

UNDERSTANDING THE USE OF “GENETIC PREDISPOSITION” IN CANADIAN LEGAL DECISIONS

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Since the advent of the Human Genome Project in 1989, the ethical, legal, and social implications inherent in future genetic science and its applications have worried researchers and scholars in law and ethics. Concern that the results of genetic testing might be used to discriminate against particular individuals and groups of individuals has been paramount, prompting calls for specific legislation to protect against genetic discrimination. Against this backdrop we sought to investigate instances of genetic discrimination in Canadian legal decisions. We searched Canadian court and administrative tribunal decisions, using the key words “genetic predisposition” and its cognates, and found none that took up the issue of genetic discrimination. However, in 468 decisions, “genetic predisposition” was used by courts and tribunals when describing the causal origins of health related conditions. Genetic predisposition was cited with respect to numerous health conditions, and in various areas of law, in particular criminal, family, workers’ compensation, and tort. In several criminal law decisions, genetic predisposition served to explain the origin of a mental health condition in addressing the issue of criminal responsibility. The predominant use in family law was in describing a child’s health condition in crown

Depuis la mise en place du « Projet génome humain » en 1989, les implications éthiques, légales et sociales inhérentes au futur de la génétique et de ses applications ont soulevé une certaine inquiétude chez les chercheurs et spécialistes de l’éthique et du droit. Ces appréhensions graves sur le fait que les résultats de tests génétiques puissent être utilisés pour discriminer certains individus ou groupes de personnes en ont incité plusieurs à demander qu’on légifère de façon spécifique afin de contrer la discrimination génétique. C’est dans ce contexte que nous avons voulu enquêter sur les cas de discrimination génétique dans les décisions légales canadiennes. Nous avons effectué nos recherches parmi les décisions des cours et tribunaux administratifs canadiens, utilisant les mots-clés « prédisposition génétique » et leurs parents, mais n’avons trouvé aucune décision abordant la discrimination génétique. Cependant, « prédisposition génétique » fut utilisé dans 468 décisions pour décrire les causes d’une grande variété de problèmes de santé, et ce dans divers domaines du droit, en particulier le droit criminel, de la famille, la responsabilité extra-contractuelle et l’indemnisation de travailleurs. Dans plusieurs décisions de droit criminel, la prédisposition génétique fut utilisée comme explication

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Acknowledgements: We acknowledge funding from Genome Canada and the Ontario Genomics Institute

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Citation: Mark Pioro et al “Understanding the Use of ‘Genetic Predisposition’ in Canadian Legal Decisions” (2013) 7:1 McGill JL & Health 1.

Référence : Mark Pioro et al « Understanding the Use of ‘Genetic Predisposition’ in Canadian Legal Decisions » (2013) 7 : 1 RD & santé McGill 1.

wardship and youth protection proceedings. In workers' compensation and tort, genetic predisposition was used to argue whether the claimant's condition was inherited rather than related to the workplace or the negligence of the defendant. Genetic predisposition, when used to argue the issue of disease causation on a balance of probabilities, reflects "geneticization": the tendency to describe the underlying basis of health and disease as genetic. Geneticization, like genetic discrimination, can be problematic. Specifically, both may exaggerate the extent to which genetic information is exceptional and determinative of health and disease outcomes. Also, geneticization, like genetic discrimination, may marginalize people on a perceived genetic basis.

pour la source de troubles de santé mentale lors de la détermination de la responsabilité criminelle. L'usage le plus courant en droit de la famille fut pour décrire l'état de santé d'un enfant dans le cadre de procédures touchant la tutelle de l'état et la protection de la jeunesse. Dans le cas de la responsabilité extra-contractuelle et l'indemnisation de travailleurs, la prédisposition génétique fut utilisée dans des cas où l'on voulait déterminer si la condition d'un demandeur lui avait été transmise ou si elle était plutôt liée au lieu de travail ou à la négligence du défendeur. La prédisposition génétique, lorsqu'utilisée dans le cadre d'arguments sur la causalité d'une maladie sur la balance des probabilités, reflète la « génétisation » : la tendance à décrire l'origine de la maladie et de l'état de santé comme étant génétique. Or, la génétisation, tout comme la discrimination génétique, peut devenir problématique. Toutes deux peuvent exagérer l'étendue du caractère distinctif et déterminatif de l'état de santé qu'ont les renseignements génétiques. De plus, la génétisation et la discrimination génétique peuvent marginaliser certaines personnes sur la base d'une perception de condition génétique.

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Introduction

Since the Human Genome Project set out in 1989 to map and sequence the human genome,¹ scholars have considered the ethical, legal and social implications of the Project.² A particular concern identified early was that of “genetic discrimination”, which has been defined as “the denial of rights, privileges or opportunities on the basis of information obtained from genetically-based diagnostic and prognostic tests.”³ Genetic discrimination has been anticipated in the employment and insurance contexts in particular.⁴ In Canada, where individuals receive publicly-funded health care, discrimination has been thought more likely to occur in relation to disability⁵ or life in-

¹ James D Watson, “The Human Genome Project: Past, Present, and Future” (1990) 248:4951 *Science* 44.

² See e.g. Michael S Yesley, “What’s ELSI Got to Do with It? Bioethics and the Human Genome Project” (2008) 27:1 *New Genet Soc* 1; George J Annas, “At Law: Who’s Afraid of the Human Genome?” (1989) 19 *Hastings Cent Rep* 19:4; Roxanne Mykitiuk & Steven Penney, “Screening for Deficits: The Legal and Ethical Implications of Genetic Screening and Testing to Reduce Health Care Budgets” (1995) 3 *Health LJ* 235; Eric T Juengst, “Priorities in Professional Ethics and Social Policy for Human Genetics” (1991) 266:13 *JAMA* 1835; Lori B Andrews et al, eds, *Assessing Genetic Risks: Implications for Health and Social Policy* (Washington, DC: National Academies Press, 1994).

³ Larry Gostin, “Genetic Discrimination: The Use of Genetically Based Diagnostic and Prognostic Tests by Employers and Insurers” (1991) 17:1&2 *Am J L & Med* 109 at 110.

⁴ See e.g. *ibid*; Mark A Rothstein, “Genetic Discrimination in Employment and the Americans with Disabilities Act” (1992) 29:1 *Hous L Rev* 23; Marvin R Natowicz, Jane K Alper & Joseph S Alper, “Genetic Discrimination and the Law” (1992) 50:3 *Am J Hum Genet* 465; Jill Gaubing, “Race, Sex, and Genetic Discrimination in Insurance: What’s Fair?” (1994) 80 *Cornell L Rev* 1646; C Lee, “Creating a Genetic Underclass: The Potential for Genetic Discrimination by the Health Insurance Industry” (1993) 13:1 *Pace L Rev* 189; RJ McMurray et al, “Use of Genetic Testing by Employers” (1991) 266:13 *JAMA* 1827; Kathy L Hudson et al, “Genetic Discrimination and Health Insurance: An Urgent Need for Reform” (1995) 270:5235 *Science* 391.

⁵ Trudo Lemmens, “Selective Justice, Genetic Discrimination, and Insurance: Should We Single Out Genes in Our Laws?” (2000) 45:2 *McGill LJ* 347 at 352-53.

insurance.⁶ We initially sought to examine Canadian case law relating to genetic discrimination, but broadened our study to explore whether and how the language and knowledge of genetics are being used in Canadian court and tribunal decisions. Our focus was on how courts and tribunals were using, if at all, genetic information relating to disease causation or a health-related condition in question, rather than other factors (for example, genetic kinship). It is information of this kind that has begun to be produced by research and reported in the scientific literature,⁷ and which has the potential to lead to genetic discrimination.⁸ Understanding how, and in what contexts, courts and administrative tribunals use genetic language and knowledge can provide insight into the legal meaning of personal genetic information as well as the processes of legal decision making through which genetic information is used and possibly, abused.

This paper argues that adversarial legal processes, in their use of genetic concepts of disease causation, contribute to and reflect the geneticization of health and disease, with "disorders, behaviours and physiological variations defined, at least in part, as genetic in origin."⁹ This occurs because scientific uncertainty in light of the multiple risk factors and mechanisms of disease, combined with the general principle that the burden of proof rests with one

⁶ *Ibid*; Bartha M Knoppers & Yann Joly, "Physicians, Genetics and Life Insurance" (2004) 170:9 CMAJ 1421.

⁷ See e.g. Marcy E MacDonald et al, "A Novel Gene Containing a Trinucleotide Repeat that Is Expanded and Unstable on Huntington's Disease Chromosomes" (1993) 72:6 Cell 971; Richard Wooster et al, "Identification of the Breast Cancer Susceptibility Gene BRCA2" (1995) 378:6559 Nature 789.

⁸ Yvonne Bombard et al, "Perceptions of Genetic Discrimination among People at Risk for Huntington's Disease: A Cross Sectional Survey" (2009) 338:b2175 BMJ; Hudson et al, *supra* note 4; Paul R Billings et al, "Discrimination as a Consequence of Genetic Testing" (1992) 50 Am J Hum Genet 476; S Taylor et al, "Investigating Genetic Discrimination in Australia: A Large-scale Survey of Clinical Genetics Clients" (2008) 74:1 Clin Genet 20. See also Steve E Humphries, Paul M Ridker & Philippa J Talmud, "Genetic Testing for Cardiovascular Disease Susceptibility: A Useful Clinical Management Tool or Possible Misinformation?" (2004) 24:4 Arterioscler Thromb Vasc Biol 628 at 628-29, 634; Ine Van Hoyweghen, Klasien Horstman & Rita Schepers, "Genetic 'Risk Carriers' and Lifestyle 'Risk Takers'. Which Risks Deserve our Legal Protection in Insurance?" (2007) 15:3 Health Care Anal 179 (both discussing the predictive and practical limits of genetic factors of disease in relation to non-genetic factors).

⁹ Abby Lippman, "Prenatal Genetic Testing and Screening: Constructing Needs and Reinforcing Inequities" (1991) 17:2 Am J L & Med 15 at 19.

of the parties on a balance of probabilities, render it sufficient (and economical) to resolve the issue of disease causation without thoroughly examining the genesis of the condition in question. The resolution of claims in this way leaves open the possibility that genetics will stand in for “hidden causes”¹⁰ of disease. For example, in a personal injury case where a condition is found to be compensable, ideas of genetic susceptibility may serve to differentiate individuals subject to common exposures where only some become or remain ill.¹¹ Likewise, where the required causal link is found not to exist, the origin of the condition may conveniently be ascribed to genetic predisposition itself.¹² While genetic discrimination was not at issue in any of the decisions we surveyed, our findings nonetheless raise concern. This is because geneticization, like genetic discrimination, may reflect a problematic view of the extent to which genetic information is exceptional, and determinative of health and disease outcomes.¹³ The next section provides background on legal and policy responses to the threat of genetic discrimination as well as how the scope of this paper was set. The paper then sets out the research methodology used to obtain and analyze the sample of decisions it considers. It first presents the results as an overview of the sample of decisions retrieved. Specifically, decisions are catalogued by jurisdiction, area of law, and the clinical condition in respect of which “genetic predisposition” is being cited. This overview sets the stage for classification of the various ways in which reference to genetic predisposition resolves different legal issues. The results are then discussed, particularly with regards to the way in which legal decision making may contribute to the geneticization of health and disease. Finally, this paper comments on the implications of geneticization in legal decision making from a disability rights perspective.

¹⁰ Michel Morange, *The Misunderstood Gene* (Cambridge, MA: Harvard University Press, 2001) at 12.

¹¹ See e.g. *Kolokathis et Industries Maintenance Empire* (22 January 2002), 114774-71-9904 at para 37, online: QCCLP <www.clp.gouv.qc.ca> [*Kolokathis*].

¹² See e.g. *Decision no 2008-1082* (10 December 2008), 2008 CanLII 85217, online: AWCAC <www.appealscommission.ab.ca>; *Decision no 2004-05655* (27 October 2004), 2004 CanLII 71273, online: BCWCAT <www.wcat.bc.ca>.

¹³ Péter Kakuk, “Genetic Information in the Age of Genohype” (2006) 9:3 *Med Health Care Philos* 325 at 335. See also Rochelle Cooper Dreyfuss & Dorothy Nelkin, “The Jurisprudence of Genetics” (1992) 45:2 *Vand L Rev* 313 (discussing genetic essentialism at 320-21); Susan M Wolf, “Beyond ‘Genetic Discrimination’: Toward the Broader Harm of Geneticism” (1995) 23:4 *JL Med & Ethics* 345 (Wolf goes farther by arguing that even when scientifically accurate, describing people in terms of genetic is still problematic, at 350).

I. Background

Individuals¹⁴ and government agencies¹⁵ have proposed a variety of legislative and policy responses to genetic discrimination and other ethical concerns stemming from developments in human genetics. International bodies have advocated for a use of genetic data that respects human rights and dignity.¹⁶ A majority of American states have restricted use of an individual’s genetic information by health insurers and employers.¹⁷ At the federal level, the *American Genetic Information Nondiscrimination Act* (“GINA”) of 2008¹⁸ prohibits discrimination in employment and health insurance based on genetic information. Disability discrimination and health information privacy

¹⁴ See e.g. Hudson et al, *supra* note 4; Karen Eltis, “Genetic Determinism and Discrimination: A Call to Re-Orient Prevailing Human Rights Discourse to Better Comport with the Public Implications of Individual Genetic Testing” (2007) 35:2 *JL Med & Ethics* 282; Bartha Maria Knoppers, “Overview of Law and Policy Challenges” (December 2005) 66 *La L Rev* 21.

¹⁵ See e.g. Privacy Commissioner of Canada, “Genetic Testing and Privacy” (Ottawa: PCC, 1995), online: PCC <www.priv.gc.ca/information/02_05_11_e.pdf>; United Kingdom, Department of Health, “Our Inheritance, Our Future: Realising the Potential of Genetics in the NHS” (London: DH, 2003), online: Department of Health <www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4019239.pdf>; United States, Department of Health & Human Services, *U.S. System of Oversight of Genetic Testing: A Response to the Charge of the Secretary of Health and Human Services. Report of the Secretary’s Advisory Committee on Genetics, Health, and Society* (Bethesda, SACGHS, 2008), online: DHHS <oba.od.nih.gov/oba/sacghs/reports/sacghs_oversight_report.pdf>.

¹⁶ See e.g. Universal Declaration on the Human Genome and Human Rights, UNESCO (11 November 1997); International Declaration on Human Genetic Data, UNESCO (16 October 2003); Resolution 2004/9 on Genetic Privacy and Non-discrimination, E/RES/2004/9, ECOSOC (21 July 2004).

¹⁷ National Conference of State Legislatures, “Genetics and Health Insurance State Anti-Discrimination Laws” (January 2008), online: NCLS <www.ncsl.org/issues-research/health/genetic-nondiscrimination-in-health-insurance-laws.aspx>; National Conference of State Legislatures, “Genetic Employment Laws” (January 2008), online: NCLS <www.ncsl.org/issues-research/health/genetic-employment-laws.aspx>.

¹⁸ Pub L 110-233, 122 Stat 881.

legislation also provides some protection against genetic discrimination.¹⁹ In Europe, Article 11 of the *EU Convention on Human Rights and Biomedicine*²⁰ prohibits genetic discrimination and Article 12 restricts the use of genetic testing to health-related purposes. These regulations in the United States and Europe are implemented in a variety of national instruments pertaining to health information privacy and non-discrimination.²¹ Aside from preventing and remedying genetic discrimination, these measures may allay fear of undergoing genetic tests based on concern that discrimination would result.²² In Canada, no formal legislative response has been made regarding genetic discrimination. Scholars and agencies have, however, contemplated various courses of action including strengthening existing privacy and human rights legislation, and creating separate legislation to address the issue.²³

¹⁹ National Human Genome Research Institute, “Existing Federal Anti-Discrimination Laws and How They Apply to Genetics” (28 February 2012), online: NHGRI <www.genome.gov/12513979>; *Americans with Disabilities Act*, 42 USC § 12101 (1990); *Health Insurance Portability and Accountability Act of 1996*, Pub L 104-191, 110 Stat 1936.

²⁰ Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine, 4 April 1997, 2137 UNTS 171, Eur TS164.

²¹ Nancy J King, Sukanya Pillay & Gail A Lasprogata, “Workplace Privacy and Discrimination Issues Related to Genetic Data: A Comparative Law Study of the European Union and the United States” (2006) 43:1 Am Bus LJ 79 at 82-83.

²² See Louise A Keogh et al, “Is Uptake of Genetic Testing for Colorectal Cancer Influenced by Knowledge of Insurance Implications?” (2009) 191:5 Med J Aust 255.

²³ See e.g. Trudo Lemmens, Daryl Pullman & Rebecca Rodal, Genome Canada, “Revisiting Genetic Discrimination Issues in 2010: Policy Options for Canada”, Policy Brief No. 2, (Ottawa: GPS, 2010), online: Genome Canada <www.genomecanada.ca/medias/pdf/en/GPS-Policy-Directions-Brief-2-EN.pdf>; Trudo Lemmens, Mireille Lacroix & Roxanne Mykitiuk, *Reading the Future?: Legal and Ethical Challenges of Predictive Genetic Testing* (Montréal: Les Éditions Thémis, 2005); Jo Ann Watton, “Fighting Genetic Discrimination in Canada: A New Coalition Takes Up the Cause” (2008) 22:6 GeneWatch 21, online: Council For Responsible Genetics <www.councilforresponsiblegenetics.org/GeneWatch/GeneWatchPage.aspx?pageId=229>; Québec, Conseil de la santé et du bien-être, “La santé et le bien-être à l’ère de l’information génétique: enjeux individuels et sociaux à gérer” (Québec: Conseil de la santé et du bien-être, 2001), online: FQRSC <www.fqrsc.gouv.qc.ca/upload/editeur/etique/avissante_bienetre.pdf>; Privacy Commissioner of Canada, *supra* note 15; Ontario Law Reform Commission, “Report on Genetic Testing” (Toronto: Queen’s Printer, 1996),

Against this backdrop of concern about genetic discrimination, we investigated whether Canadian case law since the inception of the Human Genome Project indicates a record of allegations of genetic discrimination.²⁴ We performed Quicklaw searches of the “All Canadian Court Cases” and “All Boards and Tribunals” databases for “genetic discrimination” as a phrase, which revealed no results. A CanLii search also produced no results. We then searched both “genetic” and “discrimination” separately and found no cases that raised the issue of genetic discrimination. We also reviewed the academic literature addressing genetic discrimination in Canada and found two noteworthy cases not identified from our keyword search. Although these cases do not discuss genetic discrimination as an issue, they provide background on how Canadian law might approach claims of genetic discrimination.

