

History of Childhood Abuse in Populations Incarcerated in Canada: A Systematic Review and Meta-Analysis

Claire Bodkin, BA, Lucie Pivnick, MD, MSc, Susan J. Bondy, PhD, Carolyn Ziegler, MA MIS, Ruth Elwood Martin, MD, Carey Jernigan, BSc, and Fiona Kouyoumdjian, MD, PhD, MPH

Background. A history of childhood abuse may affect people's health and criminal justice system involvement. Understanding the prevalence of childhood abuse among individuals in prison is important to inform effective and appropriate correctional services.

Objectives. To review and summarize data on the prevalence of childhood abuse among people experiencing imprisonment in Canada.

Search Methods. We searched for studies in bibliographic indexes, reference lists, and gray literature, and we consulted experts.

Selection Criteria. We included studies published since 1987 that reported data on prevalence of a history of abuse before the age of 18 years among people in Canadian prisons, including any abuse, physical abuse, sexual abuse, emotional abuse, and neglect.

Data Collection and Analysis. Two authors independently reviewed titles and abstracts for eligibility and reviewed full texts for eligibility. Analyses included summary estimates and meta-regression with random effects.

Main Results. The search identified 1429 records. We included 34 unique studies in our review and 29 nonoverlapping studies in our meta-analysis. The summary prevalence for any type of childhood abuse was 65.7% (95%

confidence interval [CI] = 52.6, 77.7; range = 56.2% to 75.0%) among women; only one study reported the prevalence among men (35.5%). The summary prevalence of sexual abuse was 50.4% (95% CI = 33.5, 67.2; range = 9.9% to 77.3%) among women and 21.9% (95% CI = 15.7, 28.8; range = 8.3% to 55.6%) among men. The prevalence of neglect was 51.5% (95% CI = 43.1, 59.7; range = 45.5% to 65.1%) among women and 42.0% (95% CI = 12.7, 74.6; range = 6.8% to 99.0%) among men. The prevalence of physical abuse was 47.7% (95% CI = 41.3, 54.0; range = 16.3% to 83.0%), and the prevalence of emotional abuse was 51.5% (95% CI = 34.8, 67.9; range = 8.7% to 96.0%); we did not find differences according to gender. Prevalence estimates for all types of abuse showed high and unexplained variability across studies.

Conclusions. Half of people in prisons in Canada experienced abuse in childhood.

Public Health Implications. Prisons should incorporate trauma-informed approaches. Research is required to understand the association between a history of childhood abuse and criminal justice system involvement and to prevent childhood abuse and mitigate its adverse effects.

Systematic Review Registration. PROSPERO CRD42017056192. (*Am J Public Health*. Published online ahead of print January 24, 2019; e1–e11. doi:10.2105/AJPH.2018.304855)

PLAIN-LANGUAGE SUMMARY

A history of childhood abuse may affect people's health and criminal justice system involvement. We reviewed data on the prevalence of childhood abuse among people in prisons in Canada. We searched for studies published since 1987 reporting the prevalence of any abuse, physical abuse, sexual abuse, emotional abuse, or neglect before the age of 18 years among people in prison in Canada and summarized data via a meta-analysis. We

identified 34 relevant studies and included 29 studies in our meta-analysis. The summary prevalence of any child abuse was 65.7% among women; only one study reported prevalence among men (35.5%). The summary prevalence of sexual abuse was 50.4% among women and 21.9% among men, and the prevalence of neglect was 51.5% among women and 42.0% among men. The prevalence of physical abuse was 47.7% and the prevalence of emotional abuse was 51.5%,

with no significant differences between men and women. Prevalence estimates varied substantially across studies for all types of abuse. Overall, we conclude that half of people in prison in Canada experienced abuse in childhood. Given this high prevalence, prisons should incorporate trauma-informed approaches, and work should be done to prevent adverse health effects and criminal justice system involvement among people who experience childhood abuse.

In Canada, more than 41 000 adults and youths are imprisoned in correctional facilities on any given day.^{1,2} Understanding the health status of this population is important to inform health care and other services in correctional facilities, as well as individual- and policy-level strategies designed to prevent further criminal justice system involvement.

People who experience imprisonment often have a history of childhood abuse.^{3–6} The associations between childhood abuse and imprisonment are poorly understood and likely complex.^{7,8} People abused in childhood may be at a higher risk of perpetrating violence or of engaging in delinquent behavior as an adult⁹ (referred to as the “cycle of violence” or “intergenerational transmission of abuse”¹⁰), and this could lead to criminal justice system involvement.^{7,8} Childhood abuse may also increase the risk of substance use and substance use disorders,^{4,8,11–13} which could result in imprisonment given criminalization of drug use and possession in Canada.^{14,15} Also, common antecedent variables such as parental and family dysfunction may increase one’s likelihood of experiencing both abuse in childhood and subsequent imprisonment.^{8,16}

Childhood experiences of abuse are associated with mental and physical health needs in adulthood, which persist and may be exacerbated during imprisonment.^{4,8,17} Thus, regardless of how childhood abuse and imprisonment are related, we need to understand the prevalence of histories of child abuse to inform effective and appropriate correctional services. Our objective was to review and summarize data on the prevalence of childhood abuse among people who experience imprisonment in Canada.

METHODS

We conducted a systematic review and meta-analysis.

Search Strategy and Selection Criteria

In February 2017, we searched MEDLINE, PsycINFO, CINAHL, the Cochrane Central Register of Controlled Trials, the Cochrane Database of Systematic Reviews,

and the following ProQuest databases: Canadian Research Index, International Bibliography of the Social Sciences, Published International Literature On Traumatic Stress, ProQuest Dissertations & Theses Global, Social Services Abstracts, and Sociological Abstracts. We also searched Social Sciences Abstracts and Criminal Justice Abstracts via EBSCOhost. We limited our search to studies published since 1987 to include recent data. We selected this time frame on the basis of data relevance considerations. We did not include any language restrictions, although we used only English-language search terms. We reviewed the reference lists of included studies and relevant reviews. We sent requests to study authors for studies we could not retrieve.

The search strategy for MEDLINE (see Appendix A, available as a supplement to the online version of this article at <http://www.ajph.org>) was developed by a research librarian, piloted and refined, and then repeated with the other databases. Full search details are available on request.

We identified relevant organizations and searched their Web sites: the Correctional Service of Canada, Statistics Canada, the Office of the Correctional Investigator, Public Safety Canada, the provincial and territorial ministries responsible for correctional facilities, the Prisoners’ HIV/AIDS Support Action Network, the John Howard Society of Canada, and the Canadian Association of Elizabeth Fry Societies. We also consulted with experts.

We included studies of adults and adolescents who had been detained or imprisoned in a jail or prison in Canada, whether they were remanded or sentenced and whether the study focused on these individuals before, during, or subsequent to detention or incarceration. We limited the scope to studies from Canada given

heterogeneity in the prevalence of child abuse across countries⁸ and the fact that we were interested in defining the burden of childhood abuse and associated needs and opportunities in the Canadian correctional system. We excluded studies that did not specify that participants had been imprisoned, such as studies of “offenders” or “forensic” populations that did not explicitly specify a history of imprisonment.

We included only studies that specified their methods; we excluded reviews and commentaries. We included quantitative studies and mixed-method studies, cohort studies, cross-sectional studies, and randomized controlled trials in which prevalence data were presented. We excluded case reports and case series without a defined source population or sample.

We used the World Health Organization’s definition of child abuse: “Child abuse or maltreatment constitutes all forms of physical and/or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation [of children younger than 18 years], resulting in actual or potential harm to the child’s health, survival, development or dignity in the context of a relationship of responsibility, trust or power.”¹⁸ We categorized childhood abuse as any abuse, physical abuse, sexual abuse, emotional or psychological abuse (hereafter referred to as emotional abuse), or neglect. We did not include witnessing abuse or attending residential school.

