THE CONNECTION BETWEEN PROFESSIONAL SPORTING EVENTS, HOLIDAYS AND DOMESTIC VIOLENCE IN CALGARY, ALBERTA[†]

Sophia Boutilier, Ali Jadidzadeh, Elena Esina,
Lana Wells and Ron Kneebone

SUMMARY

There are some days in Calgary, Alta when domestic violence is more likely to happen than other days. There is a statistically significant connection between higher rates of domestic violence and certain Calgary Stampeders' football games as well as the arrival of the Calgary Stampede. During the 10-day-long Calgary Stampede, domestic violence calls on the seventh, ninth and tenth day of Stampede, were up 15 per cent compared to an average day. Weekends and summer months were also generally associated with the highest rates of domestic violence reports in Calgary.

When it came to Calgary Stampeders' football games, calls were higher only when the Stampeders faced off against the rival Edmonton Eskimos – with a 15 per cent increase in domestic violence reports. Grey Cup games in which Calgary played were associated with a 40 per cent increase in reports of domestic violence. However, games played by the Calgary Flames seemed to have no relationship to domestic violence calls, even those against the rival Edmonton team.

Also, New Year's Day appears to be associated with a significant spike in domestic violence, going by a four-year count of phone calls reporting domestic violence to both police and a local help line for those experiencing domestic and sexual abuse. There are also increases in calls associated with Good Friday, Easter, Canada Day, Labour Day, Valentine's Day and Halloween.

Meanwhile, the 2013 catastrophic floods in Calgary resulted in an increase in reports of domestic violence to police and the Connect help line, averaging an additional 6.6 reported incidents of domestic violence per day during the flood, 14 per cent higher than average.

A correlation was also found in Calgary between the fall in oil prices and the rise in calls, with every US$10 fall in the price of West Texas Intermediate resulting in an extra call for help every two days.

Since reducing domestic violence requires recognizing possible contributing factors and finding ways to counteract their effect, identifying these correlates is the first step to prevention. New places to look, based on these results, are highly charged Stampeder football games, the Calgary Stampede, weekends, summer months and certain holidays. Based on the study results, the authors recommend increasing publically funded childcare and affordable family outings; working with sporting organizations to better educate and support gender equity, healthy relationship skills and bystander skills; increasing training in social and emotional learning for parents and families; and conducting further research on the role of alcohol in domestic violence.

ABSTRACT

Growing evidence finds a correlation between professional sporting events, holidays and rates of domestic violence (DV). Results are often mixed and vary based on factors such as geographic location, access to alcohol, and how certain events are celebrated. This study examines changes in DV rates during sporting events and holidays in Calgary, Alta., a large Canadian city, controlling for situational factors that can influence the fluctuations, such as weather. The authors measured over a four-year period (2011 to 2014) daily counts of phone calls both to the Calgary Police Service and a service known as "Connect," a specialized Calgary phone line for people experiencing domestic and/or sexual violence. Findings show that certain daily, seasonal and economic patterns resulted in a significantly higher number of DV calls. Controlling for these patterns, New Year's Day was associated with more than twice the average number of DV calls. The Calgary Stampede (a large-scale summer event) also showed a positive correlation. Weather conditions were not associated with the increase in DV rates, except for the catastrophic flood that occurred in Calgary in 2013. The only football games associated with an increase in DV calls were games when the hometown Stampeders faced their rivals, the Edmonton Eskimos, and championship Grey Cup games involving the Stampeders. Due to the complexity of situational factors associated with variation in DV, the authors call on multiple stakeholders to advance primary prevention efforts to mitigate these effects where possible. Recommendations include increasing publically funded childcare and affordable family outings and activities; increasing training in social and emotional learning and competencies for parents; and conducting further research on the role of alcohol in domestic violence.

1.0 INTRODUCTION

Domestic violence (DV) happens in every country of the world to people of all ages, ethnic backgrounds and genders, yet it is clear that DV is a gender-asymmetrical phenomenon. It disproportionately impacts women.[1] DV is often a hidden phenomenon, occurring in private residences and underreported to police and formal service providers.[2] The outcomes of DV include injury, mental health problems, stress-related diseases (such as cardiovascular diseases), extended periods of living in terror, substance use, disability and death.[3, 4] Children who witness and experience DV may also suffer long-term health impacts as adults.[5]

---

[1] Lori Heise and Claudia Garcia-Moreno, "Violence by Intimate Partners," in *World Report on Violence and Health*, ed. Etienne G. Krug et al. (Geneva: World Health Organization, 2002), http://whqlibdoc.who.int/publications/2002/9241545615_eng.pdf?ua=1.

[2] Maire Sinha (ed.), "Measuring Violence Against Women: Statistical Trends" (Ottawa: Statistics Canada, 2013), http://www.statcan.gc.ca/pub/85-002-x/2013001/article/11766-eng.pdf.

[3] Claudia Garcia-Moreno et al., "Global and Regional Estimates of Violence against Women: Prevalence and Health Effects of Intimate Partner Violence and Non-Partner Sexual Violence" (World Health Organization, London School of Hygiene and Tropical Medicine, South African Medical Research Council, n.d.), http://apps.who.int/iris/bitstream/10665/85239/1/9789241564625_eng.pdf.

[4] Heise and Garcia-Moreno, "Violence."

[5] V.J. Edwards et al., "The wide-ranging health consequences of adverse childhood experiences," in *Victimization of Children and Youth: Patterns of Abuse, Response Strategies*, ed. Kathleen Kendall-Tackett and Sarah Giacomoni (Kingston, N.J.: Civic Research Institute, 2005).

DV is defined differently across contexts and used interchangeably with terms like intimate partner violence, family violence, or violence against women. For the purpose of this paper, we use a broad definition of DV, which includes verbal, physical, sexual, psychological, emotional, spiritual and economic abuse, and the violation of human rights against an intimate partner. To prevent DV, understanding the conditions associated with these acts of violence is of primary importance. In short, determining the conditions correlated with DV incidents can help businesses, government and practitioners to moderate the influence of those conditions, if not reduce the conditions themselves.

In particular, there is growing evidence of the relationship between situational factors and rates of domestic violence. Studies in the United States, Australia, and the United Kingdom have found that weather, temporal and economic factors influence the incidence of domestic violence, as does the occurrence of cultural and special events (i.e., holidays and sporting events).[6] From this literature, cautious conclusions can be drawn about environments and settings associated with DV. None of the findings are categorical. All are sensitive to local-level factors that may mitigate or exacerbate the likelihood of domestic violence occurring. Thus, it is important to identify the size and significance of correlations specific to a locale. There is a paucity of up-to-date Canadian literature on DV situational-level factors. Investigating this issue using data from a Canadian city helps to capture the local context relevant to prevention activities and policies.

The goals of this paper are: 1) to examine variation in DV rates during holidays and professional sporting events, and identify DV-correlated conditions in a large metropolitan centre, namely Calgary, Alta.; and 2) to make recommendations for primary prevention efforts.

Alberta has the third-highest self-reported rate[7] and the fourth-highest police-reported rate of DV for a Canadian province.[8] The Calgary Police Service has reported steadily rising domestic violence rates in the last few years with the largest increase in 2016 (36 per cent more DV calls than the average), the highest rate since 2004.[9] Compounding the toll that violence takes on individuals and families, the minimum cost to Alberta's taxpayers is estimated at $100 million per year for basic services for victims.[10]

Calgary is a predominantly white-collar city of approximately 1.2 million people with the third-highest number of head offices in Canada. Most of these head offices are in the oil and gas industry and, not surprisingly, the level of economic activity is very sensitive to the price of energy. Over the past 15 years in particular, the city has experienced an extraordinary rate of growth that has put pressure on social services, housing costs, rates of homelessness and domestic violence. The recent and dramatic slowdown in economic

---

[6] See Section 2 for a detailed literature review on each factor.

[7] Statistics Canada, Family violence in Canada: A statistical profile, 2014 (Canadian Centre for Justice Statistics, 2016).

[8] Marta Burczycka and Shana Conroy, "Family Violence in Canada: A Statistical Profile, 2015" (Canadian Centre for Justice Statistics, 2017).

[9] Yolande Cole, "Domestic Violence Calls Increasing in Calgary During Economic Downturn," *Calgary Herald*, November 1, 2016, http://calgaryherald.com/news/local-news/calgary-police-say-domestic-violence-calls-increased-by-36-per-cent.

[10] Lana Wells, Casey Boodt and Herb Emery, "Preventing Domestic Violence In Alberta: A Cost Savings Perspective," University of Calgary School of Public Policy Research Paper 5, 17 (2012): 1–13.

activity associated with a fall in the price of oil has brought its own set of challenges to families as they deal with the consequences of an unemployment rate not experienced since the early 1980s.

Based on the literature and Calgary's socio-economic conditions, the authors hypothesized that (1) such situational factors as the day of the week and the season, as well as weather- and economic-related conditions, influence rates of DV in Calgary; and (2) that professional sporting events and holidays positively influence rates of DV, controlling for the variables identified in hypothesis 1. We conducted a statistical analysis of daily counts of calls to the Calgary Police Service and a service known as "Connect," a specialized phone line offered in Calgary for people experiencing DV and/or sexual violence (SV). We use four years of daily data from Jan. 1, 2011 to Dec. 31, 2014 (T=1,461). In Section 2 we provide a brief review of the literature that highlights previously identified correlates with incidents of DV and theoretical approaches that explain possible connections between these variables and rates of domestic violence. In Section 3 we describe our data and methods. Section 4 explores statistically significant relationships affecting DV rates. Section 5 discusses limitations of the current study. Section 6 explores the implications of our findings for primary prevention. Section 7 concludes the article.