The 1990 Superior Court of Québec decision in *Audet v Industrielle-Alliance*²⁵ concerned a life insurance policy-holder who died in an automobile collision. His widow claimed benefits under the policy, but the company refused to pay having discovered that the insured had a genetic condition; Steinert disease (a type of muscular dystrophy transmitted in an autosomal dominant pattern). The insured in applying for coverage had denied having any physical or mental anomalies. The court decided in favour of the insurance company and declared the insurance policy void, holding that even though the insured was almost completely asymptomatic, the condition constituted an anomaly and the insured made a false declaration. The facts of this case involve what could be described as genetic discrimination on the part of the insurer, as it sought to deny coverage on the basis of the claimant’s genetic condition.

online: Osgoode Hall Law Library <ia700601.us.archive.org/5/items/reportongenetic00onta/reportongenetic00onta.pdf>; Canadian Biotechnology Advisory Committee, “Protecting Privacy in the Age of Genetic Information” (Ottawa: CBAC, August 2004), online: Government of Canada Publications <publications.gc.ca/collections/Collection/Iu44-19-2004E.pdf> .

²⁴ See Roxanne Mykitiuk et al, “The Potential for Misusing ‘Genetic Predisposition’ in Canadian Courts and Tribunals” (2011) 183:14 CMAJ 1601 [Mykitiuk et al, “The Potential for Misusing”]. This 2011 CMAJ study is based on the same comprehensive electronic search results as the present paper. The short 2011 study analyzes references to genetic predisposition in Canadian legal decisions. It discusses the health conditions cited, the areas of law and legal issues involved, and the purpose of referring to genetic predisposition.

²⁵ *Audet v Industrielle-Alliance, compagnie d’assurance sur la vie*, [1990] RRA 500, [1990] JQ no 2532 (QL) (Qc Sup Ct).

The Supreme Court of Canada decision in *Boisbriand*,²⁶ though it does not involve genetic testing, raised the issue of discrimination on the basis of perceived or future disability. This decision would be relevant to a claim of genetic discrimination because the claimant would have to show that he or she was treated differentially based on a prohibited ground of discrimination. As genetic discrimination involves denying the rights of a person who may not have any clinical symptoms of disability at the time, he or she would have to establish that perceived or future disability is covered by the terms “disability” or “handicap” contained in Canadian human rights legislation. In *Boisbriand*, several employers had refused to hire or retain individuals who, upon medical examination not involving genetic testing, were shown to have particular health conditions. These included Crohn’s disease and an anomaly of the spinal column.²⁷ The conditions, while not affecting functional capability with respect to employment, were nonetheless of concern to the (potential) employers. In defending against allegations of discrimination, the employers argued that a condition not affecting function is not a “handicap” for the purposes of the Québec *Charter of human rights and freedoms*.²⁸ The court, however, took a liberal and purposive approach to interpreting “handicap” based on the quasi-constitutional nature of the Québec *Charter* and on the interpretation of human rights legislation throughout Canada. The court held that “handicap” in the Québec *Charter* includes perceived disabilities. *Boisbriand* has been cited in numerous decisions throughout Canada on the point that disability in human rights legislation includes perceived disability.²⁹ It does not, however, examine when instances of discrimination based on perceived disability are justifiable. This issue would be of importance in the case of refusal to insure or employ someone on the basis of a genetic predisposition or condition.

²⁶ *Québec (Commission des droits de la personne et des droits de la jeunesse) v Montréal (City); Québec (Commission des droits de la personne et des droits de la jeunesse) v Boisbriand (City)*, 2000 SCC 27, [2000] 1 SCR 665.

²⁷ *Ibid* at para 3.

²⁸ RSQ, c C-12 [Québec *Charter*].

²⁹ See e.g. *Vetricek v 642518 Canada Inc (Algonquin Careers Academy)*, 2010 HRTO 757 at para 35, [2010] OHRTD no 697 (QL); *Petterson v Gorcak*, 2009 BCHRT 439 at para 449, [2009] BCHRTD no 439 (QL); *Vantage Contracting Inc v Marcil*, 2004 ABQB 247 at paras 31-32, 27 Alta LR (4th) 262; *Tanzos v AZ Bus Tours Inc*, 2007 CHRT 33 at para 32, [2007] DCDP no 33 (QL); *New Brunswick (Human Rights Commission) v Griffin’s Pub Ltd*, 2005 NBQB 403 at para 14, 143 ACWS (3d) 899; *Evans v Health Care Corp of St John’s*, 2003 NLCA 13, 121 ACWS (3d) 508.

While our search for decisions of Canadian courts and tribunals dealing with genetic discrimination did not yield any cases directly on point, this does not suggest that incidents of genetic discrimination do not take place. Indeed, studies examining the experiences of those who have developed, or are at risk of developing, a genetic condition have illustrated that discrimination may be occurring.³⁰ Our results demonstrate that within the scope of the search we conducted (as described below) we could not identify legal cases of genetic discrimination. Our search did, however, yield legal decisions raising related issues warranting analysis and discussion.

II. Research Methodology

This paper's methodology is guided by the principles of content analysis, whereby "a scholar collects a set of documents, such as judicial opinions on a particular subject, and systematically reads them, recording consistent features of each and drawing inferences about their use and meaning."³¹ Doing so permits researchers to notice and reflect on patterns in jurisprudence that occur in large numbers of decisions.³² The major limitation of this method stems from the fact that legal decisions do not contain complete and accurate facts and reasons arising from the disputes they concern.³³ Therefore, it is generally not well-suited for predicting legal outcomes, and caution is required in attaching meanings to observations made.³⁴ This very quality, however, makes content analysis effective for studying how judges or adjudicators write decisions, and connecting resulting knowledge with "other parts of the social, political, or economic landscape."³⁵

The first step of content analysis is selection of cases.³⁶ In order to understand how courts and tribunals understand genetic arguments of disease cau-

³⁰ The following studies were conducted wholly or partly in Canada: Bombard et al, *supra* note 8; Billings et al, *supra* note 8. See also for an international perspective Hudson et al, *supra* note 4; Taylor et al, *supra* note 8.

³¹ Mark A Hall & Ronald F Wright, "Systematic Content Analysis of Judicial Opinions" (2008) 96:1 Cal L Rev 63 at 64.

³² *Ibid* at 78. See also Matthew Herder, "Demythologizing PHOSITA: Applying the Non-Obviousness Requirement under Canadian Patent Law to Keep Knowledge in the Public Domain and Foster Innovation" (2009) 47:4 Osgoode Hall LJ 695 at 712.

³³ Hall & Wright, *supra* note 31 at 100.

³⁴ *Ibid.*

³⁵ *Ibid.*

³⁶ *Ibid* at 79.

sation, we conducted a keyword search for the terms “genetic predisposition”, and cognates “genetic pre-disposition”, “genetically predisposed”, “genetically pre-disposed”, and “prédisposition génétique” (hereinafter referred to collectively as “genetic predisposition”), on Quicklaw, CanLii, and jugements.qc.ca.³⁷ We chose these keywords for our search because they yielded a rich yet manageable sample of decisions to analyze, which contain the unifying theme of reference to the role of genetic factors in health and disease. We complemented these results by searching the websites of individual tribunals listed on these services, where available. This yielded additional results, as the decisions of only some tribunals for some years are available on Quicklaw and CanLii. This was the case with, for example, the Pension Appeals Board (“PAB”) and the British Columbia Workers’ Compensation Appeal Tribunal (“BC WCAT”). Duplicate decisions were removed.

We then coded the decisions citing genetic predisposition for numerous variables, including federal/provincial jurisdiction, area of law, the clinical condition in respect of which a genetic predisposition was cited, the party reported in the decision as raising the issue of genetic predisposition, the legal issue which reference to genetic predisposition served to address, and the outcome of the proceeding. In a large subset of decisions, genetic predisposition was clearly linked with an argument relating to disease causation made in support of a particular legal outcome. In these decisions we noted whether reference to genetic predisposition helped or harmed the interests of the parties (in particular the individual with the supposed predisposition): the existence of the predisposition was being affirmed or denied; genetic predisposition was viewed as a sufficient, necessary, or contributory cause of the health condition; or the reference supported or opposed legally significant disease causation. We use “legally significant cause” as shorthand to refer to the factual finding concerning disease causation required by the party seeking to fulfill the burden of proof. For example, the legally significant cause in a personal injury negligence claim is the negligent conduct of the defendant, in workers’ compensation it is injury “arising out of and in the course of employment”, and in Crown wardship applications it is the conduct of parents that supports the Crown’s submissions regarding the best interests of the child.

³⁷ See Mykitiuk et al, “The Potential for Misusing”, *supra* note 24 at 1601.

The final step in content analysis is to analyze the coded cases.³⁸ We employ a descriptive approach, mapping the terrain of legal references to genetic predisposition.³⁹ We provide numerous examples and excerpts from the decisions in order to allow the reader to interpret the decisions, and to provide more insight than coding and counting can on its own. For example, this type of description can indicate the weight a decision maker places on statements concerning genetic predisposition in a way that quantitative content analysis cannot.

III. Overview of Search Results

In this section we briefly survey the results of our search, noting in particular the conditions for which genetic predisposition was cited, the jurisdictions in which the cases took place, and the areas of law involved. A variety of conditions form the object of reference to genetic predisposition in the results. A few of the interesting features regarding the conditions cited are as follows. Eighteen decisions contain reference to a genetic predisposition to two or more distinct clinical conditions. For example, a board medical advisor reporting to a panel of the BC WCAT, noted both that the worker "may have a genetic pre-disposition"⁴⁰ to obesity, and with respect to diabetes, that "there is a genetic pre-disposition to the disorder."⁴¹ Likewise, in *Children's Aid Society for the Districts of Sudbury and Manitoulin v PL*,⁴² a psychiatrist witness referred to the possibility that the child may have "a genetic predisposition toward either a mood or anxiety disorder."⁴³ In total there were 490 references to a particular genetic predisposition made in 468 decisions from 1984 to May 31, 2010.⁴⁴

Regarding the types of conditions cited, 188 references to genetic predisposition were to musculoskeletal conditions.⁴⁵ The most cited of this type of condition was osteoarthritis (40 references), degenerative disc disease (32), carpal tunnel syndrome (24), and Dupuytren's contracture (23). Mental

³⁸ See Hall & Wright, *supra* note 31 at 79.

³⁹ *Ibid* at 90.

⁴⁰ *Decision no 2007-03289* (24 October 2007), online: BCWCAT <www.wcat.bc.ca> at 13.

⁴¹ *Ibid*.

⁴² 2007 ONCJ 621, 170 ACWS (3d) 549, [2007] OJ no 5118 (QL) [*Manitoulin*].

⁴³ *Ibid* at para 13.

⁴⁴ See Mykitiuk et al, "The Potential for Misusing", *supra* note 24 at 1601-02.

⁴⁵ See *ibid*.

health conditions follow, with 100 references in the results. Mental health conditions include various mood disorders (39), schizophrenia (12), alcoholism (8), and substance abuse (7). Other types of conditions include respiratory (31), cancer (26), neurological (23), allergy (23), dermatological (21), and others.

Some references were not specific to a particular condition. For example, in *Brewers' Distributor Ltd v Brewery, Winery & Distillery Workers Union, Local 300*,⁴⁶ a decision concerning entitlement of employees to extended health benefits, the labour arbitrator wrote, "what use an employee makes of this benefit, including whether he or she exhausts it, will vary with the individual's circumstances, which may include age and disability, as well as general health, lifestyle, genetic predispositions and many other personal characteristics."⁴⁷

In two decisions, reference to genetic predisposition was to a clearly non-medical condition. For example, in a decision setting forth reasons for a criminal sentence, the judge reproduced part of a report of an assessment of the accused by a psychologist. The report states that the accused "has a penchant for externalizing responsibility, holds grudges, and perceiving himself as mistreated. This is exacerbated by his drug abuse and a strong genetic predisposition authored by his father's side of the family (including mental disorder and violent criminality)."⁴⁸ An excerpt of a radio broadcast reported in a decision concerning a complaint about that broadcast states: "Host: The topic of a recent conference hosted by Focus on the Family: Freedom from homosexuality is possible. It's not a genetic predisposition and it's not just a choice."⁴⁹

The results break down by jurisdiction as follows: 175 decisions were from Ontario, 134 from British Columbia, 79 from Québec, 31 from Alberta, 15 federal, 12 from Manitoba, 9 from Newfoundland and Labrador, 8 from

⁴⁶ [2003] BCCA AAA no 217 (QL).

⁴⁷ *Ibid* at para 95. See also *Mortimer v Cameron* (1992), 32 ACWS (3d) 928, [1992] OJ no 764 (QL) (Ont Ct J (Gen Div)) [cited to QL] (referring to "genetic predisposition to a particular disease" as one factor determining average Canadian male mortality in the context of calculating damages for loss of future income, at 83).

⁴⁸ *R v Eckland*, 2004 BCPC 298 at para 10, [2004] BCJ no 1747 (QL).

⁴⁹ *CFYI-AM re Focus on the Family* (28 June 2001), 99/00-0724 at Appendix A, online: CBSC <www.cbsc.ca>.

Nova Scotia, 2 from Prince Edward Island, 1 from Saskatchewan, 1 from New Brunswick, and 1 from the Yukon.⁵⁰ The areas of law involved are: 355 labour/employment law decisions, including 339 workers' compensation decisions; 44 tort; 18 criminal; 18 family; 12 insurance; 8 pension and benefit; 5 tax; 3 human rights; and 5 others.⁵¹

The frequency with which particular conditions, areas of law, and jurisdictions appear in the results is influenced by various factors. One such factor is the prevalence of the condition in society. For example, a Statistics Canada study has noted that nearly half of workplace injuries in Canada were related to "overexertion or strenuous movements and falls."⁵² This suggests one reason why musculoskeletal conditions, which arise largely within labour law, are prevalent in our results.⁵³ In addition, the Statistics Canada study noted that individuals reporting three or more chronic conditions were more likely to be injured than others.⁵⁴ Because these chronic conditions are sometimes explained in terms of genetic origin, this risk factor also accounts for some of our results.

The degree to which a condition lends itself to litigation or adjudication influences the extent to which it appears in reported legal decisions. For example, the legal issues associated with criminal responsibility naturally lend themselves to consideration of conditions affecting mental health. In our study, 17 of 19 references to genetic predisposition in criminal law pertained to mental health conditions (this includes alcoholism and substance abuse). Finally, variation among Canadian jurisdictions can be explained: a larger population suggests that more adjudicative decisions will be rendered. Availability of electronically searchable decisions also varies by jurisdiction.

IV. Use of Genetic Predisposition by Area of Law

With the above picture of the decisions as background, we turn to analyzing the role of genetic predisposition in the resolution of legal issues. This

⁵⁰ See Mykitiuk et al, "The Potential for Misusing", *supra* note 24 at 1603.

⁵¹ See *ibid* at 1601.

⁵² Statistics Canada, "Study: Work Injuries", *The Daily* (Ottawa: 10 July 2007), online: Statistics Canada <www.statcan.gc.ca/daily-quotidien/070710/dq070710-eng.pdf> at 2.

⁵³ 176 references to musculoskeletal conditions occurred in labour law out of 188 total references to musculoskeletal conditions.

⁵⁴ *Ibid*. A combination of such conditions might include, for example, migraine, arthritis, and multiple chemical sensitivity.

inquiry is best organized by area of law, given the unique legal issues raised in each, and the differing functions genetic predisposition serves in settling these respective issues. Each area of law we discuss presents a progressively more detailed analysis of and reliance on genetic predisposition. We begin with criminal law and family law, followed finally by personal injury law, where reference to genetic predisposition often played a major role in determining entitlement to compensation and/or benefits. This essay focuses on the role of genetic knowledge in legal accounts of causation. While in many cases it is not clear whether reference to genetic predisposition was dispositive of the outcome, genetic predisposition is nonetheless often employed in a manner that directly addresses the issue at hand. In this way, whether genetic predisposition is presented as an excerpt of a piece of evidence, a summary of a party's argument, or the adjudicator's own line of reasoning (and it is sometimes difficult to tell which of these accounts for a particular reference), it is useful to analyze the way the concept itself is functioning to make legal sense of the individual's condition.

A. Criminal Law

As in other areas of law, criminal law decisions refer to the notion of genetic predisposition as a convenient means of resolving legal issues, and in doing so tend to ascribe genetic etiology to conditions of unknown origin. We discuss the two main types of criminal law issues that emerged in our results: criminal responsibility and sentencing. In addition to these two main types of criminal law issue, there was one criminal law decision that alluded to the issue of genetic discrimination. We describe this case in order to highlight that the bulk of our results deal with more common, conventional issues normally associated with criminal law. The 2001 judgment of the Ontario Court of Justice in *R v TT*⁵⁵ resulted from an application by the Crown to take a DNA sample from a young offender who pleaded guilty to a charge of robbery. The court dismissed the application, finding that the Crown had not established on a balance of probabilities that the interest of society in the identification of those who commit offences outweighed the privacy interest of the accused. Part of the judgment, citing findings of the Ontario Law Reform Commission and the work of American legal scholars, expresses concern that retained DNA samples may be tested in the future for susceptibility to disease. One such passage states that:

⁵⁵ (2001), 50 WCB (2d) 467, [2001] OJ no 2936 (QL) (Ont Ct J).

It is the current policy not to test for genetic predisposition to diseases, and the current legislation contains significant safeguards. But the fact is that biological material is retained and kept for future testing according to future policies, which may change from the current ones. The legislation may also change, although legislative changes would take longer than policy changes, especially given potential for charter pitfalls.⁵⁶

In contrast with this decision, the others did not refer to the privacy implications of DNA sampling or the potential for discrimination.

i. Criminal Responsibility

Seven criminal law decisions cite genetic predisposition to a mental condition in relation to the issue of criminal responsibility. In our discussion, criminal responsibility includes the inter-related issues of voluntariness of conduct, the defence of not being criminally responsible by reason of mental disorder ("NCR-MD"), and the likelihood of recurrence of either of these types of conduct. In the decisions that follow, genetic predisposition is framed as a necessary or contributory cause of the accused's actions, driving arguments about criminal responsibility. The ability to explain the accused's actions in this way facilitates legal decision making in the absence of scientific certainty about the accused's condition.

