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December 31, 2020

Mr. George Deebo, Executive Director
Virginia Birth-Related Neurological Compensation Program
7501 Boulders View Drive, Suite 210
Richmond, Virginia 23225

Dear Mr. Deebo:

Section 38.2-5021 of the Code of Virginia requires the State Corporation Commission Bureau of Insurance (Bureau) to conduct an actuarial evaluation, at least biennially, of the assets and liabilities of the Virginia Birth-Related Neurological Injury Compensation Fund (the Fund), and to notify promptly the Speaker of the House of Delegates, the President of the Senate, the Board of Directors of the Program, and the Virginia Workers' Compensation Commission in the event the Fund cannot be maintained on an actuarially sound basis subject to the maximum assessments permitted by § 38.2-5020. A copy of the required report is attached. The report details the findings of an actuarial evaluation performed on behalf of the Bureau by Pinnacle Actuarial Resources, Inc. (Pinnacle). The primary findings in the Pinnacle report this year include the following:

- As of December 31, 2019, the Fund was not actuarially sound and had a total estimated deficit of $26.8 million. This estimated deficit is far less than the $79.5 million forecasted in the prior report due to investment income results for 2019 reported at 16.5% and the 3-year annualized return of 7.4% rather than the 5.25% utilized in the projections. These returns were sufficient to overcome the impact of the $21 million Medicaid claw back payment made in September 2018 that contributed to the 2019 report forecasted deficit.
- Pinnacle estimates that the Fund, although actuarially unsound, currently has sufficient assets to meet ALL expected future benefits obligations of participants that have been admitted to the Program as of yearend 2019. This is a positive finding that differs from prior reports, where the actuaries estimated that the assets were sufficient to meet expected future benefits for at least 50 years.

It is notable that the Fund was forecasted to have a deficit of $168.9 million as recently as eleven years ago, compared to the December 31, 2019 estimated deficit of only $26.8 million.

The report cautions that it provides a reasonable estimate of unpaid benefits liabilities to Program participants born prior to a given valuation date with no implication of certainty.

After you have had an opportunity to review the attached report, I will be glad to discuss the findings with you in more detail and answer any questions you may have.

Cordially,

Scott A. White
Commissioner of Insurance
Attachment

# Commonwealth of Virginia
# State Corporation Commission – Bureau of Insurance

## 2020 Analysis of the Virginia Birth-Related Neurological Injury Compensation Program

December 21, 2020

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*Commitment Beyond Numbers*

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# Virginia Birth-Related Neurological Injury Compensation Program

*Actuarial Analysis as of December 31, 2019*

## *Executive Summary*

Through a review and analysis of a significant amount of data and information, Pinnacle Actuarial Resources, Inc. (Pinnacle) has come to a number of key conclusions regarding the Virginia Birth-Related Neurological Injury Program (Program) and the Virginia Birth-Related Neurological Injury Fund (Fund) administered by the Program. This report summarizes Pinnacle's actuarial analysis based on data valued as of December 31, 2019. Beyond our key findings, there are several recommendations related to the ongoing operations of the Program.

### Findings

**Finding 1. Estimated Unpaid Benefits Liability and Surplus Position as of December 31, 2019**
Pinnacle estimates that, as of December 31, 2019, the Fund had an outstanding liability of $569.1 million related to future benefits payments for Program participants who have been born as of December 31, 2019, regardless of whether they have been admitted to the Program as of this date. This estimate also includes a provision for future claim administrative expenses. When compared to assets valued at $542.3 million, this results in an estimated Fund deficit of $26.8 million.

**Table 1 – Estimated Fund Surplus/(Deficit) as of December 31, 2019**

**Estimated Financial Position as of 12/31/2019**
($ in millions, on a present value basis)

| Claimant Status | Estimated Ultimate Number of Claimants | Estimate of Future Claim Payments | Estimate of Future Claim Admin. Expenses | Value of Total Assets | Forecasted Surplus/ (Deficit) |
|---|---|---|---|---|---|
| All Claimants Admitted to the Program | 234 | 410.5 | 21.4 | | |
| All Claimants Not Yet Admitted to the Program | 54 | 132.2 | 5.0 | | |
| Grand Total | 288 | 542.7 | 26.4 | 542.3 | (26.8) |

These values are different than the projected financial position of the Fund as of December 31, 2019 in the prior report using data as of December 31, 2018 of an outstanding liability of $564.0 million, a forecasted asset value of $484.5 million and a Fund deficit of $79.5 million. This difference stems from current Fund assets that are higher than expected in the previous analysis.

**Finding 2. Actuarial Soundness of the Fund as of December 31, 2019**

As a result of the estimated Fund deficit of $26.8 million as of December 31, 2019, we find that the Fund continues to not be "actuarially sound" as of this date. In essence, this means that the current value of the Fund's assets is less than the present value of its liabilities, most notably the present value of the future benefits obligations and related administrative expenses for all Program participants born on or before December 31, 2019, regardless of whether or not they have been admitted to the Program as of this date. This finding is solely related to the legislated standard for continuing the 0.25% premium tax on liability insurance premiums in Virginia. This finding that the Fund is not actuarially sound should not be confused with any immediate concerns with the Fund's ability to pay benefits.

This definition of actuarial soundness has been used with regard to the Program and the Fund since 1992. However, it is worth noting that the Fund does currently have sufficient assets as of December 31, 2019 ($542.3 million) to meet all expected future benefits obligations of participants that have been admitted to the Program as of December 31, 2019 ($431.9 million, including future administrative expenses). This suggests that the Fund can be viewed as having sufficient funding for all currently admitted participants. While this is not sufficient for the Fund to be viewed as actuarially sound, it is a positive finding regarding the financial condition of the Fund.

**Finding 3. Forecasted Unpaid Benefits Liability and Surplus Position as of December 31, 2020**

We forecast that the Fund will continue not being actuarially sound as of December 31, 2020, and will have unpaid benefits liabilities (including expenses) of $593.5 million and a Fund deficit of approximately $26.6 million. This is shown in Table 2 on the next page.

**Table 2 – Estimated Fund Surplus/(Deficit) as of December 31, 2020**

**Estimated Financial Position as of 12/31/2020**
($ in millions, on a present value basis)

| Claimant Status | Estimated Ultimate Number of Claimants | Estimate of Future Claim Payments | Estimate of Future Claim Admin. Expenses | Value of Total Assets | Forecasted Surplus/ (Deficit) |
|---|---|---|---|---|---|
| All Claimants Admitted to the Program | 245 | 429.5 | | | |
| All Claimants Not Yet Admitted to the Program | 53 | 137.6 | | | |
| Grand Total | 298 | 567.0 | 26.5 | 567.0 | (26.6) |

Our calculations indicate that the total number of participants as of December 31, 2020 will be 298. This is an increase of 10 participants from the total number as of December 31, 2019.

**Finding 4. Forecasted Unpaid Benefits Liability and Surplus Position as of December 31, 2021 and December 31, 2022**

Similar forecasts for the next two calendar year ends (i.e. 2021 and 2022) produce comparable results as the estimated Fund deficit will grow to $28.8 million at the end of 2021 and to $33.4 million at the end of 2022. This is shown in Tables 3 and 4, respectively, which follow. This modest worsening of the Fund deficit over the three-year projection period is consistent with estimated assessment revenues and expected investment income not being quite sufficient to keep pace with calendar year benefits payments and additional unpaid benefits liabilities associated with new eligible Program participants, whether admitted or not.

**Table 3 – Estimated Fund Surplus/(Deficit) as of December 31, 2021**

**Estimated Financial Position as of 12/31/2021**
($ in millions, on a present value basis)

| Claimant Status | Estimated Ultimate Number of Claimants | Estimate of Future Claim Payments | Estimate of Future Claim Admin. Expenses | Value of Total Assets | Forecasted Surplus/ (Deficit) |
|---|---|---|---|---|---|
| All Claimants Admitted to the Program | 255 | 449.9 | | | |
| All Claimants Not Yet Admitted to the Program | 53 | 143.4 | | | |
| Grand Total | 308 | 593.3 | 26.5 | 591.0 | (28.8) |

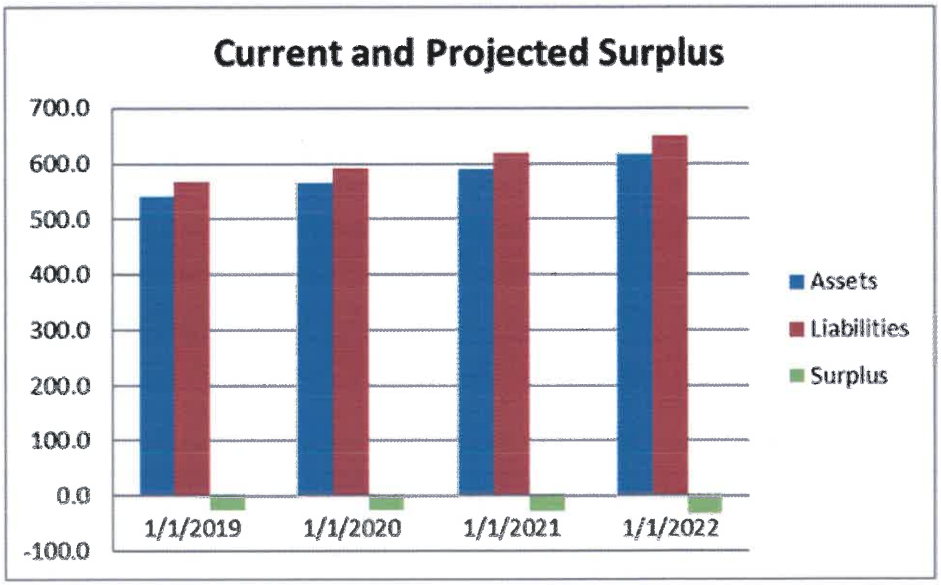
**Table 4 – Estimated Fund Surplus/(Deficit) as of December 31, 2022**

**Estimated Financial Position as of 12/31/2022**
($ in millions, on a present value basis)

| Claimant Status | Estimated Ultimate Number of Claimants | Estimate of Future Claim Payments | Estimate of Future Claim Admin. Expenses | Value of Total Assets | Forecasted Surplus/ (Deficit) |
|---|---|---|---|---|---|
| All Claimants Admitted to the Program | 265 | 472.9 | | | |
| All Claimants Not Yet Admitted to the Program | 53 | 150.5 | | | |
| Grand Total | 318 | 623.4 | 26.5 | 616.5 | (33.4) |

The steady growth of the Fund's assets and liabilities over the forecast period, as well as the slight deterioration in the Fund deficit, can be seen in the following graph.

**Table 5 – Projected Fund Assets, Liabilities and Surplus/(Deficit) 2019-2022**




**Finding 5. Cash Position**

The Fund is in a strong position to continue paying Program benefits for many years into the future. There does not appear to be a material risk of a cash shortfall for decades. This is based on a comparison of the current Fund asset value of $542.3 million compared to forecasted annual benefits payments in the near future, before recognizing the impact of mortality and discounting for the time value of money. Although the Fund is not technically actuarially sound for the purpose of discontinuing

the liability insurance premium tax, it has sufficient assets to continue paying expected future benefits and related administrative expenses for admitted claimants as of December 31, 2019.

**Recommendations**

In addition, there are several recommendations related to the ongoing operations of the Program that we find appropriate at this time. These recommendations are:

1. The Program should continue to assess the maximum levels permitted by law for participating and non-participating physicians and participating hospitals.

2. The Program should continue to assess liability insurers at the maximum amount permitted by law (currently 0.25% of net direct liability premiums written in Virginia).

3. Reviews of the Program should be undertaken annually by the Virginia State Corporation Commission, Bureau of Insurance (VA SCC) to assess the Fund's actuarial soundness due to the current uncertainty in annual benefits payments.

4. The Program should continue to maintain payment history, claimant personal information and life plans for all Program participants, as well as Fund assessment information in formats suitable for future actuarial studies.

5. The Program should continue to maintain current copies of the claimants' insurance policies.

6. We recommend that the Program continue to evaluate potential changes in the estimated life expectancies for Program participants based on actual participant survival rates, changes in life plans, and changes in the life expectancies in the life plans. In addition, to continue to satisfy the legislative intent to consider individual participant costs, increases in estimated life expectancies have historically been a major source of adverse development for the Fund and remain potentially the single greatest risk factor for the Program going forward.

7. The Program should consider more detailed modeling of the growing impact of the wage loss benefit.

## *Scope & Background*

**Scope**

Pinnacle Actuarial Resources, Inc. (Pinnacle) has been retained by the Virginia State Corporation Commission, Bureau of Insurance (VA SCC) to perform an actuarial analysis of the Virginia Birth-Related Neurological Injury Compensation Program (the Program) and particularly the Virginia Birth-Related Neurological Injury Compensation Fund (the Fund) overseen by the Program.

This report summarizes Pinnacle Actuarial Resources, Inc.'s (Pinnacle's) actuarial analysis of the Program's funding adequacy as well as the financial soundness of the Fund. This actuarial report has five major objectives:

- Estimate the total unpaid benefits liabilities for all current and future Program participants born on or before December 31, 2019;
- Evaluate the surplus or deficit position of the Fund as of December 31, 2019;
- Project the surplus or deficit position of the Fund as of December 31 of 2020, 2021 and 2022;
- Evaluate the benefits paying ability of the Program in light of the current and projected Fund cash and invested assets, surplus/(deficit) position, and expected annual benefits payments; and
- Provide recommendations regarding assessment levels and other revenue sources for the Program in light of current operating results and financial conditions.

Our analysis is based on assessment revenue, participant counts, benefits payments, investment returns, and Program administrative costs valued as of December 31, 2019. Participant life expectancies and life plans data from Pinnacle's previous analysis were used. Estimates at subsequent annual valuations are also provided in the report.

This actuarial report summarizes our analysis and recommendations. The exhibits and analysis supporting our recommendations are contained in the enclosed set of exhibits. These exhibits detail many of our methodologies, assumptions, selections and findings. As such, the exhibits should be considered an integral part of this report.

**Background**

The Virginia Birth-Related Neurological Injury Compensation Program was created in 1987 to provide the exclusive remedy for covered birth-related neurological injuries in Virginia for births on or after January 1, 1988. Injury must have resulted from oxygen deprivation or mechanical injury during labor, delivery, or resuscitation in the immediate post delivery period in a hospital. The injury must result in both physical and mental impairment. In addition, either the obstetrical services related to the birth must be provided by a participating physician or they must have occurred in a participating hospital, or both. Participation is voluntary for physicians, registered nurses, midwives and hospitals. The Virginia Workers' Compensation Commission is the exclusive venue for hearings to determine whether a claimant will be admitted to the Program. The Virginia Office of the Attorney General supports the Program by providing requested legal services.

Benefits provided include:

- **Lifetime actual, medically necessary, and reasonable medical expenses including physicians, nursing, hospital, rehabilitation and therapy, prescription medications, medical equipment and appliances, and related travel expenses. This also includes certain housing and transportation expenses.**
- **Loss of earnings from the age of 18 to age 65 based on 50% of the average weekly wage in the Commonwealth for workers in the private, non-farm sector.**
- **The Act affords attorneys' fees and litigation expenses associated with the filing of eligibility and post-admission compensation claims.**
- **Reimbursement may be provided for nursing and attendant care that is provided by a relative or legal guardian of a Program beneficiary so long as that care is beyond the scope of child care duties and services normally and gratuitously provided by family members to uninjured children.**
- **Benefits also include certain housing and transportation expenses afforded by the Program's Guidelines at the discretion of the Program's Board.**

The birth fund legislation in Virginia also explicitly specifies that several expenses are not covered. A ten-year statute of limitations applies to all claims for Program benefits.