2.0 LITERATURE REVIEW

Holidays, Special Days and Domestic Violence

Evidence shows that different holidays will have variable impacts on DV rates, and on the type of crime.[11] New Year's Day is commonly found to have an effect on DV rates around the globe[12] while other holidays such as Christmas, Valentine's Day, Easter and St. Patrick's Day show mixed results in the literature.[13] Although there are some commonalities, the association between holidays and increased DV also varies from country to country and from region to region. For example, in a large Australian study, DV rates spiked on holidays relative to average days by 157 per cent in New South Wales, 79 per cent in Northern Territory, and 34 per cent in South Australia.[14] In some cases, however, researchers found no relationship between incidents of DV and holidays.[15] In addition to major holidays,

---

[11] Ellen G. Cohn and James Rotton, "Even Criminals Take a Holiday: Instrumental and Expressive Crimes on Major and Minor Holidays," *Journal of Criminal Justice* 31 (2003): 351–60, doi:10.1016/S0047-2352(03)00029-1.

[12] See, for example, studies from Australia, the U.S. and the U.K.: Cohn and Rotton, "Even Criminals"; Rochelle Braaf and Robyn Gilbert, "Domestic Violence Incident Peaks: Seasonal Factors, Calendar Events and Sporting Matches," Stakeholder Paper (Australian Domestic and Family Violence Clearinghouse, October 2007); Vaseekaran Sivarajasingam et al., "Relations between Violence, Calendar Events and Ambient Conditions," *INJURY: International Journal of the Care of the Injured* 35 (2004): 467–73, doi:10.1016/S0020-1383(03)00241-9; David Card and Gordon B. Dahl, "Family Violence and Football: The Effect of Unexpected Emotional Cues on Violent Behaviour," *Quarterly Journal of Economics* 126 (2011): 103–43.

[13] In addition to the previous note, please see, for example, Manisha Joshi and Susan B. Sorenson, "Intimate Partner Violence at the Scene: Incident Characteristics and Implications for Public Health Surveillance," *Evaluation Review* 43, 2 (2010): 116–36; Walter Gantz , Zheng Wang and Samuel D. Bradley, "Televised NFL Games, the Family, and Domestic Violence," National Resource Center on Domestic Violence; "Domestic Violence and the Holidays: Promoting Wellness and Managing Stress," Technical Assistance Guidance (National Resource Center on Domestic Violence, 2014).

[14] Braaf and Gilbert, "Domestic."

[15] See, for example, Doug Erikson, "Review: Holidays Don't Hike Domestic Violence," *The Capital Times & Wisconsin State Journal*, November 25, 2007, sec. D.

"special days" (i.e., festivals and local holidays) may also influence rates of DV.[16] Likewise, the level of impact varies, and may be specific to geographic location and how these events are celebrated. Thus, researchers must consider specific geographic and cultural contexts.

Professional Sporting Events and Domestic Violence

Research often finds strong correlations between professional sporting events and higher levels of DV.[17] The degree of violence that is part of the game itself has shown a positive correlation with DV incidents. For example, Adubato's review of televised sports in Philadelphia found that both ice hockey and football were positively correlated with increases in DV, but basketball and baseball were not.[18] Similarly, interviewing women who had been beaten following sports events, Sabo et al. found that the most common sports watched by the offenders were contact sports, although their sample was small (N=18).[19]

Professional sporting events do not occur in a vacuum. They're subject to local cultural and social effects. Thus, while a game of tennis, for instance, may not normally be associated with incidents of DV, this may change if a particular match involves high stakes or involves players from different countries, or from different social or religious groups. Card and Dahl's study of the game outcomes of six National Football League teams found increases in domestic violence associated with games between teams with well-established rivalries. They also found that playoff games had a significant effect on DV, whereas non-playoff games did not, concluding that only games that really mattered to fans had an effect.[20] Importantly, the effect of an upset loss, that is a loss in a game in which a team was expected to win, had the largest effect — about a 10 per cent increase — on DV rates. The authors conclude that the unexpected emotional cue of the upset loss bridges the game's outcome and the act of violence.

Drawing on Card and Dahl's study, Dickson et al. analyzed DV rates in Strathclyde, Scotland from January 2003 to October 2011 between the traditional rivals of the Scottish Premier League, the Rangers and the Celtics (also referred to as Old Firm matches).[21] Their findings departed from Card and Dahl's upset-loss thesis; domestic violence increased by 36 per cent following Old Firm matches regardless of who won or lost. Games between non-rivals, or less important rivals, did not register the same effect, leading the authors

---

[16] Cohn and Rotton, "Even Criminals."

[17] A small sample of the many studies of the influence of American football games include Annie Crowley, Oona Brooks, and Nancy Lombard, "Football and Domestic Abuse: A Literature Review" (The Scottish Centre for Crime and Justice Research, 2014); Gantz, Wang and Bradley, "Televised"; Catherine Palmer, "Violence Against Women and Sport: A Literature Review" (End Violence Against Women, 2011); and Carolyn J. Sachs and Lawrence D. Chu, "The Association Between Professional Football Games and Domestic Violence in Los Angeles County," *Journal of Interpersonal Violence* 15, 11 (2000). For an analysis of the impact of rugby and soccer games, see Vaseekaran Sivarajasingam, S. Moore and Jonathan Shepherd, "Winning, Losing, and Violence," *Injury Prevention* 11 (2005): 69–70.

[18] Beth Adubato, "Fanning the Flames: Televised, Professional Football Games and Domestic Violence" (PhD diss., Rutgers University, 2011).

[19] Donald Sabo, Philip M. Gray and Linda A. Moore, "Domestic Violence and Televised Athletic Events: 'It's a Man Thing,'" in *Masculinities, Gender Relations and Sport*, ed. Jim McKay, Michael A. Messner and Donald Sabo (SAGE Publications, 2000), 127–46.

[20] Card and Dahl, "Family Violence."

[21] Alex Dickson, Colin Jennings and Gary Koop, "Domestic Violence and Football in Glasgow: Are Reference Points Relevant?" SIRE Discussion Paper (University of Strathclyde, 2012).

to believe that neither the game itself, nor the outcome, were the catalysts of domestic violence, but rather that the rivalry between the Celtics and the Rangers was the most salient feature associated with DV increases.

The situation is made more complex when professional sporting events are played on major holidays[22] that are also often associated with alcohol[23] and family disruption. Other factors can also have contributing effects (i.e., demographic characteristics such as gender, race, ethnicity and socioeconomic class). Thus, depending on the location and nature of a sport, sporting events can take on a holiday-like quality, similarly involving increased social interactions, drinking, high expectations, high stress levels, and changes to routine — all factors that may predict higher rates of DV. To tailor DV-prevention efforts most effectively, it is important to understand the separate associations between DV and holidays and special days while accounting for other factors that may impact the fluctuations. While some of these factors are outside the control of policy-makers and practitioners, isolating effects that *can* be targeted may help to ameliorate conditions conducive to overall violence.

2.1 Other Contributing Factors

Weather and Seasonal Factors and Domestic Violence

Certain weather conditions, such as warm temperatures and precipitation, have often been found to exhibit a strong correlation with increased DV. Hsiang et al.'s recent meta-analysis of studies on climate's impact on violence found strong, statistically significant effects of deviations from mild temperatures or precipitation rates on both interpersonal (including DV and SV) and intergroup conflict.[24] These fluctuations have been associated with seasonal influences[25] and with changes in weather conditions within a season.[26]

Temperature's relationship to DV is contested in the literature. Oths and Robertson argue that warm weather facilitates greater social interaction in American culture, which increases the opportunity for conflict.[27] However Michael and Zumpe suggest that while increased social interaction might reasonably explain the relationship to the

---

[22]   Examples include: U.S. college football championships played on Christmas and New Year's Day, a plethora of NFL games played on American Thanksgiving, the annual World Junior Hockey Championships played during the end-of-year holiday season, etc.

[23]   Please see Section 2.1 for literature review on alcohol as a factor in DV.

[24]   Solomon Hsiang, Marshall Burke and Edward Miguel, "Quantifying the Influence of Climate on Human Conflict," *Science* 341 (2013): 1212–1226, doi:10.1126/science.1235367.

[25]   See, for example, Salvador Vazquez, Mary Stohr and Marcus Purkiss, "Intimate Partner Violence Incidence and Characteristics: Idaho NIBRS 1995 to 2001 Data," *Criminal Justice Policy Review* 16 (2005): 99–114. Their study of 36,000 incidents of domestic violence in Idaho over a seven-year period (1995–2001) found summer seasonal peaks, with the highest rate in the month of July. See also Richard P. Michael and Doris Zumpe, "An Annual Rhythm in the Battering of Women," *American Journal of Psychiatry* 143 (1986): 637–40. Their study of 27,000 reports of battered women in five U.S. cities identify an "annual rhythm" of abuse whereby the peak occurred during summer months.

[26]   Paul Butke and Scott Sheridan ("An Analysis of the Relationship between Weather and Aggressive Crime in Cleveland, Ohio," *American Meteorological Society* 2 (2010): 127–39) report finding a positive linear relationship between temperature increases for all types of aggressive crimes analyzed, including domestic violence and rape. In their study on the role of sporting events, Card and Dahl ("Family Violence") include a dummy variable for temperature and report a positive and statistically significant effect whereby family violence rates were found to be eight per cent higher on hot days (temperature greater than 80 F or 27 C) than on days cooler than that.

[27]   Kathryn S. Oths and Tara Robertson, "Give Me Shelter: Temporal Patterns of Women Fleeing Domestic Abuse," *Human Organization* 66, 3 (2007): 249–60.

increase in many sources of conflict, it does not explain seasonal fluctuations in DV, given that cohabitating partners would see each other on a daily basis regardless of season.[28] Unexpected hot weather could disrupt normal routines, prompting conflicts that could lead to DV.[29] Finally, Felson and Boba stress that a combination of factors associated with hot temperatures — what they call a "chemistry for crime" — co-occur and interact to produce conditions more conducive to DV.[30] Although the mechanisms are debated, it is clear that weather and seasonal factors should be considered when analyzing situational-level factors associated with DV.

