Healthcare Utilization and Costs for Women with a History of Intimate Partner Violence

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Objective: To determine the healthcare utilization and medical care costs of women with a history of intimate partner violence (IPV) compared to women without a history of IPV.

Design: Longitudinal cohort study.

Setting: Mixed-model health maintenance organization.

Participants: Over 3000 (3333) women aged 18 to 64 years with ≥3 year’s cumulative enrollment prior to the survey, at least 1 year of which was after the 18th birthday.

Main Exposure: IPV since age 18 as determined from responses to telephone interview using questions from the Behavioral Risk Factor Surveillance System and also the Women’s Experience with Battering Scale.

Outcome Measures: Healthcare utilization and costs (from automated data) during the time that IPV occurred and following its cessation, compared to healthcare utilization for women who did not report IPV since age 18.

Results: A total of 1546 women reported IPV in their lifetime; at the time of interview, IPV had ceased in 87% of women, on average 16.0 years prior to interview. Healthcare utilization was higher for all categories of service during IPV compared to women without IPV, and decreased over time after cessation of IPV. However, healthcare utilization was still 20% higher 5 years after women’s abuse ceased compared to women without IPV. Adjusted annual total healthcare costs were 19% higher in women with a history of IPV (amounting to $439 annually) compared to women without IPV. Based on prevalence for IPV of 44%, the excess costs due to IPV are approximately $19.3 million per year for every 100,000 women enrollees aged 18–64.

Conclusions: Women with a history of IPV had significantly higher healthcare utilization and costs, continuing long after IPV ended. Given its high prevalence, IPV has a major impact on medical care resource utilization and efforts to prevent its occurrence and consequences are clearly indicated.

Introduction

In the last decade, intimate partner violence (IPV) has come to be recognized as a health and healthcare problem for individual women as well as for healthcare delivery systems, and not just a criminal justice issue. Physicians in a variety of professional settings encounter women with a history of IPV,1 and these women present with both acute and chronic health-related conditions.2–4 Prior studies indicate that women who experience IPV are at increased risk for a wide range of medical and psychologic morbidities, including headaches, chronic pain, gastrointestinal and gynecologic symptoms, depression and anxiety, and acute and chronic injuries.5–12

Prior studies of individuals with a history of IPV have documented increased healthcare utilization11,13–18 and medical care costs.15,19,20 This increased healthcare utilization has been found for inpatient hospitalization, primary and specialty care, and mental health care. Prior studies report a 1.5- to more than 4-fold increase in utilization attributable to IPV.16 Estimates of the increased annual healthcare costs range from $1114 to $2263 (2004 dollars) in women with IPV compared to costs for women without IPV.16 In 1995, across the United States, medical and mental healthcare costs...
stemming from IPV for women were estimated at $4.1 billion.\textsuperscript{21}

These prior studies had limitations, including small samples, unrepresentative populations, reliance exclusively on self-report for utilization and costs, and short follow-up, often for only 1 year. To our knowledge, no studies have examined whether healthcare utilization and costs vary in relationship to the time of abuse, both during and after the period of IPV. Based on studies of adults who were abused as children, the effects of violence on health and healthcare utilization appear to persist for decades; it is unknown whether this is also true for IPV.

The purpose of this study was to determine the marginal increase in the use of health services (e.g., primary care, mental health care, hospital care) and accompanying healthcare costs among women with a current or past history of IPV compared to women without a reported history of IPV in a longitudinal cohort of women insured through a large mixed model health maintenance organization (HMO). Health care utilization and associated costs were hypothesized to be higher for women with IPV, both during the period of abuse as well as for some time after abuse ended, compared with women who reported never experiencing IPV.

Methods

Setting

This study was conducted at Group Health Cooperative (GHC), the sixth largest nonprofit HMO and the largest consumer-governed HMO in the United States, serving approximately 550,000 enrollees in Washington State and northern Idaho. The study was approved by GHC’s human subjects review board.

Sociodemographic characteristics of the GHC population are generally similar to those in the surrounding area. However, the GHC population is more highly educated, and Whites are slightly overrepresented and Asians slightly underrepresented compared to the surrounding area. Fewer enrollees of GHC live in rural settings compared to the state as a whole. Approximately 9% of Group Health enrollees under age 65 have insurance through Medicaid or the Washington Basic Health Plan for the medically indigent. Enrolleeship in Group Health is relatively stable over time, with only 15% of enrollees leaving each year.

