Commonwealth of Virginia
State Corporation Commission – Bureau of Insurance

2018 Analysis of the Virginia Birth-Related Neurological Injury Compensation Program

December 18, 2018

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Commitment Beyond Numbers

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Virginia Birth-Related Neurological Injury Compensation Program

Actuarial Analysis as of December 31, 2017

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, 2017. 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, 2017
Pinnacle estimates that, as of December 31, 2017, the Fund had an outstanding liability of $511.8 million related to future benefits payments for Program participants who have been born as of December 31, 2017, 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 $506.2 million, this results in an estimated Fund deficit of $5.6 million.

Table 1 – Estimated Fund Surplus/(Deficit) as of December 31, 2017

Estimated Financial Position as of 12/31/2017
($ 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	216	361.6	18.7		
All Claimants Not Yet Admitted to the Program	56	126.6	4.9		
Grand Total	272	488.1	23.6	506.2	(5.6)

These compare to the projected financial position of the Fund as of December 31, 2017 in the August 2016 report using data as of December 31, 2015 of an outstanding liability of $508.3 million, a forecasted asset value of $460.0 million and a Fund deficit of $48.2 million. We do not consider the difference in the magnitude of outstanding liabilities between these two projections to be material.

Underlying Pinnacle's December 31, 2015 analysis was the assumption the fund would earn a return of 5.25% on its assets. In contrast to this, for calendar year 2016, the fund achieved a 13.1% return. Also, the Fund's three year annualized return of 5.4% is fifteen basis points above the return assumed in our prior analysis. This has contributed to higher than expected investment income, resulting in a higher than expected Fund asset balance, and thus a decrease in the Fund's deficit.

Finding 2. Actuarial Soundness of the Fund as of December 31, 2017

As a result of the estimated Fund deficit of $5.6 million as of December 31, 2017, 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, 2017, 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 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, 2017 ($506.2 million) to meet all expected future benefits obligations of participants that have been admitted to the Program as of December 31, 2017 ($380.3 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, 2018

We forecast that the Fund will continue not being actuarially sound as of December 31, 2018, and will have unpaid benefits liabilities (including expenses) of $554.5 million and a Fund deficit of approximately $23.1 million. A large, one-time, administrative expense payment is partially responsible for the significant Fund deficit. This is shown in Table 2 below.

Table 2 – Estimated Fund Surplus/(Deficit) as of December 31, 2018

Estimated Financial Position as of 12/31/2018
($ 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	228	381.3			
All Claimants Not Yet Admitted to the Program	54	128.5			
Grand Total	282	509.8	44.7	531.4	(23.1)

Our calculations indicate that the total number of participants as of December 31, 2018 will be 282. This is an increase of 10 participants from the total number as of December 31, 2017.

Finding 4. Forecasted Unpaid Benefits Liability and Surplus Position as of December 31, 2019 and December 31, 2020

In the past, we have provided similar forecasts for the next two calendar year ends (i.e. 2019 and 2020). However, due to the significant recent changes increasing the Fund's benefit payment obligations, and therefore the future benefits liabilities, we are not in a position to make recommendations for the 2019 and 2020 unpaid benefits liability and surplus based on the currently available data. We strongly recommend that the VA SCC update the actuarial study in 2019, when there will be more credible data on which to base the actuarial projections.

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 $506.2 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 benefits and related administrative expenses for eligible claimants as of December 31, 2017, both admitted and non-admitted, for over fifty years**.**

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 at least biennially by the Virginia State Corporation Commission, Bureau of Insurance (VA SCC) to assess the Fund's actuarial soundness. If a biennial comprehensive review is determined to be sufficient, an interim evaluation, on a smaller scale, to ascertain if any material changes impacting the Program have occurred may still be appropriate. These changes might include material changes in Program benefits payments or investment results, changes in Program administration or the legislation governing the Program, and/or other legislative or judicial changes at the state or federal level, including the implementation of the *Patient Protection and Affordable Care A*ct (PPACA), that may materially impact Program benefits payments and, therefore, the Fund deficit.

4. The significant shift in benefits, specifically health insurance payments, will likely be a material change calling for an interim review prior to the next biennial analysis. Due to the material changes expected in the Fund's benefit payments going forward and in keeping with our recommendation above, we recommend that this study be revisited during 2019 based on data valued as of December 31, 2018, rather than waiting until data valued as of December 31, 2019.

5. For the 2019 analysis, we recommend revisiting the amount of surplus required for the removal of the premium tax assessment. Even a positive Fund balance, if not large enough, may not be enough to support the Fund's future obligations without this additional revenue.

6. 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.

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

8. 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.

9. The Program should consider engaging a consultant to evaluate the potential impact of PPACA on the Program generally, potential changes in future benefits payments and, ultimately, the likely impact of PPACA on the indicated Fund surplus.

10. The Program should consider more detailed modeling of the growing impact of the wage loss benefit and the related issue of some participants losing Medicaid benefits. The Program incurs increased costs for medical-related benefits as a result of the latter impact.

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, 2017;
- Evaluate the surplus or deficit position of the Fund as of December 31, 2017;
- Project the surplus or deficit position of the Fund as of December 31 of 2017 and 2018;
- 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, Program administrative costs, and participant life expectancies and life plans data valued as of December 31, 2017. 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 2017, 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.