Temporal and Daily Factors and Domestic Violence

The literature shows that reported DV rates increase during evenings, nights and weekends. For example, Cohn's study of reports to the Minneapolis Police Department found time of day to have the largest effect size of all predictor variables in determining violence rates. The highest frequency of reporting occurred in the afternoon and evenings. Her study also found that more violence occurred on weekends, making weekend evenings the most likely time for DV to occur.[31] A later study using the same data found that DV was most common between 9 p.m. and 3 a.m. on Saturdays and Sundays.[32] In Joshi and Sorenson's review of almost 10,000 incidents of domestic violence in a major American city, higher rates were again found on the weekends, with the majority (56 per cent) of reports made between 6 p.m. and 4 a.m.[33] Temporal and daily variations may also relate to professional sporting events and holidays,[34] which typically occur on weekends and in the evening. Disaggregating these effects will help to inform targeted prevention efforts.

Economic Pressures and Domestic Violence

Several longitudinal studies[35] confirm that levels of financial stress are positively associated with the risk of experiencing physical violence.[36] Unemployment, for example, is associated

---

[28]   Michael and Zumpe, "An Annual."

[29]   See James Rotton and Ellen Cohn, "Temperature, Routine Activities, and Domestic Violence: A Reanalysis," *Violence and Victims* 16, 2 (2001): 203-15.

[30]   Marcus Felson and Rachel S. Boba, "Chemistry for Crime," in *Crime and Everyday Life*, 4th ed. (Thousand Oaks, Calif.: SAGE Publications, 2010), 25–48.

[31]   Ellen Cohn, "The Effect of Weather and Temporal Variations on Calls for Police Service," *American Journal of Police* 15, 1 (1996): 23–43.

[32]   Rotton and Cohn, "Temperature." Also see Vazquez, Stohr and Purkiss, "Intimate," for evidence from Idaho showing Wednesdays to have the lowest reporting rate and that weekend rates are almost 50 per cent higher than weekday rates.

[33]   Joshi and Sorenson, "Intimate."

[34]   Crowley, Brooks and Lombard, "Football"; Ktarina Grech and Melissa Burgess, "Trends and Patterns in Domestic Violence Assaults: 2001-2010 (NSW Bureau of Crime and Statistics Research, Australia: 2011)"; Liz Gilchrist et al., "Roles of Alcohol in Intimate Partner Abuse," *Alcohol Insight* (Alcohol Research U.K., 2014).

[35]   Anna Greenberg and Jennifer Berktold, "Holiday Stress," American Psychological Association Survey (Greenberg Quinlan Rosner Research, 2006), http://www.apa.org/news/press/releases/2006/12/holiday-stress.pdf.

[36]   Nadine Smith and Don Weathernurn, "Personal Stress, Financial Stress, Social Support and Women's Experiences of Physical Violence: A Longitudinal Analysis," *Contemporary Issues in Crime and Justice* 168 (Australia: NSW Bureau of Crime Statistics and Research, 2013).

with a higher risk of DV incidents.[37] Schneider and colleagues' study confirmed this finding by analyzing data from the U.S Bureau of Labor Statistics' "Fragile Families and Child Wellbeing" study that showed a positive relationship between unemployment, economic hardship and abusive behaviour. The authors also found that a rapid increase in the unemployment rate increased men's controlling behaviour toward intimate partners.[38] Data from 2005 to 2009 found that higher levels of monthly mortgage foreclosures were associated with higher levels of DV, underscoring the correlation between economic stress, the threat of losing a home or financial status, and increased risks of DV.[39] Consequently, the recent slowdown in economic activity in Alberta and associated economic stressors are important contextual variables for understanding rates of DV in the province.

Alcohol and Domestic Violence

Authors often cite the role of alcohol[40] as a contributing factor to DV spikes during weekends, holidays and professional sporting events where drinking is expected to take place. In Calgary, a review of domestic-violence court cases found that 61 per cent of the accused had used alcohol, as had 28 per cent of the victims. In only 29 per cent of cases was no alcohol involved.[41] Canadian data have consistently shown that women partnered with heavy drinkers report rates of DV five times higher than women with partners who drink moderately or not at all.[42] Nevertheless, the empirical data frequently lack offender-level characteristics, making alcohol just a likely — rather than an observed — association. Rather than see alcohol as a cause for violence, scholars often describe alcohol as one of several factors that come together to facilitate violence.[43] Alcohol may be present before, during, and after a DV episode, contributing to violence and serving as a coping mechanism for the trauma.[44]

---

[37] Capaldi et al., "A Systematic Review of Risk Factors for Intimate Partner Violence," *Partner Abuse* 3, 2 (2012): 231–280, doi.org/10.1891/1946-6560.3.2.231.

[38] Daniel Schneider et al., Intimate Partner Violence in the Great Recession, *Demography* 53, 2: 471–505, https://doi.org/10.1007/s13524-016-0462-1.

[39] April Pattavina, Kelly M. Socia and Malgorzata J. Zuber, "Economic Stress and Domestic Violence," *Justice Research and Policy* 16, 2 (2015): 147–164, https://doi.org/10.1177/1525107115623938.

[40] For example, Heise and Garcia-Moreno, "Violence"; Kirby et al., "Can the FIFA World Cup Football (Soccer) Tournament Be Associated with an Increase in Domestic Abuse?" *Journal of Research in Crime and Delinquency*, 51, 3 (2014): 1-18; Therese McCarthy, "Public Health, Mental Health and Violence Against Women: Report Produced for Vic Health," Scoping Report (Mental Health and Wellbeing Unit, Australia: Victorian Health Promotion Foundation, 2003); Michael A. Messner and Jeffrey Montez de Oca, "The Male Consumer as Loser: Beer and Liquor Ads in Mega Sports Media Events," *Signs: Journal of Women in Culture and Society* 30, 3 (2005): 1879–1909; Palmer, "Violence"; Sivarajasingam et al, "Relations"; World Health Organization, "Intimate Partner Violence and Alcohol" (Geneva: World Health Organization, and John Moores University, Centre for Public Health, 2006), http://www.who.int/violence_injury_prevention/violence/world_report/factsheets/fs_intimate.pdf.

[41] Leslie Tutty et al., "Evaluation of the Calgary Specialized Domestic Violence Trial Court and Monitoring the First Appearance Court: Final Report" (RESOLVE Alberta, 2011).

[42] Holly Johnson, "Measuring Violence Against Women: Statistical Trends 2006," Catalogue no. 85-570-XIE (Statistics Canada, 2006).

[43] For example, Heise and Garcia-Moreno, "Violence"; Kirby et al, "Kirby et al., "Can the FIFA"; McCarthy, "Public"; Messner and Montez de Oca, "The Male"; Palmer, "Violence"; Sivarajasingam et al., "Relations."

[44] Kaysen et al., "Domestic violence and alcohol use: Trauma-related symptoms and motives for drinking," *Addictive Behaviours* 32, 6 (2007): 1272-283.

While alcohol's presence in studies of DV is highly consistent, the causal mechanisms involved vary with the setting and are often only implied, rather than observed. The role of alcohol in certain celebrations or professional sporting events may depend on the local culture or "rules" for drinking,[45] as well as on other structural factors affecting particular communities. Furthermore, Oths and Robertson found no difference between "drinking holidays" and holidays not typically associated with drinking, suggesting that holidays play an important role quite separate from the role played by alcohol.[46]

Although the authors recognize the possible presence of alcohol during professional sporting events and holidays, as well as its role before, during, or after a DV incident, our data do not allow us to determine its potential separate contribution because relevant information on alcohol use was not collected in this study.

2.2 Theoretical Frames

There is no *single* risk factor for DV; multiple factors work together to produce the conditions for violence. What is more, factors not listed here, such as whether the perpetrator experienced violence as a child, also contribute to the likelihood of DV.[47] Under the circumstances of complex and multi-faceted DV mechanisms, focusing on primary prevention[48] — mitigating risk factors before violence occurs — is the most effective way to reduce the incidence of DV. Accordingly, we have paid less attention to describing several theories (Ecological Model, Routine Activity Theory, General Affective Aggression Model)[49] that we believe help explain the interaction of factors and *why* certain factors are associated with violence.

Instead, we synthesize the commonalities and insights of these theories for the purpose of understanding how primary prevention activities can contribute to reducing risk factors and building resilience. Each theory points to multi-causal models and diverse pathways to DV. Each emphasizes the interaction of individual factors with situational and structural influences that can either encourage or reduce risk or protective factors to violence. By integrating these theories, we can see that, for example, individual aggressive cognitions and appraising the consequences of one's actions, elements of the General Affective

---

[45] Braaf and Gilbert, "Domestic." See also discussion of "risky drinking cultures" in World Health Organization, "Intimate."

[46] Oths and Robertson, "Give Me."

[47] Bonnie E. Carlson, "Causes and Maintenance of Domestic Violence: An Ecological Analysis," *Social Service Review* 58, 4 (1984): 569–87.

[48] The co-authors of this paper work at Shift: The Project to End Domestic Violence, located in the faculty of social work at the University of Calgary. This initiative is focused on supporting primary prevention research and activities with multiple stakeholders to stop violence before it starts.

