

**Computer-assisted screening for intimate partner violence and control: a randomized trial**

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## ABSTRACT

**Background:** Intimate partner violence and control (IPVC) is prevalent and can be a serious health risk to women.

**Objective:** To assess whether computer-assisted screening can improve detection of women at risk for IPVC in a family practice setting.

**Design:** Randomized trial. Randomization was computer-generated. Allocation was concealed by using opaque envelopes that recruiters opened after patient consent. Patients and providers, but not outcome assessors, were blinded to the study intervention.

**Setting:** An urban, academic, hospital-affiliated family practice clinic in Toronto, Ontario, Canada.

**Participants:** Adult women in a current or recent relationship.

**Intervention:** Computer-based multirisk assessment report attached to the medical chart. The report was generated from information provided by participants before the physician visit ( $n = 144$ ). Control participants received standard medical care ( $n = 149$ ).

**Measurements:** Initiation of discussion about risk for IPVC (discussion opportunity) and detection of women at risk based on review of audiotaped medical visits.

**Results:** The overall prevalence of any type of violence or control was 22% (95% CI, 17% to 27%). In adjusted analyses based on complete cases ( $n = 282$ ), the intervention increased opportunities to discuss IPVC (adjusted relative risk, 1.4 [CI, 1.1 to 1.9]) and increased detection of IPVC (adjusted relative risk, 2.0 [CI, 0.9 to 4.1]). Participants recognized the benefits of computer screening but had some concerns about privacy and interference with physician interactions.

**Limitation:** The study was done at 1 clinic, and no measures of women's use of services or health outcomes were used.

**Conclusion:** Computer screening effectively detected IPVC in a busy family medicine practice, and it was acceptable to patients.

**Primary Funding Source:** Canadian Institutes of Health Research and Ontario Women's Health Council.

Intimate partner violence (IPV) is physical or sexual violence or threats of violence made by one partner to another, often accompanied by controlling behaviors (1). Intimate partner violence is a prevalent and serious health risk for women (1–4). Despite frequent health care visits (5–8), many women refrain from disclosing their experience of IPV to clinicians because of feelings of shame (9–12). Direct inquiry by physicians facilitates disclosure (13–15), but physicians often fail to inquire about IPV risk owing to lack of time, more pressing acute medical problems, discomfort, fear of offending the patient, and lack of familiarity with resources (16–21). The result is missed opportunities for intervening and preventing harm.

Computer screening may help to overcome some of the barriers to discussing risk for IPV. Studies in hospital emergency departments reported higher frequency of patient disclosure and of physician detection of IPV when interactive computer screening was used, compared with patients receiving standard medical care (22–24). Computer-assisted screening may be particularly useful in primary care settings, where physicians focus on comprehensive care, including psychosocial risks, and where women experiencing IPV seek ongoing care from their trusted physicians (25). Universal screening for IPV is under debate (26–28). On the basis of inconclusive systematic reviews (29–31), however, some medical associations

(including the American Medical Association and American Academy of Family Physicians) recommend routine screening for IPV among adult women (32–35). These recommendations are based on available evidence about the burden of IPV, the benefits of provider referral for help, and the low risk associated with asking (36).

Several qualitative studies of abused women report that IPV risk assessment by concerned health care providers reduces their feelings of isolation and improves their sense of self-worth, knowledge about resources, and willingness to seek help (37–39). Longitudinal studies show that use of tailored counseling services reduces partners' controlling behavior or physical violence and, in pregnant women, postnatal depression (40, 41). In addition, access to employment and social support reduces revictimization

(42). Primary care physicians can be pivotal in detecting IPV and offering support and referrals in a timely manner to at-risk women who might otherwise remain silent and delay seeking help (43, 44). Assessment of the partner's controlling behavior is important because such acts precede physical violence (45) or have negative consequences (46).

We tested the effectiveness of computer-assisted screening for identifying patients at risk for intimate partner violence or control (IPVC) in a Canadian family practice clinic. We hypothesized that computer-assisted screening of female patients would create opportunities for women to discuss IPVC with their providers and would increase the frequency of IPVC detection compared with standard medical care.

## METHODS

### Study Site

The study was conducted at a multiphysician, hospital-affiliated, academic family practice clinic in inner-city Toronto, Ontario, Canada, between March and September 2005. The clinic had a multidisciplinary clinical team providing care to diverse patients (50 000 annual visits). The clinic nurse manager, a social worker, and a physician collaborated on development of the trial protocol, modifications of the computer survey, and pilot testing. Relevant university and hospital ethical approvals were obtained from the research ethics boards of St. Michael's Hospital and University of Toronto.

### Intervention

The study intervention was a computer program that administered a previously validated survey (22, 23, 25) to patients and generated risk reports for physicians and recommendation sheets for patients at the time of their clinic

visit (**Appendix Figure**, available at [www.annals.org](http://www.annals.org)). We modified the program, called "Promote Health," for a Canadian family practice context. Our modified version included 79 questions on IPVC and alcohol, tobacco, and street drug use; risk for sexually transmitted infection; road and home safety; depression; cardiovascular risks; and some sociodemographic factors. Embedding questions about women's risk for IPVC (physical or sexual violence, threat of violence, and control by partner) allowed us to conceal the study focus from physician and patient participants. The survey was written on a fifth-grade reading level.

