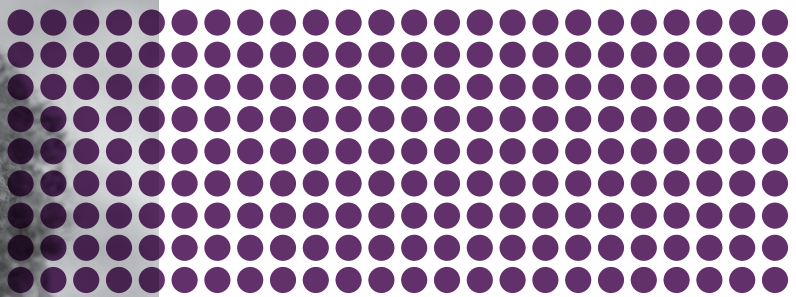




THE HEALTHPATH
FOUNDATION OF OHIO

IMPACT OF DOMESTIC VIOLENCE EXPOSURE

Recommendations to better
serve Ohio's children



Research Methodology

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Prevalence of Domestic Violence Methodology

Using data from the National Survey of Children's Exposure to Violence (Finkelhor, Turner, Shattuck, & Hamby, 2015; Finkelhor et al., 2009), the prevalence of children age birth to 17 years old living in the East North Central Census Division (Ohio, Indiana, Illinois, Wisconsin, and Michigan) was estimated using final sample weights. The East North Central Census Division was the smallest geographic unit available to estimate the prevalence of domestic violence exposure specific to Ohio.

Map Methodology

The map on the next page displays by county the percentage of children estimated to be exposed to domestic violence and the services available for them. Data are displayed in Table 1 (see page 4). To estimate the percentage of children exposed to domestic violence, three different sources of domestic violence incidence reporting were used.

The first source was unpublished data from the Ohio Incident Based Reporting (OIBRS) System that included the number of victims in 2015 by county who were involved in domestic violence incidents recorded by law enforcement. Only domestic violence incidents between spouses, ex-spouses, common-law spouses, boyfriends/girlfriends, and same-sex partners were included. These data were used to estimate the number of children exposed to domestic violence reported to law enforcement (a). Because some counties did not report for 100% of the county population, first the estimated total domestic violence reported to law enforcement was calculated by the incidents reported multiplied by the percentage of population not covered and then divided by the population covered. To estimate the number of children exposed to domestic violence reported to law enforcement, prevalence estimates by Fantuzzo and Fusco (2007) were used, where 44% of domestic violence incidents reported to law enforcement had children present and of those incidents, an average of 1.8 children were present. Therefore, the estimated total domestic violence reported to law enforcement was multiplied by 44% and then multiplied by 1.8.

The second source of data was the Ohio Family Health Survey (Steinman & Bonomi, 2009), which included estimates of children living in homes where adult domestic violence is occurring (b).

The third source of data was the estimated number of Child Protective Services (CPS) cases with a domestic violence concern (c). The Ohio Needs Assessment for Child Welfare Services reported that 43.02% of CPS cases had a concern of domestic violence (Ohio Department of Job and Family Service, 2016). Using reported allegations of maltreatment (i.e., physical abuse, neglect, sexual abuse, emotional abuse), the number of allegations of maltreatment was multiplied by 43.02% for each county (Public Children Services Association of Ohio, 2016). To create the total estimated number of children exposed to domestic violence by county, the three data sources were summed. The estimated percentage of children exposed to domestic violence was determined by dividing the total number of estimated children exposed to domestic violence by the child population.

The map displays the proportion of children estimated to be exposed to domestic violence by county. The percentage was split into four



groups; darker shades indicate higher rates of estimated exposure: less than 4.00% (lightest blue), between 4.00% and 4.99% (light blue), between 5.00% and 5.99% (medium blue), and 6.00% or more (dark blue).

Despite using the best available data to make these estimations, some limitations need to be noted. Because some children interact with multiple systems, it is possible that some children may have been double counted using the four sources of data. Data were de-identified so it is not possible to know the extent of

possible double counting. The average estimated percentage of children exposed to domestic violence was 4.24%. This is much lower than the national estimate of 6.4% of children exposed annually. Therefore, it is possible that these numbers are underestimated and that there is a larger number of children who are experiencing domestic violence than reported in this report. Another limitation is that while most recent data were used for all sources, the data time period differed between sources, ranging from 2013 to 2016.

*Map 1
Percentage of children estimated to be exposed to domestic violence, by county. Darker shades indicate higher rates of estimated exposure.*

