ARTICLES

HOW THE **WAGE DEFICIT APPROACH (WDA)** CAN BE USED TO ASSESS ECONOMIC LOSS DAMAGES BASED ON GUIDANCE FROM BRITISH COLUMBIA CASE LAW

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I. INTRODUCTION

In many personal injury cases, a quantum expert will be hired to quantify the impact of permanent and substantial[1] disability on an individual's earning capacity. The most common approach to this task is to establish the plaintiff's "*without*-incident"[2] and "*with*-incident"[3] income profiles. These two profiles are then compared and if the former exceeds the latter, there may be an ongoing loss of income attributable, in part or entirely, to the incident in question. This standard method is known as the "career A" versus "career B" comparison.

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1 I purposely use the word "substantial" in this context rather than "partial" because a claimant could have a partial disability but not necessarily have an impact on their salary, whereas a "substantial" disability typically coexists with some effect on earning capacity.

2 Shorthand for "what would have happened in the absence of the incident". I use the word "incident" rather than "accident" because earnings are interrupted not just by motor vehicle accidents but as a result of medical negligence, slip and fall, death, sexual or physical assault, or wrongful imprisonment or wrongful confinement.

3 Shorthand for "what will happen now that the incident has occurred".

In this paper, we propose an alternative method for assessing potential income losses in situations where the standard "career A" versus "career B" comparison cannot be undertaken for various reasons, many of them typically dependent on the fact situation surrounding the plaintiff. The standard approach has been typically referred to in British Columbia jurisprudence as the loss of earnings/loss of earning capacity[4] or "real possibility" approach[5] *in contrast to* the "loss of opportunity" or "loss of capital asset" approach reflected in *Pallos v Insurance Corp. of British Columbia*[6] and subsequent case law following the decision in *Pallos.*

Below are examples in which the standard "career A" versus "career B" comparison *cannot* be used to quantify the claimant's potential income loss, and an alternate approach is required:

- In cases involving children or young adults whose impairment on career or future working capacity is not yet fully known or manifesting itself (because there is no career or working capacity established yet)
- In cases where the plaintiff resumed working in the same job (or type of job), is earning a similar salary to the one paid before the incident, but is fulfilling their job duties by virtue of an accommodating workplace or employer and/or is expected to experience future deficits (the *Pallos*[7] fact situation)
- In cases where the plaintiff resumed working in the same profession but is not able to work as productively, work as many clinic hours, or "bill" the same hours or fees
- In cases where the plaintiff can resume working full-time, but is unable to sign up for night or weekend shifts

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4 See, for instance, *Steenblok v Funk,* [1990] 46 BCLR (2d) 133 [CA], 5 WWR 365 and *Perren v Lalari* 2010 BCCA 140 [*Perren*].

5 See *Rosvold v Dunlop,* 2001 BCCA 1 at para 11 [*Rosvold*]; reiterated in *Falati v Smith,* 2010 BCSC 465 at para 38 [*Falati*].

6 [1995] 3 WWR 728, 100 BCLR (2d) 260 (CA) [*Pallos*].

7 *Ibid*.

(accompanied by "shift differential" extra pay) or overtime work

- In cases where the plaintiff might have kept working, but an economic 'boom' in the plaintiff's industry (whether it be oil & gas, construction, technology, etc.) obscures the plaintiff's reduced earning capacity since the incident
- In cases where the plaintiff has become less "marketable" or less "competitive" in the job market (like in situations where an incident has resulted in facial or bodily disfigurement[8])
- For small business owners whose hours or productivity (or both) have impacted their business
- In cases where the plaintiff will experience a shortened working life expectancy because of the incident, causing them to retire earlier than they would have done[9]

Veit, J also observed in *Dabrowski v Robertson*[10] that there are instances—especially when the pre-trial period[11] is longer than

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8 For further discussion on how to evaluate potential income losses and a loss of marriage benefit from disfigurement, see Cara L Brown, *Damages: Estimating Pecuniary Loss* (Canada Law Book, a Thomson Reuters business), 2023 (34th ed), ss 5:5 ("Impact of Disfigurement") and 5:4 ("Loss Opportunity of Family Income (Loss of Marriage Benefit)") [Brown, *Damages*].

9 Beames J declined to undertake a calculation of an explicit "early retirement" approach due to lack of supporting evidence from a vocational expert as to the number of years potentially lost by the plaintiff, *and* the court observed that no evidence was given at trial as to the plaintiff's residual earning capacity *following* early retirement (as opposed to nil earnings during the "lost" working years). The wage deficit approach could be used instead to capture both the possibility that the plaintiff might lose some working years due to disability and/or earn a lower income if the plaintiff had to change jobs. See *Mossop v Hogg,* 2019 BCSC 1552.

10 2007 ABQB 522, aff'd 2009 ABCA 105, rev'd on other grounds (the author testified for the plaintiff in this case).

11 Defined by quantum experts as the time between the date of incident and the date of settlement/mediation/trial. The latter date is used as the quantum expert's "date of valuation" since it divides the past loss of income from the future loss of income (if applicable), which are computed differently and may

five years—where the plaintiff may be earning a *higher* income at the date of settlement or trial than they earned in the year of the incident, but it is attributable to wage inflation and productivity in those five years,[12] not necessarily a recovery of earning capacity. In these cases, it does not necessarily follow that the plaintiff has not or will not suffer a loss of income. This can be especially true if the plaintiff's wage decline is obscured by an uptake in economic activity in the industry sector where the plaintiff was or is employed. This specific issue was addressed in *Podiluk v Bunz*[13] where the judge permitted an income loss award despite the fact that the plaintiff's income at the date of trial *exceeded* their income in the year the incident occurred.

The situations above have two things in common:

a) the impact on the *with*-incident career is obscured either by circumstance or changes in economic activity related to the plaintiff's occupation or industry; and/or
b) the impact on the *with*-incident career may not be observable or easily quantified at time of trial or settlement, but medical and/or vocational professionals have concluded the claimant has suffered a permanent disability, the effects of which will fully emerge over time.

The alternative method described in this paper is called the *wage deficit approach (WDA).* Instead of comparing the *without*-

be governed by different loss methodologies according to legislation. For a summary of the legislative differences in loss methodologies by jurisdiction in Canada, see Brown, *Damages*, *supra* note 8, Table 14-1, pp 14-2, 14-3.

12 The plaintiff's income in 2022 versus, say, 2015 (or earlier) may have increased simply because of wage inflation and productivity, as measured by Statistics Canada's *Survey of Employment, Payroll and Hours* (SEPH). For instance, the SEPH data shows that from 2015 to 2022, wages in British Columbia increased by approximately 28% across all industries as measured by the BC industrial aggregate wage index. These increases—which accrue to all workers—will occur regardless of the plaintiff's (in)capacity for work, which can obscure the impact on the plaintiff's income from the incident.

13 2002 SKQB 55.

and *with*-incident income profiles (the "career A" versus "career B" comparison), the wage deficit methodology requires the expert to determine the claimant's *without*-incident income, at which point a negative percentage is applied to reflect the plaintiff's severity or type of disability.[14] This negative percentage is derived based on the experiences of actual disabled Canadians. The court in *Pallos* affirmed that this approach could be used by economic experts:

> The cases to which we were referred suggest various means of assigning a dollar value to the loss of capacity to earn income. . . . Another [method] is to *award the present value of some nominal percentage loss per annum applied against the plaintiff's expected annual income*.[15]

The research presented in this paper aims to provide reliable statistical evidence for "some nominal percentage" which reflects the labour market experiences of disabled Canadians. This is how quantum experts can assist the parties to the litigation and the trier of fact when there is not sufficient information to perform a "career A" versus "career B" comparison or provides further context in conjunction with another scenario.

The *wage deficit approach (WDA)* relies on Statistics Canada's disability survey data, which tells us what has happened to Canadians in the labour market when they have a permanent or partial disability.[16] Regression analysis, a form of economic measurement, permits us to tailor the wage deficits to the plaintiff

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14 See section III(a) below for a list of the steps which are undertaken to estimate the claimant's *without*-incident earning capacity.

15 *Supra* note 6 at para 43 [emphasis added].

16 We exclude disabled Canadians from Statistics Canada's disability surveys whose impairment prevented them from working at all. In other words, if a disability prevents a worker from seeking work, they are *not* counted in our analysis. In this way, the wage deficits published in this paper exclude the impact of disability on the initial choice or ability to work ("participate"). For information about the impact of disability on unemployment rates and participation rates by gender, see Cara L Brown, "2017 *Canadian Survey on Disability:* Unemployment rates & Participation rates (Part 1)" (2021) 18:3 Brown's Economic Damages Newsletter 1.

in terms of *severity* of disability (mild, moderate, severe, or very severe) or by *type* of disability.[17]

First, however, we review the guidelines set out by British Columbia's appeal court and various trial courts as to how the claimant's potential loss of earning capacity should be assessed using the "loss of capital asset" or "loss of opportunity" approaches.

II. GUIDANCE FOR QUANTUM EXPERTS FROM BRITISH COLUMBIA CASE LAW

A. THE TESTS ESTABLISHED IN *BROWN V* GOLAIY FOR THE "CAPITAL ASSET" APPROACH

The British Columbia decision of *Brown v Golaiy*[18] provides precedent for the notion that even though an injured plaintiff may return to work after an accident and earns the same amount of or more money than in the pre-accident period, the plaintiff can still be compensated for their loss of earning capacity, if it can be shown that they have suffered or will suffer some sort of permanent impairment because of the incident. Justice Finch set out the following guidelines in *Brown* to assess the plaintiff's potential loss of earning capacity:

i) Has the plaintiff been rendered less capable overall from earning income from all types of employment?
ii) Is the plaintiff less marketable or attractive as an

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17 The types of disability are listed in Table 4, *below*, from Statistics Canada's disability surveys. As of the 2012 and 2017 *Canadian Surveys on Disability,* the categories recognized under type of disability included pain, mobility (to move around, walk or use stairs), hearing, seeing, flexibility (difficulties bending down or reaching), dexterity (difficulties using fingers to grasp small objects), and the impact from mental/psychological, memory, learning or developmental deficits. See Statistics Canada, *Canadian Survey on Disability, 2017: Concepts and Methods Guide*, by Elisabeth Cloutier, Chantal Grondin & Amélie Lévesque, Catalogue No 89-654-X2018001 (Ottawa: Statistics Canada, 28 November 2018) at 58–64.

18 (1985), 26 BCLR (3d) 353, [1985] BCJ No 31 (SC) [*Brown*].

employee to potential employers?

iii) Has the plaintiff lost the ability to take advantage of all job opportunities that might otherwise have been open to them, had they not been injured?

iv) Is the plaintiff less valuable to themself as a person capable of earning income in a competitive labour market?

What is interesting about the four components above is that they are qualitative in nature and do not easily translate to economic loss calculations. In fact, all four components typically fall within the purview of a vocational expert and/or occupational therapist, who both produce *qualitative* reports describing the impact of the incident. The difficulties in translating the four components above into *quantitative* losses include:

i) "Less capable"—while a permanent partial disability can be described in percentage terms by medical experts, these percentages *cannot* be applied to a claimant's earning capacity which depend exclusively on hours of work, capacity to perform the specific job requirements, and rate of pay. Additionally, the quantum expert is unable to compare the claimant's income from "all types of employment" because there are more than 35,000 job titles[19] included in this category.

ii) Assessing the description of "less marketable or attractive" is not performed in quantitative terms because these qualities are intangible and resistant to measurement. Also, the value to potential employers can only be assessed by potential employers, and no quantum expert is able to consult with these potential employers to determine value other than observe the wage paid by such employers. But

[19] As per Statistics Canada's "National Occupational Classification (NOC) 2016 Version 1.0" (last modified 26 June 2018), online: *Statistics Canada* <statcan.gc.ca/en/subjects/standard/noc/2016/index>. Each of the 35,000 job titles include additional occupations, such as NOC 2114 (Meteorologists and climatologists), which includes 12 job titles; or NOC 9537 (Other products assemblers, finishers, and inspectors), which contain 548 job titles.

the description of component (ii) is similar to component (i): presumably it means *all* possible employers, which are unlikely to have been identified (even by a vocational expert), so the quantum expert cannot possibly hope to achieve an assessment of 35,000 career paths, a task which is obviously time and cost prohibitive.

iii) Assessing whether the plaintiff has lost the ability to "take advantage of job opportunities otherwise available to him/her" is under the purview of vocational experts. Economists must take guidance from a vocational expert for the answer to this question.

iv) The quantum expert has no expertise to assess the plaintiff's *own value* of their earning capacity. Rather, the quantum expert must depend on the *value assigned in the labour market,* which is demonstrated through evaluation of salary sources which publish wages paid in the labour market.

What this means is that even if the quantum expert has the benefit of vocational or occupational therapists' expert opinions about the impacts identified according to *Brown* for the specific plaintiff, the quantum expert must still find a way to translate these impacts into quantifiable terms to help counsel assess the potential economic loss.

The four considerations above formed the basis of the $20,000 award granted in 1985 in *Brown.*[20] Justice Finch explained that:

> [Mr Brown] is effectively precluded from pursuing some lines of work which he has engaged in previously, namely, logging and trucking. The onset of pain in the knee will further restrict the sort of work he can do, and hence his employability, or attractiveness to employers. . . . It is not certain such surgery will occur, nor is it certain when it may occur, nor is it certain how much time loss from work the plaintiff may suffer as a result. Even so, the risk of surgery is a real one[21]

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20 *Supra* note 18 at para 11.

21 *Ibid* at para 9.

After contemplating the above-noted effects, Finch J concluded that the plaintiff's "worth as a capital asset capable of producing income has been diminished or impaired"[22] and awarded Mr. Brown $20,000 for economic losses.[23] (The concept of impairment to a capital asset as the basis for an income loss award had previously been established in *Andrews v Grand & Toy (Alta) Ltd*[24].) The criteria in *Brown* were subsequently applied and became known as the "capital asset approach".

In 2010 in the decision of *Falati v Smith,* the trial judge reiterated:

> Those general principles involved in the process of assessment include the following:
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> - The task of the court is to assess damages, rather than to calculate them mathematically—*Mulholland (Guardian ad litem of) v Riley Estate* (1995), 12 B.C.L.R. (3d) 248 (B.C.C.A.) at para. 43;
> - The standard of proof is not the balance of probabilities; the plaintiff need only establish a real and substantial possibility of loss, one which is not mere speculation, and hypothetical events are to be weighed according to their relative likelihood—*Athey v Leonati,* [1996] 3 S.C.R. 458, 140 D.L.R. (4th) 235 (S.C.C.), at para. 27;
> - Allowances must be made for the contingencies that the assumptions upon which an award is based may prove to be wrong—*Milina v Bartsch* (1985), 49 B.C.L.R. (2d) 33 (B.C.S.C.), at 79, aff'd (1987), 49 B.C.L.R. (2d) 99 (B.C.C.A.);
> - Any assessment is to be evaluated in view of its overall fairness and reasonableness—*Rosvold,* at para. 11.[25]

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22 See *ibid*.

23 See *ibid* at para 11. Using British Columbia's all-items *Consumer Price Index* (CPI) from January 1985 to April 2022, we project that the $20,000 award in *Brown* translates into $44,000 in 2022 dollars.

24 [1978] 2 SCR 229 at 251, 1 WWR 577.

25 *Falati*, *supra* note 5 at para 41.

Importantly, the first principle above does not imply that mathematical calculations should be excluded from establishing a loss of earning capacity or loss of capital asset award. Rather, the British Columbia courts have been clear that while economic evidence concerning wage losses can be helpful,[26] it is not the end of the evaluation process, which likely involves both qualitative and quantitative aspects.[27] Rather, a quantum expert's evidence could be used as a starting point for the courts. As the British Columbia appeal court observed in *Falati:* "The [trier of fact's] assessment for loss of earning capacity is not a mathematical calculation. It is what it is called: an assessment."[28]

A further note on the third principle above is warranted. Economic experts routinely apply positive contingencies for non-wage benefits[29] and negative contingencies for working life expectancy, such as unemployment, non-participation, or part-time work (if the plaintiff's demonstrated history suggests this is appropriate), disability, and mortality. While the economist will rely on empirical patterns and data from the labor market, they must also tailor the contingencies to the claimant's characteristics and demonstrated employment history (if such exists).