The Program is governed by a nine-member Board of Directors. The Board is appointed by the Governor with six citizen representatives and one representative each of participating physicians, participating hospitals, and liability insurers. The Board's powers are clearly delineated in the Program's enabling legislation. Day-to-day operations are managed by an Executive Director, George Deebo, and the Deputy Director, Candace Thomas, both hired by the Board. The Executive Director is supported by additional staff as needed.

The Program is funded through the Virginia Birth-Related Neurological Injury Compensation Fund (the Fund), which is organized as a segregated account (i.e., trust fund). The assets of the Fund are administered by the Board of Directors of the Program. The Board has retained investment advisors to manage the Program's assets.

The Program uses a variety of funding approaches. First, participating physicians are required to pay an assessment. In 2019, this assessment was $6,200. In addition, all licensed physicians that do not participate in the Program are required to pay a fee of $300 annually as a condition of being licensed in Virginia. Hospitals pay an assessment of $55 per live birth to participate, subject to a maximum of $200,000 in assessments annually. A number of exclusions to the assessments apply for physicians with extenuating circumstances. Finally, if, and only if, the Program is determined not to be actuarially sound, an assessment of up to 0.25% of all "net direct premiums written" by liability insurers in Virginia may be charged. These assessments of liability insurers have been charged at the maximum amount for many years. All changes in assessment levels require a legislative action.

Medical professional liability insurers in the Commonwealth of Virginia are required by law to provide a discount for hospitals and healthcare providers that participate in the Program. These discounts typically range from 10% to 15% of otherwise indicated premiums.

Several legislative changes have been made to the Program in the last decade. Many of the changes have been in response to the increasing estimated deficits for the Fund. While a detailed description of these changes is beyond the scope of our engagement, a brief summary of elements of each legislative action follows:

> Effective July 1, 2003 – Provided for the payment of legal expenses for applicants not admitted to the Program and allowed an award of $100,000 to the families of children who died within 180 days of birth.
>
> Effective July 1, 2004 – Removed the benefit for the payment of legal expenses for applicants not admitted to the Program created in 2003 and increased assessments.
>
> Effective July 1, 2006 – Allowed an additional opportunity for claim reporting for births between January 1, 1988 and July 1, 1993, and made minor changes governing investment controls.
>
> Effective July 1, 2008 – Allowed that "any claimant who timely filed a claim and after timely seeking and being denied an opportunity to ... confront or cross-examine witnesses and was denied an award of benefits, shall have the right to have the determination against them

vacated and the claim re-determined De Novo. By filing a petition ... on or before July 1, 2009." Added a requirement to "account for individual participant costs and injury characteristics" in the unpaid benefits liability assessment. Allowed reimbursement of nursing and attendant care from a relative or legal guardian. Provided additional annual increases in assessments.

Effective July 1, 2011 – Changes were made to the rules for compensation of attorney's fees.

Effective July 1, 2013 – Changes were made expanding the information required at the time a claim is filed.

A 2018 court judgment significantly shifted the Program's expected benefits as payments previously made by Medicaid as the primary provider are now being provided by the Program as primary. We discuss the impact of this shift on each benefit category in the **Benefit Payments by Benefit Type** section.

An annual audit by a certified public accountant selected by the Board is a required element of the Program's financial controls. In addition, a biennial actuarial study on the financial soundness of the Program and recommended assessment rates is required. The actuarial study is funded and directed by VA SCC. From the inception of the Program through 2010, these actuarial studies were performed by Oliver Wyman Actuarial Consulting, Inc. (Oliver Wyman). Detailed information regarding these prior studies is contained in the 2010 Oliver Wyman report. Pinnacle has provided actuarial services to VA SCC since 2011. Previous to this, Pinnacle provided a variety of actuarial services to the Program itself from 2003 through 2010.

Pinnacle is an Illinois corporation owned by members of its professional staff. It has been providing property/casualty actuarial consulting services since it was formed in 2003, although many of our client relationships predate this reorganization. Pinnacle is one of the largest property/casualty actuarial consulting firms in the U.S. We specialize in insurance pricing, loss reserving, alternative markets, legislative costing, market analysis and financial risk modeling. Our headquarters are located in Bloomington, IL.

Pinnacle has established a reputation as a provider of unbiased, independent, actuarially sound analyses and reports. This reputation is demonstrated in the variety of clients that have engaged us for projects similar to this one. Clients that have engaged Pinnacle in similar assignments include patient compensation funds, birth-related neurological injury funds, joint underwriting associations, and state insurance regulators in a wide variety of states including Connecticut, Florida, Illinois, Indiana, Iowa, Maine, Michigan, New Mexico, New York, Ohio, Oregon, Texas, Virginia, and Wisconsin. Specifically, Pinnacle currently also serves the Florida Neurological Injury Compensation Association, the New

Mexico Patient Compensation Fund, the Wisconsin Injured Patients and Families Compensation Fund, and advises the New York State Department of Health regarding the New York Medical Indemnity Fund.

## *Data Sources*

In 2011, Pinnacle was provided a significant amount of historical material from the Fund and from VA SCC's former actuarial consultants, Oliver Wyman Actuarial Consulting, Inc. Most notably this included detailed historical benefit payments for all admitted participants in the Program, as well as mortality tables previously used by Oliver Wyman, including Shavelle life tables for almost all Program participants. This historical information continues to be relied upon, details of which can be found in prior Pinnacle reports. Additional information was provided for this report, and was primarily provided by Candace Thomas, CGFM, the Program's Deputy Director. The data provided included:

- Detailed benefits by participant and benefit category for calendar year 2019,
- Detailed life plans for all Program participants (for members where these are not yet available, an average life expectancy was applied),
- Historical assessment income by year and source (participating physicians, non-participating physicians, participating hospitals, and insurance company premium-based assessments),
- The Fund's balance sheet as of December 31, 2019,
- Historical administrative expenses for the Program,
- Wage loss benefits paid to participants for years 2007-2019 and projections of future wage loss benefits

The historical benefits payments by Program participant were organized into detailed categories:

- Nursing costs (by far the largest individual category)
- Medical expenses
    - Hospital and physician
    - Physical therapy
    - Medical equipment
    - Prescription drugs
- Non-medical expenses
    - Vans
    - Housing benefits
    - Incidental expenses
    - Automobile and health insurance
- Wage loss benefits

- Admission expenses
  - Medical review/intake
  - Legal fees

In addition to the data provided by the Fund, Pinnacle also utilized the following items:

- Historical data regarding the number of live births in Virginia from the Virginia Department of Health website, and
- The Fund's Quarterly Investment Analysis for Period Ending December 31, 2019, obtained from Fund staff (generally obtained from Virginia's Legislative Information System).

The data is appropriate for the intended purpose of the analysis. There were no additional records that Pinnacle required to complete its analysis and issue this report.

## *Methods & Assumptions*

**Overview**

The approach taken to estimate the unpaid benefits liability of the Fund as of December 31, 2019 is similar to the approach used by Pinnacle in our previous report. The steps in developing this estimate are as follows:

1) Estimate the ultimate number of participants born on or before December 31, 2019 that will ultimately be admitted to the Program.
2) Forecast the expected benefits payments and claims administration expenses for each participant by benefit type and year.
3) Adjust these future benefits payments for two factors:
   a. The probability that the participant will survive until that year, and
   b. Discounting to reflect the time value of money and the expected investment income the Fund should realize between December 31, 2019 and the payment of the benefits.

This information is then combined with actual assessment income, investment income, administrative expenses and benefit payments to estimate the surplus or deficit balance of the Fund as of December 31, 2019.

In addition, once the estimates of future benefits payments have been made and the December 31, 2019 surplus or deficit estimate is developed, this information is combined with estimates of future assessment revenue along with the number of new eligible births by year and their associated lifetime costs to estimate the likely surplus or deficit of the Fund as of future annual valuations.

The current invested assets of the Fund as well as the historical and estimated annual benefit payment and administrative expense cash flows are used to support an evaluation of the benefits paying ability of the Program.

Finally, the current surplus or deficit balance of the Fund, along with annual assessment income and benefits payments, provide information that is necessary to make recommendations regarding future assessment levels and other revenue sources for the Program.

This ***Methods & Assumptions*** section of the report will go through the analysis process described above (in order) and provide additional detail and support for key methods and assumptions underlying our analysis.

**Number of Program Participants**

Because of the ten-year statute of limitations for applying for admittance to the Program, participants may not be known by the Program until many years after their birth. As a result, estimates of the ultimate number of participants admitted to the Program for the last ten birth years must be developed. The Fund carries a liability on its balance sheet for children that have already been born and will eventually be admitted as participants to the Program. The analysis used to estimate these currently non-admitted participants is documented in Exhibit 4.

Three methods were used to estimate the number of ultimate Program participants by birth year. The first method, often called a loss development method in the insurance industry, examines the pattern of Program admissions by birth year and the calendar year of the admission. This information is shown in Exhibit 4, Page 2. These historical admissions patterns were then used to extrapolate the ultimate number of participants by birth year. The estimated number of claims by birth year is shown in Exhibit 4, Page 1, Column 4.

The second method, known as an expected loss or expected count method, estimates the long-term average number of Program participants per 100,000 live births in Virginia. The selected ultimate ratio is shown in column 10 of Exhibit 4, Page 1. While this ratio was in excess of ten claims per 100,000 live births in the early 2000s, it dropped below ten claims from 2010 through 2014 before increasing again in the most recent five years. We continue to select an expected rate of 9.5 admitted participants per 100,000 births for this method, consistent with the 2018 analysis. The estimated number of participants by birth year is shown in Exhibit 4, Page 1, Column 5.

The final method, called the Bornhuetter-Ferguson (B-F) method, combines the loss development and expected loss techniques. The purpose of the expected loss approach is to add stability to ultimate loss

estimates in years where a substantial amount of development on admissions is expected or where a small portion of the expected admissions has emerged. If we define

A = Admitted Participants to Date
B = Expected Percentage of Ultimate Participants Admitted to Date
C = # of Live Births (in 100,000s)
D = Expected Participant Rate per 100,000 Live Births

then the estimated ultimate participants using the expected loss technique is:

$$A + [C \times D \times (1 - B)]$$

The estimated number of participants by birth year is shown in Exhibit 4, Page 1, Column 6.

Our estimate of the ultimate number of Program participants by birth year was then selected based on these methods and is shown in column 8. The number of currently non-admitted participants is then computed in column 9.

**Benefit Payments by Cohort**

In the Oliver Wyman analyses, Program participants were segregated into three cohorts:

- Group A – Participants who had been in the Program for at least three years.
- Group B – Participants who had been admitted to the Program for less than three years.
- Group C – Participants who had been already been born, but who were not yet admitted to the Program.

Estimates for future benefits payments for Group A participants were heavily reliant on benefits payments in the last three years, either individually or collectively depending on the benefit. Averages for the Group A participants then formed the basis for future benefits estimates for Groups B and C.

While this delineation worked reasonably well, it presented several opportunities for improvement. For example, benefits payments from periods prior to the last three years were largely ignored. The recent payment activity for Group B members was also given little or no consideration. Individual participants with exceptionally large annual benefits payments, and often lower than average life expectancies, may need more customized treatment in developing the overall unpaid benefits estimates. Finally, no consideration appears to have been given to the current physical condition of the individual participant and the impact this may have on annual benefits payments and/or life expectancies.

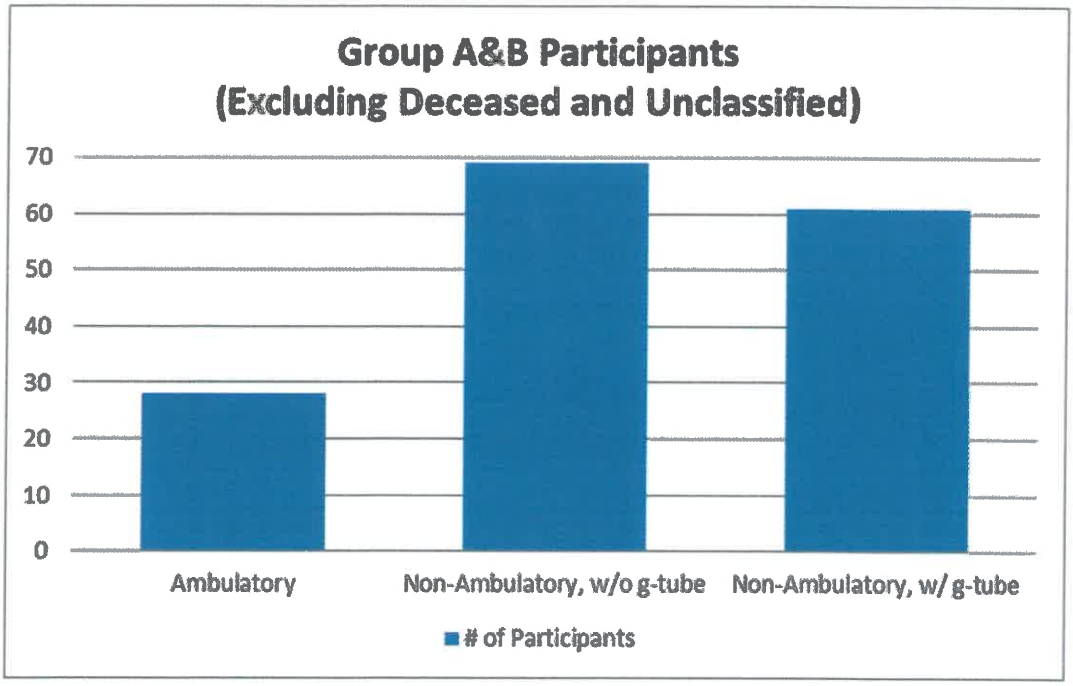
To address some of these opportunities, Pinnacle made several changes to how the data is organized to develop our future benefits payments. First, older years of benefits payments for Group A members are included in our assessment of historical benefits payments. For example, we examined not only three-year averages, but also five-year and all-admitted-year averages to develop our assumptions regarding future benefits payments levels. Group B data, although only for a limited number of years, was included to increase the credibility of the benefits payment data in recent years. For the nursing benefit category, individual participants with average annual benefits of more than twice the average for that benefit type were individually modeled for future years.

However, the most significant change in the organization of the historical benefits payment data by cohort may deal with the incorporation of information regarding the physical condition of the participant. The life plans provided for each admitted Program participant contained five specific items regarding each child's condition: their ambulatory status; whether they have a gastric feeding tube (g-tube), ventilator, or tracheostomy tube (trach tube); and, their ability to lift their head. Based on previous work and experience, Pinnacle organized the admitted participants into three categories based on their ambulatory and g-tube status for the purpose of estimating average annual benefits payments:

1) Ambulatory – all ambulatory participants regardless of whether they have a g-tube
2) Non-ambulatory without g-tube
3) Non-ambulatory with g-tube

The current distribution of admitted Program participants (Groups A and B) by these three categories, excluding those that have died and those who have not been classified to date due to their recent admission, is as follows:

**Table 6 – Distribution of Group A & B Participants by Ambulatory and G-Tube Status**




* Excludes participants who are deceased and those who have yet to be classified.