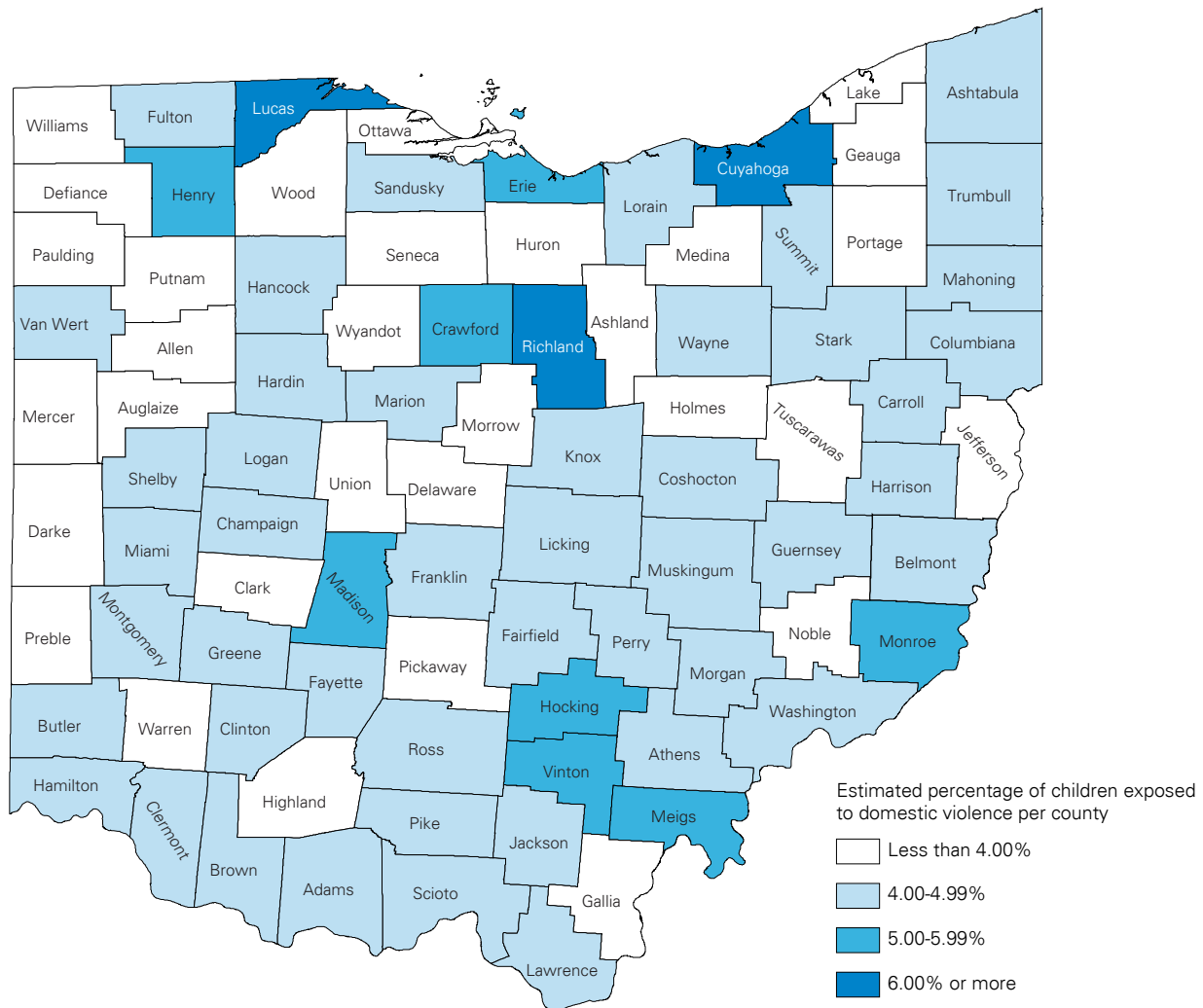


Table 1
Estimated number of children exposed to domestic violence, by county

County	Child population 2015	Estimated exposure reported to law enforcement^a	Children living in homes where an adult reports domestic violence is occurring^b	Estimated number of CPS cases with domestic violence^c	Total estimated number of children exposed	Estimated percentage of children exposed
Adams	6,833	56	149	116	321	4.70%
Allen	24,346	35	533	348	915	3.76%
Ashland	12,248	51	263	156	469	3.83%
Ashtabula	22,120	149	501	309	959	4.33%
Athens	9,882	96	216	166	477	4.83%
Auglaize	11,107	81	242	103	426	3.83%
Belmont	13,189	140	286	165	591	4.48%
Brown	10,148	89	231	112	432	4.26%
Butler	90,328	577	1,935	1,102	3,614	4.00%
Carroll	5,904	[58]	136	72	266	4.51%
Champaign	8,912	78	209	112	400	4.48%
Clark	30,897	173	684	339	1,196	3.87%
Clermont	48,113	300	1,060	632	1,992	4.14%
Clinton	9,921	49	219	163	431	4.34%
Columbiana	21,882	108	492	302	901	4.12%
Coshocton	8,618	67	186	133	387	4.49%
Crawford	9,301	122	211	133	465	5.00%
Cuyahoga	268,170	4,118	6,069	5,966	16,153	6.02%
Darke	12,601	79	275	15	370	2.93%
Defiance	8,950	65	199	58	322	3.60%
Delaware	52,718	65	1051	213	1,329	2.52%
Erie	15,712	278	357	196	831	5.29%
Fairfield	36,664	370	798	456	1,624	4.43%
Fayette	6,849	89	150	83	322	4.70%
Franklin	295,725	3,139	5,867	4,638	13,644	4.61%

Note: Carroll and Sandusky Counties had no reported data to OIBRS. Estimates (shown with brackets) were calculated by multiplying the average proportion of IPV exposure per county by the county population.

^a Fantuzzo, J. W., & Fusco, R. A. (2007). Children's direct exposure to types of domestic violence crime: A population-based investigation. *Journal of Family Violence, 22*(7), 543-552.

^b Steinman, K. J., & Bonomi, A. E. (2009). Intimate partner violence among Medicaid and uninsured populations in Ohio: Associations with health outcomes and care utilization. Columbus, OH.

^c Ohio Department of Job and Family Service, (2016). Ohio needs assessment for child welfare services; Public Children Services Association of Ohio. (2016). PCSAO Factbook: 12th edition 2015-2016.

Table 1, continued
 Estimated number of children exposed to domestic violence, by county

County	Child population 2015	Estimated exposure reported to law enforcement ^a	Children living in homes where an adult reports domestic violence is occurring ^b	Estimated number of CPS cases with domestic violence ^c	Total estimated number of children exposed	Estimated percentage of children exposed
Fulton	10,284	62	228	138	428	4.16%
Gallia	6,963	45	156	74	275	3.95%
Geauga	22,331	59	503	133	695	3.11%
Greene	34,044	381	731	428	1,540	4.52%
Guernsey	8,868	3	199	188	390	4.40%
Hamilton	187,937	1,408	3,973	2,286	7,667	4.08%
Hancock	17,083	171	369	142	682	4.00%
Hardin	7,362	65	158	111	334	4.53%
Harrison	3,242	29	73	42	144	4.44%
Henry	6,544	102	148	87	337	5.16%
Highland	10,447	79	230	100	409	3.92%
Hocking	6,494	89	146	120	355	5.47%
Holmes	14,367	44	304	40	387	2.69%
Huron	14,321	60	327	155	542	3.79%
Jackson	7,848	101	171	60	331	4.22%
Jefferson	13,199	48	292	95	435	3.30%
Knox	14,158	139	306	223	667	4.71%
Lake	47,536	124	1,064	393	1,580	3.32%
Lawrence	13,547	118	307	140	565	4.17%
Licking	40,213	319	858	485	1,662	4.13%
Logan	10,80	370	798	456	1,624	4.43%
Lorain	68,903	386	1,506	943	2,835	4.11%
Lucas	100,612	2,047	2,214	2,079	6,339	6.30%
Madison	9,215	146	202	160	508	5.51%
Mahoning	47,425	636	1,075	576	2,287	4.82%
Marion	13,794	94	307	281	682	4.95%