Study Population

Recruitment. A random sample of women enrollees aged 18–64 were sent a letter and information sheet explaining the study, inviting participation and informing potential participants to expect a phone call. The study was presented as one that broadly assessed women’s health rather than IPV specifically to protect women who may have been residing with their abuser. Those who did not decline in response to the letter were contacted by phone, the study was explained, and then agreement to participate was obtained and recorded at the time of the phone call. Participants were given $25 to partially recompense their time. The telephone survey was administered using a computer-assisted telephone interview program that incorporated complex branching logic and score responses.\textsuperscript{22} The final survey took a mean of 33.1 minutes (SD=9.9) to complete. The response rate for eligible women was 56.4%, with 28.9% refusals and 14.7% who could not be contacted. This resulted in 3333 women who completed interviews and form the population for this report. Further details of the sampling and recruitment process are available elsewhere.\textsuperscript{23}

To assess potential bias and evaluate the generalizability of study results, the Human Subjects committee approved access to additional data on nonrespondents. Compared to the respondents, nonrespondents were younger (43.1 vs. 45.3 years), but enrolled at GHC a similar length of time (7.9 vs. 8.2 years). Using adjusted clinical group (ACG) scores to summarize healthcare resource utilization in the year prior to the survey, nonrespondents were more likely to be nonusers of healthcare services (14.5% vs. 7.1%) compared to respondents. Propensity scores were created using logistic regression to estimate the probability that a subject responded to the survey, based on age, length of enrollment at GHC, and healthcare utilization in the year prior to the survey. The estimated probability of study participation was similar for women exposed to IPV compared to women who reported no IPV (0.58 vs. 0.57). These analyses indicate that nonresponse should not bias the estimated effects of exposure to IPV on cost and utilization.

Study Sample. For this utilization and cost analysis, only those women aged 18 to 64 at sampling and who were enrolled at GHC for at least 12 of the 41 calendar quarters preceding the calendar quarter of sampling were included. Enrollees were sampled between June 19, 2003 and May 6, 2005, as described previously.\textsuperscript{23} A woman’s starting date for the assessment of cost and utilization data was January 1, 1991, or her first quarter of enrollment in the health plan as an adult (aged ≥18 years) during the January 1, 1991 to June 30, 2003 period, whichever was later. The ending date for the assessment was December 31, 2002, or date of last disenrollment in the plan. A woman could have more than one start and stop date if she disenrolled and then re-enrolled in the health plan between 1991 and 2002. To account for varying times of enrollment and follow-up, data were divided by quarters of time enrolled in GHC. If the woman was enrolled for at least 2 months of the quarter, it was counted as a full quarter. Data analysis examined annual utilization, and used the woman-year as the unit of analysis. For a woman-year to be included in the analysis, it was required that a woman be enrolled for all four quarters in the calendar year. On average, women contributed 7.4 years of utilization data.

Definitions and Survey Instruments

Intimate partner violence was defined as physical, sexual, or psychologic violence between adults aged 18–64 years who were present or past sexual/intimate partners, in heterosexual or homosexual relationships. Intimate partners were defined as current or former spouses, nonmarital partners, or dating partners in relationships lasting longer than 1 week. In concert with current Centers for Disease Control and Preven-
tion definitions, an intimate partnership could have been present without a sexual relationship.24

Intimate partner violence was assessed using questions from the Behavioral Risk Factor Surveillance System (BRFSS) and the Women’s Experience with Battering (WEB) Scale.25,26 The five BRFSS questions assessed exposure to physical abuse, sexual abuse (forced intercourse or sexual touching), fear due to anger or threats of an intimate partner, and controlling behavior; these are scored dichotomously. This survey has been widely used in the United States.27–29 The 10-item WEB was used to assess battering resulting from a woman’s perceived loss of power and control due to interaction with her partner.30 Each item is scored on a 6-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). Scores greater than 20 (range, 10–60) are indicative of battering. Women were classified as experiencing IPV if (1) they reported physical, or sexual abuse, or threats, or chronic controlling behavior on the BRFSS questions, or (2) their score on the WEB for any partner was 20 or higher. The survey asked whether the respondent had an intimate partner since age 18, the gender of the partner, the current status of the partnership, and, if applicable, the beginning and ending years of each relationship. This information was gathered for up to three partners, after which respondents were asked to estimate how many intimate partners they had in their adult lifetime. These data provided complete intimate partnership history for the past 5 years for 98.7% of all study subjects. As reported previously, approximately 77% of women with a history of IPV experienced physical and/or sexual abuse.23