It is also noteworthy that based on the current participant life plans and the related Shavelle mortality tables, these three groups have markedly different life expectancies as will be discussed further in a later section.

For several of the benefits categories, these groups have markedly different historical average annual benefits payments. This suggests that different assumptions for future payments by category may be appropriate. Further, these groups have significantly different remaining life expectancies. Interestingly, the non-ambulatory with g-tube group has remained a steady proportion (approximately 40%) of the total admitted participant population for the last decade. More detailed discussion on how this impacted our assumptions by benefit type will be provided in the appropriate part of the ***Methods & Assumptions*** section.

**Claimants Who Are Deceased at the Time of Acceptance**

Historically, a small number of Program participants have died prior to the completion of the admission process. For the purposes of our analysis of the Fund's unpaid benefits liabilities and surplus/(deficit) position, we modeled the approximate number of Group C claimants that will pass away prior to admission and their benefits. We have continued to accept the Oliver Wyman assumption that 5% of participants will pass away within 180 days of birth. This assumption seems reasonable given the limited amount of data available. For each of these Group C claimants, we have assumed their families will receive the $100,000 benefit prescribed by law. This benefit is over and beyond legal and medical

intake expenses related to the admission process which are contemplated in the analysis of those benefits categories.

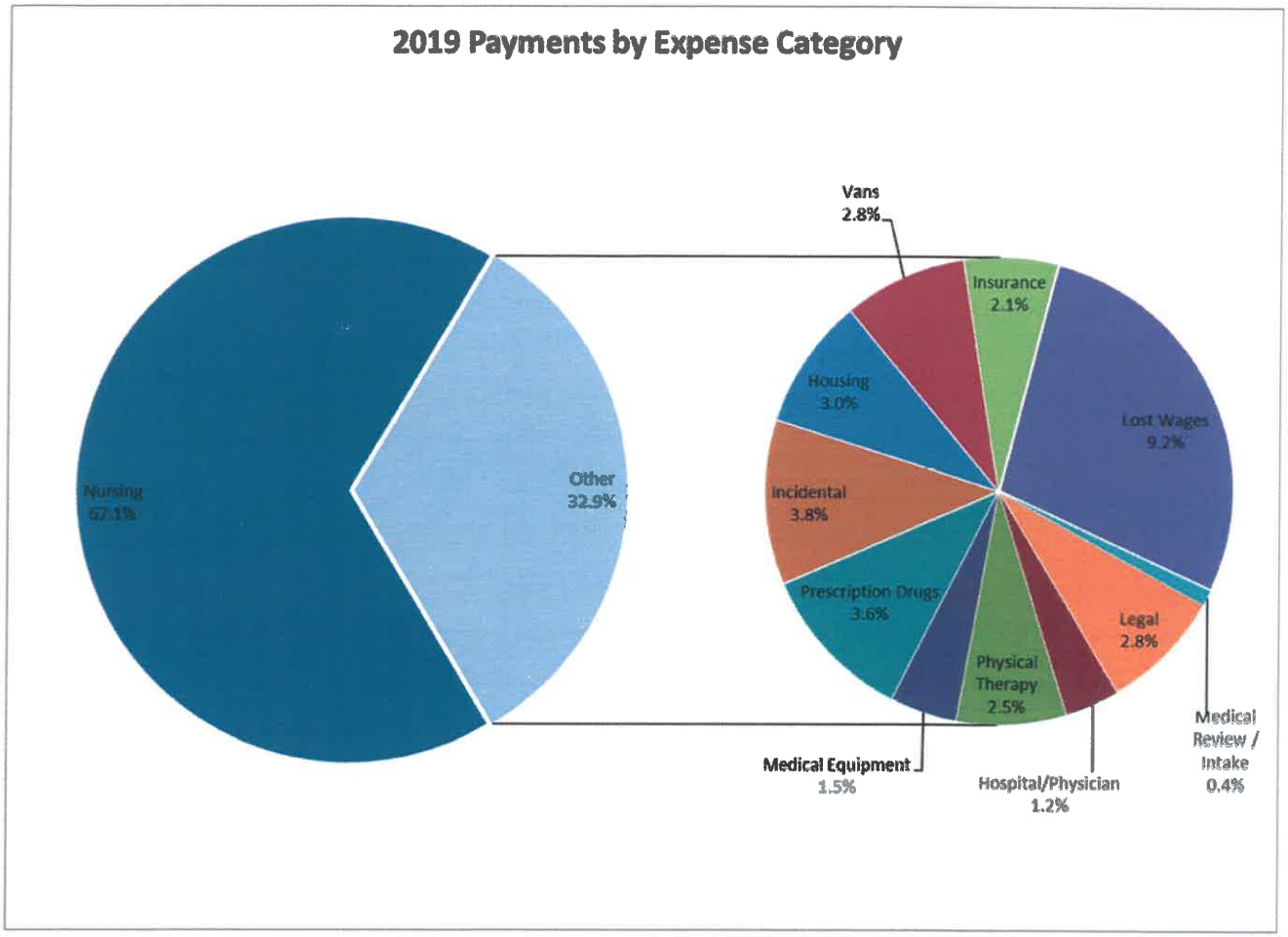
**Benefit Payments by Benefit Type**

The approach used to estimate future benefits payments varies somewhat according to the specific type of benefit being evaluated. The following sections will review each benefit type individually. A brief recap of historical Fund benefits payments by benefit type is shown in Table 10 and the accompanying chart that follows. In both 2018 and 2019, the high percentage (relative to the percentages of all years' payments) in lost wages is noteworthy.

**Table 7A – Summary of Benefits Payments in 2018, 2019 and All Years Combined**

| Total Claim Payments Through 12/31/2019 | | | | | | |
|---|---|---|---|---|---|---|
| Expense Category | Payments Through 12/31/2019 | Percentage of Total Payments | Payments In 2018 | Percentage of 2018 Payments | Payments In 2019 | Percentage of 2019 Payments |
| Nursing | 164,864,896 | 66.09% | 13,442,547 | 66.34% | 15,945,604 | 67.11% |
| Hospital/Physician | 3,444,974 | 1.38% | 419,255 | 2.07% | 296,354 | 1.25% |
| Physical Therapy | 6,427,705 | 2.58% | 516,160 | 2.55% | 594,571 | 2.50% |
| Medical Equipment | 4,313,274 | 1.73% | 340,416 | 1.68% | 362,789 | 1.53% |
| Prescription Drugs | 3,516,201 | 1.41% | 584,873 | 2.89% | 857,835 | 3.61% |
| Incidental | 7,267,974 | 2.91% | 471,604 | 2.33% | 892,355 | 3.76% |
| Housing | 23,981,852 | 9.61% | 586,375 | 2.89% | 706,495 | 2.97% |
| Vans | 11,795,901 | 4.73% | 870,684 | 4.30% | 668,201 | 2.81% |
| Insurance | 2,900,320 | 1.16% | 383,766 | 1.89% | 507,127 | 2.13% |
| Lost Wages | 13,621,430 | 5.46% | 1,926,449 | 9.51% | 2,184,295 | 9.19% |
| Medical Review / Intake | 468,580 | 0.19% | 55,585 | 0.27% | 85,208 | 0.36% |
| Legal | 6,867,234 | 2.75% | 664,921 | 3.28% | 659,616 | 2.78% |
| Total | 249,470,341 | 100.00% | 20,262,635 | 100.00% | 23,760,450 | 100.00% |

**Table 7B – Summary of 2019 Benefits Payments**




The shift in benefit payments due to the 2018 judgment significantly impacted our estimates of future benefit payments. In the next table, we show the expected 2017 and 2018 payments based on prior benefit payment types and the actual 2017 and 2018 payments by category, along with the indicated and selected impacts by category.

**Table 7C – Shift in Benefits Payments Indicated by 2018 Data**

| | Average Payments per Participant | | | | | | |
|---|---|---|---|---|---|---|---|
| | Actual | | Expected | | Estimated | Selected | Affected |
| | 2017 | 2018 | 2017 | 2018 | Increase | Increase | Categories |
| Incid-N | 1,427 | 2,049 | 1,500 | 1,567 | 13.4% | 15.0% | * |
| HospPhys-N | 1,081 | 1,904 | 390 | 398 | 278.7% | 275.0% | * |
| Nursing-N | 53,409 | 60,538 | 54,158 | 56,399 | | | |
| Therapy-N | 1,825 | 2,331 | 1,947 | 1,995 | 5.5% | 5.0% | * |
| MedEquip-N | 1,115 | 1,537 | 883 | 880 | 50.5% | 50.0% | * |
| Vans-N | 2,664 | 3,890 | 2,182 | 2,081 | | | |
| Housing-N | 2,962 | 2,694 | 3,474 | 3,548 | | | |
| Legal-N | 1,632 | 1,813 | 2,628 | 2,849 | | | |
| MedRev-N | 120 | 183 | 65 | 71 | | | |
| Ins-N | 568 | 1,803 | 514 | 434 | 150.1% | 150.0% | * |
| Rx-N | 918 | 2,692 | 737 | 789 | 136.5% | 150.0% | * |
| LostWages-N | 7,775 | 8,693 | 8,006 | 8,838 | | | |

*Denotes categories assumed to be impacted by the shift in benefit payments

We have reviewed the 2019 data for consistency and have adjusted our estimates based on the additional year of benefits payments. In particular, the hospital & physician costs and medical equipment have come in somewhat lower than anticipated while therapy costs have come in higher than projected.

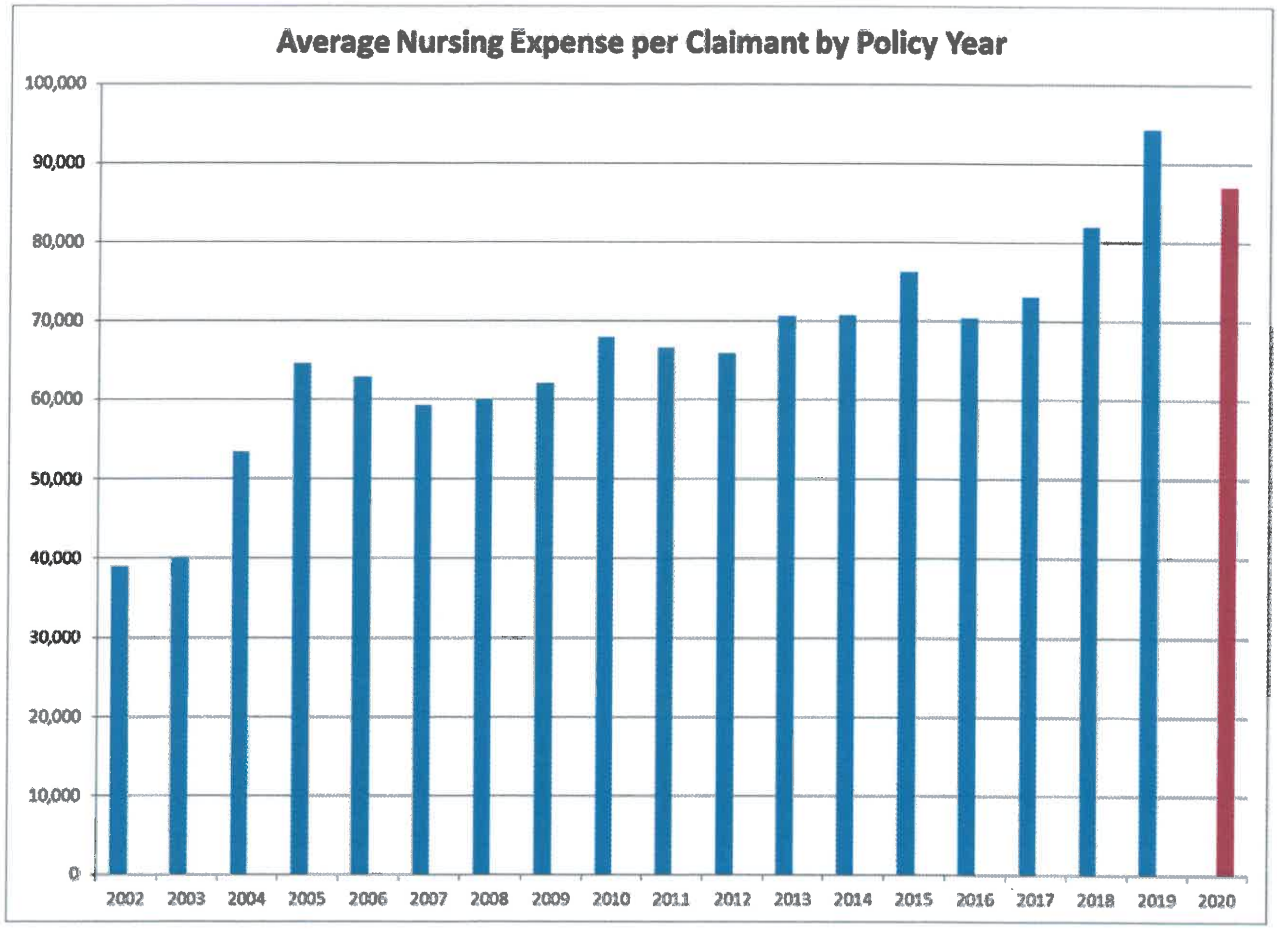
**Nursing**

As Table 7B shows, nursing costs have historically been, and continue to be, by far the largest benefits category for the Fund. Nursing costs also provide the largest amount of benefits variability between not only participant category (i.e. ambulatory, g-tube status), but also between individuals within these groups. For example, the average annual benefits payments for non-ambulatory participants with g-tubes is consistently near or above $100,000 per participant, while the other groups are consistently near $55,000 per participant a year. Furthermore, several participants average nursing benefits close to or exceeding $300,000 per year.

To reflect this variety of benefits being received by individuals and also reflect the differences between the medical statuses of the groups, a hybrid approach to estimating future benefits payments has been used. For a group of 20 individual participants with very high annual nursing costs and 16 participants with low annual nursing costs, individual future severity assumptions have been developed based predominantly on the three-year average for the individuals. For the remainder of the participants, annual benefits costs were selected for the following cohorts: non-ambulatory participants with a g-tube, ambulatory participants, and non-ambulatory participants without a g-tube. These selections produce an annual average nursing benefit of approximately $87,030 in 2020 as shown in Table 8 below. The selections produce averages by group that are consistent with the three-, five- and all-year

trended averages. Group C is then based on this overall average, reflecting the potential for some Group C claimants to also have potentially high nursing costs.

**Table 8 – Average Nursing Benefits by Year**




We believe this approach does a good job of incorporating as much of the historical experience as possible (thus creating stable benefits assumptions) and also matching unique participant benefits situations to their corresponding life expectancies.

Based on discussions with Program staff, this category does not appear to be impacted by the benefit payment shift but will need to continue to be monitored as two perceived trends develop over time. There appear to be both increased utilization of the nursing benefit by more participants over the years and more participants are using the option of having family members provide some portion of the nursing benefit. Although the impact of these perceived trends will be seen more clearly in the coming years, nursing costs rose significantly in both 2018 and 2019 compared to prior years.