The following provides background for appreciating the use of genetic predisposition in these decisions. One of the requirements to establish criminal responsibility is voluntariness. The Supreme Court of Canada has written that:

Even before the advent of the Charter, it became a basic concern of the criminal law that criminal responsibility be ascribed only to acts that resulted from the choice of a conscious mind and an autonomous will. In other words, only those persons acting in the knowledge of what they were doing, with the freedom to choose, would bear the burden and stigma of criminal responsibility.⁵⁷

⁵⁶ *Ibid* at para 32.

⁵⁷ *R v Ruzic*, 2001 SCC 24 at para 34, [2001] 1 SCR 687, 197 DLR (4th) 577.

The defence of automatism alleges a lack of voluntariness. The majority judgment of the Supreme Court of Canada in *R v Stone*⁵⁸ stated that:

Two forms of automatism are recognized at law: insane automatism and non-insane automatism. Involuntary action which does not stem from a disease of the mind gives rise to a claim of non-insane automatism. If successful, a claim of non-insane automatism entitles the accused to an acquittal...

On the other hand, involuntary action which is found, at law, to result from a disease of the mind gives rise to a claim of insane automatism. It has long been recognized that insane automatism is subsumed by the defence of mental disorder, formerly referred to as the defence of insanity.⁵⁹

The Criminal Code precludes criminal responsibility where the accused's mental disorder "rendered the person incapable of appreciating the nature and quality of the act or omission or of knowing that it was wrong."⁶⁰ The party raising the issue of NCR-MD must prove it on a balance of probabilities.⁶¹

The 2005 Ontario Court of Justice decision of *R v Luedecke*⁶² uses the concept of genetic predisposition in distinguishing between these two types of automatism. In this case, the accused admitted to having sexual contact with the complainant without her consent. He argued that he engaged in this conduct while asleep, and that this constituted non-insane automatism. A psychiatrist specializing in sleep disorders who assessed the accused, testified that he believed the accused did not commit the act consciously because he was in a state of parasomnia.⁶³ He explained that the likely causes of the sexual contact occurring while in a state of parasomnia included a genetic component, stating "there was a genetic predisposition, as both his mother and brother have had a number of such episodes [sleepwalking],"⁶⁴ alongside triggering factors such as physical activity and exercise, sleep deprivation,

⁵⁸ [1999] 2 SCR 290, 173 DLR (4th) 66 [cited to SCR].

⁵⁹ at paras 157-58.

⁶⁰ RSC 1985, c C-46.

⁶¹ *Ibid*, ss 16(2)-(3).

⁶² 2005 ONCJ 294, 35 CR (6th) 205, 68 WCB (2d) 49.

⁶³ *Ibid* at para 23.

⁶⁴ *Ibid* at para 18.

alcohol consumption, and stress.⁶⁵ He also testified that the accused's condition was not a mental illness in a medical sense.⁶⁶

Although the judge found that the accused did not have a mental disorder according to the legal definition, the accused was nevertheless acquitted. In reaching this conclusion the judge noted that the accused had not engaged in similar criminal conduct in the past, but rather had experienced similar episodes within consensual relationships.⁶⁷ The accused was also taking measures to prevent recurrence of such episodes, suggesting that he would not pose a "continuing danger" to society.⁶⁸ The judge avoided characterizing the accused's condition as an "internal cause" of his conduct (which would suggest that it amounted to a mental disorder), instead stating that somnambulism is not well-suited to the "internal cause theory" of mental disorders.⁶⁹

The Ontario Court of Appeal overturned the trial court's decision, noting in particular:

While the cause of parasomnia may not fit within the "external/internal" causal dichotomy described in the case law, Dr. Shapiro's evidence establishes that the predisposition for parasomnia, found in some three per cent of the adult population, is hereditary. A genetic predisposition is the epitome of an internal cause. Although that disposition does not cause the particular automatistic event, it does predispose the individual to that condition thereby increasing the risk of recurrence. The trial judge erred in discounting the significance of this internal cause of the respondent's condition. He did so based on a misapprehension of the "sleepwalking" case law and a failure to consider evidence relevant to the causal inquiry.⁷⁰

The Court of Appeal directed that a new trial take place on the issue of whether the respondent's automatism should lead to an acquittal or a finding

⁶⁵ *Ibid* at para 15.

⁶⁶ *Ibid* at para 50.

⁶⁷ *Ibid* at para 48.

⁶⁸ *Ibid* at paras 47-48.

⁶⁹ *Ibid* at para 46.

⁷⁰ *R v Luedecke*, 2008 ONCA 716 at para 106, 93 OR (3d) 89, 269 OAC 1.

of NCR-MD. Mr. Luedecke was subsequently found NCR-MD and the Ontario Review Board ordered that Mr. Luedecke be discharged absolutely.⁷¹

The legal argument and reference to genetic predisposition in *R v Teepell*⁷² is similar to that in *R v Luedecke*, but was unsuccessful as the accused was found guilty. The accused had argued he was not conscious while he engaged in non-consensual sexual intercourse with the complainant. A medical expert's explanation of the causes of parasomnia featured genetic predisposition:

For almost all of the cases that have been published, you will find that there is this unusual ... juxtaposition of someone who first of all has genetic predisposition to develop sleepwalking, who then has these factors primed (I call sleep deprivation and stress priming factors) Then there needs to be an actual trigger ... something has to go bump in the night. It could be a noise, it could be simply be being pushed. In some individuals, they snore themselves awake. All of that has to happen simultaneously and the chances of it having happened in the past or in the future are quite remote.

None of the transcripts of the testimony, even Dr. Shapiro's report, indicate any significant sleep deprivation or what I would call acute stress.⁷³

This excerpt suggests that even if there is a genetic predisposition to sleepwalking, an episode of parasomnia may be unlikely to recur.

Risk of recurrence is relevant not only where non-insane automatism is alleged, but also to the defence of NCR-MD. The association of genetic predisposition with risk of recurrence of conduct relating to the NCR-MD defence was made in two 1999 British Columbia Supreme Court decisions in the case of *R v Campagna*.⁷⁴ The accused was charged with dangerous driving causing the death of two people. The Crown and defence jointly submitted that the accused was suffering from a mental disorder at the time of the incident. Until about two days before the incident, she had consumed an

⁷¹ *R v Luedecke*, 2010 ONCJ 59, [2010] OJ No 804 (QL) at paras 16-18.

⁷² [2009] OJ no 3988 (QL) (ONCJ).

⁷³ *Ibid* at para 206.

⁷⁴ (1999), 43 WCB (2d) 375, 46 MVR (3d) 35, [1999] BCJ no 2022 (BC SC) [*Campagna* trial decision]; [1999] BCJ no 2023 (QL) (BC SC) [*Campagna* sentencing hearing].

over-the-counter appetite suppressant which led to her first episode of mania and psychosis.⁷⁵ The trial decision relates the testimony of a psychiatrist witness who explained the accused's mental state as "induced by an over-the-counter appetite suppressant, together with a strong genetic predisposition towards a mood disorder."⁷⁶ Another psychiatrist witness came to a different conclusion. The judgment states:

Dr. Vath was troubled with the diagnosis that the accused may have suffered from a true genetic bipolar disease. The accused had little history of any significant pre-existing symptoms and the symptoms that she did experience shortly before the date of the accident had rapidly cleared with treatment and because of this concern he discussed this case with Dr. David Dunner, an internationally recognized expert in the area of bipolar disorder. It was Dr. Dunner's opinion that even in healthy persons, excessive stimulant substances can induce psychosis and Dr. Dunner recommended that the accused's progress be monitored.⁷⁷

Though the court found the accused NCR-MD without much difficulty, the cause of the incident came up again at the sentencing hearing. The Crown argued that the accused should be given a discharge with conditions, citing one of the psychiatrist witnesses who found:

[T]hat the accused suffered an intense, extreme psychosis, more likely caused by the latent genetic bipolar disorder rather than substance induced, confirmed by the fact that this accused exhibited such mental disorder over a considerable period of days after the incident and that, therefore, the accused ought to be monitored for some time in the future because there is the possibility of this serious risk of conduct recurring.⁷⁸

The court disagreed with the Crown's position and ordered an absolute discharge, noting that it cannot avoid doing so based on speculation or suspicion alone.⁷⁹ Earlier in the decision the court cited the testimony Dr. Vath

⁷⁵ *Campagna* trial decision, *supra* note 74 at paras 19, 21.

⁷⁶ *Ibid* at para 21.

⁷⁷ *Ibid* at para 25.

⁷⁸ *Campagna* sentencing hearing, *supra* note 74 at para 41.

⁷⁹ *Ibid* at para 43.

gave at trial as having “totally eliminated any such predisposition to bipolar mood disorder on behalf of the accused.”⁸⁰

As in *Campagna*, the language of genetic predisposition bolstered a finding of NCR-MD in the decision of *R v Carmichael*,⁸¹ where the accused was charged with murdering his 11 year-old son. It appeared that mental illness, specifically depression, was the only explanation for the act.⁸² Regarding the nature of the illness, the judgment stated: “I heard that there is a significant family history of depression and other mental illnesses, and I heard evidence of a genetic predisposition to the development of depression. Mr. Carmichael’s twin brother had strikingly similar episodes of depressive illness which originated in work pressure, which for Mr. Carmichael involved financial pressures as well.”⁸³

A similar but unsuccessful argument involving genetic predisposition was made in *R v Warsing*,⁸⁴ a case involving a young man charged with murdering two younger step-siblings and attempting to murder his step-mother:

At the present trial, Dr. Wanis testified that the accused had a genetic predisposition for Bipolar Affective Disorder which often first presents in the late teens. Coupled with significant stressors relating to the divorce of his biological parents, his inability to attend university, and the pending separation of the Warsings, this predisposition led to a manic episode. The manic episode was manifested by an inability to sequence thoughts and actions, as well as by delusional thinking.

According to Dr. Wanis, the accused, acting on command hallucinations, killed the children thinking that he was saving them from a divorce experience. In addition, the accused, while still in a delusional state, then concluded that Mrs. Warsing killed the children and acted violently towards her. Dr. Wanis opined that the accused was unable, in the circumstances, to appreciate the

⁸⁰ *Ibid* at para 4.

⁸¹ [2005] OJ no 4781 (QL) (Ont Sup Ct) [*Carmichael*]

⁸² *Ibid* at para 6.

⁸³ *Ibid* at para 16.

⁸⁴ 2000 BCSC 388, [2000] BCJ no 452 (QL).

nature and quality of his acts, or their consequences, or that they were wrong.⁸⁵

The judge did not ascribe much weight to this testimony, and in the end found that while the accused had a mental disorder, it did not amount to a defence under s 16(1) of the Criminal Code, because it did not affect his capacity.⁸⁶ *R v Warsing* and the preceding cases considering mental disorder are examples of where an environmental trigger was required for the condition which caused the criminal action to manifest itself. This construction of genetic predisposition makes sense given the context of these cases, which requires trying to determine the trigger of an accused's mental state at a given time. Other legal contexts give rise to different constructions of genetic predisposition.

ii. Aggravating and Mitigating Factors in Sentencing

Genetic predisposition was cited as both an aggravating and a mitigating factor in the following two sentencing hearings, though the reasons did not necessarily make clear connections between genetic predisposition and a sentence. For example, in *R v Eckland* part of a psychological assessment report stated that the accused:

[h]as a lengthy history of drug and alcohol abuse, treatment and relapse. Although he has completed some programs (institutional and community) targeting his anger and controlling behaviour, his habits of threatening and behaving petulantly persist. He has a penchant for externalizing responsibility, holds grudges, and perceiving himself as mistreated. This is exacerbated by his drug abuse and a strong genetic predisposition authored by his father's side of the family (including mental disorder and violent criminality).⁸⁷

The reference to genetic predisposition here seems to suggest that the accused would be less likely to respond to rehabilitative efforts and more likely to repeat offensive behaviour.

⁸⁵ *Ibid* at paras 99-100.

⁸⁶ *Ibid* at paras 133, 148.

⁸⁷ *Supra* note 48 at para 10.

In *R v KLM*,⁸⁸ it appears that awareness of a genetic predisposition could be considered by the courts as a mitigating factor. The accused was convicted of impaired driving causing bodily injury and impaired driving causing death. The reasons for arriving at the resulting sentence state that:

K.L.M. has the ability and, it appears, the commitment to succeed in her own rehabilitation. She has pursued counselling on her own. She has abstained from alcohol since the accident. She recognizes that she may have a genetic predisposition towards alcoholism. Though her own alcohol issues remain untreated, she has attended Alcoholics Anonymous meetings with her mother for help in dealing with her father's alcoholism.⁸⁹

iii. Conclusions

Though we have not aimed to comprehensively survey the implications of genetic knowledge in criminal cases, our search results allow us to draw some initial conclusions. Whereas an American study has noted that defence lawyers have, largely unsuccessfully, used arguments concerning behavioural genetic predispositions to negate criminal responsibility,⁹⁰ for example by arguing that it led to an “overpowering compulsion” which should excuse the accused from liability,⁹¹ our study illustrates that genetic predisposition is being used in a more conventional and flexible manner. It is used in a conventional manner in that it is being cited in connection with common and unelaborate legal arguments, and in a flexible manner in that its significance takes shape in consideration of the evidence as a whole. Thus if the totality of evidence shows that otherwise criminal behaviour was involuntary, a genetic predisposition could suggest an internal cause and support a finding of NCR-MD. In sentencing, whether in NCR-MD or other cases, the idea of genetic predisposition may be related to likelihood of recurrence. The ultimate finding of likelihood will depend on various factors, including whether or not the trigger of an incident is rare and avoidable, and whether the accused is likely to seek and benefit from treatment.

⁸⁸ 2004 BCPC 200, 77 WCB (2d) 500, [2004] BCJ no 1396 (QL).

⁸⁹ *Ibid* at para 44.

⁹⁰ Nita A Farahany & James Coleman, “Genetics and Responsibility: To Know the Criminal from the Crime” (2006) 69:1 & 2 Law & Contemp Probs 115 at 115-16.

⁹¹ *Ibid* at 119.

B. Family Law

Similar to criminal law, the family law context makes use of particular arguments involving genetic predisposition in order to resolve legal issues where a party has a health condition of uncertain origin. The family law decisions we identified included Crown wardship applications, youth protection orders, contested adoption applications, child custody disputes, and a divorce proceeding. We begin by discussing Crown wardship and youth protection decisions, followed by other family law decisions.

i. Crown Wardship and Youth Protection Decisions

The following decisions highlight the flexibility with which genetic predisposition may be employed, sometimes implying poor parenting capabilities and other times adequate capabilities; sometimes serving as an alternate explanation to an environmental condition; and sometimes interacting with environmental conditions. In *Children’s Aid Society of Ottawa v MB*,⁹² an application for Crown wardship of two children, one of the parenting behaviours warranting the application was that the mother was overfeeding them. Both parents and one physician witness represented genetic predisposition as a contributory cause of the children’s obesity, while disagreeing about the nature of the environmental factor that triggered or exacerbated the condition. The mother denied overfeeding the children and the father only admitted some responsibility on his part, while partly ascribing the condition to predisposition.⁹³ In contrast, the physician witness reported that “[w]hile other factors including genetic predisposition and mother’s gestational diabetes may have contributed to the boys’ obesity, there would nevertheless seem to be convincing evidence that overfeeding was a major contributor to both boys’ trouble.”⁹⁴ The court noted that the “inescapable conclusion in this case is that both children were seriously overfed,” which formed part of the rationale for the removal of the children from the custody of their parents.

Three other decisions also consider how genetic predisposition, along with parental conduct inviting scrutiny by child welfare agencies, contributed to a child’s unhealthy condition. In *Catholic Children’s Aid Society of Ham-*

⁹² 148 ACWS (3d) 416, [2006] OJ no 1962 (QL) (Ont Sup Ct J) [*Children’s Aid Society of Ottawa*].

⁹³ *Ibid* at para 38.

⁹⁴ *Ibid* at para 49.

ilton-Wentworth v SM,⁹⁵ evidence showed the child's father suffered from anti-social personality disorder and had continuing involvement with the criminal justice system. One psychiatrist witness reported "T.C.B. [the child] needs to be protected from exposure to individuals who engage in unlawful and dishonest activities to hopefully prevent him from engaging in such activities, despite his genetic predisposition and vulnerability."⁹⁶ Part of the court's conclusion reads: "T.C.B. should have the opportunity to be placed with an adoptive family who will be responsive to his ongoing needs. It is likely that he has ADHD and it is also likely that he will at least be susceptible to other difficulties given his difficult genetic background and that fact that he was born prematurely."⁹⁷ Thus the genetic susceptibility of the child was used as a reason to remove him from circumstances that would trigger that susceptibility.

A similar argument was made in the case of *X (Dans la situation de)*,⁹⁸ an interim youth protection application. Here, one of the justifications for state intervention concerned an episode triggered by the mother's "lack of judgment"⁹⁹ in discussing menstrual hygiene against her daughter's will:

La psychologue décrit X comme étant une enfant au tempérament anxieux. Il s'agit selon elle d'une jeune fille fragile et insécure. L'enfant aurait, compte tenu du désordre mental dont souffre chacun de ses parents, des prédispositions génétiques à développer une maladie mentale. Madame Pothier est d'avis que le trouble obsessionnel-compulsif dont souffre X est la conséquence d'un état de stress post-traumatique qu'elle a subi. Selon les informations qu'elle a obtenues, dont celles provenant des propos de X, les enseignements de la mère de l'enfant au sujet de l'hygiène menstruelle est l'élément déclencheur du choc post-traumatique qui a provoqué le T.O.C..La psychologue précise que l'événement n'est pas en soi porteur de traumatisme mais c'est l'interprétation qu'en fait l'enfant qui entraîne les répercussions déjà décrites.

⁹⁵ [2002] OJ no 2760 (QL) (Ont Sup Ct J).

⁹⁶ *Ibid* at para 41.

⁹⁷ *Ibid* at para 44.

⁹⁸ 2006 QCCQ 10753, [2006] JQ no 11954 (QL) (Youth Div).

⁹⁹ "un manque de jugement", *ibid* at para 53.