Three of the authors (C. B., L. P., and F. K.) independently screened each title and abstract for eligibility. We resolved disagreements in the reviewers’ decisions through discussions and involved a third author when necessary. Two authors (C. B. and F. K.) independently reviewed each full text to assess whether it met the inclusion criteria. We resolved disagreements through discussions.

ABOUT THE AUTHORS

Claire Bodkin is with the Michael G. DeGroote School of Medicine, McMaster University, Hamilton, Ontario, Canada. At the time of the study, Lucie Pivnick was with the Michael G. DeGroote School of Medicine, McMaster University. Susan J. Bondy is with the Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada. Carolyn Ziegler is with St. Michael’s Hospital, Toronto. Ruth Elwood Martin is with the School of Population and Public Health, University of British Columbia, Vancouver, British Columbia, Canada. Fiona Kouyoumdjian is with the Department of Family Medicine, McMaster University, and the Centre for Urban Health Solutions, St. Michael’s Hospital, Toronto.

Correspondence should be sent to Fiona Kouyoumdjian, David Braley Health Sciences Centre, 5th Floor, 100 Main St West, Hamilton, Ontario, L8P 1H6, Canada (e-mail: kouyoujf@mcmaster.ca). Reprints can be ordered at <http://www.ajph.org> by clicking the “Reprints” link.

This article was accepted October 28, 2018.

doi: 10.2105/AJPH.2018.304855

Data Analysis

Two of the authors (C. B. and F. K.) independently extracted data using a template that we developed, piloted, and modified. We resolved disagreements regarding extracted data through discussions. We extracted data on study characteristics: publication year, study period, study location, name of facility, type of facility (provincial–territorial or federal), study type, recruitment strategy, data collection method, and sample size. We also extracted data on participant characteristics (age, gender, race/ethnicity, morbidity) and childhood abuse (types of abuse, definition, prevalence by type of abuse).

Two authors (C. B. and F. K.) independently assessed each included study for risk of bias in 2 domains: selection and outcome measurement.^{19–21} We resolved disagreements regarding bias assessment through discussions. We classified risk of bias in each domain as unclear, low, or high, consistent with principles of bias assessment in the Cochrane handbook²⁰ and related guides.^{22,23}

With respect to selection, we considered the risk of bias high if the participant recruitment or selection method was not systematic, the inclusion and exclusion criteria were not specified, or there was a suggestion of bias in terms of participants in comparison with the eligible population; we considered the risk low if methods of participant selection were well described (including explicit inclusion and exclusion criteria), there was a high participation rate, and there was no evidence of bias in participation; and we considered the risk unclear if methods for defining the population and inclusion and exclusion criteria were not specified or the participation rate was not specified.

In regard to outcome measurement, we considered the risk of bias high if the investigators used a measure of child abuse that was not validated, low if the investigators reported use of a validated measure (e.g., a measure validated against a gold standard or assessed for content validity), and unclear if there was no specification of whether the measure was validated. We classified the overall risk of bias for each study as low if the risk was low for both domains, high if the risk was high in either domain, and unclear otherwise.²⁰

We qualitatively summarized studies according to study characteristics and risk of

bias. For the purposes of summarizing data, we considered data from multiple publications as a single study if the study data matched on key variables.

In our quantitative synthesis, we included data from the study with the larger sample size when studies overlapped in terms of population, time frame, and type of abuse reported. In the case of studies that reported more than one prevalence estimate for a single type of abuse (e.g., separate reports of physical abuse by the mother and physical abuse by the father), we used the greater value to indicate the minimum proportion of participants experiencing that type of abuse.

We used Stata 14 (StataCorp LP, College Station, TX) to perform our quantitative meta-analysis and produce graphics.^{24–27} We generated forest plots for each type of abuse; estimates are presented as prevalence percentages with exact binomial confidence intervals (CIs).

For summary estimates, we assumed random effects given the heterogeneity in study samples, populations, methods, and rigor.²⁸ In our meta-analysis, binary outcome data were transformed via the Freeman–Tukey double arcsine transformation (and then back transformed to show estimates and confidence intervals as percentages). When summarizing just 3 study estimates, we used the metan procedure²⁷ along with a logit transformation of the proportion and standard error of the transformed proportion. Transformations ensured that no studies with a prevalence nearing 100% were excluded and that confidence intervals did not fall outside of the valid range.^{29,30} We used the DerSimonian and Laird method (assuming random effects with inverse-variance weights) to conduct tests of heterogeneity of estimates between studies.²⁴

We also report I^2 statistics, interpreted as approximately the proportion of total estimate variability that is due to inconsistency between studies.^{31,32} We conducted heterogeneity analyses to explore inconsistency rather than to exclude outliers.³¹ We used the Stata `metaprop_one` procedure to generate forest plots with confidence intervals and heterogeneity statistics.²⁴

Potential publication bias was assessed via graphical and regression-based statistical tests (and only when summary results were based on at least 10 study estimates). We used the

Egger test with logit and standard error of logit prevalence to perform regression-based statistical tests for publication bias. We generated contour-enhanced funnel plots²⁵ to minimize oversensitivity of our bias tests with respect to binary outcomes and small samples.³³

We analyzed 3 study population characteristics that might predict abuse prevalence and account for between-study heterogeneity: gender, adult versus youth populations, and federal versus provincial or territorial facilities. We selected these 3 factors on the basis of the published literature,⁸ theoretical considerations, and available data. We assessed gender differences for all types of abuse and plotted results by gender. We used mixed-effects logistic regression models to test whether these factors were significantly associated with study prevalence; we also used random intercept logistic models with an unstructured covariance matrix. We explored whether apparent associations were unduly influenced by specific studies by examining model diagnostic statistics for influence, including Cook's D statistic and delta-B estimates (and outcome estimates if a study was removed), and visually inspecting data using subgroup sorted forest plots (data not shown). Studies with the largest amounts of influence are discussed but were not excluded from our analysis according to any specific cut point. Only studies with single-gender reporting were included in our mixed-effects regression modeling.

In cases in which gender was significantly associated with abuse prevalence, we plotted gender-specific but not overall estimates. When abuse prevalence did not vary significantly according to gender, we plotted gender-specific and overall estimates, ensuring that study subjects were counted only once.

We defined the research protocol a priori and registered the protocol with PROSPERO.³⁴ We revised the protocol to include a meta-analysis prior to conducting our analyses.

RESULTS

Our search identified 1429 records overall and 1130 records without duplicates (Figure 1). Of the records without duplicates, 92 were eligible for full review. We were unable to retrieve 2 articles.^{35,36} Of the 90 full articles

reviewed, 39 were eligible for inclusion,^{37–75} representing 34 unique studies. We included 29 nonoverlapping samples in our quantitative synthesis.

Table 1 summarizes the characteristics of the 34 included studies. Most studies examined the prevalence of childhood sexual abuse (n = 26) or childhood physical abuse (n = 23). Fewer studies assessed the prevalence of any abuse (n = 7), emotional abuse (n = 12), and neglect (n = 8). Most studies focused on adults (n = 27) and individuals in federal facilities (n = 22). Only 5 studies provided data on the prevalence of childhood abuse solely among

women; 17 studies reported data only on men. Half of the studies were conducted in British Columbia, Ontario, or Quebec (n = 17), with another 8 involving individuals in federal custody in facilities across Canada. In 6 studies, there was no specification of study location. Three studies were conducted in the Prairies, Territories, or Maritimes.

Most studies included the general population of people in prison; however, several included only individuals convicted of sex offenses (n = 6), and some excluded individuals on the basis of language, literacy, active psychiatric illness, or presence of

organic brain disorders. All of the included studies were cross sectional. Data were collected via interviews (n = 17), administrative file reviews (n = 17), and questionnaires (n = 8). Studies differed in terms of definitions of age of abuse, with some specifying only abuse during childhood and others specifying ages of abuse ranging from before 10 years to before 18 years.