[49] The three theories — Ecological Model, Routine Activity Theory, General Affective Aggression Model — help to make sense of the correlations shown by the literature review and our data. Given the variety of findings, each of these theories may be needed in combination to best prepare for and reduce the incidence of DV. First developed by Bronfenbrenner, the Ecological Model calls for a multi-level analysis of factors affecting human development and behaviour. Cohen and Felson's Routine Activity Theory emphasizes the opportunities for crimes, rather than the traits of an offender. The General Affective Aggression Model starts from basic inputs influencing an individual's situation, progressing through five levels to choosing a behaviour. Urie Bronfenbrenner, "Toward an Experimental Ecology of Human Development," *American Psychologist* 32, 7 (1977): 513–31, doi:10.1037/0003-066X.32.7.513; Lawrence E. Cohen and Marcus Felson, "Social Change and Crime Rate Trends: A Routine Activity Approach," *American Sociological Review* 44, 4 (1979): 588–608; James J. Lindsay and Craig A. Anderson, "From Antecedent Conditions to Violence Actions: A General Affective Aggression Model," *Personality and Social Psychology Bulletin* 26, 5 (2000): 533–47, doi:10.1177/0146167200267002.

Aggression Model (GAAM), may be shaped by socio-cultural factors like traditional gender roles and the legitimacy of violence identified by Carlson[50] and Heise[51] in the Ecological Model. Furthermore, situational variables that start the chain reactions in the GAAM might include ruptures to routine providing both cues and opportunities for violence. The theories also point to the "chemistry for crime" thesis put forth by Felson and Boba[52] and utilized by Vazquez et al.[53] to consider how the combination of certain factors (such as the weekend, evening, hot weather, and a drinking holiday, for example) increases the likelihood of violence. Both the challenge and the advantage of these approaches is that they offer multiple sites for prevention work that will be discussed in Section 6.

3.0 DATA AND METHODS

The literature shows that circumstances related to DV vary by local context. Thus, it is crucial to identify risk factors unique to Calgary. Our study examines the effect size and statistical significance of a range of independent variables identified in the literature on variation in DV rates over a four-year period. Identifying these relationships will inform prevention strategies as well as future research on effective ways to interrupt and prevent the process of violence.

In this study, our dependent variable, rates of reported DV, is derived from daily counts of calls to the Calgary Police Service and the "Connect" service[54] (a DV and SV help line offered in Calgary) from people experiencing or witnessing DV and/or SV. We use four years of daily data comprised of 69,912 calls made over 1,461 days from Jan. 1, 2011 to Dec. 31, 2014. Table 1 shows summary statistics for our sample. We report average month and year incidents of the violence in Calgary in the same table. Figure 1 plots our data.

TABLE 1   SUMMARY STATISTICS OF DOMESTIC VIOLENCE CALLS

| Daily DV Calls				Monthly	Yearly
Minimum	Median	Mean	Maximum	Mean	Mean
21	47	48	128	1,457	17,478

---

[50]   Carlson, "Causes."

[51]   Lori Heise, "Violence Against Women: An Integrated, Ecological Framework," *Violence Against Women* 4, 3 (1998): 262–90.

[52]   Felson and Boba. "Chemistry."

[53]   Vazquez, Stohr and Purkiss, "Intimate."

[54]   The authors would like to thank Haley Scott who gathered the data from Connect.

FIGURE 1   DAILY DV PHONE CALLS
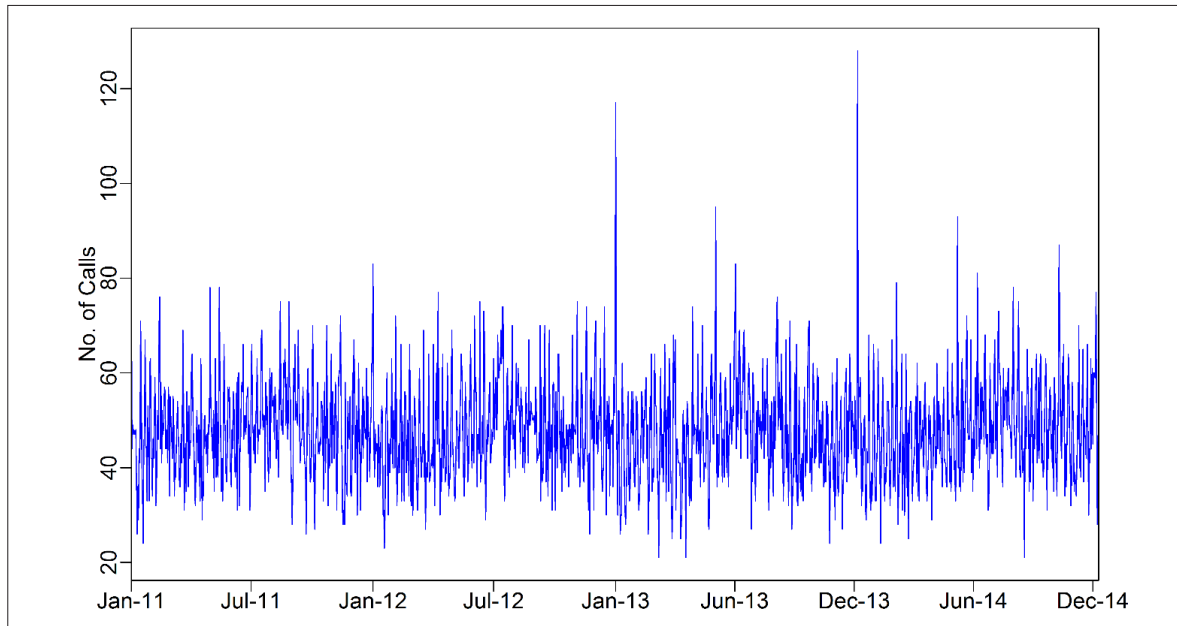
These data exhibit what statisticians identify as a *stationary* process.[55] This property gives us confidence our analysis will avoid identifying spurious correlations.

We use regression analysis to determine the effect size of day of week and month of year on variations in DV rates.[56] Controlling for these factors, we can isolate the independent effects of other situational variables, identifying holidays or professional sporting events correlated with periods of unusually high DV incidents. We also assess the effects of weather and economic stress.

4.0 ANALYSIS AND FINDINGS

4.1 Daily and Seasonal Patterns of DV calls

We begin by identifying seasonal and daily patterns of domestic-violence variations using dummy variables identifying months and days of the week.[57] Figures 2 and 3 show how DV calls vary by day of the week and by month, respectively. Our findings confirm patterns noted in the literature; calls are higher on weekends and during the summer months. The weekend effect is strong. DV reporting increases by about one-third on weekends relative to mid-week. The seasonal effect is not as large but still significant; the incidence of DV is over 10 per cent greater in July than in March.

---

[55]   A stationary process has the property that the mean, variance, and autocorrelation structure of the data do not change over time. Loosely speaking, this means the statistical properties of the process generating the data do not change over time and so greater confidence can be had that correlations that are identified are not spurious. We confirm the statistical diagnosis with unit root tests. These results are available on request.

[56]   Regression analysis identifies the size and strength of influence of one variable on another. The approach identifies this influence while holding constant (or "controlling for") the possible influence of other variables.

[57]   A *dummy variable* (also known as an "indicator variable") takes the value of zero or one to indicate the absence or presence of some influence that might be expected to influence an outcome. Our approach to identifying daily and seasonal patterns in DV calls is explained in the next section.

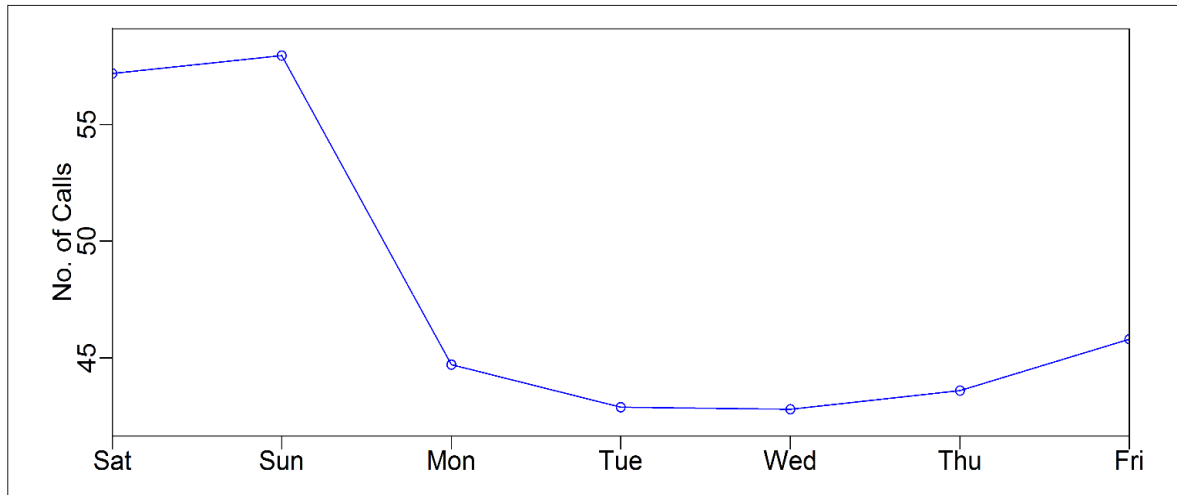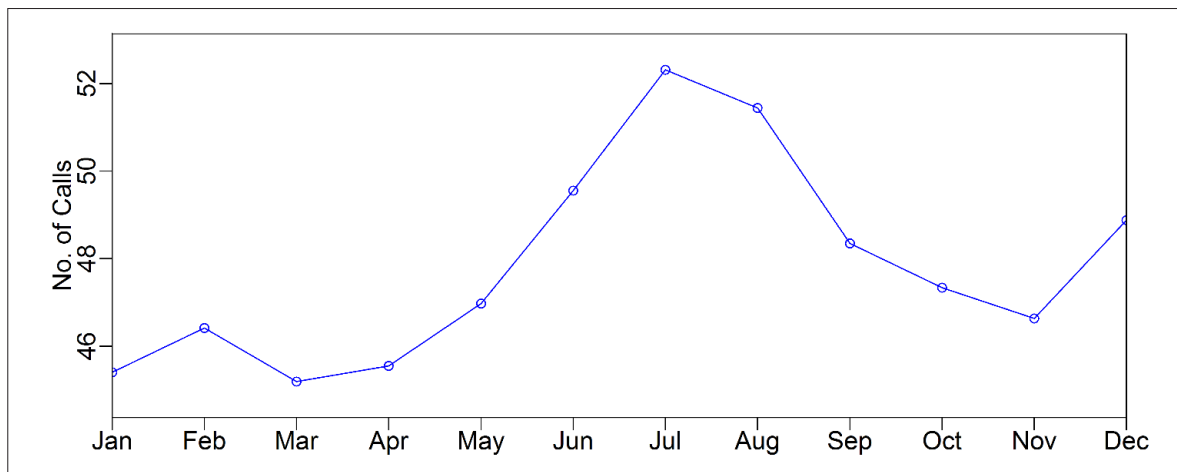**FIGURE 2   DAILY PATTERNS OF DV CALLS**