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, and advises the New York State Insurance Department 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 years 2016 and 2017,
- Detailed life plans for all Program participants,
- 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, 2017,
- Historical administrative expenses for the Program,
- Wage loss benefits paid to participants for years 2010-2015 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,
- The Fund's Quarterly Investment Analysis for Period Ending December 31, 2017, obtained from Virginia's Legislative Information System,
- The Fund's December 31, 2017 Comprehensive Annual Financial Report obtained from the Fund's website

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, 2017 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, 2017 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, 2017 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, 2017.

In addition, once the estimates of future benefits payments have been made and the December 31, 2017 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 late 1990s and early 2000s, it has appeared to decrease significantly in more recent years. We have selected an expected rate of 9.5 admitted participants per 100,000 births for this method. 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 have been 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 presents 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 is 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 be given to the current physical condition of the individual participant and the impact this may have on annual benefits payments and/or life expectancies.

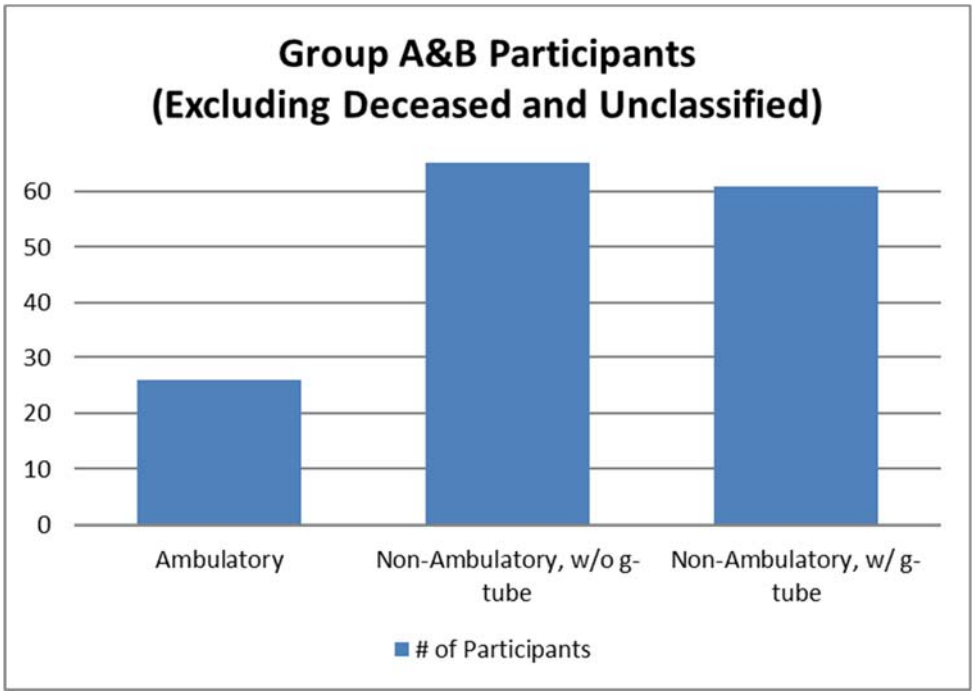
To address some of these opportunities, Pinnacle made several changes to how the data was organized to develop our future benefits payments. First, older years of benefits payments for Group A members have been included in our assessment of historical benefits payments. For example, we examined not only 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 many benefits categories, 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 3 – 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.