Regarding overall risk of bias, we found a low risk in only one study. Risks were unclear in 5 studies (15%) and high in 29 studies (85%; Table A, available as a supplement to the online version of this article at <http://www.ajph.org>).

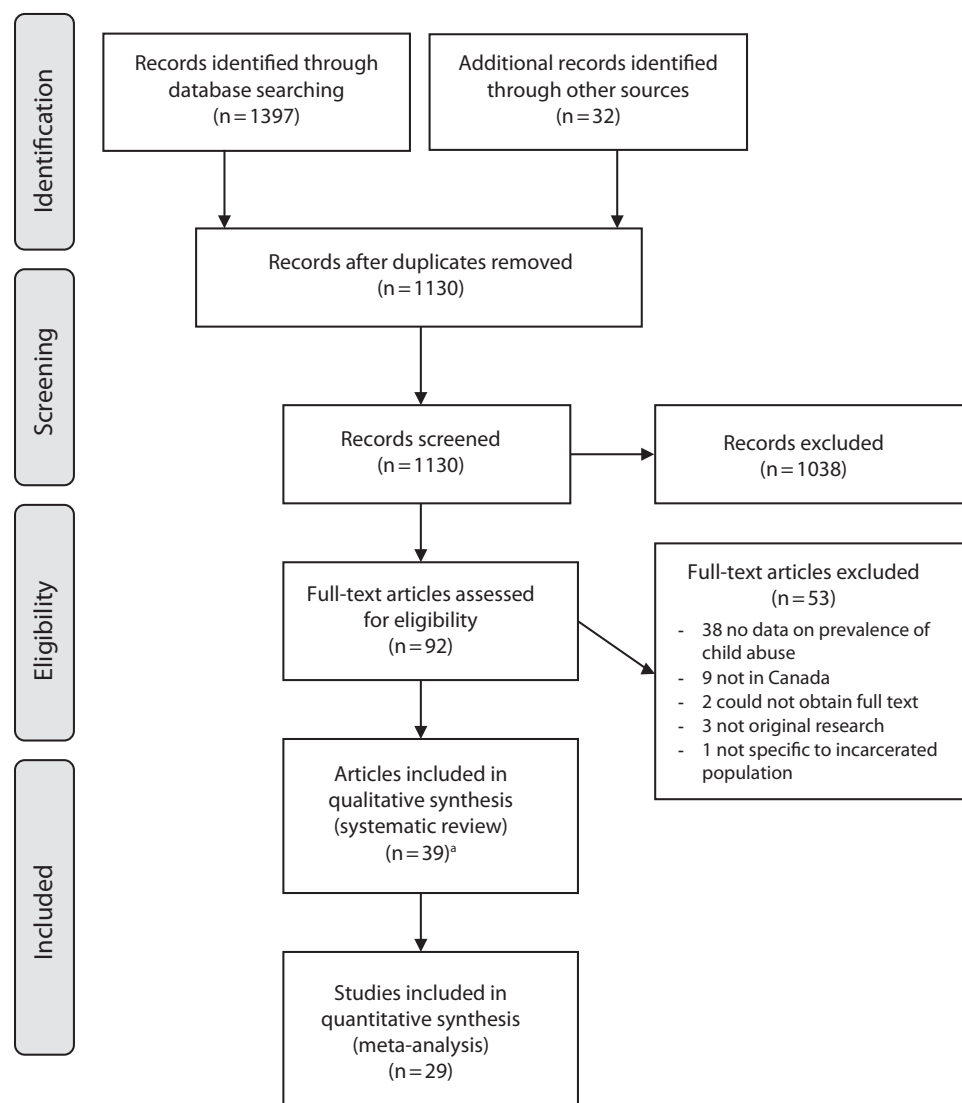


FIGURE 1—Flow Diagram of Study Selection for Our Systematic Review and Meta-Analysis of Childhood Abuse Among People in Canadian Prisons

TABLE 1—Studies Included in Systematic Review of Prevalence of Exposure to Childhood Abuse Among People in Canadian Prisons (n = 34)

Study	Province/Territory	Type of Facility	Participants		Type of Childhood Abuse ^a				
			Youth or Adult Sample	No. (% Male)	A	P	S	E	N
Allenby et al. ³⁷	Across Canada	Federal	Adult	56 (0)	X	X	X	X	
Beauregard et al. ³⁸	Quebec	... ^b	Adult	77 (100)		X	X	X	
Chubaty, ³⁹ Chubaty ⁴⁰	Manitoba, Saskatchewan	Federal	Adult	91 (100)		X	X		
Colantonio et al. ⁴¹	Ontario	Provincial	Adult	224 (55.8)		X	X		X
Day et al. ⁴²	Ontario	Provincial	Youth	112 (60.7)		X		X	
Wanklyn et al. ⁴³				110 (60.9)	X	X	X	X	X
Dhawan and Marshall ⁴⁴	Ontario	Federal	Adult	65 (100)			X		
Dutton and Hart ^{45,46}	... ^b	Federal	Adult	597 (100)		X	X		
Forth and Tobin ⁴⁷	... ^b	Provincial	Youth	95 (100)		X	X	X	X
Fraser and Roesch, ⁴⁸ Fraser ⁴⁹	British Columbia	Provincial	Youth	100 (100)		X	X	X	X
Heney ⁵⁰	Ontario	Federal	Adult	44 (0)	X	X	X		
Heney and Kristiansen, ⁵¹ Heney ⁵²	Ontario	Federal	Adult	31 (0)					
Johnston ⁵³	Northwest Territories, Alberta, Saskatchewan, Manitoba	Federal	Adult	64 (100)		X	X		X
Johnston ⁵⁴	... ^b	Federal	Adult	518 (... ^b)		X	X		
Joubert et al. ⁵⁵	Ontario	Provincial	Adult	522 (79.7)		X	X	X	X
Keown et al. ⁵⁶	Across Canada	Federal	Adult	4 313 (94)	X				
Marshall et al. ⁵⁷	... ^b	Federal	Adult	54 (100)			X		
Marshall and Marshall ⁵⁸	... ^b	Federal	Adult	40 (100)			X		
Martin et al. ⁵⁹	Across Canada	Federal	Adult	4 366 (93.4)	X				
Milcent and Granger ⁶⁰	Quebec	Federal	Adult	23 (100)		X			
Motiuk ⁶¹	Ontario	Federal	Adult	604 (94.9)					
Mowat-Leger ⁶²	Ontario	Provincial	Adult	154 (100)		X	X	X	
Nunes et al. ⁶³	Across Canada	Federal	Adult	250 (100)			X		
Reckdenwald et al. ^{64,65}	Quebec	Federal	Adult	576 (100)		X	X	X	
Robeson Barrett et al. ⁶⁶	Alberta, British Columbia, Nova Scotia, Ontario, Quebec, Saskatchewan	Federal	Adult	151/116 (0)		X	X		
Robinson and Taylor ⁶⁷	Across Canada	Federal	Adult	935 (100)		X	X	X	X
Smale ⁶⁸	... ^b	Provincial	Youth	12 (100)		X	X	X	X
Smith and Corrado ⁶⁹	British Columbia	Provincial	Youth	278 (75.2)		X	X		
Stewart and Wormith ⁷⁰	Across Canada	Federal	Adult	101 (0)		X	X	X	
Stewart et al. ⁷¹	Across Canada	Federal	Adult	2 273 (100)	X				
Stewart et al. ⁷²	Across Canada	Federal	Adult	26 166 (94.8)	X				
Swihart ⁷³	British Columbia	Both	Adult	111 (0)		X	X	X	
Ulzen and Hamilton ⁷⁴	Ontario	Provincial	Youth	49 (77.6)		X	X		
Vitelli ⁷⁵	Ontario	Provincial	Adult	118 (100)		X	X		

^aType of abuse: A = any; P = physical; S = sexual; E = emotional or psychological; N = neglect.