Healthcare Utilization

Utilization was determined from automated transactional databases at GHC, from 1991 through 2002. Utilization for all insured services was captured by these databases including out-of-plan use for which bills were submitted to GHC. The automated data sources included visits to primary and specialty care providers, emergency and urgent care visits, acute care hospitalizations, behavioral health services, home care services, laboratory and radiologic services, and pharmaceutical utilization. These data are a key component of GHC’s clinical improvement efforts, and have been validated in a variety of research and clinical applications.31–36

Costs

Standardized cost data have been available for GHC enrollees since 1991. The cost system captures utilization information from 15 different systems at GHC on a monthly basis, calculating the precise cost for each unit of service delivered and assigning costs to patients based on the units of service they utilized. Key characteristics of the cost methodology are that actual costs from the general ledger are reported, overhead costs are fully allocated to patient care departments, total costs are reduced to the unit of service, and there is systematic verification of the automated data. This methodology has been used in a number of studies from GHC.37,38 All costs were adjusted to 2004 dollars using the medical care component of the Consumer Price Index for the Seattle–Tacoma–Everett Metropolitan Statistical Area (MSA).39

Data Analysis

The primary study comparison was based on lifetime exposure to IPV. Women were considered exposed to IPV if they were positive on the BRFSS or WEB survey during their adult lifetime. The comparison group included women who reported no IPV on the BRFSS or WEB; this group includes the 22% of women who reported never having an intimate partner because they are part of the general population of women at GHC. Health service utilization and costs collected during follow-up for women exposed to IPV, regardless of the timing of care relative to abuse, were compared to utilization and costs among women never exposed to IPV. All data analyses were conducted in 2006.

A secondary exposure measure related utilization to the timing of abuse. Each year of utilization data was characterized as occurring before, during, or after IPV exposure. The year that the woman reported first experiencing IPV as defined by the BRFSS or WEB questions was taken to signify the start of abuse. The end of IPV was identified as the year in which the last episode of abuse was reported to have occurred (this was the same as the year of the interview if abuse was ongoing). All utilization years between the start and end of abuse were characterized as “during” abuse. The “during” abuse period was not necessarily a continuous period of abuse, nor was it necessarily confined to one abuser. Utilization years after the end of abuse were characterized as “after” abuse. To examine the changes in utilization and costs after IPV ended, the “after” period was further subdivided into “recent IPV” (IPV ended within 5 years of the date of utilization) and “remote IPV” (IPV ended more than 5 years before the date of utilization). All utilization data occurring prior to abuse were excluded from this portion of the analysis. For women not reporting IPV, the utilization period was the entire time between the individual’s enrollment start and stop dates, defined above.

To adjust for comorbid conditions that were not related to IPV but which may differ in their distribution between IPV and the non-IPV cohorts, a limited set of Adjusted Diagnosis Groups (ADGs), the base components of the ACG case-mix adjustment system, were utilized.40–42 ADGs are 32 resource-based morbidity groupings that correspond to the constellation of ambulatory and inpatient ICD-9-CM diagnoses coded by healthcare personnel. The ACG system has been shown to explain 40% to 50% of concurrent and 10% to 20% of the prospective variance in health service costs among adults.41–45 Because ADGs categorize morbidity based on diagnoses over an extended period of time (typically 1 year), for a woman to contribute to a year, she must have been enrolled at GHC for all four quarters of that year. For each utilization year, ACGs were assigned using diagnoses recorded over all 12 months in the year. To avoid overadjusting for IPV-related morbidities, the limited set of major ADGs that are highly related to utilization and healthcare costs but that are unlikely to be related to IPV were used. These included the ADGs related to: time-limited major conditions, time-limited major primary infections, likely to recur or progressive conditions, unstable chronic medical and surgical conditions, and malignancy.

To improve the precision of estimated exposure effects and control for potential confounding, all multivariable models adjusted for age, education, and select ADG comorbidity
indicators (as described above). Age was included in the models as a series of indicator variables for 5-year age categories, to allow for a nonlinear association between age and healthcare costs and utilization.

