

# Intimate partner violence and adverse pregnancy outcomes: A population-based study

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**OBJECTIVES:** The purpose of this study was to measure the prevalence of exposure to intimate partner violence during pregnancy and to determine whether such exposure is associated with adverse pregnancy outcomes.

**STUDY DESIGN:** We measured the prevalence of exposure to intimate partner violence and fear of a partner during pregnancy among 4750 residents of Vancouver, British Columbia, who gave birth between January 1999 and December 2000. We undertook a multivariate analysis to examine the associations with second- or third-trimester hemorrhage, preterm labor and delivery, intrauterine growth restriction, and perinatal death.

**RESULTS:** We report a prevalence rate of 1.2% for exposure to physical violence by an intimate partner during pregnancy and 1.5% for fear of a partner. Physical violence was associated with an increased risk of antepartum hemorrhage (adjusted odds ratio [OR]: 3.79, 95% CI 1.38-10.40), intrauterine growth restriction (OR: 3.06, 95% CI 1.02-9.14), and perinatal death (OR: 8.06, 95% CI 1.42-45.63). Fear of a partner in the absence of physical violence was not associated with an elevated risk of adverse pregnancy outcomes.

**CONCLUSION:** Our study confirms prior work reporting an association of physical abuse during pregnancy with intrauterine growth retardation and, in addition, reports an association with antepartum hemorrhage and perinatal death. (*Am J Obstet Gynecol* 2003;188:1341-7.)

**Key words:** Pregnancy, violence, hemorrhage, growth restriction, neonatal death

Pregnancy, for some women, is a time of risk for injury caused by abuse by an intimate partner. Abuse can begin or escalate during the course of the pregnancy.<sup>1-3</sup> In numerous studies to date, the reported findings of consequences of abuse to mothers and infants have been inconsistent. Among 15 studies addressing pregnancy outcomes and exposure to violence, 5 have reported a positive association between intimate partner violence and low birth weight or preterm birth.<sup>4-8</sup> Rates of low birth weight among battered women were 1.5 to 2.5<sup>4-6</sup> times higher than those among nonbattered women, and rates of preterm birth ranged from 2.5 to 4<sup>3-6</sup> times higher. Among 10 studies<sup>9-18</sup> reporting no association of abuse with adverse pregnancy outcomes, one did not re-

port outcomes separately for women exposed to verbal and physical abuse.<sup>9</sup> Others lacked sufficient power to address most pregnancy outcomes assessed.<sup>10-13</sup> One study ascertained exposure status through a mailed survey,<sup>14</sup> whereas the others interviewed study subjects. A number of studies have reported increased rates of low birth weight, reduction in mean birth weight, or preterm labor in bivariate analyses but the associations became non-significant when adjusted for use of tobacco and other substances.<sup>15-18</sup> Only one of these studies was population based.<sup>14</sup>

This study was designed to answer, within the population of the Canadian city of Vancouver, British Columbia, the question of whether exposure to violence by or fear of a partner during pregnancy is associated with selected adverse pregnancy outcomes.

## Methods

We measured the prevalence of physical abuse by an intimate partner or fear of a partner during pregnancy among Vancouver residents delivering in hospitals between January 1, 1999, and December 31, 2000. The obstetric population of the city is served by two hospitals, St Paul's and BC Women's. St Paul's Hospital, situated in the downtown core of Vancouver, with about 1400 deliveries per year, is a community general hospital, providing ma-

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**Table I.** Demographics/lifestyle characteristics of abused and nonabused women