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26 For example, in concluding that the plaintiff had not offered persuasive evidence that her earning capacity would be detrimentally affected by possible impairments, Arnold-Bailey J "note[d] the absence of the usual kind of expert opinion evidence relied upon to prove this type of loss": *Repole v Bakker*, 2007 BCSC 592 at para 211.

27 See, for instance, *Hay v Hofman*, 1999 BCCA 26 and *Brown v Ryan*, 2002 BCCA 83.

28 *Falati v Smith*, 2011 BCCA 45 at para 13.

29 This type of benefit refers to the employer contributions to group insurance and health benefits, plus contributions to a savings or pension plan on behalf of the employee. These contributions are not directly paid to the employee but rather on their behalf. Non-wage benefits can also refer to other perquisites, such as paid parking, a health spending account (HSA), stock options, or other on-site advantages (such as health club or daycare). For specific data quantifying the value of non-wage (fringe) benefits in civil litigation, see Brown, *Damages*, *supra* note 8, chapter 2 ("Augmenting the Base Salary for Fringe Benefits").

B. Application of the tests embodied in *Brown v Golaiy* and the subsequent award in *Pallos v Insurance Corp. of British Columbia*

Three cases that followed *Brown* and affirmed the "capital asset" approach were *Earnshaw v Despins,*[30] *Kwei v Boisclair,*[31] and *Palmer v Goodall.*[32]

After reviewing *Brown*, *Andrews*, *Earnshaw*, *Palmer*, and *Kwei*, Finch J.A. surmised in *Pallos* that:

> These cases all treat a person's capacity to earn income as a capital asset, whose value may be lost or impaired by injury. It is a different approach from that taken in *Steenblok v Funk* and similar cases, where the court is asked to determine the likelihood of some future event leading to loss of income. Those cases say, if there is a "real possibility" or a "substantial possibility" of such a future event, an award for future loss of earnings may be made. *There is nothing in the case law to suggest that the "capital asset" approach and the "real possibility" approach are in any way mutually exclusive.* They are simply ways of attempting to assess the same head of damages, future loss of income.[33]

As remarked above, the "real possibility" approach is often associated with a precise award from a quantum expert using the 'career A' versus 'career B' comparison. *Brown* and *Pallos* appear to stand for a more global assessment of the impact of an injury on a plaintiff's *without*-incident lifetime earning capacity, with or without expert economic opinion. The purpose of relying on the disability data from Statistics Canada is to offer the trier of fact assistance in assessing such an impact by drawing on the actual experiences of disabled Canadians when they enter the labour market.

While the $40,000 income loss award in *Pallos* was based on one year's income (using the plaintiff's income level before the incident), *McCarron v Podgorny*[34] clarified that although the one-

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30 (1990), BCLR (2d) 380, [1990] BCJ No 944 (CA) [*Earnshaw*].

31 (1991), 60 BCLR (2d) 393, [1991] BCJ No 3344 (CA) [*Kwei*].

32 (1991), 53 BCLR (2d) 44, [1991] BCJ No 16 (CA) [*Palmer*].

33 *Supra* note 6 at para 27 [emphasis added, citation omitted].

34 1999 BCCA 287.

year income benchmark can be used as a guideline for determining awards, it is not a rule per se. Indeed, the British Columbia Court of Appeal set aside the award in *Anderson v Miner,*[35] which had been based on one year's average income according to the plaintiff's expected education level, because it was "inordinately low, and out of all proportion to the extent of the plaintiff's probable economic losses."[36]

In *Rosvold v Dunlop,* the British Columbia Court of Appeal set aside the trial judge's award for loss of earning capacity of $125,500 and adjusted it upward to $300,000.[37] Interestingly, the Court of Appeal observed that the trial judge had taken an "excessively mathematical approach" but in Mr. Rosvold's case, the court determined that the capital asset he had lost was the ability to perform physically demanding work.[38]

In *Tom v Truong,*[39] the British Columbia Court of Appeal did not set aside the trial judge's loss of earning capacity award of $435,000, even after considering aspects of Ms. Tom's career that, it was concluded, the trial judge had not considered in the reasons for judgment. These aspects comprised

> (i) whether Ms. Tom will be able to work a four- or five-day work week; (ii) whether Ms. Tom would have been promoted to a management position but for the accident; and, (iii) whether Ms. Tom will be able to work to the normal retirement age of 65.[40]

The Court of Appeal also recognized that Ms. Tom would have received pension benefits in the order of 6%.[41]

Interestingly, the trial judge in *Steward v Berezan* awarded Mr. Steward a past loss of income equal to $70,000 plus $50,000 for "diminished future earning capacity" with the reasoning that it "is

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35 1999 BCCA 1 [*Anderson*].

36 *Ibid* at 22. The court of appeal's decision in *Anderson* changed the trial judge's award for income loss from $26,000 to $150,000.

37 2001 BCCA 1 at para 18 [*Rosvold*].

38 *Ibid* at para 12.

39 2003 BCCA 387, aff'g 2002 BCSC 643.

40 *Ibid* at para 8.

41 *Ibid* at paras 22–28.

impossible to say at this juncture that the residual injuries to his back, neck and arm will not harm his income earning capacity over the rest of his working life".[42] The Appeal Court explained that this conclusion was *not* supported by the estimation of the chance that the event (the harm) will occur (para 18). The plaintiff's total award was subsequently reduced by $50,000 (para 19).

Again, in *Kralik v Mount Seymour Resorts Ltd,* the BC Court of Appeal allowed the appeal in part by reducing the $300,000 loss of earning capacity award to $75,000, roughly based on "two times his pre-accident income and makes due allowance both for the difficulties he may encounter and the more positive contingencies that exist in this case".[43] The reasoning given for the reduction in this award was that "while it is true that Mr. Kralik's opportunities of earning income from heavy labour or other employment that involves lifting or reaching have been seriously diminished, the chances are good that he will turn to other employment and will do so successfully".[44] The *Kralik* case can be distinguished for another reason: the Court of Appeal recognized that in this case, the plaintiff's acquisition of a Ph.D. in mathematics left him in a better position to realize his earning capacity than the uneducated plaintiffs in *Heyes v Lanphier,*[45] *Rosvold,*[46] and *Niitamo v Insurance Corp of British Columbia.*[47]

In *Perren* the British Columbia Court of Appeal stated that:

> A plaintiff must *always* prove, as was noted by Donald J.A. in *Steward*, by Bauman J. in *Chang*, and by Tysoe J.A. in *Romanchych*, that there is a real and substantial possibility of a future event leading to an income loss. If the plaintiff discharges that burden of proof, then depending upon the facts of the case, the plaintiff may prove the quantification of that loss of earning capacity, either on an earnings approach, as in *Steenblok,* or a capital asset approach, as in *Brown.* The former approach will be more useful when the

42 2007 BCCA 150 at paras 3, 15.

43 2008 BCCA 97 at para 27 [*Kralik*].

44 *Ibid* at para 27.

45 2003 BCSC 1126.

46 *Rosvold*, *supra* note 5.

47 2003 BCSC 608.

> loss is more easily measurable, as it was in *Steenblok.* **The latter approach will be more useful when the loss is not as easily measurable,** as in *Pallos* and *Romanchych*.[48]

The BC Court of Appeal then set aside the trial judge's award of $10,000 for loss of future earning capacity based on its finding that "there was no evidence that she was limited in performing any realistic alternative occupation".[49]

Sobolik v Waters[50] is worth noting because the Appeal Court found that the trial judge did not properly instruct the jury that they *had to find the plaintiff had suffered a permanent partial disability* from the incident in question to support the award for $240,400 for loss of future earning capacity. The British Columbia Court of Appeal ordered a new trial.

The value in the *wage deficit approach (WDA)* explained in this paper is that it can be useful in situations where the medical and/or vocational evidence forecasts that the claimant's impairments will affect their future earning capacity, but there is no readily available way to measure such impacts. The WDA fills in this void by supplying exact data on the impact of disability on employment and income experienced by disabled Canadians from Statistics Canada's disability surveys. This is vividly demonstrated in the next British Columbia case where the economic expert failed to properly analyze Statistics Canada's disability surveys and provide a more tailored assessment to the plaintiff.

C. How to Avoid the Outcome in *McColm v Street*

In *McColm v Street,*[51] the plaintiff was injured in a motor vehicle accident in June 2014 that resulted in soft tissue injuries to his neck, back, and shoulder. At the time of the accident, the plaintiff was 23 years old and had been employed as a gas pipe fuser for a year and a half with the intention of ultimately pursuing a

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48 *Perren*, *supra* note 4 at para 32 [emphasis added].

49 *Ibid* at para 33.

50 2010 BCCA 523 [*Sobolik*].

51 2018 BCSC 984 at paras 1–3 [*McColm* 2018].

management-level position in the oil and gas industry.[52] The plaintiff was off work for approximately one year after the accident and returned to work in a number of retail sales positions leading up to the trial, never returning to his work as a gas pipe fuser.[53]

Justice Warren observed that:

> the most contentious issues are the ongoing impact of the injuries on [the plaintiff's] functional abilities and work capacity, and, most significantly, whether the injuries have rendered him no longer suited for work in a physically demanding job; whether, as a result of the injuries, there is a real and substantial possibility that he will suffer a future income loss; what his likely career path would have been had the accident not occurred; and what his career path will now likely be.[54]

The plaintiff relied on a number of experts to assist the court in this determination, including a vocational consultant and an economist. The plaintiff's vocational consultant opined that the plaintiff's injuries restricted him from strenuous, labouring work, however, he remained suited for lighter occupations and it was unlikely the plaintiff would be restricted to retail sales for the remainder of his working life.[55]

Defence counsel in *McColm* objected to the admissibility of certain portions of the plaintiff's economist's report, resulting in a "mid-trial ruling."[56] In calculating estimates of the plaintiff's potential loss of income/earning capacity, the plaintiff's expert presented information concerning the impact of limitations at work on future earnings that was extracted from the results of Statistics Canada's *Canadian Survey on Disability* (CSD)[57], and

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52 *Ibid* at paras 1, 2, 9.

53 *Ibid* at paras 20–23.

54 *Ibid* at para 57.

55 *Ibid* at paras 43–44.

56 *McColm v Street,* 2017 BCSC 1831 at para 1 [*McColm* 2017].

57 The plaintiff's expert's report did not specify which year of the CSD data was relied upon. Given the year of the judgment in *McColm* (2017), we assume it was the 2012 CSD, since the 2017 CSD dataset was not made available until 8 November 2019.

using "simple averages", alleged that a man of the plaintiff's age and education level would suffer a 55% reduction in lifetime earnings.[58] Justice Warren concluded that the portion of the plaintiff's expert's report that relied on a 55% reduction in lifetime earnings was inadmissible because this average was irrelevant (to the plaintiff);[59] however, Justice Warren noted that it "is not the admissibility of the CSD data itself that is in issue; *it is the admissibility of the expert evidence based on that data that is objectionable*."[60]

In determining the admissibility of portions of the plaintiff's expert's report, Justice Warren stated:

> In this case, [the plaintiff's expert] has calculated an average impact that is derived from data generated from a wide range of individuals whose limitations cover a broad spectrum. . . . it is plain from the appendix that [the plaintiff's expert's] average is based on the earnings and labour market experience of respondents *whose limitations cover almost the entire spectrum of disability* . . . .
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> [The plaintiff's expert] expressly acknowledges that his average calculation can only be taken as a rough approximation of the impact of limitations at work. However, he has not provided any view as to whether and to what extent extrapolations can be made from the average. For example, *he has not expressed any opinion as to whether it would be valid to apply the average of 55% to a plaintiff who is found to have moderate limitations or the extent to which it would be valid to discount the average to reflect a person with mild limitations.* In the absence of this kind of an explanation,

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58 *McColm* 2017, *supra* note 56 at para 13.

59 See *McColm* 2017, *supra* note 56 at paras 6, 12, 21. The plaintiff's expert's report contained three parts: Part 1 calculated the present value of the average earnings of British Columbia males by age and specific occupations; Part 2 presented information concerning the impact of limitations at work on future earnings using data extracted from the CSD; and Part 3 used the present values calculated in Part 1 and the average reduction presented in Part 2 to provide sample estimates of the present value of the plaintiff's future earnings losses under four different scenarios. Justice Warren determined that Part 1 and the portions of Part 3 that did not relate to the CSD reductions were admissible.

60 *Ibid* at para 13 [emphasis added].

> the average is simply not helpful. In other words, the average alone is probative of nothing.[61]

A similar outcome to *McColm* was found in *Latreille v Downey.*[62] Unfortunately, in this case, the judgment did not contain details as to how the plaintiff's expert used the 2012 CSD*;* for instance, no mention was made of what deduction the expert applied from this data to Mr. Latreille or of how he arrived at such a deduction.[63] In fact, it would appear that the plaintiff's expert backed off from using this set of data during cross-examination to the extent that none of the survey's properties or advantages were explained during trial (or were not included in the judgment). And, just as in the *McColm* decision, no attempt appears to have been made to forge a link between Mr. Latreille and the survey's respondents, a finding that figured into the court's rejection of this plaintiff's expert's analysis and presentation of the disability data.[64] BC courts have long ago expressed concern about matching the disability data to the plaintiff when results from the 1986 *Health and Activity Limitation Survey* (HALS) survey (a predecessor to the 1991 HALS, *Participation and Activity Limitation Surveys* (PALS), and CSD) were initially presented in the early 1990s.[65]

Since the *White Burgess Langille Inman v Abbott and Haliburton Co*[66] case decided by the Supreme Court of Canada in 2015, challenges to expert evidence have become more common and

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61 *Ibid* at paras 14, 16 [emphasis added].

62 2020 BCSC 976 [*Latreille*].

63 *Ibid* at paras 275–76.

64 See also *Onley v Town of Whitby*, 2020 ONSC 20 (where a similar outcome occurred). In this case, the plaintiff's expert calculated a potential income loss using the CSD (presumably the 2012 one) by arguing that the claimant's income would be reduced by 13.8% based on a "mild" disability. Justice Koke did not accept this approach because he found that no medical evidence was presented to vouch for the plaintiff's actual disability or specific category of impairment.

65 See generally *Canada (Attorney General) v Greer CD-DAM 7137*, [1994] BCJ No. 3025, 1994 CarswellBC 2679; *D (Guardian ad litem of) v F* [1995] BCJ No. 2693, 1995 CarswellBC 2646.

66 2015 SCC 23 [*White Burgess*].

judges are more cognizant of their "gatekeeper" role. Scholar Jennifer Hunter has described the *White Burgess* case as one that "released a comprehensive decision on expert bias and how it relates to the admissibility and weight of expert evidence".[67] Chin et al examined cases following the *White Burgess* decision and concluded that "[t]he data suggest that *White Burgess* increased the frequency of challenges related to expert biases".[68] While the court in *McColm* did not evaluate the plaintiff's economic expert for the possibility of bias, defence counsel still challenged the admissibility of the plaintiff's economic expert. In this author's opinion, such challenges will likely become more common in the future. Chin has suggested the following as a way for experts to respond to these challenges: "Scrutiny focused on the transparency of the expert's data and analysis, and whether that analysis can reliably be applied to the relevant factual question, may provide a valuable way to evaluate expertise."[69]

Justice Warren's concerns in *McColm* (and Justice Punnett's comments in *Latreille*) were well-founded because the application of the wage deficits from Statistics Canada's 2001 and 2006 PALS and the 2012 and 2017 CSD rely on these criteria:

1) That a link can be established between the plaintiff's impairments and the disability survey data by having the plaintiff fill out Statistics Canada's disability questionnaire (as well as adducing relevant healthcare practitioner evidence);
2) Scoring the Statistics Canada disability questionnaire to ascertain the **severity** of the plaintiff's disability (mild, moderate, severe or very severe) and/or **type** of disability;

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67 See J L Hunter, *Expert Evidence: a review of recent case law* for Canadian Defense Lawyers' (CDL) June 6, 2019 seminar, p 9.