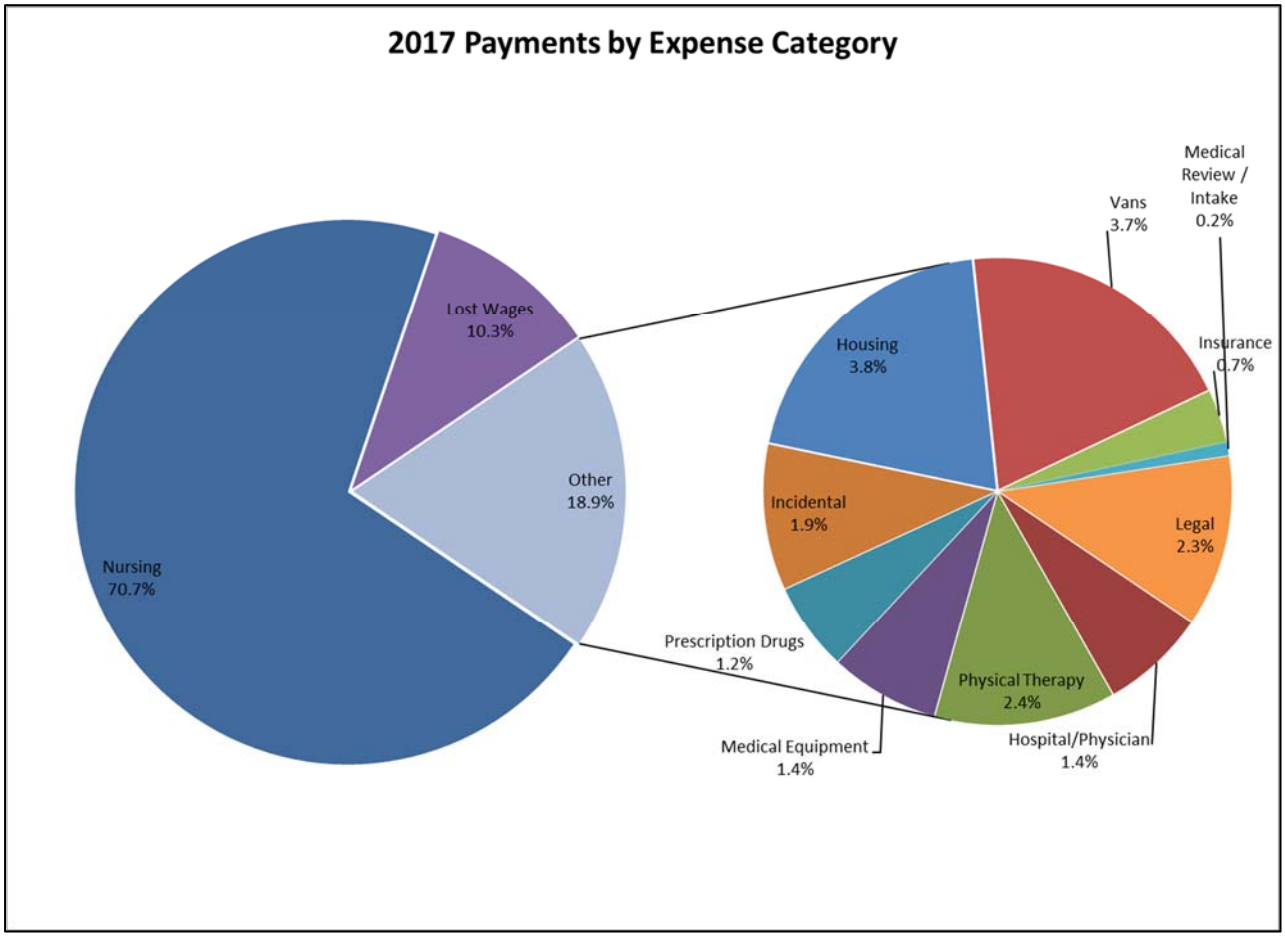
Benefit Payments by Benefit Type

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 4 and the accompanying chart that follows. In both 2016 and 2017, the high percentages (relative to the percentages of all years' payments) in lost wages and nursing costs are noteworthy.

Table 4A – Summary of Benefits Payments in 2016, 2017 and All Years Combined

Total Claim Payments Through 12/31/2017						
Expense Category	Payments Through 12/31/2017	Percentage of Total Payments	Payments In 2016	Percentage of 2016 Payments	Payments In 2017	Percentage of 2017 Payments
Nursing	135,493,141	66.05%	11,058,289	71.58%	11,773,871	70.72%
Hospital/Physician	2,729,366	1.33%	80,526	0.52%	230,433	1.38%
Physical Therapy	5,317,488	2.59%	362,065	2.34%	396,427	2.38%
Medical Equipment	3,612,340	1.76%	152,127	0.98%	239,070	1.44%
Prescription Drugs	2,073,688	1.01%	172,945	1.12%	195,074	1.17%
Incidental	5,909,860	2.88%	311,443	2.02%	319,456	1.92%
Housing	22,751,733	11.09%	595,474	3.85%	631,853	3.80%
Vans	10,279,572	5.01%	601,156	3.89%	618,567	3.72%
Insurance	2,010,611	0.98%	115,041	0.74%	115,853	0.70%
Lost Wages	9,069,538	4.42%	1,554,752	10.06%	1,722,939	10.35%
Medical Review / Intake	327,787	0.16%	18,950	0.12%	29,270	0.18%
Legal	5,554,481	2.71%	425,181	2.75%	375,435	2.26%
Total	205,129,607	100.00%	15,447,949	100.00%	16,648,248	100.00%