^bNot specified.

For each type of abuse, overall and gender-specific estimates showed very high between-study heterogeneity (Figures 2 and

3; Figures A–C, available as supplements to the online version of this article at <http://www.ajph.org>), with I^2 values all above

80.9%. In terms of any childhood abuse, the summary prevalence among women was 65.7% (range = 56.2% to 75.0%; Figure A).

Only one study reported childhood abuse among men, with a prevalence of 35.5%. The difference according to gender was apparent and statistically significant.

The summary prevalence estimate for physical abuse (Figure 2) was 47.7% (range = 16.3% to 83.0%), and study heterogeneity was very high ($I^2 = 94.6\%$ overall; $P < .01$). There was no strong evidence that gender, provincial versus federal facility, or youth versus adult population explained the heterogeneity in between-study estimates. Bias analyses and contour-enhanced funnel plots (data not shown) indicated very high heterogeneity, but there was not strong evidence of bias ($P = .06$).

The estimated mean prevalence of a history of sexual abuse was 50.4% (range = 9.9% to 77.3%) among women and 21.9% (range = 8.3% to 55.6%) among men (Figure 3). Heterogeneity was high (above 94% for both genders; $P < .01$). In mixed-model regression analyses incorporating only gender-specific estimates, the odds ratio was 4.5 (95% CI = 3.0, 6.9) in comparisons of studies involving women with those involving men. Two of the studies included in the regression model, Marshall et al.⁵⁷ and Swihart,⁷² had a large influence on the results (Figure 3), and exclusion of these studies resulted in a stronger gender difference; we retained all studies in the final forest plots and gender-specific summary estimates presented. Egger tests for publication bias were nonsignificant for each gender and for cases in which the genders were combined.

Exploratory analyses suggested that type of facility predicted the prevalence of a reported history of sexual abuse; the prevalence was higher among individuals in federal facilities, even after control for gender. When the analysis was restricted to data on men (Figure D, available as a supplement to the online version of this article at <http://www.ajph.org>), the results showed that those in federal facilities were more likely than those in provincial facilities to have a history of sexual abuse. As federal facilities are also adult facilities (Figure E, available as a supplement to the online version of this article at <http://www.ajph.org>), the effect of the 2 characteristics cannot be separated. We could not examine the impact of facility type among women because there was only one estimate available (from a youth facility study).

For emotional abuse, there was a statistically significant gender effect, with a higher

prevalence of abuse reported among female than male populations. However, the Wanklyn et al.⁴³ and Fraser and Roesch⁴⁸ studies had an unacceptably high influence on the results. After exclusion of the Wanklyn et al. study, there was no significant difference between men and women. On the basis of these analyses and a visual inspection of the data, we did not find sufficient evidence of a difference between men and women. We therefore considered all studies, yielding a summary estimate of 51.5% (range = 8.7% to 96.0%; Figure B) that was highly heterogeneous.

In exploratory analyses controlling for gender, we found a significant association between emotional abuse and a pair of group categories (adults vs youths and individuals in provincial-territorial vs federal facilities), with a higher prevalence for youths and for those in provincial-territorial facilities (Figures F–G, available as supplements to the online version of this article at <http://www.ajph.org>). As with the sexual abuse model, we could not examine the effects of facility type and age group independent of each other because they were collinear.

The mean prevalence of neglect was 51.5% (range = 45.5% to 65.1%) among women and 42.0% (range = 6.8% to 99.0%) among men (Figure C). Estimate heterogeneity was extremely high ($I^2 = 99\%$) within the male estimates; heterogeneity could not be estimated for female populations because there were only 2 studies. Using mixed-model regression and including only gender-specific studies, we found an odds ratio of 1.8 (95% CI = 1.2, 2.8) among women (relative to men). Although the Fraser and Roesch study⁴⁸ had an unacceptably high influence, we did not exclude that study; its exclusion would not have had a large impact on the odds ratio (which would have been 1.9). There were too few studies of gender-specific neglect to examine publication bias statistics. There was no strong evidence of a difference between adult and youth populations or between individuals in federal and provincial-territorial facilities.

DISCUSSION

Our meta-analysis revealed a very high prevalence of childhood abuse among people in prison in Canada. Although summary

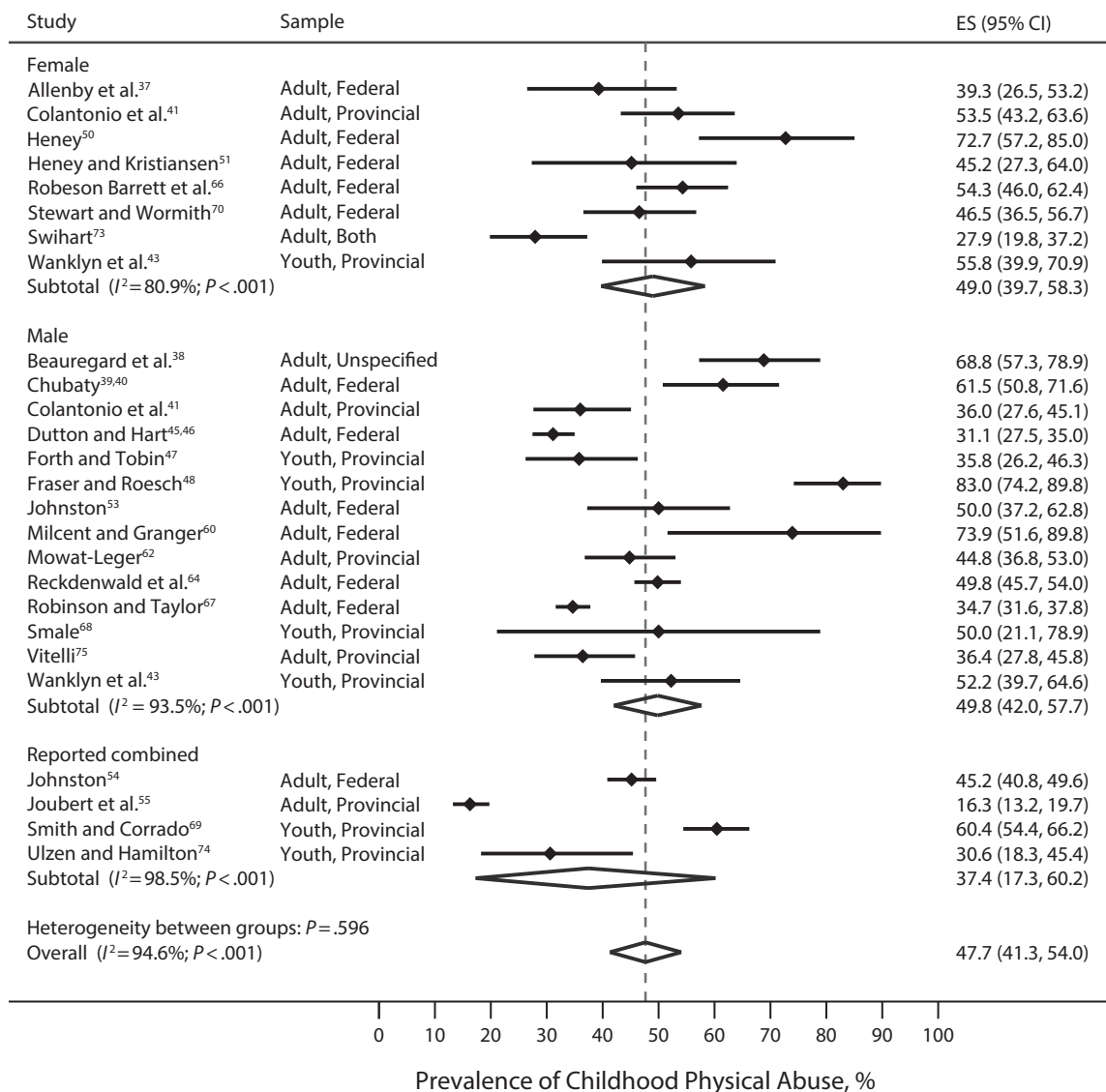
estimates are imprecise and the ranges of estimates are broad, it is clear that people in prison commonly report many forms of abuse. Our summary estimates indicate that approximately half of people in Canadian prisons have experienced at least one type of childhood abuse. Women were more likely than men to have experienced sexual abuse (50.4% vs 21.9%) and neglect (51.5% vs 42.0%). We did not find sufficient evidence of a difference between men and women in the prevalence of physical abuse (47.7% overall) or emotional abuse (51.5%).

