.031	1.091	1.000	1.000
2008		2.000	1.333	1.208	1.276	1.000	1.108	1.024	1.000
2009	3.000	1.733	1.308	1.147	1.205	1.021	1.000	1.042	1.000
2010	3.250	1.923	1.280	1.125	1.083	1.000	1.000	1.026	1.000
2011	2.333	1.714	1.542	1.027	1.053	1.000	1.100	1.000	
2012	3.400	2.118	1.222	1.045	1.087	1.000	1.000		
2013	2.400	1.917	1.174	1.148	1.032	1.000			
2014	7.000	2.286	1.188	1.158	1.000				
2015	-	2.615	1.206	1.073					
2016	1.857	1.462	1.211						
2017	7.000	1.333							
2018	2.571								

<b>All Time Dollar Weighted Average Link Ratios</b>	3.409	1.879	1.259	1.119	1.098	1.011	1.038	1.016	1.000	<b>Apparent Tail Factor</b>	1.000	
<b>Selected Link</b>	3.409	1.879	1.259	1.119	1.098	1.011	1.038	1.016	1.000	1.000		
<b>LDFs</b>	10.558	3.097	1.648	1.309	1.170	1.065	1.054	1.016	1.000	1.000		
<b>Interpolated LDFs</b>	-	3.762	1.866	1.380	1.202	1.090	1.057	1.025	1.004	1.000	<b>Prior Years</b>	<b>Total</b>
<b>Reported To-Date</b>	4	18	28	23	44	44	32	50	44	40	807	1134
<b>Estimated Ultimate Counts</b>	-	68	52	32	53	48	34	51	44	40	807	1229
<b>Estimated Ultimate Counts</b>	55	55	52	32	53	48	34	51	44	40	807	1271
<b>Reporting Pattern</b>	7.27%	32.73%	53.59%	72.46%	83.22%	91.78%	94.62%	97.56%	99.62%	100.00%		

Notes: Selected 2018 to moderate high early reportings, given volume of data. 2019 set to match.

### OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019

#### Triangle of Incremental Reported Claims (9/30/2019 Data)

**Incremental Reported Claim Counts**

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>
2000										
2001										0
2002									0	0
2003								2	0	0
2004							1	0	1	0
2005						4	1	1	0	0
2006					4	4	0	0	1	0
2007				4	5	1	1	3	0	0
2008			9	6	5	8	0	4	1	0
2009		10	11	8	5	8	1	0	2	0
2010	4	9	12	7	4	3	0	0	1	0
2011	6	8	10	13	1	2	0	4	0	
2012	5	12	19	8	2	4	0	0		
2013	5	7	11	4	4	1	0			
2014	2	12	18	6	6	0				
2015	0	13	21	7	3					
2016	7	6	6	4						
2017	3	18	7							
2018	7	11								
2019	4									
<b>Reported in</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
	38	42	41	48	57	40	47	46	50	29

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Percentage of Claims Adjudicated that Result in Awards with Projected Award Ratios for Claims Remaining at Various Stages  
(9/30/2019 Data)

DOAH Incremental Awarded to Incremental Adjudicated Percentage

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>
2000										34.2%
2001									32.5%	-
2002								44.0%	-	-
2003							42.9%	0.0%	0.0%	-
2004						52.4%	50.0%	33.3%	0.0%	100.0%
2005					34.5%	37.5%	0.0%	0.0%	0.0%	-
2006				47.1%	60.0%	33.3%	0.0%	-	0.0%	-
2007			63.6%	50.0%	20.0%	33.3%	0.0%	0.0%	50.0%	-
2008		66.7%	71.4%	30.0%	33.3%	0.0%	33.3%	0.0%	0.0%	-
2009	100.0%	50.0%	66.7%	33.3%	16.7%	0.0%	0.0%	33.3%	50.0%	0.0%
2010	100.0%	55.6%	40.0%	33.3%	0.0%	0.0%	0.0%	-	-	0.0%
2011	-	20.0%	58.3%	9.1%	28.6%	66.7%	50.0%	0.0%	0.0%	-
2012	-	33.3%	42.9%	33.3%	33.3%	16.7%	0.0%	-	-	-
2013	33.3%	80.0%	66.7%	10.0%	33.3%	0.0%	0.0%	-	-	-
2014	100.0%	66.7%	30.0%	16.7%	37.5%	0.0%	-	-	-	-
2015	-	75.0%	40.0%	35.3%	33.3%	-	-	-	-	-
2016	0.0%	60.0%	25.0%	12.5%	-	-	-	-	-	-
2017	-	57.1%	28.6%	-	-	-	-	-	-	-
2018	0.0%	62.5%	-	-	-	-	-	-	-	-
2019	0.0%	-	-	-	-	-	-	-	-	-
<b>All Time</b>										
<b>Weighted Avg. Ratio</b>	0.417	0.557	0.458	0.272	0.291	0.176	0.138	0.125	0.118	0.333
<b>Three Stage Centered Average</b>		48%	46%	37%	26%	23%	15%	13%		
<b>Selected Incre. Award Ratio</b>	45%	45%	45%	25%	25%	15%	15%	15%	15%	15%
<b>Weighted Award Ratio for All Remaining Claims</b>	0.273	0.252	0.204	0.181	0.150	0.150	0.150	0.150	0.150	0.150

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Cumulative Ratios of Percentage of Adjudicated Claims Resulting in Award (9/30/2019 Data)

DOAH Cumulative Awarded to Cumulative Adjudicated Percentage

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>
2000										34.2%
2001									32.5%	32.5%
2002								44.0%	44.0%	44.0%
2003							42.9%	40.9%	39.1%	39.1%
2004						52.4%	52.2%	50.0%	43.3%	45.2%
2005					34.5%	35.1%	34.2%	33.3%	31.7%	31.7%
2006				47.1%	50.0%	46.4%	40.6%	40.6%	39.4%	39.4%
2007			63.6%	57.1%	50.0%	48.3%	45.2%	41.2%	41.7%	41.7%
2008		66.7%	70.0%	50.0%	47.8%	37.9%	37.1%	34.2%	31.7%	31.7%
2009	100.0%	62.5%	64.7%	53.8%	46.9%	39.5%	34.9%	34.8%	35.4%	34.7%
2010	100.0%	60.0%	53.3%	44.4%	36.4%	34.3%	31.6%	31.6%	31.6%	30.8%
2011	-	20.0%	47.1%	32.1%	31.4%	34.2%	35.0%	33.3%	31.8%	
2012	-	33.3%	40.0%	37.1%	36.6%	34.0%	32.0%	32.0%		
2013	33.3%	62.5%	64.3%	41.7%	40.7%	35.5%	34.4%			
2014	100.0%	71.4%	47.1%	34.5%	35.1%	29.5%				
2015	-	75.0%	47.4%	41.7%	40.5%					
2016	0.0%	37.5%	33.3%	25.0%						
2017	-	57.1%	38.1%							
2018	0.0%	55.6%								
2019	0.0%									
<b>All Time</b>										
<b>Weighted Avg. Ratio</b>	0.417	0.547	0.503	0.417	0.401	0.377	0.371	0.372	0.363	0.366

### OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019

#### Development of Dismissed Claims (9/30/2019 Data)

**DOAH Dismissed Claim Counts**

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>
2000										25
2001									27	27
2002								28	28	28
2003							12	13	14	14
2004						10	11	13	17	17
2005					19	24	25	26	28	28
2006				9	11	15	19	19	20	20
2007			4	9	13	15	17	20	21	21
2008		1	3	10	12	18	22	25	28	28
2009	0	3	6	12	17	23	28	30	31	32
2010	0	4	7	15	21	23	26	26	26	27
2011	0	4	9	19	24	25	26	28	30	
2012	0	4	12	22	26	31	34	34		
2013	2	3	5	14	16	20	21			
2014	0	2	9	19	24	31				
2015	0	1	10	21	25					
2016	3	5	8	15						
2017	0	3	13							
2018	1	4								
2019	1									

**DOAH Dismissed Claim Count Link Ratios**

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>
2000									
2001									
2002									1.000
2003								1.077	1.000
2004							1.182	1.308	1.000
2005						1.042	1.040	1.077	1.000
2006					1.364	1.267	1.000	1.053	1.000
2007				1.444	1.154	1.133	1.176	1.050	1.000
2008			3.333	1.200	1.500	1.222	1.136	1.120	1.000
2009		2.000	2.000	1.417	1.353	1.217	1.071	1.033	1.032
2010	-	1.750	2.143	1.400	1.095	1.130	1.000	1.000	1.038
2011	-	2.250	2.111	1.263	1.042	1.040	1.077	1.071	
2012	-	3.000	1.833	1.182	1.192	1.097	1.000		
2013	1.500	1.667	2.800	1.143	1.250	1.050			
2014	-	4.500	2.111	1.263	1.292				
2015	-	10.000	2.100	1.190					
2016	1.667	1.600	1.875						
2017	-	4.333							
2018	4.000								

											Sherman-Boor	
											Tail Factor (per last three)	
All Time Dollar Weighted Average Link Ratios	5.500	2.733	2.137	1.260	1.230	1.123	1.064	1.066	1.008	1.008		
Selected Link	5.500	2.733	2.137	1.260	1.230	1.123	1.064	1.066	1.008	1.008		
LDFs	64.356	11.701	4.281	2.003	1.590	1.293	1.152	1.083	1.016	1.008		
Interpolated LDFs	-	14.710	5.087	2.311	1.676	1.356	1.184	1.099	1.032	1.010	Prior	Total
Dismissed To-Date	1	4	13	15	25	31	21	34	30	27	510	711
Estimated Ultimate Dismissed Counts	-	59	66	35	42	42	25	37	31	27	510	874
Selected Ultimate Dismissed Counts	40	38	38	25	34	34	23	35	30	28	510	835

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

**Incremental Dismissed Claims and Annual Percentage of Adjudicated Claims that are Dismissed  
(9/30/2019 Data)**

Incremental DOAH Dismissed Claim Counts

	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>	<u>72</u>	<u>84</u>	<u>96</u>	<u>108</u>	<u>120</u>
2000										
2001										0
2002									0	0
2003								1	1	0
2004							1	2	4	0
2005						5	1	1	2	0
2006					2	4	4	0	1	0
2007				5	4	2	2	3	1	0
2008			2	7	2	6	4	3	3	0
2009		3	3	6	5	6	5	2	1	1
2010	0	4	3	8	6	2	3	0	0	1
2011	0	4	5	10	5	1	1	2	2	
2012	0	4	8	10	4	5	3	0		
2013	2	1	2	9	2	4	1			
2014	0	2	7	10	5	7				
2015	0	1	9	11	4					
2016	3	2	3	7						
2017	0	3	10							
2018	1	3								
2019	1									
<b>Dismissed in</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
	19	26	28	34	39	30	33	30	33	36
<b>Annual Dismissed Percentage</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
	46%	59%	78%	68%	74%	65%	73%	67%	70%	75%

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Anticipated Average Payout Pattern of Claims Paying in the Future (Future Awarded and Pipeline)  
(in 2019 \$\$\$)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Loss Payout	\$155,778	\$107,120	\$103,759	\$100,191	\$102,635	\$99,773	\$103,296	\$99,095	\$101,349	\$102,497
Defense (Incl. with Loss Above)										
Total Payout	155,778	107,120	103,759	100,191	102,635	99,773	103,296	99,095	101,349	102,497
	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Total Payout	104,284	105,109	106,334	105,600	104,462	106,209	106,870	110,654	111,545	116,834
	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Total Payout	121,146	120,870	123,382	124,786	128,192	125,432	128,137	127,994	123,415	122,237
	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060
Total Payout	118,280	110,281	106,674	100,348	92,622	87,568	79,333	76,898	75,583	74,545
	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070
Total Payout	71,788	71,237	67,585	64,696	58,712	56,855	54,990	53,149	51,148	49,716
	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080
Total Payout	46,237	41,467	36,628	31,218	26,254	23,344	20,982	16,358	11,556	8,473
	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090
Total Payout	\$6,495	5,630	3,639	3,024	2,412	1,646	1,047	644	640	505

Discounted and inflation corrected to 12/31/2019 at (Rates are from Exhibit 10) 2.2% inflation and 5.1% investment return. \$2,813,423

For 2020 birth year claims projected to begin in 2022 \$2,735,793

Average inflation and discount effect 54%

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Defense Incurred Per To 2017 and 2018-9/30/2019 Awarded Claims

(1) Data                      (2) Data                      (3) (1)/(2)                      (4) Data                      (5) Data                      (6) ((4)-(1))/((5)-(2))

Birth Year	Incurring Defense on Awarded at 12/31/2017	Claims Awarded at 12/31/2017	Average Incurred Defense on Awarded at 12/31/2017	Incurring Defense on Awarded at 9/30/2019	Claims Awarded at 9/30/2019	Total Incremental Defense Incurred 12/31/2017 - 9/30/2019
2000	135,717	13	10,440	135,717	13	-
2001	193,658	13	14,897	193,658	13	-
2002	340,990	22	15,500	340,990	22	-
2003	140,220	9	15,580	140,220	9	-
2004	296,319	14	21,166	296,319	14	-
2005	151,153	13	11,627	151,153	13	-
2006	153,097	13	11,777	153,341	13	-
2007	152,648	14	10,903	307,821	15	155,173
2008	130,847	13	10,065	153,934	13	-
2009	146,668	17	8,628	146,750	17	-
2010	57,193	12	4,766	57,261	12	-
2011	105,083	14	7,506	105,083	14	-
2012	215,926	16	13,495	215,926	16	-
2013	55,135	11	5,012	55,135	11	-
2014	86,467	11	7,861	114,923	13	14,228
2015	84,947	10	8,495	74,633	17	(1,473)
2016	32,921	4	8,230	35,002	5	2,081
2017	3,853	1	3,853	80,278	8	10,918
2018	-	-	-	69,249	5	13,850
2019	-	-	-	-	0	-
<b>Total</b>	<b>\$2,482,844</b>	<b>220</b>		<b>\$2,827,394</b>	<b>243</b>	
<b>Average</b>			<b>\$11,286</b>			<b>\$14,980</b>

