

## Medical education

# A randomized controlled trial of communication training with primary care providers to improve patient-centeredness and health risk communication<sup>☆</sup>

Deborah L. Helitzer<sup>a,\*</sup>, Marianna LaNoue<sup>b</sup>, Bronwyn Wilson<sup>b</sup>, Brisa Urquieta de Hernandez<sup>b</sup>, Teddy Warner<sup>b</sup>, Debra Roter<sup>c</sup>

<sup>a</sup> Department of Family and Community Medicine, 1 University of New Mexico, Albuquerque, USA

<sup>b</sup> University of New Mexico School of Medicine, USA

<sup>c</sup> The Johns Hopkins Bloomberg School of Public Health, USA

## ARTICLE INFO

## Article history:

Received 27 August 2009

Received in revised form 22 December 2009

Accepted 30 January 2010

## Keywords:

Patient provider communication

Adverse childhood events

Adverse adult events

Determinants of disease

Training

## ABSTRACT

**Objective:** To determine the efficacy and effectiveness of training to improve primary care providers' patient-centered communication skills and proficiency in discussing their patients' health risks.

**Methods:** Twenty-eight primary care providers participated in a baseline simulated patient interaction and were subsequently randomized into intervention and control groups. Intervention providers participated in training focused on patient-centered communication about behavioral risk factors. Immediate efficacy of training was evaluated by comparing the two groups. Over the next 3 years, all providers participated in two more sets of interactions with patients. Longer term effectiveness was assessed using the interaction data collected at 6 and 18 months post-training.

**Results:** The intervention providers significantly improved in patient-centered communication and communication proficiencies immediately post-training and at both follow-up time points.

**Conclusions:** This study suggests that the brief training produced significant and large differences in the intervention group providers which persisted 2 years after the training.

**Practice implications:** The results of this study suggest that primary care providers can be trained to achieve and maintain gains in patient-centered communication, communication skills and discussion of adverse childhood events as root causes of chronic disease.

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## 1. Introduction

The literature documents the close relationship between psychological health and physical health [1–3] and supports the notion that poor psychological health (including traits and states such as depression, anxiety and negative affect) is a predictor of health risk behaviors such as smoking, high saturated fat consumption, physical inactivity, and risky sexual activity [4,5]. Additionally, it is well established that both poor psychological health and health risk behaviors are associated with increased morbidity and mortality in chronic medical illness [6].

The determinants of an individual's health status are complex, but it has recently been suggested that some influences may be rooted in childhood maltreatment; the practice of risky behaviors or the experience of depression, for example, leading to chronic health

outcomes, may be a direct or indirect result of these childhood determinants [7]. Felitti's work on this subject showed elevated odds ratios for a large number of chronic health conditions when an adult had experienced adverse childhood events [8]. Subsequently, other large epidemiologic studies have reaffirmed this relationship [9,10]. Both the Centers for Disease Control and the World Health Organization have published the position that childhood maltreatment has long-term adulthood consequences of adverse health outcomes and risky health behaviors [11,12].

These organizations and researchers further suggest that failing to ask patients about a history of childhood maltreatment obscures the relationship between abuse and health outcomes, and overestimates the strength of other predictive factors and therefore an important potential predictor of adult health problems and health risk behaviors is overlooked. We hypothesized that uncovering and discussing possible childhood determinants of those behaviors with patients would enhance providers' attempts to address risky behaviors and would result in more success in helping patients to find solutions [13–15]. (See Appendix A—for a more personal, clinical example.)

Given the role of primary care providers in behavioral risk reduction and chronic disease management, it seems appropriate

<sup>☆</sup> Support: This research was supported through a grant from the Centers for Disease Control (R01-CD-04-002).

\* Corresponding author at: Department of Family and Community Medicine, MSC 09-5040, 1 University of New Mexico, Albuquerque, NM 87131, United States. Tel.: +1 505 272 1601; fax: +1 505 272 1550.

E-mail address: [Helitzer@salud.unm.edu](mailto:Helitzer@salud.unm.edu) (D.L. Helitzer).

to consider the primary care visit as an opportunity for such discussions. However, the literature suggests that discussions on health risk determinants rarely take place during the primary care visit [16]. This is particularly true for topics about which patients may feel inhibited revealing sensitive information, unless the physician signals an interest in discussing these issues. However, many physicians feel their training does not prepare them to raise these topics in a short primary care encounter, especially one in which so many other pressing physical health problems must be addressed. Even physicians who internalize the importance of listening to behavioral health issues are often at a loss to know realistically how to incorporate them into their practice [17].

The literature documents that relationships between patients and their primary care providers can be enhanced by improvements in communication during the primary care visits [18–20]. In particular, the patient-centered approach to communication between clinicians and patients has been gaining prominence in recent years [21–24]. This approach includes key communication strategies such as eliciting patient perspectives, responding to patient concerns, giving information; partnership building; engaging the patient in participatory decision-making; and developing a follow-up health care plan together [23–25]. This is a central recommendation of the Institute of Medicine report, “Crossing the Quality Chasm” [26].

Studies have demonstrated positive associations between elements of the patient-centered approach and patient satisfaction [23,28–30], patient recall of the content of the health care visit [29], patient compliance [27], patient health outcomes [30–33], health care utilization [34] and provider satisfaction [35]. More recently, Roter and Larson advocated for a change from the term “patient-centeredness” to the term “relationship-centeredness” to emphasize the relational reciprocity between patient and physician [36]. We encouraged the providers to engage in more patient-centered communication to increase the likelihood that the interaction would be more closely aligned with the patient’s psychosocial needs and would therefore facilitate a discussion of childhood adversity.