FIGURE 3   MONTHLY PATTERNS OF DV CALLS

To identify the independent effects of other variables on DV calls, we regress dummy variables for day and season on the dependent variable.[58] The residuals from that regression show variation in DV calls not influenced by the day of the week or the month of the year. Figure 4 shows the resulting filtered data.

---

[58]   To avoid what is known as the "dummy variable trap," we exclude Sunday and July dummy variables from the regression. Were we not to do this, our statistical model would exhibit perfect multi-collinearity across dummy variables and we would be unable to compute the value of coefficients or their statistical significance. The choice of which day-of-the-week and month-of-the-year dummy variables to omit is arbitrary.

FIGURE 4   FILTERED DV PHONE LINE CALLS (RESIDUALS)
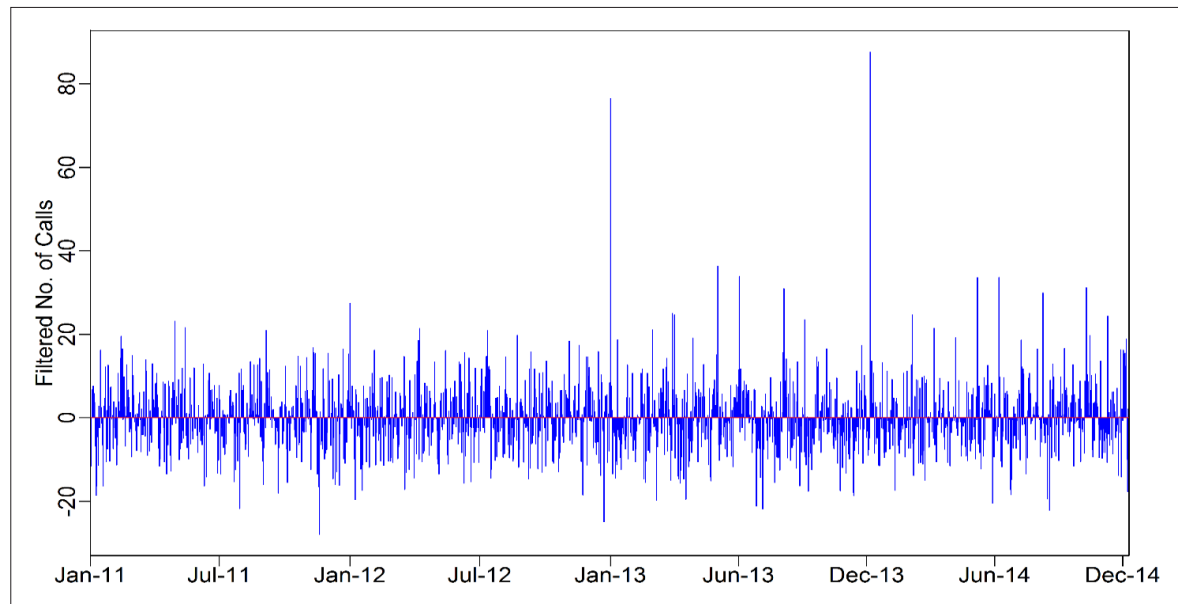
Next, we define dummy variables for selected holidays and special events. These are listed in Table A1 in the appendix. In addition, we include continuous variables for daily oil prices, precipitation and temperature. The multivariate regression yields the independent effects of holidays and special days, professional sporting events, economic conditions and weather on variation in DV calls. The strength and statistical significance of each of these correlations is determined independent of the influence of the others. The measures of these influences are reported in tables A2, A3 and A4 of the appendix.

4.2 Weather and Economic Effects and Domestic Violence

Following the literature, we hypothesized that economic stress brought about by recession, stress associated with extreme temperatures (both hot and cold), and unique weather-related events are positively correlated with increases in incidents of DV.

Table A2 shows the results of adding weather and economic variables to the previous model.[59] We use daily minimum temperature (in degrees Celsius, C) and precipitation (in millimeters, mm), which are available from Environment Canada.[60] Further, we define a dummy variable, *Flood,* to control for a unique event that occurred in the summer of 2013 (June 19 to July 12) when a significant part of Calgary was flooded by the Elbow and Bow rivers that run through the downtown area and surrounding neighbourhoods.[61] Finally, we

---

[59]   To be clear, all of the "special day" variables discussed in Section 5.1 and reported in Table A2 are also included in this model.

[60]   Our measure of temperature is the minimum overnight temperature. An alternative would be to use the maximum daytime temperature. The two measures are, of course, highly correlated; over our sample period, an overnight minimum temperature of more than 10 C was typically associated with a daytime high temperature of 24 C. The range of temperatures we use allows us to investigate the impact on incidents of DV stemming from both warm temperatures and very cold temperatures of the sort that keep people indoors and, so, in close proximity with others.

[61]   As reported by Environment and Climate Change Canada (https://www.ec.gc.ca/meteo-weather/default. asp?lang=En&n=5BA5EAFC-1&offset=2&toc=hide), over 100,000 Albertans were displaced by the flood and it was, to that point, Canada's costliest natural disaster in terms of damage losses and recovery costs.

use daily oil prices to control for economic recessions and expansions in Calgary and include a dummy variable identifying those dates when social assistance cheques are made available.

Our statistical estimates suggest that an economic downturn, as measured by a fall in the price of oil, is negatively associated with DV calls. As the price of oil falls, DV rates are expected to increase. In other words, as economic stress increases, so do DV rates. The size of the estimated effect indicates that a US$10 fall in the price of West Texas Intermediate (WTI) oil is associated with an extra DV call every two days. A somewhat related event, the issuance of social assistance cheques, is found to be associated with an extra 1.9 DV calls per day during the five days following. The flood of downtown Calgary and surrounding neighbourhoods in June of 2013 is positively associated with DV, registering an effect of 6.6 additional DV per day calls during that period (a 14 per cent increase). Finally, and contrary to what is often reported in the literature, relatively high temperatures did not have a statistically significant influence on DV.[62] Very cold temperatures are associated with a fall in DV calls, although the significance of the relationship is statistically weak.

4.3 Domestic Violence Calls during Holidays and Special Days

The statistical results reported in Table A3 show evidence that DV calls are highly correlated with New Year's Day, Good Friday, Canada Day (July 1st), Easter, Labour Day, Valentine 's Day and the day after Halloween. Each of these days is associated with a statistically significant increase in the number of DV calls.[63] A series of "special days" unique to Calgary are the 10 days in early July defining the Calgary Stampede, a major agricultural and ranching exhibition that has come to be associated with drinking and partying. Our results identify statistically significant increases in DV calls occurring on the seventh, ninth and tenth days of the Stampede. On these days, DV calls increased by about 15 per cent compared to an average day.

The influence of New Year's Day is particularly strong. The estimated coefficient of +55 indicates that, after controlling for all other independent variables, an additional 55 incidents of DV were reported. Given that the daily average of DV incidents is 48, this means New Year's Day is associated with more than twice the usual number of DV calls.

Notable for their absence are statistically significant relationships with Christmas or Thanksgiving; two holidays associated with family gatherings and, particularly at Christmas, pressures on finances. St. Patrick's Day, a non-statutory holiday sometimes associated with increased alcohol consumption, is not identified in our data as having a statistically significant influence of DV calls.

4.5 DV Calls during Professional Sporting Events

Calgary is host to two teams in major sports leagues: the Calgary Flames of the National Hockey League (NHL) and the Calgary Stampeders of the Canadian Football League

---

[62]   This may be explained by the fact that even high daytime temperatures in Calgary are typically associated with a significant cooling by early evening. Calgary's climate is also very dry, so humidity rarely contributes to the discomfort felt from high temperatures.

[63]   We allow for the possibility that incidents of DV — or the reporting of such incidents — may occur the day before, the day of, or the day following the date of the holiday or "special day." We note these findings in the text.

(CFL). The Flames and Stampeders played a total of 295 and 87 games, respectively, during our study period.

Following the literature, we include dummy variables identifying playoff and championship games involving the home teams and dummy variables identifying games involving the home team playing against key rivals.[64] Finally, we included dummy variables to identify the effects on DV calls of the Super Bowl — the championship of American professional football — and matches of the Ultimate Fighting Championship (UFC), a popular contact-sport event.