Table 4B – Summary of 2017 Benefits Payments



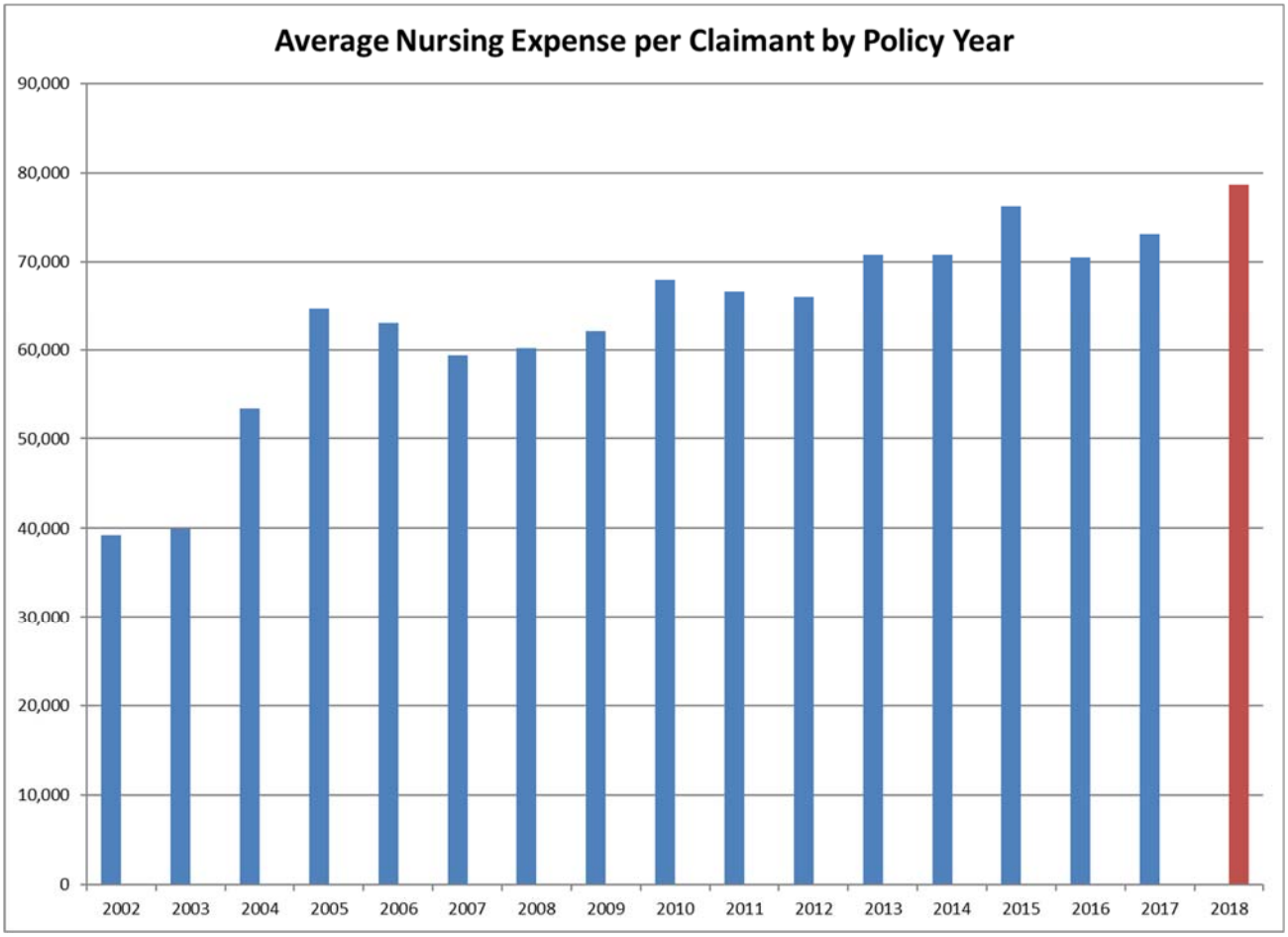
Nursing

As Table 4B 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 consistently near $50,000 per participant a year. Furthermore, several participants average nursing benefits close to $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 15 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 was 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 $78,631 in 2018 as shown in Table 5 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 5 – 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. The historical approach of using the most recent year's nursing costs only for developing the assumption of future costs led to some volatility in this benefits category. These previous studies also imposed maximums and minimums that are not necessary with our approach.

Based on discussions with Program staff, this category 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. The impact of these perceived trends will be seen more clearly in the coming 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 and prior to any coverage by Medicaid. Generally, these costs on an annual, per participant basis are relatively small, often averaging less than $1,000 on a Program-wide basis for a year.

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 $425, $800 and $800 respectively. These assumptions are based on a review of historical three, five and ten year trended averages by cohort. The resulting overall average of about $654 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 and prior to Medicaid.

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 $1,750 annually; those who are non-ambulatory and have a g-tube are assumed to have average costs of $2,150 annually. Participants who are neither ambulatory, nor have a g-tube are assumed to have average costs of $4,000 annually, and as of yet uncategorized participants are assumed to have the resulting Group B average annual cost of $2,743. 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 $800 currently valued dollars per year in benefits for each ambulatory participant in Groups A and B going forward, compared to $1,925 annually per participant for the non-ambulatory without g-tube category, and $1,600 annually for the non-ambulatory with g-tube category. The current overall average of $1,612 is then applied to each Group C participant. These selections are somewhat higher than actual experience in recent years, but are consistent for longer term averages for this benefit category.

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 three to five years. For the remaining participants, an average cost of $400 for the non-ambulatory without g-tube category or $425 otherwise annually provides a reasonable approximation of historical benefits levels. Group C is based on the estimated overall average per participant cost of $1,234, 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. $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. In recent years, incidental benefits have averaged around $2,000 per admitted participant. Based on our review of program benefits experience for this category, we have assumed future annual benefits payments of $2,350 for each non-ambulatory participant with a g-tube, $1,975 for each non-ambulatory participant without a g-tube, and $2,100 annually for each ambulatory participant. This results in an overall average of $2,141, consistent with overall averages. No individual participant had historical benefits levels materially different enough from the overall average to justify individual assumptions.

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 taken a different approach than in prior analyses. While previously health insurance was purchased for only a small portion of the participants, the Program now pays health insurance premiums for nearly all the participants. We were provided with insurance premiums paid for each admitted participant and assumed future costs will be consistent with these costs (trended forward to account for expected premium increases).

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 $28,125 in 2018. 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 $36,000. We have assumed that each Group C participant will incur approximately $36,000 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, 2017 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 and Casualty Loss and Loss Adjustment Expenses Reserves* (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 2017 are as follows:

Maturity	Rate
1 Year	1.76%
3 Year	1.98%
5 Year	2.20%
7 Year	2.33%
10 Year	2.40%
20 Year	2.58%
30 Year	2.74%

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 six years ago 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 6 – 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 2017	2.16%	3.85%	1.99%	3.61%
Hospital/Physician	Medical care services	1935 to 2017	3.16%	4.30%	2.99%	4.13%
Physical Therapy	Professional services	1967 to 2017	2.16%	3.85%	1.99%	3.61%
Medical Equipment	Medical care commodities	1935 to 2017	2.30%	2.77%	2.83%	2.83%
Prescription Drugs	Prescription drugs	1935 to 2017	3.02%	3.34%	3.85%	3.50%
Incidental	All items	1913 to 2017	1.60%	2.50%	1.38%	2.34%
Housing	Shelter	1967 to 2017	2.18%	3.06%	2.66%	3.22%
Vans	New vehicles	1935 to 2017	0.96%	1.78%	0.68%	1.78%
Auto Ins	Motor vehicle insurance	1935 to 2017	4.10%	4.47%	5.26%	4.89%
Health Ins	Health insurance	2005 to 2017	4.10%	4.47%	5.26%	4.89%
Lost Wages	Based on BLS VA data	1979 to 2017	1.60%	2.63%	1.38%	2.48%
Medical Review / Intake	All items	1913 to 2017	1.60%	2.50%	1.38%	2.34%
Legal	Legal services	1986 to 2017	2.55%	3.53%	2.64%	3.38%

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 7 below.