The unit of analysis was the woman-year, with women contributing up to 11 years of utilization data (mean 7.4 years). To account for within-woman correlation across utilization years, generalized estimating equations (GEE) with robust standard error estimates assuming an independent working correlation were used. For outcomes assessing "any use" of health services, odds ratios were estimated using GEE with logit link and binomial errors. For counts of healthcare utilization within each component of care and for each of the cost outcomes, regression models were used to estimate rate ratios using a log link and a gamma error distribution.

Results

Among the 3333 study participants, 1546 women had a history of IPV since age 18 and 1789 women had no history of IPV; they were followed for a mean of 7.3 (SD=3.7) and 7.5 (SD=3.7) years, respectively. Among the women with a history of IPV, 87% reported that the last episode of abuse was in a different calendar year than the interview. Among these women, the mean time between ending of IPV and time of the interview was 16.0 (SD=10.5) years. Women reporting IPV were slightly older, had somewhat lower household incomes, and were slightly more likely to be working at the time of interview than women without a history of IPV (Table 1).

Service Utilization

Compared to women without IPV, women with IPV were more likely to use mental health services, substance abuse services, hospital outpatient visits, emer-

### Table 1. Characteristics of the women at time of survey, by IPV exposure

<table>
<thead>
<tr>
<th></th>
<th>No IPV</th>
<th>IPV ever</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=1787</td>
<td>n=1546</td>
<td></td>
</tr>
<tr>
<td>Mean age at survey</td>
<td>46.4 (11.5)</td>
<td>47.6 (10.3)</td>
<td>0.001</td>
</tr>
<tr>
<td>(years, SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household income (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;$25,000</td>
<td>7.9</td>
<td>12.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>$25,000–$49,999</td>
<td>25.1</td>
<td>31.3</td>
<td></td>
</tr>
<tr>
<td>$50,000–$74,999</td>
<td>27.5</td>
<td>26.1</td>
<td></td>
</tr>
<tr>
<td>≥$75,000</td>
<td>39.5</td>
<td>30.5</td>
<td></td>
</tr>
<tr>
<td>Employed at least part time (%)</td>
<td>80.2</td>
<td>83.0</td>
<td>0.04</td>
</tr>
<tr>
<td>High school graduate or less (%)</td>
<td>11.2</td>
<td>12.0</td>
<td>0.45</td>
</tr>
<tr>
<td>White (%)</td>
<td>82.1</td>
<td>83.6</td>
<td>0.27</td>
</tr>
<tr>
<td>Have children in the home (%)</td>
<td>33.5</td>
<td>34.1</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Number of intimate partners, lifetime (%)

<table>
<thead>
<tr>
<th></th>
<th>No IPV</th>
<th>IPV ever</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=1787</td>
<td>n=1546</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>4.1</td>
<td>0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1–2</td>
<td>70.5</td>
<td>39.4</td>
<td></td>
</tr>
<tr>
<td>3 or more</td>
<td>25.4</td>
<td>60.6</td>
<td></td>
</tr>
</tbody>
</table>

IPV, intimate partner violence; SD, standard deviation.

### Table 2. Annual healthcare costs and utilization for women with and without a history of IPV, by timing of IPV

<table>
<thead>
<tr>
<th></th>
<th>No IPV</th>
<th>IPV ever</th>
<th>During IPV</th>
<th>Recent IPV</th>
<th>Remote IPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of woman-years</td>
<td>13,359</td>
<td>113,319</td>
<td>2926</td>
<td>1383</td>
<td>6447</td>
</tr>
<tr>
<td>Follow-up time, mean (SD)</td>
<td>7.48 (3.74)</td>
<td>7.32 (3.67)</td>
<td>1.89 (3.39)</td>
<td>0.89 (1.57)</td>
<td>4.17 (4.34)</td>
</tr>
</tbody>
</table>

