Lost Valuable Services and Future Care Costs: The Actuary's Role

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Introduction

It is the actuary's job to take a life care planner's opinion regarding an injured party's future care needs, and convert that opinion into a lump-sum present value.

Similarly, it is the actuary's job to take an expert's opinion (or Statistics Canada data) regarding an injured or deceased party's lost valuable services, and convert that opinion or data into a lump-sum present value.

This paper provides an overview of the future care cost/lost valuable services valuation process from the actuary's perspective.

Information Needs

The life care planning expert will opine on the future goods and services required and/or recommended for the injured party, and also on the household tasks that the injured (or deceased) party is no longer able to perform.

That opinion will include unit costs for each good and service (either including or excluding applicable taxes), as well as the frequency and duration (start date and end date) for each good and service.

Examples from a life care plan/lost valuable services opinion:

Item	Unit Cost	Frequency	Start	End
Accessible van	$20,000 + HST	once only	immediate need	-
Wheelchair	$600	every 5 years	immediate	for life
Physiotherapy	$90	monthly	immediate	after 2 years
Massage therapy	$80 + HST	monthly	immediate	age 80
Prescription drug "x"	$5	daily	immediate	for life
Housekeeping assistance	$125 + HST	weekly	age 65	age 80

Start Dates of Life Care Items

There are time lags in the trial preparation process. A life care plan may be prepared in 2018. The actuarial valuation may be prepared in 2020 using a valuation date in 2021. Using this timing as an example, the actuary would typically adjust costs from 2018 dollars to 2021 dollars based on inflationary cost increases.

Ideally, the life care plan would anticipate such delays and provide clarity regarding situations such as these:

- For the "once only" item above (using this timing as an example), the actuary would usually assume that the items are still needed and would be delivered in 2021 (soon after the valuation date) not in the past (in 2018, when the life care plan was written).

- For the "after 2 years" item above, the actuary would generally assume that the need begins on the valuation date and will continue for 2 years afterwards and not that the need began in 2018 and ended in 2020.

- If the injured party was 63 years old at the time of the assessment, is the start date for housekeeping services really age 65 or is it 2 years after the valuation date regardless of the valuation date? Usually the answer is clear from the context, but sometimes the actuary has to make an assumption.

Actuarial Present Value Method

In Canada, actuaries and other economic loss experts use the actuarial present value method which has long been accepted by the courts as the proper method for applying mortality and disability incidence contingencies when estimating the present value of future pecuniary losses or other amounts.

Under the actuarial present value method, the amount to be valued in each future year is

discounted by the probability of survival to that year based on the age-by-age mortality and disability rates of the selected tables. This calculation is applied separately to each future year up to the end of the mortality and disability incidence tables (for example, to age 110 for the 2016-2018 Canada Life Tables). The interest discount factors are similarly applied on a year-by-year basis.

For example, if there will be a care cost of $1,000 one year from now and the plaintiff has a 10% chance of dying in the next year (therefore a 90% probability of living through the year), then the expected cost is $900 (90% of $1,000). This $900 is the amount that will be discounted, by one year of interest in this particular example, to the valuation date. In other words, the negative contingency of mortality (and disability where applicable) is applied to each and every future cost item.

A present value calculation that assumes an individual will survive (with certainty) for the duration of his or her life expectancy, and then die (with certainty) at that moment, would not be realistic and would not be in accordance with accepted actuarial practice.

Important Terminology

a. Mortality Tables, Mortality Rates, Life Expectancy

Mortality tables do not predict when an individual will die. Instead, they illustrate the year-by-year probability that an individual of a specified age will die in the future.

According to the Canada Life Tables for 2016-2018, a male aged 30 years has a life expectancy (average expected future lifetime) of 51.01 years or to age 81.01. If 100,000 males of exact age 30 were tracked until their deaths, the average future lifetime of those 100,000 is expected to be 51.01 years. Some of them may die in a few days. Others will live to beyond age 100. The life expectancy is the average of <u>all</u> the times until death.

According to the same mortality table, a male aged 65 has a life expectancy of 19.40 years or to age 84.40. This older cohort of males has a different average expected future lifetime because they have "beaten the odds". By surviving to age 65, they now have a different (and older) life expectancy (average expected future lifetime) than the 30-year-old cohort – some of whom may not survive to age 65.