68 See Jason M Chin, Michael Lutsky & Itiel E Dror, "The Biases of Experts: An Empirical Analysis of Expert Witness Challenges" (2019) 42:4 Man LJ 21 at 22.

69 See Jason M Chin, "*Abbey* Road: The (Ongoing) Journey to Reliable Expert Evidence" (2018) 96:3 *The Can Bar Rev* 422 at 422.

3) Applying econometric analysis (using regression equations) of Statistics Canada's disability surveys (with samples of almost 50,000 men and women per disability survey) rather than using simple averages.

Justice Warren in *McColm* also acknowledged four cases that discussed the use of Statistics Canada's HALS.[70] In both *Crabbe v Bajan*[71] and *Messmer (Guardian ad litem of) v Daley*[72], the judges used the HALS data to award an amount for loss of income; both plaintiffs were minor children and the experts relied on income data by education level (rather than specific occupation).[73] Justice Josephson found that the economic expert's report was admissible in *Messmer* as the HALS survey was an integral part of the report and was sufficiently contemporary and relevant to the circumstances of this case.[74]

In *Tanyag (Guardian ad litem of) v Dhaliwal*,[75] Justice Holmes concluded that a given statistical discount to the plaintiff's prospective earnings was not applicable because the plaintiff was still able to attend university. She could still pursue and succeed in the same *without*-incident career path which could be equally remunerative, and even if diagnosed as per the 1986 or 1991 HALS data, the category would have been an "extremely mild" disability.[76] In *Trofimenkoff v Chen*,[77] the court did not accept the

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70 The 1986 and 1991 HALS surveys were the original ones developed by Statistics Canada in collaboration with Employment and Social Development Canada ("ESDC") (formerly Human Resources and Skills Development Canada). The HALS surveys were subsequently followed by the 2001 and 2006 PALS. In 2012 and 2017, Statistics Canada conducted the CSD. For a comparison of results from the 1991 HALS, 2001 PALS, 2006 PALS, 2012 CSD, and 2017 CSD, see Brown, *Damages*, *supra* note 8., ss 5:12–5:24.

71 [1990] BCJ No 2892, 1990 CarswellBC 1307.

72 [1991] BCJ No 3042, 1991 CarswellBC 255 [*Messmer*].

73 This is a standard procedure when the plaintiff is injured as an infant, minor child, or young adult.

74 *Supra* note 72 at 104.

75 1998 CarswellBC 682, 78 ACWS (3d) 717.

76 *Ibid* at paras 82–83, 111.

plaintiff expert's use of the 1986 HALS data because this expert attempted to derive an income loss claim by alleging that British Columbian males with physical and/or cognitive disabilities were 32.7% less likely to be employed than non-disabled British Columbia males.[78] Justice Newbury's refusal to use this statistic for an income loss claim was prescient given there is no foundation for assuming that an overall reduction in employment prospects leads to a one-to-one decline in income. What was needed in *Trofimenkoff* were the wage deficits derived from Statistics Canada's disability surveys using econometric analysis.

III. HOW STATISTICS CANADA'S DISABILITY SURVEYS ARE USED IN CONJUNCTION WITH THE "WAGE DEFICIT APPROACH" (WDA)

A. STANDARD METHODOLOGY FOR CALCULATING THE PLAINTIFF'S POTENTIAL INCOME LOSS (THE 'REAL POSSIBILITY' APPROACH)

Numerous steps are undertaken by quantum experts when assessing the plaintiff's *without*-incident income profile,[79] whether for the "career A" versus "career B" comparison (the loss of earning capacity or real possibility approach) *or* the WDA (used in cases establishing loss of opportunity or loss of a capital asset). These steps include:

1) Detailed analysis of the plaintiff's educational attainment,[80] employment history and income history

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77 [1995] BCJ No 1193, 1995 CarswellBC 2619 [*Trofimenkoff*].

78 *Ibid* at paras 35, 38.

79 Shorthand for "what would have happened in the absence of the incident". This term is consistent with the Supreme Court of Canada's comment that "[i]n assessing damages the court determines not only what will happen but also *what would have happened* by estimating the chance of the relevant event occurring, which chance is then to be directly reflected in the amount of damages": *Janiak v Ippolito*, [1985] 1 SCR. 146 at para 42, [1985] SCJ No 5.

80 In cases involving infants or minor children, it is important to discover the parents' and siblings' highest educational attainment, since we know that two-thirds of Canadians surpass their parents' education level. See Creese, G.

(referred to by economists as the individual's "human capital characteristics");[81]

2) Information about the plaintiff's career aspirations or ambitions vis-à-vis competing interests on the plaintiff's time (if applicable);[82]
3) An assessment of the plaintiff's pre-incident hours of work and labour force attachment;[83]
4) Statistical benchmarking from various salary sources to assess the career stage the plaintiff was at when the incident occurred (i.e., starting, mid-career, or peak earning stages);

L., N. Guppy, and M. Meissner. *Ups and downs on the ladder of success: social mobility in Canada* (Ottawa: Statistics Canada, 1991), Catalogue no. CS11-612/5E-PDF. In such cases economists typically rely on average earnings by educational attainment (rather than by occupation).

81 The definition of "human capital" is "a measure of the skills, education, capacity and attributes of labour which influence their productive capacity and earning potential." Characteristics that can be observed by economists usually include formal education, other schooling or certification or trade programs, *on-the-job experience, on-the-job training, and tenure* (emphasis added). According to the OECD, human capital is defined as: "the knowledge, skills, competencies and other attributes embodied in individuals or groups of individuals acquired during their life and used to produce goods, services or ideas in market circumstances". "Individual capital" consists of the "skills and abilities of individual workers": Tejvan Pettinge "*Human Capital definition and importance*" (22 September 2019), online (blog): *Economics Help* <economicshelp.org/blog/26076/economics/human-capital-definition-and-importance> [emphasis added].

82 Competing interests typically refer to choices made by women (as a group) to either substitute unpaid work caring for family members for paid work, or divide their time between paid and unpaid work.

83 Labour force attachment is defined as "the change in workers' labour market state, as established by their situation at predetermined moments of time, which range from unemployment (or inactivity) to employment through a permanent contract": Donnalee Bell, "Labour Market Attachment: Defining the Spectrum between the Employed and the Inactive" (July 2012) at 3, online (pdf): *Canadian Career Development Foundation* <ccdf.ca/wp-content/uploads/2019/02/Supplement-3-Labour-Market-Attachement.pdf> citing Miguel Ángel Malo & Fernando Muñoz-Bullón, "Temporary Help Agencies and the Labour Market Biography: A Sequence-oriented Approach" (2002) Spanish Ministry of Labour Working Paper No 2002/05.

5) Determination of "real" wage growth[84] for entry-level and mid-career claimants;
6) Analysis of financial data if the claimant was self-employed;[85]
7) Assessment of fringe (non-wage) benefits;
8) Assessment of working life expectancy contingencies, such as non-participation, unemployment, part-time work, disability, and mortality; and
9) Prediction of retirement age.

The quantum expert ultimately calculates the present value of the claimant's future losses so they can be expressed as discounted lump sums once the steps listed above are completed.

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[84] This component of wage growth refers to salary increases granted over-and-above cost-of-living inflation adjustments and productivity, and is specific to the plaintiff's characteristics (gender, age, employment status (full-time, part-time or self-employed), educational attainment, occupation, and geographical residence). A cost-of-living adjustment (COLA) is an increase in salaries corresponding to the increase in the rising cost of goods and services measured by the *Consumer Price Index* (CPI). COLA is calculated as a percentage of the increase in the CPI (60 to 75% of the CPI if partially indexed, or 100% indexation if matched to the CPI): see Nova Scotia Pension Services Corporation, "Cost-of-living adjustment" (1 March 2023), online: <nstpp.ca/members/your-retirement/cost-living-adjustment>; Statistics Canada, *Your Guide to the Consumer Prince Index*, Catalogue no. 62-557-XPB (Ottawa: Statistics Canada, December 1996) at 1 and 10. The main index that reflects both cost-of-living and productivity changes is Statistics Canada's *Survey of Employment, Payroll and Hours* (SEPH), which compiles average weekly wages by industry sector and province or territory, two of the main influences on wage levels. The main source of 'real wage growth' is either from Statistics Canada's Census surveys (the 2021 Census being the most recent); from wage increases granted from movements on 'steps' or 'levels' specified within a collective agreement; or from industry association surveys which publish salaries by level of responsibility (engineers), year of call to the bar (lawyers), or by years of experience (economists).

[85] This pertains to analysis of the plaintiff's corporate holdings and financial statements from all businesses (or sole proprietorships) because self-employed persons are able to retain income earned in the corporate entities which means their income tax returns do not capture the plaintiff's full earning capacity.

In British Columbia, economic experts must use the province's mandated real discount rate.[86]

The steps described above conform to the British Columbia's court of appeal's commentary in *Hay v Hofmann:*

> [A] trial judge, in deciding on an award of damages under the heading of anticipated future loss . . . ought to endeavour to make an informed estimate or assessment of anticipated loss as opposed to merely undertaking to do a computation . . . . [C]ontingencies *positive and negative* fall to be considered . . . . [A] purely mathematical approach will usually not be appropriate because such an analysis is too limited in scope. . . .
>
> [A] proper assessment must include consideration of the potential for improvement in health, the existing and likely future *opportunities for advancement,* and the usual chances and *hazards of life.*[87]

By following the nine steps enumerated above, the quantum expert can assist the court with relevant data about positive and negative contingencies; factor in opportunities for advancement (with the assessment of "real wage growth" to establish the age-earnings profile for the plaintiff); and and factor in some hazards in life (using the disability and mortality contingencies). Understandably, the quantum expert cannot assist the court in relation to qualitative evaluations, with one example from the quote above being "improvement in health", or any other factors that the court must consider.

Having to proceed through steps (1) to (9) to establish the *without*-incident income profile means that the WDA, by applying a negative percentage to the claimant's *without*-incident earning capacity, *captures* the unique identifiers related to their choice of

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86 Effective April 30, 2014, the discount rate under s 56(2)(a) is 1.5% and the rate under s 56(2)(b) is 2%: BC Reg 74/2014. (The previous rates of 2.5% and 3.5%, respectively, had been in place since August 25, 1981: BC Reg 352/81). This means that BC's mandated discount rate has been set at 1.5% per year to calculate the present value of loss of income or earning capacity (in an injury or fatality case); and 2.0% for all other heads of damage (cost of care, loss of housekeeping capacity, tax gross-up).

87 *Hay, supra* note 27 at paras 67, 69 [emphasis added].

educational attainment, occupation, stage of career, ambitions, and aspirations.

B. Statistics Canada's disability surveys

At the *National Conference on Disability and Work in Canada* (December 4–5, 2018),[88] an overview of the evolution of Canada's Disability Data Strategy was conducted, which commenced with Statistics Canada's 1986 and 1991 HALS. After that, the 2001 and 2006 PALS[89] were conducted. Following the 2006 PALS, Statistics Canada conducted the *Canadian Survey on Disability* (CSD) in 2012 and 2017.[90] Regression results from the 2001 and 2006 PALS surveys as well as the 2012 and 2017 CSD surveys are presented in this paper.

The HALS/PALS/CSD surveys are Statistics Canada's "flagship" surveys about the impact of disability in Canada. Much of the results from these surveys have been used and quoted widely within Canada and in other countries. This is because these surveys are massive (almost 50,000 persons per sample), randomly drawn, and are associated with higher-than-average response rates.[91] Table 1 summarizes the sample sizes and

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88 This conference was held under the auspices of the Government of Canada's Employment and Social Development Canada, division of Social Research, Employment and Social Development Canada.

89 For more information regarding analysis of the 2001 PALS dataset, see Cara L Brown & Emery JC Herbert, "The Impact of Disability on Earnings and Labour Force Participation in Canada: Evidence from the 2001 PALS and from Canadian Case Law" (2010) 16:2 J of Leg Economics 19. For results from the 2001/2006 PALS and 2012/2017 CSD datasets, as well as comparisons between the results from these disability surveys, see Brown, *Damages*, *supra* note 8, chapter 5.

90 See Statistics Canada, *Canadian Survey on Disability, 2012: Concepts and Methods Guide*, by Social and Aboriginal Statistics Division, Catalogue no 89-654-X—No 2014001 (Ottawa: Statistics Canada, February 2014) Statistics Canada) [*CSD 2012 CM Guide*].

91 See Statistics Canada, *A Profile of Disability in Canada, 2001,* by Housing, Family and Social Statistics Division, Catalogue no. 89-577-XIE (Ottawa: Statistics Canada, December 2002) at 6 [*Profile of Disability 2001*]; Statistics Canada, *Participation and Activity Limitation Survey 2006: Technical and Methodological Report*, by Social and Aboriginal Statistics Division, Catalogue

response rates for the 2001/2006 *Participation and Activity Limitation Surveys* (PALS) and the 2012/2017 *Canadian Surveys on Disability* (CSD).

Table 1: Total Sample Sizes and Response Rates—2001/2006 PALS & 2012/2017 CSD Surveys[92]

Statistics Canada's Survey	Total Sample Size	Overall Response Rate
2001 PALS	43,276	82.5%
2006 PALS	47,793	75.0%
2012 CSD	45,443	74.6%
2017 CSD	49,976	69.5%

These statistical properties translate into excellent sources of information about the labour market experiences of the disabled in Canada because:

i) Large survey universes improve precision and reliability of results.[93]

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no 89-628-XIE—No 001 (Ottawa: Statistics Canada, December 2007) at 12 [*PALS 2006*]; Statistics Canada, *Participation and Activity Limitation Survey 2006: Analytical Report,* by Social and Aboriginal Statistics Division, Catalogue no 89-628-XIE—No 002 (Ottawa: Statistics Canada, December 2007) at 8; and *CSD 2012 CM Guide*, *supra* note 90 at 22.

92 *CSD 2017 CM* Guide, *supra* note 17 at 6; and *CSD 2012 CM Guide*, *supra* note 90 at 18, 22; *PALS 2006*, *supra* note 91; *Profile of Disability*, *supra* note 91 at 6.