a Fantuzzo, J. W., & Fusco, R. A. (2007). Children's direct exposure to types of domestic violence crime: A population-based investigation. *Journal of Family Violence*, 22(7), 543-552.

b Steinman, K. J., & Bonomi, A. E. (2009). Intimate partner violence among Medicaid and uninsured populations in Ohio: Associations with health outcomes and care utilization. Columbus, OH.

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County	Child population 2015	Estimated exposure reported to law enforcement ^a	Children living in homes where an adult reports domestic violence is occurring ^b	Estimated number of CPS cases with domestic violence ^c	Total estimated number of children exposed	Estimated percentage of children exposed
Medina	40,862	132	911	133	1,177	2.88%
Meigs	5,026	72	112	95	279	5.55%
Mercer	10,473	84	225	83	392	3.74%
Miami	24,089	304	518	163	985	4.09%
Monroe	3,000	28	66	62	155	5.17%
Montgomery	119,127	1,534	2,583	1,652	5,769	4.84%
Morgan	3,169	38	72	19	129	4.07%
Morrow	8,403	21	187	65	273	3.24%
Muskingum	19,959	154	432	286	872	4.37%
Noble	2,646	6	59	34	99	3.72%
Ottawa	7,817	29	179	89	296	3.79%
Paulding	4,501	29	102	35	167	3.70%
Perry	8,683	67	195	109	371	4.27%
Pickaway	12,598	134	273	46	453	3.60%
Pike	6,757	80	150	57	287	4.25%
Portage	31,122	40	702	450	1,192	3.83%
Preble	9,520	34	215	115	364	3.83%
Putnam	8,710	370	798	456	1,624	4.43%
Richland	26,456	573	584	769	1,926	7.28%
Ross	16,683	186	365	256	807	4.84%
Sandusky	13,734	[135]	309	120	564	4.11%
Scioto	16,922	166	376	175	717	4.24%
Seneca	12,437	21	279	155	455	3.66%
Shelby	12,620	169	281	102	551	4.37%

Note: Carroll and Sandusky Counties had no reported data to OIBRS. Estimates (shown with brackets) were calculated by multiplying the average proportion of IPV exposure per county by the county population.

a Fantuzzo, J. W., & Fusco, R. A. (2007). Children's direct exposure to types of domestic violence crime: A population-based investigation. *Journal of Family Violence, 22*(7), 543-552.

b Steinman, K. J., & Bonomi, A. E. (2009). Intimate partner violence among Medicaid and uninsured populations in Ohio: Associations with health outcomes and care utilization. Columbus, OH.

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County	Child population 2015	Estimated exposure reported to law enforcement ^a	Children living in homes where an adult reports domestic violence is occurring ^b	Estimated number of CPS cases with domestic violence ^c	Total estimated number of children exposed	Estimated percentage of children exposed
Stark	81,870	1,076	1,801	1,151	4,027	4.92%
Summit	116,666	1,970	2,587	972	5,529	4.74%
Trumbull	42,580	540	974	536	2,051	4.82%
Tuscarawas	21,267	173	458	188	818	3.85%
Union	13,672	31	296	143	470	3.44%
Van Wert	6,687	73	150	50	273	4.09%
Vinton	2,960	25	68	57	150	5.07%
Warren	57,543	166	1,219	202	1,587	2.76%
Washington	12,223	94	270	151	515	4.22%
Wayne	28,521	143	609	394	1,146	4.02%
Williams	8,519	29	186	88	302	3.55%
Wood	26,801	145	570	298	1,013	3.78%
Wyandot	5,170	38	115	38	191	3.70%

a Fantuzzo, J. W., & Fusco, R. A. (2007). Children's direct exposure to types of domestic violence crime: A population-based investigation. *Journal of Family Violence*, 22(7), 543-552.

b Steinman, K. J., & Bonomi, A. E. (2009). Intimate partner violence among Medicaid and uninsured populations in Ohio: Associations with health outcomes and care utilization. Columbus, OH.

c Ohio Department of Job and Family Service, (2016). Ohio needs assessment for child welfare services; Public Children Services Association of Ohio. (2016). PCSAO Factbook: 12th edition 2015-2016.

Effect of Domestic Violence on Child Outcomes: Systematic Literature Review Methodology

A systematic literature review was conducted examining the effect of domestic violence exposure on child outcomes. In order to identify relevant studies measuring the impact of domestic violence exposure on child outcomes, seven electronic bibliographic databases (CINAHL, ERIC, Lexis Nexis, Medline, PsychINFO, Social Science Citation Index, and Social Work Abstracts) were searched for articles published up until December of 2016. Key search terms included "(domestic OR interparental OR family OR marital OR interpersonal) AND (expos* OR witness*) AND (violen* OR conflict

OR abus* OR batter*) AND (child* OR youth)". After de-duplication, this search yielded 12,579 results. In order to specifically identify studies that have examined the long- and short-term effect domestic violence exposure has had on children and the protective factors that promote optimal development, two separate research assistants coded each citation for inclusion to or exclusion from the systematic review. Conflicting inclusion or exclusion decisions were reconciled by a third, doctoral-level research assistant. Inclusion criteria were as follows: the study (1) contained participants ages birth to 18 years old (or those with more than 80% of the sample ages birth to 18); (2) measured domestic violence exposure compared with other children who have experienced another form of violence,

polyvictimization, or who have never been exposed to violence; and (3) used measurement tools for which full descriptions of the measurement scales and scoring procedures are available. Articles were excluded for employing an adult retrospective report and/or using a case study, correlational, or descriptive design. After all coding was completed, a total of 328 citations were included in the systematic review. Of those studies, 267 were conducted with children from the United States, which are summarized by focal outcomes within children’s behavioral, mental health, cognitive, social, health, and physiological domains.