	<i>Physical abuse or fear of partner (n = 88)</i>	<i>No physical abuse or fear of partner (n = 4662)</i>	<i>P value</i>
Age (y) (No. [%])			<.001
≤19	5 (5.7)	86 (1.8)	
20-24	23 (26.1)	416 (8.9)	
25-29	18 (20.5)	1106 (23.7)	
30-34	26 (29.5)	1696 (36.4)	
≥35	16 (18.2)	1355 (29.1)	
Missing		3	
Lone parent			<.001
Yes	36 (41.9)	273 (5.9)	
No	50 (58.1)	4333 (94.1)	
Missing	2	56	
Race/ethnicity			<.001
White	26 (31.0)	1975 (45.0)	
East Asian	23 (27.4)	1745 (39.7)	
South Asian	5 (6.0)	362 (8.2)	
First Nations	20 (23.8)	92 (2.1)	
Black	0	29(0.7)	
Other	10 (11.9)	188 (4.3)	
Unknown	4	271	
Household income			<.001
Quintile 1 (lowest)	55 (68.8)	1576 (34.9)	
Quintile 2	8 (10.0)	1061 (23.5)	
Quintile 3	7 (8.8)	582 (12.9)	
Quintile 4	3 (3.8)	493 (10.9)	
Quintile 5	7 (8.8)	799 (17.7)	
Quintile unknown	8	151	
Use of alcohol			<.001
Dependent	6 (7.0)	32(0.7)	
Nondependent	6 (7.0)	56 (1.2)	
Never	74 (86.0)	4507 (98.1)	
Unknown	2	67	
Illicit drug use			<.001
Dependent	8 (9.3)	36 (0.7)	
Nondependent	7 (8.1)	54 (1.2)	
Never	71 (82.6)	4509 (98.1)	
Unknown	2	63	
Tobacco use			<.001
Current	26 (29.9)	243 (5.3)	
Former	2 (2.3)	106 (2.3)	
Never	59 (67.8)	4253 (92.4)	
Unknown	1	60	

ternity care for Vancouver residents only. BC Women's Hospital serves Vancouver city residents for primary and secondary level obstetric care (4500 deliveries per year) and the entire province for tertiary obstetric care. During the study period, regulated midwifery was being introduced in British Columbia, and we estimate that fewer than 75 births were completed at home.

At BC Women's Hospital, 270 obstetric nurses attended an education program in preparation for incorporating questions addressing domestic violence into their routine patient assessments.<sup>19</sup> At St Paul's Hospital, assessment for domestic violence was already incorporated into nursing admission protocols. To standardize the approach for assessment across both hospitals, in-service programs were conducted with the 75 obstetric nurses at St Paul's Hospital. Nurses were taught to ask women giving birth at either hospital at some point during the hospital stay about exposure to violence. Questions were asked in pri-

vacy, without the partner or other family members present. Nurses speaking the same language as their patients asked the questions verbally, and translated forms were also available in Chinese script, Punjabi, and Vietnamese. Nurses were taught supportive listening skills, safety planning, and how to offer women referrals to the hospital social worker and/or other community agencies. If desired, arrangements were made for admission to a woman's shelter on leaving the hospital.

Individual consent for subject participation was not obtained because in both hospitals assessment for domestic violence was deemed a standard of nursing care. Approval was obtained for the study from the University of British Columbia Clinical Research Ethics Board and from the Research Review Committees of the participating hospitals.

After a standardized preamble that included a statement that violence is related to women's health and that

**Table II.** Pregnancy-related characteristics of abused and nonabused women

	<i>Physical abuse or fear of partner (n = 88)</i>	<i>No physical abuse or fear of partner (n = 4662)</i>	<i>P value</i>
Prepregnancy weight (kg)	58.8 ± 12.0	59.3 ± 11.7	.77
Weight gain (kg)	15.2 ± 5.3	14.7 ± 5.4	.44
Height (cm)	161.0 ± 8.1	162.4 ± 7.6	.14
Primigravid	24 (27.3)	1662 (35.6)	.10
Nulliparous	39 (44.3)	2404 (51.6)	.18
Prior spontaneous abortions			.15
0	68 (77.3)	3863 (83.0)	
1	12 (13.6)	587 (12.6)	
2	5 (5.7)	154 (3.3)	
3 or more	3 (3.4)	48 (1.0)	
Missing	0	10	
Prior induced abortions			.03
0	59 (67.0)	3677 (79.0)	
1	21 (23.9)	705 (15.2)	
2	4 (4.5)	195 (4.2)	
3 or more	4 (4.5)	75 (1.6)	
Missing	0	10	