93 It is often impractical and cost-prohibitive to conduct studies based on an entire population. When analyzing a set of data, conducting a survey, running an experiment, or taking a poll, in actual practice, a sample of some population of interests is studied rather than the whole population. When planning a study, researchers first need to evaluate the sample of their studies. This involves selecting the sample and the sample size. It is important that a sample of a population is representative of the target population. For example, the CSD includes a sample of Canadians with self-reported disability and this sample is representative of the Canadian population with disabilities. The sample size refers to the number of participants or observations included in a study. The size of a sample influences two statistical properties: the precision of estimates and the power of the study to draw conclusions. This is because when a sample is

ii) Studies where the participants are identified by a random

representative of a population to which results will be generalized, the size of the sample dictates the amount of information we have about the whole population and as such, the larger the sample size, the less uncertainty surrounding our studies and the more precise our results are. For instance, with respect to the importance of sample size in many research fields, particularly medical research, Biau et al state that "[s]ignificant results issued from larger studies usually are given more credit than those from smaller studies because of the risk of reporting exaggerating treatment effects with studies with smaller samples . . . and small trials are believed to be more biased than others": David Jean Biau, Solen Kernéis & Raphaël Porcher. "Statistics in Brief: The Importance of Sample Size in the Planning and Interpretation of Medical Research" (2008) 466: 9, Clinical Orthopaedics & Related Research 2282 at 2286. They also state that "the size of the sample studied is a major determinant of the risk of reporting false-negative findings. Therefore, the sample size is important for planning and interpreting medical research .... The larger the tested sample size is, the better the precision": *ibid* at 2283, 2285. Biau et. al. further indicate that "the reasons to plan a trial with an adequate sample size likely to give enough power to detect a meaningful difference are essentially ethical. Small trials are considered unethical by most, but not all, researchers because they expose participants to the burdens and risks of human research with a limited chance to provide any useful answers. Underpowered trials also ineffectively consume resources (human, material) and add to the cost of healthcare to society": *ibid* at 2286 [citations omitted]. Similarly, Patino and Ferreira indicate that "[i]n clinical research, our goal is to make an inference regarding something about a population by studying a sample of that population. This sample has to be representative of the target population, and the number of participants must be appropriate. It should be large enough that the probability of finding differences between groups by mere chance is low and that of detecting true, clinically significant differences is high.": Cecilia Maria Patino & Juliana Carvalho Ferreira, "What is the importance of calculating sample size?" (2016) 42:2 Jornal Brasileiro de Pneumologia 162 at 162) (See also Institute for Work and Health, :Sample Size and Power" (2008), online (pdf): *Institute for Work and Health* <iwh.on.ca/sites/iwh/files/iwh/at-work/at_work_53.pdf>; Sarah Littler, "The Importance and Effect of Sample Size"(2 October 2015), online (blog): *Select Statistical Services* <select-statistics.co.uk/blog/importance-effect-sample-size/>; Peter Bacchetti, Leslie E Wolf, Mark R Segal, Charles E McCulloch, "Ethics and sample size" (2005) 161:2 American J Epidemiology 105; Kevin B Freedman, S Back, J Bernstein, "Sample size and statistical power of randomised, controlled trials in orthopaedics" (2001) 83:3 J Bone & Joint Surgery 397; Scott D Halpern, Jason H Karlawish, Jesse A Berlin, "The continuing unethical conduct of underpowered clinical trials" (2002) 288:3 JAMA 358..

sample, versus a sample where the participants are identified and chosen, reflect results that can represent the general population.[94] In contrast, when the survey is not drawn randomly, the results may not be representative of the population but rather only representative of the characteristics of the surveyed people. These studies can still provide valuable information, but it is prudent for the researcher to put the results in context of the non-random survey universe.

iii) Table 1 demonstrates that Statistics Canada's disability surveys boast unusually high response rates. Other voluntary salary surveys have response rates that are much lower, though they still provide valuable information.[95] However, variability in results is reduced when sample sizes are in the thousands, like Statistics Canada's disability surveys.

C. WHY REGRESSION ANALYSIS PRODUCES SUPERIOR ESTIMATES OF WAGE GAPS

WHAT *ARE* "SIMPLE AVERAGES"?

Simple averages involve taking an extremely broad "snapshot" from large amounts of data by totaling, averaging, or taking ratios of values. Simple averages only describe what the data show for large groups of people, but do not permit reliable extrapolation

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[94] See Statistics Canada, *Survey Methodology and Practices*, Catalogue no 12-587-X (Ottawa, Statistics Canada, 2003): Statistics Canada, *Sampling and Weighting Technical Report: Census of Population, 2016*, Catalogue no 98-306-X2016001 (Ottawa, Statistics Canada, 2018); and *CSD 2017 CM Guide*, *supra* note 17.

[95] See, for instance, Canadian Lawyer's 2018 annual compensation survey (155 responses) or the *Canadian Association of Business Economists'* (CABE) 2019 salary survey (366 responses). For a list of additional salary sources, see Brown, *Damages*, *supra* note 8, chapter 1 Appendix 1C ("Comparison of Sources—Trade and Professional Association Salary Surveys"), Appendix 1E ("Comparison of Sources—Private Sector Salary Surveys").

from a segment of the population who were surveyed to an individual claimant.[96]

The plaintiff's expert in *McColm* testified to a -55% decline in Mr. McColm's earning capacity by simply comparing the average income of a non-disabled worker to a disabled worker. Justice Warren appeared to be uncomfortable using the -55% deficit in part because there was no link to Mr. McColm and there was no tailoring of this percentage to the severity or type of Mr. McColm's disability.

But the other disadvantage of the plaintiff expert's -55% factor in *McColm* is that by using only simple averages, the size of this gap could well be reflecting other characteristics of both populations that cause wages to vary—not just disability status—so it will likely overstate the gap in earnings between disabled and non-disabled persons *for reasons other than disability.*[97] Put another way, the 55% average could be picking up a divergence in earnings related to someone's gender, education level, occupation, stage of career, or industry sector, or even disabled status (if applicable). Without performing regression analysis, the researcher is unable to inform the court that the 55% simple average reflects a plaintiff's gap in earning capacity *solely due to disability*.

To explain, we know from studying the attributes influencing wage levels that these differentiating characteristics can cause a

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96 See generally, *Program Evaluation Methods: Measurement and Attribution of Program Results*, 3rd ed (Ottawa: Treasury Board of Canada Secretariat, 2998), chapter 5; Jeffrey M Wooldridge. *Introductory Econometrics*: *A Modern Approach*, 4th ed (Mason, OH: South-Western Cengage Learning, 2009); and Scot H Simpson, "Creating a Data Analysis Plan: What to Consider When Choosing Statistics for a Study" (2015) 68:4 Canadian J Hospital Pharmacy 311.

97 For instance, the average annual employment income of disabled men was equal to only 54% of that earned by non-disabled men from the 2012 CSD. This would be an example of a "simple average". When regression analysis was performed, the actual gap due to disability was -27% (all severity levels, all types of disability). Similarly, the average annual employment income of disabled women was equal to only 56% of that earned by non-disabled women, whereas the regression analysis found that the overall wage deficit for disabled women is -15% (all severity levels, all types of disability).

significant gap between people's income, before disability status is even considered:

a) **Gender**[98]—on average, women earn 15% to 30% less than men[99]
b) **Education level**—on average, the higher a person's

[98] Various legal scholars (and practitioners) have argued that using salary data for female plaintiffs that is solely based on female workers will embed the wage gap that currently exists between men and women and accordingly disadvantages female plaintiffs versus male plaintiffs. However, this argument depends on two assumptions: (a) that the salary benchmarks used by quantum experts are in fact distinguished for each gender; and (b) the wage gap that has persisted for decades (and plateaued in the 1990s) will dissipate in the future as society eliminates the "discrimination" causing the wage gap. The latter assumption depends on a further argument that the gender wage gap is caused by "discrimination" (and that such discrimination can be eliminated), an argument that has not gained traction with most economists. Most economists measuring the gender wage gap concede that much of the gap can be explained by factors *other than* discrimination, such as different choices by men and women as to educational attainment, hours of work, type of job obtained (referred to as occupational segregation) and simple measurement error. Empirical data confirm that, on average, men work more hours per week than women; women are far more likely to work part-time than men; and women pursue different jobs than men (more women are employed in the service sector than in heavy industry and construction). These varying characteristics cause differences in pay between men and women. Moreover, many of the salary benchmarks used by quantum experts in interrupted earnings cases are "unisex" in that they are only available with both genders combined. The best example of "unisex" wage data are the salary grids contained in collective agreements for teachers, healthcare workers, and other unionized jobs. If the quantum expert relies on "unisex" wage data, then the concern about using "gendered" wage data becomes irrelevant, and instead differences between men's and women's age-earnings profiles emerge due to differences in hours of work, career advancement, and the application of negative contingencies related to working life expectancy (unemployment, non-participation, part-time work, disability, and mortality).

[99] For a summary of the studies on earnings by gender and what the quantifiable reasons are for the gap in earnings between men and women, see Cara L Brown, "The Gender Wage Gap: Dimensions (Part I)" (2014) 11:9 Brown's Economic Damages Newsletter 1; Cara L Brown, "The Gender Wage Gap: Dimensions (Part II)" (2014) 11:10 Brown's Economic Damages Newsletter 1.

educational attainment is, the higher are income levels[100]

c) **Occupation**—people earn varying levels of income depending on occupation
d) **Industry sector**—empirical studies have consistently documented that wages vary depending on whether one is employed in goods-producing industries (or service-producing industries),[101] and whether salaries are governed by collective bargaining (such as in the health and social services, education and public sectors) or by private sector organizations
e) **Age/years of work experience**—on average, workers with more years of work experience and tenure earn more than workers starting jobs[102]
f) **Geography/region**—wage levels differ by province and territory in Canada[103]

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100 Statistics Canada's Census surveys from the past 20 years (2001, 2006, 2011, 2016, and 2021) empirically demonstrate that achieving a higher educational attainment is associated with higher earnings, all else remaining equal.

101 See Andrew Sharpe John Tsang, "A Detailed Analysis of Newfoundland and Labrador's Productivity Performance, 1997-2018" (2019), online (pdf): *Centre for the Study of Living Standards* <sls.ca/reports/csls2019-06.pdf>; Alexander Murray, "Partial versus Total Factor Productivity: Assessing Resource Use in Natural Resource Industries in Canada" (2016), online (pdf): *Centre for the Study of Living Standards* <csls.ca/reports/csls2016-20.pdf>; and Matthew Calver & Alexander Murray, "Decomposing Multifactor Productivity Growth in Canada by Industry and Province, 1997-2014" (2016), online (pdf): *Centre for the Study of Living Standards* <csls.ca/reports/csls2016-19.pdf>.

102 Statistics Canada's Census surveys from the past 20 years (2001, 2006, 2011, 2016, and 2021) empirically demonstrate that accumulating more years of work experience is, on average, associated with higher earnings.

103 See Statistics Canada, "Cities and Growth: Earnings Levels Across Urban and Rural Areas: The Role of Human Capital" by Desmond Beckstead et al, in *The Canadian Economy in Transition Series*, Catalogue no. 11-622-M—No 020 (Ottawa: Statistics Canada, 2010); André Bernard, Ross Finnie & Benoît St-Jean, "Interprovincial mobility and earnings" (2008) 20:4 Perspectives on Labour and Income 15 (Statistics Canada Catalogue no. 75-001-X);Statistics Canada, "Provincial earnings differences" by Kamal K Sharan, in *Perspectives*, Catalogue No. 75-001-XPE (Ottawa: Statistics Canada, 2000); Statistics

g) **Hours of work**—part-time workers earn, on average, lower incomes than full-time workers because they work fewer hours

Regression analysis permits us to isolate the wage variance due solely to disability—and removes the influence of factors (a) to (g) above when calculating the wage deficit due strictly to disability. Therefore, wage deficits derived from regression analysis are usually *lower* than those derived from simple averages; the other influences have been disentangled from the effect of disability.

WHAT IS REGRESSION ANALYSIS (ECONOMETRICS)?

Literally interpreted, econometrics means "economic measurement" and has been defined as "quantitative analysis of actual economic phenomena based on the concurrent development of theory and observation, related by appropriate methods of inference".[104] Ouliaris similarly defines econometrics:

> Econometrics uses economic theory, mathematics, and statistical inference to quantify economic phenomena . . . it turns theoretical economic models into useful tools for economic policymaking. The objective of econometrics is to convert qualitative statements (such as "the relationship between two or more variables is positive") into quantitative statements (such as "consumption expenditure increases by 95 cents for every one dollar increase in disposable income"). Econometricians—practitioners of econometrics—transform models developed by economic theorists into versions that can be estimated.[105]

Gujarati summarizes why it is important to analyze data systematically using econometrics:

Canada, "Sources of Differences in Provincial Earnings in Canada", by Kamal K Sharan, Catalogue No. 75F0002MIE—00008 (Ottawa: Statistics Canada, 2000).

[104] PA Samuelson, TC Koopmans & J.R.N. Stone, "Report of the Evaluative Committee for *Econometrica*" (1954) 22:2 *Econometrica* 141 at 142.

[105] Sam Ouliaris, "What is Econometrics? Taking a Theory and Quantifying It" (December 2011) at 38, online: *IMF Institute* <imf.org/external/pubs/ft/fandd/2011/12/pdf/b2b.pdf>.

> Economic theory makes statements or hypotheses that are mostly qualitative in nature. For example, microeconomic theory states that, other things remaining the same, a reduction in the price of a commodity is expected to increase the quantity demanded of that commodity. Thus, economic theory postulates a negative or inverse relationship between the price and quantity demanded of a commodity. *But the theory itself does not provide any numerical measure of the relationship between the two; that is, it does not tell by how much the quantity will go up or down as a result of a certain change in the price of the commodity.* It is the job of the econometrician to provide such numerical estimates. Stated differently, it is econometrics that gives empirical content to most economic theory.[106]

In using regression analysis on Statistics Canada's disability surveys, we test whether disability affects income and if so, to what extent (percentage). Once regression analysis produces results of this inquiry, further tests establish whether the results are "statistically significant". To qualify as being "statistically significant" means that the values obtained from the sample of the population can, with a high level of statistical confidence (usually 95%), be extrapolated to represent an individual within that population.[107]

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106 Damodar Gujarati, *Basic Econometrics*, 1st ed (New York: McGraw-Hill Book Company, 1978) at p 2 [emphasis added].

107 When analyzing a set of data, conducting a survey, running an experiment or taking a poll, it is commonplace to obtain answers from a portion of the population, rather than whole populations, since the latter are typically cost-prohibitive or not practical. This approach is called "sampling", a statistical procedure that allows statisticians to estimate characteristics of a population by examining a sample (portion) of the entire population. But to form conclusions about an entire population based on a study carried out on a sample, the results from this study must be "statistically significant". As stated by author Gallo from the Harvard Business Review, "when a finding [from analyzing a sample] is [statistically] significant, it is simply means you can feel confident that's it real, not that you just got lucky (or unlucky) in choosing the sample", where "real" means that we can state with a certain level of confidence (usually 95%) that the finding drawn from a sample representing a population is efficient in predicting the values that would result if the whole population were surveyed under the same conditions (Amy Gallo, "A Refresher on Statistical Significance", *Harvard Business Review* (16 February 2016), online: <hbr.org/2016/02/a-refresher-on-statistical-

Regression analysis essentially allows economists to test the validity of an economic theory. In scientific circles, it is not sufficient to simply postulate that a relationship exists between two variables (i.e., disability affects earnings); *one must provide statistical evidence to validate the relationship and enable extrapolations to the disabled population*. "Simple averages" do not permit such extrapolation, which is precisely what Justice Warren intuited in *McColm v Street* when he did not rely on the plaintiff expert's 55% ratio.

REGRESSION EQUATIONS USED TO CALCULATE WAGE DEFICITS

Three models are estimated to study the impact of disability on labour market outcomes. First, using ordinary least squares (OLS) estimation, a model is estimated with the logarithm of annual earnings as the dependent variable using only the observations for individuals in our sample who reported participating in the labor force. Second, a Probit model is estimated using an indicator variable for labour force participation as the dependent variable. (The first and second regressions are done twice: once using the overall dummy variable for disability, then using specific dummy variables for different severity levels of disability). Third, a Heckman two-stage estimation is performed to correct for possible sample selection bias. This method re-estimates the log-earnings equation including an Inverse Mill's Ratio (IMR) constructed from the Probit estimation to account for potential sample selection bias in the OLS regression.

The first analysis is analyzed by estimating the following regressions:

$$y_i = \alpha + \beta D_i + \sum_X \gamma_X Severity_i + \sum_X \theta_X X_i + \mu_i \quad (1)$$

$$y_i = \alpha + \beta D_i + \sum_X \gamma_X Type_i + \sum_X \theta_X X_i + \mu_i \quad (2)$$

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significance>). When results are *not* statistically significant, this means that the estimates from a sample are not close enough to the population values to be accepted as reliable interpretations. See Statistics Canada, *Selection of a Sample*, Catalogue No 12-004X, 2 September 2021 Update (Ottawa: Statistics Canada, 2021).

where i denotes an individual; y_i is the labour market outcomes (employment earnings or labor force participation); D_i is a dummy variable representing disability; $Severity_i$ is a set of dummy variables describing severity of disability; $Type_i$ is a set of dummy variables describing type of disability; and X_i is a matrix of control variables describing sociodemographic characteristics of individual i including gender, age, marital status and educational attainment.