**Hospital & Physician Expenses**

This category is somewhat self-explanatory and provides for the portion of physician, hospital, emergency room and other direct medical treatment costs not otherwise covered by private insurance. In the past, these costs on an annual, per participant basis were relatively small, often averaging less than $1,000 on a Program-wide basis for a year. However, this category is expected to increase significantly – approximately 275% – based on the shift in benefit payments previously described. We have modified this shift slightly based on lower-than-expected benefits payments in 2019 for this category.

For the three participant cohorts: non-ambulatory participants with a g-tube, ambulatory participants, and non-ambulatory participants without a g-tube we have assumed average annual costs of $1,750, $2,300 and $2,500 respectively. These assumptions are based on a review of historical three, five and ten year trended averages by cohort and the emerging shift in benefit payments beginning in 2018. The resulting overall average of about $2,175 per participant, per year was then applied to Group C and as-yet-unclassified Group B participants. All of these assumptions are net of otherwise applicable private insurance.

**Physical Therapy**

Most Program participants receive some form of physical therapy for several years. Oftentimes, this level of physical therapy diminishes as the children grow older. This change in benefits costs over time makes the physical therapy benefit an intricate one to model into the future. We have assumed that all physical therapy benefits are made within ten years of admittance to the Program. For Group A participants, we have modeled future costs based on each child's historical trended average costs over the last three years. For Group B, ambulatory participants are assumed to have average costs of $1,838 annually; those who are non-ambulatory and have a g-tube are assumed to have average costs of $2,258 annually. Participants who are neither ambulatory, nor have a g-tube are assumed to have average costs of $4,500 annually, and as of yet uncategorized participants are assumed to have the resulting Group B average annual cost of $2,966. These assumptions include the expected upward shift in benefit payments of approximately 5% for therapy, adjusted for the actual 2019 benefits payments. We assume these costs occur for five years and then are reduced to half of these values for another five years to replicate historical severities. A similar approach is used for Group C claimants, based on an average across the medical statuses, starting the year of admittance.

Private insurance often provides coverage for items in this category and costs to the Fund are net of this collateral source.

**Medical Equipment**

This benefit category deals with durable medical equipment, most notably wheelchairs. The non-ambulatory participant categories have higher historical average benefits costs for this category than the ambulatory participants. As a result, we have assumed $900 currently valued dollars per year in benefits for each ambulatory participant in Groups A and B going forward, compared to $2,500 annually per participant for the non-ambulatory without g-tube category, and $2,400 annually for the non-ambulatory with g-tube category. The current overall average of $2,178 is then applied to each Group C participant. These selections are impacted by the shift in benefit payments but the approximately 50% expected increase has been adjusted downward slightly based on 2019 experience.

Private insurance often provides coverage for items in this category.

**Prescription Drugs**

Several individual participants have thousands of dollars in annual prescription drugs costs, while many participants have hundreds of dollars in annual costs. In order to get an appropriate matching of individual costs and life expectancies for the high annual cost participants, we have made individual selections of prospective prescription drug costs based on these children's experience in the last two to five years (the two-year average is included in order to reflect the increase in benefit payments in 2018). For the remaining participants, an average cost of $1,000 for the non-ambulatory without g-tube category or $1,063 otherwise annually provides a reasonable approximation of historical benefits levels. Group C is based on the estimated overall average per participant cost of $4,756, including the individual high cost exceptions, to reflect the potential for Group C claimants to also have unique prescription drug needs.

We expect private insurance will continue to provide some coverage for this category as it has in the past.

**Vans**

The Program purchases a van with a wheelchair lift for every participant who is restricted to a wheelchair, upon request. The vans are equipped with whatever special equipment is needed, based on the participant's needs. The Program also covers all ongoing repairs and maintenance to the specialized equipment, but not maintenance and repairs to the van itself, other than the automobile insurance benefits described elsewhere in this section. This van can be replaced every 100,000 miles. As a result, the average van provided to Program participants is updated on average every six years.

Historically, it was assumed that only bedridden or wheelchair bound participants were using this benefit. The Program's detailed benefits information suggests that some admitted claimants who ambulate, although not independently, may receive a van. Additionally, because medical needs change as

claimants age, we have also assumed that all future participants will get a van and will receive their first van at age six. This is based on based on historical averages for the Program and is somewhat of a conservative assumption. The assumed benefit cost of $40,000 also includes a provision for ongoing maintenance costs of specialized equipment based on an analysis of historical costs for this benefits category.

**Housing**

There are four categories of housing benefits, and each needs to be modeled separately. These include:

- Trust homes – For participants who have received trust homes (September 24, 1999 and prior), we assumed the three-year trended average for ongoing expenses will continue in the future.
- Housing grant – Based on historical data for individual grants, we have assumed that the outstanding balance on these grants will be incurred over the next four years.
- Rental assistance – For individual participants electing this housing benefit, we have assumed the three-year trended average will continue into the future, subject to a $175,000 maximum established by the Program.
- Renovation completed – no future costs are associated with participants that have completed renovations.

For Group C participants, we have assumed they will receive a $130,000 benefit over a four-year period (generally either for renovations or rental expenses) when they are admitted and are at least six years of age. This amount ($130,000) was chosen as it is the predominate balance established by the Fund for participants who to date have not incurred or incurred only very little housing expense.

**Incidental Benefits**

Incidental benefits are those related to a wide variety of not otherwise classified items including non-durable medical supplies, over-the-counter drugs, feeding tubes, diapers, computers and related equipment, and travel expenses. These items generally have relatively low average annual costs but also showed an upward shift in 2018. In recent years, incidental benefits have averaged around $2,000 per admitted participant. This amount increased to over $5,000 in 2019. Based on our review of program benefits experience for this category and the shift in 2018, we have assumed future annual benefits payments of $3,800 for each non-ambulatory participant with a g-tube, $2,250 for each non-ambulatory participant without a g-tube, and $2,000 annually for each ambulatory participant. This results in an overall average of $2,804, higher than the overall average of $2,465 in 2018. With the significant jump in 2019, we will be monitoring historical benefits levels for individual participants to determine whether individual assumptions may become appropriate.

**Insurance**

We have assumed that the Program will pay automobile insurance premiums of $750 annually. We have conservatively assumed this benefit will be paid to all Program participants, consistent with our assumption that all participants will ultimately have vans. While somewhat conservative, the impact of this assumption is immaterial to the overall results of our analysis. For health insurance, we have followed the approach taken in the prior analysis. Prior to 2017, health insurance was purchased for only a small portion of the participants. However, now the Program now pays health insurance premiums for nearly all the participants. We were provided with insurance premiums paid for each admitted participant in 2018 and 2019 and assumed future costs will be consistent with these costs (trended forward to account for expected premium increases). For participants whose health insurance costs were not provided, we have assumed an average cost of $3,335 in 2020.

Group C participants are each assumed to receive the overall average of the assumed insurance costs for the Group A and B participants to reflect that some of them will also purchase health insurance.

**Wage Loss**

As in previous analyses, we have continued to assume that Program participants age 18 and older will be eligible to receive wage loss benefits consistent with workers compensation benefits in the Commonwealth. The benefit is equal to 50% of the private, non-agricultural average weekly wage. We have assumed this benefit will be approximately $28,896 in 2020. We also continue to assume that all participants that are eligible for the benefit will utilize it.

**Medical Review/Intake**

This category is related to non-legal expenses incurred by admitted Program participants during the application process. As such there should be no unpaid benefits in this category for participants in Groups A and B. We have assumed Group C participants will incur approximately $1,500 in medical review and intake expenses, stated in currently valued dollars.

**Legal Fees**

The legal fees included in our unpaid benefits estimates are limited to those associated with the application process for the Group C participants. Groups A and B are assumed to have no additional legal fees. On average, Group A and B participants, including those currently deceased, have average legal fees of approximately $45,000, an increase from the previous assumption of $36,000. We have assumed that each Group C participant will incur approximately $45,000 in legal fees, stated in currently valued dollars, which will be reimbursed by the Plan.

**Interest Rates**

In the summaries of the financial condition of the Fund provided in the analysis, unpaid benefits liabilities are presented on a discounted basis to reflect the time value of money associated with an estimate of the future investment earnings expected to be generated from assets supporting these future benefits payments between the accounting date and the benefit payment date. That is, the Fund presents its liability for unpaid benefits on a discounted (or present value) basis. The key issue for this analysis is determining the appropriate interest rate to use to discount the future benefits payments.

Pinnacle's approach to discounting the Fund's unpaid benefits liabilities, and specifically selecting a discount rate, has several issues associated with it. Considerations include:

- Does the Fund have valid invested assets supporting all unpaid benefits liabilities?
- What is a reasonable investment return to expect during the period between December 31, 2019 and the various loss payment dates?
- Particularly, what is a reasonable investment return expectation for future benefits payments more than a decade into the future?
- How should the recent financial uncertainty be contemplated?
- Are there actuarial professionalism considerations that need to be taken into account?

For the purpose of discounting loss reserves for a financial statement, Actuarial Standard of Practice No. 20, *Discounting of Property/Casualty Unpaid Claim Estimates* (ASOP 20), provides guidance to an actuary and defines the issues and considerations that an actuary should take into account in determining discounted reserves. Actuarial literature and publications can also provide additional assistance in determining the approach.

Section 3.4 of ASOP 20 provides guidance for selecting the interest rates for discounting. This section specifically notes that the appropriate selected interest rates are a function of the context in which the discounted reserves are used (emphasis added). Two choices provided are a time value of money approach or a rate of return from a particular portfolio. First, we discuss the two choices followed by a discussion of the context.

The time value of money approach uses a selected interest rate that should approximate the risk-free interest rate. The risk-free interest rate is often approximated by reviewing Treasuries with a maturity that is consistent with the duration of the liability. The Treasury Constant Maturity rates at year-end 2019 are as follows:

| Maturity | Rate |
|---|---|
| 1 Year | 1.59% |
| 3 Year | 1.62% |
| 5 Year | 1.69% |
| 7 Year | 1.83% |
| 10 Year | 1.92% |
| 20 Year | 2.25% |
| 30 Year | 2.39% |

For a portfolio interest rate approach, the actuary should consider the relationships between market and book values of the assets, between anticipated portfolio and market interest rates, and between the maturities of the assets and the timing of loss and loss adjustment expense payments. Section 3.4.1b of ASOP 20 addresses the portfolio interest rate approach.

Historically, the Fund has assumed interest rates between 6% and 7% to discount unpaid benefits liabilities for the Fund. In general, these assumptions have been based on the target rates of return for Fund invested assets provided by the Fund's investment managers, sometimes reduced by an explicit adjustment to reflect the significant risk in the investment portfolio. This adjustment has been appropriate as the Fund has not always hit its investment targets in the past. The historical investment returns for the Program are shown in Exhibit 1. The amount of risk inherent in the Fund's investment portfolio is also seen in a comment in an investment management report from 2013 that states that the Fund's risk tolerance is as follows: "The annual nominal return is expected to fall within a range of -3.4% to +15.6% two thirds of the time (one standard deviation) over this period [10 years]. There is a 95% probability that losses will not exceed -9.5% in any given year." This is a significant amount of variability and risk. Both the highs and lows of this volatility can be seen in the historical returns in Exhibit 1. The investment management report also indicated that the target rate of return for the investment portfolio is a "...6.1% annualized return or 3.6% over inflation as measured by the CPI-U. This projection is based on 2012 Projections for the ensuing ten years..." This assumption for long term expected returns appears somewhat optimistic for the purpose of discounting future benefits payments, especially in light of recent returns on investments.

A discounted reserve may be an inadequate estimate of economic value unless an appropriate risk margin is included. One means of providing for a reasonable adjustment for investment risk is to include some form of implicit risk margin in the selected discount rate. Pinnacle has selected a discount rate of 5.25% that we believe is reasonable based on the considerations reflected in this section.

**Inflation Rates**

For each benefit category, future annual costs need to be adjusted by an appropriate factor to reflect expected cost inflation. In addition, historical benefits payments need to be adjusted for inflation to develop our selections of average benefits costs at current cost levels. We have taken a two-step

process of first estimating general inflation (both historical and prospective) and then indexing specific inflation rates for each benefit category off of these general inflation rates. Both long and short term averages were considered in our selections and are provided in Exhibit 2. A comparison of our prior and current selections is summarized in Table 6 below.

**Table 9 – Selected Historical and Prospective Inflation Assumptions**

| | | | Prior Report | | Current Selection | |
|---|---|---|---|---|---|---|
| Expenditure Category | CPI Category | Years Available | Selected Historical Inflation | Selected Future Inflation | Historical Inflation | Future Inflation |
| Nursing | Professional services | 1967 to 2019 | 1.79% | 3.48% | 1.54% | 3.36% |
| Hospital/Physician | Medical care services | 1935 to 2019 | 2.91% | 4.05% | 2.90% | 4.01% |
| Physical Therapy | Professional services | 1967 to 2019 | 1.79% | 3.48% | 1.54% | 3.36% |
| Medical Equipment | Medical care commodities | 1935 to 2019 | 2.63% | 2.78% | 2.09% | 2.66% |
| Prescription Drugs | Prescription drugs | 1935 to 2019 | 3.56% | 3.45% | 2.77% | 3.29% |
| Incidental | All items | 1913 to 2019 | 1.58% | 2.38% | 1.80% | 2.36% |
| Housing | Shelter | 1967 to 2019 | 2.90% | 3.39% | 3.11% | 3.55% |
| Vans | New vehicles | 1935 to 2019 | 0.41% | 1.62% | 0.22% | 1.47% |
| Auto Ins | Motor vehicle insurance | 1935 to 2019 | 5.88% | 5.09% | 5.53% | 5.11% |
| Health Ins | Health insurance | 2005 to 2019 | 5.88% | 5.09% | 5.53% | 5.11% |
| Lost Wages | Based on BLS VA data | 1979 to 2019 | 1.58% | 2.52% | 1.80% | 2.50% |
| Medical Review / Intake | All items | 1913 to 2019 | 1.58% | 2.38% | 1.80% | 2.36% |
| Legal | Legal services | 1986 to 2019 | 2.99% | 3.42% | 2.95% | 3.35% |

**Mortality and Life Expectancy**

One the most difficult assumptions needed in estimating the future benefits payments for the Fund relates to the life expectancy of the Program's participants. Between 1999 and 2009, Oliver Wyman had to consistently increase their assumption of life expectancies as the actual experience of the Program's participants continued to outperform modeled expectations.

A significant change occurred with the addition of individual life plans and mortality tables for each admitted Program participant. The Shavelle tables provide individual expected survival rates by year for many participants and appear to provide a reasonable life expectancy not only for each child, but also appear to reflect differences between groups of participants based on ambulatory and g-tube status. Therefore, we have relied on the Shavelle tables for each Group A and B participant for which a Shavelle table was available, to reflect the likelihood of a child surviving to receive the assumed benefits. The challenge this approach presents is the treatment of participants for which a Shavelle table was not provided, which includes Group C participants.

For Group C and participants without a Shavelle table, we have developed a mortality table that combines the Shavelle tables for each of the current Group A and B participants for which one was provided. This approach works well for older ages where almost all participants' data can be included.

It is somewhat less effective for the younger ages. As a result, selections were made for the younger ages based on the available information in order to maintain consistency between the indicated survival rates by age. This blended mortality table is summarized in Exhibit 3. A comparison of the life expectancies of the historical Oliver Wyman mortality tables and the composite Shavelle table is shown in Table 13 below.