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Defense Paid Per To 2017 and 2018-9/30/2019 Awarded Claims

(1) Data                      (2) Data                      (3) (1)/(2)                      (4) Data                      (5) Data                      (6) ((4)-(1))/((5)-(2))

Birth Year	Paid Defense on Awarded at 12/31/2017	Claims Awarded at 12/31/2017	Average Paid Defense on Awarded at 12/31/2017	Paid Defense on Awarded at 9/30/2019	Claims Awarded at 9/30/2019	Total Incremental Defense Paid 12/31/2017 - 9/30/2019
2000	135,717	13	10,440	343,588	25	17,323
2001	193,658	13	14,897	868,414	28	44,984
2002	340,990	22	15,500	496,449	28	25,910
2003	140,220	9	15,580	109,687	14	(6,107)
2004	296,319	14	21,166	275,434	17	(6,962)
2005	151,153	13	11,627	257,659	28	7,100
2006	153,097	13	11,777	299,529	20	20,919
2007	152,648	14	10,903	209,120	21	8,067
2008	130,847	13	10,065	307,537	28	11,779
2009	146,668	17	8,628	282,818	32	9,077
2010	57,193	12	4,766	155,489	27	6,553
2011	105,083	14	7,506	227,559	30	7,655
2012	215,926	16	13,495	328,837	34	6,273
2013	55,135	11	5,012	147,673	21	9,254
2014	58,126	11	5,284	336,247	31	13,906
2015	31,876	10		189,172	25	10,486
2016	5,002	4		111,772	15	9,706
2017	3,833	1		145,979	13	11,845
2018	5,002	4		37,711	4	-
2019	3,833	1		-	1	-
<b>Total</b>	<b>\$2,382,326</b>	<b>225</b>		<b>\$5,130,673</b>	<b>442</b>	
<b>Average</b>			<b>\$10,588</b>			<b>\$12,665</b>
<b>OIR Selection</b>						<b>\$14,000</b>

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Defense Incurred Per To 2017 and 2018-9/30/2019 Dismissed Claims

(1) Data                      (2) Data                      (3) (1)/(2)                      (4) Data                      (5) Data                      (6) ((4)-(1))/((5)-(2))

Birth Year	Incurring Defense on Dismissed at 12/31/2017	Claims Dismissed at 12/31/2017	Average Incurred Defense on Dismissed at 12/31/2017	Incurring Defense on Dismissed at 9/30/2019	Claims Dismissed at 9/30/2019	Total Incremental Defense Incurred 12/31/2017 - 9/30/2019
2000	343,523	25	13,741	135,717	13	17,317
2001	867,997	28	31,000	193,658	13	44,956
2002	496,016	28	17,715	340,990	22	25,838
2003	109,463	14	7,819	140,220	9	(6,151)
2004	274,816	17	16,166	296,319	14	(7,167)
2005	257,246	28	9,187	151,153	13	7,073
2006	299,011	20	14,951	153,341	13	20,810
2007	207,379	21	9,875	307,821	15	(16,740)
2008	306,879	28	10,960	153,934	13	10,196
2009	277,860	31	8,963	146,750	17	9,365
2010	151,161	26	5,814	57,261	12	6,707
2011	195,772	26	7,530	105,083	14	7,557
2012	329,274	32	10,290	215,926	16	7,084
2013	97,073	16	6,067	55,135	11	8,388
2014	123,394	20	6,170	114,923	13	1,210
2015	100,010	11	9,092	75,343	17	(4,111)
2016	22,351	7	3,193	7,649	5	7,351
2017			-	26,648	8	3,331
2018			-	15,283	5	3,057
2019			-			-
<b>Total</b>	\$4,459,224	378		\$2,693,157	243	
<b>Average</b>			\$11,797			\$13,082

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Defense Paid Per To 2017 and 2018-9/30/2019 Dismissed Claims

(1) Data                      (2) Data                      (3) (1)/(2)                      (4) Data                      (5) Data                      (6) ((4)-(1))/((5)-(2))

Birth Year	Paid Defense on Dismissed at 12/31/2017	Claims Dismissed at 12/31/2017	Average Paid Defense on Dismissed at 12/31/2017	Paid Defense on Dismissed at 9/30/2019	Claims Dismissed at 9/30/2019	Total Incremental Defense Paid 12/31/2017 - 9/30/2019
2000	343,523	25	13,741	343,588	25	-
2001	867,997	28	31,000	868,414	28	-
2002	496,016	28	17,715	496,449	28	-
2003	109,463	14	7,819	109,687	14	-
2004	274,816	17	16,166	275,434	17	-
2005	257,246	28	9,187	257,659	28	-
2006	299,011	20	14,951	299,529	20	-
2007	207,379	21	9,875	209,120	21	-
2008	306,879	28	10,960	307,537	28	-
2009	277,860	31	8,963	282,818	32	4,958
2010	151,161	26	5,814	155,489	27	4,328
2011	195,772	26	7,530	198,509	30	684
2012	310,299	32	9,697	328,837	34	9,269
2013	97,073	16	6,067	147,673	21	10,120
2014	108,549	20	5,427	281,561	31	15,728
2015	66,234	11		189,172	25	8,781
2016	19,853	7		56,153	15	4,538
2017				66,032	13	5,079
2018				10,553	4	2,638
2019				-	1	-
<b>Total</b>	<b>\$4,389,130</b>	<b>378</b>		<b>\$4,873,660</b>	<b>437</b>	
<b>Average</b>			<b>\$11,611</b>			<b>\$8,212</b>
<b>OIR Selection</b>						<b>\$10,000</b>

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Computation of Estimated Reinsurance Recoveries for 2020 and Prior Birth Year Claims at 12/31/2019

Total \$0

Per NICA, all reinsurance has been either commuted or exhausted.

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Computation of Variance of Possible Eventual Costs of NICA Unpaid as of 12/31/2019 for 2020 and Prior Claims