The second set of equations can be represented as:

$$P(y_i = 1|D_i, Severity_i, X_i) = \Phi(\alpha + \beta D_i + \sum_X \gamma_X Severity_i + \sum_X \theta_X X_i + \mu_i) \quad (3)$$

$$P(y_i = 1|D_i, Type_i, X_i) = \Phi(\alpha + \beta D_i + \sum_X \gamma_X Type_i + \sum_X \theta_X X_i + \mu_i) \quad (4)$$

where y_i is a dummy variable representing labor force participation; $\Phi(.)$ denotes the cumulative distribution function of a standard normal distribution.

From these equations, we present the wage deficits according to **severity** of disability (mild, moderate, severe, or very severe) in Table 3 below, and by **type** of disability (seeing, hearing, mobility, flexibility, dexterity impairments, or the impact from mental/psychological disorders, memory deficits, learning or developmental deficits) in Table 4 below.

IV. FINDINGS FROM STATISTICS CANADA'S DISABILITY SURVEYS (PALS/CSD)

According to the 2017 *Canadian Survey on Disability* (CSD), 22% of Canadians reported having one or more disabilities that limited them in their daily activities.[108] Of the 22% of the Canadian population with disabilities, approximately two-fifths of them were classified as having a "mild" disability whereas one-fifth of them had a moderate, severe, or very severe disability.[109] Persons

[108] See Statistics Canada, *A demographic, employment and income profile of Canadians with disabilities aged 15 years and over, 2017*, by Stuart Morris, et al, in *Canadian Survey on Disability Reports* (Ottawa: Statistics Canada, 2018); CSD 2017 CM Guide, *supra* note 17 at 6.

[109] See Statistics Canada, *Severity of disability for persons with disabilities aged 15 years and over, by age group and sex, Canada, provinces and territories, in Canadian Survey on Disability* (Ottawa: Statistics Canada, 2018), Table 13-10-

with disabilities are at higher risk to be unemployed or live-in poverty or have lower educational achievement levels.[110]

With such large numbers, understanding the relationship between disability and labour market outcomes is of interest to policy makers who design, manage, and investigate reforms for income support programs for the disabled. In addition, the wage gap and differing labour force experiences of persons with disabilities vis-à-vis non-disabled persons can have some practical application in economic assessments prepared in civil litigation cases.

A. Accessing Statistics Canada's disability surveys

To analyze the 2001 and 2006 PALS data, Brown Economic purchased the Public-Use Microdata Files (PUMF) from Statistics Canada and as such are governed by Statistics Canada's copyright and licensing rules. The data contained in the PUMF files cannot be read by human eyes; the data is comprised of anonymized records from the original surveys.[111] Empirical analysis is required to establish a usable sample after which regression analysis is used to derive the wage deficits shown in Tables 3 and 4 below.

One of the key advantages of the WDA is that it is straightforward to use. This author has estimated wage gaps from Statistics Canada's disability surveys since the 1991 HALS was available to purchase, and these results were published in 2010 in a peer-reviewed journal, the Journal of Legal Economics.[112] This

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0375-01; Cara L Brown "2017 *Canadian Survey on Disability*: Unemployment rates & Participation rates (Part 1)" (2021) 8:3 Brown's Economic Damages Newsletter 1 at 3.

110 See Statistics Canada, *Canadian Survey on Disability, 2017*, in *The Daily* (Ottawa: Statistics Canada, 28 November 2018) [*2017 Survey*].

111 Our firm has been asked in past years to produce, as part of a working file, the "PALS data". However, this is not possible given the nature of how the PUMF data is stored as well as the copyright provisions imposed by Statistics Canada on the PUMF datasets.

112 See Brown & Emery, *supra* note 89. A substantial part of chapter 5 in Brown, *Damages*, *supra* note 8 is devoted to comparing results from the 1991 *Health and Activity Limitation Survey* (HALS), 2001 and 2006 Participation and

article has been referenced in at least two other independent sources (from Statistics Canada and the Public Health Agency of Canada).[113]

A formal written proposal, along with fingerprinting and a substantial fee, is required before a researcher can enter Statistics Canada's Research Data Centres (RDC) at university campuses across Canada to access the 2012 and 2017 CSD data. A formal written proposal, along with equation specifications and references, had to be evaluated by a Statistics Canada representative before admission to the RDC was granted. Results which Brown Economic generated from working with both the 2012 and 2017 CSD datasets were vetted by Statistics Canada analysts at the RDC centres at the University of Calgary (2012 CSD) and University of New Brunswick (2017 CSD) before they were released.

This author initially approached Statistics Canada to ask if they could undertake the analysis described in this paper using the 2017 CSD dataset, since our prior work with the 2001 and 2006 PALS had been cited by Statistics Canada and the Public Health Agency of Canada. Statistics Canada declined the project offer, citing the complexity of the proposed regression analysis.

B. STATISTICS CANADA'S DEFINITION OF DISABILITY

Over the years, Statistics Canada has modified its disability survey methodology to reflect evolving global standards for defining and modeling disability. The World Health Organization ("WHO") states that, in general, disability can be defined using a medical model, a social model, or some combination of the two:

> *The medical model views disability as a feature of the person, directly caused by disease, trauma or other health condition*, which

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Activity Limitation Surveys (PALS), and the 2012 and 2017 *Canadian Surveys on Disability* (CSD).

113 See e.g. Statistics Canada, "Persons with disabilities and employment", by Martin Turcotte, in *Insights on Canadian Society,* Catalogue No 75-006-X (Ottawa: Statistics Canada, 3 December2014); Public Health Agency of Canada, *Key Health Inequalities in Canada: A National Portrait*, Catalogue No HP35-109 (Ottawa: Minister of Health, August 2018).

> requires medical care provided in the form of individual treatment by professionals. Disability, on this model, calls for medical or other treatment or intervention, to 'correct' the problem with the individual.
>
> *The social model of disability, on the other hand, sees disability as a socially-created problem and not at all an attribute of an individual.* On the social model, disability demands a political response, since the problem is created by an unaccommodating physical environment brought about by attitudes and other features of the social environment.[114]

Statistics Canada based the 2001/2006 PALS approach on a combined medical/social model of disability (referred to as a biopsychosocial model) consistent with the World Health Organization's *International Classification of Functioning, Disability and Health (ICF)* approved in 2001. In contrast, the 2012/2017 CSD was designed to move more fully towards the social model of disability consistent with the *United Nations Convention on the Rights of Persons with Disabilities*, ratified by Canada in 2010.[115] Both the PALS and CSD were designed to reflect the idea that disability is a result of the interaction between a medical impairment and a social context. As stated by the WHO:

> Disability is a complex phenomenon that is both a problem at the level of a person's body, and a complex and primarily social phenomena. ***Disability is always an interaction between features of the person and features of the overall context in which the person lives***. . .[116]

The *United Nations Convention on the Rights of Persons with Disabilities*, which served as the basis for the 2012/2017 CSD approach, provided the following definition:

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[114] See *Towards a Common Language for Functioning, Disability and Health: ICF*, (2002) World Health Organization, WHO/EIP/GPE/CAS/01.3 at 8–9 [*ICF*, emphasis added].

[115] *CSD 2017 CM* Guide, *supra* note 17 at 5; *CSD 2012 CM Guide*, *supra* note 90 at 6.

[116] *ICF*, *supra* note 114 [emphasis added].

> Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which ***in interaction with various barriers*** may hinder their full and effective participation in society on an equal basis with others.[117]

Consistent with the United Nations' definition, Statistics Canada based its methodology for the 2012/2017 CSD on the idea that "disability is a social disadvantage that an unsupportive environment imposes on top of an individual's impairment".[118]

The questionnaires used in Statistics Canada's surveys on disability consist of filter questions and screener questions to determine if a respondent has a disability and if so, the type(s) and severity of disability. Between 2010 and 2012, Statistics Canada in collaboration with ESDC developed a new set of questions to identify persons with disabilities, called the *Disability Screening Questions* ("DSQ"). The DSQ instrument was extensively tested and used for the first time in the 2012 CSD questionnaire. The 2017 CSD continued with the DSQ framework for the measurement of disability in Canada.[119]

There are filter questions and screener questions included in the 2012 and 2017 CSD questionnaires. The filter questions were asked to all respondents to identify if they are likely to have a disability that falls into the following five categories of disability types:

1) Sensory (seeing and hearing)
2) Physical (mobility, flexibility, dexterity and pain)
3) Cognitive (learning, developmental and memory)
4) Mental health-related (emotional, psychological or mental health conditions)

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117 *Convention on the Rights of Persons with Disabilities*, 13 December 2006, 2515 UNTS 3 (entered into force 3 May 2008) at 4 [emphasis added].

118 *CSD 2017 CM* Guide, *supra* note 17 at 6; *CSD 2012 CM Guide*, *supra* note 90 at 5.

119 *CSD 2017 CM* Guide, *supra* note 17 at 7; *CSD 2012 CM Guide*, *supra* note 90 at 6.

5) Other/unknown[120]

If respondents answered being "sometimes," "often," or "always" to these filter questions, they are likely to have one or more disabilities[121] and then asked to answer the screener questions to identify the severity of their disability. The screener questions measure the following:

6) the *intensity of the difficulties* ("no difficulty," "some difficulty," "a lot of difficulty," or "cannot do" responses) and
7) the *frequency of the activity limitations* ("never," "rarely," "sometimes," "often," or "always" responses) that respondents experienced with each disability type.[122]

Most screening questions from the 2012 CSD remained unchanged in the 2017 CSD. However, the DSQ used in the 2017 CSD was further developed and updated from the 2012 CSD questions to include new questions related to the age of onset and the age at which activity limitations began for each disability type. As a result, there are six filter questions and 55 screener questions included in the 2017 CSD questionnaire. According to Statistics Canada, the new screening questions used in the 2017 CSD allow for better coverage overall of persons with disabilities, and especially of persons with disability types that are less visible, such as disabilities related to pain, memory, learning,

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120 "['Other/Unknown'] is a 'catch-all' category for people who reported a health problem or condition that limits their daily activities but does not fit [one of the four categories]": Statistics Canada, *A New Survey Measure of Disability: The Disability Screening Questions (DSQ)*, by Chantal Grondin, Catalogue no. 89-654-X2016003, (Ottawa: Statistics Canada, 29 February 2016) at 16.

121 *CSD 2012 CM Guide*, *supra* note 90; *2017 Survey*, *supra* note 110.

122 *CSD 2012 CM Guide*, *supra* note 90; *CSD 2017 CM* Guide, *supra* note 17; Statistics Canada, "Disability Statistics: Canadian Experience" (Presentation at the United Nations Expert Group Meeting on the Guidelines and Principles for the Development of Disability Statistics at the UN Headquarters, 12–14 July, 2017), online (pdf): <unstats.un.org/unsd/demographic-social/meetings/2017/new-york--disability-egm/Session%204/Canada.pdf>; Grondin, *supra* note 120.

developmental deficits, and mental health. Additionally, the 2017 survey employs for the first time a module that captures data on episodic disability in the working age population. This dedicated module addresses whether respondents have periods of time when they are limited by their condition, whether their conditions are getting better, worse or staying the same and the expected duration of their limitations.[123] Due to these changes, the population targeted to participate in the 2017 survey was more inclusive than in 2012, according to Statistics Canada.

While the disability definitions used by Statistics Canada evolved from 1986 to 2017, all of them retained two key elements:

1) The functional limitations could arise from a physical or mental condition or health problem;
2) To discover the *consequences of being functionally limited*.

In other words, it is not sufficient to simply designate one as disabled; to qualify as "being disabled" the respondent had to indicate *how the disability translated into functional limitations.* This is the essence of what is captured in the WDA**.** The existence of "functional limitations" was identified by the British Columbia appeal court in *Roberts v Kidd*[124] as being a mandatory factor to make an award for loss of income.

Whereas the HALS and PALS surveys included "accident" or "motor vehicle accident" as a choice for a precipitating cause of the health condition,[125] the 2012 CSD added an option to choose "another cause", and the 2017 CSD expanded possible answers to these inquiries by adding condition "07: Stress or trauma".[126] This

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123 See *CSD 2017 CM Guide*, *supra* note 17 at 69.

124 *Roberts v Kidd* (1998), 52 BCLR (3d) 326 (CA), [1998] BCJ 1198.

125 Statistics Canada, *Participation and Activity Limitation Survey - 2001 (Adults - 15 and over) – Form 02 (PALS) – Questionnaires* (question B105); and Statistics Canada, *Participation and Activity Limitation Survey - 2006 (Adults - 15 and over) (PALS) – Questionnaires* (questions T3 and T4).

126 Statistics Canada, *Canadian Survey on Disability—2012—Questionnaires* (question XMAC Q03); *Statistics Canada, Canadian Survey on Disability—2017—Questionnaires* (questions MC_Q10 and MC_Q25).

implies that wage deficits could be attributed not just to accidents but to other intervening causes, such as sexual assault, when deriving them from the disability surveys.[127]

C. How Statistics Canada's questionnaires are linked to the plaintiff

To supply a link between the plaintiff and the disabled Canadians who responded to Statistics Canada's disability surveys, we provide a questionnaire that contains excerpted questions from Statistics Canada's 2012 *Canadian Survey on Disability Questionnaire* and the *Canadian Survey on Disability – 2017 Questionnaire* (which are virtually identical). Because these questionnaires contain 385 questions spanning 92 pages, the excerpted questions we reproduce pertain strictly to investigation of the severity and type of disabilities experienced by the plaintiff.[128]

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[127] For wage gaps calculated from the 2017 CSD originating from "stress or trauma" that can be used in sexual assault cases, contact the author.

[128] The main categories of questions included in the 2017 CSD questionnaire are: disability screening questions, episodic disabilities, main condition, aids and assistive devices—hearing, aids and assistive devices—vision, aids and assistive devices—mobility and agility, aids and assistive devices—learning and developmental, aids and assistive devices—all, medication use, help received, health care services, education, educational experiences, educational background, labor market activities, labor force status, class of worker, self-employed, job tenure, industry, occupation, workplace, usual hours of work, part-time employment, permanent work, periods of unemployment, employment details, looking for work, past job attachment, classification of retirement, retirement details, unemployed details, not in the labor force details, labor market attachment, periods of employment, labor mobility, workplace training, employment modifications, labor force discrimination, general health, housebound, veterans, internet use, accessibility of government services, and sources of income. The categories of questions included in the excerpted questionnaire we provide pertain to the following categories: disability screening questions, main condition, help received, education, educational experiences, educational background, labor market activities minimal, labor force status, class of worker, self-employed, industry, occupation, workplace, usual hours of work, part-time employment, retirement details, unemployed details, not in the labor force details, labor market attachment, labor force discrimination, and sources of income.

Some counsel improperly attribute the creation of and ownership of the excerpted questions we use from Statistics Canada's questionnaires to this author. Rather, a more apt description is that we *rely* on Statistics Canada's disability questionnaire to *tailor the results of our analysis to the plaintiff in question*. The tailoring is accomplished through having the plaintiff complete the questionnaire to find out their scores related to the *severity* of the specific impediments and the *type* of injuries they may experience.

Other counsel allege that the excerpted questionnaire should be administered by a neutral, independent expert with extensive experience. This is not necessary. First, we already know that almost 50,000 Canadians responded to each disability survey in all four years (see Table 1, *above*). Presumably, none of these respondents had "extensive experience" with administering statistical surveys, and they were able to complete the questionnaire. In fact, Statistics Canada designed their disability questionnaires *precisely* so that laypeople could answer them without medical advice.