Any utilization of services

<table>
<thead>
<tr>
<th></th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health services</td>
<td>7.3</td>
<td>13.7</td>
<td>18.9</td>
<td>13.5</td>
<td>11.4</td>
</tr>
<tr>
<td>Alcohol/drug services</td>
<td>0.2</td>
<td>1.0</td>
<td>1.5</td>
<td>1.1</td>
<td>0.7</td>
</tr>
<tr>
<td>Inpatient admits</td>
<td>4.7</td>
<td>5.3</td>
<td>5.5</td>
<td>7.5</td>
<td>4.6</td>
</tr>
<tr>
<td>Hospital outpatient visits</td>
<td>8.3</td>
<td>10.2</td>
<td>9.8</td>
<td>10.3</td>
<td>10.6</td>
</tr>
<tr>
<td>Emergency department visits</td>
<td>3.8</td>
<td>5.9</td>
<td>6.9</td>
<td>5.9</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Number of visits/prescriptions

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary care</td>
<td>2.9 (2.8)</td>
<td>3.4 (3.3)</td>
<td>3.6 (3.3)</td>
<td>3.5 (3.6)</td>
<td>3.3 (3.2)</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>11.4 (14.3)</td>
<td>14.5 (18.4)</td>
<td>14.7 (18.5)</td>
<td>12.7 (14.7)</td>
<td>15.1 (19.4)</td>
</tr>
<tr>
<td>Specialty care</td>
<td>1.4 (2.5)</td>
<td>1.6 (2.9)</td>
<td>1.7 (3.1)</td>
<td>1.5 (2.4)</td>
<td>1.6 (2.9)</td>
</tr>
</tbody>
</table>

Costs for services (2004 dollars)

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary care costs</td>
<td>488 (566)</td>
<td>587 (873)</td>
<td>597 (628)</td>
<td>582 (693)</td>
<td>593 (1015)</td>
</tr>
<tr>
<td>Pharmacy costs</td>
<td>378 (915)</td>
<td>488 (1056)</td>
<td>489 (908)</td>
<td>395 (695)</td>
<td>522 (1204)</td>
</tr>
<tr>
<td>Specialty costs</td>
<td>338 (888)</td>
<td>410 (972)</td>
<td>401 (850)</td>
<td>392 (751)</td>
<td>421 (1069)</td>
</tr>
<tr>
<td>Laboratory costs</td>
<td>68 (129)</td>
<td>79 (164)</td>
<td>82 (119)</td>
<td>80 (117)</td>
<td>77 (188)</td>
</tr>
<tr>
<td>Radiology costs</td>
<td>165 (465)</td>
<td>200 (519)</td>
<td>192 (484)</td>
<td>177 (549)</td>
<td>212 (541)</td>
</tr>
<tr>
<td>Inpatient costs</td>
<td>374 (2822)</td>
<td>418 (2762)</td>
<td>352 (1832)</td>
<td>552 (2476)</td>
<td>430 (3223)</td>
</tr>
<tr>
<td>Total costs</td>
<td>2511 (5443)</td>
<td>2892 (5854)</td>
<td>2856 (4281)</td>
<td>2947 (5337)</td>
<td>2945 (6667)</td>
</tr>
</tbody>
</table>

*Ever: IPV occurrence within the woman's adult lifetime (aged 18–64 years).

*During: time period in which IPV occurred, based on start and stop dates.

*Recent: IPV ended within 5 years of the date of service utilization.

*Remote: IPV ended more than 5 years prior to the date of service utilization.

*Total costs reported include several elements of health services used, such as durable medical equipment, home health use, and skilled nursing facility care that are not included in the detailed analysis. Therefore, the cost components that are reported do not sum to total costs.

IPV, intimate partner violence; SD, standard deviation.
gency department visits, and admission to acute inpa-
tient care during and after their IPV (Table 2). Women
reporting abuse also had 17% more primary care visits,
14% more specialist visits, and 27% more prescription
fills.

The proportion of women using mental health,
substance abuse, and emergency department (ED)
services decreased with cessation of IPV, and further
decreased over time after IPV ceased (Table 2). In
contrast, the proportion with hospital outpatient visits
and inpatient admissions tended to increase after IPV
had ended. However, even for women whose IPV ended
more than 5 years before the date of utilization, health
care use was still higher in nearly all categories for
women with IPV compared to those with no IPV.

After adjusting for calendar year, age, education,
and the presence of major unrelated illness, the odds ratio
of use for women with IPV ever was approximately 50%
higher for ED visits, twofold higher for mental health
visits, and sixfold higher for use of alcohol or drug
services (Table 3). The number of visits for primary and
specialty care and pharmacy use was 14% to 21%
higher in women with IPV ever compared to those with
no history of IPV. Rates of use were highest during the
period of IPV and decreased after cessation of IPV.
Nevertheless, even 5 years after the cessation of IPV,
women with a prior history of IPV still had significantly
higher use rates for all types of services except inpatient
hospital care (Table 3).