Life expectancy considers only the negative contingency of mortality, nothing more.

b. Health-adjusted Life Expectancy (HALE)

Some life care planners incorporate the concept of Health-adjusted Life Expectancy (HALE) into their reports.

HALE takes into account two negative contingencies: the probability of death and the risk of disability. It is the average expected future time that an individual will remain both alive and free of disability. Depending on the disability table that is used, it can be a measure of average future years during which the plaintiff is expected to be able to perform household tasks (similar in concept to regular life expectancy) or it may instead simply be a measure of quality of life.

The Statistics Canada HALE is a measure of functional health and quality of life rather than the ability to work or perform household tasks. Instead of disability incidence tables, the Statistics Canada HALE uses "Health Utility Index" measures from both household and institutional sources. The HUI considers things like being able to read without glasses, being able to walk without difficulty, being able to hear in a group conversation without a hearing aid, and whether or not one is happy. These are not necessarily determinant of one's ability to work or perform household tasks. Furthermore, the Statistics Canada HALE is measured from birth, not from the relevant valuation age for the plaintiff. And, in addition to using qualitative rather than quantitative measures of "disability", the Statistics Canada HALE uses an outdated mortality table.

HALE is a useful concept, to be sure. However, the actuary cannot incorporate health-adjusted life expectancy directly into a valuation any more than they can incorporate regular life expectancy.

For lost valuable services, most economic loss experts:

- Include both mortality and disability decrements when estimating the present value of lost valuable services
- Use the mortality rates of the most recent Statistics Canada Life Tables (currently the 2016-18 tables), and the most recent disability incidence rates that are available (currently those used in the 30th valuation of the Canada Pension Plan, as of December 31, 2018)
- Use the limiting age (maximum duration) that is specified by the life care planner or occupational therapist – often to age 75 or 80

The result would be an estimate of the present value of valuable services that are assumed to continue until the earlier of the plaintiff's death, onset of disability, or attainment of the limiting age. The limiting age is typically viewed as the age at which an individual would choose to cease to perform the specified household task had the injury or death not occurred – regardless of health status at that time.

If the life care planner or occupational therapist specifies a HALE instead of a limiting age, the economic loss expert must work backwards to determine the limiting age before proceeding with the valuation. Here are some examples for plaintiffs of different ages and sex:

Valuation Age	Sex	HALE	Equivalent Limiting Age
30	male	age 72.0	80.00
65	male	age 72.0	72.65
30	female	age 73.2	81.05
65	female	age 73.2	73.90

For example, if the life care planner specifies a HALE of 42 years (to age 72) for lost valuable services when the injured party is a 30-year-old male, a limiting age of 80 is required in order to properly reflect the life care planner's opinion as to the duration of the loss.

"HALE" and "limiting age" are not synonyms. HALE is an average. Limiting age is a maximum.

Note:

- The above examples use the standard mortality rates in the 2016-2018 Life Table for Canada and the age-specific disability incidence rates that were used for the 30th actuarial valuation of the Canada Pension Plan (December 31, 2018), age 65 incidence rates for all ages over 65.

c. Work Life Expectancy (WLE)

Like HALE, WLE is an "average future lifetime" measure. It measures the average future time that a group of individuals of the same age would be expected to remain in the workforce. The studies that measure WLE typically track the employed individual until the earlier of death, disability, or retirement.

"WLE" and "retirement age" are not synonyms. WLE is an average. Retirement age is a maximum – the "lost earnings" equivalent to the lost valuable services limiting age.

What Affects the Cost of the Actuarial Valuation?

Not all life care plans are created equal!

If the life care planner adds applicable taxes to the various unit costs, then they may charge a bit more and the actuary's fees will be a bit lower. If the life care planner does not adjust for applicable taxes, then they may charge a bit less and the actuary's fees will be a bit higher. This is generally a wash, and should not be of concern to the lawyer. What is important is that the life care plan clearly state whether or not taxes are included in the amounts.