Economic Impact Analysis Methodology

Methodological Overview

Our methods for estimating the costs associated with exposure to domestic violence are aligned with those followed by the Centers for Disease Control and Prevention for economic cost analyses in public health, particularly in the area of child welfare (Fang, Brown, Florence, & Mercy, 2012). That is, we take an incidence-based approach and estimate the aggregate costs accrued by a well-defined cohort of individuals over their lifetime. In the ideal world, the incidence-based approach would be implemented as follows: A cohort of children exposed to domestic violence for the first time would be followed from that time forward. An “almost” identical cohort of nonexposed children would be followed for comparison. All relevant cost outcomes at all future time periods would be estimated for both cohorts, and the difference would constitute the “exposure effect” by outcome and time period. With those time-specific estimates in hand, we could easily calculate the present discounted value of all costs accruing from domestic violence exposure over the life trajectory. It is virtually impossible to identify and follow two cohorts that differ only in their exposure to domestic violence, but our approach aligns with this incidence-based definition of costs, relying on previously derived estimates of effects to estimate such costs.

In the existing literature, explicit estimates for the “economic costs” of domestic violence exposure (i.e., in dollars) are rare. We therefore have to

rely on assumptions linking estimated behavioral effects to changes in expected costs, for each cost category analyzed. For the three categories of outcomes, the key assumptions we make are as follows:

- **Health care costs.** Estimated effects of domestic violence exposure on the utilization of hospital care and physician and clinical services were obtained from the literature. Although the estimate on utilization that is available is specific to females, we assume an equal-sized effect applies to males. At each age, we assume that the relative increase in utilization translates into a relative increase in healthcare spending of equal magnitude.
- **Crime costs.** The estimated effect of domestic violence exposure on the likelihood of violent crime in young adulthood was obtained from the literature. These effects are assumed to be consistent across the four categories of violent crime (murder, rape/sexual assault, aggravated assault, robbery). At each age, we assume an increase in crime by applying that estimate to the age profile of criminal behavior in each crime category. From this, we can calculate the expected increase in crime (in each category) at each age, which we then multiply by cost-of-crime estimates in the literature to obtain the crime costs associated with domestic violence exposure at each age.
- **Productivity costs.** The productivity effects of domestic violence exposure are inferred from the estimated effect of domestic violence exposure on educational attainment. Using estimates for the age-specific effects of education on worker earnings, we calculate the expected earnings detriment associated with exposure to domestic violence based on the reduced earnings we anticipate given the estimated reduction in educational levels.

More details about the estimation procedures used in each cost category are provided below.

Our analysis sidesteps issues about the timing of exposure to domestic violence in the child’s life, instead focusing on the lifetime costs accruing to a hypothetical young adult exposed to domestic violence at any point in their childhood. Our measure of “lifetime” costs pertains to ages 20 to 64. In our main estimates, a 3% discount

rate is applied to the estimated cost increments that occur at later ages. As a more conservative alternative, estimates using a 7% discount rate are also provided.

We have chosen to focus our attention on the costs of domestic violence exposure associated with healthcare spending, criminal behavior, and labor market productivity. We anticipate these cost categories to be the main drivers of tangible economic costs arising from adverse childhood events. Nonetheless, there are potentially important costs we miss, including the tangible costs of social services, the intangible psychological harm experienced by exposed individuals, and potentially important intergenerational spillovers (Ehrensaft et al., 2003). Consequently, the “total lifetime costs” we estimate provide a lower-bound estimate of true lifetime costs.

Literature Scan

We systematically scanned the literature to identify reliable estimates of domestic violence exposure effects on health, human capital, and criminal behavior. These secondary data estimates were entered as inputs into our estimation of the cost of domestic violence exposure. By “reliable” we mean estimates that are obtained through an acceptable counterfactual analysis within contexts that are applicable or transferable to the U.S. population. Estimates derived from counterfactual analyses are better able to isolate the effect of domestic violence exposure from the effect of co-occurring conditions such as poverty and adverse experiences other than domestic violence exposure that may also affect our outcomes of interest. In particular, we required estimates that attempted to isolate the specific effect of domestic violence exposure, independent of the co-occurrence of child maltreatment and controlling for sociodemographic characteristics.

Additional data sources were drawn upon to provide other pieces of information necessary for constructing the “age profile” of outcomes (crime) or costs (health, education/productivity) required for our long-term cost estimates. They will be described in the specifics related to the analysis of each cost category.

We searched the literature for peer-reviewed studies of the consequences of domestic violence exposure using the following Boolean condition:

(“logistic regression” OR “probability” OR “marginal effects” OR “effects”) AND (domestic OR interparental OR family OR intimate partner OR marital OR interpersonal) AND (expos* OR witness*) AND (violen* OR conflict OR abus* OR batter*) AND (child* OR youth) AND “adverse childhood experiences” AND Umbrella Outcome (i.e., Physical Health, Mental Health, etc.) OR Sub-Outcome (i.e., primary OR specialty OR urgent OR behavioral health care service*, etc.)

within the following databases: PsychInfo, Social Work Abstracts, SocIndex, CINAHL, Social Sciences Citation Index, Criminal Justice Abstracts, APA/PsychNet, and the Education Resources Information Center (ERIC). This search yielded 75 articles that were scanned by reading the abstracts and sometimes the main text. In a few cases, references from this initial search led to other articles that were explored for reliable estimates of exposure to domestic violence.

