Lowering the Threshold for Discussions of Domestic Violence

A Randomized Controlled Trial of Computer Screening

Karin V. Rhodes, MD; Melinda Drum, PhD; Elizabeth Anliker, BA; Richard M. Frankel, PhD; David S. Howes, MD; Wendy Levinson, MD

Background: Women experiencing domestic violence (DV) frequent health care settings, but DV is rarely identified.

Methods: We conducted a randomized controlled trial to determine the effect of computer screening on health care provider–patient DV communication at 2 socioeconomically diverse emergency departments (EDs). Consenting nonemergent female patients, aged 18 to 65 years, were randomized to self-administered computer-based health risk assessment, with a prompt for the health care provider, or to "usual care"; all visits were audiotaped. Outcome measures were rates of DV discussion, disclosure, and services.

Results: Of 2169 eligible patients, 1281 (59%) consented; 871 (68%) were successfully audiotaped, and 903 (71%) completed an exit questionnaire. Rates of current DV risk on exit questionnaire were 26% in the urban ED and 21% in the suburban ED. In the urban ED, the computer prompt increased rates of DV discussion (147/262 [56%] vs 123/275 [45%]; $P=.004$), disclosure (37/262 [14%] vs 23/275 [8%]; $P=.07$), and services provided (21 [8%] vs 10 [4%]; $P=.04$). Women at the suburban site and those with private insurance or higher education were much less likely to be asked about experiences with abuse. Only 48% of encounters with a health care provider prompt regarding potential DV risk led to discussions. Both inquiries about and disclosures of abuse were associated with higher patient satisfaction with care.

Conclusions: Computer screening for DV increased but did not guarantee that DV would be addressed during ED encounters. Nonetheless, it is likely that low-cost interventions that allow patients the opportunity to self-disclose can be used to improve detection of DV.

Arch Intern Med. 2006;166:1107-1114

Author Affiliations:
Department of Medicine, Section of Emergency Medicine (Drs Rhodes and Howes and Ms Anliker) and Department of Health Studies (Dr Drum), University of Chicago, Chicago, Ill; Indiana University School of Medicine, Regenstrief Institute, Health Services Research and Development, and Richard L. Roudebush Veterans Affairs Medical Center, Indianapolis (Dr Frankel); and Department of Medicine, University of Toronto, Toronto, Ontario (Dr Levinson). Dr Rhodes is now with the Department of Emergency Medicine, University of Pennsylvania Hospital, Philadelphia.

DOMESTIC VIOLENCE (DV) is a major cause of morbidity and mortality for women.[1-4] While evidence-based reviews do not support routine screening,[5-7] there is qualitative evidence from abuse survivors that identification by health care providers is both desirable and helpful.[8-11] Indeed, failure to recognize DV may result in missed diagnoses, unnecessary testing,[12,13] and high rates of health care utilization.[14-16] However, these potential opportunities to intervene are frequently missed owing to health care provider reluctance to initiate discussions about sensitive issues.[17-19] Likewise, abused women are unlikely to volunteer the information unless specifically asked.[20,21] The end result is silence between patients and health care providers.

Victims of DV often seek care in emergency departments (EDs),[22-24] but this setting is particularly challenging due to time pressures and the urgency of unscheduled care.[25,26] Trained and dedicated staff can increase identification and referrals for DV, but these effects have not been sustainable.[27,28] One well-designed system-change model improved health care provider attitude, knowledge, beliefs, and screening behavior without increasing the number of identified DV cases.[29] Computer-based health risk assessment has the potential for patient self-disclosure, allowing the health care provider to focus on assessment and referral. Patients are more likely to disclose sensitive and illegal behaviors on computer-based surveys than on paper questionnaires or personal interviews.[30-34] Ideally, computer screening could take advantage of patients' waiting time to provide valuable information about a variety of health risks. The goals of this study were to assess rates of computer-based DV disclosure at 2 socioeconomically diverse sites and to determine the effect of computer screening on DV communication between patients and health care providers during the course of the ED visit.

Table 1. Distribution by Site of Positive Responses on Domestic Violence Exit Questionnaire*

Question	Urban (n = 578)	Suburban (n = 325)	Total (n = 903)	*P* Value
Current emotional abuse (asked only if in a relationship)†	109 (19)	43 (13)	152 (17)	.03
1. Does your partner try to control your life?				
2. Does your partner try to keep you away from your family or friends?				
3. Does your partner insult you or put you down?				
4. Are you afraid to disagree with your partner?				
Current physical abuse‡	72 (12)	23 (7)	95 (11)	.01
5. Has your partner ever physically hurt you?				
6. Have you EVER been physically hurt by a partner (if current partner or within last year)?				
Sexual abuse by current partner	20 (3)	4 (1)	24 (3)	.05
7. Have you ever been made to have sex when you didn't want to? Did this happen with a current partner?				
Threat	41 (7)	15 (5)	56 (6)	NS
8. Do you feel threatened by a current or former partner?				
Current domestic abuse (emotional, physical, sexual, threat)§	151 (26)	67 (21)	218 (24)	.06
Lifetime domestic abuse (current emotional, physical, sexual, threat, or history of physical domestic violence)‖	226 (39)	101 (31)	327 (36)	.02

Abbreviation: NS, not significant.
*Unless otherwise indicated, data are reported as number (percentage) of subjects. There were no differences within each site by group assignment.
†Positive reply to any of questions 1 through 4.
‡Positive reply to question 5 or 6.
§Positive reply to any of questions 1 through 5, 7, or 8.
‖Positive reply to any of questions 1 through 8.