La psychologue Pothier est catégorique; il est nécessaire que les contacts de l'enfant et de sa mère soient suspendus tant et aussi longtemps que la maladie de X ne sera pas parfaitement contrôlée.¹⁰⁰

A subsequent decision discussing the same facts also touched on this episode:

À l'occasion du témoignage qu'elle a rendu le 28 mars 2006, madame Pothier a expliqué qu'elle est d'avis que l'enfant a développé des troubles obsessionnels compulsifs après avoir vécu un état de stress traumatique. Selon elle, les propos que lui a tenus sa mère au sujet des menstruations sont l'événement traumatique à l'origine de son trouble. Elle ajoute que ce n'est pas l'événement en soi qui est porteur de traumatisme, mais plutôt l'interprétation qu'en a faite X. Un peu plus tard, la psychologue fait également état des prédispositions génétiques qui favorisent le développement d'une maladie mentale chez X. La psychologue explique qu'un enfant dont les deux parents souffrent de maladie mentale court 50% de risques de développer lui aussi une telle maladie. Elle ajoute que la naissance de X, survenue dans des conditions traumatisantes a pu causer des séquelles à l'enfant qui ont laissé des empreintes au niveau de son cerveau et de sa mémoire corporelle. Elle émet l'hypothèse que les événements survenus en octobre 2005 ont pu réveiller la mémoire corporelle de sa naissance et ainsi déclencher des émotions fortes.¹⁰¹

¹⁰⁰ *Ibid* at paras 38-39. To paraphrase: The psychologist described X as a child with an anxious temperament. She behaved like a young, fragile, and insecure girl. The child, taking account of the mental disorder suffered by each of her parents, has the genetic predispositions to develop a mental illness. Ms. Pothier's opinion is that X suffers from obsessive-compulsive disorder as a result of post-traumatic stress. According to the information she has obtained, including that originating from X, the mother's instructions regarding menstrual hygiene were the trigger for post-traumatic shock that caused the O.C.D. The psychologist specifies that the event was not in itself cause of the trauma but the child's interpretation that in fact led to the impacts already described.

The psychologist Pothier is adamant: it is necessary that the contacts of the child and her mother are suspended for as long as the disease X is not perfectly under control.

¹⁰¹ *Protection de la jeunesse – 061*, 2006 QCCQ 12335 at para 78, [2006] JQ no 13429 (Youth Div). To paraphrase: On the occasion of her testimony on March

In contrast with the previous decisions, the two following decisions refer to genetic predisposition as separate from and in opposition to parental conduct. In *Manitoulin*, which concerned two children, the court noted that “[c]ontrary to the assertions that were made throughout the proceedings, the expert opinion is that N.-A.L.’s difficulties were not genetic in origin, but largely caused by environmental factors. This means that as between ‘nature’ and ‘nurture’, the evidence points to ‘nurture’.”¹⁰² The difficulties referred to include an alleged “genetic predisposition toward either a mood or anxiety disorder.”¹⁰³

Likewise, in the decision in *RM (Re)*,¹⁰⁴ genetic predisposition was considered a causal explanation of a child’s condition, as an alternative to parental fault. The decision concerned an application by the Crown for permanent guardianship of two children. In contrast with *PL*, however, the parent cited genetic predisposition in denying her adverse impact on one of her children’s health. The decision states:

With respect to C.P.’s teeth, the pediatric dentist had to perform four fillings, two extractions, six crowns and one pulpectomy, which he blamed on insufficient brushing and poor oral hygiene. When asked about this during their testimony, K.P. responded, ‘You can only do so much. C.P. wanted to brush his teeth by himself.’ L.M. claims she was told by a professional, ‘Don’t worry, they are only baby teeth and they will fall out.’ She also claimed that her children had a genetic predisposition towards bad teeth.¹⁰⁵

28, 2006, Ms. Pothier said she believes the child developed obsessive-compulsive disorder after experiencing traumatic stress. According to her, the remarks her mother made about menstruation are the traumatic event causing her disorder. She adds that it is not the event itself that carries trauma, but rather its interpretation by X. A little later, the psychologist also reported genetic predispositions that favour the development of mental illness in X. The psychologist says that children whose parents suffer from mental illness run a 50% risk of developing such illness. She added that the birth of X, which occurred in traumatic circumstances, could cause sequelae in the child that left imprints in her brain and body memory. She speculates that the events in October 2005 could awaken the body memory of her birth and thus trigger strong emotions.

¹⁰² *Supra* note 42 at para 13.

¹⁰³ *Ibid.*

¹⁰⁴ 2005 ABPC 222, [2005] WDFL 3793, [2005] AWLD 3085.

¹⁰⁵ *Ibid* at para 13.

In effect, the mother used genetic predisposition to argue that her child's dental condition was likely to develop regardless of her conduct, and that she should therefore not be seen as responsible for the condition. Due to their common issues, these Crown wardship and youth protection cases reveal patterns in the way genetic predisposition is used in legal decisions featuring causal arguments about health conditions. A further variety of uses are observed in other types of family law proceedings.

ii. Other Family Law Decisions

In *Marrocco v Marrocco*,¹⁰⁶ a divorce proceeding, the main issue was whether the mother of the child (who had custody), could relocate with the child several hundreds of kilometres away from the father (who had access to the child). In denying the proposed relocation, the court considered and rejected the argument that the child needed to move because of his allergies. Genetic predisposition was used to suggest that the child's allergic condition would develop and could be relieved in the same manner as his mother's:

Dr. Krop concludes 'considering his maternal health history, and his own genetic predisposition to allergy, and asthma, there is a strong likelihood that he may develop sensitivities to chemicals similar to his mother. This is particular likely as he lives in the same polluted area as his mother'. It is not clear if Dr. Krop took into account Johnny's paternal medical history. Mr. Marrocco says he 'grew out of' his own childhood asthma symptoms. Dr. Krop recommends that Johnny move out of the Windsor area 'for the same reasons I recommend his mother moving'. In doing so, Dr. Krop seems to equate the mild symptoms of Johnny with the much more significant symptoms of his mother. Based upon the degree of Johnny's symptoms, and notwithstanding the possibility of future 'Multiple Chemical Sensitivity' it seems to me unlikely Dr. Krop would be recommending that Johnny needs to move to Muskoka, but for the fact that he thinks Mrs. Marrocco needs to move there.¹⁰⁷

It is noteworthy that this case warranted speculation on the prognosis of the child's asthma, whereas many more decisions in our sample required analysis of past causes of disease.

¹⁰⁶ 161 ACWS (3d) 275, [2007] OJ no 4026 (QL) (Sup Ct (Fam Div)).

¹⁰⁷ *Ibid* at para 44.

Further highlighting the variety of ways in which genetic predisposition can be framed in response to the nature of a claim, two oppositions to adoption applications use the concept in a unique manner. Specifically, the decisions reference not a particular condition, but the totality of conditions, whether disease-related or neutral traits, that a person may develop. In *Nguyen v McGinn*,¹⁰⁸ the “natural mother”¹⁰⁹ of a child opposed the application of the child’s lawful guardians to adopt her. A psychologist witness reported:

Genetic factors, additionally, are becoming a focus of attention regarding pre-disposition for various behaviours, ways of interacting and how individuals learn. Although environment still plays a very important part on how a particular child perceives the world, these genetic predispositions (nature versus nurture) are assumed to have greater importance than they did some years ago. It is my opinion that Natasha’s cultural and genetic requirements would be most optimally met in her mother’s care. Residence in a Caucasian home, however loving, would be second best.¹¹⁰

The court found the arguments on both sides approximately equal, but decided that the “cultural and genetic factors” were “of over-riding importance in this case and dictate the return of the child” to her natural mother, over a transition period.¹¹¹

Similarly in *DHC v RS*,¹¹² the maternal grandmother opposed an adoption application by the child’s interim guardians. The judgment stated:

While acknowledging that a two-parent family would likely be in a position to better raise a child, the psychologist believed that a child would gain higher self-esteem and more complete identity development if raised by its natural parents by being able to adopt and feel comfortable with racial characteristics and attributes and genetic predispositions including physical appearance

¹⁰⁸ (1989), 97 AR 38, 15 ACWS (3d) 432, [1989] AJ no 515 (QL) (Alta QB) [*Nguyen* cited to QL].

¹⁰⁹ This is the term used by the court.

¹¹⁰ *Nguyen*, *supra* note 108 at 7.

¹¹¹ *Ibid* at 10.

¹¹² (1990), 106 AR 196, 26 RFL (3d) 301, [1990] AJ no 1289 (QL) (Alta QB).

and medical history similar to its own, a reinforcing feedback from the child's total environment.¹¹³

In this case the court decided that it was in the child's best interests to be adopted by his interim guardians, largely because his grandmother's household was not a "nurturing, secure environment."¹¹⁴ The court also noted that it felt the interim guardians could address any problems of identification the child may face in the future.¹¹⁵ As in the criminal law cases, the preceding family law decisions illustrate that ideas of genetics are used within conventional legal argument, and that they will be considered as one among many factors in the overall decision.

Finally, in transitioning to a discussion of civil law cases where the cause of a condition is the main issue at hand, and where arguments concerning genetic factors have a more decisive role, one additional family law case is instructive. *Ivans v Ivans*,¹¹⁶ was an uncontested divorce proceeding where the unsettled issue was entitlement to and quantum of spousal support. The husband argued that in order to claim support in connection with her disability (schizoaffective disorder), the wife must establish that her disability was caused by the marriage. The decision states:

In my view, the husband's argument fails on the basis of the case law alone. Moreover, in this particular case, it cannot be said with certainty whether or not there is a causal connection between the illness and the marriage. The doctor's evidence was that there exists in some individuals a genetic predisposition to this type of illness and the actual manifestation of the illness may be precipitated by various stressors within the life of the individual at a given time. The early 20's and the mid-30's are particular times of vulnerability. In the present case, the wife's illness manifested itself in the early 30's and at a time when she was suffering from particular stresses related to the marriage and the family obligations that she had; notably the move to Ottawa at the instance of her husband and the terminal illness of her mother. However, it is not possible to say with certainty that these stresses were the precipitating factor or that the illness would

¹¹³ *Ibid* at para 15.

¹¹⁴ *Ibid*.

¹¹⁵ *Ibid* at para 29.

¹¹⁶ (1992), 35 ACWS (3d) 708, 82 Man R (2d) 101, [1992] MJ no 432 (QL) (Man QB (Fam Div)) [cited to QL].

not have manifested itself even had she remained a single person. Thus, while there is no certainty that there is a causal connection between the marriage and the illness, conversely there is no certainty that there is not a connection. This illustrates the folly of the causal connection test which in many cases is equivalent to trying to answer the age old question ‘Why is a duck?’¹¹⁷

While it was uncertain whether the wife’s condition was triggered by the marriage, the court stated that a causal link was not necessary to merit an award of support, though it would be one factor to take into account. This is in contrast to the cases we discuss next, wherein the legal issues to be decided lend much more significance to the causal origins of health conditions.

C. Personal Injury Law

Causation is a major issue in cases involving individuals seeking compensation for injuries they have sustained or diseases they have developed. In tort law, parties are required to compensate victims only for the consequences of their wrongdoing.¹¹⁸ Similarly, private insurance contracts and various statutory insurance regimes promise the payment of benefits relating to injuries associated with participation in various activities, such as motor vehicle use,¹¹⁹ military service,¹²⁰ or employment.¹²¹ In all of these areas where causation is in dispute, courts apply common law principles developed in the tort law context, to the extent that they have not been specifically overruled by statute. Workers’ compensation law makes use of some such departures from the common law, though these are exceptional. It also employs some unique language in describing concepts analogous to those in the common law. A basic review of the relevant principles precedes consideration of different accounts of causation in these areas of law.

¹¹⁷ *Ibid* at 4.

¹¹⁸ See *Clements v Clements*, 2012 SCC 32 at paras 7-8, 346 DLR (4th) 577, [2012] SCJ No 32 (QL).

¹¹⁹ See e.g. The Automobile Accident Insurance Act, RSS 1978, c A-35; Automobile Insurance Act, RSQ, c A-25.

¹²⁰ *Pension Act*, RSC 1985, c P-6.

¹²¹ See e.g. *Workers Compensation Act*, RSBC 1996, c 492 [BC *WCA*]; *Workers’ Compensation Act*, RSA 2000, c W-15 [AB *WCA*].

i. Relevant Legal Principles

To satisfy the basic test for causation in tort, the plaintiff must establish that the injury would not have occurred “but for” the defendant’s wrongdoing.¹²² This rule also applies in situations involving injuries with multiple causes.¹²³ The Supreme Court of Canada has also held that where the “but for” test is unworkable due to the operation of multiple contributory causes to the injury, causation is established if the tortious conduct “materially contributed to the occurrence of the injury.”¹²⁴ The Supreme Court of Canada has explained:

It is not now necessary, nor has it ever been, for the plaintiff to establish that the defendant’s negligence was the sole cause of the injury. There will frequently be a myriad of other background events which were necessary preconditions to the injury occurring. To borrow an example from Professor Fleming (*The Law of Torts* (8th ed. 1992) at p. 193), a “fire ignited in a wastepaper basket is . . . caused not only by the dropping of a lighted match, but also by the presence of combustible material and oxygen, a failure of the cleaner to empty the basket and so forth”. As long as a defendant is part of the cause of an injury, the defendant is liable, even though his act alone was not enough to create the injury. There is no basis for a reduction of liability because of the existence of other preconditions: defendants remain liable for all injuries caused or contributed to by their negligence.¹²⁵

This principle has implications for the remedy available to the injured party. Compensation in tort aims to restore the plaintiff to his or her “original position.”¹²⁶ Certain causal factors may render a particular plaintiff more susceptible to injury than others, making return to his or her original position

¹²² *Resurfice Corp v Hanke*, 2007 SCC 7 at para 21, [2007] 1 SCR 333, 278 DLR (4th) 643.

¹²³ *Ibid.*

¹²⁴ *Athey v Leonati*, [1996] 3 SCR 458 at para 15, 140 DLR (4th) 235 [*Athey*]. But see Lynda M Collins & Heather McLeod-Kilmurray, “Material Contribution to Justice? Toxic Causation after *Resurfice Corp. v. Hanke*” (2010) 48 Osgoode Hall LJ 411 at 439, arguing that this formulation of causation has since been rejected by the Supreme Court of Canada. Nevertheless, because of its influence on the decisions we cite, we have included it.

¹²⁵ *Athey, ibid* at para 17 [emphasis in original].

¹²⁶ *Ibid* at para 32.

more costly to the defendant. The “thin skull” rule “makes the tortfeasor liable for the plaintiff’s injuries even if the injuries are unexpectedly severe owing to a pre-existing condition. The tortfeasor must take the victim as the tortfeasor finds him or her, and is therefore liable even though the plaintiff’s losses are more dramatic than they would be for the average person.”¹²⁷ In contrast,

The so-called “crumbling skull” rule simply recognizes that the pre-existing condition was inherent in the plaintiff’s “original position”. The defendant need not put the plaintiff in a position better than his or her original position. The defendant is liable for the injuries caused, even if they are extreme, but need not compensate the plaintiff for any debilitating effects of the pre-existing condition which the plaintiff would have experienced anyway.¹²⁸

The formulations of the thin skull and crumbling skull rules both refer to pre-existing conditions. While a pre-existing condition may be at issue in either scenario, the difference is that in a thin skull situation, the pre-existing condition leads to an indivisible injury which the defendant caused.¹²⁹ An example is a disc herniation resulting from the combination of a weak back and involvement in two automobile collisions.¹³⁰ The pre-existing condition (weak back) and the tortious causes (automobile collisions) are not to be separately accounted for as they resulted in a single injury (disc herniation). In a crumbling skull situation, the effect of the pre-existing condition is divisible from the consequences, if any, of the defendant’s conduct.¹³¹ A basic example is where one cause leads to an arm injury, and another a leg injury.¹³²

These principles all apply, with some qualification, in workers’ compensation law. Workers’ compensation exists as an historical compromise between employers and workers. From the worker’s perspective, he or she gives up the right to sue in tort for full legal damages in return for the ability to recover compensation through a more streamlined process, without having to establish that the employer was negligent or to combat various defences

¹²⁷ *Ibid* at para 34.

¹²⁸ *Ibid* at para 35 [emphasis in original].

¹²⁹ See *ibid* at paras 24-25.

¹³⁰ *Ibid* at paras 1-6.

¹³¹ *Ibid* at paras 24-25.

¹³² *Ibid* at para 24.

available to the employer. From the employer’s perspective, certain liabilities involving employees are replaced by payments to the Injury Fund.¹³³

Notwithstanding the historical compromise, applications for compensation are often met with contention. Because injuries are compensable only if they are work-related, causation is often in dispute. This is evident in the decisions of the various workers’ compensation appeals tribunals throughout Canada. Though the appeals process is distinct from that of a court, it contains elements that are analogous to personal injury litigation in tort. Primarily, for entitlement to compensation, causation must be established. Statutes describe the requirement of work-relatedness in the language of “arising out of and in the course of employment.”¹³⁴ Consistent with the tort principle of material contribution to the occurrence of injury, where multiple causal factors may have contributed to an injury, the condition will be found to be compensable if the occupational exposure was a “significant” causal or contributory factor.¹³⁵ Similarly, adjudicators look for significant acceleration, activation, advancement, or aggravation of a pre-existing condition.¹³⁶ The amount of compensation to be received for particular injuries is set out in de-

¹³³ *Husky Oil Operations Ltd v MNR*, [1995] 3 SCR 453 at paras 124-25, 128 DLR (4th) 1, citing *Reference re: Workers’ Compensation Act, 1983 (Nfld)*, 44 DLR (4th) 501, 67 Nfld & PEIR 16 (NLCA), aff’d [1989] 1 SCR 922, 26 DLR (4th) 765.

¹³⁴ See e.g. *Workers Compensation Act*, CCSM c W200, s 4(1); *Workplace Safety and Insurance Act, 1997*, SO 1997, c 16, Schedule A, s 13(1) [ON WSI]. See similarly *Workers’ Compensation Act*, SNU 2007, c 15, s 10 and *Workers’ Compensation Act*, SNWT 2007, c 21, s 10, both of which describe compensable injuries as “arising out of and during the course of employment”. The Yukon statute uses “work-related” (*Workers’ Compensation Act*, SY 2008, c 12, s 4(1) [YK WCA]).

¹³⁵ See e.g. *Decision no 2003-01384* (9 July 2003), 2003 CanLII 69913, online: BCWCAT <www.wcat.bc.ca> (using the language of “significant cause” at 6); *Decision no 398/92* (16 June 1992), 1992 CanLII 5812, online: OWSIAT <www.wsiat.on.ca> (“significant causal factor” at 6); *Decision no 1919/09*, 2009 ONWSIAT 2661, online: OWSIAT <www.wsiat.on.ca> (“significant contributing factor” at para 28); *Decision no 2007-4682* (19 July 2007), 2007 CanLII 70361, online: NBWHSCC <www.whsc.nf.ca> (“significant contributing factor” at 5).