**Table III.** Physical abuse during pregnancy and adverse outcomes

	<i>Physical abuse (n = 56)</i>	<i>No physical abuse (n = 4694)</i>	<i>Unadjusted relative risk (95% CI)</i>	<i>Adjusted OR (95% CI)*</i>	<i>OR adjusted additionally for use of substances†</i>
Antepartum hemorrhage	5 (8.9)	121 (2.6)	3.60 (1.45-9.45)	3.79 (1.38-10.4)	3.51 (1.27-9.72)
Preterm labor	5 (8.9)	228 (4.9)	1.89 (0.76-4.70)	1.42 (0.49-4.18)	1.29 (0.43-3.82)
Preterm delivery	6 (10.7)	302 (6.4)	1.73 (0.75-4.00)	1.35 (0.67-2.56)	1.27 (0.48-3.37)
Intrauterine growth restriction	6 (10.7)	128 (2.7)	4.13 (1.80-9.47)	3.06 (1.02-9.14)	2.83 (0.94-8.50)
Perinatal death	2 (3.6)	21 (0.4)	7.61 (1.97-29.38)	8.06 (1.42-45.63)	7.28 (1.28-41.3)

\*OR adjusted for income quintile and race/ethnicity.

†OR adjusted for income quintile, race/ethnicity, and any versus no use of substances (alcohol, illicit drugs, or tobacco).

all women are asked about violence, two questions were asked:

1. Since you've been pregnant, have you been hit, slapped, kicked, or otherwise physically hurt by current or former intimate partner?

2. Have you been afraid of a current or former intimate partner during your pregnancy?

These two questions were taken from the Abuse Assessment Screen (AAS), a brief, validated screening tool that has been used extensively among pregnant women.<sup>4,5,7,10</sup> In this study we included a question from the AAS asking about fear of the partner in addition to the question on physical abuse to assess the impact of threatened physical abuse on pregnancy outcomes. At BC Women's Hospital, women were asked additional questions relating to abuse exposure before the pregnancy.

Outcomes assessed included antepartum hemorrhage in the second or third trimester, preterm labor (onset of labor before 37 completed weeks of gestation), preterm delivery (before 37 completed weeks of gestation), intrauterine growth restriction, and perinatal death. These outcomes were considered to be present if the condition was identified as a discharge diagnosis or listed as a diag-

nosis elsewhere in the chart. In addition, intrauterine growth restriction was coded as an outcome if the birth weight was at the 10th percentile or less based on published birth weights in weekly gestational age categories. Perinatal death as coded in this study referred to fetal deaths occurring after 20 completed weeks of gestation or death of the newborn during the index hospital admission. With a type I error, two sided, set at  $P = .05$ , the study had 80% power to detect relative risks on the order of 3.0 for all outcomes.

Answers to study questions documented by nurses and maternal demographic, obstetric, and outcome data recorded during the hospital stay were abstracted after discharge by health records personnel at BC Women's Hospital and by medical unit clerks at St Paul's Hospital. Income quintiles, average household income adjusted for household size at an enumeration area level, were derived from 1996 Canadian Census information.

Prevalence of exposure to physical abuse, fear, or either by an intimate partner during pregnancy was determined for screened cohort members and 95% CIs calculated. Unadjusted relative risks and 95% CIs were calculated to examine bivariate relationships between di-

**Table IV.** Risk of adverse pregnancy outcomes associated with physical abuse by use of substances

Substance	APH (No. [%])			
	Abused	Not abused	RR	95% CI
Alcohol				
User	1 (9.1)	3 (3.4)	2.40	0.40-14.46
Nonuser	4 (9.3)	117 (2.6)	3.78	1.37-10.41
Illicit drugs				
User	1 (9.1)	0		
Nonuser	4 (9.3)	120 (2.6)	3.69	1.34-10.15
Tobacco				
User	2 (10.5)	13 (3.7)	2.82	0.72-11.09
Nonuser	3 (8.3)	107 (2.5)	3.47	1.08-11.15

APH, Antepartum hemorrhage; IUGR, intrauterine growth restriction; RR, relative risk.

\*Data missing on use of alcohol or illicit drugs for one subject in this category.

chotomous outcome variables and exposure to physical abuse, fear, or either during pregnancy. An estimated odds ratio (OR) and 95% CI were computed for each multivariate analysis by using logistic regression. Odds ratios were adjusted for demographic or obstetric variables if their inclusion in the regression model changed the estimate of the OR by 10% or more.