METHODS

Between June 2001 and December 2002, we conducted a randomized controlled trial of a self-administered computer-based health risk assessment tool (Promote Health Survey),[35] which generates health recommendations for patients and alerts physicians to a variety of potential health risks, including DV. Our primary outcomes, assessed by audiotape analysis, were rates of discussion of DV, patient disclosure of DV to the health care provider, and evidence of DV services provided during the visit, defined as a safety assessment, counseling by the health care provider or social worker, or referrals to DV resources. Secondary outcomes were medical chart documentation of DV screening (positive or negative), DV "case finding" (chart documentation of current or past DV), and overall patient satisfaction assessed by exit questionnaire.

SITES

The study was conducted at 2 socioeconomically diverse EDs: an urban academic medical center that serves a predominately publicly insured inner-city African American population, and a suburban community hospital serving a privately-insured suburban white population. Both EDs are part of the same emergency medicine residency training program and participate in joint educational conferences, including annual training about DV. Health care providers were informed that the study objective was to study the effect of a computer prompt on DV communication and were encouraged to screen all women for abuse. Participating health care providers and patients signed written consent, and the institutional review boards of both hospitals approved the protocol.

PATIENT RECRUITMENT AND DATA COLLECTION

Women aged 18 to 65 years and triaged as medically nonemergent were recruited sequentially from the ED waiting rooms for a study of physician-patient communication. Consenting patients were randomly assigned in a 1:1 ratio to usual care or to the DV Promote Health Survey. Treatment assignment was ascertained by the research assistant by opening sealed randomization envelopes in sequential order; the envelopes were prepared from a randomization list generated by computer in blocks of size 10 to ensure balance between groups over short time spans, such as shifts and days of the week, as well as over the entire course of the study. The Promote Health Survey solicited information about lifestyle and health risks and generated a 1-page summary of patient risks, which was stapled to the chart during the ED visit. All patients consented to audiotaping of their entire ED visit and to an exit questionnaire before leaving the ED. Digital audio recorders were attached to intravenous drip poles that traveled with the patient. Audiotapes were subsequently edited to remove all names and non–health care provider–patient conversations; a 7-hour ED visit might be edited to 20 minutes of actual health care provider–patient interaction.

SURVEY INSTRUMENTS

The development and testing of the computer-based Promote Health Survey, which served as our intervention, has been described previously.[35] Patients completed the survey on a touch-screen computer in a private room. If the patient answered "Yes" to any of the DV risk questions listed in **Table 1**, "Physician to Assess Risk" box at the top of the computer-generated report said *"Possible partner violence: Assess for current abuse"* and suggested referral options. The DV screen (also completed by both groups on the exit questionnaire) was derived from the previously validated questionnaires, the Abuse Assessment Screen[36,37] and Partner Violence Screen,[38] and modified after cognitive interviewing and field testing. A woman was considered to be at potential risk for current DV if the abuse happened within the last year or involved a current partner. Because there is no gold standard for DV, health care providers were told that positive responses were risk factors for DV and should prompt an assessment.