Second, the excerpted questions are multiple choice, with most of the choices either being "yes, no, don't know" or "no difficulty, some difficulty, a lot of difficulty" or "never, rarely, sometimes, often, always". This leaves little to no room for interpretation or manipulation by anyone scoring the questionnaire. The respondent's answers, however, must be scored before the questionnaire can be linked to the wage deficit approach.[129]

D. How disability affects employment and income

[129] When using the wage deficit approach in income loss assessments, we ask the claimant to complete the excerpted questionnaire, and return it to our office for scoring.

The consensus in the economics literature is that **disability decreases earnings**.[130] Deviations in earnings from the plaintiff's

[130] For studies from Canada, see *2017 Survey*, *supra* note 110 at 2; Statistics Canada, *A demographic, employment and income profile of Canadians with disabilities aged 15 years and over, 2017*, by Stuart Morris et al in Reports on Disability and Accessibility in Canada, Catalogue No 89-654-X2018002 (Ottawa: Statistics Canada, 28 November 2018) at 13; Statistics Canada; Statistics Canada, *Persons with disabilities and employment*, by Martin Turcotte, in Insights on Canadian Society, Catalogue No 75-006-X (Ottawa: Statistics Canada, 3 December 2014) at 6; Statistics Canada, *Employment among the disabled*, by Diane Galarneau & Marian Radulescu, Catalogue No 75-001-X (Ottawa: Perspectives, May 2009) at 8; Statistics Canada, *Participation and Activity Limitation Survey 2006: Labour Force Experience of People with Disabilities in Canada*, by Social and Aboriginal Statistics Division, Catalogue No 89-628-X—No 007 (Ottawa: Statistics Canada, 2008); Statistics Canada, *Participation and Activity Limitation Survey 2006: Tables (Part III)*, by Social and Aboriginal Statistics Division, Catalogue No. 89-628-X—No 008 (Ottawa: Statistics Canada, 2008); Statistics Canada, *Participation and Activity Limitation Survey 2006: Tables (Part V)*, by Social and Aboriginal Statistics Division, Catalogue No 89-628-X—No 011 (Ottawa: Statistics Canada, 2008); Statistics Canada, *Participation and Activity Limitation Survey 2006: Tables*, by Social and Aboriginal Statistics Division, Catalogue No 89-628-XIE—No 003 (Ottawa: Statistics Canada, 2007); Statistics Canada, *Participation and Activity Limitation Survey 2006: Technical and Methodological Report*, by Social and Aboriginal Statistics Division, Catalogue No. 89-628-XIE—No 001 (Ottawa: Statistics Canada, 2007); Statistics Canada, *Participation and Activity Limitation Survey (PALS) 2001: User's Guide to the Public Use Microdata File*, by Housing, Family, and Social Services Division, Catalogue No 82M0023GPE (Ottawa: Statistics Canada, 2004); Derek Hum & Wayne Simpson "Canadians with Disabilities and the Labour Market" (1996) 22:3 Canadian Public Policy 285; Statistics Canada, *Employment of People with Disabilities*, by Alan Shain, in *Canadian Social Trends* 38 (Ottawa: Statistics Canada, 1995) at 8; Statistics Canada, *A Portrait of Persons with Disabilities*, by Michael Bergob, Catalogue No 89-542-XPE (Ottawa: Statistics Canada, 1995); Jon Harkness, "Labor Force Participation by Disabled Males in Canada" (1991) Canadian Journal of Economics 26:4 p 878; Statistics Canada, *Selected Socio-Economic Consequences of Disability for Women in Canada*, Catalogue No. 82-615 (Ottawa: Statistics Canada, 1991); Statistics Canada, *Profile of Canadians with Disabilities* in *Canadian Social Trends*, by Kathy Nessner, in *Canadian Social Trends* 18 (Ottawa: Statistics Canada, 1990) at 2; Statistics Canada, *Employment of Disabled Persons in Canada*, by David Gower, in *Canadian Social Trends* 9 (Ottawa: Statistics Canada, 1988) at 30–32. For studies from the US, see Burt S Barnow, "The employment rate of people with disabilities" (2018) 131:11 Monthly Labor Rev 44; Lisa A Schur "Barriers or

potential *without*-incident earning capacity could result from impacts such as the following:

- an inability to work full-time hours ("full-time work" is defined by Statistics Canada as 30 hours or more per week)[131]
- change or limit to the amount or kind of work previously done
- change in job

Opportunities? The Causes of Contingent and Part-time Work Among People with Disabilities" (2003) 42:4 Industrial Relations 589; Kerwin K Charles, "The Longitudinal Structure of Earnings Losses among Work-Limited Disabled Workers." (2003) 38:3 J Human Resources 618; Thomas W Hale, Howard V Hayghe & John M McNeil, "Persons with Disabilities: Labor Market Activity, 1994" (1998) 121:9 Monthly Labor Review 3; Steven Stern "Semiparametric Estimates of Supply and Demand Effects of Disability on Labor Force Participation" (1996) 71 J Econometrics 49; Marjorie L Baldwin, Lester A Zeager & Paul R Flacco, "Gender Differences in Wage Losses from Impairments: Estimates from the Survey of Income and Program Participation" (1994) 29:3 J Human Resources 865; Marjorie L Baldwin & William G Johnson, "Labor Market Discrimination Against Men with Disabilities" (1994) 29 J Human Resources 1; Rovert Haveman & Barbara Wolfe "The Economic Well-Being of the Disabled 1962-84" (1990) 25 J Human Resources 32; Harold S Luft, "The Impact of Poor Health on Earnings." (1975) 57 Rev Economics & Statistics 43; Joseph M Davis "Impact of Health on Earnings and Labor Market Activity" (1972) 95:10 Monthly Labor Review 46. For studies from Australia, see Roger Wilkins "The Effects of Disability on Labour Force Status in Australia" (2004) 37:4 Austl Economic Rev 359; Richard Brazenor "Disability and Labour Market Earnings in Australia" (2002) 5:3 Austl J Labour Economics 319. For studies from Europe, see Anne M Dano, "Road injuries and long-run effects on income and employment" (2005) 14:9 Health Economics 955; Brenda Gannon, "A dynamic analysis of disability and labour force participation in Ireland 1995-2000" (2005) 14:9 Health Economics 925; Peter S Thoursie, "Occupational Attainment and Earnings: The Case of the Disabled" (2004) 18:3 Labour 415.

131 See Statistics Canada, *2001 Census Dictionary,* Catalogue No 92-378-XIE (Ottawa: Statistics Canada, 2003) at 57; Statistics Canada, *2006 Census Dictionary*, Catalogue No 92-566-X (Ottawa: Statistics Canada, 2010) at 56; Statistics Canada, *National Household Survey Dictionary, 2011*, Catalogue No 99-000-X2011001 (Ottawa: Statistics Canada, 2013) at 68; Statistics Canada, *Dictionary, Census of Population, 2016*, Catalogue No 98-301-X2016001 (Ottawa: Statistics Canada, 2018) at 235.

- change in location of where job is fulfilled (e.g., remotely)
- reduced productivity
- inability to undertake overtime work
- lengthy workplace absences due to medical difficulties
- reduced scope of job tasks due to disability
- foregone promotions or job advancement

From all of Statistics Canada's disability survey questionnaires, we have identified important questions put to the respondents about how their impairments affected their labour market performance. These questions are reproduced from the 2017 CSD questionnaire in Table 2 below,[132] along with the proportion of disabled Canadians who answered "YES" to each question, differentiated by gender.

[132] See Statistics Canada, *2017 Canadian Survey on Disability Questionnaire(s)* (Ottawa: Statistics Canada, 2017) (effective period: 1 March 2017 to 31 August 2017).

Table 2: 2017 CSD Survey Questions about the Impact of Disability on Respondents' Education & Labour Market Activities

Question Number	Survey Question	% of Disabled Canadians Who Answered "Yes"	
		Men	**Women**
EDE_Q05	Because of your condition, have you ever:		
	1) changed the kind of work you do?	17%	15%
	2) changed the amount of work you do?	17%	19%
	3) changed jobs?	12%	12%
	4) began working from home?	4%	6%
	5) taken an absence from work of one month or more?	16%	20%
EDE_Q10	Does your condition limit the amount or kind of work you can do at your present job or business?*	36%	39%
EDE_Q25	Is your condition the reason you are now doing a different kind of work?	74%	74%
EDE_Q30	Do you believe that your condition makes it difficult for you to change jobs or to advance at your present job?	36%	38%
RDE_Q05	Did you retire because of your condition?	66%	67%
LFD_Q10	In the past five years, do you believe that because of your condition, you have been: refused a job?	13%	11%
LFD_A15	In the past five years, do you believe that because of your condition, you have been: refused a job promotion?	9%	10%
EDU_Q30	Are/Were you studying part-time because of your condition?	21%	19%
EEX_Q10	Have you ever discontinued/Did you discontinue your formal education or training because of your condition?	29%	23%
EEX_Q20A	Because of your condition, did it take you longer to achieve your present level of education?	42%	35%

* Repeated in other parts of the questionnaire for unemployed persons, people not working (or seeking work), or retired respondents.

The first set of questions in Table 2 show that just under 20% of disabled Canadians altered the kind, or amount, of work, changed jobs, reverted to working from home, or embarked on a lengthy absence from work because of their impairments. Presumably in part because the 2017 CSD was conducted before the 2020 pandemic, only a very small percentage (4–6%) answered that they began working at home because of their disability.

The next question, which asks if one's condition limits the amount of kind of work they can do in their present job, almost 40% answered affirmatively. This is precisely the type of impact that can be hard to measure (even for the claimant) but which the econometric analysis of the survey data can reflect in the wage deficits shown Tables 3 and 4, *below*.

Even though only 12% of individuals changed jobs due to their condition, an overwhelming 74% stated that their condition was the reason they were doing different work by the time of the survey. This points to either job changes before the survey, or experiences the disabled have with accommodating employers, particularly large companies, and union-governed environments.

Another two-thirds of respondents (66–67%) had retired because of their condition. This supports the research that indicates it is a poor investment for older workers to retrain,[133]

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[133] See e.g. Christine Neill & Tammy Schirle, "Remain, Retrain or Retire: Options for older workers following job loss" in *Retirement Policy Issues in Canada,* (Montreal & Kingston: McGill-Queens University Press, 2009) 277. The authors conclude that since older workers have a shorter expected remaining working life, their "responses to displacement will systematically involve a higher retirement rate and lower rate of participation in training and education": *ibid* at 289. In particular, training and education is not likely to help displaced, older workers because the "lifetime income increase due to the training would only just cover the costs for a worker aged 50 at displacement, and would have ***negative*** returns for older workers": *ibid* at 289 [emphasis added]. Indeed, the fact that a large upfront investment in both time and money is required makes retraining a less viable alternative the older an individual becomes: see *ibid* at 290. Additionally, a number of statistical studies have linked disability and early retirement, and in particular, indicate that poor health is one of the main reasons people stop working. According to Pyper, 54% of men in the age 50 to 54 category who were not working had health related reasons and reported poor and

especially if the individual has an existing disability that functionally prevents or inhibits them from working. This impact can be measured by the economic expert in "early retirement" scenarios, or by using the WDA.

More than two-thirds of respondents (36–38%) stated that their condition makes it difficult for them to change jobs or advance at their present job. Again, because such impacts are so challenging to predict—both in terms of timing and quantifiable outcomes—the WDA can mirror this type of impact.

Only small numbers of respondents had either been refused a job or refused a promotion (around 10%). With respect to the impact on education, however, we see much larger effects. One-fifth of respondents claimed to be studying part time because of their condition; 23% to 29% of disabled men and women discontinued their formal schooling because of their condition. A larger share of respondents answered affirmatively (35–42%) that their condition meant that it was taking longer to complete their education. Such an impact can be directly reflected in the age-earnings profile contemplated by the economic expert.

E. WAGE DEFICITS BY SEVERITY OF DISABILITY

Table 3 compares the estimated wage deficits by severity of disability (mild, moderate, severe, or very severe) for men and women. The severity categories are established by Statistics Canada and the questionnaire questions permits them to group people with disabilities into four severity categories (mild, moderate, severe and very severe). As expected, the wage deficits *increase* as the severity of disability *increases*, for both genders.

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declining health more often than those working. See Wendy Pyper, "*Aging, health and work*" (2006) 7:2 Perspectives on Labour & Income 48. The *2002 General Social Survey* reports that 30% and 29% of males who retired between ages 50 to 54 and 55 to 59 respectively did so for health reasons, and it is estimated that 40% of males retired before the age of 59 because of poor health. See Statistics Canada, *Caring for an Aging Society,* by Kelly Cranswick, Catalogue No 89-582-XIE (Ottawa: Statistics Canada, 2003).

All of the coefficients reported in Table 3 were found to be statistically significant.[134] When the results were found not to be statistically significant (see Table 3 below), they are not shown (instead the category is shown by N/A or -----).

[134] As stated by the author Gallo from the Harvard Business Review, "[w]hen a finding [from analyzing a sample] is [statistically] significant, it simply means you can feel confident that's it real, not that you just got lucky (or unlucky) in choosing the sample", where "real" means that we can state with a certain level of confidence (usually 95%) that the finding drawn from a sample representing a population is efficient in predicting the values that would result if the whole population were surveyed under the same conditions. When results are *not* statistically significant, this means that the estimates from a sample are not close enough to the population values to be accepted as reliable interpretations: Amy Gallo, "A Refresher on Statistical Significance" in *HBR Guide to Data Analytics Basics for* Managers (La Vergne: Harvard Business Review Press, 2018) 121 at 122. See also Statistics Canada, *Selection of a Sample,* Catalogue No. 12-004X (Ottawa: Statistics Canada, undated).

Table 3: Wage Deficits by SEVERITY of Disability, 2012/2017 CSD and 2001/2006 PALS

Severity of Disability	**Men**			
	2017 CSD[1]	**2012 CSD[2]**	**2006 PALS[3]**	**2001 PALS[4]**
Overall disability	-23%	-27%	-21%	-22%
Mild	-8%	-10%	-16%	-15%
Moderate	-20%	-31%	-22%	-23%
Severe	-57%	-37%	-42%	-33%
Very Severe	-72%	-61%	-51%	-49%
Severity of Disability	**Women**			
	2017 CSD[1]	**2012 CSD[2]**	**2006 PALS[3]**	**2001 PALS[4]**
Overall disability	-26%	-15%	-33%	-29%
Mild	-9%	n/a*	-16%	-21%
Moderate	-23%	-16%	-36%	-29%
Severe	-48%	-35%	-66%	-40%
Very Severe	-69%	-37%	-66%**	-57%

[1] Reproduced from **Brown's Economic Damages Newsletter** entitled "2017 *Canadian Survey on Disability*: Wage Gaps by **SEVERITY** of Disability (Part 2)", September 2021, vol. 18, issue 4.

[2] Reproduced from **Brown's Economic Damages Newsletter** entitled "2012 *Canadian Survey on Disability*: Wage Gaps by **Severity** of Disability (Part II)", July 2017, vol. 14, issue 5, Table 3, at p. 7.

[3] Reproduced from **Brown's Economic Damages Newsletter** entitled "2006 PALS: Wage deficits by degree of severity (Replicating the 2001 PALS regression results)", February 2011, vol. 8, issue 1 at p. 6.

[4] Reproduced from C.L. Brown and J.C.H. Emery, "The Impact of Disability on Earnings and Labour Force Participation in Canada: Evidence from the 2001 PALS and from Canadian Case Law" (April 2010) Journal of Legal Economics, vol. 16, no. 2, Table 6, p. 46.

* This result is not statistically significant.

** This result reflects the impact of disability on labour force participation rather than wages.

These percentages can be applied directly to the plaintiff's *without*-incident income to represent the average impact—over

their working years—of the disability, varying by the severity. For instance, if the male claimant is found to have a *moderate* impairment due to the incident, his *with*-incident income can be estimated to be -20% (2017 CSD) to -31% (2012 CSD) lower than his *without*-incident income, on average over all years.