	Calculations	Variance	Source
<b>1. Variance of Costs of Awarded and Evaluated (worksheet) Claims</b>			
a. Assumed coefficient of variation of a single lifespan	40%		Data
b. Number of such claims	191		Data
c. $(=a./\text{square root of } b.)$ Coefficient of variation of all such claims	2.89%		
d. Discounted reserve for such claims	\$485,465,658		(Summary - Page 1)
e. $((c.*d.)^2)$ Estimated variance in this component		197,425,679,669,852	
<b>2. Variance of to be Awarded and Pipeline Claims Costs for 2019 and Prior Years (Serious Claims only)</b>			
a. Average squared claim size (12/31/2019 dollars)	7,915,350,577,056		Computed
b. Expected number of such claims	36		(Summary - Page 1)
c. $(=a.*b.)$ Estimated variance in 12/31/2019 dollars	283,252,679,710,505		Poisson Collective Risk
d. Average inflation and discount factor	54%		(Exhibit 4)
e. $(=c.*d.*d.)$ Estimated process variance in this component	82,623,459,545,228		
f. % of 2019 claims costs that arise from unpaid costs on claims used to compute average	79%		Data
g. Assumed coefficient of variation of a single lifespan	40%		Data
h. Number of claims averaged in estimating average cost (1.b.)	191		Data
i. $(=f.*g./\text{square root of } h.)$ Coefficient of variation of projected average payout	2.28%		
j. Discounted reserve for such claims	\$100,679,013		(Summary - Page 1)
k. $(=(i.*j.)^2)$ Parameter variance for this class	5,250,995,374,340		
l. $(=e.+k.)$ Estimated variance in this component		87,874,454,919,568	
<b>3. Variance of 2020 Claims Costs (Serious Claims only)</b>			
a. Average squared claim size (12/31/2019 dollars)	7,915,350,577,056		Data
b. Expected number of such claims	13		(Exhibit 2)
c. $(=a.*b.)$ Estimated variance in 12/31/2019 dollars	105,280,748,509,965		
d. Average inflation and discount factor	53%		(Exhibit 4) Adj. 1 Year
e. $(=c.*d.*d.)$ Estimated process variance in this component	29,038,532,956,450		
f. % of 2019 claims costs that arise from unpaid costs on claims used to compute average	79%		Data
g. Assumed coefficient of variation of a single lifespan	40%		Data
h. Number of claims averaged	191		Data
i. $(=f.*g./\text{square root of } h.)$ Coefficient of variation of projected average payout	2.28%		
j. Discounted reserve for such claims	\$37,452,854		(Summary - Page 1)
k. $(=(i.*j.)^2)$ Parameter variance for this class	726,663,862,965		
l. Variance of counts used in projecting frequency (number of projected counts per Poisson)	13		Data
m. $(=l./5.0)$ Parameter variance of expected counts	2.6602		
n. Square of average discounted severity of claim used	7,484,564,138,658		Data
o. $(=m.*n.)$ Addition for count parameter variance	19,910,186,090,123		
p. $(=e.+k.+o.)$ Estimated variance in this component		49,675,382,909,539	
<b>4. Variance Due to Inflation and Interest Uncertainty</b>			
a. Best estimate of net reserve	\$639,690,966		(Summary - Page 1)
b. Coefficient of Variation from interest rate simulation	58%		(Exhibit 8)
c. $(=(a.*b.)^2)$ Variance due investment and inflation uncertainty		137,656,404,452,710,000	
<hr/>			
5. a. $(=1.e.+2.l.+3.p.+4.c.)$ Total Variance		137,991,379,970,209,000	
b. $(=\text{square root of } a.)$ Standard Deviation of 2020 and Prior Discounted Costs		\$371,471,910	
<hr/>			
6. a. $(=1.e.+2.l.+[4.b*(4.a-3.j)]^2)$ Variance of Just 2019 and Prior Costs		122,294,466,306,044,000	
b. $(=\text{square root of } a.)$ Standard Deviation of 2019 and Prior Discounted Costs		\$349,706,257	

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

## Estimate of Variance and Coefficient of Variation of Effects of Varying Interest and Inflation

## Results of Simulation of 2000 Future Interest Rate Path Scenarios

1. Arithmetic Mean Discount Factor	80%
2. Geometric Mean Discount Factor	73%
3. Best Estimate Discount Factor (Exhibit 9)	64%
4. Variance of Discount Factor	0.136
5. $(= (4.)^2)$ Standard Deviation of Discount Factor	0.369
6. Coefficient of Variation of Discount Factor	58%

Notes: Top two values are likely affected by randomness and skew of distributions.  
Decision was made to accept best estimate for computing the coefficient of variation.

**OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019**

Anticipated Average Payout Pattern of Total Pre-Reinsurance Liabilities Including 2020 Birth Year  
(in 2019 \$\$\$)

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Total Payout	\$35,779,936	30,219,293	31,193,619	30,159,661	29,464,642	29,810,650	30,008,361	30,579,987	30,215,032	28,445,277
	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
Total Payout	28,901,465	29,438,231	29,654,422	28,819,309	27,945,425	28,246,942	28,316,262	27,159,957	26,572,581	24,540,712
	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Total Payout	24,756,183	24,955,706	24,645,361	23,984,269	23,953,027	23,810,453	20,743,455	19,533,320	18,163,126	16,550,582
	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Total Payout	16,444,872	16,287,596	15,675,876	14,880,007	13,841,716	10,837,758	10,489,356	9,571,065	8,893,317	8,242,694
	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069
Total Payout	8,005,487	7,639,721	7,547,375	7,284,210	6,049,493	5,282,007	4,827,143	3,718,111	3,420,714	3,024,498
	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079
Total Payout	2,946,629	2,796,716	2,458,275	2,045,967	1,683,844	1,354,744	1,184,577	1,061,343	864,465	631,129
	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089
Total Payout	456,921	345,128	287,850	205,088	156,599	126,539	90,992	59,354	36,962	31,456
	2090									
Total Payout	\$26,595									

Discounted and inflation corrected to 12/31/2019 at 2.2% inflation and 5.1% investment return. \$639,690,966  
Assumes all ULAE paid in 2020  
(Rates are from Exhibit 10)