Table 7 – 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, 2017, there were 216 admitted Program participants, an increase of 16 from year end 2015. We estimate that an additional 56 children that are eligible for the Program and who will eventually be admitted have been born as of December 31, 2017. This estimate compares to our estimate of 51 Group C participants in our prior analysis. Our analysis of the total number of Program participants as of December 31, 2017 is attached as Exhibit 4 and a summary by birth year is provided in Table 8 below.

Table 8 – Estimated Ultimate Participants as of December 31, 2017

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	10	11	1
2008	7	9	2
2009	10	12	2
2010	4	8	4
2011	7	10	3
2012	2	7	5
2013	5	10	5
2014	2	9	7
2015	4	11	7
2016	0	10	10
2017	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 9 below.

Table 9 – Summary of Calendar Year Benefits Payments Through 2017

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	5,747,789	24,186,228
12/31/2001	5,577,877	29,764,104
12/31/2002	4,638,442	34,402,547
12/31/2003	5,429,845	39,832,391
12/31/2004	6,012,468	45,844,860
12/31/2005	8,548,706	54,393,566
12/31/2006	10,482,314	64,875,880
12/31/2007	9,230,255	74,106,135
12/31/2008	10,778,949	84,885,084
12/31/2009	10,068,816	94,953,900
12/31/2010	10,172,181	105,126,081
12/31/2011	11,685,910	116,811,990
12/31/2012	12,211,818	129,023,808
12/31/2013	13,242,387	142,266,195
12/31/2014	15,024,205	157,290,400
12/31/2015	15,743,010	173,033,410
12/31/2016	15,447,949	188,481,359
12/31/2017	16,648,248	205,129,607

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 $1.5 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.

A table with historical benefits payments for 2017, 2016 and all years combined by benefit category follows as Table 10 and is identical to Table 4A shown earlier. Between 2016 and 2017, significant changes in payments by benefit type included:

- An increase in hospital/physician costs from $81,000 to $230,000. While this is not a significant change dollar-wise, this is a 190% increase within this category.
- Continued growth in wage loss benefits to $1.72 million in 2017.

Table 10 – Summary of Calendar Year Paid and Incurred Losses 1998-2017

Total Claim Payments Through 12/31/2017

Expense Category	Payments Through 12/31/2017	Percentage of Total Payments	Payments In 2016	Percentage of 2016 Payments	Payments In 2017	Percentage of 2017 Payments
Nursing	135,493,141	66.05%	11,058,289	71.58%	11,773,871	70.72%
Hospital/Physician	2,729,366	1.33%	80,526	0.52%	230,433	1.38%
Physical Therapy	5,317,488	2.59%	362,065	2.34%	396,427	2.38%
Medical Equipment	3,612,340	1.76%	152,127	0.98%	239,070	1.44%
Prescription Drugs	2,073,688	1.01%	172,945	1.12%	195,074	1.17%
Incidental	5,909,860	2.88%	311,443	2.02%	319,456	1.92%
Housing	22,751,733	11.09%	595,474	3.85%	631,853	3.80%
Vans	10,279,572	5.01%	601,156	3.89%	618,567	3.72%
Insurance	2,010,611	0.98%	115,041	0.74%	115,853	0.70%
Lost Wages	9,069,538	4.42%	1,554,752	10.06%	1,722,939	10.35%
Medical Review / Intake	327,787	0.16%	18,950	0.12%	29,270	0.18%
Legal	5,554,481	2.71%	425,181	2.75%	375,435	2.26%
Total	205,129,607	100.00%	15,447,949	100.00%	16,648,248	100.00%

Administrative Expenses

Exhibit 6 provides a historical summary of benefits administration expenses for the Program. The average annual costs per living participant have trended downward through 2017 from the 2011 level, and historical averages have exhibited a small level of downward pressure as the number of participants have grown. Based on this information, we have assumed that in the immediate future the Fund will pay benefits administration expenses of approximately $7,000 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, 2017

As previously shown in Table 1, and repeated here as Table 11, we estimate that the Fund has future benefits payments with a present value of approximately $488.1 million, along with future benefits administration expenses with an additional present value of $23.6 million. When compared to actual asset values as of this valuation date, these estimates result in an estimated Fund deficit of $5.6 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 11 – Estimated Fund Surplus/(Deficit) as of December 31, 2017

Estimated Financial Position as of 12/31/2017
($ 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	216	361.6	18.7		
All Claimants Not Yet Admitted to the Program	56	126.6	4.9		
Grand Total	272	488.1	23.6	506.2	(5.6)

Projection to 2018-2020 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 Table 2. 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 2018 interest accrual of $26.6 million on the asset side of the balance sheet is fairly comparable to the $19.0 million and $6.6 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 $26.8 million is somewhat more than the current annual expected present value of lifetime new participant liabilities of approximately $22.6 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 12 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, 2017. 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 12 – Inflation Rate Sensitivity Testing

($ in millions, on a present value basis)

Annual Inflation (Baseline +/-)	Estimated Future Claim Payments	Difference From Baseline
-1.50%	385.2	-103.0
-1.00%	413.6	-74.6
-0.50%	447.5	-40.6
Baseline	488.1	0.0
0.50%	532.9	44.7
1.00%	585.6	97.5
1.50%	648.4	160.2

Table 13 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 13 – Interest Rate Sensitivity Testing

($ in millions, on a present value basis)

Interest Rate (Baseline +/-)	Estimated Future Claim Payments	Difference From Baseline
-5.25% (Undiscounted)	1,980.2	1,492.1
-2.67% (Risk-Free)	849.4	361.3
-1.50%	645.8	157.7
-1.00%	583.7	95.5
-0.50%	531.8	43.7
Baseline	488.1	0.0
0.50%	451.0	-37.2
1.00%	419.1	-69.0
1.50%	391.5	-96.6

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.
Assessments levels – The percentage of full 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 table 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 period of limitation 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 unpaid portion of benefits 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.