The main source of simultaneous information of current outcomes and childhood domestic violence exposure among adults in the United States comes from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an annual, state-based, random-digit-dial telephone survey that collects health and risk factors



data from noninstitutionalized U.S. adults. The BRFSS includes questions on a series of adverse childhood experiences, including child maltreatment and exposure to domestic violence. Their metrics are based on the Adverse Childhood Experiences (ACE) questionnaire, first proposed in a 1998 Center for Disease Control-Kaiser Permanente study of the relationship between childhood abuse and neglect and lifelong well-being (Felitti et al., 1998). The BRFSS provides a sound framework to estimate adult outcome effects of childhood exposure to domestic violence as its design includes a reliable counterfactual. Restricting our search to articles published after 1999 and including the term “adverse childhood experience” allowed us to scan among studies that use a sound and consistent framework to identify domestic violence effects across our main categories. Even when not using the BRFSS survey, studies in our scan either used the ACE questionnaire framework or refer to it.

For each of our areas of interest (health costs, crime, productivity), only a single article was identified providing reliable estimates of independent domestic violence exposure effects in a manner that allowed inference to economic costs.

Lifetime Health Costs

Cannon et al. (2010) estimated the healthcare utilization effect of domestic violence exposure for a sample of adult females, adjusted for age, education, and calendar year. The data for

these estimates came from a survey of 3,568 randomly sampled women from all enrollees in Group Health Cooperative, an insurance and health care delivery system (Cannon et al., 2010). Well-validated questions from BRFSS were used to measure childhood exposure to domestic violence among women aged between 18 and 64 years old. Using detailed information from Group Health databases, researchers captured healthcare utilization from 1992 to 2002 for women with at least 12 months of utilization data.

Cannon et al. (2010) estimated that domestic violence exposure increases the relative risk of hospitalization by 11%, from which we assumed an 11% increase in “Hospital Care” costs for exposed individuals. The article does not provide an domestic violence effect estimate specific to “Physician and Clinical Services,” but attributed to domestic violence exposure an 11% increase in utilization of hospital outpatient services, a 42% increase in utilization of emergency department services, and a 9% increase in primary care visits. They also found insignificant negative effects in utilization of mental health services and specialty care visits. These results suggest that “Physician and Clinical Services” spending increases with domestic violence exposure, but do not provide a firm estimate of the magnitude. Thus, we assumed that domestic violence exposure has the same size effect on “Physician and Clinical Services” than that assumed for “Hospital Care” (i.e., 11%). We also assumed the 11% increase in costs was consistent over

*Table 2
Implied per capita cost personal health expenditures due to domestic violence exposure in childhood*

Age group	Hospital care		Physician and clinical services	
	Per capita spending	Implied charge due to domestic violence exposure	Per capita spending	Implied charge due to domestic violence exposure
19–44	\$1,867	\$200	\$1,239	\$133
45–64	\$3,903	\$418	\$2,580	\$276
65–84	\$6,431	\$689	\$3,820	\$409
85+	\$9,725	\$1,041	\$4,436	\$475

Note: Original spending data (in 2012 dollar values) adjusted to 2016 values using standard consumer price index (CPI) adjustment.

the lifespan of an individual exposed to domestic violence in childhood.

Taking an 11% effect size of exposure over nonexposure, the average healthcare cost due to exposure (h_e) was 1.11 times the cost for those not exposed (h_c). This latter value can be derived by knowing the spending estimate for the general population (h) and the lifetime prevalence rate of childhood exposure to domestic violence in the general population of 25%. We derived h from tables by the Centers for Medicare & Medicaid Services (DHHS-CMS, 2012), which provide per capita healthcare spending information by spending categories and age groupings. With this information, the per capita healthcare cost for the nonexposed population (h_c) was derived from:

$$h = 0.25(1.11h_c) + 0.75h_e$$

Solving for h_c , the implied change in per capita spending attributable to an individual's exposure to domestic violence was $h_e = 1.11h_c$. Table 1 reports those "implied changes" or expected spending increments associated with childhood domestic violence exposure applied to age groups across the entire age range. From this table, we constructed costs due to exposure to domestic violence over an age profile between ages 20 and 64. Because the Centers for Medicare & Medicaid Services cost values are provided by age categories, we assumed a constant annual increase in spending applies to each year within each age category. We used these values to construct an age profile of the predicted spending increments due to domestic violence exposure at each age, 20–64. A more conservative estimate using a 7% discount rate was also calculated.

Lifetime Crime Costs

Ireland and Smith (2009) provided estimates for the independent effect of domestic violence exposure during early adulthood (early to mid-20s) for subjects in the Rochester Youth Development Study. In logistic regressions controlling for gender, race/ethnicity, family poverty, family transitions, and caregiver education, they estimated an odds-ratio domestic violence exposure effect of 1.42 for the subject's likelihood of violent crime (significant at the

Figure 1
Simulated age profiles for murder rates (1A), rape/sexual assault rates (1B), aggravated assault (1C), and robbery (1D) among individuals exposed to domestic violence ($eIPV = 1$) and not exposed ($eIPV = 0$).