Similar to national studies of prison populations in the United States and the general population in Canada, we found high absolute proportions of all types of childhood abuse. Across types of abuse, our mean prevalence estimates were substantially higher than the estimates revealed in the 2014 Canadian General Social Survey, with a 4-fold higher prevalence of sexual abuse among men and women; that 2014 survey showed that 35% of men and 31% of women had experienced any form of child maltreatment, 31% of men and 22% of women had experienced childhood physical abuse, and 4% of men and 12% of women had experienced childhood sexual abuse.⁷⁶

Our prevalence estimates were also higher than those found in national surveys conducted in US correctional facilities between 1995 and 1997, which revealed rates of any form of childhood abuse of 14.4% among men and 36.7% among women in state prisons, 5.8% among men and 23.0% among women in federal prisons, and 11.9% among men and 36.6% among women in jails.⁷⁷ Several other US studies have also identified a high prevalence of childhood abuse among people in jails and prisons, with varying results that may be due to differences in sampling and measurement.^{4,78–82}

Limitations

There are several potential limitations to the included studies. The high risk of bias in most studies in the domains of selection and outcome measurement may have affected study validity. Selection of a sample that is neither random nor representative of the total population could lead to a higher or lower prevalence than the true prevalence for the population. Outcome measurement issues



Note. CI = confidence interval; ES = estimate. Summary estimates for prevalence estimates are presented for information purposes, despite statistically significant heterogeneity statistics (see the Discussion section for rationale).

FIGURE 2—Forest Plot From Meta-Analysis of Studies Reporting Prevalence of a History of Childhood Physical Abuse Among People in Canadian Prisons, by Gender

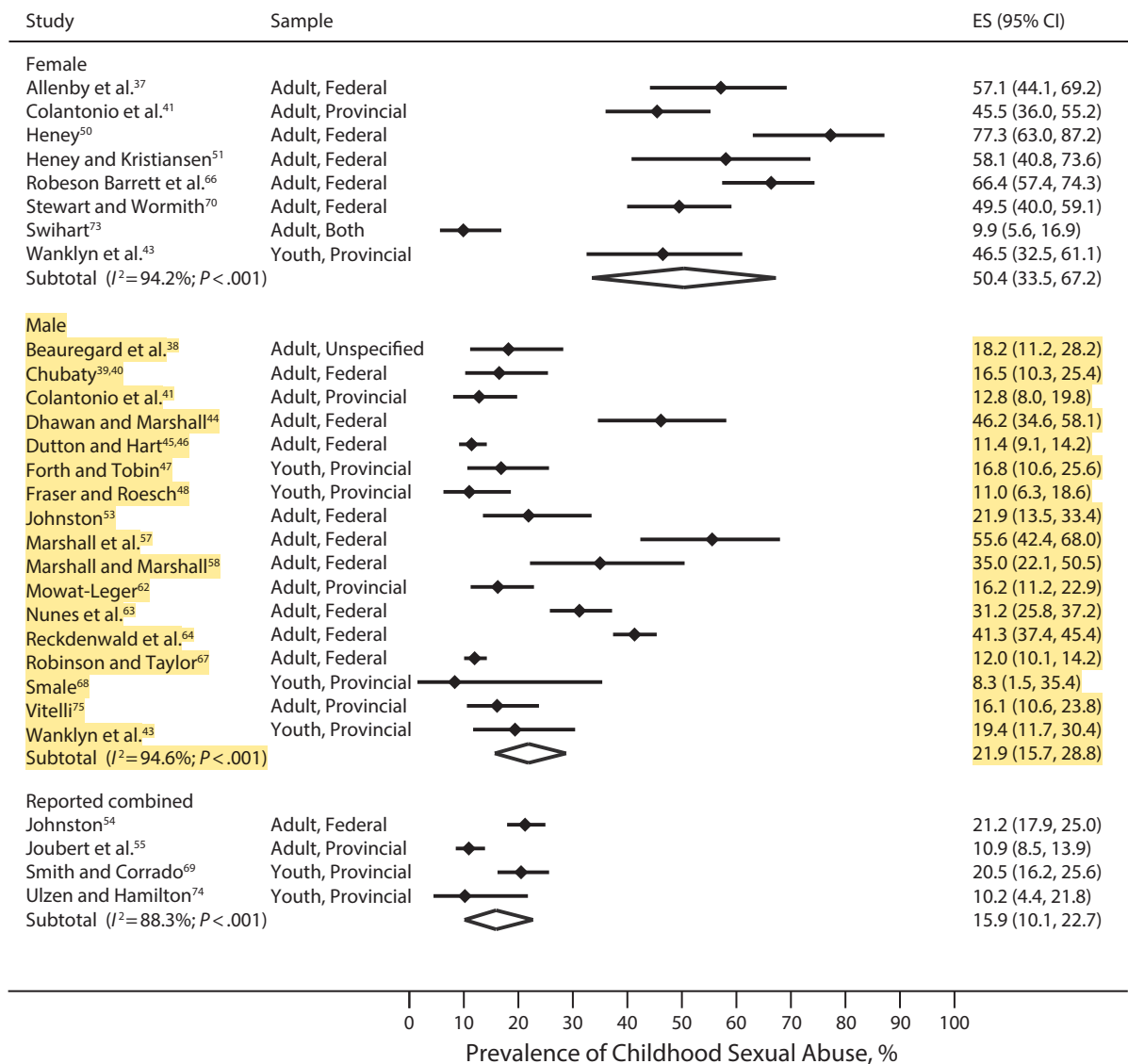
such as social desirability and forgetting could lead to underestimation of childhood abuse, whereas the narrowness or breadth of the definition of childhood abuse could lead to underestimation or overestimation.^{83,84}

Specific challenges include asking only about a single type of abuse, collecting data only on part of childhood or on abuse perpetrated by certain individuals (e.g., parents), classifying abuse as a binary variable, and relying on administrative data or tools that have not been validated and may lack

sensitivity.⁸⁵ Validated tools (the Childhood Trauma Questionnaire and the Clarke Parent-Child Relations Questionnaire) were used in the 2 studies that were at low risk of outcome measurement bias,^{42,43,60} but these studies involved relatively small sample sizes. Using multiple sources of data may also improve sensitivity; for example, Joubert et al. used institutional files, medical charts, and interviews to examine childhood abuse among 522 individuals,⁵⁵ although such a strategy may be relatively resource intensive.

Note that the only estimate of the prevalence of any childhood abuse among men⁷² that we identified was significantly lower than the prevalence of physical abuse^{38,40,43,48,53,60,62,64} or emotional abuse^{38,47,48,62,64} among men in several studies, indicating that the prevalence of any child abuse revealed in that study may be lower than the true prevalence.

There are also limitations to the review itself. We included only studies published in the past 30 years because we wanted to



Note. CI = confidence interval; ES = estimate. Summary estimates for prevalence estimates are presented for information purposes, despite statistically significant heterogeneity statistics (see the Discussion section for rationale). Overall summary estimates are not shown owing to apparent and statistically significant differences according to gender.