The section on IPVC included questions on partner's controlling behavior, physical and sexual violence, and threat of violence. These questions were derived from validated scales of the Abuse Assessment Screen (47, 48) and Partner Violence Screen (49), along with items from *Improving the Health Care Response to Domestic Violence: A Resource Manual For Health Care Providers* (50). The survey section on depression included questions derived from validated scales of the Center for Epidemiologic Studies Depression scale, Hamilton Rating Scale for Depression, and the Geriatric Depression Scale (51–53). The questions were modified after cognitive interviewing with patients in earlier work by Rhodes and colleagues (22). Any "yes" response to IPVC-related questions was reported on the 1-page risk report and labeled "Possible Partner Abuse—assess for victimization" for physician review. Relevant community referrals were printed at the end of the risk report.

### Participants and Procedures

All physicians initially received study information, and those willing to participate provided written consent. Training was provided during clinical team meetings and at the time of consent. Physician participants were blinded to the study's primary purpose throughout the trial by emphasizing all health risks included in the multirisk computer survey and by using a nonspecific study title.

Female patients were eligible to participate if they were at least 18 years of age, were in a current or recent intimate relationship (within the last 12 months), and were able to read and write English. At registration, the clinic receptionist gave letters of invitation to the patients who were then approached by a recruiter. Eligible consenting patients received further details in a separate room, unaccompanied by friends or family. Women were blinded to the study's primary purpose by using the same strategies we used for physician participants.

Women who provided informed consent were then randomly assigned to the intervention (computer survey) or control (usual care) group, with an allocation ratio of 1:1. We used a random-number sampling scheme stratified by participating physicians (54). Before recruitment, the randomization assignment was computer-generated by an off-site biostatistician using varying block sizes of 2 and 4. These patient assignments were sealed in opaque envelopes

that were marked on the outside with a physician number and sequence number (55). The envelopes were opened by the recruiter after patients' written consent.

Women assigned to the computer group completed the computer survey by using a touch screen. The computer-generated risk reports were attached to the women's medical chart. These women also received a computer-generated recommendation sheet about their reported health risks with the contact numbers of appropriate community agencies. Women assigned to the control group continued to receive usual care with no screening before the consultation.

The visits of participating women were audiotaped. After their visit, women completed a pencil-and-paper exit survey and received brochures on cancer screening, cardiac and mental health, and domestic assault, at which time the research staff disclosed the purpose of the study to patients. No one withdrew consent at that stage. The purpose of the exit survey was to collect information about IPV risk from women in either group, so that those who reported having risk for IPV or experiencing symptoms of depression could immediately be provided assistance in the form of emotional support, recommendation to see an on-site nurse counselor, and contact numbers for community-based counselors and crisis help lines. Questions about IPV in the exit survey were identical to those in the computer survey.

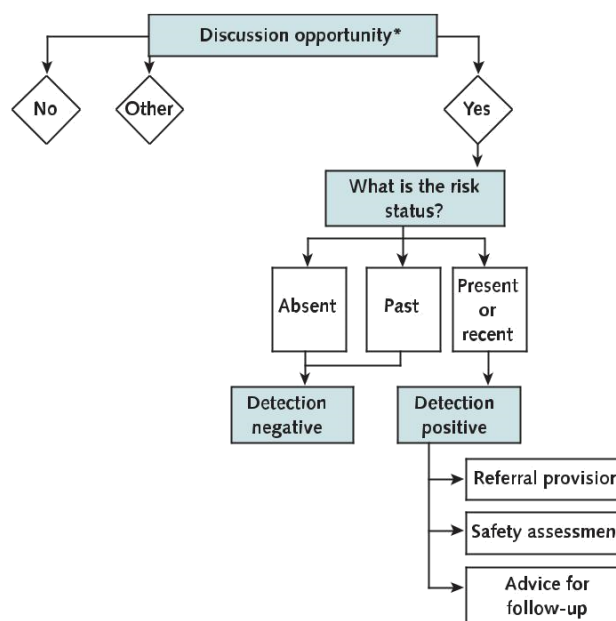
The exit survey also gathered information on demographic characteristics and measures of self-perceived health, symptoms of depression, and acceptance of computer-assisted screening by using the Computerized Lifestyle Assessment Scale (CLAS) (56, 57), which assessed patient perceptions about the benefits of screening and the quality of the subsequent medical visit, concerns about privacy, and concerns about interference in the interaction with the physician.

### Outcomes and Data Collection

The primary outcomes of the trial were whether the patient or physician raised the possibility of the patient being at risk for IPV (discussion opportunity) and, for cases in which an opportunity occurred, whether the risk was detected when the woman identified that risk as being present and recent (IPVC detection). The trial's secondary outcomes were provider assessment of patient safety and provision of appropriate referrals and advice for follow-up, and patient acceptance of the computerized screening.

Using an iterative qualitative approach, 2 coders developed a coding scheme by listening to the first 10 audiotapes (58). By the end of this training, their agreement on identifying IPV discussion opportunities was complete ( $\kappa = 1$ ). A structured coding sheet (Figure 1) and an instruction manual were then created, and the 2 coders worked independently and were blinded to the patients' group assignments. The primary researcher performed accuracy checks; 37 randomly selected audiotapes were dou-

**Figure 1. Coding scheme for the audiotaped physician-patient interactions.**



Shaded areas represent measured primary outcomes; after training, inter-coder reliability was good for all measures ( $\kappa = 0.82$  to  $1.0$ ).

\* "Discussion opportunity" refers to whether the patient or physician raised the possibility of the patient being at risk for intimate partner violence or control.

ble coded, and intercoder agreement was good ( $\kappa = 0.82$  to  $1.0$ ) (Figure 1).

The IPV discussion opportunities were coded as "yes" or "no"; unclear instances in which reference to risk was ambiguous were coded as "other" and excluded from the analysis. When an IPV discussion opportunity occurred, IPV risk was coded as "absent," "present and recent," or "present in the past." Conversations with women at present or recent risk for IPV were coded for provider assessment of safety and provision of referrals and advice for follow-up.