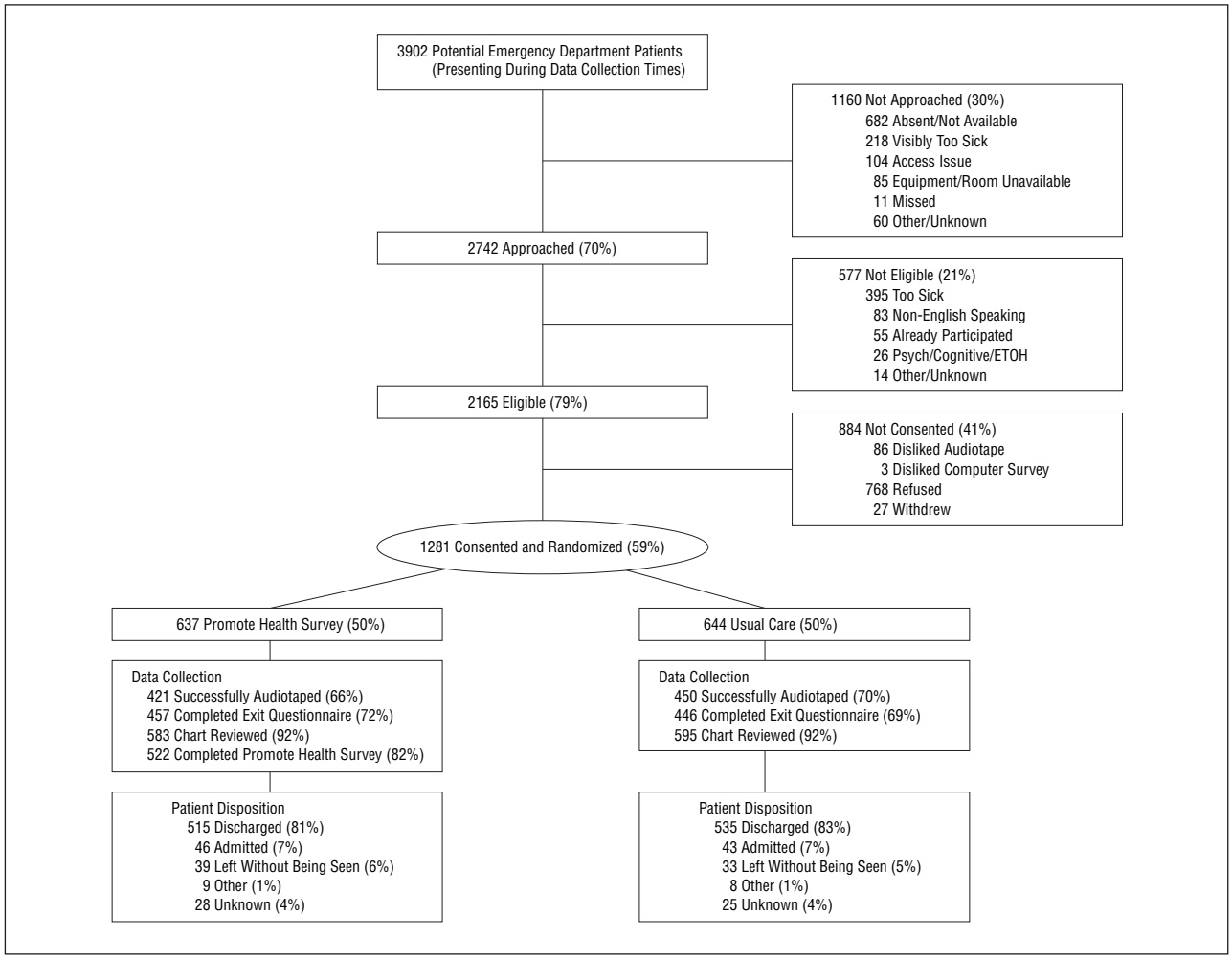

Figure. Study flow diagram. Psych indicates psychological reasons; ETOH, alcohol use.

AUDIO CODING

A structured audiotape coding scheme was developed by 4 of us by independently listening to 30 tapes, comparing results, and reaching consensus in an iterative fashion, a well-accepted qualitative research technique.[39] Research assistants, blinded to group assignment, were trained using a coding manual, sample cases, and self-testing until 100% agreement was reached with the investigators. To monitor coding quality, approximately 10% of all recordings were double coded. Agreement was 87% for mention of DV and 95% for patient disclosure of DV.

MEDICAL CHART REVIEW

Charts of all enrolled patients were coded using a structured chart abstraction form to assess evidence of DV documentation. To monitor chart abstraction quality, 10% of all charts were doubly abstracted. Agreement was 85% for DV screening ("positive," "negative," or "not screened"). Case finding was defined as chart documentation of a positive screen finding.

STATISTICAL ANALYSIS

The primary analysis evaluated the effect of the randomized intervention, the Promote Health Survey, within each site, on audiocoded rates of DV discussion, disclosure, and services, using mixed logistic regression models[40,41] with intervention as the fixed effect of interest and primary provider as a random effect, entered to adjust standard errors of the intervention effect for correlation due to clustering of patients within providers. If this correlation were 0, the mixed logistic model would be equivalent to a univariate logistic model or a χ^2 test. A subgroup analysis of the intervention effect was conducted on patients reporting DV risk on the exit questionnaire. All tests of intervention effect were conducted as intent-to-treat analyses. Multivariate logistic regression models were used to evaluate simultaneous effects of the Promote Health Survey intervention, ED site, and patient characteristics on the DV audio outcomes and on chart documentation of DV screening. Two-sample t tests and χ^2 tests were used to compare patient characteristics and rates of patient disclosure of DV on exit questionnaire between sites, as well as associations between patient satisfaction (dichotomized as "very satisfied" vs lower ratings) and DV discussion and disclosure. All analyses were conducted using STATA SE, version 8.2 (StataCorp, College Station, Tex).

RESULTS

We enrolled 1281 (59%) of 2165 eligible female patients who presented during data collection periods; 871 (68%) of these were successfully audiotaped; 903 (70%) completed an exit questionnaire, and 1178 charts were reviewed (92%). The **Figure** is a flowchart of all poten-

Table 2. Patient Characteristics by Site*

Characteristic	Urban (n = 883)	Suburban (n = 398)	Both Sites (n = 1281)	*P* Value
Age, mean (SD), y	32.1 (11.6)	36.2 (12.4)	33.3 (12.0)	<.001
Race				
African American	755 (86)	12 (3)	767 (60)	<.001
White	48 (5)	320 (80)	368 (29)	
Other	31 (4)	60 (15)	91 (7)	
Unknown	49 (6)	6 (2)	55 (4)	
Education				
<High school diploma	114 (13)	18 (5)	132 (10)	<.001
High school or equivalent	190 (22)	41 (10)	231 (18)	
>High school	334 (38)	282 (71)	616 (48)	
Unknown	245 (28)	57 (14)	302 (24)	
Income, $				
<20 000	305 (53)	57 (18)	362 (40)	<.001
20 000-39 999	134 (23)	86 (26)	220 (24)	
40 000-79 999	53 (9)	94 (29)	147 (16)	
≥80 000	11 (2)	57 (18)	68 (8)	
Unknown	75 (13)	31 (10)	106 (12)	
Insurance				
Private	245 (28)	259 (65)	504 (39)	<.001
Medicaid/Medicare	407 (46)	34 (9)	441 (34)	
Self-pay	127 (14)	12 (3)	139 (11)	
Other or unknown	104 (12)	93 (23)	197 (15)	
Marital status				
Married	100 (11)	169 (43)	269 (21)	<.001
Divorced, separated, or widowed	115 (13)	54 (14)	169 (13)	
Single	451 (51)	122 (31)	573 (45)	
Unknown	218 (25)	53 (13)	270 (21)	
Reason for visit				
Medical	601 (68)	196 (49)	797 (62)	<.001
Injury	66 (7)	175 (44)	241 (19)	
Gynecological or urinary	204 (23)	21 (5)	225 (18)	
Other or unknown	12 (1)	6 (2)	18 (1)	
Patient disposition				
Left without being seen	62 (7)	10 (3)	72 (6)	<.001
Admitted	41 (5)	48 (12)	89 (7)	
Discharged	722 (82)	328 (82)	1050 (82)	
Other or unknown	58 (7)	12 (3)	70 (5)	

*Unless otherwise indicated, data are reported as number (percentage) of subjects. There were no differences within each site by group assignment.

tially eligible and approached patients and reasons for refusal or noncompletion. Generation of the health care provider prompt required completion of the computer survey, but 115 (18%) of the patients randomized to the computer program had the process interrupted, most frequently by being called for treatment. As a result, the full realization of our intervention was only 82%. For our primary outcomes, the analysis was based on the 871 complete audible audiotapes from 331 suburban and 540 urban encounters.