Average inflation and discount effect 64%

### OIR Analysis of Neurological Injury Compensation Association 2020 and Prior Year Reserves at 12/31/2019

#### Evaluation of Investment Income Premiums over Inflation Using Historical Earnings of NICA

	(1) (2) Previous	(2) Data Balance Sheets	(3) Data Inc. Statements	(4) Data Inc. Statements	(5) (3)-(4)	(6) (5)/(avg((1),(2)))	(7) Data Yahoo.com	(8) (7)/prev(7)	(9) Data Yahoo.com	(10) (6)-(9)	(11) (8)-(9)	(12) Data BLS.gov	(13) [(1.0+(6)) / (1.0+(12))] - 1.0	(14) [(13)-prev(13)]^2	(15) (Solver)
Calendar Year	Beginning Assets	Ending Assets	Investment Income	Investment Fees	Net Invest. Revenue	Net Return	NYSE Index 6/30	NYSE 6/30 to 6/30 Return	3 Month T-Bill Rate 6/30 Prior	Excess Returns of NICA	Excess Returns of NYSE	Consumer CPI-U Increase	NICA Excess Return over CPI	Year-to-Year Volatility	Vol. Given Mean Revert
1999	-	259,753,054	14,729,889	634,437	14,095,452		6,853.15		4.97%			2.2%			
2000	259,753,054	290,594,274	13,484,516	757,077	12,727,439	4.5%	6,798.17	-0.8%	4.67%	-0.45%	-5.77%	3.4%	1.1%	0.0001	0.0003
2001	290,594,274	322,448,433	26,492,391	898,720	25,593,671	8.0%	6,574.32	-3.3%	5.70%	3.35%	-7.96%	2.8%	5.1%	0.0016	0.0005
2002	322,448,433	346,096,030	(2,364,423)	1,069,770	(3,434,193)	-1.0%	5,636.54	-14.3%	3.56%	-6.73%	-19.96%	1.6%	-2.6%	0.0059	0.0030
2003	346,096,030	382,229,582	12,021,744	1,092,207	10,929,537	3.0%	5,505.17	-2.3%	1.66%	-0.60%	-5.89%	2.3%	0.6%	0.0010	0.0004
2004	382,229,582	440,726,160	43,973,889	1,440,245	42,533,644	9.8%	6,602.99	19.9%	0.84%	8.17%	18.28%	2.7%	6.9%	0.0040	0.0017
2005	440,726,160	500,202,393	43,454,989	1,903,011	41,551,978	8.5%	7,217.78	9.3%	1.30%	7.62%	8.47%	3.4%	4.9%	0.0004	0.0004
2006	500,202,393	606,754,030	61,655,301	2,715,730	58,939,571	10.1%	8,169.07	13.2%	3.06%	8.81%	11.88%	3.2%	6.7%	0.0003	0.0014
2007	606,754,030	716,319,722	90,147,957	3,219,148	86,928,809	12.3%	9,873.02	20.9%	4.86%	9.27%	17.80%	2.8%	9.3%	0.0007	0.0040
2008	716,319,722	705,135,858	(16,082,004)	3,421,872	(19,503,876)	-2.8%	8,660.48	-12.3%	4.67%	-7.64%	-17.14%	3.8%	-6.3%	0.0244	0.0087
2009	705,135,858	563,808,849	(109,232,024)	2,418,989	(111,651,013)	-19.3%	5,905.15	-31.8%	1.71%	-23.97%	-36.48%	-0.4%	-19.0%	0.0160	0.0465
2010	563,808,849	652,202,115	86,478,251	2,558,749	83,919,502	12.9%	6,469.65	9.6%	0.18%	11.21%	7.85%	1.6%	11.1%	0.0906	0.0079
2011	652,202,115	762,134,527	111,039,225	3,167,414	107,871,811	14.2%	8,319.10	28.6%	0.17%	13.99%	28.41%	3.2%	10.6%	0.0000	0.0057
2012	762,134,527	800,516,517	17,678,775	2,863,323	14,815,452	1.9%	7,801.84	-6.2%	0.02%	1.71%	-6.39%	2.1%	-0.2%	0.0118	0.0011
2013	800,516,517	890,786,400	73,775,304	3,263,491	70,511,813	8.0%	9,112.69	16.8%	0.08%	7.99%	16.79%	1.5%	6.4%	0.0044	0.0013
2014	890,786,400	1,024,478,268	144,560,808	3,865,431	140,695,377	13.7%	10,979.42	20.5%	0.03%	13.61%	20.40%	1.6%	11.9%	0.0030	0.0080
2015	1,024,478,268	1,030,522,152	8,795,827	3,644,655	5,151,172	0.5%	10,805.20	-1.6%	0.02%	0.47%	-1.62%	0.1%	0.4%	0.0132	0.0007
2016	1,030,522,152	1,072,391,046	35,864,078	3,618,760	32,245,318	3.0%	10,489.76	-2.9%	0.01%	3.00%	-2.94%	1.3%	1.7%	0.0002	0.0001
2017	1,072,391,046	1,158,494,820	95,128,890	3,070,049	92,058,841	7.9%	11,761.70	12.1%	0.25%	7.92%	12.12%	2.1%	5.7%	0.0016	0.0008
2018	1,158,494,820	1,210,964,330	50,669,779	3,417,424	47,252,355	3.9%	12,504.25	6.3%	0.99%	3.66%	6.07%	2.4%	1.4%	0.0018	0.0002
2019	1,210,964,330	1,315,790,163	106,706,461	3,236,594	103,469,867	7.9%	13,049.71	4.4%	1.88%	6.87%	3.37%	1.8%	5.9%	0.0020	0.0010
Geometric Average						5.1%		3.3%	1.8%			2.2%	2.8%		
Geometric Average Last 10 Years						7.3%		8.3%	0.4%			1.8%	5.4%		
										Variance or Average Volatility			0.0049	0.0091	0.0047
										Standard Deviation				0.0956	0.0685
										Beta	49.49%				
										10 Year Beta	34.63%				
Summary of indications															
Selected Long-Term Investment Return						5.1%									
Selected Inflation Rate						2.2%									
Selected Long-Term Return over Inflation						2.8%									
Selected Year-to-Year Standard Deviation of Volatility						10.0%									
Indicated Mean Reversion Factor						90.0%									(used .7 for reasonableness)

Notes: All accounting statements used are as of 6/30 of the relevant year.

## **Technical Appendix**

### **Background—Data:**

The primary data presented to the OIR for analysis consisted of two types of components, although secondary data was provided as well. The first component was a claims status report as of 9/30/2019. This contained the paid and case incurred loss (payments to claimants and claimants' attorneys) and defense costs for each claim reported to NICA as of the valuation date. It contained a field with the date of final adjudication of each claim, and a related field indicating whether the Division of Administrative Hearings, "DOAH," awarded (deemed compensable) or dismissed each claim. It also contained fields such as the date of birth of the subject child and the date the claim was reported.

The second major data element provided by NICA was a set of individual claim worksheets. These provide a projection of all the costs: dollar awards, medical expenses, nursing expenses (the primary costs), etc. for each future year. They provide for all expenses through an estimated future lifetime as estimated by NICA in conjunction with medical personnel. These are reviewed annually (in this case, during the following Spring) by NICA, and form the basis for the case reserves established as of 12/31 of each year. The future payments generally are not updated throughout the year. As an important note, these worksheets were reviewed by the consulting actuary used by the Office in its 2010 review of NICA, and, except for discounting and inflation, he found them to be acceptable. The Office concurs with his assessment, other than it might be desirable to have an understanding<sup>8</sup> of how any skew in claimant actual lifetimes (vs. the expected lifetimes) might impact the average costs. The Office previously used the 2011 and subsequent versions of these worksheets in prior reports.

Additional data was presented in the form of financial statements of NICA as of 6/30/2019 and prior years. The actual investment return in each of the prior years was determined from these. This was used in the construction of Exhibit 10.

Lastly, information for projecting 2020 costs and premium was also provided by NICA. Premium was provided, as was information on the historical count of live births and on the obstetricians and midwives covered. Noting that some of the premium comes from physicians that do not deliver babies, the premium was deemed not desirable for estimating 2020 costs. So, the number of physicians and midwives electing coverage through NICA was used to project NICA costs arising from 2020 births. The calculation is contained in Exhibit 2.

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<sup>8</sup> In the end, the Office was unable to identify any data that could be used to evaluate this.

### **Background—Claim Categories within Claim Lifetimes:**

Claims of NICA may be thought of as having several stages of life. Initially, the child is born and suffers some potentially compensable condition for which the parents will eventually bring a claim. At that time, the claim has occurred, but it has not yet been reported to NICA, so the claim is considered “unreported.” At some point the claim is presented (“reported”) to NICA, at which time the claim becomes a “pending” claim. During that time NICA forms an impression of the claim as whether it is valid or not, but they are not allowed to make a binding decision on the compensability of the claim. So, pending claims may be also referred to as “unadjudicated.”