Our empirical results, reported in Table A4, suggest that only a few professional sporting events have a statistically significant influence on DV calls. The day after Grey Cup[65] games in which the Stampeders played (in 2012, when they lost, and in 2014, when they won) were associated with statistically significant and very large increases in DV calls of about 40 per cent above average. On days the Stampeders play their chief rivals, the Edmonton Eskimos, DV calls increase by nearly 15 per cent above average. Games in which the Stampeders play their other key rivals or play in non-championship playoff games had no statistically significant influence on DV calls. The American Super Bowl had no statistically significant influence on DV calls, nor did UFC fights. Hockey games involving the Flames were not found to have a statistically significant influence on DV calls even when they played their main rivals. During our sample period, the Flames did not participate in the playoffs. Given our results for the Stampeders, and the intensity of hockey playoff games involving the home team, it is reasonable to hypothesize that the number of DV calls would rise on those days. Our data, however, did not permit us to test this influence.

5.0 LIMITATIONS

Understanding domestic violence needs a broad lens. The current data set does not include demographic information on callers or offenders,[66] which must be considered when designing and evaluating DV-prevention measures. Nevertheless, our data do allow us to identify common associations between contexts or triggers and variations in DV rates. Investigating these contexts is a necessary step in identifying where interventions must take place, but it is only that, a step.

Consistent with the literature, our results also suggest that a combination of variables (for example, a sporting event on New Year's Day) will have a greater impact than the two variables occurring separately, but we were not able to interact variables with one another to confirm this hypothesis. Also, we were not able to include alcohol in our analyses.[67] As a

---

[64] Key rivals for the Stampeders football club are the B.C. Lions, the Saskatchewan Roughriders and the Edmonton Eskimos. For the Flames hockey team, the key rivals are the Edmonton Oilers and Vancouver Canucks. In our statistical estimation we allow for the possibility that incidents of DV associated with sporting events may not result in a call to police until the next day and we allow for the possibility that away games (where Calgary teams play in the opposing team's city) and home games differ in their influence on DV calls.

[65] The Grey Cup is the name of both the CFL championship game and the trophy awarded to the winning team. It is one of Canada's largest annual sporting events.

[66] Demographic information for callers was not provided by CPS or Connect.

[67] Alcohol is often cited in the literature as a contributing factor in DV.

result, future research could look at the interplay of such factors — the so called "chemistry for crime" — and consequent impacts on DV rates.

6.0 DISCUSSION

Domestic violence is often seen as a problem that can't be solved, but DV *is* preventable. Its prevention, however, requires an informed investment of resources, people, leadership and commitment. Primary prevention efforts must be research-based and seek to promote gender equity and healthy relationships by reducing factors associated with violent behaviour (risk factors) and strengthening factors that support positive behaviours (protective factors). Prevention also requires shifting the focus from a specific person or potential perpetrator to entire populations and communities, by changing attitudes, community norms and behaviours, including situational factors discussed in this paper. Understanding the interplay between individual, situational and structural factors separately is an important step towards recognizing true triggers and finding comprehensive solutions to mitigate them and/or prevent violence.

This paper examines situational factors that create conditions conducive to DV. Anyone may face one or more of these factors at any point in their life. True primary prevention lies not just in trying to remove some of the risk factors (which would be impossible for some factors, such as weather or celebrations), but in developing resilience and social-emotional competencies so that individuals are able to manage and appropriately respond to conflict and stress in healthy, non-violent ways. Based on the significant relationships described in the results section of our study, the summer season, financial stress, and certain holidays and sporting events are important primary prevention entry points. Crucially, understanding the mechanism that brings about DV under these conditions is necessary. Here we provide possible explanations for significant findings, followed by suggestions for prevention.

6.1 Seasonal Patterns

The strong positive correlation between summer months, notably July, which had the highest monthly incidence of DV calls even after controlling for hot weather, suggests that the time of year is more important than the temperature. The coincidence of the summer season with the end of the school year when children are more likely to be home during the day may contribute to increased reports of DV. The significant effect of weekend days (when children would also be home from school) supports this conclusion.

Recommendation: The government of Alberta could prioritize additional subsidized child care over long/holiday weekends and during summer months to accommodate families. This recommendation is aligned with the provincial government's recent commitment to additional affordable day-care spaces throughout the province.[68] In addition, the Human Services sector along with different levels of government could offer more subsidized family activities along with integrating training and supports for parents to build their social and emotional competencies to better deal with conflict, stress and positive parenting.

---

[68] Michael Franklin, "Alberta government investing in more child-care spaces," CTV News Calgary, November 15, 2016, http://calgary.ctvnews.ca/alberta-government-investing-in-more-child-care-spaces-1.3161707.

6.2 Weather and Economic Effects

Both economic downturns (as estimated by the oil-price proxy) and social-assistance-cheque days had significant effects on DV rates. These two variables, each associated with influences on family finances, suggest a different type of family stress for those who are employed and those who are unemployed and receive social assistance. The loss of employment or income for a middle-class family perhaps uncovers the stress of struggling to meet mortgage payments and similar expenses. The receipt of a social assistance cheque, by a family already struggling to make ends meet, may expose a different type of stress: how to allocate limited funds over numerous demands. The findings point to the importance of considering varied class dimensions when tailoring prevention efforts.

Recommendation: Governments should continue to prioritize poverty-reduction strategies and focus on increasing, and indexing to inflation, levels of social assistance income. In addition, governments should increase their support to crisis-intervention agencies that assist families through crisis and the prevention of domestic violence.

The flood of 2013 was associated with significant increases in DV. This increase was presumably due to the stress of losing one's home or property, either permanently or temporarily, damage to businesses, threats to employment, limited mobility due to street closures, and other related factors.

Recommendation: Any disaster can be a strong contributing factor for escalating violence. A focused, ongoing strategy to support the public to build social and emotional competencies along with the skills to recognize abuse, respond appropriately, and refer to appropriate agencies (referred to in the literature as The Three "R"s[69]) may build resiliency and skills to prevent and reduce violence during and after a disaster. Furthermore, having first responders and paraprofessionals trained in trauma-informed practice may also reduce trauma and violence.[70]

6.3 Holidays and Special Days

In addition to the expected strong and significant influence of New Year's Day, other holidays and special days bore a positive relationship with DV. The association of Easter and Good Friday with increases in DV calls is somewhat unexpected. A possible explanation is the fact that these two holidays fall on the same long weekend. Their influence may be a product of an extended period of family togetherness. Canada Day (July 1st) and Labour Day (the first Monday of September) are also strongly positively correlated with DV rates. These holidays unofficially mark the beginning and end of the warmest months of the year, and are often associated with celebrations and long weekends. The day after Halloween and, with a significantly larger effect on DV calls, Valentine's Day, may be the result of heightened expectations of children and loved ones, respectively. The

[69] Jordana Navarro, Jana L. Jasinski and Carol Wick, "Working for Change: Empowering Employees and Employers to Recognize, Respond, and Refer for Intimate Partner Abuse," *Journal of Workplace Behavioral Health* 29, 3 (2014): 224-239; Hampshire College, "Student Supporting Resources," https://www.hampshire.edu/sites/default/files/HCsupportingstudentsfolder1415.pdf, accessed April 20, 2017.

[70] Tracey L. Fried and Associates, "Training for First Responders. Behavioural Health 101: A Trauma Informed Approach" (San Diego, Health and Human Services Agency, 2012), http://sandiego.camhsa.org/files/Facilitator-Manual.pdf.

Calgary Stampede, which has come to be characterized by heavy drinking and partying, also showed a significant and positive relationship with DV rates, especially toward the end of the festival.

Recommendation: In addition to the increased child-care support recommended in Section 6.1 to alleviate some of the pressure on families during holidays, the governments of Alberta and Calgary, and the Stampede organization, sponsors, bars and restaurants that endorse the event, should partner with violence-prevention community-based organizations to fund a comprehensive violence-prevention strategy that includes:

a) developing and implementing an organizational domestic-violence prevention policy that includes training on prevention such as The Three "R"s (how to recognize domestic violence, how to respond appropriately and safely, and where to refer the victim or perpetrator for help);[71]

b) providing training on social emotional learning competencies,[72] gender equity, healthy relationship skills and bystander skills;

c) implementing a comprehensive social-marketing strategy that provides education, information and resources throughout each environment that uses gender-appropriate messaging;

d) reducing accessibility and availability of alcohol;[73] and

e) partnering with the Calgary Police Service and local violence-prevention organizations that have the expertise in this area to co-develop activities to prevent domestic violence that include educating staff to prepare help lines and crisis-intervention organizations for the increase in calls.

6.5 Sporting Events

The impacts of sporting events were limited to specific types of games, namely those that were high-stakes or championship games and/or involved local rivals. Increases in DV calls were associated with Grey Cup games involving the Calgary Stampeders, suggesting that the extra intensity of the home team's involvement in a championship game is key. Indeed, the importance of the game seems to be more salient than whether the game is considered a contact sport. The statistical insignificance of UFC fights on DV calls supports this interpretation.

Recommendation: Advocate for all local contact-sport associations (professional and amateur) to develop and implement a DV-prevention policy that includes training for coaches and athletes, a commitment to zero-tolerance within their organization,

---

[71] Navarro, Jasinski and Wick, "Working"; Jordana Navarro, "Promoting Courage: An Evaluation of Harbor House of Central Florida's Domestic Violence Primary Prevention Initiative Project Courage," *Electronic Theses and Dissertations* 2667 (2013), http://stars.library.ucf.edu/cgi/viewcontent.cgi?article=3667&context=etd.

[72] Social and emotional competencies include self-awareness, self-management, social awareness, relationship skills and responsible decision-making. Collaborative for Academic, Social, and Emotional Learning (CASEL), http://www.casel.org/, accessed May 9, 2017.