Table 2 lists the patient characteristics for the urban and suburban hospital EDs. Since there were no significant demographic differences by group assignment, we focus on differences by site. As expected, women patients at the urban ED were younger (mean age, 32 years), predominantly African American (86%), unmarried (64%), and more likely to be living in poverty. Women at the suburban site had a mean age of 36 years, were predominantly white (80%), more likely to be married (43%), and to have higher levels of income, education, and private insurance.

Almost all eligible health care providers (101/104) gave consent to participate in the study; 80 of the consenting health care providers (30/39 attending physicians, 46/58 residents, and 4/4 nurse practitioners) had audiotapes used in the analysis. Participating health care providers were 74% white, 14% African American, and 12% Asian or other. The average ages of attending physicians, nurse practitioners, and residents were 44, 45, and 29 years, respectively.

Table 1 reports frequencies of positive responses to DV items on the exit questionnaire by site. Within sites, the intervention and control groups did not differ significantly in rates of current or lifetime DV disclosure. Of the 903 women completing the exit questionnaire, 151 (26%) of 578 at the urban ED and 67 (21%) of 325 at the suburban ED disclosed risk of current DV (current threat, control, isolation, insulted or put down, afraid to disagree, physically hurt, or forced into sex by partner). Lifetime prevalence of DV exposure was higher among women at the urban site (39% vs 31%). If a woman disclosed DV to the computer, 90% of the time she also disclosed DV on the exit questionnaire.

Table 3. Effect of Promote Health Survey Intervention on Audiotaped DV Discussion, Disclosure, and Receipt of DV Services by ED Site

Patient Category	Observed Rate*		Logistic Regression Estimate†	
	Intervention	Control	Odds Ratio (95% CI)	*P* Value
Urban ED	n = 262	n = 275		
DV discussion	147 (56)	123 (45)	1.99 (1.25-3.18)	.004
Any DV disclosure	37 (14)	23 (8)	1.71 (0.96-3.05)	.07
Any DV services	21 (8)	10 (4)	2.29 (1.04-5.02)	.04
Among DV-positive patients on EQ‡	n = 98	n = 90		
DV discussion	63 (64)	40 (44)	3.44 (1.52-7.79)	.003
Any DV disclosure	28 (29)	13 (14)	2.64 (1.20-5.81)	.02
Suburban ED	n = 159	n = 171		
DV discussion	17 (11)	16 (9)	1.12 (0.52-2.41)	.78
Any DV disclosure	5 (3)	5 (3)	0.96 (0.26-3.53)	.95
Any DV services	4 (2.5)	0		
Among DV-positive patients on EQ‡	n = 44	n = 49		
DV discussion	9 (20)	4 (8)	3.29 (0.75-14.5)	.12
Any DV disclosure	5 (11)	1 (2)	8.38 (0.68-103)	.10

Abbreviations: CI, confidence interval; DV, domestic violence; ED, emergency department; EQ, exit questionnaire.
*Unless otherwise indicated, data are reported as number (percentage) of subjects.
†Mixed logistic regression: logistic regression of outcome on intervention group, adjusted for clustering of patients within primary provider by entering primary provider as a random effect.
‡Among subgroup of patients with positive DV risk on EQ.

Our primary results, summarized in **Table 3**, show the effect of the computer intervention on rates of DV discussion, patient disclosure of DV risk to the health care provider, and receipt of DV services by site: overall and for the subset who disclosed DV on the exit questionnaire. At the urban ED, rates of DV discussion were higher in the intervention group (147/262 [56%]) than in the usual care group (123/278 [45%]) ($P=.004$); rates of patient disclosure of DV to the health care provider also tended to be higher in the intervention group (37/262 [14%] vs 23/278 [8%]) ($P=.07$). The number of patients who received DV services was small but significantly higher in the intervention group: 57% (n=21) of the 37 patients who disclosed DV in the intervention group compared with only 43% (n=10) of the 23 patients in the usual care group were given any counseling or verbal referral by the provider. At the suburban ED, the rate of DV discussion and thus disclosure was uniformly low in both groups (DV discussion, intervention vs control, 11% vs 9%; DV disclosure, 5% in both groups).

Overall, only 48% of audiotaped encounters during which patients disclosed DV risk to the computer led to a DV discussion. Only 17% of suburban compared with 61% of urban women disclosing DV on the computer had any mention of the topic during their visit. Among patients disclosing DV on exit questionnaire, those in the intervention group were both significantly more likely to have DV discussions and twice as likely to disclose DV to the health care provider. At the urban ED, the presence of a DV discussion was associated with patients being more likely to say they were "very satisfied" with their ED visit: 62% of patients who had any discussion of DV reported very high satisfaction compared with 50% of those for whom the topic did not arise ($P=.01$). This association was not observed at the suburban ED.

Chart documentation of DV screening and documentation of risk factors varied considerably between sites, but the effect of the intervention on these outcomes was not significant at either site.