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 12/31/2017

Selected Discount Rate

	Annual Return		
	1 Yr.	3 Yr.	5 Yr.
VBIF	13.1%	5.4%	6.3%
Index Target	11.9%	5.5%	6.6%
S&P 500	21.8%	11.4%	15.8%

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, 2017

Virginia Birth Related Neurological Injury Compensation Fund

Exhibit 2

Reserve Analysis as of 12/31/2017

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	2015	Selected Historical Inflation	Selected Future Inflation	Historical Inflation	Future Inflation
Nursing	Professional services	1967 to 2017	5.12%	3.06%	2.10%	1.89%	0.97%	2.16%	3.85%	1.99%	3.61%
Hospital/Physician	Medical care services	1935 to 2017	5.14%	4.01%	3.11%	2.87%	2.43%	3.16%	4.30%	2.99%	4.13%
Physical Therapy	Professional services	1967 to 2017	5.12%	3.06%	2.10%	1.89%	0.97%	2.16%	3.85%	1.99%	3.61%
Medical Equipment	Medical care commodities	1935 to 2017	3.07%	2.79%	2.60%	3.06%	2.80%	2.30%	2.77%	2.83%	2.83%
Prescription Drugs	Prescription drugs	1935 to 2017	3.51%	3.62%	3.48%	4.22%	3.40%	3.02%	3.34%	3.85%	3.50%
Incidental	All items	1913 to 2017	3.13%	2.31%	1.55%	1.21%	2.13%	1.60%	2.50%	1.38%	2.34%
Housing	Shelter	1967 to 2017	4.29%	2.64%	2.16%	3.16%	3.32%	2.18%	3.06%	2.66%	3.22%
Vans	New vehicles	1935 to 2017	2.44%	0.16%	1.11%	0.24%	-0.25%	0.96%	1.78%	0.68%	1.78%
Auto Ins	Motor vehicle insurance	1935 to 2017	5.10%	3.50%	4.67%	5.85%	7.72%	4.10%	4.47%	5.26%	4.89%
Health Ins	Health insurance	2005 to 2017	2.41%	N/A	2.38%	2.50%	1.65%	4.10%	4.47%	5.26%	4.89%
Lost Wages	Based on BLS VA data	1979 to 2017	3.40%	2.31%	1.55%	1.21%	2.13%	1.60%	2.63%	1.38%	2.48%
Medical Review / Intake	All items	1913 to 2017	3.13%	2.31%	1.55%	1.21%	2.13%	1.60%	2.50%	1.38%	2.34%
Legal	Legal services	1986 to 2017	4.11%	3.95%	2.65%	2.63%	3.56%	2.55%	3.53%	2.64%	3.38%

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 12/31/2017

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

Exhibit 4

Reserve Analysis as of 12/31/2017

Page 1

Ultimate Participant Development

Birth Year	Births	Admitted Participants	Dev. Factor	Indicated Ultimate Participants: Development Method	Indicated Ultimate Participants: Expected Method	Indicated Ultimate Participants: B-F Method	Prior Sel. Ultimate Participants	Select Ultimate Participants	IBNR Claims	Indicated Participants per 100K Births
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(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	10	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	6	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	12	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	10	12	0	11.27
2007	108,417	10	1.0400	10.4	10.3	10.4	12	11	1	10.15
2008	106,578	7	1.1440	8.0	10.1	8.3	9	9	2	8.44
2009	104,979	10	1.2298	12.3	10.0	11.9	12	12	2	11.43
2010	102,934	4	1.2790	5.1	9.8	6.1	8	8	4	7.77
2011	102,525	7	1.3877	9.7	9.7	9.7	10	10	3	9.75
2012	102,811	2	1.6652	3.3	9.8	5.9	9	7	5	6.81
2013	101,977	5	1.9150	9.6	9.7	9.6	9	10	5	9.81
2014	102,795	2	2.5853	5.2	9.8	8.0	10	9	7	8.76
2015	103,074	4	4.0072	16.0	9.8	11.3	10	11	7	10.67
2016	103,589	0	10.0180	0.0	9.8	8.9		10	10	9.65
2017	104,107	0	25.0451	0.0	9.9	9.5		10	10	9.61
Total		216		244.6			251.0	272.0	56	
1995-2015	2,113,044	164		192.6	200.7	194.3	199.0	200.0	36	9.47
2000-11	1,237,416	110		117.5	117.6	118.4	120.0	122.0	12	9.86
2000-13	1,442,204	117		130.4	137.0	133.9	138.0	139.0	22	9.64

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

(9) Col (8) - Col (2)