¹³⁶ See e.g. *Decision no 2003-04042* (9 December 2003), online: BCWCAT <www.wcat.bc.ca>; *Decision no 09082* (April 2009), online: NLWHSCRD <whscrd.gov.nl.ca> (“significant aggravation” at 9).

tail in legislation¹³⁷ and tribunal policy.¹³⁸ The rules conform to the thin skull principle in that conditions resulting from individual vulnerabilities or pre-existing conditions are generally fully compensable. Where a distinct pre-existing condition already affects the worker's employment, compensation will only be available to the extent that a subsequent compensable injury worsens the condition.¹³⁹

Statutory provisions modify or specify the application of these general principles in certain circumstances. For example, in most provinces legislation requires that where evidence is approximately equal, the tribunal is to resolve issues in favour of workers.¹⁴⁰ Several other provisions have to do with occupational diseases, a category of injury for which workers may receive compensation.¹⁴¹ For example, though injuries are generally compensable if occupational factors are significant contributors, Manitoba and Prince Edward Island legislate a "dominant causation" test with respect to the com-

¹³⁷ See e.g. An Act respecting industrial accidents and occupational diseases, RSQ, c A-3.001, Chapter III [An Act respecting industrial accidents].

¹³⁸ See e.g. Ontario Workplace Safety and Insurance Board, "Operational Policy Manual: Benefit Payments" (Ontario: WSIB, 2013), online: WSIB <www.wsib.on.ca/en/community/WSIB/230/PolicyLanding/24346?vgnextoid=2f3d8588e7a4e110VgnVCM1000000e18120aRCRD>.

¹³⁹ See e.g. BC *WCA*, *supra* note 121 s 5(5); Workers' Compensation Board of British Columbia, "Rehabilitation Services and Claims Manual, vol 1" (British Columbia: WCB, 2002), online: WorkSafeBC <www.worksafebc.com/publications/policy_manuals/rehabilitation_services_and_claims_manual/volume_i/default.asp> at 22.20; Workers' Compensation Board of British Columbia, "Rehabilitation Services & Claims Manual, vol 2" (British Columbia: WCB, 2002), online: WorkSafeBC <www.worksafebc.com/publications/policy_manuals/rehabilitation_services_and_claims_manual/volume_ii/default.asp> at 44.10 [RSCM II]; *Workplace Health, Safety and Compensation Act*, RSNL 1990, c W-11, s 43.1 [NL *WHSCA*]; *Workers' Compensation Act*, RSNB 1973, c W-13, s 7(5)(b) [NB *WCA*]; *Decision no 2004-224* (12 March 2004), 2004 CanLII 70776, online: AWCAC <www.appealscommission.ab.ca> at para 27; *Decision no 2011-01198* (13 May 2011), 2011 CanLII 51258, online: BCWCAT <www.wcat.bc.ca> at paras 48-49.

¹⁴⁰ BC *WCA*, *supra* note 121, s 99; *Workers' Compensation Act*, SS 1979, c W-17.1, s 25(2) [SK *WCA*]; ON *WSIA*, *supra* note 134, s 119(2); NL *WHSCA*, *supra* note 139, s 60(1); *Workers' Compensation Act*, SNS 1994-95, c 10, s 187 [NS *WCA*]; *Workers Compensation Act*, RSPEI 1988, c W-7.1, s 17 [PEI *WCA*]; YK *WCA*, *supra* note 134, s 19.

¹⁴¹ See e.g. YK *WCA*, *ibid*, s 3(1) "injury" (d); BC *WCA*, *supra* note 121, s 6(1).

pensability of occupational diseases.¹⁴² Also, some jurisdictions exclude “ordinary diseases of life” from the scope of occupational diseases.¹⁴³ This perhaps targets illnesses such as influenza, which (even though they may in fact be transmitted via a co-worker) are not contracted on account of the nature of the workplace per se. These diseases have been recognized as occupational diseases for individuals such as healthcare workers, who face a particular risk of illness in light of the nature of their work.¹⁴⁴ Certain diseases shown to be more prevalent among workers in particular occupations than in the general population are listed in schedules and appendices as entitling exposed workers to a presumption of causation.¹⁴⁵ In other words, the usual requirement to establish causation is reversed and evidence must affirmatively disprove causation if the employer is to avoid a finding of compensability. A small number of conditions are deemed to have been caused by certain workplace exposures. An example from Ontario is asbestosis. If a worker was involved in mining, milling, or manufacturing involving asbestos fibres, and later develops asbestosis, the disease will be deemed to have been caused by the nature of the worker’s employment.¹⁴⁶ In these cases no argument on causation is involved.

A unique issue arising within workers’ compensation is cost relief. Once initial entitlement to compensation is established, employers may obtain relief if it is found that fully attributing the worker’s injury to that employer’s account (thereby raising the employer’s insurance premiums), would be unfair or unduly burdensome.¹⁴⁷ Benefits paid to the worker would not be fully attributed to the account of the individual employer. Such relief is available in various circumstances, including where the injury is partly owing to prior

¹⁴² *Workers Compensation Act*, RSM 1987, c W200, CCSM c W200, s 4(4) [MB *WCA*]; PEI *WCA*, *supra* note 140, s 3(10).

¹⁴³ MB *WCA*, *supra* note 142, s 1(1) “occupational disease”; YK *WCA*, *supra* note 134, s 3(1) “injury”.

¹⁴⁴ RSCM II, *supra* note 139 at 26.03.

¹⁴⁵ See e.g. BC *WCA*, *supra* note 121, s 6(3), Schedule B; AB *WCA*, *supra* note 121, s 24(6); *Workers’ Compensation Regulation*, Alta Reg 325/2002, Schedule B; ON *WSIA*, *supra* note 134, s 15(3); *General*, O Reg 175/98, Schedule 3 [*General*]; *An Act respecting industrial accidents*, *supra* note 137, s 29, Schedule I; NS *WCA*, *supra* note 140, s 12(3); *Workers’ Compensation General Regulations*, NS Reg 22/96, Appendix B.

¹⁴⁶ ON *WSIA*, *supra* note 134, s 15(4); *General*, *supra* note 145, Schedule 4. See also NS *WCA*, *supra* note 140, s 35.

¹⁴⁷ See e.g. AB *WCA*, *supra* note 121, ss 91(4), 95, 97.

employment,¹⁴⁸ a disaster or similar event,¹⁴⁹ or to a pre-existing condition or disability.¹⁵⁰ Because the thin skull rule precludes apportionment on the basis of personal makeup or risk factors, this added layer of analysis promotes fairness to employers while not taking away from recovery by disabled workers.

Having outlined causation and related issues in the context of personal injury law, we can proceed to analyzing the decisions. As was done in the sections pertaining to criminal law and family law, we have sorted examples by the way in which genetic predisposition is cited in relation to disease causation. Thus, examples vary by whether they tend to support or harm the injured party's case; genetic predisposition is considered a necessary, sufficient, or contributory¹⁵¹ cause of the injured party's condition; and having a genetic predisposition supports or opposes legally significant causation. Though some statements do not fall neatly within a particular category, many do. Overall, the decisions support our argument that genetic concepts are a convenient medico-legal mechanism through which to adjudicate the issue of causation where medical complexity is at issue. Other details from the cases, such as who presented the argument featuring genetic predisposition and how the decision maker considered that argument in reaching an ultimate decision, are also considered where relevant.

¹⁴⁸ See e.g. NS *WCA*, *supra* note 140, s 18; An Act respecting industrial accidents, *supra* note 137, s 328.

¹⁴⁹ NL *WHSCA*, *supra* note 139, s 116; NB *WCA*, *supra* note 139, s 65; *An Act respecting industrial accidents*, *supra* note 137, s 330; ON *WSIA*, *supra* note 134, s 98; SK *WCA*, *supra* note 140, s 144; BC *WCA*, *supra* note 121, s 39(1)(d).

¹⁵⁰ *An Act respecting industrial accidents*, *supra* note 137, s 329; Manitoba, Workers Compensation Board, "Policy Manual: Cost Relief/Cost Transfers" (Winnipeg: WCB, 2011), online: MWCB <www.wcb.mb.ca/sites/default/files/files/31_05_10_CostReliefCostTransfer.pdf> at s 31.05.10; BC *WCA*, *supra* note 121, s 39(1)(e); Ontario, Workplace Safety and Insurance Board, "Operational Policy Manual: Second Injury and Enhancement Fund" (Hamilton: WSIB, 2006), online: OWSIB <www.wsib.on.ca/en/community/WSIB/OPMDetail?vgnextoid=1365fcea9bfc7210VgnVCM100000449c710aRCRD> [SIEF Policy].

¹⁵¹ That is, the predisposition together with other factors amount to an unnecessary but sufficient cause for the development of the disease. This type of causal condition has been described as "an *insufficient* but *non-redundant* part of an *unnecessary* but *sufficient* condition" or to use the first letters of the italicized words, an "in^s condition" (JL Mackie, *The Cement of the Universe: A Study of Causation* (Oxford: Clarendon, 1980) at 62).

ii. Genetic Predisposition as a Contributory or Necessary Cause of Injury

Several decisions feature references to genetic predisposition that support an injured party's case. In many of these statements, genetic predisposition is presented as a contributory or necessary cause of the individual's ultimate injury. Accordingly, an environmental factor is also described as part of the origin of the condition.¹⁵² The 2001 tort decision of the British Columbia Supreme Court in *EB v Order of the Oblates of Mary Immaculate in the Province of British Columbia*¹⁵³ concerned the occurrence of sexual abuse by a staff member at a residential school. Regarding some of the psychological injuries suffered by the plaintiff, a medical expert report was quoted as stating:

I feel that some of his difficulties including symptoms suggestive of PTSD, that is flashbacks, nightmares, intrusive thoughts, strange experiences etc., as well as his sex-related problems including acting out against young girls are most likely sequelae of the sexual abuse he suffered during his childhood. His other problems such as substance abuse could be a combination of a genetic predisposition, other social or emotional experiences, and sexual abuse.¹⁵⁴

Under cross-examination, the same witness stated that by "looking at what kind of family he came from and genetic and environmental and social

¹⁵² Decisions containing this sort of statement, but which we do not discuss in detail include: *NP c SAAQ* (19 April 2005), SAS-Q-096423-0303, 2005 CanLII 70841, online: TAQ <www.taq.gouv.qc.ca> at para 30; *Decision no 737/91* (17 August 1995), [1995] OWCATD no 846 (QL) at para 50, 1995 CanLII 8158, online: OWSIAT < www.wsiat.on.ca >; *Decision no 1358/97* (30 November 1998), [1998] OWSIATD no 2185 (QL), 1998 CanLII 17325, online: OWSIAT <www.wsiat.on.ca> at para 61-62; *Campbell v Vancouver (City of)*, 2001 BCSC 350 at para 34, 103 ACWS (3d) 621 (quoting a previous decision not in our sample); *Decision no 321/91* (22 June 1994), [1994] OWCATD no 492 (QL) at para 23, online: OWSIAT <www.wsiat.on.ca>; *Decision no 161/04* (18 November 2004), 2004 ONWSIAT 2379 at paras 18, 26, [2004] OWSIATD 2284 (QL), online: OWSIAT <www.wsiat.on.ca> ; *Mitchell v Mason Estate* (2002), 117 ACWS (3d) 648, [2002] OJ no 4030 (QL) at para 94 (Ont Sup Ct J); *Morgan v Metropolitan Toronto (Municipality of)* (2006), 153 ACWS (3d) 749, 44 CCLT (3d) 198, [2006] OJ no 4951 (QL) at para 348 (Ont Sup Ct J); *Decision no 2003-04042*, *supra* note 136.

¹⁵³ 2001 BCSC 1783, 110 ACWS (3d) 289, [2001] BCTC 1783.

¹⁵⁴ *Ibid* at para 196.

[factors]”¹⁵⁵ he believed the plaintiff was at a high risk of becoming an alcoholic, but also stated that “the combination of sexual abuse and his genetic vulnerability made things worse for a period of time.”¹⁵⁶ Justice Cohen found the plaintiff’s alcoholism to have resulted from the sexual assaults.¹⁵⁷ This decision shows that viewing genetic predisposition as one aspect of multifactorial disease causation does not preclude the consideration of social and environmental factors alongside genetic traits. The trial decision in favour of the plaintiff was overturned by the BC Court of Appeal on the basis that it erred in finding the defendant vicariously liable for the conduct of the individual who committed the sexual assaults.¹⁵⁸

This type of causal argument is sometimes described in terms of underlying risk and trigger. In *Kolokathis et Industries Maintenance Empire*,¹⁵⁹ an injured worker appealed a denial of his claim for recognition of ulcerative colitis as an occupational injury. The worker alleged that his condition was caused by medication taken in the course of treating a prior occupational injury. One of the worker’s treating physicians submitted a report to the tribunal, which the tribunal found convincing. The report stated, in part:

Is there a direct causal link between the accident and this man’s illness? I believe the answer to this question is yes. Mr. Kolokathis probably has a genetic predisposition to ulcerative colitis. The colitis was triggered off by the medication he was taking for his pain which included the anti-inflammatory medication ANSAID. ANSAIDS, and in particular Voltaren, although they may not be the etiological factor for inflammatory bowel disease, may be the triggering mechanism for the disease process.¹⁶⁰

In arriving at a finding of occupational causation, the tribunal cited the Supreme Court of Canada’s decision in *Snell v Farrell*, wherein the court held that the law does not require “certainty” of causation, but only what

¹⁵⁵ *Ibid* at para 198.

¹⁵⁶ *Ibid* at para 197.

¹⁵⁷ *Ibid* at para 255.

¹⁵⁸ *EB v Order of the Oblates of Mary Immaculate in the Province of British Columbia*, 2003 BCCA 289, 227 DLR (4th) 298, 14 BCLR (4th) 99.

¹⁵⁹ *Kolokathis*, *supra* note 11.

¹⁶⁰ *Ibid* at para 37.

amounts to a probability of 51%.¹⁶¹ The quoted medical report demonstrates an example of the way in which medical language concerning causation aids legal inquiry into "but for" and "material contribution" formulations of causation.

The notions of trigger and underlying risk factors were also employed in *FN c SAAQ*.¹⁶² In this case, an individual involved in a motor vehicle accident appealed a decision of the Société de l'assurance automobile du Québec refusing to recognize a causal link between the collision and the appellant's subsequent development of Type I diabetes. An excerpt of the appellant's argument concerning his appeal stated:

Ce dommage survient généralement à la suite d'une prédisposition génétique, c'est-à-dire dans le cas où la personne a reçu, par hérédité, une susceptibilité de réagir ainsi au niveau de son pancréas. Dans la présente affaire, le violent coup subi à l'abdomen lors de l'accident a nécessairement entraîné un bris de cellules bêta considérable, ce qui a précipité l'apparition du diabète. Le sinistre a donc constitué un facteur précipitant sans lequel le diabète chez la victime ne serait jamais apparu ou, à tout le moins, ne serait pas apparu à cette époque.¹⁶³

The Tribunal administratif du Québec, in dismissing the appeal, noted that no medical evidence was submitted in support of this argument. The appellant stated that his physician had noted the possibility of the relationship, but refused to write a medical opinion to that effect.¹⁶⁴ The panel held that the appellant had failed to satisfy the required burden of proof on a balance of probabilities.¹⁶⁵

¹⁶¹ *Ibid* at para 41, citing *Snell v Farrell*, [1990] 2 SCR 311 at para 34, 72 DLR (4th) 289, 107 NBR (2d) 94.

¹⁶² (1 August 2001), SAS-Q-065751-0007, 2001 CanLII 36580, online: TAQ <www.taq.gouv.qc.ca>.

¹⁶³ *Ibid* at para 11. To paraphrase: This damage usually occurs as a result of a genetic predisposition, that is to say, in the event that the person has inherited a susceptibility to react in the pancreas. In this case, the violent blow to the abdomen during the accident has necessarily resulted in a significant beta cell failure, which precipitated the onset of diabetes. The blaze has been a precipitating factor without which the victim's diabetes would never have appeared or, at least, would not have appeared at that time.

¹⁶⁴ *Ibid* at para 15.

¹⁶⁵ *Ibid* at paras 24-30.

Other cases also illustrate how decision makers consider genetic predisposition where extensive conflicting evidence is available. In *Decision no 935/90*,¹⁶⁶ the Ontario Workers' Compensation Appeals Tribunal ("WCAT", now the Workplace Safety and Insurance Appeals Tribunal ("WSIAT")), dismissed an appeal by a worker claiming entitlement for allegedly having developed Dupuytren's contracture¹⁶⁷ as a result of working for 34 years as a bricklayer. A plastic and reconstructive surgeon retained as a witness by the appellant reported:

In your questions to me, you ask is it probable that contracture was caused or brought on by performing heavy manual work as a brick layer for thirty-four years – my response to that would be that probably this man had a genetic predisposition to develop Dupuytren's contracture and that the repeated trauma of his work aggravated that condition.¹⁶⁸

The panel also repeatedly cited the opinion of Dr. R.M. McFarlane, a witness whom the panel described as "a leading medical expert on Dupuytren's disease."¹⁶⁹ Dr. McFarlane argued against manual labour as a cause or aggravating factor in the development of the disease. Interestingly, to this end he described the condition as a "genetic disease", using the concept of genetics to argue against occupational causation. The panel, taking the argument and evidence together concluded that "on the current state of medical science, the question of what causes or aggravates Dupuytren's disease is still unknown."¹⁷⁰ Echoing *Snell v Farrell*, the panel noted that while the "standard of proof does not require an 'exact answer', a 'mere speculative possibility' is not sufficient to find in favour of the worker."¹⁷¹ Also of interest is what the panel stated with respect to the uncertainty of the relationship between manual work and Dupuytren's:

¹⁶⁶ (3 April 1995), [1995] OWCATD no 314 (QL), 1995 CanLII 8151, online: OWSIAT <www.wsiat.on.ca> [cited to QL].

¹⁶⁷ Dupuytren's contracture is a disease marked primarily by the contracture/bending of some of the fingers toward the palm (see J Vernon Luck, "Dupuytren's Contracture: A New Concept of the Pathogenesis Correlated with Surgical Management" (1959) 41 J Bone Joint Surg Am 635 at 636).

¹⁶⁸ *Decision no 935/90*, supra note 166 at 5.