The effects of patient characteristics, site, and the Promote Health Survey intervention on audio-coded DV discussion, DV disclosure to the health care provider, DV services, and chart documentation of DV screening are summarized in **Table 4**. In multivariate analysis, effects of the Promote Health Survey intervention are unmodified by patient characteristics and remain essentially the same as the unadjusted effects in Table 3. Rates of all outcomes were substantially and significantly higher at the urban ED. At both sites, higher rates of DV discussion were associated with less education, younger age, and presentation with gynecologic and/or urinary tract complaints. Rates of DV disclosure were lower at both sites when health care providers were caring for women with private insurance. Higher rates of disclosure were associated with younger age at the suburban site and lower education at the urban site. At the urban site, patients without insurance were more likely to receive DV services. Chart documentation of DV screening was strongly associated with being at the urban site, younger age, public or no insurance, and presenting with gynecologic and/or urinary complaints. Multivariate models for DV discussion and disclosure retained most factors that were significant in the univariate analysis. By contrast, age was the only significant factor in the multivariate model for chart documentation of DV screening.

COMMENT

We found that women at both urban and suburban sites were willing to disclose DV risks to a computer. However, computer screening increased rates of health care provider–patient DV communication at the urban ED only. This was accompanied by increases in disclosure

Table 4. Effects of Promote Health Survey Intervention and Patient Characteristics* on DV Outcomes From Logistic Regression Analysis

Evaluated Characteristic	ED Site	Odds Ratio† (95% CI)	*P* Value
Univariate Effects			
DV discussion on audiotape‡			
(n = 867; 303 cases)			
Site: urban vs suburban		4.39 (2.36-8.17)	<.001
Group: intervention vs control	Urban	2.05 (1.29-3.27)	.003
	Suburban	1.12 (0.52-2.44)	.77
Age: 10-y increments	Both	0.82 (0.69-0.97)	.02
Education			
<HS vs >HS	Urban	2.26 (1.15-4.43)	.02
HS vs >HS		1.86 (1.07-3.23)	.03
<HS vs >HS	Suburban	7.63 (1.90-30.7)	.004
HS vs >HS		0.57 (0.11-2.80)	.49
Insurance: private vs all other	Urban	0.69 (0.42-1.16)	.16
	Suburban	0.31 (0.13-0.76)	.01
Reason for visit: gynecologic/urinary	Both	2.26 (1.35-3.80)	.002
Any DV disclosure on audiotape‡			
(n = 867; 70 cases)			
Site: urban vs suburban		2.96 (1.28-6.83)	.01
Group: intervention vs control	Urban	1.70 (0.95-3.03)	.71
	Suburban	0.99 (0.27-3.57)	.99
Age: 10-y increments	Urban	0.88 (0.68-1.14)	.33
	Suburban	0.62 (0.44-0.87)	.01
Education: >HS vs ≤HS	Urban	0.52 (0.28-0.97)	.04
	Suburban	1.18 (0.23-6.07)	.84
Insurance: private vs all other	Both	0.31 (0.16-0.60)	.001
DV services on audiotape‡			
(n = 540, 31 cases)			
Group: intervention vs control	Urban§	2.29 (1.04-5.02)	.04
Insurance			
Medicare/Medicaid vs private	Urban§	1.79 (0.63-5.13)	.28
Self-pay vs private	Urban§	3.45 (1.06-11.3)	.04
Chart documentation of DV screening			
(n = 1135; 439 cases)			
Site: urban vs suburban		14.8 (9.39-23.3)	<.001
Group: intervention vs control	Urban	1.21 (0.92-1.59)	.18
	Suburban	0.82 (0.34-1.95)	.65
Age, 10-y increments	Both	0.75 (0.68-0.84)	<.001
Marital status: married	Urban	0.97 (0.63-1.51)	.90
	Suburban	0.43 (0.16-1.13)	<.09
Education: <HS vs ≥HS	Urban	1.23 (0.82-1.87)	.32
	Suburban	3.68 (0.96-14.2)	.06
Insurance: private vs all other	Both	0.45 (0.34-0.58)	<.001
Reason for visit: gynecologic/urinary	Both	1.83 (1.35-2.49)	<.001

(continued)

Table 4. Effects of Promote Health Survey Intervention and Patient Characteristics* on DV Outcomes From Logistic Regression Analysis (cont)

Evaluated Characteristic	ED Site	Odds Ratio† (95% CI)	*P* Value
Multivariate Effects‖			
DV discussion on audiotape			
(n = 862; 300 cases)			
Group: intervention vs control	Urban	1.85 (1.13-3.05)	.02
	Suburban	1.18 (0.49-2.83)	.71
Education			
<HS vs >HS	Urban	1.94 (0.97-3.88)	.06
HS vs >HS		1.65 (0.93-2.93)	.09
<HS vs >HS	Suburban	6.30 (1.52-26.2)	.01
HS vs >HS		0.51 (0.10-2.59)	.42
Insurance: private vs all other	Urban	0.83 (0.49-1.43)	.51
	Suburban	0.39 (0.15-1.01)	.05
Reason for visit: gynecologic/urinary	Both	1.92 (1.12-3.30)	.02
Any DV disclosure on audiotape‡			
(n = 862; 69 cases)			
Group: intervention vs control	Urban	1.79 (0.98-3.26)	.06
	Suburban	0.83 (0.21-3.44)	.80
Age: 10-y increments	Urban	0.98 (0.74-1.29)	.86
	Suburban	0.46 (0.22-0.96)	.04
Insurance: private vs all other	Both	0.34 (0.17-0.70)	.003
DV services on audiotape‡			
(n = 540; 31 cases)			
Group: intervention vs control	Urban§	2.52 (1.11-5.71)	.03
Insurance			
Medicare/Medicaid vs private	Urban§	1.85 (0.64-5.32)	.26
Self-pay vs private	Urban§	4.02 (1.21-13.4)	.02
Chart documentation of DV screening			
(n = 1127; 433 cases)			
Group: intervention vs control	Urban	1.21 (0.92-1.60)	.18
	Suburban	0.77 (0.32-1.84)	.55
Age: 10-y increments	Both	0.80 (0.72-0.90)	<.001

Abbreviations: CI, confidence interval; DV, domestic violence; ED, emergency department; HS, high school.