### Results

During the study period, 9794 Vancouver residents were delivered of infants at 20 or more weeks' gestation. Among these, 4750 were assessed for domestic violence exposure: 3586 (75.5%) at BC Women's hospital and 1164 (24.5%) at St Paul's hospital. The overall rate of assessment was 48.5%. The rate at BC Women's (46.3%) was slightly lower than that at St Paul's Hospital (50.2%). Women who were not assessed did not differ from those who were in terms of proportion of teens (1.9% vs 2.1%), lone parent status (4.5% vs 5.7%), ethnicity (31.7% vs 35.9% white, 45.8% vs 41.2% East Asian women, 9.9% vs 9.5% South Asian women, and 2.5% vs 2.4% First Nations), income quintile (39.2% vs 38.4% in lowest quintile), history of therapeutic abortions (1.7% vs 1.5% with 3 or more), use of alcohol (0.5% of both groups), illicit drugs (1.6% vs 1.7%), or tobacco (5.7% vs 6.8%). No women who were approached for assessment indicated that they did not wish to answer the questions related to intimate partner violence.

A total of 56 (1.2%, 95% CI 0%-1.5%) women reported exposure to physical violence by an intimate partner during pregnancy and 69 (1.5%, 95% CI 1.2%-1.8%) reported fear of their partner. Eighty-eight women (1.9%, 95% CI 1.5-2.3) reported either physical abuse or fear. Rates of exposure did not differ significantly between hospitals.

Among BC Womens Hospital's assessed patients, 32 women (0.9%, 95% CI 0%-1.9%) reported physical abuse by an intimate partner before the pregnancy and 47

women (1.3%, 95% CI 0.93%-1.7%) reported fear of their partner before the pregnancy. Among 3534 women who had not experienced abuse (physical violence or fear) before the pregnancy, abuse began during pregnancy for 35 (1.0%). Among the 52 women who had experienced abuse before the pregnancy, 36 (69.2%) continued to experience abuse during the pregnancy, whereas for 16 (30.8%) the abuse ceased.

Abused and nonabused women differed in several characteristics. Abused women were younger, more likely to be parenting on their own, of First Nations ethnicity, in the lowest income quintile, or users of alcohol, illicit drugs or tobacco (Table I). They were more likely to have had induced abortions before this pregnancy, and particularly more likely to have had multiple (3 or more) induced abortions (Table II).

In general, exposure to physical abuse during pregnancy was associated with elevated risk of all outcomes studied (Table III). In a multivariate analysis, both income quintile and race/ethnicity confounded the association between exposure to violence and pregnancy outcomes. The odds ratios estimating the association between physical abuse and antepartum hemorrhage (OR: 3.79, 95% CI 1.38-10.4), intrauterine growth retardation (OR: 3.06, 95% CI 1.02-9.14), and perinatal death (OR: 8.06, 95% CI 1.42-45.63) remained significantly elevated after adjustment for these factors (Table III). After additional adjustment for use of alcohol, drugs, or tobacco, associations between physical abuse and both antepartum hemorrhage (OR: 3.51, 95% CI 1.27-9.72) and perinatal death (OR: 7.28, 95% CI 1.28-41.3) remained significantly elevated. In a stratified analysis to explore further the relationship of use of substances to adverse pregnancy outcomes, associations between physical abuse and both antepartum hemorrhage and perinatal mortality were stronger among nonusers (Table IV). Associations between physical abuse and intrauterine growth restriction, however, were higher among users.

<i>IUGR (No. [%])</i>				<i>Perinatal death (No. [%])</i>			
<i>Abused*</i>	<i>Not abused</i>	<i>RR</i>	<i>95% CI</i>	<i>Abused</i>	<i>Not abused</i>	<i>RR</i>	<i>95% CI</i>
3 (27.3)	2 (2.2)	7.12	2.69-18.90	0	1 (1.1)		
2 (4.7)	126 (2.8)	1.70	0.41-6.94	2 (4.7)	20 (0.4)	10.11	2.61-39.23
3 (27.3)	2 (3.2)	6.13	2.17-17.32	1 (9.1)	1 (1.1)	5.1	1.11-22.99
2 (4.7)	125 (2.8)	1.70	0.42-6.99	1 (2.3)	20 (0.4)	5.2	0.75-35.84
4 (21.1)	14 (3.9)	5.27	1.95-14.28	1 (5.3)	4 (1.1)	4.10	0.67-25.05
2 (5.6)	114 (2.7)	2.13	0.52-8.75	1 (2.8)	17 (0.4)	6.82	0.99-47.10

Women (n = 32) who experienced fear in the absence of physical abuse were not at significantly increased risk of adverse pregnancy outcomes.