A key finding from the results in Table 3 is that, as we would expect, the wage gap widens as the severity of disability increases. In *McColm*, the judge commented that the -55% wage deficit used by the plaintiff's expert was too broad to represent Mr. McColm's losses. If we use the data in Table 3, we can see that if it had been determined that Mr. McColm was *moderately* disabled from the incident, he would have experienced a wage deficit ranging from -20% to -31% (Table 3 above): *not* -55%. This is precisely the tailoring that Justice Warren identified in *McColm* that might have made the CSD analysis useful in that case. Having Mr. McColm complete the disability questionnaire would have allowed us to match his *severity* of disability to a percentage loss in Table 3 above, or to match his *type* of disability to a percentage loss in Table 4 below. This is an example of how to appropriately use the WDA.

F. Wage Deficits by Type of Disability

Statistics Canada's 2012 and 2017 CSD questionnaires included disability screening questions (DSQ) designed to evaluate the presence and severity of 10 distinct types of disabilities related to a health problem or condition that has lasted or is expected to last for six months or more, including seeing, hearing, mobility, flexibility, dexterity, pain, learning, developmental, mental/psychological and memory disabilities. The DSQ also contains a question concerning any other health problem or condition that has lasted or is expected to last for six months or more.[135] Table 4 shows the wage deficits estimated by type of disability.

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[135] This question is associated with the "other" disability type from the 2001/2006 PALS surveys. For confidentiality reasons related to the 2001 and 2006 PUMFs, five types of disabilities were reclassified into the "other" disabilities category. The disabilities included in this category were:

The percentages in Table 4 can be applied directly to the plaintiff's *without*-incident income to represent the average impact—over their working years—arising from type of disability. For instance, if a female claimant is found to have a "mobility" disability due to the incident, her future *with*-incident income can be estimated to be -16% (2006 PALS) to -55% (2017 CSD)[136] lower than her *without*-incident income. From this range, we can average the deficits for a mobility disability to derive a wage deficit of -30% for disabled women with mobility difficulties.

The findings in Table 4 are consistent with an analysis of the 2017 *Canadian Survey on Disability* by researchers seeking to discover the impact of developmental disabilities on Canadians. In this 2020 study, the authors found that "compared to the general Canadian public, persons with [developmental disabilities] are less likely to: finish high school or post–secondary education; participate in the labor force or be employed; and earn on average less/year in total income".[137]

"Learning", "Memory", "Developmental", "Psychological", and "Unknown": Statistics Canada, *User's Guide to the Public Use Microdata File PALS 2001,* by Housing, Family and Social Services Division, Catalogue No. 82M0023GPE, (Ottawa: Statistics Canada, 2004), Appendix G. In the 2012 Canadian Survey of Disability, this type of disability is counted only if no other limitation has been reported under the 10 types of disability listed above. If there is both a limitation under one of the 10 types and an "other" limitation, the latter will be ignored. A decision to ignore the "other" type when there was already a limitation under one of the 10 disability types was made because it was observed that respondents with a disability that fell under one of the 10 types tended to report the disease that caused their disability under "other". Double counting of disability types was thus avoided. An "unknown" type was created for persons who reported only an "other" type of limitation and no other limitation. Approximately 0.7% of males and 0.5% of females with disabilities were categorized in the "unknown" disability category in the 2012 CSD. See *CSD 2012 CM Guide, supra* note 90 at 7.

136 The wage gap from the 2012 CSD for women with mobility impediments was -21% in Table 4, falling within the range of -16% to -55% in other survey years.

137 Patrick Berrigan, Craig WM Scott & Jennifer D Zwicker, "Employment, Education, and Income for Canadians with Developmental Disability: Analysis from the 2017 Canadian Survey on Disability" (13 July 2020) J Autism & Developmental Disorders at 1. From Table 4, *below*, we can see that men with

Table 4: Wage Deficits by TYPE of Disability, 2012/2017 CSD and 2001/2006 PALS

Type of Disability	Men				Women			
	2017 CSD[1]	2012 CSD[2]	2006 PALS[3]	2001 PALS[4]	2017 CSD[1]	2012 CSD[2]	2006 PALS[3]	2001 PALS[4]
Overall disability	***-23%***	***-27%***	***-21%***	***-22%***	***-26%***	***-15%***	***-33%***	***-29%***
Pain disability	-30%	-26%	---*	-17%	-31%	-15%	---*	-22%
Mobility disability	-57%	-42%	-16%	-24%	-55%	-21%	-16%	-29%
Hearing disability	-28%	-36%	---*	-15%	-44%	---*	---*	-33%
Seeing disability	-27%	-39%	---*	-26%	-26%	---*	---*	-38%
Flexibility Disability[5]	-42%	-36%			-50%	-22%		
Dexterity disability[5]	-51%	---*			-55%	-33%		
Agility disability[5]			---*	-22%			-12%	-35%
Mental/ Psychological disability[6]	-37%	-52%			-36%	---*		
Memory disability[6]	-50%	-73%			-48%	-39%		
Learning disability[6]	-47%	-50%			-61%	-37%		
Developmental disability[6]	-74%	---*			-84%	-52%		
Other disability[6]			-27%	-36%			-44%	-35%

a "developmental disability" experience a -74% wage deficit (2017 CSD), whereas women with a "developmental disability" experience a wage deficit ranging from -52% (2012 CSD) to -84% (2017 CSD).

Type of Disability	Men				Women			
	2017 CSD[1]	2012 CSD[2]	2006 PALS[3]	2001 PALS[4]	2017 CSD[1]	2012 CSD[2]	2006 PALS[3]	2001 PALS[4]
Communication (speech) Disability[7]			-27%	-41%			-51%	-35%

* This result is not statistically significant.

1 Reproduced from **Brown's Economic Damages Newsletter** entitled "2017 *Canadian Survey on Disability*: Wage Gaps by TYPE of Disability (Part 3)", October 2021, vol. 18, issue 5.

2 Reproduced from **Brown Economic Damages Newsletter** entitled "2012 *Canadian Survey on Disability*: Wage Gaps by Type of Disability (Part III)", August 2017, vol. 14, issue 6, Table 1, at p. 6.

3 Reproduced from **Brown's Economic Damages Newsletter** entitled "2006 PALS: Wage deficits by education level & dealing with self employed plaintiffs using the PALS data", May 2011, vol. 8, issue 4, Table 2, p. 3. The results shown are for an overall level of severity (neither "less severe" nor "more sever").

4 Reproduced from C.L. Brown and J.C.H. Emery, "The Impact of Disability on Earnings and Labour Force Participation in Canada: Evidence from the 2001 PALS and from Canadian Case Law" (April 2010) *Journal of Legal Economics*, vol. 16, no. 2, Table A, p. 32. The results shown are for a "less severe" level of disability.

5 The *2001 PALS* and *2006 PALS* included flexibility and dexterity disabilities in the category "agility disability".

6 The *2001 PALS* and *2006 PALS* included psychological, learning, memory, developmental disabilities in the category "other disability" (along with 'unknown disabilities').

7 The *2017/2012 CSD* did not include questions on communication (speech) disability.

G. WHY THE WAGE DEFICITS VARY BETWEEN THE 2001/2006 PALS SURVEYS AND THE 2012/2017 CSD SURVEYS

We expect the estimated wage deficits to differ from survey to survey for a number of reasons:

i) First, since the 2001 PALS, 2006 PALS, 2012 and 2017 CSD surveys are cross-sectional surveys, the samples for each survey *will contain a different group of people*, each a segment of the disabled population in the survey year

(2000, 2005, 2010 or 2015). [138] Different people mean that different results will be derived from each survey population. This does not invalidate the findings from the disability surveys; it simply frames our expectations that each survey's results could vary from the other surveys. And because the disability surveys are not a time-use series (following the same data indicator over consecutive years), each year's survey results are independent from the others. This is a standard outcome for cross-sectional surveys.

ii) Second, the estimated wage deficits are expected to differ because each survey's dataset *contains income information from different years* (2000, 2005 2010, 2015). To the extent that business cycle effects and economic activity levels are different in these years, the wage deficits could be different.[139] However, in this analysis, the outcome is precisely what was expected: the impact of disability on income was negative, and the gap in wages *widened* as the *severity* of disability *increased* (see Table 3). In fact, that we observed this pattern without exception across all four surveys is remarkable, and a testament to the dependability of the results.

iii) Third, due to a change in the criteria used to identify disabled individuals in the 2012 and 2017 CSD surveys, some individuals who would have been categorized as disabled (and thus considered for inclusion in the survey sample) in the 2012 or 2017 CSD surveys would not be

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[138] The alternative to a cross-sectional survey is a longitudinal one, which follows the *same* people over many years. Nevertheless, most surveys—such as Statistics Canada's Census—are cross-sectional in nature.

[139] Analysis of real GDP growth in expenditure, industry, and employment for the 2000, 2005, 2010 and 2015 years shows that general economic conditions were quite similar in the four time periods, although GDP performance in 2015 declined compared to prior years. See Business Cycle Council, "First Report – Fifth Report" (October 2012 – December 2018), online: *CD Howe Institute* <cdhowe.org/council/business-cycle-council>. We have no reason to expect that this affected the gap in income between the disabled and non-disabled.

> categorized as disabled in the 2001/2006 PALS surveys.[140] This means that the individuals captured in each severity category or type category between survey years differ in the type and extent of their disability.

In fact, if the wage gaps were found to be identical between survey years, *this* would be a surprising outcome given (i)) to (iii)) above. Instead, the finding that the wage gaps between survey years are relatively similar but *demonstrate the same trend*—that wage gaps *increase* as the severity of disability *increases*—lends a great deal of credibility to the statistical analysis of all survey years in Tables 3 and 4.

V. CASES THAT HAVE ACCEPTED AND USED STATISTICS CANADA'S DISABILITY SURVEYS

The wage deficit approach has been accepted in several cases in Alberta from which judges have used it to calculate or evaluate the plaintiff's income losses, including *Adams v Canada (Attorney General)*,[141] *Mahe v Boulianne*,[142] *Russell v Turcott*,[143] and *Dabrowski v Robertson*.[144] This author presented evidence about the usage of Statistics Canada's disability surveys in each case.

In an earlier case, *Olson v General Accident Assurance Co. of Canada* (1998),[145] Binder J. reiterated the principles from *Pallos* and applied the four criteria in *Brown* and *Kwei* to assess Mr.

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140 For more information about the differences between the 2001/2006 PALS and the 2012/2017 CSD disability screening methodologies, see *CSD 2012 CM Guide, supra* note 90 at 44–48; *CSD 2017 CM Guide*, *supra* note 17 at 52.

141 2015 ABQB 527 at paras 153–56 [*Adams*]. The author testified on behalf of the defendants in this case.

142 2008 ABQB 680 at para 93 [*Mahe*]. The author testified on behalf of the plaintiff in this case.

143 2009 ABQB 19 at paras 298–319 [*Russell*]. The author testified on behalf of the plaintiff in this case.

144 *Supra* note 10 at paras 157–64. The author testified on behalf of the plaintiff in this case.

145 1998 ABQB 405 [*Olson*]. The author testified on behalf of the plaintiff in this case.

Olson's loss of future earning capacity.[146] The award granted in *Olson* was based on the loss of 50% of Mr. Olson's projected income ($330,000 per year) for four years following age 61.[147] The Alberta Court of Appeal affirmed the trial judge's award but concluded that the yearly loss at age 61 must be discounted to present value.[148]

In *Adams*, Justice Dario preferred the use of -16% reduction in earnings by this author based on a "mild" disability rating from the 2001/2006 PALS data.[149] Although the court found that a future loss of income was not appropriate in this case, Justice Dario provisionally assessed the plaintiff's damages and determined that a -16% reduction in earnings would have been applicable based on the plaintiff's evidence.[150] Specifically, she concluded:

> [153] Although I have found no loss of future income has been established, had I not made such a determination, the following are my findings had Mr. Adams established future loss as a reasonable possibility. There are problems with the assumptions relied on by each of the economic experts. Mr. Adams' expert assumed him to be an average full-time employee and compared him against certain labour groups. *The Defendant's expert assumed future work parameters that are more realistic, but it is not clear whether the discount rate she used (based on a "mild disability" reduction of 16%) was appropriate*.
>
> [154] Of the two economic experts, I prefer both the assumptions relied upon and the methodology used by the Defendant's expert, for various reasons. Regarding methodology for example, Mr. Adams' expert made allowance for real growth for "without incident" income, but held the "with incident" income at a no growth constant dollar amount. Mr. Adams contests the method by which the Defendant's expert arrived at the level of disability to apply in her calculations. *Nevertheless, I find that the*

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146 See *ibid* at para 51.

147 *Ibid* at paras 52–53.

148 2001 ABCA 91 at paras 28–31.

149 *Supra* note 141 at para 154. The author testified on behalf of the defendant in this matter.

150 *Ibid* at paras 153–54.

> *Defendant's expert evidence is preferable even taking into account this concern.* In coming to this conclusion, I must balance Mr. Adams' residual issues—such as memory problems and other mental and cognitive functional difficulties—may be attributable to his crack cocaine and marijuana addictions rather than to the attack. *I accept that a mild disability rating is acceptable in light of the Plaintiff's evidentiary issue*.[151]

In *Mahe*, Marshall J considered the 1991 HALS and 2001 PALS data presented by this author on the plaintiff's behalf:

> [93] I accept the Health and Activity Limitation Survey and Participation and Activity Limitation Survey ["HALS-PALS"] approach to ascertaining the effect of disability on earnings. The Plaintiff has less than 11 years of working life before likely retirement. One to two of those years will probably be spent in retraining. When this is considered along with this disability, I conclude that he should be compensated on the basis of a very severe disability with a 49% PALS reduction in earnings as set out in scenario A2 B3 on page 5 of Exhibit 18.[152]

In *Dabrowski*, Veit J considered the 1991 HALS and 2001 PALS data presented on the plaintiff's behalf.[153] Even though Veit J did not award damages in this case because she found no liability on the part of the defendant, she stated the following with regard to the use of these disability surveys with respect to making an award for loss of income:

> [155] Had the court concluded that Ms. Robertson was to some degree negligent with respect to the accident, it would have concluded that, as of the date of trial, Mr. Dabrowski had, essentially, recovered from the accident: as of the date of trial, Mr. Dabrowski held a truck driving job that is similar to the job he had before the accident, he is making more money than he made at the time of the accident, his depression and anxiety are manageable, as is his highway driving at speed phobia . . .

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151 *Ibid* at paras 153–54 [emphasis added].

152 *Mahe*, *supra* note 142 at para 93.

153 At the time this author prepared a report for this matter, the 2006 PALS dataset had not been released, and the 2012 CSD had not been conducted yet by Statistics Canada.

[157] Nonetheless, the court would have gone on to conclude that Mr. Dabrowski had established, through Cara Brown's HALS/PALS analysis, that it was possible that he would suffer some loss of income in the future, although that loss would be based on a minor or moderate level of disability rather than the severe level of disability used by Ms. Brown.

(i) The HALS/PALS analysis

[158] Had the court concluded that Mr. Dabrowski was entitled to recovery, it would have agreed with Mr. Dabrowski's economist, Cara Brown, on her endorsement of the HALS/PALS approach to using statistical data to predict the probable effect of disability of a member of the labour force. This approach is particularly important in a situation such as the one here where Mr. Dabrowski eventually returned to the labour force, and was earning more money at the time of trial than he had been earning at the time of the accident. As Ms. Brown puts it:

> The impairment suffered by the plaintiff may not have translated into a loss of earnings because of a 'boom' in the plaintiff's industry (generating increase in earnings beyond the pre-incident income levels regardless of the plaintiff's reduced capacity) . . .