Summary tables, located all together in one section of the report and having a consistent format, are a time saver for the actuary. Most actuaries prefer a presentation similar to this:

Item	Unit Cost	Frequency	Start	End
Accessible van	$20,000 + HST	once only	immediate need	-
Wheelchair	$600	every 5 years	immediate	for life
Physiotherapy	$90	monthly	immediate	after 2 years
Massage therapy	$80 + HST	monthly	immediate	age 80
Prescription drug "x"	$5	daily	immediate	for life
Housekeeping assistance	$125 + HST	weekly	age 65	age 80

Or this:

Item	Unit Cost	Frequency	Annual Amount	Start	End
Accessible van	$20,000 + HST	once only	-	immediate need	-
Wheelchair	$600	every 5 years	-	immediate	for life
Physiotherapy	$90	monthly	$1,080	immediate	after 2 years
Massage therapy	$80 + HST	monthly	$960 + HST	immediate	age 80
Prescription drug "x"	$5	daily	$1,825	immediate	for life
Housekeeping assistance	$125 + HST	weekly	$6,000* + HST	age 65	age 80

* 48 weeks each year

While it's always helpful to the economic loss expert if the life care plan expert converts daily, weekly, or monthly cost items to annual amounts (as above), it is usually less helpful for the life care plan expert to "convert" the unit cost of items required every few years (say, every 5 years) into an equivalent "annual" amount.

Statistics Canada Time Use Data

In litigation pertaining to personal injury or wrongful death, the annual cost of lost valuable services is ideally determined based on the actual time that the injured or deceased individual expended on household tasks during a specified period (per month or per week, for example). Population averages, however, can be used if it is difficult or impractical to estimate the time previously spent on certain tasks.

In the absence of an expert opinion or other plaintiff-specific information, actuaries have generally used survey data from one of two sources in recent years:

1. *Where does time go?* – This 1991 document, based on 1986 data, was published by the Housing, Family and Social Statistics Division of Statistics Canada as part of its General

Social Survey Analysis Series. Although the study was released almost 30 years ago, the analysis remained useful because it includes a breakdown of the average time spent by individuals on Domestic Work, Primary Child Care, and Support and Services based on demographic characteristics such as:

- Male or female
- Employed, not employed, or retired
- Lives with or without a partner, with parents, alone, or with non-family individuals
- Lives with children over the age of 5 years, under the age of 5 years, or without children

One shortcoming of the 1991 publication is that there is no breakdown by age. A second shortcoming is that the underlying data, as mentioned above, is more than 30 years old!

2. *2010 Overview of the Time Use of Canadians* – Although more recent, the data in this Statistics Canada publication is based on all females and males (combined) in given age groupings including those who are employed, unemployed, and retired, regardless of home and family circumstances. For that reason, the 2010 data is not necessarily a helpful benchmark for estimating the lost valuable services of a specific individual.

Raw data from the more recent 2015 General Social Survey – available from Statistics Canada as a Public Use Microdata File – includes a considerable amount of granularity when compared to the 2010 publication. Using the 2015 data, we at McKeating Actuarial Services generated time use tables broken down by the demographic and other characteristics set out in the 1991 publication, as well as by age group. The resulting tables, along with an explanation of the methodology used, can be found in a paper entitled *Where did time go in 2015?*, which is publicly available (http://mckeating-actuarial.com/mck-act---2015-statistics-canada-time-use-paper---May-2019.pdf).

Although I prefer to rely on the expert opinion of a life care planner or occupational therapist, or the evidence of a surviving spouse, I use the 2015 time use tables at the link above when the use of population averages is required or otherwise deemed to be appropriate.

How is the Value of the Loss Calculated?

As explained above, the actuarial present value method is used.

For **future care costs**, the only negative contingency is mortality. The goods and services that are required as a result of the injury are assumed to continue for the duration that is specified by the life care planner – unless the injured party dies first.

For **lost valuable services**, two negative contingencies are usually applied. It is assumed that replacement of lost services is required as long as the injured party is alive and would not have become disabled from other causes – if not for the incident that caused the injury. If there has been a fatality, then it is assumed that replacement is required as long as the deceased individual was expected to be alive and not disabled, and as long as the surviving dependent is expected to be alive.

The **interest discount assumption** has a significant impact on the lump-sum value of a future loss.

First, some useful terminology:

- "Nominal" rates refer to the rates of return on investments (sometimes called "estimated investment rates" in legislation)

- "Real" rates refer to the difference between the investment rate of interest and the rate of increase in earnings and/or price inflation. A real rate of interest measures the extent to which the nominal rate of interest exceeds inflation.

For example, if the nominal rate is assumed to be 4.55% per annum and the inflation rate is assumed to be 2% per annum, then one is implicitly assuming a real (after inflation) rate of return of 2.5% per annum (because 1.0455/1.02 = 1.025).