### Costs of Medical Care

Annual healthcare costs were higher in every service
category for women with a history of IPV ever com-
pared to those without IPV exposure (Table 2). Costs
of women with IPV were higher than comparison women
even 5 years after the cessation of IPV. However, unlike
utilization, some costs were higher after IPV ceased
than they were during the period of IPV occurrence.

After adjusting for calendar quarter, age, education,
and the presence of major unrelated illness, total
annual costs were 19% higher in women with IPV ever
compared to those with no history of IPV (Table 4).
This amounts to $439 annually per women with a
history of IPV at some point during their adult lives.
With the notable exception of inpatient hospital costs,

### Table 3. Adjusted* odds of healthcare utilization and adjusted rate ratios of annual number of utilizations for women with
and without a history of IPV, and by timing of IPV.

<table>
<thead>
<tr>
<th>Any utilization of services</th>
<th>IPV ever versus no IPV</th>
<th>During versus no IPV</th>
<th>Recent versus no IPV</th>
<th>Remote versus no IPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health services</td>
<td>1.98 (1.69–2.32)</td>
<td>2.79 (2.29–3.40)</td>
<td>1.89 (1.48–2.41)</td>
<td>1.66 (1.37–2.00)</td>
</tr>
<tr>
<td>Alcohol/drug services</td>
<td>6.01 (3.59–10.06)</td>
<td>9.05 (4.77–17.10)</td>
<td>6.79 (2.97–15.55)</td>
<td>4.34 (2.38–7.91)</td>
</tr>
<tr>
<td>Inpatient admits</td>
<td>1.01 (0.88–1.16)</td>
<td>0.97 (0.78–1.19)</td>
<td>1.26 (0.98–1.60)</td>
<td>0.99 (0.83–1.17)</td>
</tr>
<tr>
<td>Hospital outpatient visits</td>
<td>1.16 (1.04–1.31)</td>
<td>1.15 (0.95–1.38)</td>
<td>1.16 (0.93–1.46)</td>
<td>1.20 (1.05–1.37)</td>
</tr>
<tr>
<td>Emergency department visits</td>
<td>1.54 (1.33–1.78)</td>
<td>1.78 (1.45–2.20)</td>
<td>1.47 (1.13–1.90)</td>
<td>1.47 (1.23–1.75)</td>
</tr>
</tbody>
</table>

### Table 4. Adjusted* ratio of annual healthcare costs (2004 dollars) for women with and without a history of IPV and by
timing of IPV.

<table>
<thead>
<tr>
<th>Any utilization of services</th>
<th>IPV ever versus no IPV</th>
<th>During versus no IPV</th>
<th>Recent versus no IPV</th>
<th>Remote versus no IPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary care</td>
<td>1.21 (1.13–1.30)</td>
<td>1.23 (1.15–1.32)</td>
<td>1.22 (1.13–1.31)</td>
<td>1.13 (1.07–1.19)</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>1.21 (1.13–1.30)</td>
<td>1.21 (1.13–1.45)</td>
<td>1.23 (1.11–1.36)</td>
<td>1.18 (1.09–1.28)</td>
</tr>
<tr>
<td>Specialty care</td>
<td>1.14 (1.06–1.21)</td>
<td>1.21 (1.09–1.35)</td>
<td>1.14 (1.01–1.29)</td>
<td>1.10 (1.02–1.19)</td>
</tr>
</tbody>
</table>

Cost ratios in which the 95% CI excludes 1 are indicated by bold type.

*Adjusted: calendar year, age, education, select ADGs.

ADG, adjusted diagnosis groups; CI, confidence interval; IPV, intimate partner violence; IRR, incidence rate ratio; OR, odds ratios.

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Am J Prev Med 2007;32(2) 93
Discussion

This study’s findings indicate that IPV had a substantial impact on healthcare service use and costs. Women with a history of IPV had increased utilization across all types of health services, translating into 19% higher annual costs than women without a history of IPV. These increased healthcare costs were, in general, greatest during the period of IPV, and persisted for more than 5 years after IPV had ended. When examined in the light of the prevalence for IPV of 44% of women at some time during their adult lifetimes, the impact on a health plan is substantial. Assuming an IPV prevalence of 44%, for every 100,000 women enrollees, IPV is responsible for $19.3 million in “excess” healthcare costs each year.