¹⁶⁹ *Ibid* at 17.

¹⁷⁰ *Ibid* at 1.

¹⁷¹ *Ibid* at 15.

Does that oblige the Tribunal to request an exhaustive investigation into the question? We think not. As noted in Decision No. 909 / 90 (1991), 20 W.C.A.T.R. 168, the statutory instruction to the Tribunal to decide cases on their real merits and justice requires a panel to consider what additional medical or other investigation ought to be pursued before it is confident that it has sufficient evidence to decide the case. However, the real merits and justice instruction also requires a panel "to consider when justice reasonably requires a halt to further investigations and to the further delays such investigations entail."¹⁷²

This last excerpt captures the limits of adjudicative inquiry into disease causation. The scope for factual investigation may be even more curtailed in court, where processes are based on an adversarial rather than an inquisitorial model of leading evidence and adjudication.¹⁷³

The above personal injury decisions illustrate that the argument that an individual has a genetic predisposition to a particular condition may support his or her case. It can do so by explaining why an environmental exposure constituting an insufficient cause of disease led to injury in the claimant (but might not do so in others). A corollary is making the argument that without demonstrating such a predisposition, the claimant cannot show that his or her condition is related to the relevant exposure or incident: that is, he or she cannot establish a vulnerability to an exposure by which other workers are not typically injured. Notwithstanding the logical plausibility of this claim, there was only one instance in our search results where it was clearly argued. In *Decision no 484/90*,¹⁷⁴ the Ontario WCAT decided an appeal from a denial of benefits in connection with an alleged disability owing to an allergy to smoke and fumes in the workplace. In considering the possibility that the worker had developed occupational asthma, the majority of the panel summarized the opinion provided by a respirologist:

Dr. Ho reported that there was no evidence of occupational asthma nor were there any specific respiratory complaints. Dr. Ho noted that the worker's chest was entirely clear and that there were no abnormal findings at all. The doctor indicated that the worker was not an atopic person (i.e., he did not have a genetic

¹⁷² *Ibid* at 17.

¹⁷³ See Gavin MacKenzie, "Breaking the Dichotomy Habit: The Adversary System and the Ethics of Professionalism" (1996) 9 Can JL & Jur 33 at 45.

¹⁷⁴ [1990] OWCATD no 626 (QL), 1990 CanLII 4596, online: OWSIAT <www.wsiat.on.ca> [cited to QL]

pre-disposition to become allergic), there were no known allergies and no previous history of asthma.¹⁷⁵

Here, the absence of susceptibility was probative in ruling out the existence of asthma, and therefore, occupational asthma. The majority dismissed the appeal, writing that “the non-specific nature of the worker’s physical complaints, the possibility of other explanations for those complaints, and the low concentration of fumes in the workplace do not indicate that the worker in this case was particularly susceptible to the low threshold exposure.”¹⁷⁶ The dissenting panel member would have allowed the appeal based on his or her weighing of the evidence.¹⁷⁷

This type of argument is rarely made, perhaps because it is often more difficult to disprove the existence of a predisposition than to prove it. Furthermore, as the burden of proof generally lies with the party seeking compensation, it is necessary only to impugn or discredit the claimant’s argument: the defending party need not conclusively resolve medical uncertainties. Finally, if it is clear that the claimant has developed the alleged condition during the period of employment and the main issue is causation, each party may prefer to focus on which factors triggered the predisposition, rather than on the nature of the predisposition itself. In contrast, if as in the above example, the predisposition and resulting condition are well-defined and well-understood, denying the existence of the former may be a viable argument.

A more common argument than denying the existence of increased risk or vulnerability, made by defendants in tort and employers in workers’ compensation, is that the risk was triggered by non-legally significant causes.¹⁷⁸

¹⁷⁵ *Ibid* at para 12.

¹⁷⁶ *Ibid* at para 39.

¹⁷⁷ *Ibid* at para 55.

¹⁷⁸ Decisions featuring this type of argument include *Decision no 2008-01239* (24 April 2008), 2008 CanLII 25521, online: BCWCAT <www.wcat.bc.ca>; *Decision no 320/87* (9 November 1989), [1989] OWCATD no 1013 (QL) at paras 28-29, 1989 CanLII 1936, online: OWSIAT <www.wsiat.on.ca>; *Haney v Malischewski* (1997), 41 BCLR (3d) 230 at paras 9, 35, 73 ACWS (3d) 247, [1997] BCJ no 1894 (BC SC); *Aubin v Tremblay* (1991), [1991] BCWLD 2055, [1991] BCJ no 2458 (QL) (BC SC); *Bonin et Cargill ltée* (21 July 2008), 2008 QCCLP 4192, online: QCCLP <www.clp.gouv.qc.ca>; *Comeau v Canada (Attorney General)*, 2005 FC 1648 at para 14, 284 FTR 107, 144 ACWS (3d) 744; *Blackwater v Plint*, 2001 BCSC 997 at para 711, 93 BCLR (3d) 228, [2001] BCJ no 1446 (QL).

This approach can discredit the claimant’s argument while avoiding the potentially difficult issue of whether or not the claimant had a predisposition to develop a particular disease. In *Williams v Thomas Development (1989) Corp*¹⁷⁹ a decision of the Newfoundland and Labrador Supreme Court (Trial Division), the plaintiff, a cardiologist, alleged she suffered a spinal injury as a result of a motor vehicle accident. The decision notes an alternate explanation for her injury: “The Defendants have also raised the issue of Dr. Williams being a cardiologist and the continuous wearing of lead coats, either alone or combined with some genetic predisposition to this type of injury as other possibilities for the injury.”¹⁸⁰ The plaintiff was successful at trial but this decision was overturned on appeal based on the issues of duty and standard of care.¹⁸¹ That is, one of the defendants was held on appeal not to owe a duty of care to the plaintiff, and the other was found not to have breached its duty. As a result, the claim failed and the issue of causation was moot.

Similarly, in *Decision no 1919/09*,¹⁸² a worker sought entitlement for chronic obstructive pulmonary disorder (“COPD”), for which he had the confirmed genetic vulnerability of alpha 1 antitrypsin deficiency. The decision cited the policy of the Workplace Safety and Insurance Board (“WSIB”), which had set occupational dust exposure levels deemed generally to satisfy the test for occupational causation of COPD. In particular, the WSIB policy contained a general threshold as well as a lower exposure threshold to recognize that due to the susceptibility of the worker, it would take less occupational exposure to dust to cause disability than it would in another person. The panel dismissed the worker’s appeal. The decision stated:

We have determined that the worker’s dust exposure was not sufficient to have been a significant contributing factor in the progression of his COPD, at any level. The worker has an underlying genetic predisposition to emphysema and a significant smoking history. His dust exposure does not reach the thresholds set out in the Board policy or the COPD manual and, in our view, was insignificant relative to these factors.¹⁸³

¹⁷⁹ 2006 NLSCTD 44, 254 Nfld & PEIR 61, 146 ACWS (3d) 747.

¹⁸⁰ *Ibid* at para 28.

¹⁸¹ *Williams v Thomas Development (1989) Corp*, 2007 NFCA 54, 269 Nfld & PEIR 290, 283 DLR (4th) 273; leave to appeal to SCC refused, *Williams v Thomas Development (1989) Corp*, [2007] SCCA no 535 (QL), 2008 CanLII 3200.

¹⁸² *Supra* note 135.

¹⁸³ *Ibid* at para 28.

A similar statement appeared in *Decision no 1546/04*,¹⁸⁴ in which the Ontario WSIAT denied an appeal of a worker seeking entitlement for a low back injury that the worker claimed was a result of a fall at work. The panel did not find the worker to be a credible witness, but rather found that: “The medical evidence does establish that the worker has degenerative disc disease, including spondylosis and spondylolisthesis, which are consistent with the normal aging process, a genetic predisposition, and the worker’s clinical condition of ‘morbid obesity’.”¹⁸⁵ This subsection has discussed one major type of reference to genetic predisposition. The next subsection considers another way of speaking about genetic predisposition, with different implications for legal decision making.

iii. Genetic Predisposition as an Alternate Cause of Injury

Genetic predisposition in the above personal injury decisions is conceived of as an increase in risk requiring a trigger in order to manifest as a clinical condition. Being found to have such a predisposition need not harm an injured individual’s case: in fact, as we have shown, it can be found to help it. However, in the following examples, having a genetic predisposition to a condition is equated with a causal argument against entitlement to compensation. In effect, when a participant in the legal process takes for granted factors such as “the normal aging process”,¹⁸⁶ the “normal activity of life”,¹⁸⁷ or “the wear and tear of life in general”,¹⁸⁸ and omits mention of them, “genetic predisposition” remains the primary causal explanation. Statements made in various decisions employ genetic predisposition as a sufficient cause of disease alternate to the legally significant factor.¹⁸⁹

¹⁸⁴ (19 November 2004), 2004 ONWSIAT 2392, [2004] OWSIATD no 2306 (QL), online: OWSIAT <www.wsiat.on.ca>.

¹⁸⁵ *Ibid* at para 74.

¹⁸⁶ *Ibid*.

¹⁸⁷ *Decision no 2008-01428* (14 May 2008), 2008 CanLII 33577, online: BCWCAT <www.wcat.bc.ca> at p. 4.

¹⁸⁸ *Decision no 1188/00* (30 April 2001), 2001 ONWSIAT 1460 at para 37, [2001] OWSIATD no 1435 (QL), online: OWSIAT <www.wsiat.on.ca>.

¹⁸⁹ See e.g. *Decision no 2005-03494* (30 June 2005), online: BCWCAT <www.wcat.bc.ca>; *Decision no 710/99* (24 January 2001), 2001 ONWSIAT 158 at para 20, [2001] OWSIATD no 233 (QL), online: OWSIAT <www.wsiat.on.ca>; *Dinyer-Fraser v Laurentian Bank*, 2005 BCSC 225 at para 138, 28 CCLT (3d) 205, 40 BCLR (4th) 39; *Decision no 02213* (June 2002),

In *Polovnikoff v Banks*,¹⁹⁰ the plaintiff alleged that his injuries resulting from an automobile collision with the defendants included a traumatic brain injury and a psychiatric disorder. The decision stated:

The defendants strenuously argued that the symptoms of a brain injury exhibited by the plaintiff were equally indicative of late stage alcoholism, a psychotic illness that involved a shared delusion with his father, or a psychotic disorder based on genetic predisposition. In my view, there is no evidence to support the defence theory that the plaintiff's symptoms stem from a spontaneously appearing psychotic disorder that he was genetically predisposed to.¹⁹¹

The court found in favour of the plaintiff.

In contrast, a similar use of genetic predisposition was successful in *Decision no 2008-1082*¹⁹² of the Appeal Commission for Alberta Workers' Compensation ("AWCAC"), where a worker had appealed a finding that he was not entitled to compensation for a back injury. A medical consultant to the Board reported:

As [first WCB medical consultant] has indicated, disc injuries and pain do not arise from long-term driving. She has quoted a study done on identical twins from Finland which indicates that this is much more likely due to degenerative disc disease rather

02056-02, online: NLWHSCRD <whsrd.gov.nl.ca>; *Decision no 2004-02756* (27 May 2004), online: BCWCAT <www.wcat.bc.ca>; *Decision no 2004-04487* (26 August 2004), online: BCWCAT <www.wcat.bc.ca>; *Decision no 2003-00481* (9 May 2003), 2003 CanLII 70178, online: BCWCAT <www.wcat.bc.ca>; *Hall v MacDougall*, 2007 BCSC 1296 at para 63, 161 ACWS (3d) 248; *Bittante v Zichy*, 2008 BCSC 728 at para 125, 168 ACWS (3d) 791; *Bas de Nylon Doris Ltée et Nicolas Ulysse Bélizaire* (19 February 2001), 128525, online: QCLP <www.clp.gouv.qc.ca> at para 48; *Decision no 2008-01512* (22 May 2008), online: BCWCAT <www.wcat.bc.ca>; *Decision no 2003-02849* (2 October 2003), online: BCWCAT <www.wcat.bc.ca>; *Decision no 2005-00539* (31 January 2005), online: BCWCAT <www.wcat.bc.ca>.

¹⁹⁰ 2009 BCSC 750, [2009] BCJ no 1128 (QL).

¹⁹¹ *Ibid* at para 341.

¹⁹² *Supra* note 12. Another decision featuring similar statements, also concerning degenerative disc disease and involving two of the same panel members is *Decision no 2008-219*, 2008 CanLII 86645, online: AWCAC <www.appealscommission.ab.ca>.

than occupation. The degenerative disc progression is more likely that of a genetic predisposition rather than from driving jobs.¹⁹³

The AWCAC noted that evidence provided by the worker's physiotherapist did not provide a causal explanation linking the injury to occupational factors.¹⁹⁴ They dismissed the worker's appeal, preferring the evidence of the Board's medical consultants.

Likewise, in *Decision no 2004-05655*,¹⁹⁵ a BC WCAT decision, a worker appealed a decision denying him entitlement for a right knee injury. The worker had previously undergone surgery for a left knee condition which was found to be compensable, and argued unrepresented that "after his meniscal surgery he walked with more weight on his right leg which caused more strain on the right meniscus and wore out the knee over the years."¹⁹⁶ A board medical advisor reported, in contrast, that there was "no medical evidence to support that the medial joint arthritis in his left knee was causative for arthritis in his right knee. The most likely cause of the degenerative arthritis in his right knee was a genetic predisposition."¹⁹⁷ The adjudicator, citing Board policy, held that "a lay judgement should not be preferred to a medical opinion on a question of medical expertise. As such, I am not prepared to substitute the worker's understanding of body physics, for the medical opinion of a doctor regarding body bio-mechanics and the most probable cause of the worker's right knee degeneration."¹⁹⁸ The appeal was denied.

In the decisions discussed in this sub-section, alleging "genetic predisposition" as a cause suggested that the injured party's condition would have occurred "but for" the occupational exposure, automobile collision, etc. While defendants argued that injured parties' conditions were a result of genetic predisposition and therefore non-compensable, plaintiffs or claimants denied the existence of a genetic predisposition.¹⁹⁹ For example, in *Decision no*

¹⁹³ *Decision no 2008-1082*, *supra* note 12 at para 23.3.

¹⁹⁴ *Ibid* at paras 24-25.

¹⁹⁵ *Supra* note 12.

¹⁹⁶ *Ibid* at 3.

¹⁹⁷ *Ibid* at 2.

¹⁹⁸ *Ibid* at 5.

¹⁹⁹ See e.g. *Decision no 2004-03193* (18 June 2004), online: BCWCAT <www.wcat.bc.ca> (worker denying he has non-occupational risk factors for inguinal hernia, including genetic predisposition); *Decision no 2004-06212* (25

2004-02756²⁰⁰ of the BC WCAT, the worker appealed a decision finding that his current medical issues were not causally related to his prior compensable claims. A Board medical advisor argued that the worker's having to undergo a particular surgical operation "was most likely due to a genetic predisposition to early degenerative disc disease."²⁰¹ The decision describes that the worker argued that his conditions "were work related, and not genetic."²⁰² The worker was unsuccessful. In *DJB v ARB*,²⁰³ a tort claim arising out of sexual assaults by the plaintiff's step-father, one of the plaintiff's claims was that her alcohol abuse was a form of injury she experienced as a result of the defendant's tortious conduct. The decision describes the testimony of a psychiatrist witness:

In his report, Dr. O'Shaughnessy stated that in general there is not a good one-to-one correlation between sexual abuse in childhood and substance abuse in adulthood. He went on to state that while the area of causality of substance abuse is clearly clouded, and considering he believed there was no evidence of genetic predisposition, then based on special circumstances, namely, had the abuse and the early introduction of alcohol by the defendant not occurred, it is unlikely the plaintiff would have developed a substance abuse disorder.²⁰⁴

November 2004), online: BCWCAT <www.wcat.bc.ca> (worker arguing that mother's hearing loss, and therefore her own, was not due to a genetic predisposition); *Decision no 2004-02471* (12 May 2004), online: BCWCAT <www.wcat.bc.ca> (worker's family physician provides evidence that he is not aware of any genetic predisposition to osteoarthritis as indicated by the worker's history); *Decision no 03251* (October 2003), 03298-07, online: NLWHSCRD <www.gov.nl.ca/whscred> (in response to the suggestion that genetic predisposition was a factor in his condition, the worker responded, "[i]t is very wrong to state this because I did not experience hip problems prior to the injury" at 7); *Decision no 347/97* (20 June 1997), 1997 CanLII 14105, online: OWSIAT <www.wsiat.on.ca> at para 25; *Decision no 1203/03* (15 July 2003), 2003 ONWSIAT 1627 at para 43, online: OWSIAT <www.wsiat.on.ca>; *Decision no 375/01* (28 February 2003), 2003 ONWSIAT 454 at para 34, online: OWSIAT <www.wsiat.on.ca>.

²⁰⁰ (27 May 2004), online: BCWCAT <www.wcat.bc.ca>

²⁰¹ *Ibid* at 5.

²⁰² *Ibid* at 1.

²⁰³ (1997), 44 BCLR (3d) 154, 73 ACWS (3d) 785 (SC) [*DJB* cited to BCLR].

²⁰⁴ *Ibid* at para 62.

The court preferred the testimony of the defendant, who did not make any argument regarding the genetic predisposition of the plaintiff, but rather testified that he did not give the plaintiff alcohol until she was 16 years old, and by that time “the plaintiff had already been stealing liquor from her parents’ home and drinking it in the back of the classroom with her girlfriends.”²⁰⁵

As in *DJB v ARB*, claimants sometimes unsuccessfully attempted to deny the existence of a predisposition. In contrast, several decisions involve the successful denial of the existence of a predisposition as an alternate cause of injury. The British Columbia Supreme Court in *Campbell v Tenhave*²⁰⁶ dealt with assessment of damages in a motor vehicle accident. A central issue was whether the plaintiff’s headaches were caused by the accident. A neurologist witness called by the defendant testified that it was “[e]xtremely unlikely that the headaches are caused by the accident,”²⁰⁷ though he acknowledged that “it is possible that the general stress of the accident has acted as a trigger in a migraine syndrome for which he had a genetic predisposition.”²⁰⁸ Justice Lander rejected the ambiguous position of this witness, preferring instead the testimony of two neurologist witnesses called by the plaintiff as well as that of the plaintiff’s family physician. The judgment states:

When cross-examined by Mr. Considine, Dr. Simpson said he did not pursue the genetic predisposition aspect of this matter. I find he did not investigate the family history of Mr. Campbell in order to determine if in fact there is any such predisposition. I find as a fact there is no such predisposition on the part of the plaintiff. Mr. Campbell, the father of the plaintiff, and the medical evidence does not support Dr. Simpson’s conclusion as to a genetic predisposition on the part of the plaintiff.²⁰⁹

Justice Lander found that the headaches were caused by the accident. In another damages assessment decision, the BC Supreme Court likewise found the plaintiff’s headaches to have been caused by the motor vehicle accident at issue rather than by a genetic predisposition. The plaintiff had provided evidence to the effect that she did not have a family history of headaches.²¹⁰

²⁰⁵ *Ibid* at para 65.