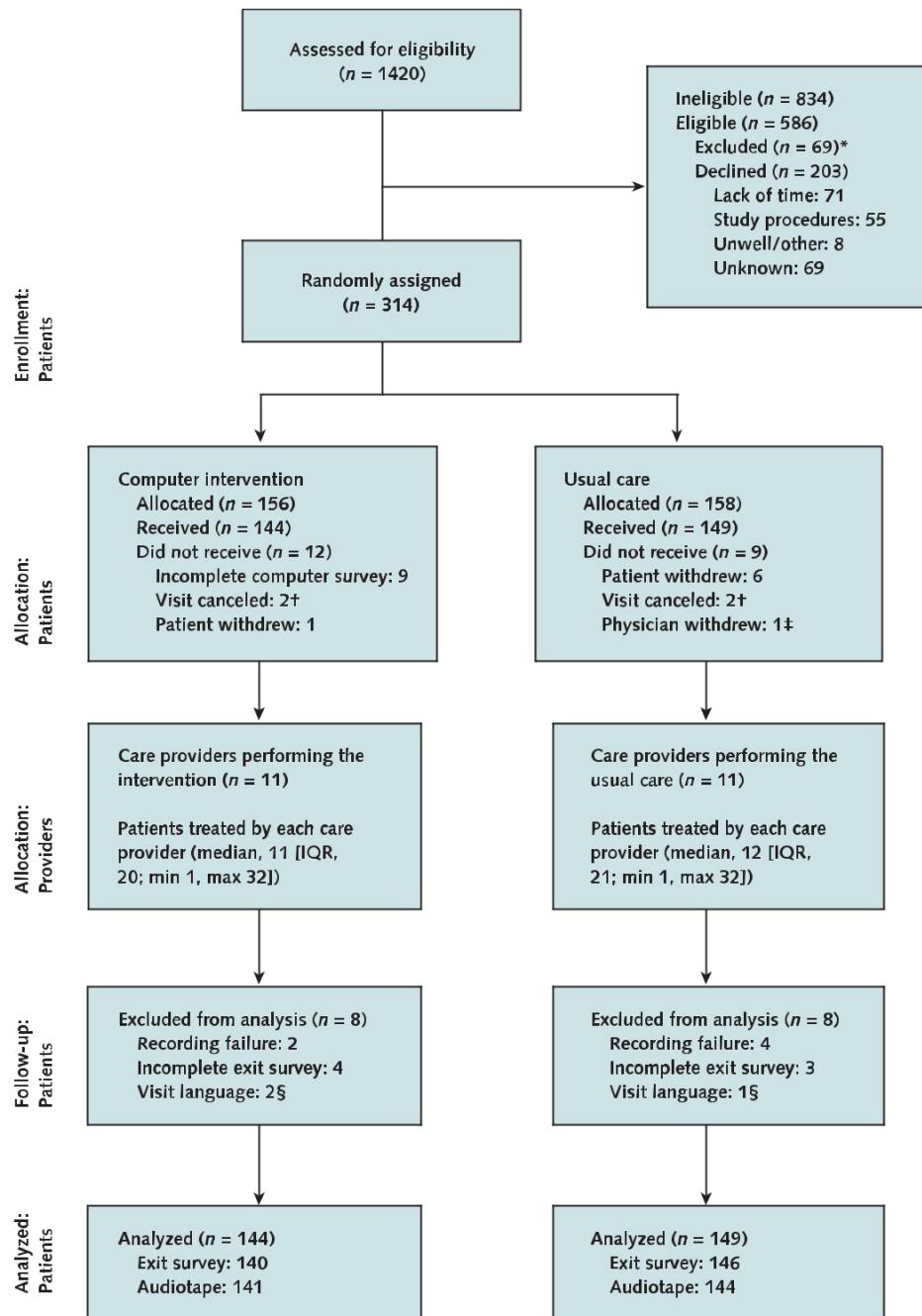
A similar scheme was used to define and code the opportunities to discuss and detect other risks (mental health disorders [depression or other], sexually transmitted infections, and substance abuse), which were included to explore the intervention effect.

### Statistical Analysis

Assuming an absolute increase of 9% in the IPV detection from the reported baseline of 3% in a similar Canadian setting (59), we calculated a required sample size of 272 participants with power of 80% at an  $\alpha$  level of 0.05 (60).

Overall prevalence of any type of partner violence or control was defined as the proportion of all patients who reported "yes" to at least 1 IPV item (partner control, threat of IPV, physical or sexual IPV) on the exit survey, an approach also used by others (3).

Figure 2. Study flow diagram.



IQR = interquartile range.

\* Informed consent could not be completed because patients were called into visit ( $n = 40$ ) or the research room was busy ( $n = 29$ ).

† 1 patient left before the visit because the physician was behind schedule; 2 physicians canceled the visits because of personal emergency; and 1 physician assigned the visit to a resident.

‡ The physician withdrew because the participant had mental health issues.

§ The physician and patient conversed in a language not understood by the coders.

The computer and usual care groups were compared by using the chi-square and  $t$  tests. Binomial regression models with log link were fit by using Stata, version 8.0 (StataCorp, College Station, Texas), to estimate the relative risk of discussing and detecting each of the outcomes

comparing the computer-screened group with the usual care group, both with and without adjustment for covariates (61, 62). Covariates included place of birth (Canada or elsewhere), education, employment status, and self-rated health. Confidence intervals were constructed by using a

bias-corrected and accelerated bootstrap technique, with 1000 samples (63). Two sets of CIs were constructed by using 2 methods of resampling, 1 with patients as the unit of sampling and 1 with physicians as the unit of sampling. Results from these 2 resampling techniques were compared to assess the potential effect of clustering of patients within physicians on CI estimates. For the results presented in Table 3, only participants with complete information (no missing values) on the outcome of interest and the covariates were used for analysis to facilitate practical interpretation while the attrition rate was low and similar for the 2 groups.