FIGURE 3—Forest Plot From Meta-Analysis of Studies Reporting Prevalence of a History of Childhood Sexual Abuse Among People in Canadian Prisons, by Gender

include relatively recent data and ensure that our prevalence estimates would remain valid. Evidence is mixed regarding whether the prevalence of childhood abuse has changed over time.^{84,86,87} If the prevalence has not changed, limiting the search may have unnecessarily affected the summary estimates' values and precision. We categorized childhood abuse as a binary variable, although the experience and impact of child abuse vary significantly according to factors such as severity, duration, and timing of exposure.⁸

For consistency with the World Health Organization's definition of childhood abuse, we did not include witnessing abuse in our review, despite its inclusion in many definitions and measures of childhood abuse and its demonstrated effects on children.⁸⁸ We also did not include attending residential school as a specific type of child abuse; however, abuse in residential schools may have been captured in our prevalence estimates because we did not specify any limits regarding the setting of abuse or the perpetrator of abuse. Given the

inherently abusive and traumatic nature of residential schools⁸⁹ and the overrepresentation of Indigenous peoples in Canadian correctional facilities,⁹⁰ this likely contributed to underestimation of child abuse prevalence and may limit the direct applicability of our findings in terms of informing interventions implemented in the Canadian correctional system.

We used only English terms in our search, and we identified only one French-language study in our review.⁶⁰ We believe it is

unlikely that we missed any relevant French-language studies, however, because we reviewed reference lists of studies from the province of Quebec and contacted experts.

Finally, there was substantial heterogeneity between studies in the prevalence of all types of childhood abuse, which likely reflects a combination of diversity in included populations, methodological issues such as bias, and statistical issues such as lack of precision.^{20,91,92} We chose to present and explore heterogeneity substantively.³¹ We used random effects in analyses, examined subgroups that we defined a priori, and considered the distribution of results within strata and the effects of outliers.^{20,91,93} Our data plots show which individual study estimates fall outside the confidence intervals for summary estimates, highlighting evidence of potential clinical heterogeneity. Note that the summary prevalence was close to or greater than 50% for each of the following categories: any childhood abuse among women, sexual abuse among women, neglect among women, physical abuse among both men and women, and emotional abuse among both men and women. These findings increase our confidence that at least half of people who experience imprisonment have experienced some form of childhood abuse.

We have presented heterogeneity statistics and information about studies with high influence as exploratory and potentially informative given the limited and emerging nature of evidence in this area to date. However, given the wide confidence intervals for all summary estimates and the acknowledged unexplained variability, we believe that it would be inappropriate to directly apply these estimates (e.g., to calculate service requirements or to conduct cost analyses). Further research is needed to determine whether the studies with the highest or lowest prevalence rates are indicative of true case-mix differences across facilities, which would require expanded surveillance with representative sampling and consistent data collection methods.

Conclusions

Given the state's responsibility to provide health care and social services for people in custody, the cyclical nature of childhood abuse and intergenerational transmission of

violence, and the state's obligation to protect children from abuse,⁹⁴ our findings support 3 clear imperatives. First, policymakers and researchers should advance research to elucidate the severity and nature of exposure to childhood abuse and the mechanisms linking such abuse to imprisonment among people in prisons in Canada; attention should be paid to populations with a particularly high prevalence of childhood abuse, including women, youths, and Indigenous peoples. Given that most people who experience abuse in childhood do not go on to perpetuate abuse or experience imprisonment,^{7,9} research should also explore protective factors that mitigate criminal justice system involvement.

Second, correctional authorities should promote trauma-informed services that seek to create a safe, transparent, and empowering environment while avoiding retraumatization.⁹⁵ Imprisonment may serve as a unique opportunity to improve health and interrupt the cycle of abuse and transmission of violence to future generations. Such an approach could address the consequences of trauma, facilitate healing, and prevent retraumatization through criminal justice system involvement. Third, all sectors should recognize childhood as a pivotal developmental stage and redouble efforts to support healthy families and prevent child abuse, including as a strategy to potentially prevent criminal behavior and imprisonment.

Future work needs to involve people with lived experiences of childhood abuse and imprisonment in Canada, policymakers, health care and social service leaders, populations overrepresented in corrections facilities, and researchers in further defining the issues and planning and implementing effective strategies. These efforts should include qualitative methods exploring pathways from childhood abuse to imprisonment and identifying opportunities for intervention, as well as quantitative research incorporating sensitive and acceptable tools to better characterize this public health problem. We also recommend reviews of international data, which could address some of the limitations of our review. **AJPH**

CONTRIBUTORS

C. Bodkin, L. Pivnick, S.J. Bondy, C. Ziegler, R. Elwood Martin, and F. Kouyoumdjian contributed to study conceptualization and design. C. Bodkin, L. Pivnick, and F. Kouyoumdjian screened abstracts and retrieved

full texts, and C. Bodkin and F. Kouyoumdjian reviewed full texts. S.J. Bondy conducted the meta-analysis. C. Bodkin, L. Pivnick, S.J. Bondy, R. Elwood Martin, C. Jernigan, and F. Kouyoumdjian contributed to interpretation of data. C. Bodkin, L. Pivnick, S.J. Bondy, and F. Kouyoumdjian drafted the article, and all of the authors contributed to revisions of the article.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

HUMAN PARTICIPANT PROTECTION

No protocol approval was needed for this study because only publicly available data were used.

REFERENCES

- Malakieh J. Youth correctional statistics in Canada, 2015/2016. Available at: <http://www.statcan.gc.ca/pub/85-002-x/2017001/article/14702-eng.htm>. Accessed December 31, 2018.
- Reitano J. Adult correctional statistics in Canada, 2015/2016. Available at: <http://www.statcan.gc.ca/pub/85-002-x/2017001/article/14700-eng.htm>. Accessed December 31, 2018.
- Kouyoumdjian F, Schuler A, Matheson FI, Hwang SW. Health status of prisoners in Canada: narrative review. *Can Fam Physician*. 2016;62(3):215–222.
- Wolff N, Shi J. Childhood and adult trauma experiences of incarcerated persons and their relationship to adult behavioral health problems and treatment. *Int J Environ Res Public Health*. 2012;9(5):1908–1926.
- Baglivio MT, Epps N, Swartz K, Huq MS, Sheer A, Hardt NS. The prevalence of adverse childhood experiences (ACE) in the lives of juvenile offenders. *JJuv Justice*. 2014;3(2):1.
- Fox BH, Perez N, Cass E, Baglivio MT, Epps N. Trauma changes everything: examining the relationship between adverse childhood experiences and serious, violent and chronic juvenile offenders. *Child Abuse Negl*. 2015;46:163–173.
- English DJ, Widom CS, Brandford C. Childhood victimization and delinquency, adult criminality, and violent criminal behavior: A replication and extension. Available at: <https://www.ncjrs.gov/pdffiles1/nij/grants/192291.pdf>. Accessed December 31, 2018.
- Gilbert R, Widom CS, Browne K, Fergusson D, Webb E, Janson S. Burden and consequences of child maltreatment in high-income countries. *Lancet*. 2009;373(9657):68–81.
- Fitton L, Yu R, Fazel S. Childhood maltreatment and violent outcomes: a systematic review and meta-analysis of prospective studies. *Trauma Violence Abuse*. 2018 [Epub ahead of print].
- Widom CS, Wilson HW. *Intergenerational Transmission of Violence*. Dordrecht, the Netherlands: Springer Netherlands; 2014.
- Affif TO, MacMillan HL, Boyle M, Taillieu T, Cheung K, Sareen J. Child abuse and mental disorders in Canada. *CMAJ*. 2014;186(9):E324–E332.
- Dube SR, Felitti VJ, Dong M, Chapman DP, Giles WH, Anda RF. Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: the Adverse Childhood Experiences Study. *Pediatrics*. 2003;111(3):564–572.
- Friestad C, Ase-Bente R, Kjelsberg E. Adverse childhood experiences among women prisoners: relationships to suicide attempts and drug abuse. *Int J Soc Psychiatry*. 2014;60(1):40–46.