**Table 10 – Comparison of Mortality Assumptions**

| | Life Expectancy at | |
|---|---|---|
| Table | Birth | Age 3 |
| 1999 Table | 17.5 | 19.5 |
| Blended Table | 22.1 | 24.7 |
| 2009 Table | 26.4 | 28.3 |
| 2010 Table | 28.5 | 30.1 |
| Shavelle Composite Table | 28.4 | 29.1 |

## *Discussion and Analysis*

### Number of Program Participants

As of December 31, 2019, there were 234 admitted Program participants, an increase of 9 from year-end 2018. We estimate that an additional 54 children that are eligible for the Program and who will eventually be admitted have been born as of December 31, 2019. This estimate compares to our estimate of 54 Group C participants in our prior analysis. Our analysis of the total number of Program participants as of December 31, 2019 is attached as Exhibit 4 and a summary by birth year is provided in Table 14 on the next page.

**Table 11 – Estimated Ultimate Participants as of December 31, 2019**

| Birth Year | Admitted Participants | Selected Ultimate Participants | Currently Unadmitted Participants |
|---|---|---|---|
| 1988 | 2 | 2 | 0 |
| 1989 | 9 | 9 | 0 |
| 1990 | 5 | 5 | 0 |
| 1991 | 9 | 9 | 0 |
| 1992 | 8 | 8 | 0 |
| 1993 | 11 | 11 | 0 |
| 1994 | 8 | 8 | 0 |
| 1995 | 10 | 10 | 0 |
| 1996 | 8 | 8 | 0 |
| 1997 | 9 | 9 | 0 |
| 1998 | 7 | 7 | 0 |
| 1999 | 7 | 7 | 0 |
| 2000 | 13 | 13 | 0 |
| 2001 | 13 | 13 | 0 |
| 2002 | 13 | 13 | 0 |
| 2003 | 11 | 11 | 0 |
| 2004 | 5 | 5 | 0 |
| 2005 | 5 | 5 | 0 |
| 2006 | 12 | 12 | 0 |
| 2007 | 12 | 12 | 0 |
| 2008 | 10 | 10 | 0 |
| 2009 | 11 | 12 | 1 |
| 2010 | 6 | 8 | 2 |
| 2011 | 8 | 10 | 2 |
| 2012 | 2 | 4 | 2 |
| 2013 | 7 | 10 | 3 |
| 2014 | 3 | 7 | 4 |
| 2015 | 7 | 12 | 5 |
| 2016 | 2 | 8 | 6 |
| 2017 | 1 | 10 | 9 |
| 2018 | 0 | 10 | 10 |
| 2019 | 0 | 10 | 10 |

**Estimated Lifetime Benefits**

A history of benefits payments to admitted participants made by the Fund by year since its inception is provided in Table 15 below.

**Table 12 – Summary of Calendar Year Benefits Payments Through 2019**

| Total Claim Payments to Admitted Participants | | |
|---|---|---|
| As Of | Incremental Amount Paid | Cumulative Amount Paid |
| 12/31/1988 | 0 | 0 |
| 12/31/1989 | 0 | 0 |
| 12/31/1990 | 0 | 0 |
| 12/31/1991 | 0 | 0 |
| 12/31/1992 | 14,161 | 14,161 |
| 12/31/1993 | 97,886 | 112,047 |
| 12/31/1994 | 239,124 | 351,171 |
| 12/31/1995 | 1,884,027 | 2,235,198 |
| 12/31/1996 | 4,919,816 | 7,155,014 |
| 12/31/1997 | 4,664,716 | 11,819,730 |
| 12/31/1998 | 3,018,411 | 14,838,141 |
| 12/31/1999 | 3,600,298 | 18,438,439 |
| 12/31/2000 | 5,680,388 | 24,118,827 |
| 12/31/2001 | 5,551,600 | 29,670,427 |
| 12/31/2002 | 4,608,621 | 34,279,048 |
| 12/31/2003 | 5,429,845 | 39,708,893 |
| 12/31/2004 | 6,012,468 | 45,721,361 |
| 12/31/2005 | 8,548,706 | 54,270,067 |
| 12/31/2006 | 10,482,314 | 64,752,381 |
| 12/31/2007 | 9,230,255 | 73,982,637 |
| 12/31/2008 | 10,778,949 | 84,761,586 |
| 12/31/2009 | 10,068,816 | 94,830,401 |
| 12/31/2010 | 10,613,329 | 105,443,730 |
| 12/31/2011 | 11,685,910 | 117,129,640 |
| 12/31/2012 | 12,211,818 | 129,341,458 |
| 12/31/2013 | 13,242,387 | 142,583,845 |
| 12/31/2014 | 15,024,205 | 157,608,049 |
| 12/31/2015 | 15,743,010 | 173,351,060 |
| 12/31/2016 | 15,447,949 | 188,799,009 |
| 12/31/2017 | 16,648,248 | 205,447,256 |
| 12/31/2018 | 20,262,635 | 225,709,891 |
| 12/31/2019 | 23,760,450 | 249,470,341 |

The calendar year payments had been relatively steady over the five years prior to 2011, generally between $10 million and $11 million per year. In 2011, benefits payments increased by approximately $1 million relative to 2010 to $11.7 million, and increased another $1.5 million to $13.2 million over the next two years. In 2014, benefits payments again increased by $1.8 million, and while 2015 and 2016 stayed between $15 million and $16 million, 2017 again increased approximately $1 million over the prior two years. In 2018, benefits payments increased by $3.6 million, demonstrating the shift in benefits payments previously referenced. This shift continued in 2019 with an increase of $3.5 million.

A table with historical benefits payments for 2019, 2018 and all years combined by benefit category follows as Table 13 and is identical to Table 7A shown earlier. Between 2018 and 2019, significant changes in payments by benefit type included:

- A drop in hospital/physician costs from $419,000 to $296,000. This decrease led us to modify our estimate of the impact of the shift in benefits payments on this category.
- Continued increases in Physical Therapy, Medical Equipment, Prescription Drugs, Incidental, and Insurance Costs. These are the categories we believe were affected by the upward shift in benefit payments.
- Continued growth in wage loss benefits to $2.18 million in 2019.

**Table 13 – Summary of Calendar Year Paid and Incurred Losses 1998-2019**

| Total Claim Payments Through 12/31/2019 | | | | | | |
|---|---|---|---|---|---|---|
| Expense Category | Payments Through 12/31/2019 | Percentage of Total Payments | Payments In 2018 | Percentage of 2018 Payments | Payments In 2019 | Percentage of 2019 Payments |
| Nursing | 164,864,896 | 66.09% | 13,442,547 | 66.34% | 15,945,604 | 67.11% |
| Hospital/Physician | 3,444,974 | 1.38% | 419,255 | 2.07% | 296,354 | 1.25% |
| Physical Therapy | 6,427,705 | 2.58% | 516,160 | 2.55% | 594,571 | 2.50% |
| Medical Equipment | 4,313,274 | 1.73% | 340,416 | 1.68% | 362,789 | 1.53% |
| Prescription Drugs | 3,516,201 | 1.41% | 584,873 | 2.89% | 857,835 | 3.61% |
| Incidental | 7,267,974 | 2.91% | 471,604 | 2.33% | 892,355 | 3.76% |
| Housing | 23,981,852 | 9.61% | 586,375 | 2.89% | 706,495 | 2.97% |
| Vans | 11,795,901 | 4.73% | 870,684 | 4.30% | 668,201 | 2.81% |
| Insurance | 2,900,320 | 1.16% | 383,766 | 1.89% | 507,127 | 2.13% |
| Lost Wages | 13,621,430 | 5.46% | 1,926,449 | 9.51% | 2,184,295 | 9.19% |
| Medical Review / Intake | 468,580 | 0.19% | 55,585 | 0.27% | 85,208 | 0.36% |
| Legal | 6,867,234 | 2.75% | 664,921 | 3.28% | 659,616 | 2.78% |
| Total | 249,470,341 | 100.00% | 20,262,635 | 100.00% | 23,760,450 | 100.00% |

**Administrative Expenses**

Exhibit 6 provides a historical summary of benefits administration expenses for the Program. The average annual costs per living participant stayed below $8,000 from 2013 through 2018, with these years showing a minimum of $6,372 in 2013 and a maximum of $7,868 in 2018 (this average for 2018 also does not account for a significant payment of $21.3 million paid by the Fund during that year). Program expenses in 2019 increased to $8,055. Based on this information, we have assumed that in the immediate future the Fund will pay benefits administration expenses of approximately $7,500 per living participant (currently valued dollars). For our estimates of the current and prospective Fund surplus/(deficits), these future liabilities were discounted to present value using a similar approach to the benefits payments themselves.

**Estimated Fund Surplus/(Deficit) as of December 31, 2019**

As previously shown in Table 1, and repeated here as Table 14, we estimate that the Fund has future benefits payments with a present value of approximately $542.7 million, along with future benefits administration expenses with an additional present value of $26.4 million. When compared to actual asset values as of this valuation date, these estimates result in an estimated Fund deficit of $26.8 million.

The estimated present values for the future benefits payments and benefits administration expenses were modeled for each individual Group A and B participant and also on an individual basis for Group C; however, certain assumptions such as mortality had to be generalized for this group. Death benefits for all Program participants and the appropriate benefits for participants who have died prior to Program admittance have also been included into these cash flow models. It is important to recognize that the accuracy of the overall liability for future benefits payments is of paramount importance, while the accuracy of individual participant estimates is of lesser importance and may vary greatly due to changes in individual care situations and mortality.

**Table 14 – Estimated Fund Surplus/(Deficit) as of December 31, 2019**

**Estimated Financial Position as of 12/31/2019**
($ in millions, on a present value basis)

| Claimant Status | Estimated Ultimate Number of Claimants | Estimate of Future Claim Payments | Estimate of Future Claim Admin. Expenses | Value of Total Assets | Forecasted Surplus/ (Deficit) |
|---|---|---|---|---|---|
| All Claimants Admitted to the Program | 234 | 410.5 | 21.4 | | |
| All Claimants Not Yet Admitted to the Program | 54 | 132.2 | 5.0 | | |
| Grand Total | 288 | 542.7 | 26.4 | 542.3 | (26.8) |

## Projection to 2020-2022 Years

To forecast our estimates of Fund liabilities and asset values forward to future years, several additional steps from the current year model are needed. For example,

- An estimate of the additional year of assessment revenue is added to assets.
- The expected benefit payments and benefit administrative expenses are paid, and are a reduction to assets and Fund liabilities.
- Estimated investment income is added to assets.
- The benefits liabilities for the births occurring during the new year are added to the Fund's liabilities.

Exhibit 7 details the impact of each of these factors in the roll forward calculations and supports the summary provided in Tables 2-4. It is important to recognize that the investment income realized by the Fund is largely offset by the loss of one year of discounting as the present value of existing benefits liabilities is moved forward one year. An easy way to see can be found in Exhibit 7, Page 1, where the 2020 interest accrual of $28.4 million on the asset side of the balance sheet is fairly comparable to the $18.9 million and $5.4 million increases in liabilities associated with losing a year's worth of discounting found in the Admitted Participants Impact and Not Yet Admitted Participants sections, respectively. Similarly, in an ideal situation, the expected assessment income in a year would be approximately equal and offsetting to the loss of one year of discounting the benefits liabilities for the births occurring during the new year.

## Program Assessment Levels

From the perspective of the actuarial soundness of the Fund, it is noteworthy that expected future annual assessment income of approximately $28.0 million is somewhat more than the current annual

expected present value of lifetime new participant liabilities of approximately $26.0 million. All other things being equal, this should contribute to gradual decrease in the Fund deficit over time, particularly if investment returns exceed the assumptions in our analysis. Assessment levels need to be monitored to ensure that they keep pace with inflationary pressure on participant benefits over time.

**Sensitivity Testing**

As in past actuarial studies of the Fund, we felt it imperative to stress test a number of the key assumptions in our analysis to evaluate the impact of differences between our assumptions and other possible actual outcomes. We have performed stress tests of our interest rate, inflation rate and mortality assumptions using an approach similar to prior years.

Table 15 shows the results of a series of stress tests examining inflation scenarios of up to 150 basis points above and below our general inflation assumption, with corresponding changes in the benefits specific inflation rates. For the purpose of these stress tests, we have focused on the impact of the underlying assumption changes on our estimated future benefits payments as of December 31, 2019. At the extreme values, these differences in assumptions have the potential to eliminate the Fund deficit entirely in an extremely low inflation scenario or more than double the deficit should inflation be much higher than expected for an extended period of time.

**Table 15 – Inflation Rate Sensitivity Testing**

($ in millions, on a present value basis)

| Annual Inflation (Baseline +/-) | Estimated Future Claim Payments | Difference From Baseline |
|---|---|---|
| -1.50% | 424.0 | -118.7 |
| -1.00% | 458.4 | -84.2 |
| -0.50% | 498.7 | -43.9 |
| Baseline | 542.7 | 0.0 |
| 0.50% | 593.9 | 51.3 |
| 1.00% | 656.2 | 113.5 |
| 1.50% | 727.9 | 185.2 |

Table 16 provides a similar stress test examining the impact of long term differences in investment returns from those assumed in our analysis. This is a particularly important test given the differences between our selected interest rate and the investment manager's target return, and also in light of current uncertainty regarding the financial markets. The impact of actual investment returns that are different than our assumptions have a similar magnitude to the inflation tests, although with the signs

reversed. This is intuitive as inflation impacts benefits and thus liabilities, while interest rates impact investments and thus assets.

**Table 16 – Interest Rate Sensitivity Testing**

($ in millions, on a present value basis)

| Interest Rate (Baseline +/-) | Estimated Future Claim Payments | Difference From Baseline |
|---|---|---|
| -5.25% (Undiscounted) | 2,209.1 | 1,666.5 |
| -3.00% (Risk-Free) | 1,041.5 | 498.8 |
| -1.50% | 722.9 | 180.2 |
| -1.00% | 652.1 | 109.4 |
| -0.50% | 592.8 | 50.1 |
| Baseline | 542.7 | 0.0 |
| 0.50% | 499.9 | -42.8 |
| 1.00% | 463.1 | -79.6 |
| 1.50% | 431.1 | -111.6 |

## *Glossary of Terms and Abbreviations*

The definitions included in this glossary are intended to be practical definitions to assist non-technical readers in understanding the key technical contents of this report. We recognize that some technical clarifications and elaborations have been omitted for the sake of clarity and brevity. We do not believe any of these omissions materially impact the reader's understanding of the report or materially misrepresent the gist of the terms.