*Potential covariates: age, marital status, education, insurance, and reason for visit. Results are omitted from the table for factors that show no association with the outcome, with the exception of intervention group.

†Separate odds ratios for urban and suburban EDs are based on the interaction of site with the covariate. Odds ratios are presented separately for urban and suburban EDs whenever the magnitude or direction of the effect differs between sites, regardless of significance of the interaction term.

‡Mixed logistic regression model: logistic regression of outcome on intervention group, adjusted for clustering of patients within primary provider by entering primary provider as a random effect.

§Insufficient number of cases at suburban site (n = 4) to include in analysis.

‖Multivatiate models selection was conducted using backward elimination; initial model included all covariates with $P<.20$ in univariate analysis. Intervention group and the site × group interaction were included in all models.

to the health care provider and counseling and/or referrals, thus underscoring the potential of computer screening to have a positive effect on outcomes of care for abused women. To our knowledge, this is the first study to use audiotaping, as opposed to retrospective reports or chart documentation, to assess the rates and content of health care provider–patient DV interactions.

This study adds to the literature about interventions to increase DV screening.[42-44] While system changes such as chart prompts, staff training, incentives, and availability of advocacy services have been associated with increased DV documentation of screening,[25,27,29] the rates have not been sustained over time, nor have they necessarily resulted in more DV case identification or DV services.[29,45] In our study, women disclosed DV risk to a computer at rates comparable to those found in studies using dedicated screeners,[22,46,47] which supports the notion that computer health risk assessment has the potential to be a useful tool for achieving routine screening for DV.

Computer screening resulted in an overall 75% increase in the odds of DV discussion. This effect size is comparable in magnitude to that of other successful public health interventions, such as those prompting health care provider interventions for depression, alcohol abuse,

and smoking.[48-50] It is important to note that even small effect sizes can have large impacts if the prevalence rate of a condition is high in the population being served, as is the case with DV.[51] Nonetheless, DV was still grossly underaddressed in the demanding pace of the ED visit; in fewer than half of encounters in which there was a prompt to the health care provider of potential DV risk was there any mention of the topic.

While our study design does not allow us to identify the specific reasons why health care providers, particularly suburban health care providers, failed to address DV when prompted to do so, we can speculate that issues like patient profiling along with competing demands, limited time, personal discomfort, lack of privacy, and the complexity of dealing with a multifactorial problem like DV might all contribute to failing to implement computer-prompted recommendations for DV assessment. More research focused on understanding and reducing the gap between information and health care provider action will be necessary to address the patient-identified need for DV risk assessment and counseling.

Women at the suburban site disclosed only slightly less current DV risk on exit questionnaire than at the urban site, 21% vs 26%. However, ED health care providers were 70% less likely to ask women at the suburban site about experiences with abuse than their urban counterparts, even controlling for all observable patient characteristics. While we cannot separate out effects of site, race, and socioeconomic status because they were all highly correlated, this result still raises the possibility of a health care provider bias against addressing DV with more affluent white women. Concern for health care provider bias has been raised in both the DV and ED literature.[17,52] While biases may result from clinical experience, screening biases can become self-fulfilling.[53] Lane et al[54] found that minority children with accidental injuries were 3 times more likely to be evaluated for suspected abuse, resulting in higher rates of diagnosed fractures due to abuse. Sugg and Inui[17] found that physicians who came from white middle-class backgrounds assumed that patients with similar sociodemographic characteristics as themselves were unlikely to be at risk for DV. Our study was not designed to evaluate health care provider bias, but our results are consistent with a different approach to urban vs suburban women. The high prevalence of DV risk at both sites raises a general concern since the rates of DV discussion for all women were grossly inadequate.

It is of interest that patients with any DV inquiry or discussion had higher rates of satisfaction with their ED visit. Prior ED studies have found lower satisfaction with care among abused women.[55,56] The US Preventive Service Task Force raised the question of whether health care provider screening for DV could cause potential harm to the health care provider–patient relationship.[57] Our study would suggest that patient satisfaction might be improved by DV screening, even in the absence of DV disclosure to the health care provider.

This study has a number of important limitations. Audiotaping had the advantage of providing direct evidence, as opposed to indirect evidence available from chart review, but it may have created a participation bias; patients who were uncomfortable discussing sensitive issues might have declined to have their visit audiotaped. Audiotaping also may have caused a Hawthorne effect owing to the nonblinding of the intervention and, along with the potential for treatment diffusion, may have decreased our ability to detect differences between groups. Domestic violence conversations may have occurred that were not captured because we had loss of data from inaudible recordings. Finally, there may have been important system issues at each site that were not captured in our study but influenced the effect of our intervention.

Domestic violence is a highly prevalent condition, but detection in the ED remains elusive. We found that female patients will disclose their DV risk to a computer. Our study both supports the potential for computer screening to increase identification and referral for DV and raises the concern that ED physicians, particularly suburban physicians, may need additional training to adequately recognize and respond to chronic, complex psychosocial issues.