²⁰⁶ [1988] BCJ no 456 (QL) (BC SC).

²⁰⁷ *Ibid* at 4.

²⁰⁸ *Ibid*.

²⁰⁹ *Ibid*.

²¹⁰ *Lindquist v Neufeld*, [1984] BCJ no 3076 (QL) at para 11 (BC SC) [*Lindquist*].

The decision states: “The evidence of the plaintiff rules out the genetic predisposition and I am left to conclude that this was caused by the soft tissue injury which she suffered.”²¹¹

As a final example, in *Decision no 09235*²¹² of the Newfoundland and Labrador Workplace Health, Safety & Compensation Review Division (“WHSCRD”), a worker appealed a decision granting entitlement for a knee injury on a proportional basis due to a pre-existing arthritic condition. The respondent, the Workplace Health, Safety and Compensation Commission argued in part that the worker’s osteoarthritis developed prior to the injury due to hereditary factors. The adjudicator rejected this argument:

The suggestion that there were hereditary factors is not only highly subjective, but all so [sic] demonstrably negated by the evidence. The worker has no genetic predisposition that can be documented medically throughout her family. The worker’s testimony and the medical evidence available suggests that any osteoarthritic changes that happened over a period of time, happened over a long period of time to the family member in question, i.e. her father and, consequently, more supports the worker’s position than the Commission’s. Consequently, I place no weight on any argument relative to hereditary factors being related to the osteoarthritis.²¹³

The worker was awarded full benefits without apportionment. As the above cases have shown, where genetic predisposition itself amounts to an argument against legally significant causation, it seems more likely to draw scrutiny than when it simply serves to signify disease susceptibility where other triggering factors are being debated.

iv. Ambiguous Use of Genetic Predisposition

Considering the preceding examples of personal injury decisions, some statements reflect tension between the use of genetic predisposition on one hand as a necessary or contributory cause of disease that can be supportive of a finding of causation, and on the other hand as a sufficient cause alternate to the legally significant factor. These more ambiguous references are marked

²¹¹ *Ibid* at para 21.

²¹² (December 2009), 09184-07, online: NLWHSCRD <www.gov.nl.ca/whscred>.

²¹³ *Ibid* at 16.

by the use of disjunctive conjunctions such as “however”,²¹⁴ “while”,²¹⁵ “but”,²¹⁶ and others.²¹⁷ As an example of this tension, in *Decision no 2003-00828*²¹⁸ of the BC WCAT, the worker appealed a refusal to increase his permanent partial disability pension award because his increased levels of impairment (concerning blood clotting problems) were not related to his prior compensable injuries. The decision recounts:

The disability awards officer asked for an opinion as to whether, given the above medical and claim history, the worker’s subsequent problems dealing with clotting were directly related to the accepted deep vein thrombosis, or whether it was more likely than not related to other non-compensable factors such as genetic predisposition or lifestyle.²¹⁹

While describing genetic predisposition as a non-compensable factor, the decision goes on to state that:

Although the worker’s family history and lifestyle may in fact have pre-disposed the worker to blood clotting disorders, the Board has accepted, as do I, that in the worker’s case, the onset of his condition was caused by the nature of his employment as a carpet layer.²²⁰

The adjudicator applied this fact in concluding that the deteriorating condition of the worker was compensable and ordered, notably, a recalculation of

²¹⁴ *Decision no 2370/01* (31 January 2002), 2002 ONWSIAT 274 at para 51, online: OWSIAT <www.wsiat.on.ca>; *Decision no 2004-01988* (21 April 2004), online: BCWCAT <www.wcat.bc.ca> at 2.

²¹⁵ *Decision no 1176/05* (16 August 2005), 2005 ONWSIAT 1828 at para 22, online: OWSIAT <www.wsiat.on.ca>; *Decision no 651/96* (17 February 1998), 1998 CanLII 15371, online: OWSIAT <www.wsiat.on.ca> at para 20.

²¹⁶ *Decision no 2005-1109*, 2005 CanLII 76251 at para 18.3, online: AWCAC <www.appealscommission.ab.ca>; *Decision no 1419/09* (22 July 2009), 2009 ONWSIAT 174 at para 29, online: OWSIAT <www.wsiat.on.ca>.

²¹⁷ See e.g. *Decision no 398/92*, *supra* note 135 at para 30; *AD v MD*, 2000 OTC 52, 94 ACWS (3d) 807 at para 33, [2000] OJ no 248 (QL) (Ont Sup Ct J); *Decision no 134/87* (27 July 1988), 1988 OWCATD no 817 (QL) at para 31, 1988 CanLII 1766, online: OWSIAT <www.wsiat.on.ca>; *Sparkes-Morgan v Webb* (1999), 178 Nfld & PEIR 237 at para 222, 1999 NJ 205 (QL) (Nfld SC (TD)).

²¹⁸ (5 June 2003) 2003 CanLII 69839, online: BCWCAT <www.wcat.bc.ca>

²¹⁹ *Ibid* at 8.

²²⁰ *Ibid* at 10.

the worker’s permanent partial disability award. Likewise, in *Bilodeau et Service correctionnel du Canada*,²²¹ a worker appealed a finding that he had not suffered an occupational injury causing him to miss work for mental health reasons. The Commission des lésions professionnelles (“CLP”), allowing his appeal, citing as applicable in the present case the following passage from existing jurisprudence:

Bien que la travailleuse soit porteuse d’une prédisposition génétique à l’anxiété de type panique, elle ne l’aurait sans doute jamais contractée, n’eussent été des risques particuliers de son travail. La règle du «thin skull» trouve application même s’il s’agit ici d’une maladie psychologique.²²²

This passage demonstrates some ambiguity. On one hand, genetic predisposition can explain an individual’s vulnerability to injury, thereby supporting his or her claim. On the other hand, the language of “bien que” (although), suggests that having a genetic predisposition could be an obstacle to recovery in some cases.

v. Workers’ Compensation Cost Relief Claims

A final use of genetic predisposition in personal injury cases remains unique to the workers’ compensation process and involves the issue of cost relief. Specifically, employers attempted to obtain cost relief by arguing that the worker’s injury resulted from genetic predisposition, which amounted to a pre-existing condition or disability. The examples below illustrate that the availability of cost relief is circumscribed in order to strike a balance between making individual employers accountable notwithstanding variation in the constitution of workers, and not holding a single employer responsible for the consequences of an injury beyond its control. The concept of genetic predisposition serves to align individual cases with one of these two competing policy concerns. We highlight the way in which genetic predisposition

²²¹ (2 November 2000), online: QCLP <www.clp.gouv.qc.ca>.

²²² *Ibid* at para 46. This passage was similarly employed in *Nicole Bédard v Cadrin Fleury Inc* (12 January 2001), online: QCLP <www.clp.gouv.qc.ca> at paras 62-63. To paraphrase: Although the worker carries a genetic predisposition to anxiety (panic type), she would never have become ill were it not for the particular risks of her work. The “thin skull” rule applies even where a psychological illness is at issue.

serves this function by outlining cost relief policy and decision making by province.

In Alberta, a pre-existing condition is defined as “any pathological condition which, based on a confirmed diagnosis or medical judgement, pre-dated a work-related injury.”²²³ In other words, it does not include *any* variation or deviation from statistical norms or other workers. For cost relief to be granted, the pre-existing condition must be found to have increased the period or degree of disablement.²²⁴ In one decision, a worker who had a family history of asthma herself developed occupational asthma. The panel decided that while the worker may have had a predisposition to developing asthma, this did not constitute a “pathological condition as required in the definition for a pre-existing condition” and cost relief was not granted.²²⁵

The situation in Québec is similar, where the language of “déjà handicapé” or “already handicapped” is used.²²⁶ Precedent links this language to (what is now) the WHO’s International Classification of Functioning, Disability and Health (“ICF”), and to the concept of disability (fr: déficience), which is defined as “une perte de substance ou une altération d’une structure ou d’une fonction psychologique, physiologique ou anatomique et correspond à une déviation par rapport à une norme biomédicale.”²²⁷ The tribunal

²²³ Alberta, Workers’ Compensation Board, “Policy 03-02 Part I: Aggravation of a Pre-Existing Condition” (Alberta: WCB, 26 November 1996), online: AWCB <www.wcb.ab.ca/pdfs/public/policy/manual/printable_pdfs/0302_1.pdf> at 1.0.

²²⁴ Alberta, Workers’ Compensation Board, “Policy 05-02 Part II - Application 1: Cost Relief” (Alberta: WCB, 30 November 2010), online: AWCB <www.wcb.ab.ca/pdfs/public/policy/manual/printable_pdfs/0502_2_app1.pdf> at 1.

²²⁵ *Decision no 2005-963*, 2005 CanLII 76428 at para 26, online: AWCAC <www.appealscommission.ab.ca>

²²⁶ *An Act respecting industrial accidents*, *supra* note 137.

²²⁷ See *Alimentation JA Drolet Inc* (8 March 2001), online: QCLP <www.clp.gouv.qc.ca> at para 15 [*Alimentation*] citing *Municipalité Petite-Rivière Saint-François et CSST Québec* (1999), online: QCLP <www.clp.gouv.qc.ca>. See also *René Matériaux composites Ltée et CSST Chaudière-Appalaches* (21 July 2003), online: QCLP <www.clp.gouv.qc.ca> at para 41 [*René Matériaux*]; *Les Silos Port-Cartier et CSST Côte-Nord* (23 December 2003), online: QCLP <www.clp.gouv.qc.ca> at para 31 [*Les Silos Port-Cartier*]; *Reboitech inc* (15 March 2004), online: QCLP <www.clp.gouv.qc.ca> at para 15 [*Reboitech*]; *CSSS de l’Énergie* (26 May 2009), 2009 QCCLP 3609, online: QCLP <www.clp.gouv.qc.ca> at para 106 [*CSSS*]; *Entreprises DF* (27 April

may also look at the effect of the disability on the workplace injury, including the nature and severity of the injury, recovery time, initial diagnosis following the injury and medical opinion in general.²²⁸ In several decisions, adjudicators found employers construing alleged personal predisposition as a disability.²²⁹ One decision even warned against using questionable "after-the-fact" reasoning to conclude that a person's genetic makeup was defective and amounted to a disability:

En outre, chaque individu a un bagage génétique qui lui est propre et il serait pour le moins hasardeux, voire dangereux, de conclure que le bagage génétique d'une personne est déficient, simplement parce qu'il a développé telle ou telle pathologie. Une prédisposition génétique, serait-elle prouvée, ce qui n'est pas le cas en l'espèce, ne constitue qu'un vague, hypothétique potentiel qui ne s'actualisera peut-être jamais. Elle ne peut, de ce fait, être assimilée à une déficience. Un facteur de risque ne constitue pas une déficience en soi.²³⁰

In this decision, cost relief on the basis of a pre-existing disability was denied where the worker contracted allergic contact dermatitis following thirty years of intermittent work in forestry. The tribunal held there was not enough evidence to demonstrate a disability beyond a supposed predisposi-

2010), 2010 QCCLP 3174, online: QCLP <www.clp.gouv.qc.ca> at para 51. To paraphrase the definition: A loss of substance or an alteration of a psychological, physiological, or anatomical structure or function that corresponds to a deviation from a biomedical norm.

²²⁸ See *Alimentation*, *supra* note 227 at para 16 citing *Hôpital Général de Montréal* (29 November 1999), online: QCLP <www.clp.gouv.qc.ca>. See also *René Matériaux*, *supra* note 227 at para 44; *Reboitech*, *supra* note 227 at para 18.

²²⁹ See e.g. *René Matériaux*, *supra* note 227 at para 39, citing several previous decisions; *Camoguid inc* (22 April 2010), 2010 QCCLP 3067, online: QCLP <www.clp.gouv.qc.ca> at para 27; *Commission scolaire de la Seigneurie des-Mille-Iles* (23 February 2010), 2010 QCCLP 1590 at para 38, online: QCLP <www.clp.gouv.qc.ca>.

²³⁰ *Reboitech*, *supra* note 227 at para 34. To paraphrase: In addition, each individual has a genetic background of their own and it would be somewhat risky, even dangerous, to conclude that the genetic makeup of a person is poor, simply because he has developed a particular disease. A genetic predisposition, were it proven, which is not the case here, constitutes only a vague, hypothetical potential that may never be realized. It cannot, therefore, be treated as a disability. A risk factor does not constitute a disability in itself.

tion. This decision (or reasoning) has been followed in other cases involving dermatitis.²³¹

A symptomatic condition is not required for a pre-existing disability to be found to exist. Rather, adjudicators seem to be satisfied where medical evidence points to a definable and identifiable condition, even if it is latent. The prevalence of this condition — or to phrase it inversely — the degree to which it is a deviation from the biomedical norm, seems to be a key factor in deciding whether it is a disability. For example, in *Alimentation*²³² 90% cost relief was granted where the worker contracted allergic dermatitis. Evidence showed the worker was atopic, meaning she had a genetic predisposition to allergic reactions stated by the employer's medical expert witness to affect 0.2 to 2% of individuals.²³³ Other decisions involving atopic workers share similar outcomes.²³⁴ Deviation from the norm also informs the analysis of other factors, such as recovery time. Employers obtained cost relief in cases where workers suffered from arthritic conditions and took substantially longer to recover from workplace injuries.²³⁵ Deviation from the norm and extended recovery time also led to findings that “mesenchymal syndrome”, a type of genetic predisposition to tendon injuries, constituted a disability for the purpose of cost relief.²³⁶

In Ontario, the policy on the Second Injury Enhancement Fund (“SIEF”) states that employers may obtain cost relief where “an accident becomes pro-

²³¹ See e.g. *Deniso Lebel inc* (7 March 2004), online: QCLP <www.clp.gouv.qc.ca> at para 29;

Les Magasins Hart inc (3 November 2005), online: QCLP <www.clp.gouv.qc.ca>; *Radiateur d'auto Drummond inc* (17 September 2009), 2009 QCCLP 6325, online: QCLP <www.clp.gouv.qc.ca>.

²³² *Supra* note 227.

²³³ *Ibid* at para 17.

²³⁴ *Les Silos Port-Cartier*, *supra* note 227; See also *Usine Bois Saumon inc* (29 January 2009), 2009 QCCLP 590, online: QCLP <www.clp.gouv.qc.ca>; *Meubles Laurier ltée* (12 March 2009), 2009 QCCLP 1792, online: QCLP <www.clp.gouv.qc.ca>; *Boulangerie Weston Québec ltée* (10 May 2004), online: QCLP <www.clp.gouv.qc.ca>.

²³⁵ *Transport Bourret inc* (10 May 2004), online: QCLP <www.clp.gouv.qc.ca>; *CSSS*, *supra* note 227.

²³⁶ *Finition Chez Soi inc* (10 June 2008), 2008 QCCLP 3354, online: QCLP <www.clp.gouv.qc.ca>; *Entreprises DF*, *supra* note 227.

longed or enhanced due to a pre-existing condition."²³⁷ Pre-existing condition is defined broadly as "an underlying or asymptomatic condition which only becomes manifest post-accident."²³⁸ While the policy states that employers are not entitled to cost relief where a minor pre-existing condition results in an accident of major severity, in other circumstances relief is available. The policy states that the SIEF encourages employers to hire disabled workers.²³⁹

In one decision, an Ontario panel concluded that a "pre-existing predisposition" could be considered a pre-existing condition for the purpose of cost relief.²⁴⁰ In that decision, the adjudicator found that the worker's atopy contributed to her development of an allergic reaction to garlic during the course of her employment at a food processing facility. The adjudicator held that this was a "minor" pre-existing condition and that the employer was entitled to 50% cost relief. In contrast, another Ontario decision illustrates that unusually serious consequences following an accident are not sufficient to warrant cost relief in the absence of evidence showing a particular pre-existing condition. In that decision the employer of a worker who developed cellulitis and necrotizing fasciitis as a result of a minor workplace trauma was not entitled to cost relief. The panel noted that the evidence was insufficient to establish that the worker had an underlying or asymptomatic condition or a genetic predisposition to either of these conditions.²⁴¹ The present section of this paper has canvassed the ways genetic predisposition is cited and the themes that are apparent when use of the concept is organized by area of law and the legal issue being considered. This paper can now proceed to considering the broader legal and social issues associated with reference to genetic predisposition in legal decision making.

V. Genetic Predisposition, Causation, and Disability

To resolve issues relating to disease causation in the face of complexity and uncertainty, legal decision makers frequently turn to medical and other scientific evidence. Such evidence often provides probabilistic statements on

²³⁷ SIEF Policy, *supra* note 150.

²³⁸ *Ibid.*

²³⁹ *Ibid.*

²⁴⁰ *Decision no 1094/06* (26 July 2006), 2006 ONWSIAT 1638 at para 13, [2006] OWSIATD no 1614 (QL), online: OWSIAT <www.wsiat.on.ca>.

²⁴¹ *Decision no 2164/07* (16 October 2007), 2007 ONWSIAT 2599 at para 9, [2007] OWSIATD no 2604 (QL), online: OWSIAT <www.wsiat.on.ca>.

association between a risk factor and a disease.²⁴² Yet demonstrating an increase in risk may be insufficient in establishing that the particular party before the court or tribunal in fact developed his or her condition as a result of the particular exposure in question.²⁴³ What is required for a finding of causation in these circumstances is an inference translating or particularizing the general risk to the injured party seeking relief.²⁴⁴ Evidence that can aid in allowing such an inference to be drawn can include testimony concerning pathophysiology and possible mechanisms of disease, the claimant's particular level of exposure to the suspected causal factor, the temporal relationship between exposure and illness, his or her medical history and risk factors, and legal procedural considerations such as the credibility of witnesses.²⁴⁵

Our results demonstrate that due to its versatility, the idea of genetic predisposition can conveniently serve to justify the decision to draw this inference or not to do so. The variety of arguments made and conclusions drawn concerning genetic predisposition varied depending on how they were framed in relation to the causal issue before the legal decision maker (that is, as supporting or opposing the legally significant cause, as a necessary, sufficient, or contributory cause of the condition, and either through affirming or denying the existence of the predisposition). The effectiveness of the argument in resolving causation, in turn, reflected the evidence and argument as a whole, suggesting that genetic predisposition functions as an explanation of a conclusion regarding causation more than as a premise or substantive argument supporting that conclusion. Accordingly, decisions rarely turned on de-

²⁴² See Troyen A Brennan, "Causal Chains and Statistical Links: The Role of Scientific Uncertainty in Hazardous-Substance Litigation" (1987) 73:3 *Cornell L Rev* 469.