**Actuarially sound** – Actuarial judgment that the current value of assets will be greater than or equal to the present value of liabilities.
**Adverse development** – Future liabilities developing greater than originally estimated.
**Ambulatory** – Having the ability to walk, although not independently; not bedridden or wheelchair bound.
**Assessment levels** – The value at which an entity is assessed as mandated by state law.
**De Novo** – Restarting the claims process from the beginning.
**Discount rate** – Rate used to discount future values to the equivalent current day present value.
**Implicit risk margin** – Implied, though not plainly expressed, value above discounted best estimate cash flows to protect against worse than expected outcomes (i.e., adverse development).
**Gastric feeding tube (g-tube)** – A medical device used to provide nutrition to patients who cannot obtain nutrition by swallowing.
**Life plans** – Actuarial tables predicting a participant's unique estimated life expectancy and survival rate.
**Mortality tables** – Actuarial tables used in the insurance industry to predict the life expectancy and the mortality rates for various types of people.
**Present value** – The value on a given date of future liabilities or a series of future liabilities, discounted to reflect the time value of money and other factors such as investment risk.
**Shavelle life tables** – Life tables providing individual expected survival rates by year for each participant.
**Statute of limitations** – A statute prescribing a specific period for the bringing of certain kinds of legal action.
**Surplus** – Assets minus liabilities.
**Time value of money** – The value of money figuring in a given amount of interest earned over a given amount of time.
**Trend** – The direction in and amount that rates, premium, or losses tend to move over time.
**Unpaid benefits liability** – The portion of benefits not yet paid owed to people as the result of injuries occurred to these people resulting from one's operations.

## *Legal Disclosures*

**Qualifications and Actuarial Standards of Practice**

I, Robert J. Walling III, FCAS, MAAA, am a Principal and Consulting Actuary with Pinnacle. I am a Fellow of the Casualty Actuarial Society (CAS) and a member in good standing of the American Academy of Actuaries (AAA). I meet the Qualification Standards of the AAA to render the actuarial opinion contained herein.

This actuarial report complies with all relevant ASOPs, Statements of Principles and other professional guidance by the Actuarial Standards Board and/or the CAS. In addition, the estimates of the ultimate number of program participants, ultimate benefits payments and associated administrative expenses were developed using generally accepted actuarial methods and techniques.

**Distribution and Use**

Pinnacle's actuarial report and supporting work papers are prepared solely for the internal business use of the Program and VA SCC. It is understood that this report may also be distributed to a variety of interested parties. In the event our report is distributed to other parties due to statute or regulations, or by agreement of Pinnacle and VA SCC, we require that the report and supporting exhibits be distributed in their entirety. Pinnacle advises that any recipient have their own actuary review the work. Pinnacle does not intend to benefit any third party recipient of its work product or create any legal duty from Pinnacle to a third party even if Pinnacle consents to the release of its work product to such third party.

In addition, VA SCC may desire to distribute the Executive Summary separately to summarize key findings. This distribution is also granted. Individual findings may also be referenced in press releases and other public communications along with proper citation of the report.

Third party users of any of the elements of this report should recognize that the furnishing of this report is not a substitute for their own due diligence and should place no reliance on this report or the data, computations, and interpretations contained herein that would result in the creation of any duty or liability by Pinnacle to the third party.

**Reliances and Limitations**

It is important to emphasize the nature of our work for the Program and the Fund. While the unpaid participant benefits liability estimates contained in this report represent our best professional judgment, arrived at after careful actuarial analysis of the available data, any study of this type of

unpaid lifetime benefits involves estimates of future contingencies which are subject to the outcome of events yet to occur, e.g., legislative changes, jury decisions, healthcare reforms, and attitudes of claimants with respect to settlements. A high severity, low frequency coverage such as no-fault benefits for children suffering from birth-related neurological and physical injuries, which also has extended reporting and Program admission lags, is especially difficult to estimate.

A reasonable estimate of unpaid benefits liabilities to Program participants born prior to a given valuation date should be interpreted as just that - an estimate with no implication of certainty. When the ultimate costs of claims occurring prior to any financial statement date are known, variation from our estimates is not only possible but, in fact, probable. While the degree of such variation cannot be quantified, it could be in either direction from our estimates. This variation is particularly significant given the small number of participants and very large lifetime benefits available.

In performing this analysis, we have relied on data and other information provided to us by Program management and VA SCC's former actuarial consultants, Oliver Wyman. This experience base includes detailed historical data listings of benefits payments, Program participant counts and investment results by year. This data was supplemented by appropriate industry benchmark data, such as historical interest and inflation rates. We have relied upon all of this information without audit or verification. Pinnacle reviewed as many elements of this data and information as practical for reasonableness and consistency. We have not anticipated any extraordinary changes to the legal, social, or economic environments that might affect benefits costs or participant counts. No adjustment has been made to reflect changes in the Fund as a result of the Affordable Care Act.

Consistent with prior analyses, we have relied on a single method to develop the unpaid lifetime benefits as most traditional actuarial methods will not work well in the context of this high severity, low frequency coverage.

Pinnacle has not examined the Fund's assets, and is not expressing any opinion as to their validity or value. We have not made an assessment of whether the Fund's unpaid claims liabilities are backed by valid assets in our discount calculations. We have assumed the assets have suitably scheduled maturities and an adequate liquidity to meet cash flow requirements. We have not examined the Plan's current investment portfolio or its current investment philosophy, other than for the purpose of establishing a reasonable discount rate for future benefits payments.

Judgments as to conclusions, recommendations, methods, and data contained in this report should be made only after studying the report in its entirety. Further reliances and limitations are contained in the report text and the exhibits accompanying the report. Furthermore, Pinnacle is available to explain

any matter presented herein, and it is assumed that the user of this report will seek such explanation as to any matter in question. The exhibits should be considered an integral part of this report.

No portion of this report or the data, computations, interpretations, and definitions contained herein, or the exhibits attached hereto, should be relied upon for any purpose other than the purpose for which its author intended --- the actuarial valuation of the assets and liabilities of the Fund pursuant to Virginia Code §38.2-5021.

A substantial source of uncertainty relates to the emergence of the COVID-19 pandemic in early 2020. This uncertainty could impact the estimation of future benefits payments in several different ways including changes associated with ongoing medical care of current participants due to the virus. At this point, it is not possible to reliably forecast these impacts. The COVID-19 pandemic may have a material impact on our estimates of future payments as its effects emerge.

Estimates discounted for the time value of money can be more uncertain than those on an undiscounted basis. In addition to the usual uncertainty in projecting future benefits payments, discounted estimates are also influenced by:

- Variations in the timing of actual benefit payments versus the rate of payment assumed in discounting estimates to present value
- Variation in the actual investment yield on the assets underlying the liabilities versus the assumed interest rate used in discounting.

While an explicit risk margin may be applied to account for this additional uncertainty, we have not incorporated an explicit risk margin in our analysis. Sudden unforeseen events such as the COVID-19 pandemic can have significant impact on investment yields, the timing of benefit payments and the Fund's financial results. The inherent risks of discounting are increased at this time.

# Index of Exhibits


| *Exhibit* | *Description* |
|---|---|
| 1 | Selected Discount Rate |
| 2 | Inflation Assumptions |
| 3 | Composite Shavelle Mortality Table |
| 4 | Ultimate Participant Development |
| 5 | Present Value of Projected Future Unpaid Benefits by Category and Medical Status |
| 6 | Claim Administration Expense Estimate |
| 7 | Roll Forward Analysis Detail |

# Virginia Birth Related Neurological Injury Compensation Fund

Exhibit 1

## Reserve Analysis as of 12/31/2019

**Selected Discount Rate**

| | Annual Return | | |
|---|---|---|---|
| | 1 Yr. | 3 Yr. | 5 Yr. |
| VBIF | 16.5% | 7.4% | 5.1% |
| Index Target | 16.2% | 7.1% | 5.2% |
| S&P 500 | 31.5% | 15.3% | 11.7% |

| | |
|---|---|
| Selected Return used in Prior Actuarial Analysis | 5.25% |
| Selected Return used in Actuarial Analysis | 5.25% |

Source: Quarterly Investment Analysis Period Ending December 31, 2019

## Virginia Birth Related Neurological Injury Compensation Fund

Exhibit 2

### Reserve Analysis as of 12/31/2019

**Consumer Price Index**

| | | | Indicated Inflation | | | | | Prior Report | | Current Selection | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Expenditure Category | CPI Category | Years Available | All Yr Trend | 25 Yr. Trend | 10 Yr. Trend | 5 Yr. Trend | 2019 | Selected Historical Inflation | Selected Future Inflation | Historical Inflation | Future Inflation |
| Nursing | Professional services | 1967 to 2019 | 4.96% | 2.84% | 1.76% | 1.32% | 1.11% | 1.79% | 3.48% | 1.54% | 3.36% |
| Hospital/Physician | Medical care services | 1935 to 2019 | 5.09% | 3.87% | 2.94% | 2.87% | 3.54% | 2.91% | 4.05% | 2.90% | 4.01% |
| Physical Therapy | Professional services | 1967 to 2019 | 4.96% | 2.84% | 1.76% | 1.32% | 1.11% | 1.79% | 3.48% | 1.54% | 3.36% |
| Medical Equipment | Medical care commodities | 1935 to 2019 | 3.01% | 2.72% | 2.32% | 1.86% | -0.04% | 2.63% | 2.78% | 2.09% | 2.66% |
| Prescription Drugs | Prescription drugs | 1935 to 2019 | 3.45% | 3.54% | 3.13% | 2.41% | -0.23% | 3.56% | 3.45% | 2.77% | 3.29% |
| Incidental | All items | 1913 to 2019 | 3.11% | 2.22% | 1.61% | 1.99% | 1.81% | 1.58% | 2.38% | 1.80% | 2.36% |
| Housing | Shelter | 1967 to 2019 | 4.23% | 2.59% | 2.87% | 3.34% | 3.38% | 2.90% | 3.39% | 3.11% | 3.55% |
| Vans | New vehicles | 1935 to 2019 | 2.38% | 0.15% | 0.55% | -0.11% | 0.37% | 0.41% | 1.62% | 0.22% | 1.47% |
| Auto Ins | Motor vehicle insurance | 1935 to 2019 | 5.08% | 3.72% | 5.14% | 5.93% | 0.90% | 5.88% | 5.09% | 5.53% | 5.11% |
| Health Ins | Health insurance | 2005 to 2019 | 3.19% | N/A | 3.68% | 4.95% | 14.54% | 5.88% | 5.09% | 5.53% | 5.11% |
| Lost Wages | Based on BLS VA data | 1979 to 2019 | 3.40% | 2.22% | 1.61% | 1.99% | 1.81% | 1.58% | 2.52% | 1.80% | 2.50% |
| Medical Review / Intake | All items | 1913 to 2019 | 3.11% | 2.22% | 1.61% | 1.99% | 1.81% | 1.58% | 2.38% | 1.80% | 2.36% |
| Legal | Legal services | 1986 to 2019 | 4.02% | 3.78% | 2.68% | 3.22% | 0.97% | 2.99% | 3.42% | 2.95% | 3.35% |

Source: Bureau of Labor Statistics, Consumer Price Index: All Urban Consumers, US City Average

# Virginia Birth Related Neurological Injury Compensation Fund

Exhibit 3

## Reserve Analysis as of 12/31/2019

### Selected Life Expectancy

| | Life Expectancy at | |
|---|---|---|
| Table | Birth | Age 3 |
| 1999 Table | 17.5 | 19.5 |
| Blended Table | 22.1 | 24.7 |
| 2009 Table | 26.4 | 28.3 |
| 2010 Table | 28.5 | 30.1 |
| Shavelle Composite Table | 28.4 | 29.1 |

## Virginia Birth Related Neurological Injury Compensation Fund

**Reserve Analysis as of 12/31/2019**

**Ultimate Participant Development**



| Birth Year | Births (1) | Admitted Participants (2) | Dev. Factor (3) | Indicated Ultimate Participants: Development Method (4) | Indicated Ultimate Participants: Expected Method (5) | Indicated Ultimate Participants: B-F Method (6) | Prior Sel. Ultimate Participants (7) | Select Ultimate Participants (8) | IBNR Claims (9) | Indicated Participants per 100K Births (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1988 | | 2 | 1.0000 | 2.0 | | | 2 | 2 | 0 | |
| 1989 | | 9 | 1.0000 | 9.0 | | | 9 | 9 | 0 | |
| 1990 | | 5 | 1.0000 | 5.0 | | | 5 | 5 | 0 | |
| 1991 | | 9 | 1.0000 | 9.0 | | | 9 | 9 | 0 | |
| 1992 | | 8 | 1.0000 | 8.0 | | | 8 | 8 | 0 | |
| 1993 | | 11 | 1.0000 | 11.0 | | | 11 | 11 | 0 | |
| 1994 | | 8 | 1.0000 | 8.0 | | | 8 | 8 | 0 | |
| 1995 | 91,871 | 10 | 1.0000 | 10.0 | 8.7 | 10.0 | 10 | 10 | 0 | 10.88 |
| 1996 | 92,115 | 8 | 1.0000 | 8.0 | 8.8 | 8.0 | 8 | 8 | 0 | 8.68 |
| 1997 | 91,664 | 9 | 1.0000 | 9.0 | 8.7 | 9.0 | 9 | 9 | 0 | 9.82 |
| 1998 | 94,114 | 7 | 1.0000 | 7.0 | 8.9 | 7.0 | 7 | 7 | 0 | 7.44 |
| 1999 | 95,207 | 7 | 1.0000 | 7.0 | 9.0 | 7.0 | 7 | 7 | 0 | 7.35 |
| 2000 | 98,864 | 13 | 1.0000 | 13.0 | 9.4 | 13.0 | 13 | 13 | 0 | 13.15 |
| 2001 | 98,531 | 13 | 1.0000 | 13.0 | 9.4 | 13.0 | 13 | 13 | 0 | 13.19 |
| 2002 | 99,235 | 13 | 1.0000 | 13.0 | 9.4 | 13.0 | 13 | 13 | 0 | 13.10 |
| 2003 | 100,561 | 11 | 1.0000 | 11.0 | 9.6 | 11.0 | 11 | 11 | 0 | 10.94 |
| 2004 | 103,830 | 5 | 1.0000 | 5.0 | 9.9 | 5.0 | 5 | 5 | 0 | 4.82 |
| 2005 | 104,488 | 5 | 1.0000 | 5.0 | 9.9 | 5.0 | 5 | 5 | 0 | 4.79 |
| 2006 | 106,474 | 12 | 1.0000 | 12.0 | 10.1 | 12.0 | 12 | 12 | 0 | 11.27 |
| 2007 | 108,417 | 12 | 1.0000 | 12.0 | 10.3 | 12.0 | 12 | 12 | 0 | 11.07 |
| 2008 | 106,578 | 10 | 1.0200 | 10.2 | 10.1 | 10.2 | 9 | 10 | 0 | 9.38 |
| 2009 | 104,979 | 11 | 1.0710 | 11.8 | 10.0 | 11.7 | 12 | 12 | 1 | 11.43 |
| 2010 | 102,934 | 6 | 1.2049 | 7.2 | 9.8 | 7.7 | 6 | 8 | 2 | 7.77 |
| 2011 | 102,525 | 8 | 1.2651 | 10.1 | 9.7 | 10.0 | 10 | 10 | 2 | 9.75 |
| 2012 | 102,811 | 2 | 1.3220 | 2.6 | 9.8 | 4.4 | 6 | 4 | 2 | 3.89 |
| 2013 | 101,977 | 7 | 1.4278 | 10.0 | 9.7 | 9.9 | 9 | 10 | 3 | 9.81 |
| 2014 | 102,795 | 3 | 1.6991 | 5.1 | 9.8 | 7.0 | 8 | 7 | 4 | 6.81 |
| 2015 | 103,074 | 7 | 1.9098 | 13.4 | 9.8 | 11.7 | 12 | 12 | 5 | 11.64 |
| 2016 | 102,243 | 2 | 2.5209 | 5.0 | 9.7 | 7.9 | 10 | 8 | 6 | 7.82 |
| 2017 | 99,655 | 1 | 4.0335 | 4.0 | 9.5 | 8.1 | 10 | 10 | 9 | 10.03 |
| 2018 | 99,091 | 0 | 10.0837 | 0.0 | 9.4 | 8.5 | 10 | 10 | 10 | 10.09 |
| 2019 | 98,596 | 0 | 31.5115 | 0.0 | 9.4 | 9.1 | | 10 | 10 | 10.14 |
| Total | | 234 | | 256.5 | | | 279.0 | 288.0 | 54 | |
| 1995-2018 | 2,414,033 | 182 | | 204.5 | 229.3 | 222.0 | 227.0 | 226.0 | 44 | 9.36 |
| 2000-13 | 1,442,204 | 128 | | 136.0 | 137.0 | 137.8 | 136.0 | 138.0 | 10 | 9.57 |
| 2002-15 | 1,450,678 | 112 | | 128.4 | 137.8 | 130.5 | 130.0 | 131.0 | 19 | 9.03 |