14. Government of Canada. Criminal code. Available at: <https://laws-lois.justice.gc.ca/eng/acts/C-46>. Accessed December 31, 2018.
15. Government of Canada. Controlled Drugs and Substances Act. Available at: <https://laws-lois.justice.gc.ca/eng/acts/C-38.8>. Accessed December 31, 2018.
16. Patterson GR, DeBaryshe B, Ramsey E. A developmental perspective on antisocial behavior. *Am Psychol*. 1989;44(2):329–335.
17. Messina N, Grella C. Childhood trauma and women's health outcomes in a California prison population. *Am J Public Health*. 2006;96(10):1842–1848.
18. World Health Organization. Child maltreatment. Available at: <http://www.who.int/mediacentre/factsheets/fs150/en>. Accessed December 31, 2018.
19. Sanderson S, Tatt ID, Higgins JP. Tools for assessing quality and susceptibility to bias in observational studies in epidemiology: a systematic review and annotated bibliography. *Int J Epidemiol*. 2007;36(3):666–676.
20. Higgins JPT, Green S. Cochrane handbook for systematic reviews of interventions. Available at: <http://handbook.cochrane.org>. Accessed December 31, 2018.
21. National Institute for Health and Care Excellence. Methods for the development of NICE public health guidance. Available at: <https://www.nice.org.uk/process/pmg4/chapter/appendix-g-quality-appraisal-checklist-quantitative-studies-reporting-correlations-and>. Accessed December 31, 2018.
22. Munn Z, Moola S, Lisy K, Riitano D, Tufanaru C. Methodological guidance for systematic reviews of observational epidemiological studies reporting prevalence and cumulative incidence data. *Int J Evid-Based Healthc*. 2015;13(3):147–153.
23. Munn Z, Moola S, Lisy K, Riitano D, Tufanaru C. Systematic reviews of prevalence and incidence. Available at: <https://reviewersmanual.joannabriggs.org>. Accessed December 31, 2018.
24. Nyaga VN, Arbyn M, Aerts M. Metaprop: a Stata command to perform meta-analysis of binomial data. *Arch Public Health*. 2014;72(1):39.
25. Peters JL, Sutton AJ, Jones DR, Abrams KR, Rushton L. Contour-enhanced meta-analysis funnel plots help distinguish publication bias from other causes of asymmetry. *J Clin Epidemiol*. 2008;61(10):991–996.
26. Palmer TM, Sterne JAC, eds. *Meta-Analysis in Stata: An Updated Collection from the Stata Journal*. 2nd ed. College Station, TX: Stata Press; 2016.
27. Harris R, Bradburn M, Deeks J, Harbord R, Altman D, Sterne J. Meta-an: fixed- and random-effects meta-analysis. *Stata J*. 2008;8(1):3–28.
28. Higgins JPT, Thompson SG, Spiegelhalter DJ. A re-evaluation of random-effects meta-analysis. *J R Stat Soc Ser A Stat Soc*. 2009;172(1):137–159.
29. Freeman MF, Tukey JW. Transformations related to the angular and the square root. *Ann Math Stat*. 1950;21(4):607–611.
30. Tukey JW. On the comparative anatomy of transformations. *Ann Math Stat*. 1957;28(3):602–632.
31. Higgins JP. Heterogeneity in meta-analysis should be expected and appropriately quantified. *Int J Epidemiol*. 2008;37(5):1158–1160.
32. Higgins JPT, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *BMJ*. 2003;327(7414):557–560.
33. Sterne JA, Gavaghan D, Egger M. Publication and related bias in meta-analysis: power of statistical tests and prevalence in the literature. *J Clin Epidemiol*. 2000;53(11):1119–1129.
34. Pivnick L, Kouyoumdjian F, Ziegler C, Elwood Martin R, Bodkin C. A systematic review of the prevalence of child abuse in people who experience incarceration in Canada. Available at: https://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42017056192. Accessed December 31, 2018.
35. Karim N. *Post-Traumatic Stress Disorder and the Psychological Effects of Long Term Imprisonment: A Cross-Sectional Sample of Long Term Offenders in the Pacific Region of Canada*. Cambridge, England: University of Cambridge Press; 2001.
36. Loucks AD. *Criminal Behavior, Violent Behavior, and Prison Maladjustment in Federal Female Offenders*. Kingston, Ontario, Canada: Queen's University; 1996.
37. Allenby K, Taylor K, Cossette M, Fortin D. *A Profile of Women Who Sexually Offend*. Ottawa, Ontario, Canada: Correctional Service of Canada; 2012.
38. Beauregard E, Stone MR, Proulx J, Michaud P. Sexual murderers of children: developmental, precrime, crime, and postcrime factors. *Int J Offender Ther Comp Criminol*. 2008;52(3):253–269.
39. Chubaty DE. Victimization, fear, and coping in prison. *Diss Abstr Int B Sci Eng*. 2001;62(2-B):1071.
40. Chubaty DE. Victimization, fear, and coping in prison. *Forum Correct Res*. 2002;14(1):13–15.
41. Colantonio A, Kim H, Allen S, Asbridge M, Petgrave J, Brochu S. Traumatic brain injury and early life experiences among men and women in a prison population. *J Correct Health Care*. 2014;20(4):271–279.
42. Day DM, Hart TA, Wanklyn SG, McCay E, Macpherson A, Burnier N. Potential mediators between child abuse and both violence and victimization in juvenile offenders. *Psychol Serv*. 2013;10(1):1–11.
43. Wanklyn SG, Day DM, Hart TA, Girard TA. Cumulative childhood maltreatment and depression among incarcerated youth: impulsivity and hopelessness as potential intervening variables. *Child Maltreat*. 2012;17(4):306–317.
44. Dhawan S, Marshall W. Sexual abuse histories of sexual offenders. *Sex Abuse*. 1996;8(1):7–15.
45. Dutton DG, Hart SD. Risk markers for family violence in a federally incarcerated population. *Int J Law Psychiatry*. 1992;15(1):101–112.
46. Dutton DG, Hart SD. Evidence for long-term, specific effects of childhood abuse and neglect on criminal behavior in men. *Int J Offender Ther Comp Criminol*. 1992;36(2):129–137.
47. Forth A, Tobin F. Psychopathy and young offenders: rates of childhood maltreatment. *Forum Correct Res*. 1995;7(1):20–22.
48. Fraser S, Roesch R. *Patterns of Substance Use in Adolescent Male Young Offenders: Relationships With Child Maltreatment Experiences and Their Inculcation of Antisocial Identities*. Vancouver, British Columbia, Canada: Simon Fraser University; 2001.
49. Fraser S. Patterns of substance use in adolescent male young offenders: relationships with child maltreatment experiences and their inculcation of antisocial identities. *Diss Abstr Int B Sci Eng*. 2002;62(9-B):4205.
50. Heney J. *Report on Self-Injurious Behaviour in the Kingston Prison for Women*. Ann Arbor, MI: ProQuest Micromedia, Correctional Service Canada; 1990.
51. Heney J, Kristiansen C. *Dying on the Inside: Suicide and Suicidal Feelings Among Federally Incarcerated Women*. Ottawa, Ontario, Canada: Carleton University; 1996.
52. Heney J. Dying on the inside: suicide and suicidal feelings among federally incarcerated women. *Diss Abstr Int B Sci Eng*. 1997;57(10-B):6574.
53. Johnston JC. Northern Aboriginal offenders in federal custody: a profile. Available at: <http://www.csc-scc.gc.ca/research/r36e-eng.shtml>. Accessed December 31, 2018.
54. Johnston JC. Aboriginal Offender Survey: case files and interview sample. Available at: <http://www.csc-scc.gc.ca/research/092/r061-er61-eng.pdf>. Accessed December 31, 2018.
55. Joubert D, Archambault K, Brown G. Cycle of coercion: experiences of maltreatment and disciplinary measures in Canadian inmates. *Int J Prison Health*. 2014;10(2):79–93.
56. Keown L, Gobeil R, Biro SM, Ritchie MB. *Ethno-cultural Offenders: An Initial Investigation of Social History Variables at Intake*. Ottawa, Ontario, Canada: Correctional Service of Canada; 2015.
57. Marshall WL, Serran GA, Cortoni FA. Childhood attachments, sexual abuse, and their relationship to adult coping in child molesters. *Sex Abuse*. 2000;12(1):17–26.
58. Marshall L, Marshall W. Sexual addiction in incarcerated sexual offenders. *Sex Addict Compulsivity*. 2006;13(4):377–390.
59. Martin MS, Dorken SK, Colman I, McKenzie K, Simpson AI. The incidence and prediction of self-injury among sentenced prisoners. *Can J Psychiatry*. 2014;59(5):259–267.
60. Milcent M-P, Granger L. *Etude du Rapport à la Paternité et des Perceptions des Figures Parentales des Pères Incestueux*. Montreal, Quebec, Canada: University of Montreal; 2001.
61. Motiuk LL. *The Validity of Offender Needs Identification and Analysis in Community Corrections*. Ottawa, Ontario, Canada: Correctional Service of Canada; 1994.
62. Mowat-Leger V. *Risk Factors for Violence: A Comparison of Domestic Batterers and Other Violent and Non-Violent Offenders*. Ottawa, Ontario, Canada: Carleton University; 2001.
63. Nunes KL, Hermann CA, Renee Malcom J, Lavoie K. Childhood sexual victimization, pedophilic interest, and sexual recidivism. *Child Abuse Negl*. 2013;37(9):703–711.
64. Reckdenwald A, Mancini C, Beauregard E. The cycle of violence: examining the impact of maltreatment early in life on adult offending. *Violence Vict*. 2013;28(3):466–482.
65. Reckdenwald A, Mancini C, Beauregard E. Adolescent self-image as a mediator between childhood maltreatment and adult sexual offending. *J Crim Justice*. 2014;42(2):85–94.
66. Robeson Barrett M, Allenby K, Taylor K. Twenty years later: revisiting the Task Force on Federally Sentenced Women. Available at: <http://www.csc-scc.gc.ca/research/005008-0222-01-eng.shtml>. Accessed December 31, 2018.
67. Robinson D, Taylor J-A. The incidence of family violence perpetrated by federal offenders: a file review study. Available at: <http://www.csc-scc.gc.ca/publications/fv/fv03/toce-eng.shtml>. Accessed December 31, 2018.
68. Smale WT. *Understanding the Issue of Dropouts: A Young Offender Perspective*. Edmonton, Alberta, Canada: University of Alberta; 2001.