The first entity with power to assess compensability is the DOAH administrative law judge. Following this decision, and any final appeals, the claim is said to be “adjudicated.” Should the DOAH judge determine the claim to be compensable (and, if the claim is appealed, the appellate court agrees), it then may be considered to be “compensable” or “awarded” in the parlance of this report. It is specifically considered “awarded and pipeline” once the claim has been awarded, but NICA has not yet prepared a worksheet evaluating the cost of the claim. As soon as the key information is then obtained (about two to six months later on the average), a worksheet is prepared and the claim may be thought of as “evaluated and open.” When payments cease, the claim is “closed.” Should the DOAH judge determine that the claim is not compensable (and, if the claim is appealed, the appellate court agrees), the claim is considered “dismissed.” A claim may be “dismissed and pipeline” until the related defense costs are paid and it is “dismissed and closed.”

### **Background—Inflation:**

Medical cost inflation is generally perceived to be significantly higher than broad, general inflation in the United States. However, the vast majority of future costs anticipated by NICA are nursing costs. Further, NICA officials indicated that many of those expenses are limited or related to a Medicaid reimbursement rate which has been relatively flat for some time. Consequently, the Exhibit 10 analysis uses the overall Consumer Price Index as a proxy for the loss cost inflation NICA experiences.

### **Background—Interest Rates:**

Recognizing that interest rates have currently been low for some time, but the investment horizon of the Association is very long, a compromise was made between the all-time and more recent average returns. The all-time average was correspondingly assigned more weight.

## **General Reserving Approach—Workbooks for Open and Evaluated Claims:**

NICA officials generally prepare claim-by-claim worksheets for use in case reserving following the end of each year for all the claims they expect to be making payments on in the following year. The majority of the projections on most of the worksheets were actually prepared using information as of the Spring following 12/31/2018. Therefore, these were done using a cost level between 12/31/2018 and 12/31/2019. This was considered to be sufficiently close to the midpoint of 2019 to treat them as being at the 2019 cost level. These worksheets combine the costs of various types of payments to be made over the course of the claim. They include projections of both loss and defense. Key data values that were obtained from the worksheet were as follows:

1. Up to five future periods of base expenses (primarily nursing care—the largest cost item), beginning in 2019, with the amount of expenses payable annually in each period, that together comprise the entire future lifetime of the child per physician estimates. These contemplate how nursing expenses change throughout a child’s life as insurance and similar arrangements change. For example, for an individual with an estimated life expectancy of twenty years, the reserve worksheet might show the estimated expense by major expense category for each of the next five years (after 2018), the five years following that, and then the remaining ten years of a twenty-year life expectancy beginning in 2019. Although expenses are projected for each year of the life expectancy of the individual claimant, the expenses were deemed to be expressed at current (2019) cost levels to simplify the process.
2. One-time expenses (expected to be incurred once throughout a child’s remaining lifetime), broken down between home remodeling (to facilitate care) and other expenses.
3. Total of periodic expenses, such as purchases of handicap ramp-equipped vans, etc. expected to be required over a child’s future lifetime.

Item 1. was assigned to calendar years using the assignment specified by the future periods (beginning in 2019). The one-time expenses were prorated over the projected lifetime. The periodic expenses were also rotated over the child’s projected remaining lifetime. These worksheets were used to construct the stream of payments underlying Exhibit 1. For purposes of this analysis, only the 2020 and subsequent years’ projected payments were included in the reserve indication.

For subsequent portions of this analysis, the full payout pattern from inception of payments was constructed for each claim. The stream of payments by calendar year through 2018 was constructed by pro-rating<sup>9</sup> the paid loss to-date at 12/31/2018 among the years starting with the year of final adjudication. These from-inception payout streams for each claim were adjusted to a common 2019 beginning cost level, and the amount and pattern of the payouts on a 2019 cost basis were determined for Exhibit 4.

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<sup>9</sup> This approximation of the payout pattern of the paid loss to-date is imperfect, but is unlikely to generate material error in the overall approximation of the expected reserve need and percentile ranges.

## **General Reserving Approach—Best Estimate Overall 2019 Plus Prior Pipeline and to be Awarded Claims:**

The first step in estimating the costs of the claims that are the subject of this report involves computing the unpaid costs as of 12/31/2019 for all 2019 and prior year claims. Generally, the approach involves first estimating the ultimate number of claims in each birth year in Exhibit 3 using a standard reported count development count technique. Then, ratios of claims awarded to claims adjudicated for various lags between birth and adjudication (noting that claims that take longer are somewhat more prone to be dismissed) and a development process were used to estimate the number of the unadjudicated (at 9/30/2019) claims that would eventually be awarded at the time of the final adjudication. The prior year estimates were heavily considered in the estimates for the more recent years. Then the process for determining the 12/31/2019 reserve was as follows:

1. Estimate the post-2019 payout of evaluated and open claims using worksheet information, (skipping the 2019 payments) and adjust the payouts to the present value of inflated future costs. Sum all those payouts together to obtain the future aggregate payout stream for all evaluated and open claims. This payout stream will eventually form part of an aggregate reserve. The last part of this step is to convert to the corresponding present value using the excess of the selected interest rate over full Consumer Price Index (“CPI”) inflation.
2. Determine the number of pipeline and to be awarded claims (43) by subtracting the number of claims with worksheets (191) and the number of closed awarded claims (205) from the total expected ultimate number of awarded claims for 2019 and prior (439 claims from Exhibit 3). This result (43) represents all claims that are expected to ultimately be awarded and are not presently (as of 9/30/2019) in worksheet status.<sup>10</sup> This includes 5 pipeline awarded claims without worksheets that were found.
3. Determine the percentage of claims that are expected to be serious (83%) using the percentage of claims awarded in the 2009-2018 period that were open and awarded in at least three calendar years.
4. Determine the average payout levels of all evaluated and open claims. Those are projected for future payouts that begin in many different years, but at this point are adjusted to the 2019 cost level. Sum all the payments from inception of payout streams and divide by the number of claims to get the average payout stream at 2019 levels of a single future awarded claim. Payments on the future evaluated and future awarded claims were assumed to have payments begin on an assumed average year of 2021. Lastly, the average payout stream was multiplied by the number of pipeline and future awarded claims, and combined with the results of Item 1.
5. In Exhibit 5, the incremental 12/31/2017-9/30/2019 paid and incurred defense costs for awarded claims divided by the number of claims awarded within the same period are shown. A cost of \$14,000 in 2019 dollars was also selected, based on the cost for awarded claims, and \$10,000 for dismissed claims.

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<sup>10</sup> Further, there were some claims with unusual features such as no determinable birth year, no adjudication date when parents abandon the system, etc. that were recognized in Exhibit 3.

6. The aggregate payout stream from Item 3 (with the enhancements to include defense costs) was discounted to 12/31/2019 using the off-balance of interest over inflation. Of note, in Exhibit 10, the future inflation was estimated at 2.2% and future investment income at an average of 5.1%. Hence, the anticipated investment rate net of inflation was approximately 2.8%. Discounting the various payment streams produced the final best estimate of the direct unpaid loss and defense liabilities as of 12/31/2019.