Conversely, if one assumes a real (after inflation) rate of return of 2.5% per annum and inflation of 2% per annum, then one is implicitly assuming a nominal rate of approximately 4.55% per annum (because 1.025 x 1.02 = 1.0455).

Only two of the Atlantic Canada provinces have prescribed discount rate assumptions:

- **Section 70.06(1) of the Nova Scotia Civil Procedure Rules** prescribes an interest discount assumption of **2.5%** for amounts which may be expected to escalate in the future in line with general economic inflation.

- **Section 53.09(1) of the Prince Edward Island Rules of Civil Procedure** prescribes an interest discount assumption of **2.5%** for amounts which may be expected to escalate in the future in line with general price inflation.

In contrast, the **Rules of Court of Newfoundland & Labrador** do not prescribe an interest discount assumption.

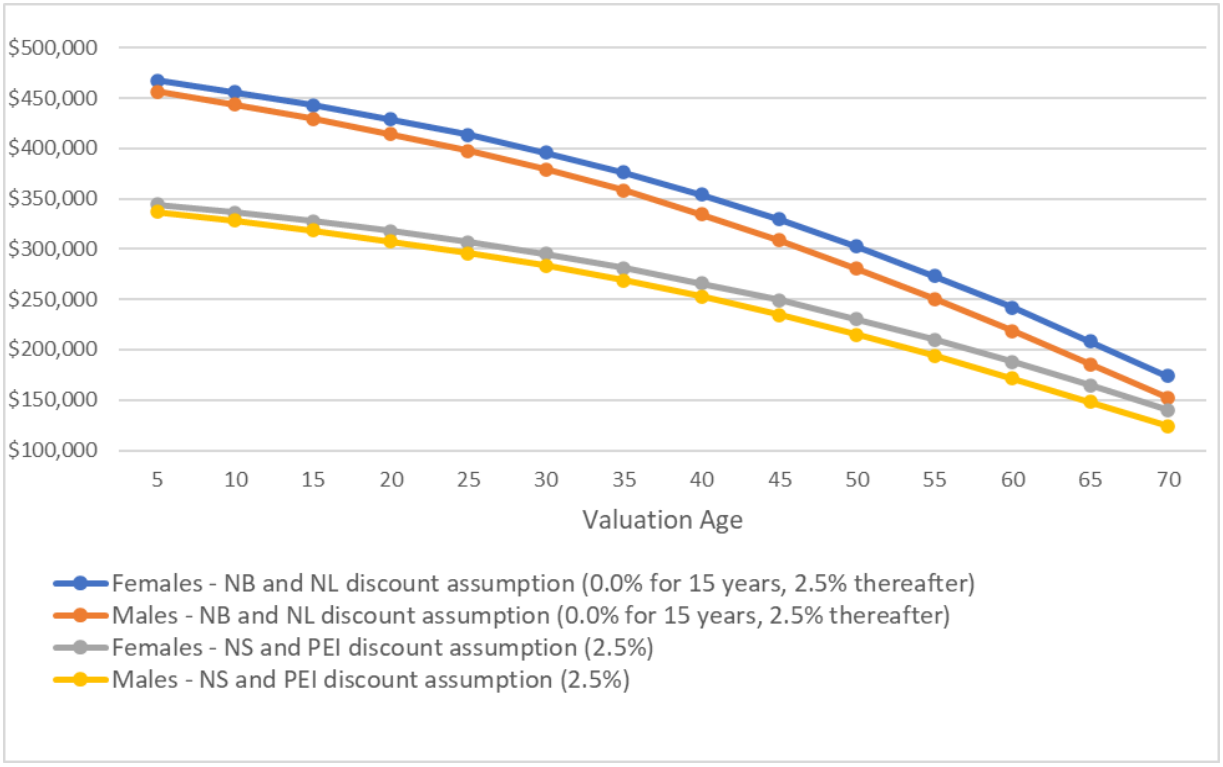
In New Brunswick, the previous prescribed net discount rate of 2.5% has become the default rate rather than the required rate. Since October 1, 2014, **Rule 54.10(2) of the New Brunswick**

Rules of Court has permitted parties to lead evidence to establish a different interest discount rate.