Figure 1A. Murder rates

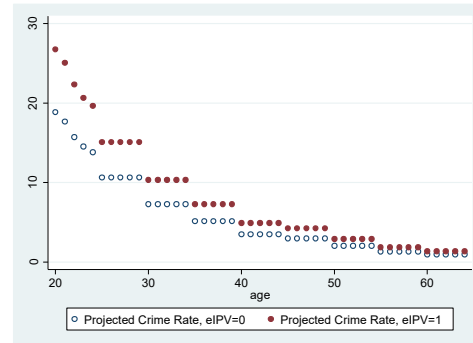


Figure 1B. Rape/sexual assault rates

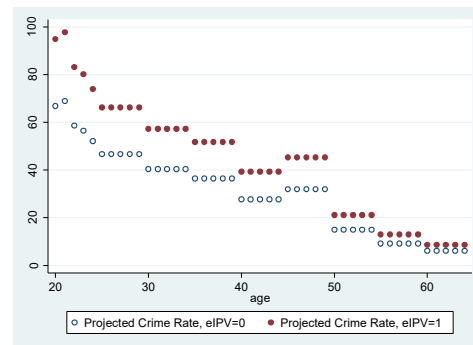


Figure 1C. Aggravated assault

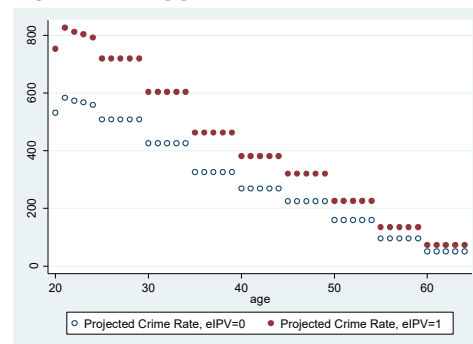
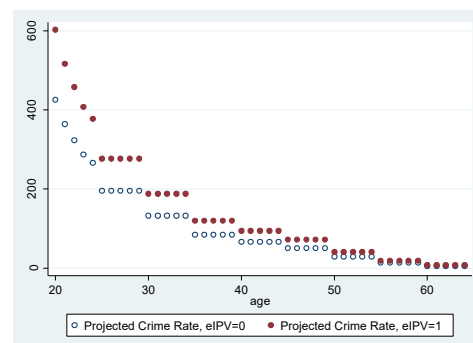


Figure 1D. Robbery



10% level). Estimated effects for arrests and for general crime were positive but insignificant. For this reason, our analysis of lifetime crime costs focused solely on the costs arising from violent crimes.

Data on criminal arrest rates, by age, were obtained from the Bureau of Justice Statistics (Snyder, 2012) and data on criminal counts were obtained from the Federal Bureau of Investigation (FBI, 2011). Arrest rates systematically underrepresent crime rates due to the frequency of unsolved criminal cases. Therefore, to simulate a baseline crime rate at each age, crime-to-arrest ratios were used to adjust upwards the age-specific arrest rates within each crime category (inflation factors were 1.317 for murder, 4.219 for rape, 1.907 for assault, and 3.275 for robbery). That is, we assumed the ratio of crimes-to-arrests was equal across all ages.

Assuming an adult domestic violence exposure prevalence rate of 25% (Finkelhor et al., 2015), the odds-ratio estimate of Ireland and Smith (2009) was applied to derive an estimate for the change in crime levels arising from domestic violence exposure at each age. This was done for each of the four categories of major violent crime (murder, rape/sexual assault, aggravated assault, and robbery). Figure 1 depicts the simulated age profiles created for each crime category.

To put a dollar value on these changes in crime levels, we drew on the findings of McCollister, French, and Fang (2010). Their article provided cost estimates for categories of crime, using a 3% discount rate. Their estimate of crime costs is inclusive, including tangible costs borne by the justice system, tangible losses to victims, and

intangible costs to victims (pain and suffering, lost life). For each crime category, the estimated change in crime levels at each age was multiplied by the estimated cost associated with that crime type, providing an age profile of the cost of domestic violence exposure due to crime (see Table 3). From there, a 3% discount rate was applied to discount all values to age 20, yielding our estimate of lifetime crime costs per victim. A more conservative estimate using a 7% discount rate was also calculated. In order to account for the potential effect of domestic violence exposure on crime dissipating as an individual ages, the magnitude of the effect, which was an estimated odds-ratio, was calculated to dissipate at a rate of 10% per year starting at age 30.

Productivity Losses

Our literature scan found no specific estimates directly relating domestic violence exposure to changes in worker productivity. However, Font and Maguire-Jack (2016) provided estimates for the effect of exposure to domestic violence on educational outcomes, specifically, on the likelihood of completing high school and college degrees. These estimates are obtained for the sample of adults participating in the BRFSS, derived from the estimation of a structural equation model including a range of socioeconomic controls. Font and Maguire-Jack (2016) estimated that the likelihood of high school completion and college completion both decreased by 4.7 percentage points with the occurrence of exposure to domestic violence. Font and Maguire-Jack (2016) also found that exposure to domestic violence was predictive of a significant reduction in their measure of

Table 3
Estimated crime costs for categories of violent crime

Crime category	Cost (PDV, 3% disc rate) 2008 dollars	Cost (PDV, 3% disc rate) 2016 dollars
Murder	\$8,982,907	\$10,015,639
Rape/sexual assault	\$240,776	\$268,457
Aggravated assault	\$107,020	\$119,324
Robbery	\$42,310	\$47,174

Source: McCollister, French, and Fang (2010); converted to 2016 dollars using standard consumer price index (CPI) adjustment. PDV: present discounted value.

income. Because this measure is categorical, the income effect they estimated was not translatable into measurable dollar amounts.

Instead, we imputed the productivity losses associated with exposure to domestic violence at any given age based on the effects we would expect due to the changes in education. For this imputation, we relied on results reported by Tamborini, Kim, and Sakamoto (2016). Specifically, Tamborini et al. reported estimated effects of education on median earnings for workers in different age ranges and by sex, employing five categories for education (less than High School, High School graduate, Some College, College Graduate, Advanced Degree). Data retrieved from the Current Population Survey on median earnings by sex and age in 2016 were used to construct an age profile for the “baseline”

earnings we expected for a typical worker not exposed to domestic violence.

From this baseline, estimates from Tamborini et al. (2016) were applied to calculate the reduction in earnings by age and sex associated with negative shifts in educational attainment. Specifically, we predicted the earning differentials associated with (a) being a High School graduate versus not, and (2) being a College Graduate versus having Some College education only. In light of Font and Maguire-Jack, we then assumed 4.7% of adults exposed to domestic violence in childhood would have suffered earnings detriments of each of those sizes.

These steps produced estimates for the earnings detriment, operating through education, associated with exposure to domestic violence at each age by sex. The simulated sex-specific age profiles for projected earnings are shown in Figure 2. We then applied the 3% discount rate to calculate the present discounted value of the estimated lifetime reduction in earnings associated with exposure to domestic violence. A more conservative estimate using a 7% discount rate was also calculated.