[73] Lana Wells, Elena Esina and Alina Turner, "The case for alcohol outlet density controls as a promising approach to prevent domestic violence," in *Crime and Violence Prevention: Moving Beyond Hot-Stove Policing and Perpetrator Rehabilitation*, ed. M. F. Taylor, U. Khan and J. A. Pooley (Hauppauge, N.Y.: Nova Science Publishers, 2016), 297-312.

implementation of a public awareness campaign consisting of public service announcements and messaging during the actual sporting events, especially during playoff games and matches against local rivals. We would encourage sporting associations to follow promising practices that include player education on the effects of domestic and sexual violence on women and girls, understanding of consent and abuse, information on how to build and maintain healthy and respectful relationships,[74] and enhancing bystander skills to recognize and disrupt inappropriate and abusive behaviour.[75] The Calgary Stampeders have already partnered with the Alberta Council of Women's Shelters in a program to stop domestic violence and abuse against women.

7.0 CONCLUSION

Alberta has the third-highest self-reported rate[76] and the the fourth-highest police-reported rate of DV in Canada,[77] with Calgary reporting steady increases in DV rates. Examining the relationship between increased levels of reported DV and situational-level factors identifies potential sites for intervention to mitigate the conditions associated with this violence. This study has focused on identifying the influence of holidays and professional sporting events specific to Calgary on DV calls from 2011 to 2014. Using multi-variate regression, we controlled for theoretically relevant variables including seasonal, daily, temporal, weather, and economic-related conditions.

Consistent with the literature, our data show clear daily and seasonal patterns to DV calls. Relative to the rest of the week, DV calls are about 30 per cent higher on Saturdays and Sundays. Relative to winter months, DV calls are also about 10 per cent more frequent during the summer months, although temperature and precipitation did not show significant effects. Even after controlling for these patterns, a strong positive correlation with DV calls was found on New Year's Day, Good Friday, Canada Day (July 1st), Easter, Labour Day, Valentine's Day and the day after Halloween. New Year's Day, for example, is associated with more than twice the average number of DV calls. The holiday-like atmosphere of the Calgary Stampede was also positively correlated with DV calls; particularly in the latter half of the 10-day event when DV calls increased by about 15 per cent. The economy also plays a role, with economic downturns associated with increased DV calls.[78] The unusual occurrence of a massive flood in Calgary in 2013 registered a small but positive and statistically significant effect on DV calls.

With respect to sports, our results suggest that increases in DV calls are associated with the combination of involvement of the home team, especially when competing with a rival team, and the importance of the game. Thus, the only football games associated with an increase in DV calls were games against the rival Edmonton Eskimos and Grey Cup games involving the hometown Stampeders. Games against the Eskimos were associated with a

---

[74]   AFL Community Club, "Respect and Responsibility", http://www.aflcommunityclub.com.au/index.php?id=750, accessed April 21, 2017.

[75]   Jackson Katz, "Reconstructing masculinity in the locker room: The mentors in violence prevention project," *Harvard Educational Review* 65, 2 (1995): 163-174.

[76]   Statistics Canada, "Family."

[77]   Burczycka and Conroy, "Family."

[78]   This has also been reported in the news. See Cole, "Domestic."

nearly 15 per cent increase in DV calls, while the day after Grey Cup games involving the Stampeders were associated with an approximate 40 per cent increase in DV calls.

DV is complex, pervasive, and costly. If the interplay of these factors increases the risk of DV, then it is necessary to eliminate some of the factors to prevent violence from happening. Clearly, some of the factors explored in this study can't be simply removed. However, by identifying the unique effects of situational factors, we can isolate which variables *can* be subject to intervention. We have included suggestions for primary prevention consistent with the risk factors borne out by our study. Future research should extend these findings, accounting for presence of alcohol and demographic factors, as well as the effectiveness of preventative measures implemented to mitigate the effects discussed.

APPENDIX TABLES

APPENDIX TABLE A1   GLOSSARY OF VARIABLES

Mnemonic	Explanation
Oil price	Cushing, OK WTI Spot Price FOB (dollars per barrel)
Cheque Days	The 27th of previous month to the 2nd of current month
Flood	Calgary flood: June 23, 2013 to July 7, 2013
Precipitation	Daily total precipitation (rain or snow) in millimeters
Min. temperature	Minimum daily temperature in degrees Celsius
Extreme high temperature	Overnight minimum temperature >= 10 C
Extreme low temperature	Overnight minimum temperature <= -30 C
Super Bowl	The date of the annual championship game of the NFL
UFC fights	Dates of Ultimate Fighting Championship bouts
Flames	Dates when Flames played
Stampeders	Dates when Stampeders played
Flames Home	Dates when Flames played in Calgary
Flames Away	Dates when Flames played out of town
Stampeders Home	Dates Stampeders played in Calgary
Stampeders Away	Dates Stampeders played out of town
Flames Win	Dates when Flames won a game
Flames Loss	Dates when Flames lost a game
Stampeders Win	Dates when the Stampeders won a game
Stampeders Loss	Dates when the Stampeders lost a game
Flames Home Win	Dates when Flames won a game in Calgary
Flames Home Loss	Dates when Flames lost a game in Calgary
Flames Away Win	Dates when Flames won a game when playing out of town
Flames Away Loss	Dates when Flames lost a game when playing out of town
Stampeders Home Win	Dates when the Stampeders won a game in Calgary
Stampeders Home Loss	Dates when the Stampeders lost a game in Calgary
Stampeders Away Win	Dates when the Stampeders won a game when playing out of town
Stampeders Away Loss	Dates when the Stampeders lost a game when playing out of town
Stamps Post Season	The days Stampeders played in a "semi-final" and "Western final" games
Grey Cup	Dates of the Grey Cup game
Christmas	Christmas Day
New Year	New Year's Day
Labour	Labour Day, first Monday of September
Easter	Easter Day
Good Friday	Good Friday
Heritage	Heritage Day, first Monday of August
Halloween	Halloween Day
Bermuda	Bermuda Shorts Day, the last day of classes at the University of Calgary
Patrick's	St. Patrick's Day, on or around March 17th
Family	Family Day, third Monday of February
Valentine	Valentine's Day
Stampede	Dates of the Calgary Stampede, 10 days starting the first Friday of July

TABLE A2   INFLUENCE OF ECONOMIC AND WEATHER CONDITIONS ON DV CALLS

	Estimate	Std. Error	
(Intercept)	4.311	2.213	.
Model (1)'s Variables	Yes, robust		
Oil Price	-0.054	0.023	*
Cheque Days	1.861	0.561	***
Flood	6.638	2.270	**
Extreme High Temp.	0.387	0.663	
Extreme Low Temp.	-1.675	0.927	.
R2	0.185		
Adjusted R2	0.149		
F-stat.	5.132	(0.000)	***

$\cdot\, p \leq .10,\quad {}^{*}p \leq .05,\quad {}^{**}p \leq .01,\quad {}^{***}p \leq .001$

TABLE A3   INFLUENCE OF SPECIAL DAYS ON DV CALLS

	Estimate	Std. Error	
Intercept	-0.540	0.319	.
Data Source (DSC)	-0.204	0.427	
New Year.pre	3.048	4.717	
New Year	55.070	4.087	***
New Year.post	1.013	4.087	
Valentine.pre	4.264	4.087	
Valentine	2.533	4.087	
Valentine.post	9.613	4.087	*
Family Day.pre	-3.868	5.779	
Family Day	0.904	2.472	
Family Day.post	-2.851	4.087	
Patrick's.pre	-0.209	4.087	
Patrick's	4.108	4.087	
Patrick's.post	-3.857	4.087	
Bermuda.pre	2.436	4.087	
Bermuda	-2.385	4.087	
Bermuda.post	-5.361	4.087	
Good Friday.pre	2.441	4.087	
Good Friday	13.006	4.087	**
Good Friday.post	-2.904	4.087	
Easter.pre	0.836	4.087	
Easter	10.707	4.087	**
Easter.post	-0.472	4.087	
Victoria.pre	-4.900	4.087	
Victoria Day	0.720	2.275	
Victoria Day.post	-4.032	4.087	
Canada	7.740	2.591	**
Stampede.pre	-0.749	4.087	
Stampede1	-2.934	4.087	
Stampede2	-1.343	4.087	
Stampede3	0.396	4.087	
Stampede4	2.910	4.087	
Stampede5	5.481	4.087	
Stampede6	6.825	4.087	.
Stampede7	9.001	4.087	*
Stampede8	3.316	4.087	
Stampede9	8.157	4.087	*
Stampede10	8.146	4.087	*
Stamp.post	0.160	4.087	
Heritage.pre	6.243	4.087	
Heritage	-1.010	2.367	
Heritage.post	8.634	4.087	*
Labour.pre	-2.225	4.087	
Labor	8.227	2.367	***

Labour.post	2.610	4.087	
Thanks.pre	-2.575	4.087	
Thanks	1.764	2.367	
Thanks.post	-1.410	4.087	
Halloween.pre	5.910	4.087	
Halloween	1.997	4.087	
Halloween.post	17.322	4.087	***
Rememb.pre	1.824	4.087	
Rememb	4.359	4.087	
Rememb.post	1.301	4.087	
Chris.pre	6.535	4.087	
Chris	4.367	4.087	
Boxing	5.454	4.087	
Boxing.post	4.055	4.087	
R2	0.169		
Adjusted R2	0.135		
F-stat.	4.990	(0.000)	***

$^{.}p \leq .10, \quad ^{*}p \leq .05, \quad ^{**}p \leq .01, \quad ^{***}p \leq .001$

Note: The mnemonics "Post" and "Pre" are used to identify dates following or preceding an event.