Accepted for Publication: December 22, 2005.
Correspondence: Karin V. Rhodes, MD, Department of Emergency Medicine, University of Pennsylvania Hospital, 3000 Spruce St, Ground Ravdin, Philadelphia, PA 10104 (rhodesk@uphs.upenn.edu).
Financial Disclosure: None.
Funding/Support: This project was funded by grant RO1 HS 11096-03 from the Agency for Healthcare Research and Quality. Dr Rhodes is also supported by grant K23/MH64572 from the National Institute of Mental Health, Bethesda, Md.
Acknowledgment: We wish to acknowledge the many people who have contributed to this project, particularly Michael Roizen, MD, Diane Lauderdale, PhD, Marshall Chin, MD, Jon Olsen, MD, Mary Guenther, MD, and the faculty, residents, staff, and patients of the University of Chicago Emergency Medicine Program, Chicago, Ill.

REFERENCES

1. Gazmararian JA, Lazorick S, Spitz AM, Ballard TJ, Saltzman LE, Marks JS. Prevalence of violence against pregnant women. *JAMA*. 1996;275:1915-1920.
2. Sutherland C, Bybee D, Sullivan C. The long-term effects of battering on women's health. *Womens Health*. 1998;4:41-70.
3. Coker AL, Smith PH, Bethea L, King MR, McKeown RE. Physical health consequences of physical and psychological intimate partner violence. *Arch Fam Med*. 2000;9:451-457.
4. Tjaden P, Thoennes N. *Prevalence, Incidence, and Consequences of Violence Against Woment: Findings From the National Violence Against Women Survey*. Washington, DC: National Institute of Justice and Centers for Disease Control and Prevention; 1998.
5. Ramsay J, Richardson J, Carter H, Davidson LL, Feder G. Should health professionals screen women for domestic violence? systematic review. *BMJ*. 2002; 325:314-318.
6. Nelson HD, Nygren P, McInerney Y, Klein J. Screening women and elderly adults for family and intimate partner violence: a review of the evidence for the US Preventive Services Task Force. *Ann Intern Med*. 2004;140:387-396.
7. MacMillan HL, Wathen CN; Canadian Task Force on Preventive Health Care. *Prevention and Treatment of Violence Against Women: Systematic Review And Recommendations*. London, Ontario: Canadian Task Force on Preventive Health Care; September 2001. Technical Report 01-4.
8. Gerbert B, Abercrombie P, Caspers N, Love C, Bronstone A. How health care providers help battered women: the survivor's perspective. *Women Health*. 1999; 29:115-135.