**Notes**

(1) From Virginia Department of Health
(2),(3) From Exhibit 4, Page 2
(4) Col (2) x Col (3)
(5) Col (1) x [9.5 / 100,000]
(6) Col (2) + {Col (1) x [9.5 / 100,000]} x [1 - 1 / Col (3)]
(7) From Prior Report
(8) Judgment based on Col (2) and Cols (4)-(7)
(9) Col (8) - Col (2)
(10) Col (8) / Col (1) x 100,000

**Virginia Birth Related Neurological Injury Compensation Fund**
**Reserve Analysis as of 12/31/2019**
**Participant Counts**

| Birth Year | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 | 156 | 168 | 180 | 192 | 204 | 216 | 228 | 240 | 252 | 264 | 276 | 288 | 300 | 312 | 324 | 336 | 348 | 360 | 372 | 384 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1988 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 1989 | 0 | 0 | 0 | 1 | 2 | 3 | 5 | 5 | 5 | 5 | 7 | 7 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | |
| 1990 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | | |
| 1991 | 0 | 0 | 0 | 1 | 2 | 4 | 5 | 7 | 8 | 8 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | | | |
| 1992 | 1 | 1 | 1 | 4 | 5 | 6 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | | | | |
| 1993 | 0 | 3 | 5 | 5 | 5 | 5 | 7 | 8 | 8 | 9 | 10 | 10 | 10 | 10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | | | | | |
| 1994 | 0 | 1 | 1 | 3 | 3 | 4 | 5 | 5 | 6 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | | | | | | |
| 1995 | 2 | 2 | 3 | 3 | 4 | 5 | 5 | 6 | 6 | 6 | 9 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | | | | | | |
| 1996 | 0 | 1 | 3 | 4 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | | | | | | | | |
| 1997 | 2 | 2 | 3 | 5 | 6 | 6 | 7 | 7 | 7 | 7 | 8 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | | | | | | | | | |
| 1998 | 0 | 1 | 3 | 4 | 5 | 5 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | | | | | | | | | | |
| 1999 | 0 | 0 | 1 | 1 | 2 | 3 | 5 | 6 | 6 | 6 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | | | | | | | | | | | |
| 2000 | 0 | 0 | 3 | 6 | 6 | 9 | 11 | 12 | 12 | 12 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | | | | | | | | | | | | |
| 2001 | 0 | 1 | 4 | 5 | 6 | 6 | 8 | 10 | 10 | 10 | 11 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 13 | | | | | | | | | | | | | |
| 2002 | 1 | 1 | 5 | 8 | 9 | 9 | 10 | 10 | 11 | 12 | 12 | 12 | 13 | 13 | 13 | 13 | 13 | 13 | | | | | | | | | | | | | | |
| 2003 | 0 | 2 | 4 | 6 | 8 | 8 | 10 | 10 | 10 | 10 | 11 | 11 | 11 | 11 | 11 | 11 | 11 | | | | | | | | | | | | | | | |
| 2004 | 0 | 0 | 1 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | | | | | | | | | | | | | | | | |
| 2005 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | | | | | | | | | | | | | | | | | |
| 2006 | 0 | 2 | 3 | 4 | 4 | 6 | 7 | 7 | 8 | 9 | 11 | 12 | 12 | 12 | | | | | | | | | | | | | | | | | | |
| 2007 | 0 | 1 | 3 | 3 | 7 | 8 | 8 | 8 | 10 | 10 | 10 | 12 | 12 | | | | | | | | | | | | | | | | | | | |
| 2008 | 0 | 2 | 3 | 5 | 7 | 7 | 7 | 7 | 7 | 7 | 9 | 10 | | | | | | | | | | | | | | | | | | | | |
| 2009 | 1 | 3 | 6 | 6 | 8 | 8 | 9 | 10 | 10 | 10 | 11 | | | | | | | | | | | | | | | | | | | | | |
| 2010 | 0 | 0 | 2 | 3 | 3 | 4 | 4 | 4 | 4 | 6 | | | | | | | | | | | | | | | | | | | | | | |
| 2011 | 0 | 0 | 1 | 3 | 5 | 5 | 7 | 8 | 8 | | | | | | | | | | | | | | | | | | | | | | | |
| 2012 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2013 | 0 | 0 | 2 | 3 | 5 | 5 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2014 | 0 | 0 | 1 | 2 | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2015 | 1 | 3 | 4 | 6 | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2016 | 0 | 0 | 1 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2017 | 0 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2018 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2019 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Birth Year | 12-24 | 24-36 | 36-48 | 48-60 | 60-72 | 72-84 | 84-96 | 96-108 | 108-120 | 120-132 | 132-144 | 144-156 | 156-168 | 168-180 | 180-192 | 192-204 | 204-216 | 216-228 | 228-240 | 240-252 | 252-264 | 264-276 | 276-288 | 288-300 | 300-312 | 312-324 | 324-336 | 336-348 | 348-360 | 360-372 | 372-384 | 384-Ult. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1988 | | | | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 2.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | |
| 1989 | | | | 2.0000 | 1.5000 | 1.6667 | 1.0000 | 1.0000 | 1.0000 | 1.4000 | 1.0000 | 1.2857 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | |
| 1990 | | | | | | | 1.0000 | 1.0000 | 2.0000 | 1.5000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.3333 | 1.2500 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | |
| 1991 | | | | 2.0000 | 2.0000 | 1.2500 | 1.4000 | 1.1429 | 1.0000 | 1.1250 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | |
| 1992 | 1.0000 | 1.0000 | 4.0000 | 1.2500 | 1.2000 | 1.1667 | 1.1429 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | |
| 1993 | | 1.6667 | 1.0000 | 1.0000 | 1.0000 | 1.4000 | 1.1429 | 1.0000 | 1.1250 | 1.1111 | 1.0000 | 1.0000 | 1.0000 | 1.1000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | |
| 1994 | | 1.0000 | 3.0000 | 1.0000 | 1.3333 | 1.2500 | 1.0000 | 1.2000 | 1.1667 | 1.1429 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | |
| 1995 | 1.0000 | 1.5000 | 1.0000 | 1.3333 | 1.2500 | 1.0000 | 1.2000 | 1.0000 | 1.0000 | 1.5000 | 1.1111 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | |
| 1996 | | 3.0000 | 1.3333 | 1.7500 | 1.1429 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | |
| 1997 | 1.0000 | 1.5000 | 1.6667 | 1.2000 | 1.0000 | 1.1667 | 1.0000 | 1.0000 | 1.0000 | 1.1429 | 1.1250 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | | |
| 1998 | | 3.0000 | 1.3333 | 1.2500 | 1.0000 | 1.2000 | 1.0000 | 1.0000 | 1.1667 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | | | |
| 1999 | | | 1.0000 | 2.0000 | 1.5000 | 1.6667 | 1.2000 | 1.0000 | 1.0000 | 1.0000 | 1.1667 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | | | | |
| 2000 | | | 2.0000 | 1.0000 | 1.5000 | 1.2222 | 1.0909 | 1.0000 | 1.0000 | 1.0833 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | | | | | |
| 2001 | | 4.0000 | 1.2500 | 1.2000 | 1.0000 | 1.3333 | 1.2500 | 1.0000 | 1.0000 | 1.1000 | 1.1818 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | | | | | | |
| 2002 | 1.0000 | 5.0000 | 1.6000 | 1.1250 | 1.0000 | 1.1111 | 1.0000 | 1.1000 | 1.0909 | 1.0000 | 1.0000 | 1.0833 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | | | | | | | |
| 2003 | | 2.0000 | 1.5000 | 1.3333 | 1.0000 | 1.2500 | 1.0000 | 1.0000 | 1.0000 | 1.1000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | | | | | | | | |
| 2004 | | | 3.0000 | 1.3333 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.2500 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | | | | | | | | | |
| 2005 | | | 1.0000 | 1.0000 | 1.0000 | 1.5000 | 1.3333 | 1.0000 | 1.0000 | 1.2500 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | | | | | | | | | | |
| 2006 | | 1.5000 | 1.3333 | 1.0000 | 1.5000 | 1.1667 | 1.0000 | 1.1429 | 1.1250 | 1.2222 | 1.0909 | 1.0000 | 1.0000 | | | | | | | | | | | | | | | | | | | |
| 2007 | | 3.0000 | 1.0000 | 2.3333 | 1.1429 | 1.0000 | 1.0000 | 1.2500 | 1.0000 | 1.0000 | 1.2000 | 1.0000 | | | | | | | | | | | | | | | | | | | | |
| 2008 | | 1.5000 | 1.6667 | 1.4000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.2857 | 1.1111 | | | | | | | | | | | | | | | | | | | | | |
| 2009 | 3.0000 | 2.0000 | 1.0000 | 1.3333 | 1.0000 | 1.1250 | 1.1111 | 1.0000 | 1.0000 | 1.1000 | | | | | | | | | | | | | | | | | | | | | | |
| 2010 | | | 1.5000 | 1.0000 | 1.3333 | 1.0000 | 1.0000 | 1.0000 | 1.5000 | | | | | | | | | | | | | | | | | | | | | | | |
| 2011 | | | 3.0000 | 1.6667 | 1.0000 | 1.4000 | 1.1429 | 1.0000 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2012 | | | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2013 | | | 1.5000 | 1.6667 | 1.0000 | 1.4000 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2014 | | | 2.0000 | 1.5000 | 1.0000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2015 | 3.0000 | 1.3333 | 1.5000 | 1.1667 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2016 | | | 2.0000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2017 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2018 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Avg. | 1.6667 | 2.2000 | 1.6873 | 1.3645 | 1.1693 | 1.2110 | 1.0808 | 1.0765 | 1.0945 | 1.1506 | 1.0470 | 1.0185 | 1.0000 | 1.0056 | 1.0000 | 1.0000 | 1.0222 | 1.0179 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | |
| Wgt. Avg. | 3.2500 | 2.6154 | 1.5075 | 1.2929 | 1.1240 | 1.1955 | 1.0789 | 1.0432 | 1.0497 | 1.1227 | 1.0523 | 1.0175 | 1.0000 | 1.0067 | 1.0000 | 1.0000 | 1.0077 | 1.0085 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | |
| 10-year | 3.0000 | 1.6111 | 1.6167 | 1.4067 | 1.0976 | 1.1592 | 1.0587 | 1.0493 | 1.0716 | 1.1391 | 1.0751 | 1.0083 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | |
| 15-year | 3.0000 | 1.8889 | 1.6400 | 1.3372 | 1.0984 | 1.2117 | 1.0752 | 1.0329 | 1.0588 | 1.1356 | 1.0658 | 1.0056 | 1.0000 | 1.0067 | 1.0000 | 1.0000 | 1.0222 | 1.0179 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | |
| Prior LDF: | 3.1250 | 2.5000 | 1.5500 | 1.3200 | 1.1250 | 1.1900 | 1.0800 | 1.0450 | 1.0400 | 1.1250 | 1.0500 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | |
| Sel. LDF: | 3.1250 | 2.5000 | 1.6000 | 1.3200 | 1.1240 | 1.1900 | 1.0800 | 1.0450 | 1.0500 | 1.1250 | 1.0500 | 1.0200 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| LDF to Ult.: | 31.5115 | 10.0837 | 4.0335 | 2.5209 | 1.9098 | 1.6991 | 1.4278 | 1.3220 | 1.2651 | 1.2049 | 1.0710 | 1.0200 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| % of Ult: | 3.2% | 9.9% | 24.8% | 39.7% | 52.4% | 58.9% | 70.0% | 75.6% | 79.0% | 83.0% | 93.4% | 98.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

# Virginia Birth Related Neurological Injury Compensation Fund

## Reserve Analysis as of 12/31/2019

**Present Value of Projected Future Unpaid Benefits by Category and Medical Status**



| | Medical Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Expenditure Category | Non-Ambulatory / No G-Tube | Non-Ambulatory / G-Tube | Ambulatory / No G-Tube | Ambulatory / G-Tube | Uncategorized Admitted Participants | Total Admitted Participants | Group C | Total |
| Nursing | 93,373,075 | 97,755,836 | 45,141,374 | 4,056,346 | 12,919,860 | 253,246,491 | 92,065,016 | 345,311,507 |
| Hospital/Physician | 4,326,840 | 1,505,865 | 2,117,835 | 192,289 | 398,798 | 8,541,627 | 2,546,883 | 11,088,511 |
| Physical Therapy | 1,782,240 | 562,927 | 207,396 | 24,508 | 112,125 | 2,689,197 | 911,974 | 3,601,171 |
| Medical Equipment | 3,317,735 | 1,736,786 | 599,026 | 58,525 | 311,112 | 6,023,185 | 2,070,944 | 8,094,129 |
| Prescription Drugs | 4,491,926 | 5,979,848 | 2,846,319 | 77,292 | 301,958 | 13,697,343 | 4,943,663 | 18,641,006 |
| Incidental | 2,830,705 | 2,653,242 | 1,247,076 | 123,472 | 380,865 | 7,235,360 | 2,561,985 | 9,797,345 |
| Housing | 4,162,173 | 4,535,209 | 3,194,473 | 184,571 | 664,308 | 12,740,734 | 4,702,540 | 17,443,274 |
| Vans | 6,961,716 | 4,020,805 | 3,302,624 | 359,432 | 675,654 | 15,320,230 | 4,117,596 | 19,437,826 |
| Auto Ins | 1,669,092 | 748,780 | 936,753 | 77,405 | 172,159 | 3,604,189 | 905,585 | 4,509,774 |
| Health Ins | 6,006,157 | 3,892,761 | 4,389,788 | 473,527 | 762,680 | 15,524,914 | 4,852,838 | 20,377,751 |
| Lost Wages | 32,704,121 | 17,026,794 | 17,331,102 | 1,827,430 | 2,572,545 | 71,461,993 | 9,922,165 | 81,384,158 |
| Medical Review / Intake | 0 | 0 | 0 | 0 | 0 | 0 | 69,332 | 69,332 |
| Legal | 0 | 0 | 0 | 0 | 0 | 0 | 2,117,387 | 2,117,387 |
| Death Benefit | 162,800 | 200,765 | 35,961 | 6,112 | 20,254 | 425,892 | 368,557 | 794,450 |
| Total | 161,788,580 | 140,619,618 | 81,349,729 | 7,460,910 | 19,292,318 | 410,511,156 | 132,156,465 | 542,667,620 |