### **General Reserving Approach—Defense Costs for Claims to be Dismissed in the Future:**

The Office analyzed (Exhibit 5) the incremental 12/31/2017-9/30/2019 paid and incurred defense costs for dismissed claims divided by the number of claims adjudicated as dismissed within the 12/31/2017-9/30/2019 period. Similarly, the Office calculated the inception-to-date average defense costs on dismissed claims. The data indicated a value of \$10,000 (see Exhibit 5) in 2019 dollars for dismissed claims. This value, when multiplied by the number of expected future dismissed claims (approximately 115), produces a non-material cost, so it was not reflected in the indicated reserves.

### **General Reserving Approach—2020 Loss and Defense Costs:**

2020 loss and defense costs were computed using a frequency/severity approach. In Exhibit 2, the total number of projected awarded claims for 2014-2018 was divided by the total count of obstetrician-years and midwife-years in the same period (obstetricians + midwives insured in each of 2014, 2015, ..., 2018 years). The result was the anticipated awarded claim frequency. The anticipated dismissed claim frequency was estimated similarly in Exhibit 2. The expected number of obstetricians and midwives insured in 2020 was provided by NICA. The projected awarded claims for 2020 births and dismissed claims for 2020 births were estimated by multiplying the projected frequencies by the number of obstetricians and midwives insured in 2020. The average awarded claim loss severities for serious and DA claims were estimated by using the appropriate average 12/31/2019 loss cost level severities (computed by adjusting the average payout of awarded claims by the inflation associated with a payments start year of 2021). Similarly, a defense cost per claim of \$10,000 in 12/31/2019 dollars was used for dismissed claims. The loss was assumed to begin paying on an assumed average year of 2021, and the defense was assumed to be paid in an assumed average year of 2021. The final values were then discounted to 12/31/2019 using the selected average net discount rate.

Since the statutes governing NICA specify that the assessments are to be paid (essentially) at the beginning of the year, the costs in the payment stream so computed were discounted to 12/31/2019. The sum of this present value and the present value of the unpaid liabilities forms the Office's best estimate of the aggregate operational liabilities as of 12/31/2019.

## Estimation of Percentile Ranges:

The last step in our analysis was the estimation of the percentile ranges. In this process, the Office first estimated the variance in the payouts at the assumed 12/31/2019 cost and interest levels. The result was used to estimate the variance in future costs given that the exact inflation and interest assumptions used by the Office in computing present values hold until each claim is closed. Then, the total variance was estimated by adding that derived variance of values at the 12/31/2019 cost level to the variance in present values due to volatility in the inflation/discount relationship from year to year. As part of the first goal of estimating the 12/31/2019 cost level values, it must be recognized that the variance in the 2019 and prior birth years will create parameter variance in the estimate of the 2020 costs. The variances accounted for are as follows:

1. Variance between the actual future lifetimes of claimants and the expected future lifetimes. This is assumed (no reliable reference could be found) to be represented as a standard deviation of ten years on a twenty five-year expected future lifetime, or a coefficient of variation of 0.4 on a single claim reserve. The calculations are slightly more complex on a set of claims with different payout amounts, but the Office used the simplified coefficient of variation of  $0.4/\sqrt{n}$  for the coefficient of variation of the total 12/31/2019 level reserve on “ $n$ ” claims.
2. For the number of future awarded claims (the cost of dismissed claims is minimal), a Poisson distribution was assumed, hence the process variance of the aggregate of a random number of counts and a random value for each one is equal to (under the compound Poisson version<sup>11</sup> of the collective risk model) the expected number of claims times the expected value of the severity squared ( $E[X^2]$ ). That expected value (at 12/31/2019 levels) may be computed by simply computing  $X^2$  of the individual claims’ costs at 12/31/2019 levels using all worksheet (award and evaluated) claims.
3. The results of Item 2. must be compounded by the parameter variance associated with the uncertainties of claimants’ lifetimes. That is computed using the ratio of post-2019 projected claims payments to the all-year total claims payments. Multiplying that ratio by the 0.4 coefficient of variation of future lifetimes and dividing by the square root of the number of claims in worksheet status yields the coefficient of parameter variation.
4. The parameter variance in the 2020 count distribution is approximately equal to the number of projected awarded claims for 2014-2018 divided by 5.
5. The process variance of the 2020 aggregate costs at 12/31/2019 calendar year cost levels is equal to the result of the collective risk formula using count parameter variance (Item 4.). That is to say, it is equal to the expected count times the expected squared individual cost per the formula from Item 2., plus the count parameter variance from Item 4. times the square of the

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<sup>11</sup> The Compound Poisson distribution is, to some actuaries, the most basic distribution for modeling aggregate loss costs. It assumes that the number of expected claims is known (the Office added some uncertainty at a later step, but this served as a starting point), and whether each claim happens is not related to whether or not any other claims happen. It assumes that the costs of each claim are not related to those of any claim, other than that all the claims are subject to the same set of potential costs.

average severity (at 12/31/2019 levels) used in projecting the cost (12/31/2019 basis) of future claims.

6. The parameter coefficient of variation from Item 3. also applies to the 2020 year.
7. The aggregate future payout streams for all claims combined for 2020, 2019, and prior years are combined into a single set of future payments. Using Brownian Motion<sup>12</sup> with “mean reversion” [in this case, 70% of the difference between the prior rate and the baseline 2.8% off-balance of interest and inflation] we derived<sup>13</sup> volatility parameters for the off-balance of investment and inflation costs in Exhibit 10. Two thousand different simulations<sup>14</sup> of the future evolution of that discount factor over the future periods were run, and the ratios of the resulting present value for each scenario were computed. The standard deviation of those values, divided by the mean value, represents the process variance coefficient of variation for net discount.
8. The aggregate variance was estimated as:
  - a. The square of (Item 1. times the present value of the open and evaluated claims).
  - b. Plus Item 2. times the square of the discount factor for claims projected to begin paying in 2021 (generally, future awards on existing claims).
  - c. Plus the square of (Item 3. times the discount factor for future claims projected to begin paying in 2021, times the cost at 12/31/2019 levels of the average future claim).
  - d. Plus Item 5.
  - e. Plus the square of (Item 3. times the discount factor for future claims projected for NICA’s 2020 year (claims from 2020 births), times the cost at 12/31/2019 levels of the average future claim).
  - f. Plus the square of (Item 7. times the best estimate of the net discounted liabilities from 2020 and prior as computed elsewhere in the report).
  - g. Plus the variance arising from interest and inflation off-balance.
  - h. Equals the variance of possible eventual aggregate loss and loss expense payouts.

The percentile ranges were then computed using a lognormal distribution fit to the mean (best estimate) and variance (Item 8.) computed by the above process. The results were graphed in Summary Page 2.

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<sup>12</sup> Brownian Motion is the most common “stochastic process” for modeling the range that a given numerical item or set of items will take as they change over time. The mean reversion aspect corrects the Brownian so that items tend to revert to their starting value over time.

<sup>13</sup> A drift standard deviation of 10% and a mean reversion factor of 70% were used, as shown in Exhibit 10.