Sensitivity analyses were conducted to gauge the potential effect of missing values. Two extreme situations were considered in which each missing value was replaced with an extreme value of the variable that was most likely to diminish the observed RR toward the null value or most likely to accentuate the observed RR away from the null. These 2 extremes provide a range of likely values for each effect.

### Role of the Funding Source

The Canadian Institutes of Health Research and Ontario Women's Health Council funded the study. The funding sources had no role in the conduct or outcome of the study.

## RESULTS

Fourteen physicians were invited to participate, and 11 (4 men and 7 women) consented. Nonparticipating physicians were either on leave or had administrative roles.

Of 1420 patients approached to participate, 586 were eligible and 314 consented (Figure 2), yielding a response rate of 60.7%. Reasons for patients declining to participate were primarily lack of time ( $n = 71$ ) and hesitation about the study procedure ( $n = 55$ ); 69 patients did not give a reason. The attrition rate after consent was 7%, primarily due to incomplete computer surveys (9 patients); in addition, 7 patients withdrew and 4 visits were canceled. We collected exit survey data from 286 participants (140 in the computer group and 146 in the usual care group) and audiotaped visit data from 288 participants (143 in the computer group and 145 in the usual care group).

Table 1 presents the demographic profile of study participants. No statistically significant between-group differences were observed for any baseline characteristic. The computer survey took an average of 7 minutes to complete (median, 6 minutes).

The overall prevalence of any type of partner violence or control according to exit survey data was 22% (62 of 286 participants), with no statistically significant difference between the computer-screened and usual care groups (20% vs. 23%, respectively; absolute difference, 3 percentage points [95% CI, -6 to 13 percentage points]) (Table 2). The prevalence of physical or sexual violence or its

**Table 1. Patient and Physician Characteristics**

| Variable                                          | Physicians ( $n = 11$ )               |                                |
|---------------------------------------------------|---------------------------------------|--------------------------------|
|                                                   |                                       |                                |
| Female, $n$ (%)                                   | 7 (64)                                |                                |
| White, $n$ (%)                                    | 7 (64)                                |                                |
| Mean age (SD), y                                  | 46.0 (11.3)                           |                                |
| Mean years in clinical practice (SD)              | 16.1 (9.9)                            |                                |
| Mean practice hours per week (SD)                 | 40.6 (6.6)                            |                                |
|                                                   | Patients ( $n = 293$ )*               |                                |
|                                                   | Computer-Screened Group ( $n = 144$ ) | Usual Care Group ( $n = 149$ ) |
| Mean age (SD), y                                  | 43.5 (14.8)                           | 44.1 (13.8)                    |
| Birth country, $n$ (%)                            |                                       |                                |
| Canada                                            | 87 (60)                               | 104 (71)†                      |
| Outside Canada                                    | 57 (40)                               | 42 (29)†                       |
| Americas (North/Central/South)                    | 7 (5)                                 | 5 (3)†                         |
| Europe (South/East/North/West)                    | 21 (15)                               | 19 (13)†                       |
| Asia (East/Southeast/South)                       | 16 (12)                               | 10 (7)†                        |
| Africa/Caribbean                                  | 10 (7)                                | 8 (6)†                         |
| Marital status, $n$ (%)                           |                                       |                                |
| Married                                           | 86 (60)                               | 78 (53)†                       |
| Living with partner                               | 27 (19)                               | 25 (17)†                       |
| Single                                            | 25 (17)                               | 35 (24)†                       |
| Separated/divorced/widowed                        | 6 (6)                                 | 8 (6)†                         |
| Children at home <15 y, $n$ (%)                   | 43 (30)                               | 39 (28)‡                       |
| Highest level of education, $n$ (%)               |                                       |                                |
| High school, some or complete                     | 31 (22)                               | 21 (14)†                       |
| College, some or complete                         | 53 (37)                               | 44 (30)†                       |
| University, some or complete                      | 42 (29)                               | 56 (38)†                       |
| Postgraduate, some or complete                    | 18 (13)                               | 25 (18)†                       |
| Current employment status, $n$ (%)                |                                       |                                |
| Full- or part-time                                | 103 (74)§                             | 100 (69)†                      |
| Not employed                                      | 18 (13)§                              | 21 (14)†                       |
| Retired, on disability, or on maternity leave     | 19 (14)§                              | 25 (17)†                       |
| Total annual household income, $n$ (%)            |                                       |                                |
| ≤\$40 000                                         | 38 (29)                               | 39 (28)¶                       |
| \$40 001–\$60 000                                 | 22 (17)                               | 26 (19)¶                       |
| \$60 001–\$80 000                                 | 21 (16)                               | 17 (12)¶                       |
| \$80 001–\$100 000                                | 21 (16)                               | 23 (17)¶                       |
| >\$100 000                                        | 30 (23)                               | 34 (25)¶                       |
| Used computer in past month, $n$ (%)              |                                       |                                |
| Every day to 3 times/wk                           | 116 (83)§                             | 115 (79)**                     |
| Once a week or once a month                       | 11 (8)§                               | 19 (13)**                      |
| Not at all                                        | 13 (9)§                               | 11 (8)**                       |
| Mean self-perceived health score (SD)††           | 3.2 (0.84)§                           | 3.5 (0.90)†                    |
| Had depression symptoms in the past 2 wk, $n$ (%) | 22 (16)§                              | 23 (16)†                       |
| Main purpose of the visit, $n$ (%)                |                                       |                                |
| Follow-up                                         | 55 (40)¶                              | 52 (36)**                      |
| Routine physical examination or Papanicolaou test | 41 (30)¶                              | 41 (28)**                      |
| New health problem or concern                     | 22 (16)¶                              | 36 (25)**                      |
| Related to pregnancy, birth, vaccine, or other    | 21 (15)¶                              | 16 (11)**                      |
| Mean number of visits in past year (SD)           | 3.9 (3.7)§                            | 3.7 (2.8)‡‡                    |