9. Gilbert B, Johnston K, Caspers N, et al. Experience of battered women in health care settings: a qualitative study. *Women Health*. 1996;24:1-7.
10. Rodriguez MA, Szkupinski Quiroga S, Bauer HM. Breaking the silence: battered women's perspectives on medical care. *Arch Fam Med*. 1996;5:153-158.
11. Weiss E. *Surviving Domestic Violence: Voices of Women Who Broke Free*. Scottsdale, Ariz: Agreka Books; 2000.
12. Drossman DA, Leserman J, Nachman G, et al. Sexual and physical abuse in women with functional or organic gastrointestinal disorder. *Ann Intern Med*. 1990; 113:828-833.
13. Haber JD, Roos C. Effects of spouse abuse in the development and maintenance of chronic pain in women. *Adv Pain Res Therapy*. 1985;9:889-895.
14. Ulrich YC, Cain KC, Sugg NK, Rivara FP, Rubanowice DM, Thompson RS. Medical care utilization patterns in women with diagnosed domestic violence. *Am J Prev Med*. 2003;24:9-15.
15. Sansone RA, Wiederman MW, Sansone LA. Health care utilization and history of trauma among women in a primary care setting. *Violence Vict*. 1997;12: 165-172.
16. Plichta S. The effects of woman abuse on health care utilization and health status: a literature review. *Womens Health Issues*. 1992;2:154-163.
17. Sugg NK, Inui T. Primary care physicians' response to domestic violence: opening Pandora's box. *JAMA*. 1992;267:3157-3160.
18. Kurtz D. Emergency department responses to battered women: resistance to medicalization. *Social Prob*. 1987;1:69-81.
19. Warshaw C. Limitations of the medical model in the care of battered women. *Gender Soc*. 1989;3:506-517.
20. Gerbert B, Bronstone A, Pantilat S, McPhee S, Allerton M, Moe J. When asked, patients tell: disclosure of sensitive health-risk behaviors. *Med Care*. 1999; 37:104-111.
21. Titus K. When physicians ask, women tell about domestic abuse and violence. *JAMA*. 1996;275:1863-1865.
22. Abbott J, Johnson R, Koziol-McLain J, Lowenstein SR. Domestic violence against women: incidence and prevalence in an emergency department population. *JAMA*. 1995;273:1763-1767.
23. Dearwater SR, Coben JH, Campbell JC, et al. Prevalence of intimate partner abuse in women treated at community hospital emergency departments. *JAMA*. 1998; 280:433-438.
24. Ernst AA, Nick TG, Weiss SJ, Houry D, Mills T. Domestic violence in an innercity ED. *Ann Emerg Med*. 1997;30:190-197.
25. Gremillion DH, Kanof EP. Overcoming barriers to physician involvement in identifying and referring victims of domestic violence. *Ann Emerg Med*. 1996;27: 769-773.
26. Larkin GL, Hyman KB, Mathias SR, et al. Universal screening for intimate partner violence in the emergency department: important patient and provider factors. *Ann Emerg Med*. 1999;33:669-675.
27. Krasnoff M, Moscati R. Domestic violence screening and referral can be effective. *Ann Emerg Med*. 2002;40:485-492.
28. McLeer SV, Anwar RA, Herman S, Maquiling K. Education is not enough: a system's failure in protecting battered women. *Ann Emerg Med*. 1989;18: 651-653.
29. Campbell JC, Coben JH, McLoughlin E, et al. An evaluation of a system-change training model to improve emergency department response to battered women. *Acad Emerg Med*. 2001;8:131-138.
30. Hasley S. A comparison of computer-based and personal interviews for the gynecologic history update. *Obstet Gynecol*. 1995;85:494-498.
31. Locke SE, Kowaloff HB, Hoff RG, et al. Computer-based interview for screening blood donors for risk of HIV transmission. *JAMA*. 1992;268:1301-1305.
32. Robinson R, West R. A comparison of computer and questionnaire methods of history-taking in a genito-urinary clinic. *Psychol Health*. 1992;6:77-84.
33. Des Jarlais DC, Paone D, Milliken J, et al. Audio-computer interviewing to measure risk behavior for HIV among injecting drug users: a quasi-randomized trial. *Lancet*. 1999;353:1657-1661.
34. Paperny DM, Aono JY, Lehman RM, et al. Computer-assisted detection and intervention in adolescent high-risk health behaviors. *J Pediatr*. 1990;116:456-462.
35. Rhodes KV, Lauderdale DS, Stocking CB, Howes DS, Roizen MF, Levinson W. Better health while you wait: a controlled trial of a computer-based intervention for screening and health promotion in the emergency department. *Ann Emerg Med*. 2001;37:284-291.
36. McFarlane J, Parker B, Soeken K, Bullock L. Assessing for abuse during pregnancy: severity of injuries and associated entry into prenatal care. *JAMA*. 1992; 267:3176-3178.
37. Norton LB, Peipert JF, Zierler JJ, et al. Battering in pregnancy: an assessment of two screening methods. *Obstet Gynecol*. 1995;85:321-325.
38. Feldhaus KM, Koziol-McLain J, Amsbury HL, et al. Accuracy of 3 brief screening questions for detecting partner violence in the emergency department. *JAMA*. 1997;277:1357-1361.
39. Crabtree BF, ed. *Doing Qualitative Research*. 2nd ed. Thousand Oaks, Calif: Sage Publications; 1999.
40. Pendergast JF, Gange SJ, Newton MA, et al. A survey of methods for analyzing clustered binary response data. *Int Stat Rev*. 1996;64:89-118.
41. Diggle PJ, Liang K-Y, Zeger SL. *Analysis of Longitudinal Data*. Oxford, England: Clarendon Press; 1994.
42. Tilden VP, Shepard P. Increasing the rate of identification of battered women in an emergency department: use of a nursing protocol. *Res Nurs Health*. 1987; 10:209-215.
43. Furbee PM, Sikora R, Williams JM, Derk SJ. Comparison of domestic violence screening methods: a pilot study. *Ann Emerg Med*. 1998;31:495-501.
44. Olson L, Anctil C, Fullerton L, et al. Increasing emergency physician recognition of domestic violence. *Ann Emerg Med*. 1996;27:741-746.
45. Centers for Disease Control and Prevention (CDC). Role of victim services in improving intimate partner violence screening by trained maternal and child healthcare providers—Boston, Massachusetts, 1994-1995. *MMWR Morb Mortal Wkly Rep*. 2000;49:114-117.
46. Anglin D, Heger AH, Hutson HR, Chan L. Violence among intimates in an innercity ED population [abstract]. *Acad Emerg Med*. 1996;3:444.
47. Muelleman RL, Lenaghan PA, Pakieser RA. Nonbattering presentations to the ED of women in physically abusive relationships. *Am J Emerg Med*. 1998;16: 128-131.
48. Spitzer RL, Kroenke K, Williams JB; the Patient Health Questionnare Primary Care Study Group. Validation and utility of a self-report version of PRIME-MD: the PHQ Primary Care Study. *JAMA*. 1999;282:1737-1744.
49. Fleming MF, Mundt MP, French MT, et al. Benefit-cost analysis of brief physician advice with problem drinkers in primary care settings. *Med Care*. 2000; 38:7-18.
50. Lancaster T, Stead LF. Physician advice for smoking cessation. The Cochrane Database of Systematic Reviews. 2004;4:CD000165. doi:10.1002/14651858.CD000165.pub2.
51. National Cancer Institute. Increasing the population impact of quitlines. http://dccps.nci.nih.gov/TCRB/quitlines_conf/Thursday/4-Impact-McAfee/impact.html. Accessed March 9, 2006.
52. Blanchard JC, Haywood YC, Scott C. Racial and ethnic disparities in health: an emergency medicine perspective. *Acad Emerg Med*. 2003;10:1289-1293.
53. van Ryn M, Burke J. The effect of patient race and socioeconomic status on physician's perceptions of patients. *Soc Sci Med*. 2000;50:813-828.
54. Lane WG, Rubin DM, Monteith R, Christian CW. Racial differences in the evaluation of pediatric fractures for physical abuse. *JAMA*. 2002;288:1603-1609.
55. Plichta SB, Duncan MM, Plichta L. Spouse abuse, patient-physician communication, and patient satisfaction. *Am J Prev Med*. 1996;12:297-303.
56. Campbell JC, Pliska MJ, Taylor W, Sheridan D. Battered women's experiences in the emergency department. *J Emerg Nurs*. 1994;20:280-288.
57. United States Preventive Services Task Force. Screening for family and intimate partner violence: recommendation statement. *Ann Intern Med*. 2004;140: 382-386.