69. Smith A, Corrado R. *Youth Violence and Victimization: Exploring the Cycle of Violence*. Vancouver, British Columbia, Canada: Simon Fraser University; 2010.
70. Stewart CA, Wormith JS. *Risk Assessment of Federal Female Offenders*. Saskatoon, Saskatchewan, Canada: University of Saskatchewan; 2011.
71. Stewart L, Nolan A, Thompson J, Sapers J. *Social Determinants of Physical Health Conditions Among Incoming Canadian Federal Inmates*. Ottawa, Ontario, Canada: Correctional Service of Canada; 2015.
72. Stewart LA, Wardrop K, Wilton G, Thompson J, Derksen D, Motiuk L. *Reliability and Validity of the Dynamic Factors Identification and Analysis*. Ottawa, Ontario, Canada: Correctional Service of Canada; 2017.
73. Swihart G. *Female Offenders: Attachment & Parenthood*. Vancouver, British Columbia, Canada: University of British Columbia; 2002.
74. Ulzen TP, Hamilton H. The nature and characteristics of psychiatric comorbidity in incarcerated adolescents. *Can J Psychiatry*. 1998;43(1):57–63.
75. Vitelli R. Comparison of early and late start models of delinquency in adult offenders. *Int J Offender Ther Comp Criminol*. 1997;41(4):351–357.
76. Statistics Canada. Family violence in Canada: A statistical profile. Available at: <https://www150.statcan.gc.ca/n1/pub/85-002-x/2017001/article/14698-eng.htm>. Accessed December 31, 2018.
77. Wolf Harlow C. *Prior Abuse Reported by Inmates and Probationers*. Washington, DC: Bureau of Justice Statistics; 1999.
78. Wolff N, Shi J, Siegel JA. Patterns of victimization among male and female inmates: evidence of an enduring legacy. *Violence Vict*. 2009;24(4):469–484.
79. Weeks R, Widom C. Self-reports of early childhood victimization among incarcerated male felons. *J Interpers Violence*. 1998;13(3):346–361.
80. Lewis DO, Shanok SS, Pincus JH, Glaser GH. Violent juvenile delinquents: psychiatric, neurological, psychological, and abuse factors. *J Am Acad Child Psychiatry*. 1979;18(2):307–319.
81. Bloom B, Lind MC, Owen B. *Women in California Prisons: Hidden Victims of the War on Drugs*. San Francisco, CA: Center on Juvenile and Criminal Justice; 1994.
82. McClellan DS, Farabee D, Crouch BM. Early victimization, drug use, and criminality. *Crim Justice Behav*. 1997;24(4):455–476.
83. Goldman JDG, Padayachi UK. Some methodological problems in estimating incidence and prevalence in child sexual abuse research. *J Sex Res*. 2000;37(4):305–314.
84. Laaksonen T, Sariola H, Johansson A, et al. Changes in the prevalence of child sexual abuse, its risk factors, and their associations as a function of age cohort in a Finnish population sample. *Child Abuse Negl*. 2011;35(7):480–490.
85. Hamby SL, Finkelhor D. *Choosing and Using Child Victimization Questionnaires*. Washington, DC: US Government Printing Office; 2001.
86. Feldman W, Feldman E, Goodman JT, et al. Is childhood sexual abuse really increasing in prevalence? An analysis of the evidence. *Pediatrics*. 1991;88(1):29–33.
87. Shields M, Tonmyr L, Hovdestad W. Is child sexual abuse declining in Canada? Results from nationally representative retrospective surveys. *Health Promot Chronic Dis Prev Can*. 2016;36(11):252–260.
88. Stiles MM. Witnessing domestic violence: the effect on children. *Am Fam Physician* 2002;66(11):2052, 2055–2056.
89. Truth and Reconciliation Commission of Canada. Honouring the truth, reconciling for the future: summary of the final report of the Truth and Reconciliation Commission of Canada. Available at: http://nctr.ca/assets/reports/Final Reports/Executive_Summary_English_Web.pdf. Accessed December 31, 2017.
90. Owusu-Bempah A, Kanters S, Druyts E, et al. Years of life lost to incarceration: inequities between Aboriginal and non-Aboriginal Canadians. *BMC Public Health*. 2014;14:585.
91. Petitti DB. *Meta-Analysis, Decision Analysis, and Cost-Effectiveness Analysis*. New York, NY: Oxford University Press; 1999.
92. Petitti DB. *Meta-Analysis, Decision Analysis, and Cost-Effectiveness Analysis: Methods for Quantitative Synthesis in Medicine*. 2nd ed. New York, NY: Oxford University Press; 2000.
93. Ioannidis JP, Patsopoulos NA, Rothstein HR. Reasons or excuses for avoiding meta-analysis in forest plots. *BMJ*. 2008;336(7658):1413–1415.
94. United Nations Office of the High Commissioner on Human Rights. Convention on the Rights of the Child. Available at: <https://www.ohchr.org/en/professionalinterest/pages/crc.aspx>. Accessed December 31, 2018.
95. Substance Abuse and Mental Health Services Administration. Trauma-informed approach and trauma-specific interventions. Available at: <https://www.samhsa.gov/ntic/trauma-interventions>. Accessed December 31, 2018.