There have been prior studies of healthcare utilization and costs related to IPV, but none with longitudinal data. Coker reported that women with more severe IPV had twice the utilization and costs compared to women with no IPV; women with less severe IPV did not have increased utilization or costs. This study, however, was limited to women covered by Medicaid, while this study population included women insured by a variety of plans, including Medicaid. A study in New Zealand found inconsistent increases in healthcare utilization associated with a lifetime history of IPV. In Australia, a lifetime history of IPV was associated with a 10% to 36% higher risk of increased healthcare utilization. Wisner found that victims of IPV had 92% higher overall costs than general female enrollees in a health plan; however, the study was limited only to women with a documented mental health visit for IPV. The prior study on medical care utilization in the same HMO reported here was also limited to cases identified by diagnoses documented in the medical record, which severely underestimates the prevalence of IPV. Two studies using data from the National Violence Against Women Survey did not examine annual healthcare costs, nor did they compare costs to those in women without IPV. Sadler reported no increased healthcare utilization associated with IPV after other risk factors have been taken into account, although this was limited to women who had served in the military.

This study was designed to avoid limitations of prior studies. It used a random sample of women from a large health plan that was demographically representative of the community. IPV was identified through a detailed interview, using broad definitions from widely used questionnaires. Healthcare costs were determined from documented healthcare utilization rather than relying on self-report. Women were followed for a mean of 7 years, yielding sufficient data to accurately assess their long-term healthcare utilization. Nevertheless, there were certain limitations to the study. The study population is very similar to that of the MSA, but is not necessarily representative of a lower income or minority population of women. This is a longitudinal cohort study in which the cost and utilization data were prospectively collected at the time of care; however, IPV history was collected retrospectively and in some cases, many years after IPV had ended. The number of women-years in whom cost and utilization data were available before the IPV was reported to have started was very small because data were available starting in 1991 only, and IPV was reported by most women as starting before this time. In 5% to 9% of women, abuse lasted more than 20 years. The analysis did not control for income and employment status both because these may have been affected by the occurrence of IPV and because these data were collected only at the time of the survey, which in many cases was remote from the occurrence of IPV. Education was used as a method of adjusting for socioeconomic status because this is a more stable variable. The “during abuse” period was composed for some women of a single period of abuse, while for other women it represented two or more periods of abuse, separated by periods without abuse. In addition, 21% of abused women reported abuse by more than one partner.

Intimate partner violence appears similar to child abuse and other forms of child adversity in which the affects on health and health resource utilization persist indefinitely. For example, Walker studied women at a mean age of 42 years in this same HMO and found that those who reported being abused or neglected as a child had significantly higher healthcare costs than those who did not report abuse. This pattern is different from some other types of behavioral problems, such as alcohol and tobacco use, in which increased healthcare costs decrease in the long term following cessation of use. Untreated alcohol and substance abusers in some studies have been shown to have healthcare costs about twice that of age and gender matched peers. Alcohol abuse treatment results in lowering of healthcare costs to levels prior to the escalation in costs seen with worsening alcohol abuse and dependence.

Aside from the human toll, the resource and economic burden on health systems from IPV is clearly demonstrated in this study. The adjusted estimate of the excess annual marginal costs from IPV amount to $439 for each abused woman in a health plan. The potential for cost savings from intervention programs is thus great. Routine screening can lead to increased identification of IPV, and interventions such as protection orders can reduce the risk of recurrent IPV by 50%. Implementation of systems for preventing IPV and lessening its consequences are warranted.
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References

Benenson Distinguished Lecture

Donald A. Henderson, MD, MPH, will be the honored guest speaker for the inaugural Benenson Distinguished Lecture, to be held on April 13, 2007, in conjunction with the 25th anniversary of the San Diego State University Graduate School of Public Health.

Honoring Abram S. Benenson, MD, for his years of service to the world, for his work in the areas of public health, military medicine, and "shoe-leather" epidemiology, the lecture series will be an annual event at the GSPH.

Check the SDSU GSPH website at http://publichealth.sdsu.edu/eventsmain.php for details of the 25th anniversary celebration events and the specific time for the Benenson Distinguished Lecture.