\* Promote Health data were used to replace missing values in the computer-screened group for age, born in Canada, marital status, children at home, highest education, employment (yes/no), self-perceived health, and number of family practice visits. Medical charts were accessed to replace missing values for age in the usual care group.

† Based on 146 patients.

‡ Based on 142 patients.

§ Based on 140 patients.

|| Based on 132 patients.

¶ Based on 139 patients.

\*\* Based on 145 patients.

†† Rated on a scale of 1 to 5: 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent.

‡‡ Based on 129 patients.

threat was 11% in both groups. Responses to the computer screen and exit survey were the same for 95% of participants who reported any type of partner violence or control, which is consistent with findings by Rhodes and colleagues (24), and for 99% of those who disclosed physical or sexual violence.

## Outcomes

The opportunity to discuss IPVC arose for 35% (48 of 139 participants) of the computer-screened group and 24% (34 of 141 participants) of the usual care group (adjusted relative risk [RR], 1.4 [CI 1.1 to 1.9]). Detection of IPVC occurred in 18% (25 of 139 participants) of the computer-screened group and 9% (12 of 141 participants) of the usual care group (adjusted RR, 2.0 [CI, 0.9 to 4.1]) (Table 3). During positive discussion opportunities, the rate of IPVC detection was 52% (25 of 48 participants) for the computer-screened group and 35% (12 of 34 participants) for the usual care group. Adjustment for potential covariates had very little effect on most estimates of RR. On comparing bootstrap confidence intervals using either the patient or the physician as the unit of resampling, we found some differences in upper and lower bounds for the RRs. For both unadjusted and adjusted results, CIs tended to be wider when resampling was based on physicians compared with patients. Our discussion focuses on physician-resampled analyses, because they better account for potential physician-level clustering. Sensitivity analyses (Appendix Table, available at [www.annals.org](http://www.annals.org)) using dif-

ferent assumptions about missing data changed the magnitude of the RR but not its direction and decreased the lower confidence limits for the study's primary outcomes to less than 1.0.

On descriptive analyses for positive IPVC detection, physicians assessed patient safety more often in the computer-screened group (9 of 25 participants) than in the usual care group (1 of 12 participants). Three patients in the computer-screened group and 1 in the usual care group received referrals. During these visits, physicians asked patients to set up a follow-up appointment more often in the computer-screened group (20 of 25 participants) than in the usual care group (8 of 12 participants).

Computer screening was associated with statistically significantly more opportunities for discussing (adjusted RR, 1.5 [CI, 1.1 to 2.0]) and detecting (adjusted RR, 1.5 [CI, 1.0 to 2.2]) mental health disorders. Opportunities for discussing and detecting other risks (such as substance abuse and sexually transmitted infections) did not statistically differ between groups.

On average, participants agreed that screening was beneficial (mean CLAS score, 3.8 [SD, 0.67]) but had some concerns about privacy (mean CLAS score, 2.9 [SD, 0.85]) and about interference with physician interactions (mean CLAS score, 2.6 [SD, 0.79]). (For the CLAS score, 1 indicates strong disagreement and 5 indicates strong agreement.) Scores did not significantly differ by IPVC status.

**Table 2. Prevalence of Self-reported Intimate Partner Violence and Control**

| Screening Question*                                                                            | Respondents Saying "Yes"             |                               |                                                       |
|------------------------------------------------------------------------------------------------|--------------------------------------|-------------------------------|-------------------------------------------------------|
|                                                                                                | Computer-Screened Group<br>(n = 140) | Usual Care Group<br>(n = 146) | Absolute Difference<br>(95% CI),<br>percentage points |
| <b>Partner control, n (%)</b>                                                                  |                                      |                               |                                                       |
| Is your partner very jealous?                                                                  | 15 (11)                              | 17 (12)                       |                                                       |
| Does your partner try to control your life?                                                    | 13 (9)                               | 12 (8)                        |                                                       |
| Does your partner try to keep you away from family/friends?                                    | 5 (4)                                | 5 (3)                         |                                                       |
| Does your partner insult you or put you down?                                                  | 7 (5)                                | 13 (9)                        |                                                       |
| Pooled responses of those saying "yes" to $\geq 1$ item                                        | 25 (18)                              | 28 (19)                       | -1 (-8 to 10)                                         |
| <b>Partner violence, n (%)</b>                                                                 |                                      |                               |                                                       |
| Threat                                                                                         |                                      |                               |                                                       |
| Are you afraid to disagree with your partner?                                                  | 9 (6)                                | 6 (4)                         |                                                       |
| Do you feel physically threatened from your partner, or does your former partner threaten you? | 4 (3)                                | 6 (4)                         |                                                       |
| Pooled responses of those saying "yes" to $\geq 1$ item                                        | 11 (8)                               | 10 (7)                        | 1 (-5 to 7)                                           |
| Physical or sexual                                                                             |                                      |                               |                                                       |
| Has your partner ever pushed, hit, kicked, or otherwise physically hurt you?                   | 6 (4)                                | 6 (4)                         |                                                       |
| Has your partner ever forced you to have sex when you didn't want to?                          | 3 (2)                                | 4 (3)                         |                                                       |
| Pooled responses of those saying "yes" to $\geq 1$ item                                        | 8 (6)                                | 7 (5)                         | 1 (-5 to 7)                                           |
| Pooled violence                                                                                | 16 (11)                              | 16 (11)                       | 0 (-7 to 8)                                           |
| <b>Any partner violence or control, n (%)†</b>                                                 | <b>28 (20)</b>                       | <b>34 (23)</b>                | <b>-3 (-6 to 13)</b>                                  |
| <b>Point estimate (95% CI)</b>                                                                 | <b>20 (14-27)</b>                    | <b>23 (17-31)</b>             |                                                       |

\* Data are derived from the exit survey.