(10) Col (8) / Col (1) x 100,000

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
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
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	
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		
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			
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				
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					
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						
1995	2	2	3	3	4	5	5	6	6	6	9	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								
1997	2	2	3	5	6	6	7	7	7	7	8	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										
1999	0	0	1	1	2	3	5	6	6	6	6	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												
2001	0	1	4	5	6	6	8	10	10	10	11	13	13	13	13	13	13													
2002	1	1	5	8	9	9	10	10	11	12	12	12	13	13	13	13														
2003	0	2	4	6	8	8	10	10	10	10	11	11	11	11	11															
2004	0	0	1	3	4	4	4	4	4	4	5	5	5	5																
2005	0	0	2	2	2	2	3	4	4	4	5	5	5																	
2006	0	2	3	4	4	6	7	7	8	9	11	12																		
2007	0	1	3	3	7	8	8	8	10	10	10																			
2008	0	2	3	5	7	7	7	7	7	7																				
2009	1	3	6	6	8	8	9	10	10																					
2010	0	0	2	3	3	4	4	4																						
2011	0	0	1	3	5	5	7																							
2012	0	0	2	2	2	2																								
2013	0	0	2	3	5																									
2014	0	0	1	2																										
2015	1	3	4																											
2016	0	0																												
2017	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-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	
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		
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			
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			
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					
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						
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							
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								
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									
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										
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											
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												
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													
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														
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															
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																
2004			3.0000	1.3333	1.0000	1.0000	1.0000	1.0000	1.0000	1.2500	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																		
2006		1.5000	1.3333	1.0000	1.5000	1.1667	1.0000	1.1429	1.1250	1.2222	1.0909																			
2007		3.0000	1.0000	2.3333	1.1429	1.0000	1.0000	1.2500	1.0000	1.0000																				
2008		1.5000	1.6667	1.4000	1.0000	1.0000	1.0000	1.0000	1.0000																					
2009	3.0000	2.0000	1.0000	1.3333	1.0000	1.1250	1.1111	1.0000																						
2010			1.5000	1.0000	1.3333	1.0000	1.0000																							
2011			3.0000	1.6667	1.0000	1.4000																								
2012			1.0000	1.0000	1.0000																									
2013			1.5000	1.6667																										
2014			2.0000																											
2015	3.0000	1.3333																												
2016																														
Avg.	1.6667	2.2000	1.6819	1.3670	1.1834	1.2120	1.0814	1.0834	1.0797	1.1464	1.0356	1.0205	1.0000	1.0063	1.0000	1.0000	1.0256	1.0208	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	2.5385	1.5000	1.2967	1.1327	1.1905	1.0769	1.0467	1.0408	1.1164	1.0392	1.0204	1.0000	1.0071	1.0000	1.0000	1.0096	1.0109	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	1.8667	1.5000	1.3733	1.0976	1.1553	1.0694	1.0493	1.0216	1.1006	1.0564	1.0083	1.0000	1.0000	1.0000	1.0000	1.0000	1.0250	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
15-year	2.3333	2.5417	1.6233	1.3594	1.1317	1.2094	1.0657	1.0329	1.0366	1.1268	1.0450	1.0056	1.0000	1.0067	1.0000	1.0000	1.0256	1.0208	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Prior LDF:	2.5000	2.5000	1.5500	1.3500	1.1500	1.2000	1.0850	1.0400	1.0750	1.1000	1.0400	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:	2.5000	2.5000	1.5500	1.3500	1.1500	1.2000	1.0850	1.0400	1.0750	1.1000	1.0400	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.:	25.0451	10.0180	4.0072	2.5853	1.9150	1.6652	1.3877	1.2790	1.2298	1.1440	1.0400	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:	4.0%	10.0%	25.0%	38.7%	52.2%	60.1%	72.1%	78.2%	81.3%	87.4%	96.2%	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 12/31/2017

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	96,665,899	83,782,991	47,140,031	4,388,035	716,584	232,693,540	92,235,864	324,929,404
Hospital/Physician	1,451,108	369,408	728,258	69,062	6,178	2,624,014	856,625	3,480,639
Physical Therapy	1,847,967	641,338	220,700	36,468	13,254	2,759,727	975,565	3,735,293
Medical Equipment	2,728,668	1,193,358	534,885	54,748	13,640	4,525,300	1,684,675	6,209,975
Prescription Drugs	770,667	1,705,343	592,128	32,656	3,799	3,104,592	1,410,385	4,514,977
Incidental	2,575,862	1,661,833	1,264,869	132,538	17,422	5,652,523	2,117,112	7,769,635
Housing	5,383,376	4,470,195	2,900,995	245,329	102,070	13,101,965	4,919,501	18,021,466
Vans	8,102,036	4,701,774	3,829,444	408,713	69,383	17,111,350	4,702,000	21,813,350
Auto Ins	1,588,614	690,777	831,834	72,396	7,599	3,191,220	632,057	3,823,277
Health Ins	5,757,763	3,917,740	4,250,459	350,301	13,983	14,290,247	4,950,405	19,240,652
Lost Wages	30,052,653	14,882,960	15,307,544	1,723,672	108,934	62,075,763	9,759,518	71,835,280
Medical Review / Intake	0	0	0	0	0	0	76,261	76,261
Legal	0	0	0	0	0	0	1,859,989	1,859,989
Death Benefit	169,762	207,274	31,763	6,278	13,876	428,953	405,109	834,062
Total	157,094,376	118,224,990	77,632,911	7,520,197	1,086,721	361,559,196	126,585,066	488,144,262