My practice, and that of some other economic loss experts, has been to use Ontario's prescribed discount rates in Newfoundland & Labrador and in New Brunswick. The reason for this is that the net discount rate assumption prescribed in Ontario has a "stepped" structure that adjusts annually. For the first fifteen years after a valuation date, the "select" discount rate is determined as the average of recent real return bond yields, minus an adjustment of 0.5% but subject to a minimum discount rate of 0%. This "select" discount rate changes on an annual basis. For the period after fifteen years, the prescribed "ultimate" discount rate is 2.5%. The "ultimate" rate is fixed and does not change. Thus, the prescribed Ontario discount rate assumption takes account of the current (low-interest) environment but also anticipates an eventual return to historic norms. Based on this, the net interest discount rate assumption that I use in Newfoundland & Labrador and New Brunswick for 2020 valuation dates, based on evidence, is 0.0% for the first fifteen years and 2.5% thereafter.

In its 2018 decision in *Chiasson v. Thériault*, the New Brunswick Court of Queen's Bench accepted the net discount rates prescribed by the Ontario Rules. In *Chiasson v. Thériault*, the discount rates used were those prescribed for trials commencing in the year 2017.

Lump-sum Present Value of $10,000 Per Annum for Life, Indexed Beginning at Various Valuation Ages (Standard Mortality, No Disability Decrement)



The current COVID-19 pandemic situation has caused interest rates to drop from levels that were already very low. However, it is important to remember that:

- The prescribed discount rates in PEI and Nova Scotia differ materially from the discount rates that actuaries and other economic loss experts would use in the absence of those prescribed rates. In today's economic environment, it may be argued that a net discount rate lower than 2.5% per annum would be more reasonable – at least for the near-term time horizon. This was true prior to the pandemic, and had been true for ten or more years. During the pandemic, it remains true.

- In my experience, nearly all of the actuaries and other economic loss experts who practice in Newfoundland & Labrador and New Brunswick use a stepped interest discount assumption of some sort (one discount rate for the first n years, and a different discount rate after n years). These evidence-based discount rate assumptions typically assume a low real rate of return initially, and then an eventual return to historical norms. During the pandemic, this pattern remains appropriate in my opinion.

What about Past Care Costs and Past Lost Valuable Services?

Past care costs are usually dealt with outside of the actuarial report, based on actual expenditures.

When no costs have been incurred, the accumulated value of past lost valuable services can be estimated by the actuary, in a manner similar to past lost earnings.

Some background reading on this subject, with a focus on New Brunswick:

Fobel v. Dean, Saskatchewan Court of Appeal (1991)

- The concept of lost housekeeping capacity was somewhat novel back in 1991. This decision provides an interesting historical review of approaches used prior to that date.
- The plaintiff was a middle-aged woman who was involved in two motor vehicle accidents about 18 months apart. She was the co-proprietor, with her husband, of a bakery.
- Future lost valuable services were determined to be a pecuniary loss.
- There was a general damages award for the past lost valuable services, the calculation of which was loosely based on the replacement cost of the lost services and on the fact that the plaintiff was able to continue to perform some household tasks – albeit at a reduced capacity. Although an award was made, the court determined that the past loss was not a pecuniary loss because no replacement worker had been hired.
- The decision includes, in the dissenting opinion, a discussion of the inconsistent treatment of the past and future lost valuable services.

Davis v. LeBlanc/Davis v. City of Saint John, New Brunswick Court of Queen's Bench (2005)

- Ms. Davis was involved in a motor vehicle accident and a slip & fall incident about six months apart, in 2002. The actions were tried together.
- The court awarded damages in respect of past lost valuable service based on the replacement costs of tasks Ms. Davis could not perform during the period prior to the trial – even though no costs were incurred.

Debly v. Cook, New Brunswick Court of Queen's Bench (2006)

- Mr. Debly was a middle-aged engineer.
- An advance payment for past lost valuable services was authorized, based on replacement costs, even though no actual costs had been incurred.

McLaughlin v. Levesque, New Brunswick New Brunswick Court of Queen's Bench (2008)

- The pecuniary damage award for past lost valuable services was based on the same annual amount is the award for future lost valuable services, even though no past costs had been incurred.

Final Word

If you've read this far, give yourself a well-deserved pat on the back!

Thank you very much for your interest. Please don't hesitate to contact me if you have any questions about the contents of this paper.

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