**Comment**

The prevalence of exposure to intimate partner violence during pregnancy in our study (1.2%) was lower than that found in many previous studies. A 1996 review of the literature reported that prevalence of exposure to violence during pregnancy varied between 0.9% and 20.1% in North American and Australian studies, with 8 of 11 studies reporting prevalences between 3.9% and 8.3%.<sup>20</sup> Six studies used the same question from the Abuse Assessment Screen as we did but did not specify that the perpetrator was an intimate partner. None, however, were population-based studies. In general, the prevalence of intimate partner violence has been found to be much lower in population-based studies of non-pregnant women. A recent Canadian national telephone survey, the General Social Survey of 26,000 people over the age of 15 years, reported prevalence rates of violence from current or former intimate partners during the previous 12 months, ranging from 4% in women under 25 years of age to 1% in women 45 and older.<sup>21</sup> A recent Canadian study reporting on women screened late in the third trimester at prenatal clinics in a geographically defined health district, described a 3.6% prevalence of physical abuse by a current or former intimate partner during pregnancy.<sup>22</sup> A later population-based survey that was mailed and followed-up by telephone in the United States reported a prevalence of 4.1% of physical abuse by a current or former intimate partner during pregnancy.<sup>3</sup>

Hospital and clinic-based studies to date have been obligated to obtain written consent from participants,<sup>1,2,4-9,11,15,18</sup> and some have paid the subjects to participate,<sup>15</sup> thus potentially introducing substantial selection bias. Abused women may be more willing to give consent to participate in a study if participation improves access to information and resources. In our

study, assessment for domestic violence was deemed a standard of care in both hospitals, and individual consent was not obtained.

Despite our population-based approach, only about half of our population was assessed. We were aware that a small proportion, approximately 10%, of nurses remained uncomfortable with assessment for intimate partner violence. Some of our hospital nurses were themselves survivors of violence. Another barrier to screening was the inability to communicate with women without the assistance of family members as translators. Although some nurses are multilingual and assessment forms were available in four languages, Southwestern British Columbia is home to many women who are immigrants and refugees from Eastern Europe, South America, and the Indian subcontinent who speak languages or dialects that are uncommon in our culture. There may be bias associated with our inability to assess this diverse group, who together may represent as much as 15% of our sample.

An additional barrier to screening was the difficulty in establishing some time alone with the women. Nurses who were not assertive enough to ask partners and other family members to leave the room for a few minutes did not always find an opportunity to query their patients. Failure to assess these women may have resulted in the underreporting of abuse, if abusive men were less likely to leave their partners alone in hospital rooms. Although our prevalence rates are similar to those reported in the population-based telephone surveys, in which women would presumably have had greater opportunity to choose a time and place to speak in privacy, it may be the case that underreporting was present in both the telephone survey and in our study.

Our data support the findings of previous investigators who have reported that pregnancy can be either a catalyst for the onset of violence or a reprieve.<sup>1,3</sup> Similar to our findings that for one third of women abused before pregnancy, the abuse ceased during pregnancy, a prior Cana-

dian study reported cessation of abuse in pregnancy among 48.3% of women who had previously been abused.<sup>1</sup> Although mechanisms for the onset of abuse during pregnancy have been explored in qualitative research, the underlying concepts explaining the protective features of pregnancy have not been explored.

Age as a risk factor for exposure to violence has been identified in a number of studies,<sup>5,6,9,11,15,22</sup> as has single parent status,<sup>1,20,11,14,22</sup> and socioeconomic status.<sup>1,3,5,14,15,22</sup> In our study there were three times as many teenagers among abused women as nonabused women. It is not known if decreasing exposure with advancing age is a result of women leaving abusive partners or if other factors associated with age are involved, such as increasing independence engendered by additional education and improved employability. It is also well known that abusive men continue to abuse women who are in the process of leaving or who have left, so that unmarried status may be a consequence of the abuse itself, as opposed to a risk factor.