# Virginia Birth Related Neurological Injury Compensation Fund

## Reserve Analysis as of 12/31/2019

**Present Value of Average Projected Future Unpaid Benefits by Category and Medical Status per Participant**
**Excludes Deceased Particpants**

| | Medical Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Expenditure Category | Non-Ambulatory / No G-Tube | Non-Ambulatory / G-Tube | Ambulatory / No G-Tube | Ambulatory / G-Tube | Uncategorized Admitted Participants | Total Admitted Participants | Group C | Total |
| Nursing | 1,353,233 | 1,602,555 | 1,805,655 | 1,352,115 | 1,614,982 | 1,525,581 | 1,704,908 | 1,569,598 |
| Hospital/Physician | 62,708 | 24,686 | 84,713 | 64,096 | 49,850 | 51,456 | 47,165 | 50,402 |
| Physical Therapy | 25,830 | 9,228 | 8,296 | 8,169 | 14,016 | 16,200 | 16,888 | 16,369 |
| Medical Equipment | 48,083 | 28,472 | 23,961 | 19,508 | 38,889 | 36,284 | 38,351 | 36,791 |
| Prescription Drugs | 65,100 | 98,030 | 113,853 | 25,764 | 37,745 | 82,514 | 91,549 | 84,732 |
| Incidental | 41,025 | 43,496 | 49,883 | 41,157 | 47,608 | 43,587 | 47,444 | 44,533 |
| Housing | 60,321 | 74,348 | 127,779 | 61,524 | 83,038 | 76,751 | 87,084 | 79,288 |
| Vans | 100,894 | 65,915 | 132,105 | 119,811 | 84,457 | 92,291 | 76,252 | 88,354 |
| Auto Ins | 24,190 | 12,275 | 37,470 | 25,802 | 21,520 | 21,712 | 16,770 | 20,499 |
| Health Ins | 87,046 | 63,816 | 175,592 | 157,842 | 95,335 | 93,524 | 89,867 | 92,626 |
| Lost Wages | 473,973 | 279,128 | 693,244 | 609,143 | 321,568 | 430,494 | 183,744 | 369,928 |
| Medical Review / Intake | 0 | 0 | 0 | 0 | 0 | 0 | 1,284 | 315 |
| Legal | 0 | 0 | 0 | 0 | 0 | 0 | 39,211 | 9,624 |
| Death Benefit | 2,359 | 3,291 | 1,438 | 2,037 | 2,532 | 2,566 | 6,825 | 3,611 |
| Total | 2,344,762 | 2,305,240 | 3,253,989 | 2,486,970 | 2,411,540 | 2,472,959 | 2,447,342 | 2,466,671 |

## Virginia Birth Related Neurological Injury Compensation Fund

Exhibit 6

**Reserve Analysis as of 12/31/2019**

**Claim Administration Expense Estimate**

| Calendar Year | Living Participants (1) | Claim Administration Expense (2) | Clm Admn Exp Per Living Participant (3) | Selected Clm Admn Exp Per Living Participant (4) | Projected Living Participants Born in 2019 or Prior: Admitted in 2019 or Prior (5a) | Projected Living Participants Born in 2019 or Prior: Not Yet Admitted (5b) | Selected Inflationary Trend (6) | Projected Claim Administration Expenses: Admitted in 2019 or Prior (7a) | Projected Claim Administration Expenses: Not Yet Admitted (7b) | Projected Claim Administration Expenses: Total (7c) | Present Value of Projected Claim Administration Expenses: Admitted in 2019 or Prior (8a) | Present Value of Projected Claim Administration Expenses: Not Yet Admitted (8b) | Present Value of Projected Claim Administration Expenses: Total (8c) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2002 | 60 | 495,000 | 8,250 | | | | | | | | | | |
| 2003 | 67 | 562,500 | 8,396 | | | | | | | | | | |
| 2004 | 76 | 546,278 | 7,188 | | | | | | | | | | |
| 2005 | 88 | 732,654 | 8,326 | | | | | | | | | | |
| 2006 | 90 | 754,290 | 8,381 | | | | | | | | | | |
| 2007 | 102 | 789,411 | 7,739 | | | | | | | | | | |
| 2008 | 105 | 752,504 | 7,167 | | | | | | | | | | |
| 2009 | 106 | 784,645 | 7,402 | | | | | | | | | | |
| 2010 | 111 | 851,426 | 7,671 | | | | | | | | | | |
| 2011 | 123 | 1,072,606 | 8,720 | | | | | | | | | | |
| 2012 | 130 | 1,047,669 | 8,059 | | | | | | | | | | |
| 2013 | 134 | 853,829 | 6,372 | | | | | | | | | | |
| 2014 | 138 | 966,295 | 7,002 | | | | | | | | | | |
| 2015 | 146 | 991,925 | 6,794 | | | | | | | | | | |
| 2016 | 149 | 1,119,167 | 7,511 | | | | | | | | | | |
| 2017 | 154 | 1,000,482 | 6,497 | | | | | | | | | | |
| 2018 | 160 | 1,258,859 | 7,868 | | | | | | | | | | |
| 2019 | 166 | 1,337,172 | 8,055 | | | | | | | | | | |
| 2020 | | | | | 160.99 | 8.78 | | 1,235,913 | 67,388 | 1,303,301 | 1,204,694 | 65,685 | 1,270,380 |
| 2021 | | | | | 156.11 | 16.39 | | 1,226,728 | 128,834 | 1,355,562 | 1,136,097 | 119,315 | 1,255,412 |
| 2022 | | | | | 151.36 | 22.16 | | 1,217,494 | 178,258 | 1,395,752 | 1,071,301 | 156,854 | 1,228,155 |
| 2023 | | | | | 146.75 | 26.53 | | 1,208,254 | 218,432 | 1,426,686 | 1,010,138 | 182,616 | 1,192,754 |
| 2024 | | | | | 142.29 | 29.68 | | 1,199,183 | 250,153 | 1,449,336 | 952,546 | 198,704 | 1,151,250 |
| Total Future Expenses | | | | | | | | 77,955,655 | 19,390,846 | 97,346,502 | 21,370,387 | 5,032,008 | 26,402,395 |
| Total | 2,105 | 15,916,712 | 7,561 | 7,500 | | | 2.36% | | | | | | |

**Notes**

(1),(2) From Virginia Department of Health; does not include DOJ settlement in 2018
(3) Col (2) / Col (1)
(4) Selected 2019 value based on Col (3)
(5) Projected based on Life Tables
(6) Judgment based on Exhibit 2
(7) Col (4) * Col (5) trended forward based on Col (6)
(8) Col (7) discounted by 5.25% from Exhibit 1

# Virginia Birth Related Neurological Injury Compensation Fund



## Reserve Analysis as of 12/31/2019

### Roll Forward 2020

| | | | | | | |
|---|---|---|---|---|---|---|
| **Assets as of 12/31/2019** | | | 542.3 | **Liabilities as of 12/31/2019** | | 569.1 |
| | | | | For Admitted Participants | 410.5 | |
| | | | | For Not Yet Admitted Participants | 132.2 | |
| | | | | For Claimant Administration Expenses | 26.4 | |
| | | | | **Surplus/(Deficit) As of 12/31/2019** | | (26.8) |
| 2020 Assessments | | | | Admitted Participants Impact | | |
| Participating Hospitals: | 3.8 | | | One Year's Interest | 21.6 | |
| Participating Physicians: | 4.5 | | | Estimated Future Payments for Participants Admitted in 2020 | 26.0 | |
| Non-Participating Physicians: | 4.6 | | | Payments in 2020 | (28.6) | |
| Liability Insurers: | 15.1 | | | | | |
| Total Assessments | | 28.0 | | Total Admitted Participants Impact | | 18.9 |
| 2020 Payments | | | | Not Yet Admitted Participants | | |
| Benefit Payments to Participants: | (30.1) | | | One Year's Interest | 6.9 | |
| Claimant Administration Expenses: | (1.3) | | | Future Payments for Participants born in 2020 | 24.5 | |
| Unallocated Expenses: | (0.3) | | | Estimated Future Payments for Participants Admitted in 2020 | (26.0) | |
| Total Payments | | (31.7) | | Total Not Yet Admitted Participants Impact | | 5.4 |
| 2020 Interest Accrual | | | | Claimant Administration Expenses | | |
| Interest Accrual on 12/31/2019 Assets | 28.5 | | | One Year's Interest | 1.4 | |
| Interest Accrual on 2020 Assessments | 0.7 | | | Expense Payments in 2020 | (1.3) | |
| Interest Accrual on 2020 Payments | (0.8) | | | Total Claimant Administration Expenses Impact | | 0.1 |
| Total Interest Accrual | | 28.4 | | | | |
| **Assets as of 12/31/2020** | | | 567.0 | **Liabilities as of 12/31/2020** | | 593.5 |
| | | | | For Admitted Participants | 429.5 | |
| | | | | For Not Yet Admitted Participants | 137.6 | |
| | | | | For Claimant Administration Expenses | 26.5 | |
| | | | | **Surplus/(Deficit) As of 12/31/2020** | | (26.6) |

Note: All values are stated in $(millions)

# Virginia Birth Related Neurological Injury Compensation Fund

## Reserve Analysis as of 12/31/2019

### Roll Forward 2021

| | | | | | |
|---|---|---|---|---|---|
| **Assets as of 12/31/2020** | | | 567.0 | **Liabilities as of 12/31/2020** | | | 593.5 |
| | | | | For Admitted Participants | 429.5 | | |
| | | | | For Not Yet Admitted Participants | 137.6 | | |
| | | | | For Claimant Administration Expenses | 26.5 | | |
| | | | | **Surplus/(Deficit) As of 12/31/2020** | | | (26.6) |
| 2021 Assessments | | | | Admitted Participants Impact | | | |
| Participating Hospitals: | 3.8 | | | One Year's Interest | 22.5 | | |
| Participating Physicians: | 4.5 | | | Estimated Future Payments for Participants Admitted in 2021 | 26.7 | | |
| Non-Participating Physicians: | 4.6 | | | Payments in 2021 | (28.8) | | |
| Liability Insurers: | 15.1 | | | | | | |
| Total Assessments | | 28.0 | | Total Admitted Participants Impact | | 20.5 | |
| 2021 Payments | | | | Not Yet Admitted Participants | | | |
| Benefit Payments to Participants: | (31.8) | | | One Year's Interest | 7.2 | | |
| Claimant Administration Expenses: | (1.4) | | | Future Payments for Participants born in 2021 | 25.3 | | |
| Unallocated Expenses: | (0.3) | | | Estimated Future Payments for Participants Admitted in 2021 | (26.7) | | |
| Total Payments | | (33.5) | | Total Not Yet Admitted Participants Impact | | 5.8 | |
| 2021 Interest Accrual | | | | Claimant Administration Expenses | | | |
| Interest Accrual on 12/31/2020 Assets | 29.8 | | | One Year's Interest | 1.4 | | |
| Interest Accrual on 2021 Assessments | 0.7 | | | Expense Payments in 2021 | (1.4) | | |
| Interest Accrual on 2021 Payments | (0.9) | | | Total Claimant Administration Expenses Impact | | 0.0 | |
| Total Interest Accrual | | 29.6 | | | | | |
| **Assets as of 12/31/2021** | | | 591.0 | **Liabilities as of 12/31/2021** | | | 619.8 |
| | | | | For Admitted Participants | 449.9 | | |
| | | | | For Not Yet Admitted Participants | 143.4 | | |
| | | | | For Claimant Administration Expenses | 26.5 | | |
| | | | | **Surplus/(Deficit) As of 12/31/2021** | | | (28.8) |

Note: All values are stated in $(millions)

# Virginia Birth Related Neurological Injury Compensation Fund

## Reserve Analysis as of 12/31/2019

### Roll Forward 2022

| | | | | | | |
|---|---|---|---|---|---|---|
| **Assets as of 12/31/2021** | | | 591.0 | **Liabilities as of 12/31/2021** | | 619.8 |
| | | | | For Admitted Participants | 449.9 | |
| | | | | For Not Yet Admitted Participants | 143.4 | |
| | | | | For Claimant Administration Expenses | 26.5 | |
| | | | | **Surplus/(Deficit) As of 12/31/2021** | | (28.8) |
| 2022 Assessments | | | | Admitted Participants Impact | | |
| Participating Hospitals: | 3.8 | | | One Year's Interest | 23.6 | |
| Participating Physicians: | 4.5 | | | Estimated Future Payments for Participants Admitted in 2022 | 26.5 | |
| Non-Participating Physicians: | 4.6 | | | Payments in 2022 | (27.1) | |
| Liability Insurers: | 15.1 | | | | | |
| Total Assessments | | 28.0 | | Total Admitted Participants Impact | | 23.0 |
| 2022 Payments | | | | Not Yet Admitted Participants | | |
| Benefit Payments to Participants: | (31.6) | | | One Year's Interest | 7.5 | |
| Claimant Administration Expenses: | (1.4) | | | Future Payments for Participants born in 2022 | 26.1 | |
| Unallocated Expenses: | (0.3) | | | Estimated Future Payments for Participants Admitted in 2022 | (26.5) | |
| Total Payments | | (33.4) | | Total Not Yet Admitted Participants Impact | | 7.1 |
| 2022 Interest Accrual | | | | Claimant Administration Expenses | | |
| Interest Accrual on 12/31/2021 Assets | 31.0 | | | One Year's Interest | 1.4 | |
| Interest Accrual on 2022 Assessments | 0.7 | | | Expense Payments in 2022 | (1.4) | |
| Interest Accrual on 2022 Payments | (0.9) | | | Total Claimant Administration Expenses Impact | | (0.0) |
| Total Interest Accrual | | 30.9 | | | | |
| **Assets as of 12/31/2022** | | | 616.5 | **Liabilities as of 12/31/2022** | | 650.0 |
| | | | | For Admitted Participants | 472.9 | |
| | | | | For Not Yet Admitted Participants | 150.5 | |
| | | | | For Claimant Administration Expenses | 26.5 | |
| | | | | **Surplus/(Deficit) As of 12/31/2022** | | (33.4) |

Note: All values are stated in $(millions)

# Virginia Birth Related Neurological Injury Compensation Fund

## Reserve Analysis as of 12/31/2019

**Footnotes for Roll Forward**



| Asset Category | |
|---|---|
| Assessments | Projected based on historical assessments by year |
| Payments | Based on undiscounted Pinnacle projections by year |
| Interest Accrual | Based on selected return from Exhibit 1 applied to other Asset categories |
| Assets as of year-end | Prior year-end Assets + Total Assessments + Total Payments + Interest Accrual<br>*Assets as of 12/31/2019 provided by VA SCC* |

| Liability Category | *for Admitted and Not Yet Admitted Participants* |
|---|---|
| One Year's Interest | Based on selected return from Exhibit 1 applied to prior year-end liabilities |
| Future Payments | Based on undiscounted Pinnacle projections by year;<br>future participant counts based on Exhibit 4, Page 1, Col (8) |
| Liabilities as of year-end | Prior year-end Liabilities + Admitted Participants Impact + Not Yet Admitted Participants Impact<br>+ Claimant Administration Expenses |