Figure 2. Simulated age profile for earnings among men (2A) and women (2B) exposed to IPV (eIPV = 1) and not exposed (eIPV = 0).

Figure 2A. Earnings among men

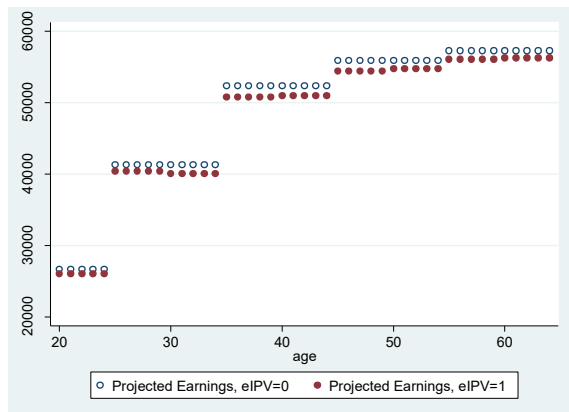
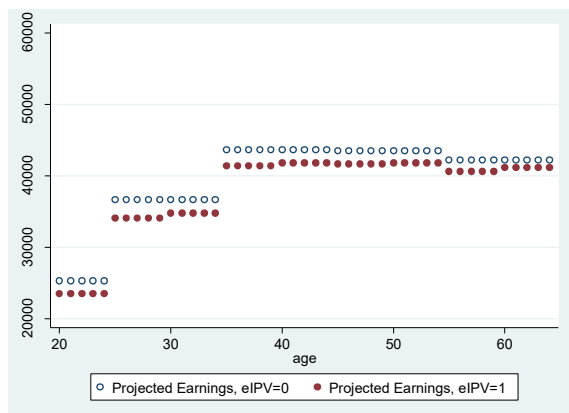


Figure 2B. Earnings among women



United States and Ohio Lifetime Estimates

Aggregate lifetime costs due to domestic violence exposure for a typical 20-year-old cohort of individuals living in the United States was calculated. National estimates indicate 25% of Americans enter young adulthood having been exposed to domestic violence in childhood (Finkelhor et al., 2015). The most recent Census population data (2015) for 20-year-old individuals (US population: 4,363,440; Ohio population: 172,500) was multiplied by 25% equaling an estimated 1,090,860 individuals in the United States and 43,125 individuals in Ohio who had been exposed to domestic violence in childhood. Each cost category was then multiplied by the estimated number of individuals who had been exposed to domestic violence in childhood.

Table 4 reports the estimates for the lifetime costs associated with domestic violence exposure measured for a hypothetical 20-year old through age 64. The preferred estimate applied a 3% discount rate to discount costs which

accrue at later ages. For the typical 20-year old, the estimated discounted lifetime costs accruing from childhood domestic violence exposure was \$50,495. Productivity costs represented roughly half of these costs, with healthcare costs (21.7%) and violent crime costs (27.5%) also making sizable contributions to this total. The present value of lifetime healthcare costs of total spending increase of \$11,042, with \$6,642 attributed to hospital care and \$4,401 to clinical/professional services. The estimated lifetime crime costs per victim was \$13,922, with more than half of these costs attributed to the predicted increase in costs associated with murder. Using a 3% discount rate yields a decrease in earnings of \$25,531 per victim of domestic violence exposure.

Table 4 also provides cost estimates under more conservative assumptions using a 7% discount rate (Alternative 1). Using a 7% discount rate, cost estimates for hospital care are \$5,595 per victim, \$10,081 due to crime, and \$14,129 in productivity losses. The resulting total cost estimate was 40% smaller, primarily from smaller estimates for healthcare costs. Alternative 2 applies only to the crime cost estimates and assumed that the estimated effect dissipates as an individual ages. When the effect of domestic violence exposure is allowed to depreciate by 10% per year by age 30, the total cost comes to \$11,223. The estimate crime costs of exposure to domestic violence were about 20% smaller under this assumption.

*Table 4
Average lifetime costs per victim of childhood IPV exposure in 2016 dollars, United States*

Cost category	Preferred estimate: 3% discount rate	Alternative 1: 7% discount rate	Alternative 2: Diminishing effect	Data sources
Health care			(n/a)	
Hospital care	\$6,642	\$3,364		Exposure to IPV on health services: Cannon et al. (2010)
Clin/prof services	\$4,401	\$2,231		Health expenditures by age and gender: DHHS-CMS (2012)
Combined	\$11,042	\$5,595		
Violent crime				
Murder	\$7,732	\$5,776	\$6,455	Exposure to IPV on crime: Ireland and Smith (2008)
Rape/sexual assault	\$1,044	\$714	\$780	Cost of Crime: McCollister, French, and Fang (2010)
Aggravated assault	\$4,462	\$3,066	\$3,402	Age-specific arrest rates: Snyder (2012)
Robbery	\$685	\$526	\$588	Crime counts: FBI (2011)
Combined	\$13,922	\$10,081	\$11,223	
Productivity loss			n/a	
Males	\$24,029	\$12,403		Exposure to IPV on education: Font and Maguire-Jack (2016)
Females	\$27,033	\$15,856		Median earnings by sex and age: Current Population Survey 2016
Mean	\$25,531	\$14,129		Lifetime earnings from education: Tamborini et al. (2016)
TOTAL	\$50,495	\$29,805	\$47,801	

Note: Costs in 2016 dollars measured over ages 20–64 discounted to age 20. Preferred estimates apply 3% discount rate. Alternative 1 estimates apply a 7% discount rate. In Alternative 2, we assume the effect of IPV exposure on crime dissipates by 10% per year starting at age 30.