† Each person who indicated that she had experienced intimate partner violence or control is counted once across domains of violence and control.

**Table 3. IPV and Other Health Risks: Complete-Case Relative Risk Analyses**

| Outcome                        | Computer-Screened<br>Group (n = 141),<br>% (n/n)* | Usual Care Group<br>(n = 144),<br>% (n/n)* |     | Crude            |                        | Adjusted†        |                          |                        |                          |
|--------------------------------|---------------------------------------------------|--------------------------------------------|-----|------------------|------------------------|------------------|--------------------------|------------------------|--------------------------|
|                                |                                                   |                                            |     | Relative<br>Risk | 95% CI‡                | Relative<br>Risk | 95% CI‡                  |                        |                          |
|                                |                                                   |                                            |     |                  | Resampled<br>(Patient) |                  | Resampled<br>(Physician) | Resampled<br>(Patient) | Resampled<br>(Physician) |
| IPVC                           |                                                   |                                            |     |                  |                        |                  |                          |                        |                          |
| Discussion opportunity         | 35 (48/139)                                       | 24 (34/141)                                | 1.4 | 1.0–2.2          | 0.9–1.9                | 1.4              | 1.0–2.2                  | 1.1–1.9                |                          |
| Detection                      | 18 (25/139)                                       | 9 (12/141)                                 | 2.1 | 1.1–4.4          | 1.0–4.5                | 2.0              | 1.0–4.3                  | 0.9–4.1                |                          |
| Mental health disorder         |                                                   |                                            |     |                  |                        |                  |                          |                        |                          |
| Discussion opportunity         | 45 (63/139)                                       | 32 (45/141)                                | 1.4 | 1.0–1.9          | 1.1–1.9                | 1.5              | 1.1–2.1                  | 1.1–2.0                |                          |
| Detection                      | 36 (50/139)                                       | 25 (35/141)                                | 1.5 | 1.0–2.1          | 1.0–2.0                | 1.5              | 1.0–2.1                  | 1.0–2.2                |                          |
| Tobacco                        |                                                   |                                            |     |                  |                        |                  |                          |                        |                          |
| Discussion opportunity         | 23 (31/138)                                       | 18 (25/141)                                | 1.3 | 0.8–2.0          | 0.9–1.7                | 1.3              | 0.8–2.2                  | 0.9–1.8                |                          |
| Detection                      | 8 (11/138)                                        | 5 (7/141)                                  | 1.6 | 0.6–4.5          | 0.8–5.2                | 1.4              | 0.5–4.2                  | 0.6–4.0                |                          |
| Alcohol                        |                                                   |                                            |     |                  |                        |                  |                          |                        |                          |
| Discussion opportunity         | 18 (25/138)                                       | 18 (26/141)                                | 1.0 | 0.6–1.6          | 0.3–1.6                | 1.0              | 0.6–1.8                  | 0.4–1.8                |                          |
| Detection                      | 17 (23/138)                                       | 12 (17/141)                                | 1.4 | 0.8–2.5          | 0.6–2.7                | 1.4              | 0.7–3.1                  | 0.7–3.2                |                          |
| Street drugs                   |                                                   |                                            |     |                  |                        |                  |                          |                        |                          |
| Discussion opportunity         | 9 (12/137)                                        | 9 (13/140)                                 | 0.9 | 0.4–2.1          | 0.2–2.5                | 1.0              | 0.4–2.9                  | 0.2–2.6                |                          |
| Detection§                     | 2 (3/137)                                         | 0                                          | –   | –                | –                      | –                | –                        | –                      |                          |
| Substance abuse (combined)     |                                                   |                                            |     |                  |                        |                  |                          |                        |                          |
| Discussion opportunity         | 30 (41/138)                                       | 26 (36/141)                                | 1.2 | 0.8–1.7          | 0.6–1.7                | 1.2              | 0.8–1.8                  | 0.6–1.8                |                          |
| Detection                      | 23 (31/138)                                       | 15 (21/141)                                | 1.5 | 0.9–2.5          | 1.0–2.6                | 1.5              | 0.8–3.0                  | 0.9–3.0                |                          |
| Sexually transmitted infection |                                                   |                                            |     |                  |                        |                  |                          |                        |                          |
| Discussion opportunity         | 22 (30/137)                                       | 20 (28/141)                                | 1.1 | 0.7–1.8          | 0.8–1.5                | 1.2              | 0.7–2.0                  | 0.9–1.6                |                          |
| Detection                      | 7 (9/137)                                         | 7 (10/141)                                 | 0.9 | 0.4–2.6          | 0.4–0.9                | 1.8              | 0.3–2.4                  | 0.4–1.9                |                          |

IPVC = intimate partner violence and control.

\* Outcome denominators are less than the total because of missing covariate values for 3 visits and outcomes coded as “other” (2 for IPVC, 2 for mental health disorder, 3 for tobacco, 3 for alcohol, 5 for street drugs, 3 for substance use, and 4 for sexually transmitted infection).