Virginia Birth Related Neurological Injury Compensation Fund

Reserve Analysis as of 12/31/2017

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	1,380,941	1,373,492	2,049,567	1,462,678	238,861	1,454,335	1,647,069	1,504,303
Hospital/Physician	20,730	6,056	31,663	23,021	2,059	16,400	15,297	16,114
Physical Therapy	26,400	10,514	9,596	12,156	4,418	17,248	17,421	17,293
Medical Equipment	38,981	19,563	23,256	18,249	4,547	28,283	30,083	28,750
Prescription Drugs	11,010	27,956	25,745	10,885	1,266	19,404	25,185	20,903
Incidental	36,798	27,243	54,994	44,179	5,807	35,328	37,806	35,971
Housing	76,905	73,282	126,130	81,776	34,023	81,887	87,848	83,433
Vans	115,743	77,078	166,498	136,238	23,128	106,946	83,964	100,988
Auto Ins	22,694	11,324	36,167	24,132	2,533	19,945	11,287	17,700
Health Ins	82,254	64,225	184,803	116,767	4,661	89,314	88,400	89,077
Lost Wages	429,324	243,983	665,545	574,557	36,311	387,974	174,277	332,571
Medical Review / Intake	0	0	0	0	0	0	1,362	353
Legal	0	0	0	0	0	0	33,214	8,611
Death Benefit	2,425	3,398	1,381	2,093	4,625	2,681	7,234	3,861
Total	2,244,205	1,938,115	3,375,344	2,506,732	362,240	2,259,745	2,260,448	2,259,927

Virginia Birth Related Neurological Injury Compensation Fund

Exhibit 6

Reserve Analysis as of 12/31/2017

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 2017 or Prior: Admitted in 2017 or Prior (5a)	Projected Living Participants Born in 2017 or Prior: Not Yet Admitted (5b)	Selected Inflationary Trend (6)	Projected Claim Administration Expenses: Admitted in 2017 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 2017 or Prior (8a)	Present Value of Projected Claim Administration Expenses: Not Yet Admitted (8b)	Present Value of Projected Claim Administration Expenses: Total (8c)
2002	61	495,000	8,115										
2003	68	562,500	8,272										
2004	77	546,278	7,095										
2005	89	732,654	8,232										
2006	92	754,290	8,199										
2007	105	789,411	7,518										
2008	108	752,504	6,968										
2009	109	784,645	7,199										
2010	114	851,426	7,469										
2011	126	1,072,606	8,513										
2012	133	1,047,669	7,877										
2013	137	853,829	6,232										
2014	142	966,295	6,805										
2015	150	991,925	6,613										
2016	155	1,119,167	7,220										
2017	160	1,000,482	6,253										
2018					153.09	9.61		1,096,706	68,866	1,165,572	1,069,004	67,126	1,136,130
2019					148.32	17.78		1,087,427	130,364	1,217,790	1,007,087	120,732	1,127,819
2020					143.70	24.34		1,078,190	182,642	1,260,831	948,724	160,711	1,109,435
2021					139.21	29.09		1,068,958	223,398	1,292,356	893,682	186,768	1,080,450
2022					134.86	32.35		1,059,792	254,244	1,314,035	841,824	201,953	1,043,777
Total Future Expenses								68,670,086	18,567,012	87,237,098	18,748,875	4,890,141	23,639,016
Total	1,826	13,320,681	7,295	7,000			2.34%						

Notes

(1),(2) From Virginia Department of Health
(3) Col (2) / Col (1)
(4) Selected 2017 value based on Col (3)
(5) Projected based on Life Tables
(6) Judgment
(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

Exhibit 7

Reserve Analysis as of 12/31/2017

Roll Forward 2018

Assets as of 12/31/2017			506.2	**Liabilities as of 12/31/2017**			511.8
				For Admitted Participants	361.6		
				For Not Yet Admitted Participants	126.6		
				For Claimant Adminsistrations Expenses	23.6		
2018 Assessments				Admitted Participants Impact			
Participating Hospitals:	3.8			One Year's Interest	19.0		
Participating Physicians:	4.3			Estimated Future Payments for Participants			
Non-Participating Physicians:	4.7			Admitted in 2018	27.4		
Liability Insurers:	14.0			Payments in 2018	(26.6)		
Total Assessments		26.8		Total Admitted Participants Impact		19.7	
2018 Payments				Not Yet Admitted Participants			
Benefit Payments to Participants:	(26.7)			One Year's Interest	6.6		
Claimant Administration Expenses:	(1.2)			Future Payments for Participants born in 2018	22.6		
Unallocated Expenses:	(0.3)			Estimated Future Payments for Participants			
				Admitted in 2018	(27.4)		
Total Payments		(28.1)					
				Total Not Yet Admitted Participants Impact		1.9	
2018 Interest Accrual							
Interest Accrual on 12/31/2017 Assets	26.6			Claimant Administration Expenses			
Interest Accrual on 2018 Assessments	0.7			One Year's Interest	1.2		
Interest Accrual on 2018 Payments	(0.7)			Expense Payments in 2018	(1.2)		
				Total Claimant Administration Expenses Impact		0.1	
Total Interest Accrual		26.5					
Assets as of 12/31/2018			531.4	**Liabilities as of 12/31/2018**			554.5
				For Admitted Participants	381.3		
				For Not Yet Admitted Participants	128.5		
				One-Time Additional Expense (2018 year only)	21.0		
				For Claimant Administration Expenses	44.7		
Surplus/(Deficit) As of 12/31/2017			(5.6)	**Surplus/(Deficit) As of 12/31/2018**			(23.1)

Note: All values are stated in $(millions)