<sup>14</sup> Since these were relatively long stepwise paths, the NtRand plug-in from Numerical Technologies was used in lieu of the standard random number generator. A standard cumulative normal distribution inversion method was used to obtain the stochastic portion of the paths.

## Sensitivity Testing:

Although considerable effort has been expended on the lifespans used in the worksheets, they nonetheless represent a process that relies heavily on opinion. So, an effort was made to evaluate what could occur to increase the lifespans and consequently the costs. The children involved are all disabled in some way, but some believe that institutionalized disabled individuals may have near normal lifespans. Likely it depends on the type of disability.

The ten-year (ten years cumulative, not annualized over ten years) mortality in various age bands implied by the projected lifespans in the data is shown below. Comparable standard mortality and disabled mortality using the most recent applicable tables from the Society of Actuaries website are shown as well.

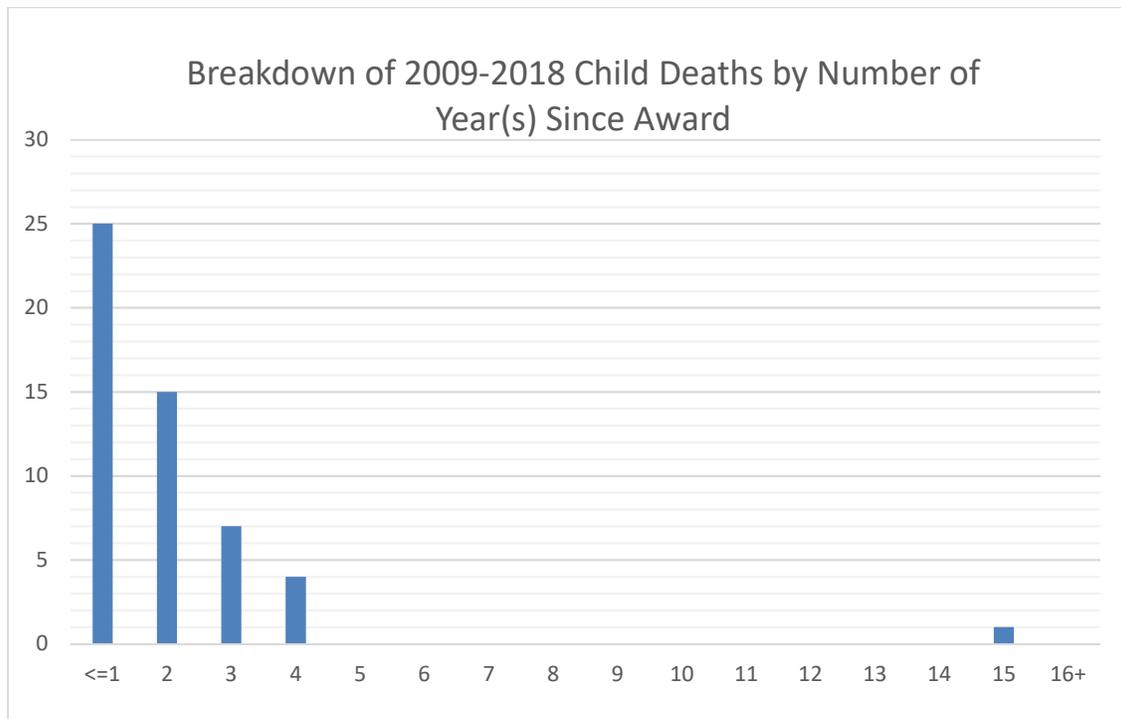
### Estimation of Mortality Underlying Spreadsheet Claims

Age Range	Remaining Lives	Mortality	Standard Mortality	Disabled Mortality
31-40	146	31.5%	2.1%	10.9%
41-50	100	35.0%	4.6%	15.2%
51-60	65	73.8%	10.6%	23.2%
61+	17	100.0%		

As one may see, the spreadsheets contemplate much higher mortality (hence lower costs) than the other tables. However, the individuals are all disabled, and the disabled mortality likely includes those with moderate lifespan effects such as back injuries and the spreadsheets suggest a significant number of vans that accommodate wheelchairs are needed, so the spreadsheet results are plausible.

Recognizing this uncertainty, a crude test was performed. One could evaluate the effect of, say, a ten-year increase in the spans of all individuals over the age of 20. There are 128 such individuals presently in spreadsheet status. Crude estimates (random sample of 5 claims) suggest an average remaining lifespan of twenty years and an average cost in the last year (at 12/31/2019 levels) of about \$200,000. The annuity factor for such a situation, at the net interest rate in the study, is about 5.0. Those combine for an additional cost of \$128 million, excluding the impact on future awarded claims and 2020 claims. So, this does not appear so far to present a solvency concern, but is somewhat meaningful.

The conclusions in this report are also sensitive to the number of claims that projected to close quickly and consequently for lower amounts than the worksheet claims (DA claims). In the report, the percentage of those claims were estimated by taking the ratio of all claims that were opened and closed within the same calendar year or within two adjacent calendar years. To test whether these were reasonably representative of the short-term claims, a frequency chart of the number of distinct calendar years claims closed, but awarded in 2009-2018, were open is shown on the next page.



The claims from the first column is included in the DA count. This strongly supports the selected percentage of DA claims.

As a measure of inflation, the trends in the average incremental paid (from the George Turner report) are divided by the number of claims awarded and in paying status from Exhibit 3. As one may see, the trends are inconsistent. This chart does not provide a definite indication of trend, nor does it invalidate the 2.2% inflation rate used in this report.

### Trend in Average Paid per Awarded Claim

	12	24	36	48	60	72	84	96	108	120
2000										10,280
2001									15,988	18,118
2002								35,984	38,145	31,932
2003							16,729	14,395	24,680	26,282
2004						36,879	29,463	25,321	13,944	17,909
2005					51,608	71,462	48,777	46,149	30,490	30,291
2006				74,980	73,187	110,681	62,501	45,766	41,268	38,634
2007			54,964	89,201	71,660	52,827	67,083	51,645	52,108	52,624
2008		133,761	82,818	44,849	49,992	27,885	39,866	43,790	48,784	52,442
2009	57,420	101,895	80,739	63,114	45,496	35,283	34,470	55,210	72,213	36,007
2010	116,166	128,562	37,801	50,080	20,030	14,509	16,928	17,317	15,241	14,186
2011		166,126	86,133	74,440	68,743	58,572	46,672	38,342	36,118	
2012		40,190	98,982	56,612	27,108	15,976	24,718	24,187		
2013	114,394	150,967	96,224	66,623	64,864	51,631	68,964			
2014	116,952	106,595	137,629	115,632	97,183	63,739				
2015		120,989	107,612	82,750	46,105					
2016		126,085	44,324	39,508						
2017		111,933	51,429							
2018		235,694								
2019										
Trend		3.2%	0.7%	-0.4%	-0.5%	-4.3%	2.7%	1.0%	6.2%	7.5%
Correlation		0.243	0.054	-0.041	-0.035	-0.233	0.175	0.073	0.369	0.455