† Adjusted for place of birth (Canada or elsewhere), education, employment status, and self-rated health status.

‡ See the Statistical Analysis section for a description of the resampling methods.

§ Analysis was not done because of the small number of events.

## DISCUSSION

In this trial of computer screening for IPVC, we found that the computer-generated risk report improved the frequency of opportunities to discuss IPVC and improved detection of women at risk, although the statistical significance of the findings was sensitive to assumptions about missing data. The prevalence of partner violence and control was high and consistent with our previous cross-sectional survey at this site (64) and other recent studies in family practice (65). The frequency of detection of women at risk for IPVC increased moderately, indicating that the intervention facilitated conversations in appropriate patients. Among detected cases, physicians assessed patient safety, offered referrals, and advised for a follow-up visit more often in the computer-screened group than in the usual care group. The findings are consistent with studies in emergency departments (22–24). We extend the existing knowledge about computer screening to a family practice setting, where many women regularly seek care from a phy-

sician they trust. Computer screening in the waiting room can help family physicians to address the prevalent issue of partner violence, possibly at an early stage.

Women in the computer-screened group accepted the use of computer screening but had some concerns about privacy and interaction with physicians. Physician training programs should continue to emphasize the importance of privacy and confidentiality and communication skills for addressing this sensitive issue (66, 67).

Computer screening also improved the rates of discussion about mental health disorders, but the rates did not improve for risk for substance abuse or sexually transmitted infection. One explanation is the low number of events for these 2 problems compared with mental health disorders. Alternatively, the discussion of mental health problems may be more sensitive than substance abuse because public health campaigns on the use of tobacco and alcohol have possibly led to their higher acceptance as a health risk.

The multirisk computer screening was time-efficient for patients and identified vital areas for physician inquiry (Appendix Figure, available at [www.annals.org](http://www.annals.org)). In interviews after the trial, physicians commented on the tool's usefulness for identifying psychosocial issues, particularly for annual visits and preventive care.

Our study has several limitations. We collected data from women visiting only 1 family practice clinic. Participating physicians were potentially more likely to ask about lifestyle health risks because of volunteer bias, the academic setting, training for the study, and nonmasking of the intervention. These biases diminish the group difference in outcomes and, hence, our estimates of the intervention effect are likely to be underestimates. On the other hand, sensitivity analyses to understand the potential influence of attrition and missing data suggest a possible overestimate of effect. Patients had 61% participation, but their characteristics were similar to those of participants of our previous cross-sectional survey with a 90% participation rate (64). We observed that patients generally showed interest in the computer screening, and some were disappointed when they were not assigned to the computer-screened group. This may explain the higher number of withdrawals in the control group. We could not determine whether patients with more comorbid conditions, whose clinic visit time might be taken up with discussions about the care of those conditions rather than about social risks, experienced the same benefits from screening as those with fewer comorbid conditions.

In addition, the quantitative nature of our study does not capture the various types of violent and controlling behaviors of intimate partners, or the underlying mechanisms by which the detection rates improved. Future qualitative research would enhance our understanding of the patterns within physician-patient dialogues. Finally, our study focused on the screening for and detection of IPV (that is, a process of health care), and we could not assess how many women utilized the services to which they were referred. Future longitudinal research should evaluate the long-term health outcomes subsequent to screening and detection. Nevertheless, computer screening is a promising tool and needs to be tested in multiple primary care settings and in other countries.

In conclusion, computer screening was an effective, time-efficient, and patient-acceptable method to screen for and detect women at risk for IPV in a busy family medicine practice. Routine use of computer screening could save the physician's time for management and referral for IPV, which might improve social and health outcomes for women at risk for it.

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Administrative, technical, or logistic support: F. Ahmad.

Collection and assembly of data: F. Ahmad.