TABLE A4   INFLUENCE OF SPORT EVENTS ON DV CALLS

	Estimate	Std. Error	
(Intercept)	3.645	2.266	
Model (3)'s variables included	Yes		
Flames Home Win	0.869	1.002	
Flames Home Win.post	-0.426	1.008	
Flames Home Loss	-1.364	1.070	
Flames Home Loss.post	1.199	1.065	
Flames Away Win	0.111	1.168	
Flames Away Win.post	0.326	1.179	
Flames Away Loss	0.895	0.955	
Flames Away Loss.post	0.535	0.956	
Stamps Home Win	-1.523	1.815	
Stamps Home Win.post	-2.480	1.840	
Stamps Home Loss	2.355	2.779	
Stamps Home Loss.post	-0.079	2.748	
Stamps Away Win	-0.387	1.959	
Stamps Away Win.post	-2.476	1.991	
Stamps Away Loss	4.984	2.687	.
Stamps Away Loss.post	-0.202	2.622	
Flames vs Edmonton Oilers	0.756	1.981	
Flames vs Edmonton Oilers.post	-3.113	1.996	
Flames vs Vancouver Canucks	-2.146	1.825	
Flames vs Vancouver Canucks.post	0.028	1.830	
Stamps vs Edmonton	6.664	2.583	**
Stamps vs Edmonton.post	0.099	2.808	
Stamps vs Saskatchewan	-2.768	2.564	
Stamps vs Saskatchewan.post	2.055	2.563	
Stamps vs BC	-1.181	2.586	
Stamps vs BC.post	2.989	2.577	
Stamps Post Season	3.666	4.053	
Stamps Post Season.post	0.498	4.007	
Grey Cup	0.999	5.743	
Grey Cup.post	-5.830	5.744	
Grey Cup * Stamps	-6.995	8.336	
Grey Cup.post*Stamps.post	19.988	8.298	*
Super Bowl	-0.531	4.152	
Super Bowl.post	-4.335	4.077	
UFC fights	0.646	0.786	
UFC fights.post	-0.351	0.814	
R2	0.210		
Adjusted R2	0.153		
F-stat.	3.700	(0.000)	***

$^{.}\, p \leq .10, \quad {}^{*}p \leq .05, \quad {}^{**}p \leq .01, \quad {}^{***}p \leq .001$

About the Authors

Sophia Boutilier is a PhD student in the Department of Sociology at Stony Brook University in New York. She completed an MSc in Gender, Development, and Globalization at the Gender Institute of the London School of Economics in 2011, and a BA in International Development Studies at McGill University in 2008. Her research includes gender inequality, sexual violence, education, the sociology of emotion, and the study of privilege, particularly in international encounters. She has collaborated with Shift: The Project to End Domestic Violence since 2015.

Ali Jadidzadeh is a Post-Doctoral Fellow at The School of Public Policy and focuses his research on understanding and developing effective solutions to social policy problems. His current research investigates the effective design of Housing First and emergency shelter programs intended to benefit and support those who are without permanent housing. He completed his PhD in Economics from the University of Calgary in December 2015.

Elena Esina is the Project Manager for Shift: The Project to End Domestic Violence and an Adjunct Professor for the Faculty of Social Work at the University of Calgary. Elena holds a Master's Degree in Social Work and a Bachelor's Degree in Financial Management. Since 2011, she has been managing large scale research projects while conducting research on the prevention of domestic and family violence. Her key areas of research include the value of informal networks in victim's and perpetrator's lives and how best to engage and support those networks, as well as alcohol outlet density controls as a promising approach to prevent domestic violence.

Lana Wells is the Brenda Strafford Chair in the Prevention of Domestic Violence and Associate Professor at the Faculty of Social Work and Fellow at The School of Public Policy at the University of Calgary, Canada. Since the appointment in 2010, Lana has held close to 4 million in research funding, grants and awards. She is currently leading the MSW Leadership Program in the Faculty of Social Work where she also teaches on leadership and policy. She actively supervises graduate students within the Faculty of Social Work and the School of Public Policy. Lana is currently leading Shift: The Project to End Domestic Violence. The purpose of Shift is to enhance the capacity of policy makers, systems leaders, and service providers to reduce rates of domestic violence through primary prevention (www.preventdomesticviolence.ca).

Ron Kneebone Ron Kneebone is the Scientific Director of the Social Policy and Health research division and Director of the Master of Public Policy Program at The School of Public Policy at the University of Calgary. He is also a Professor of Economics. His current research examines the characteristics of Canadian federal, provincial and municipal fiscal policy choices, the problem of homelessness and income supports for persons with disabilities. Professor Kneebone is a co-author on two well-known undergraduate textbooks: A text on economic principles (with Gregory Mankiw, Ken McKenzie) and an intermediate level text on macroeconomic theory (with Andrew Abel and Ben Bernanke). For joint work with Ken McKenzie, he was awarded the Doug Purvis Memorial Prize for the best published work in Canadian Public Policy in 2000.

ABOUT THE SCHOOL OF PUBLIC POLICY

The School of Public Policy has become the flagship school of its kind in Canada by providing a practical, global and focused perspective on public policy analysis and practice in areas of energy and environmental policy, international policy and economic and social policy that is unique in Canada.

The mission of The School of Public Policy is to strengthen Canada's public service, institutions and economic performance for the betterment of our families, communities and country. We do this by:

• *Building capacity in Government* through the formal training of public servants in degree and non-degree programs, giving the people charged with making public policy work for Canada the hands-on expertise to represent our vital interests both here and abroad;

• *Improving Public Policy Discourse outside Government* through executive and strategic assessment programs, building a stronger understanding of what makes public policy work for those outside of the public sector and helps everyday Canadians make informed decisions on the politics that will shape their futures;

• *Providing a Global Perspective on Public Policy Research* through international collaborations, education, and community outreach programs, bringing global best practices to bear on Canadian public policy, resulting in decisions that benefit all people for the long term, not a few people for the short term.

Our research is conducted to the highest standards of scholarship and objectivity. The decision to pursue research is made by a Research Committee chaired by the Research Director and made up of Area and Program Directors. All research is subject to blind peer-review and the final decision whether or not to publish is made by an independent Director.

The School of Public Policy
University of Calgary, Downtown Campus
906 8th Avenue S.W., 5th Floor
Calgary, Alberta T2P 1H9
Phone: 403 210 3802

RECENT PUBLICATIONS BY THE SCHOOL OF PUBLIC POLICY

POLICY INTERVENTIONS FAVOURING SMALL BUSINESS: RATIONALES, RESULTS AND RECOMMENDATIONS
http://www.policyschool.ca/wp-content/uploads/2017/05/Small-Business-Lester.pdf
John Lester | May 2017

ESTIMATING COSTS AND BENEFITS ASSOCIATED WITH EVIDENCE-BASED VIOLENCE PREVENTION: FOUR CASE STUDIES BASED ON THE FOURTH R PROGRAM
http://www.policyschool.ca/wp-content/uploads/2017/05/Fourth-R-Crooks-Zwicker-Wells-Hughes-Langlois-Emery.pdf
Claire V. Crooks, Jennifer D. Zwicker, Lana Wells, J.C. Herbert Emery, Ray Hughes and Amanda Langlois | May 2017

SOCIAL POLICY TRENDS – STOCK OF APARTMENT RENTAL UNITS IN FOUR MAJOR METROPOLITAN AREAS
http://www.policyschool.ca/wp-content/uploads/2017/05/Social-Trends-Rents-May-Issue-Final.pdf
Margarita Gres Wilkins | May 2017

THE CONTEXT AND CHALLENGES FOR CANADA'S MID-SIZED CITIES
http://www.policyschool.ca/wp-content/uploads/2017/05/Mid-Sized-Cities-Tassonyi.pdf
Almos Tassonyi | May 2017

POLICY REFLECTION: LETTER OF CREDIT USAGE BY DEFINED BENEFIT PENSION PLANS IN CANADA
http://www.policyschool.ca/wp-content/uploads/2017/05/Credit-Usage-Nielson-Hedges.pdf
Norma Nielson and Peggy Hedges | May 2017

THE INCIDENCE OF THE CORPORATE INCOME TAX ON WAGES: EVIDENCE FROM CANADIAN PROVINCES
http://www.policyschool.ca/wp-content/uploads/2017/04/Corporate-Tax-McKenzie-Ferede1.pdf
Kenneth McKenzie and Ergete Ferede | April 2017

WHO PAYS THE CORPORATE TAX? INSIGHTS FROM THE LITERATURE AND EVIDENCE FOR CANADIAN PROVINCES
http://www.policyschool.ca/wp-content/uploads/2017/04/Corporate-Tax-McKenzie-Ferede1.pdf
Kenneth McKenzie and Ergete Ferede | April 2017

SOCIAL POLICY TRENDS- INCOME SUPPORT CASELOADS IN ALBERTA
http://www.policyschool.ca/wp-content/uploads/2016/02/Social-Trends-Income-Support-for-April-Issue.pdf
Margarita Gres Wilkins | April 2017

NATIONAL PHARMACARE IN CANADA: 2019 OR BUST?
http://www.policyschool.ca/wp-content/uploads/2017/03/National-Pharmacare-Adams-Smith.pdf
Owen Adams and Jordyn Smith | March 2017

POLICY RESPONSIVENESS AND POLITICAL ACCOUNTABILITY IN CITY POLITICS
http://www.policyschool.ca/wp-content/uploads/2017/03/Policy-Responsiveness-Sayers-Lucas.pdf
Anthony Sayers and Jack Lucas | March 2017

80,000 INACTIVE OIL WELLS: A BLESSING OR A CURSE?
http://www.policyschool.ca/wp-content/uploads/2017/02/Inactive-Oil-Wells-Muehlenbachs-1.pdf
Lucija Muehlenbachs | February 2017

DISCERNING 'FUNCTIONAL AND ABSOLUTE ZERO': DEFINING AND MEASURING AN END TO HOMELESSNESS IN CANADA
http://www.policyschool.ca/wp-content/uploads/2017/01/Absolute-Zero-Turner-Albanese-Pakeman.pdf
Alina Turner, Tom Albanese and Kyle Pakeman | January 2017