[160] In this case, Dr. Jomha has provided evidence to the effect that Mr. Dabrowski should expect to feel the results of his ankle injury permanently.

[162] …even accepting Ms. Brown's approach, I would not, as she has, classified Mr. Dabrowski's impairment as ["]severe" or "very severe". In modifying her approach, I would have relied on Ms. Brown's own standards:

> The validity with which the HALS or PALS data represents the plaintiff's reduced earning capacity in the future depends on medical or vocational prognostications about the plaintiff and the degree of severity the plaintiff will suffer, such severity being defined by the HALS and PALS surveys.

[163] Here, I would place Mr. Dabrowski's impairment in the moderate category.

> [164] In the result, the court has estimated Mr. Dabrowski['s] future loss of income at $50,000.00.[154]

Veit J emphasized the necessary links needed with the results of Statistics Canada's disability surveys to the assessment of Mr. Dabrowski's injury by Dr. Jomha[155] and in her revision of Mr. Dabrowski's severity of disability from "severe" or "very severe" to "moderate".[156] This is an excellent example of the trial judge's concern (and remedy) about tailoring the wage deficit approach to an individual plaintiff, the same issue that arose in *McColm*.

Justice Rooke commented at length on the HALS/PALS approach used by this author in *Russell*. He accepted the regression analysis that had been undertaken and assessed Ms. Russell's impairments as "moderate", which he noted dovetailed with the plaintiff expert's vocational assessment of Ms. Russell.[157] Nonetheless, Justice Rooke was alive to some of the concerns about the data, in that the two surveys are not *directly* comparable as a time series (the definition of disability changed between the HALS survey in 1991 and the PALS survey in 2001),[158] that the

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154 *Supra* note 10 at paras 155 – 164.

155 *Ibid* at 160.

156 *Ibid* at 163.

157 *Russell*, *supra* note 143 at para 19,

158 The definition of disability used in the 1991 HALS survey was "any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being": Statistics Canada, *The 1991 Health and Activity Limitation Survey Microdata File – Adults in Households User's Guide* (Ottawa: Statistics Canada, September 1994) at 7, citing *International Classification of Impairments, Disabilities and Handicaps* (World Health Organization, 1980) at 143. The 1986 and 1991 HALS surveys adopted the 1980 *International Classification of Impairment, Disability and Handicap* (ICIDH) model of disability. "It modelled disability as a sequence of events, beginning with an illness or injury that caused a change or impairment to a person's ordinary level of functioning": Statistics Canada, *Living with disability series – Defining Disability in the Participation and Activity Limitation Survey* (2009). The definition of disability used in the 2001 PALS survey was "an activity limitation or participation restriction associated with a physical or mental condition or health problem": Statistics Canada, *Participation and Activity Limitation Survey 2006: Technical and Methodological Report* (2006) at 8. This definition was based on the

estimates of loss differ between surveys (the percentage wage loss estimates were computed to be larger from the 2001 PALS survey than from the 1991 HALS survey), and that the description of the approach was described with words such as "possibility" and "could".[159]

Justice Rooke also grappled with the application of HALS/PALS to Ms. Russell because even though he concurred with this author's statement that "[it] is *sometimes* difficult to quantify how disabling conditions may translate into loss of earnings",[160] Ms. Russell's injury had manifested at the date of incident and for a few years thereafter, but it was not certain that it would "occur sometime in the future."[161] Justice Rooke appeared to want to assess any award accurately given that Ms. Russell's impairments could either resolve after attendance at a chronic pain clinic, or that she could still experience a future loss of income in the long term.[162] Justice Rooke summarizes the dilemma that he saw in this case:

> [313] Where there would be a clear determination of a future loss of income, and a reasonable assessment of its playing out over time, the type of analysis done by Ms. Brown should be applied at the appropriate level of severity of impact, on a most reasonable assumption of occupation. However, that is not clear here. Nevertheless, I am prepared to accept that there is some *existent* contingency for potential future loss of income. But again, the *extent* of that contingent loss is not clear. Where the *existence* of loss is uncertain, even where accepted, and the *extent* of loss is not clear, I believe it appropriate to contemplate a form of "quick start" (my term) with a lump sum payment for the contingency.[163]

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classification by the *International Classification of Functioning, Disability and Health* (ICF) from the *World Health Organization (WHO)*.

159 *Russell*, *supra* note 143 at paras 298–306.

160 *Ibid* at para 304 [emphasis added].

161 *Ibid* at paras 307–12.

162 *Ibid* at para 312.

163 *Ibid* at para 313 [emphasis in original].

Justice Rooke's final decision regarding Ms. Russell's potential loss of income in the future resulted in a lump sum award of $100,000.[164]

The 1991 HALS approach was presented in *Jones v Cheesebrough*[165] by this author and commented on by the trial judge as being consistent with the losses awarded by the court.[166] In *Robinson v Williams Estate*,[167] Veit J commented on this author's testimony and awarded a provisional income loss award based on a HALS-type approach:

> [T]here is a wage gap between a person who has the kind of mild/moderate functional disability for employment purposes suffered by Mr. Robinson . . . and a fully able-bodied worker. That wage gap is in the range of 3–6%. In the circumstances here, this results in a probable yearly deficit for Mr. Robinson in the range of $3,000–$3,500.[168]

VI. DISCUSSION

Although the judge stated in *Mulholland (Guardian ad litem of) v Riley Estate*[169] that the task of the court is to assess the losses and not adhere to rigid mathematical calculations, many judges start with some sort of quantitative benchmark to make an economic loss award. Examples are the "one-year rule" from *Pallos* (which awards income losses based on one-year's salary) or, as in *Bucholtz v Zhang,*[170] where an award was granted based on a 1.5-year loss in working life years.

This paper offers economic evidence for employing the "capital asset" approach using analysis of the experiences of actual disabled Canadians. In many decided cases in British Columbia,

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164 *Ibid* at para 316.

165 2003 ABQB 196.

166 See *ibid* at para 98. Lomas J commented on this author's approach of using a 7% deficit based on the 1991 HALS research.

167 2005 ABQB 659. The author testified for the defendants in this case.

168 *Ibid* at para 79.

169 (1995) 12 BCLR (3d) 248 (CA), 63 BCAC 145 at para 43.

170 2020 BCSC 571.

counsel or the trier of fact may suggest a percentage loss is appropriate to represent a plaintiff's potential income loss. The wage deficit approach (WDA) assists this procedure by supplying quantitative data to buttress the percentage loss applied to the plaintiff's income stream.

A. Limitations of Statistics Canada's disability surveys

We could not locate any studies in Canada or elsewhere that identified drawbacks of Statistics Canada's disability surveys.[171] However, based on this author's experience, some counsel may be skeptical of such surveys (despite their top-notch statistical properties) because they are based on self-recall by disabled people. While there is acknowledgement that recalled information (without verification) may not be entirely accurate due to the limits of people's memory, the questions asked in the disability surveys about the impact on employment and income are factual and do not depend on people's impressions or interpretations (see Table 2 above). Even if a longitudinal study were conducted (following the same disabled people over time), there are few (if any) ways to retrieve the information than by query and answer.

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171 "Canadian Survey on Disability" (accessed on 18 February 2021), online: *Simcoe Muskoka HealthSTATS* <www.simcoemuskokahealthstats.org/resources/data-sources/canadian-survey-on-disability>; Statistics Canada, *The evolution of disability data in Canada: Keeping in step with a more inclusive Canada* by Adele Furrie Catalogue No 89-654-X2018003 (Ottawa: Statistics Canada, November 2018); Brian May, *Taking Action: Improving the Lives of Canadians Living with Episodic Disabilities*, (Ottawa: House of Commons Canada, March 2019); Catalina Devandas-Aguilar, *End of Mission Statement by the United Nations Special Rapporteur on the Rights of Persons with Disabilities*, Office of the United Nations High Commissioner for Human Rights, 12 April 2019; Employment and Social Development Canada, *Current Disability Data Options: Surveys*, National Conference on Disability and Work in Canada, December 4–5, 2018; World Health Organization. *World Report on Disability*, 2011; Organisation for Economic Co-operation and Development. *Sickness, Disability and Work: Breaking the Barriers – Canada: Opportunities for Collaborations*, 2010; and Department of Economic and Social Affairs Statistics Division, *Guidelines and Principles for the Development of Disability Statistics,* United Nations, 2001 (ST/ESA/STAT/SER.Y/10).

The advantage of using the disability surveys, however, is that they provide independent verification of the real impacts of disability on employment and income of Canadians. In other words, the respondents to these surveys are not the same plaintiffs involved in civil litigation. The respondents have no vested interest in manipulating the results of the surveys.

B. Concerns identified by BC courts

The most common refrain arising from the British Columbia cases where the use of the 1986/1991 HALS or 2012 CSD surveys was not relied upon by the courts is that the expert evidence offered to them did not establish a specific link to the plaintiff, and hence was too broad. This author attempts to ameliorate this concern by:

a) Obtaining the actual datasets (1991 HALS,[172] 2001 PALS, 2006 PALS, 2012 CSD, and 2017 CSD) from Statistics Canada.
b) Solving the identification question by using Statistics Canada's definition of disability, which depends not only on the respondent answering affirmatively to *being* disabled, but also about *if or how that disability translates into functional limitations.*
c) Controlling for other known influences on wages (age, education level, occupation, geography) so that the equations specified above isolate the impact of disability (all else held constant). This involves using econometric (regression) techniques, not using "simple averages". The latter will generally overstate the impact of disability.
d) Considering the problem of "self-selection", that is, because people choose whether or not to enter the labor market (defined by economists as the choice to "participate"), *the disability data analyzed herein only*

[172] Results from analysis of the 1991 HALS are not included in this paper because the PALS and CSD surveys cover the past 20 years. For more information about the 1991 HALS results, see Brown & Emery, *supra* note 89 at 22 and at 46 (Table 6).

includes disabled people who were working at the time of the surveys.[173] People who are so disabled they cannot work (i.e., "participate") are excluded entirely from all survey samples, so the results only apply to disabled persons who are, to some degree or extent, still able to engage in paid work.

e) Narrowing the applicability of the regression results by gender, severity, and type of disability. In doing so, we can better match the statistical results to the claimant, especially when they complete the Statistics Canada questionnaire to determine their severity and type of disability.

f) Testing the regression results to determine if the wage deficits are "statistically significant", and only presenting these results (see Tables 3 and 4 above).[174]

g) Confirming the results of the disability surveys from four independent samples reflecting four different years (2000, 2005, 2010 and 2015).[175] In all years, the statistically significant coefficients (percentages) were negative (income declined if a disability existed), and in all years the impact on income of disability worsened as the severity of disability increased.

h) Linking the results from the disability surveys to the claimant by having them complete the excerpted questionnaire created by Statistics Canada, and adducing healthcare evidence which speaks to the plaintiff's deficits.

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173 Accomplished through the 2-stage Heckman analysis and estimating Probit equations, as described in section III(c)(iii) "Regression equations used to calculate wage deficits", *above*.

174 For example, in Table 4, *above*, there are fields that contain "---*" instead of a numerical percentage. The asterisk means "this result is not statistically significant".

175 The disability surveys in 2001, 2006, 2012 and 2017 captured income data for the same years as the Census surveys (2000, 2005, 2010 and 2015).

To reject results derived from sound econometric analysis of the disability surveys (and statistically significant results) by arguing they do not apply to a specific plaintiff is like discarding the essence of sampling theory. Attempting to discover the impact of disability by surveying the *entire* disabled population is time- and cost-prohibitive, as well as impractical. Instead, statisticians and economists draw random samples from a population and investigate with regression analysis whether the results from the sample can be reliably generalized to a disabled person in Canada. And because the variability in estimates decrease as the sample sizes increase, we *observe statistically significant and highly consistent results from all four disability surveys.* The results summarized in Tables 3 and 4, *above*, tell us that it is safe to extrapolate Statistics Canada's disability data to a specific plaintiff.

This does not mean that the plaintiff's score on the disability questionnaire is the last word about the impact of disability on them. Certainly, the trier of fact hears all types of evidence (medical, vocational, neuropsychological) about the impact of the injury on the claimant. The WDA could add another piece of evidence, if found to be of use to the court.

C. Limitations of Econometrics

One of the most common and frequent criticisms of econometrics as a tool for measuring economic activity and explaining causal connections is that a model, consisting of equations, may be mis-specified or omit important variables.[176] Such misspecifications or omissions do not imply that such variables were considered and (erroneously) rejected; rather, it may well be that there are other phenomena (economic or otherwise) that do not lend themselves (easily or at all) to quantification. As one critic of econometrics argues:

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[176] Peter CB Phillips, "Laws and Limits of Econometrics" (2003) 113:486 The Economic Journal; David A Freedman, "Limits of Econometrics" (2009) Intl Econometric Rev 5; John M Keynes, "The League of Nations Professor Tinbergen's Method" (1939) 49:195 The Economic J 558.

> Statistical—and econometric—patterns should never be seen as anything other than possible clues to follow. Behind observable data, there are real structures and mechanisms operating, things that are—if we really want to understand, explain and (possibly) predict things in the real world—more important to get hold of than to simply correlate and regress observable variables.[177]

As the above-noted author contends: "econometric modelling should never be a substitute for thinking".[178] The court, therefore, can view the data embodied in the WDA as "possible clues to follow" but ultimately weighs all the relevant evidence when granting an award for potential income loss.[179] The method suggested in this paper is a way to help the trier of fact match the existing disability data as best as can be accomplished to the claimant's characteristics.

The decisions in *Brown* and *Pallos* represent cases where British Columbia courts may positively receive evidence of economic loss using the WDA**.** But it is just as clear from cases decided since *Brown* and *Pallos* that the information from Statistics Canada's disability surveys must be analyzed properly to assist the court, and such evidence is helped by forging a link to the claimant. The judge in *McColm* was correct in rejecting the plaintiff expert's broad, sweeping average of 55% to represent a potential income deficit. Economists working as experts in civil litigation can do much better in supplying the court with more tailored results. Regression analysis permits us to tailor the disability surveys to a much greater extent to the claimant than "simple averages", which serve to obscure individual differences rather than illuminate them.

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177 Lars Syll, "The Main Reason Why Almost All Econometric Models are Wrong" (2018) 8:3 WEA Commentaries 5 at 8.

178 *Ibid* at 9.

179 *Ibid* at 8.

D. APPLYING THE WAGE DEFICIT APPROACH (WDA)

When medical and/or vocational evidence indicates that a claimant will suffer impediments in the future, *but the precise nature of such impairments is unknown (or difficult to quantify) at the time of settlement or trial,* the data from the PALS and CSD surveys help us "proxy" the future impact of an injury or impairment. To utilize the wage deficit approach for a specific claimant, two steps must be completed:

1) Obtain medical, neuropsychological, and/or vocational evidence attesting to the claimant's impairments and that these impairments will affect his or her income or work capacity in the future; and
2) Have the plaintiff complete the same Statistics Canada questionnaire as filled out by 2012/2017 *Canadian Survey on Disability* (CSD) respondents to determine their level of severity and/or type of disability.[180]

The WDA reflects the idea that *if* the trier of fact concludes that the plaintiff has and will continue to experience some of the impacts that mildly, moderately, severely or very severely disabled individuals in Canada experience, then the WDA can quantify the plaintiff's potential income loss based on the actual experiences of working Canadians who suffer from a "mild," "moderate," "severe" or "very severe" disability (see Table 3). Alternatively, the wage gaps from Table 4 based on *type* of disability can also be used to assess future income losses in the same way by matching one of the type categories to the claimant's health impediments.

[180] As discussed in section IV(c) above, this author has designed a plaintiff-specific questionnaire which reproduces key questions from Statistics Canada's 2012/2017 CSD surveys. It is published in Appendix 5C in Brown, *Damages*, *supra* note 8 or available from the author by emailing cara.brown@browneconomic.com. This questionnaire must be subsequently returned to Brown Economic Consulting for scoring before it can be used.