**Appendix Table. IPVC and Other Health Risks: Intention-to-Treat Analysis With Missing Observations Replaced\***

| Outcome                        | Computer-Screened Group (n = 144), % (n/n) | Usual Care Group (n = 149), % (n/n) |     | Crude         |         |                     | Adjusted†     |                       |                     |
|--------------------------------|--------------------------------------------|-------------------------------------|-----|---------------|---------|---------------------|---------------|-----------------------|---------------------|
|                                |                                            |                                     |     | Relative Risk | 95% CI‡ |                     | Relative Risk | 95% CI‡               |                     |
|                                |                                            |                                     |     |               | Naive   | Resampled (Patient) |               | Resampled (Physician) | Resampled (Patient) |
| IPVC                           |                                            |                                     |     |               |         |                     |               |                       |                     |
| Discussion opportunity         | 33 (48/144)                                | 27 (40/149)                         | 1.2 | 0.9–1.8       | 0.9–1.8 | 0.8–1.6             | 1.3           | 0.9–1.8               | 0.9–1.7             |
| Detection                      | 17 (25/144)                                | 12 (18/149)                         | 1.4 | 0.8–2.5       | 0.9–2.8 | 0.9–2.4             | 1.4           | 0.8–2.7               | 0.8–2.7             |
| Mental health disorder         |                                            |                                     |     |               |         |                     |               |                       |                     |
| Discussion opportunity         | 44 (63/144)                                | 34 (50/149)                         | 1.3 | 1.0–1.8       | 0.9–1.8 | 1.0–1.8             | 1.4           | 1.0–1.8               | 1.1–1.8             |
| Detection                      | 35 (50/144)                                | 27 (40/149)                         | 1.3 | 0.9–1.8       | 1.0–1.9 | 1.0–1.8             | 1.3           | 0.9–1.9               | 0.9–1.8             |
| Tobacco                        |                                            |                                     |     |               |         |                     |               |                       |                     |
| Discussion opportunity         | 22 (31/144)                                | 20 (30/149)                         | 1.1 | 0.7–1.7       | 0.7–1.7 | 0.9–1.5             | 1.1           | 0.6–1.7               | 0.8–1.5             |
| Detection                      | 8 (11/144)                                 | 8 (12/149)                          | 1.0 | 0.4–2.1       | 0.4–2.3 | 0.6–1.7             | 0.9           | 0.3–2.1               | 0.5–1.6             |
| Alcohol                        |                                            |                                     |     |               |         |                     |               |                       |                     |
| Discussion opportunity         | 17 (25/144)                                | 21 (31/149)                         | 0.8 | 0.5–1.3       | 0.5–1.4 | 0.4–1.5             | 0.9           | 0.5–1.5               | 0.5–1.7             |
| Detection                      | 8 (23/144)                                 | 15 (22/149)                         | 1.1 | 0.6–1.9       | 0.6–1.9 | 0.5–1.9             | 1.1           | 0.6–2.1               | 0.6–2.1             |
| Street drugs                   |                                            |                                     |     |               |         |                     |               |                       |                     |
| Discussion opportunity         | 8 (12/144)                                 | 13 (19/149)                         | 0.7 | 0.3–1.3       | 0.4–1.4 | 0.2–1.6             | 0.7           | 0.2–1.5               | 0.2–1.7             |
| Substance abuse (combined)     |                                            |                                     |     |               |         |                     |               |                       |                     |
| Discussion opportunity         | 29 (41/144)                                | 28 (41/149)                         | 1.0 | 0.7–1.5       | 0.7–1.5 | 0.6–1.5             | 1.1           | 0.7–1.6               | 0.6–1.6             |
| Detection                      | 22 (31/144)                                | 18 (26/149)                         | 1.2 | 0.8–2.0       | 0.8–2.0 | 0.8–2.0             | 1.2           | 0.7–2.1               | 0.8–2.1             |
| Sexually transmitted infection |                                            |                                     |     |               |         |                     |               |                       |                     |
| Discussion opportunity         | 21 (30/144)                                | 23 (34/149)                         | 0.9 | 0.6–1.4       | 0.6–1.4 | 0.7–1.2             | 1.0           | 0.6–1.6               | 0.7–1.3             |
| Detection                      | 6 (9/144)                                  | 11 (16/149)                         | 0.6 | 0.3–1.3       | 0.2–1.2 | 0.3–0.9             | 0.6           | 0.3–1.4               | 0.4–1.0             |

IPVC = intimate partner violence and control.

\* Based on 293 participants. Missing values were replaced with extreme values that are likely to diminish the effect of the computer-screened group.

† Adjusted for place of birth (Canada or elsewhere), education, employment status, and self-rated health status.

‡ See the Statistical Analysis section for a description of the resampling methods.

Appendix Figure. Example of a physician report printed by Promote Health.

# Promote Health

◀Back

## Physician Report

|                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <h3>Physicians to Assess Risk</h3> <p><b>Possible Partner Abuse</b><br/> <b>Assess for victimization:</b> Assess for current emotional, physical and/or sexual abuse. Assess safety issues and document. Offer referral to social worker and helpline numbers.</p> | <p><b>Research Info:</b> ID #2008<br/> Time: 2:54:50 PM<br/> Date: 1/22/2008<br/> Time to finish quiz: 3 minutes</p> <p><b>Demographics</b><br/> Born: outside Canada<br/> Age: 35<br/> Height: 5' 4"<br/> Weight: 130 BMI: 22.3</p> <p>Marital: Living with Partner<br/> Education: Some college<br/> Employed: Yes<br/> Enough \$ to meet needs: No</p> <p><a href="#">Show all responses</a></p> <div>print</div> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Health Risks By Category

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>General Health</b><br/> No. of FP visits in last yr: 2<br/> Concern about overweight<br/> Self-rated Health Status: Good<br/> Prescription Meds Yes<br/> Takes less of meds than prescribed<br/> Hx of High cholesterol</p> <p><b>Social Network</b><br/> Has children &lt;15 years old<br/> Weak social network</p> <p><b>Conflict in Relationships</b><br/> Curr/recent partner abused physically w/in last year<br/> Curr/recent partner controlling<br/> Curr/recent partner insulting</p> <p><b>Substance Abuse</b><br/> Someone close w/substance abuse<br/> Street Drugs in last 4 weeks</p> | <p><b>Sexual Health</b><br/> Does not use condoms always<br/> STD risk factors:<br/> Hx STD in past 5 years<br/> Tested Neg. for HIV</p> <p><b>Safety</b><br/> Working smoke detector.</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Information Requested</p> <div>View Information</div> | <p><b>Suggested Referrals:</b></p> <ul style="list-style-type: none"> <li>• <u>Partner abuse:</u> Bill Wetzal, Social Worker at SMH: (416) 864-6060 x 7468; Assaulted Women's Helpline: (416) 863-0511; Family Services Association Counseling Services at (416) 595-9618; Barbara Schlifer Commemorative Clinic at (416) 323-9149.</li> <li>• <u>Addiction:</u> Pt self-refer to Metro Addiction Assessment and Referral Services (MAARS) at (416) 599-1448; Street Haven at the Crossroad at (416) 967-6060 for 24/7 service.</li> <li>• <u>Addiction by family member:</u> Family Support of the Centre for Addiction and Mental Health at (416) 535-8501, ext. 6765.</li> <li>• <u>AIDS &amp; Sexual Health InfoLine:</u> 416-392-2437</li> </ul> |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|