Increased exposure to abuse among First Nations women has been reported in prior studies. A Canadian study reported an increased rate of 5.3 (OR, 95% CI 2.6-11.3) for First Nations women.<sup>22</sup> Similar to our study, the authors did not ascertain the aboriginal status of the perpetrators. Rates of induced abortions have been associated with abuse in prior studies as well.<sup>6,18</sup> Anecdotal reports from women seeking abortion services at BC Women's have indicated that some women are forced under threat of violence, even death, by their partners to terminate the pregnancy. Assessment for exposure to abuse should be routine in all agencies providing counseling and pregnancy termination services.

The association between use of substances and exposure to abuse has similarly been reported in a number of studies.<sup>1,4,5,10,11,13,15,17</sup> Intimate partner violence appears to be associated with reduced ability to decrease or discontinue use of substances in pregnancy. The Pregnancy Risk Assessment Monitoring System in Alaska revealed that exposure to domestic violence during the 2 years before pregnancy was predictive of regular third-trimester drinking, controlling for age, and use of other substances.<sup>23</sup> We view substance use as part of the causal pathway leading from exposure to violence to adverse pregnancy outcomes. We have presented odds ratios estimating the risk of adverse pregnancy outcomes with and without controlling for use of substances but believe that the most accurate inference is derived without adjustment for use of substances.

In our study, we report for the first time, to our knowledge, an association between antepartum hemorrhage in the second or third trimester and exposure to physical abuse. During pregnancy, abuse is often directed toward the pregnant abdomen.<sup>1</sup> A case series reporting on 136 incidents of blunt force assault on pregnant women

noted that of these assaults, 9 resulted in abruptio placentae.<sup>24</sup>

We also demonstrated for the first time in a population-based study an association between intrauterine growth restriction and exposure to physical abuse. Table IV illustrates that this association is mediated largely through use of substances. The magnitude of the association in our study was larger than those described in some previous studies reporting an association, but the majority of subjects in those clinic-based studies were of low income and there may have been competing factors in the causal pathway,<sup>4,6</sup> similar to a study that found an association with low birth weight among women attending private but not public hospitals.<sup>8</sup> Two studies finding significant associations for low birth weight in bivariate analyses in magnitudes similar to ours no longer found these associations to be significant after controlling for use of substances.<sup>16,18</sup> One additional large population-based study that failed to find an association used a mailed survey with self-reported pregnancy outcomes.<sup>14</sup> In our study, independent assessment of growth restriction using standardized charts for gestational age may have classified growth restriction more accurately.

Increased risk of fetal death associated with physical abuse during pregnancy has previously been reported in one other study. In a small sample of low income women in the United States, the unadjusted odds of fetal death were 17.3 (95% CI 1.8-169).<sup>11</sup> In an analysis adjusted for maternal age and smoking, fetal distress and death were combined and the association remained significant (OR: 3.6, 95% CI 1.3-10.2). In our study, an analysis excluding all infants with any congenital anomalies also demonstrated an elevated but not statistically significant risk for perinatal death (OR: 4.74, 95% CI 0.50-44.8, adjusted for income and ethnicity).

The risks of preterm labor and delivery were not significantly elevated among abused women in our study, although the direction of the association was toward higher rates among physically abused women. The possibility of a modestly elevated risk associated with exposure to intimate partner violence remains, but our study was too small to evaluate this association adequately. Our power to detect significantly elevated risks of adverse outcomes was limited by our inability to assess all subjects and by lower prevalence of abuse than we had originally anticipated, based on previously published literature. We were able to separate the influence of violence on preterm delivery versus intrauterine growth restriction, instead of simply reporting low birth weight, a limitation of most but not all studies to date.<sup>17</sup>

In conclusion, the prevalence of exposure to abuse during pregnancy may be lower than previously reported. Our study confirms prior work reporting an association of physical abuse during pregnancy with intrauterine growth restriction and, in addition, reports an association with

second- or third-trimester hemorrhage and perinatal death. Intimate partner-perpetrated violence in pregnancy is preventable. Women provided with counseling on safety planning in abusive situations have been able to reduce their exposure to violence during pregnancy.<sup>25</sup> These findings underline the need to ask women about violence exposure at initial and subsequent prenatal visits to facilitate access to information and resources. Larger studies should continue to explore the relationship between intimate partner violence and other adverse pregnancy outcomes, as well as evaluate preventative measures.

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