²⁴³ Daniel A Farber, "Toxic Causation" (1987) 71:5 *Minn L Rev* 1219 at 1228; Clifford Fisher, "The Role of Causation in Science as Law and Proposed Changes in the Current Common Law Toxic Tort System" (2001) 9:1 *Buff Envtl LJ* 35 at 126. Compare Anita Bernstein, "Formed by Thalidomide: Mass Torts as a False Cure for Toxic Exposure" (1997) 97:7 *Colum L Rev* 2153 at 2166 (for a rare example of a substance associated with overwhelmingly strong evidence of causation).

²⁴⁴ See Russell Brown, "The Possibility of 'Inference Causation': Inferring Cause-in-Fact and the Nature of Legal Fact-Finding" (2010) 55:1 *McGill LJ* 1 at 30-31.

²⁴⁵ See e.g. Katherine Lippel et al, "La preuve de la causalité et l'indemnisation des lésions attribuables au travail répétitif: rencontre des science de la santé et du droit" (1999) 17:1 *Windsor YB Access Just* 35 at 54-55 (discussing the role of biomedical knowledge in workers' compensation cases involving musculoskeletal injury).

tailed forays into genetic science. Rather, claimants were generally unsuccessful, for example, where they submitted anecdotal²⁴⁶ or personally researched²⁴⁷ evidence that was contradicted by medical expert testimony. Likewise, an expert witness was more likely to influence the decision maker if his or her testimony was specific to the claimant and the disease in question,²⁴⁸ or if his or her qualifications were extensive and relevant to the issues being discussed.²⁴⁹ In instances where there was limited scientific uncertainty in need of resolution, fact trumped expert testimony.²⁵⁰ Arguments concerning genetic predisposition were occasionally analyzed in some detail where family history²⁵¹ or genetic testing²⁵² were used to substantiate or evaluate claims.

This leads us to ask the question: what is it about genetic concepts that make them attractive as a proxy for risk in general? We believe it is a combination of two features. The first is that genetic information, like other forms of medical information, can link individuals with statistical likelihood of developing a particular disease. Second, genetic concepts derive their utility in

²⁴⁶ See e.g. *Decision no 2008-01934* (27 June 2008), 2008 CanLII 43525, online: BCWCAT <www.wcat.bc.ca>;

Decision no 2008-01708 (10 June 2008), 2008 CanLII 43297, online: BCWCAT <www.wcat.bc.ca>; *Decision no 2006-04298* (23 November 2006), online: BCWCAT <www.wcat.bc.ca>; *Decision no 2003-01415* (10 July 2003), 2003 CanLII 69111, online: BCWCAT <www.wcat.bc.ca>.

²⁴⁷ See e.g. *Decision no 2006-416* (4 May 2006), 2006 CanLII 78859 at para 28.2, online: AWCAC <www.appealscommission.ab.ca>; *Fernande Proulx et Pâtisserie Saint-Lambert Ltée* (19 September 2003), 207570-62-0305, online: QCLP <www.clp.gouv.gc.ca> at paras 19-32.

²⁴⁸ See e.g. *Decision no 2005-1126* (22 November 2005), 2005 CanLII 76255 at paras 38-39, AWCAC <www.appealscommission.ab.ca>; *Decision no 2003-02614-RB* (22 September 2003), online: BCWCAT <www.wcat.bc.ca>; *Decision no 1203/03*, 2003 ONWSIAT 1627 at paras 43-45, online: OWSIAT <www.wsiat.on.ca>.

²⁴⁹ See e.g. *Succession EM c SAAQ* (3 November 2008), 2008 QCTAQ 10901 at paras 46-47, SAS-M-118134-0605, 2008 CanLII 60899, online: TAQ <www.taq.gouv.qc.ca>; *Decision no 2008-00782* (11 March 2008), 2008 CanLII 18365, online: BCWCAT <www.wcat.bc.ca>.

²⁵⁰ See e.g. *DJB*, *supra* note 203.

²⁵¹ *Lindquist*, *supra* note 210; *Decision no 09235*, *supra* note 212.

²⁵² *AP c Régie des rentes du Québec* (14 March 2005), SAS-Q-103321-0312, 2005 CanLII 70668, online: TAQ <www.taq.gouv.qc.ca>; *Decision no 1121/06*, 2007 ONWSIAT 3330, online: OWSIAT <www.wsiat.on.ca>.

justifying legal inferences from their general usage as an indicator of heredity or innateness. As many traits of individuals correlate to those of their ancestors (and to ethnic groups more generally), pointing to heredity is attractive when other relevant or suspect potential causes do not demonstrate a connection. In this way, genetic concepts are able to stand in for hidden causes of disease.²⁵³

Framing narratives about health and disease in terms of genetics has particular implications: social and environmental determinants of health and disability may be downplayed.²⁵⁴ In such cases, responsibility for conditions is placed with the individuals who have them, and reform efforts, if any are possible, are relegated to the medical domain.²⁵⁵ This may be said to reflect a “medical model” of health and disability.²⁵⁶ Disability rights scholars have advocated a move away from this model toward a “social model”, which is based on the goals of substantive equality and full participation in society, and which views social factors as mediating disability.²⁵⁷ The geneticization of health and disability is analogous to what Parens & Asch describe as synecdoche in the context of her disability rights critique of prenatal genetic testing. In basing decisions on synecdoche, “a single trait stands in for the whole, the trait obliterates the whole. With both discrimination and prenatal diagnosis, nobody finds out about the rest. The tests send the message that there’s no need to find out about the rest.”²⁵⁸ In Asch’s application of the

²⁵³ See Morange, *supra* note 10 at 12.

²⁵⁴ See Cooper Dreyfuss & Nelkin, *supra* note 13 at 320-21.

²⁵⁵ See Lippman, *supra* note 9 at 18-19.

²⁵⁶ Ron Amundson, “Disability, Ideology, and Quality of Life: A Bias in Biomedical Ethics” in David Wasserman, Jerome Bickenbach & Robert Wachbroit, eds, *Quality of Life and Human Difference: Genetic Testing, Health Care, and Disability* (New York: Cambridge University Press, 2005) 101 at 101-02; Gregor Wolbring, *The Triangle of Enhancement Medicine, Disabled People, and the Concept of Health: A New Challenge for HTA, Health Research, and Health Policy* (Edmonton: Alberta Heritage Foundation for Medical Research, 2005) at 12.

²⁵⁷ Amundson, *supra* note 256; Wolbring, *ibid* at 17-18.

²⁵⁸ Erik Parens & Adrienne Asch, “The Disability Rights Critique of Prenatal Genetic Testing: Reflections and Recommendations” in Erik Parens & Adrienne Asch, eds, *Prenatal Testing and Disability Rights* (Washington: Georgetown University Press, 2000) 3 at 14. See also Adrienne Asch, “Why I Haven’t Changed My Mind about Prenatal Diagnosis: Reflections and Refinements” in Parens & Asch at 234; Adrienne Asch & David Wasserman, “Where is the Sin in Synecdoche? Prenatal

concept, the "part" is the expected disability and the "whole" is the future child. In the present context, they are, respectively, the genetic makeup of the individual (or particular variations amounting to a predisposition to a disease) and his or her overall condition or constitution (including social background and environmental exposures). The resulting message is that people are reducible to their genes.

Shainblum, Sullivan & Frank provide a general example of the way in which this synecdoche can occur in the context of workers' compensation.²⁵⁹ Using as their main examples heart disease and back pain, they illustrate that causation is often more complex and subtle than what the current workers' compensation framework takes into consideration. In determining entitlement for complex conditions, generic causation language such as "arising out of employment" provides adjudicators with leeway to determine which conditions should be compensated based on unstated policy considerations.²⁶⁰ For example, the authors explain that workplace stress has a pervasive effect on health, particularly when accompanied by low a reward (salary), as is disproportionately the case for people of low socioeconomic status.²⁶¹ The workplace is also a determinant of social status, which in turn is a determinant of health.²⁶² Yet these systemic and pervasive risk factors are generally not taken into account in considering occupational disease causation, as they are instead attributed to the worker's personal circumstances.²⁶³ Furthermore, our research suggests that notions of genetic predisposition may promote this reduction of complex causation into a simple matter of work-relatedness, while downplaying the interaction of social determinants of health with occupational and other factors. Where legal decisions refer to social and other environmental causal factors alongside genetic predisposition, they may accurately describe the complex interaction between the factors that results in various health conditions. However, pointing to a predisposition-trigger ac-

Testing and the Parent-Child Relationship" in Wasserman, Bickenbach & Wachbroit, *supra* note 256 at 172.

²⁵⁹ Esther Shainblum, Terrence Sullivan & John W Frank, "Multicausality, Non-traditional Injury, and the Future of Workers' Compensation" in Morley Gunderson & Douglas Hyatt, eds, *Workers' Compensation: Foundations for Reform* (Toronto: University of Toronto Press, 2000) 58.

²⁶⁰ *Ibid* at 82.

²⁶¹ *Ibid* at 73-75.

²⁶² *Ibid* at 71.

²⁶³ *Ibid* at 78-79.

count of causation risks oversimplification, and this is the concern associated with synecdoche.

Compounding this oversimplification is the tendency of individuals to geneticize themselves in order to obtain compensation, thereby reinforcing particular ways of conceptualizing and responding to disability.²⁶⁴ Where being found to have a genetic predisposition harms a party's claim, such as where genetic predisposition amounts to a sufficient cause of disease, he or she may argue against existence of the predisposition. However, in other instances genetic predisposition serves to explain what made a claimant particularly vulnerable to the legally significant trigger of the injury. In these circumstances he or she may rely on the notion of predisposition to bolster the claim. Similarly, in criminal law, genetic predisposition can serve to support an accused's argument of NCR-MD,²⁶⁵ and in family law it can be used by biological parents and the state to explain the genesis of children's conditions in attempting to advocate for their best interests.²⁶⁶

Another implication of these causal arguments relates to the reinforcement of the definition of disability. While in the *Boisbriand* decision (discussed in the introduction to this paper), it was the claimants who asserted that they were covered by the definition of disability under the Québec *Charter*, and their employers who denied that they were disabled, personal injury decisions essentially demonstrate the reverse pattern. That is, defendants argue that claimants were already disabled, while claimants argue that their genetic predispositions do not amount to a disability, or at least did not until they were exposed to the legally significant injuring factor. Similarly, in workers' compensation cost relief claims, employers argue that a worker's measurable variation associated with a unique sensitivity or long recovery time amounts to a pre-existing disability warranting cost relief.

²⁶⁴ This dynamic has been explored in the context of the wrongful birth and wrongful life causes of action. See Wendy F Hensel, "The Disabling Impact of Wrongful Birth and Wrongful Life Actions" (2005) 40 Harv CR-CLL Rev 141 ("Any benefits secured by individual litigants in court are thus taxed to the community of people with disabilities as a whole, placing at risk, in the drive for individual compensation, the gains secured by collective action and identity" at 144).

²⁶⁵ See e.g. *Campagna* trial decision, *supra* note 74 at para 21; *Carmichael*, *supra* note 81 at para 16.

²⁶⁶ *Children's Aid Society of Ottawa*, *supra* note 92 at para 49; *RM (Re)*, *supra* note 104 at para 13.

These contrasting arguments can partly be explained by the tendency to interpret facts in a way that advances one's legal interests in a given case. They also reflect the differing conceptions of disability upon which particular policy regimes are built. Briefly, the development of welfare regimes such as workers' compensation schemes has relied heavily on medical and economic measurements, which make use of clinical diagnoses and functional assessments in determining the nature and extent of disability.²⁶⁷ In contrast, instruments based on the sociopolitical model of disability policy look largely to the limitations of living with particular conditions, real or perceived.²⁶⁸ Viewed in this way, the varied and sometimes opposing genetic arguments made in legal decisions reveal the "fragmented" basis from which Canadian disability policy stems, and highlight the opportunity to promote a more "unified, comprehensive" approach that is clearer about the goals of and relationships among different disability policies.²⁶⁹

The above concerns regarding the geneticization of health and disease emerge in our survey of Canadian court and tribunal decisions, unlike incidents of genetic discrimination. There are several interrelated reasons that may explain why genetic discrimination has not materialized as speculated. Most importantly, the predictive value of genetic information is limited.²⁷⁰ With the exception of highly penetrant single-gene disease risk markers, such as the marker for Huntington's disease, much genetic variation is associated with only small increases in the risk of contracting particular conditions.²⁷¹ As a result, the costs and risks associated with adopting a genetic screening program often outweigh the limited benefits. The costs include running the tests themselves.²⁷² Other measures of risk of disease, such as blood pressure or smoking history, also offer predictive value.²⁷³ It may therefore be more

²⁶⁷ Lyn Jongbloed, "Disability Policy in Canada: An Overview" (2003) 13 *Journal of Disability Policy Studies* 203 at 205.

²⁶⁸ *Ibid* at 205-07.

²⁶⁹ *Ibid* at 207.

²⁷⁰ Kakuk, *supra* note 13 at 326-30; James P Evans et al, "Deflating the Genomic Bubble" (2011) 331 *Science* 861 at 861.

²⁷¹ Kakuk, *supra* note 13 at 326-28; George Davey Smith et al, "Genetic Epidemiology and Public Health: Hope, Hype, and Future Prospects" (2005) 366 *Lancet* 1484 at 1485-88.

²⁷² Humphries, Ridker & Talmud, *supra* note 8 at 630.

²⁷³ *Ibid*; Ian Kerr & Timothy Caulfield, "Emerging Health Technologies" in Jocelyn Downie, Timothy Caulfield & Colleen M Flood, eds, *Canadian Health Law and Policy*, 3d ed (Toronto: LexisNexis Canada, 2007) 509 at 516.

costly to turn away prospective employees or insurance policyholders on a scientifically questionable basis than to accept them, notwithstanding their genetic profile.²⁷⁴ Also, various organizations have raised concerns about the use of genetic information in this way.²⁷⁵ Legal decisions such as *Boisbriand* and others have set out the general prohibited discrimination test that a court would apply if a genetic discrimination challenge were to be brought.²⁷⁶ With respect to insurance, a claim of genetic discrimination would have to take into account that it is socially accepted that the purpose of insurance is to discriminate among individuals and groups based on risk, as long as this is done in a manner that is “reasonable and *bona fide*.”²⁷⁷

Recognizing the limits of genetic testing, Péter Kakuk suggests that social representations of genetic information amounting to the geneticization of health and disability, are more of a concern than genetic discrimination.²⁷⁸ Accordingly, concern over genetic discrimination, which is a form of genetic exceptionalism in policy, may further reify and overstate the significance of genetic information.²⁷⁹ Along these lines it is worth considering that the development of genetic science might counteract geneticization if it serves to highlight the limits of the predictive power and determinative nature of genetic variation. In a related vein, the science of epigenetics (modifications of the genome outside of DNA sequences) is revealing the effects of environmental influences on gene expression, including intergenerational effects.²⁸⁰ Thus, the development of epigenetics may likewise provide a scientific basis for highlighting the complexity of the causal implications of genetics.

²⁷⁴ But see JA Lowden, “Genetic Discrimination and Insurance Underwriting” (1992) 51 *Am J Hum Genet* 901.

²⁷⁵ See Lizabeth A Barclay & Karen S Markel, “Discrimination and Stigmatization in Work Organizations: A Multiple Level Framework for Research on Genetic Testing” (2007) 60 *Human Relations* 953 at 973.

²⁷⁶ See e.g. *British Columbia (Public Service Employee Relations Commission) v BCGSEU*, [1999] 3 SCR 3, 176 DLR (4th) 1; *Hydro-Québec v Syndicat des employé-e-s de techniques professionnelles et de bureau d’Hydro-Québec, section locale 2000 (SCFP-FTQ)*, 2008 SCC 43, [2008] 2 SCR 561, 294 DLR (4th) 407.

²⁷⁷ Trudo Lemmens, “Selective Justice, Genetic Discrimination, and Insurance: Should We Single Out Genes in Our Laws?” (2000) 45 *McGill LJ* 347 at 404-06 [emphasis in original].

²⁷⁸ Kakuk, *supra* note 13 at 335.

²⁷⁹ *Ibid.*

²⁸⁰ See generally Mark A Rothstein, Yu Cai & Gary E Marchant, “The Ghost in Our Genes: Legal and Ethical Implications of Epigenetics” (2009) 19 *Health Matrix* 1.

Conclusion

Through this study, we have pursued several analytical objectives. Primarily, we have catalogued the types of genetic causal statements made in Canadian court and tribunal decisions. The range of these statements — in the relationships they allege among the predisposition in question, the legally significant cause at issue, and the resulting condition — highlights the convenience of using genetic arguments to resolve legal issues. With an awareness of this versatility, individuals can respond more readily to genetic arguments made by other participants in the legal process. Where such arguments merely express a legal conclusion as to causation, it is helpful to look beyond the genetic language and focus on the underlying causal arguments. In some cases it will also be possible to question the scientific validity of alleging that a predisposition exists. Individuals may also choose to direct attention toward the complex interaction of social and environmental causes that are unacknowledged in notions of genetic predisposition, along the lines of the analysis undertaken by Shainblum, Sullivan & Frank.²⁸¹ Doing so may not affect the outcome of the proceeding, as the court or tribunal must ultimately decide whether on a balance of probabilities the condition is related to the legally significant cause. Nonetheless, from a policy development perspective, acknowledging the complexity of causal factors of disease can promote reflection on social determinants of health and disability. It can also counteract the tendency to geneticize health and disease. Geneticization, which is reflected in the results of our survey of case law, has consequences that reach beyond particular legal decisions and affects society at large by shaping understandings of health and disability, as well as responses to them. It is this concern that should motivate policy, as much as that of genetic discrimination.

²⁸¹ *Supra* note 259 at 69-70.