Table 5 shows the total lifetime costs of domestic violence exposure for a cohort of U.S. 20-year-old individuals who had been exposed to domestic violence in childhood. For the United States, the aggregate lifetime costs due to domestic violence exposure amounted to over \$55.08 billion in 2016 dollars. Of this cost, over \$12.04 billion was due to increased healthcare costs, over \$15.18 billion was due to crime, and over \$27.85 billion resulted from productivity losses. For Ohio, the aggregate lifetime costs due to domestic violence exposure amounted to over \$2.17 billion in 2016 dollars. Of this cost, over \$476 million was due to increased healthcare costs, over \$600 million was due to crime, and over \$1.10 billion resulted from productivity losses.

Interventions for Children Exposed to Domestic Violence Methodology

Seven electronic bibliographic databases (CINAHL, ERIC, Lexis Nexis, Medline, PsychINFO, Social Science Citation Index, and Social Work Abstracts) were searched for articles published up until December of 2016. Key search terms included “(domestic OR interparental OR family OR marital OR interpersonal) AND (expos* OR witness*) AND (violen* OR conflict OR abus* OR batterMegan *) AND (child* OR youth) AND (treatment OR intervention OR therapy OR counseling OR program OR “randomized control trial” OR “clinical trial” OR “evidence based” OR “evidence-based”). After de-duplication, this search yielded 6,420 results. Doctoral-level research assistants coded each citation for

Table 5
Total lifetime cost of childhood domestic violence exposure in 2016 dollars, by Ohio and the United States

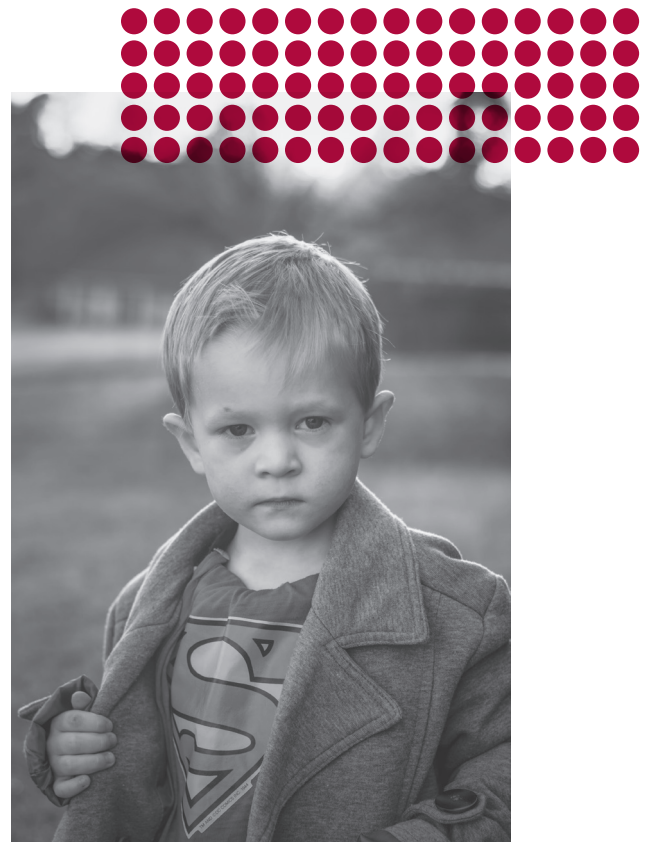
	Ohio	United States	
20-year-old population exposed to domestic violence	43,125	1,090,860	1,090,860
Cost category	3% discount rate	3% discount rate	7% discount rate
Health care			
Hospital care	\$286,436,250	\$7,245,492,120	\$3,669,653,040
Clin/prof services	\$189,793,125	\$4,800,874,860	\$2,433,708,660
Combined	\$476,186,250	\$12,045,276,120	\$6,103,361,700
Violent crime			
Murder	\$333,442,500	\$8,434,529,520	\$6,300,807,360
Rape/sexual assault	\$45,022,500	\$1,138,857,840	\$778,874,040
Aggravated assault	\$192,423,750	\$4,867,417,320	\$3,344,576,760
Robbery	\$29,540,625	\$747,239,100	\$573,792,360
Combined	\$600,386,250	\$15,186,952,920	\$10,996,959,660
Productivity loss			
Males	\$1,036,250,625	\$26,212,274,940	\$16,334,537,640
Females	\$1,165,798,125	\$29,489,218,380	\$31,664,393,220
Mean	\$1,101,024,375	\$27,850,746,660	\$23,998,920,000
Total	\$2,177,596,875	\$55,082,975,700	\$41,099,241,360

inclusion to or exclusion from the systematic review. Inclusion criteria were as follows: the study (1) described and/or assessed an intervention for children who have experienced domestic violence exposure and (2) outlined and/or evaluated an intervention specific to children exposed to domestic violence and/or their parents. After all coding was completed, a total of 411 citations were included in the systematic review, resulting in 140 of identified interventions for children exposed to domestic violence.

Ohio Domestic Violence Agencies and Services Methodology

Between the months of October 2016 and January 2017, a statewide survey was conducted with agencies that may provide services for children who have been exposed to domestic violence. An initial set of 205 agencies were identified using the Ohio Shelter and Program Referral List on the Ohio Domestic Violence Network website (<http://www.odvn.org/survivor/shelter.html>). After de-duplicating the list by removing agencies that were listed in more than one county, a total of 75 agencies were contacted and asked to complete the survey. Two questions on the survey asked respondents to list (1) the agencies to which they refer children or youths who need services their agency does not offer and (2) other agencies in their community that offer trauma services to children or youths that they had not listed. This yielded an additional 47 agencies resulting in 122 agencies across the state of Ohio that were identified as potential service providers for children exposed to domestic violence. Of the 122 agencies, 17 were

excluded due to not being able to identify either the agency itself or obtain contact information for the agency. This resulted in a total sample of 106 who were asked to complete the survey. Of those 105 agencies, 59 fully completed the survey (56.2%), 19 partially completed the survey (18.1%), 5 declined or refused to complete the survey (4.8%), and 22 did not respond to calls or emails regarding the survey (20.9%). All available data from fully completed surveys and partially completed survey (total of 78 surveys, 74.3%) were used for the results presented in this report.



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