The purpose of this study was to determine if high intensity communication training [37] with primary care health providers would improve patient-centered communication skills, as well as increase their proficiency in the elicitation of adverse childhood events and discussion of specific high risk health behaviors associated with these adverse events. We evaluated the training using simulated patient visits; actual patient visits were used to determine if training gains could be maintained over time. This study was designed, therefore, to determine both efficacy (assessment of an intervention under controlled conditions) and effectiveness (assessment of an intervention under ‘real life’ conditions). Given the important public health implications of the relationships between childhood adversity and adult health outcomes [10,11], the training included substantial focus on communication about adverse childhood events.

We hypothesized that the trained providers would improve their skills in patient-centered communication and in the use of specific communication skills, relative to their baseline scores before training. We further hypothesized that the gains seen post-training would persist into actual clinical interactions between providers and their patients at both an initial visit, and at follow-up clinical interactions a year later.

## 2. Methods

The study was approved by the Institutional Review Boards at the University of New Mexico and the Johns Hopkins Bloomberg School of Public Health.

### 2.1. Study setting and participants

Primary care providers (physicians, physician assistants and nurse practitioners) were recruited to the study from the departments of General Internal Medicine (IM) and Family Practice (FP) of one university medical system. Twenty-six of sixty (43%) eligible providers agreed to participate in the study and were randomized to receive training or serve as a control. The randomization process was stratified by gender and specialty, because prior studies have shown superior communication skills in female physicians and in primary care physicians [38,39]. Table 1 shows the demographic distribution of the providers, by practice type, treatment group, and sex. Chi-square analyses revealed no significant differences between the groups in terms of sex or practice type, either at baseline or at the final medical visit. Table 2 shows the distribution of the providers per treatment group and their enrolled patients at both first and second actual medical visits.

### 2.2. Training

Training consisted of three components: a full-day training, individualized feedback on video-taped interactions with simulated patients, and optional workshops to reinforce strategies for engaging the patient. Providers in the intervention group were

**Table 1**  
Provider distribution by treatment group, practice type and gender.

Practice type <sup>a</sup>	Control		Intervention	
	Male	Female	Male	Female
FP	5	3	4	2
IM	2	2	1	3
ML <sup>b</sup>	1	1	0	2
	8	6	5	7
Total	14		12	

<sup>a</sup> Practice type: FP: family practice physicians, IM: internal medicine physicians, ML: mid-level providers (physician assistants and nurse practitioners).

<sup>b</sup> Mid-level providers who participated were from both departments (family practice and internal medicine).

**Table 2**  
Providers and enrolled patients in actual medical visits.

Group	First actual medical visit		Second actual medical visit		
	Provider	# Patients	Provider	# Patients	
Intervention	104	10	104	10	
	105	3	105	2	
	106	1	106	0	
	108	2	108	0	
	110	4	110	3	
	119	11	119	11	
	120	10	120	10	
	122	7	122	6	
	127	3	127	3	
	128	5	128	4	
	Control	102	5	102	4
		103	1	103	0
		109	2	109	2
		111	5	111	4
112		8	112	6	
114		5	114	3	
115		4	115	3	
116		5	116	5	
124		8	124	6	
125		5	125	5	
126		7	126	5	
127		3	127	3	
129		2	129	2	

required to attend the full-day training; the morning session included a lecture on adverse childhood events and their relationship to health outcomes, as well as a presentation of the study goals, procedures and instruments. The afternoon session was interactive and included role play and training in patient-centered communication skills, health risk behavior assessment and referrals to other resources appropriate to childhood adversity, as well as elements of motivational interviewing. Intervention group participants were given continuing medical education (CME) credits for this activity, both intervention and control group participants were compensated with \$100.00.

All study providers were audio taped with a simulated patient at baseline, prior to any training. After the full-day training with the intervention group providers was completed, all study providers were again assessed with a second simulated patient. This interaction was video-taped so that the providers in the intervention group could be given individualized feedback on their performance based on training content (i.e. RIAS coding of skills and notation of discussion associated with targeted topic areas) [40].

In addition to the full-day training and individualized feedback on the video-taped simulated patient interactions, two optional workshops were made available to intervention group providers. One workshop was designed to illustrate the process of reflective writing, and how that might be useful to patients, following the work of Pennebaker and Seagal [41] who have published extensively on patient health benefits of this technique. The second focused on motivational interviewing with role playing exercises to help providers talk with patients about the relationship between their adverse events and health status. Since participation in the workshops was optional, attendance was not monitored.

### 2.3. Assessment procedures

#### 2.3.1. Simulated patient interactions

Four equivalent standardized cases were developed to assess the effectiveness of training. For each case, the patient (male or female) with a chronic disease (asthma or hypertension) had stated goals of establishing a relationship with a new provider and renewing a prescription. The simulated patient was instructed to disclose additional information only if prompted by the provider so that underlying causes of risk behavior (i.e. ACE) would only be uncovered if the provider used the skills taught in the training. (See Appendix B. There were four simulated patients, one female and one male for each of the two cases.) Providers were randomly assigned to either case A (hypertension) or B (asthma) with a male or female patient for the baseline simulation and the opposite case and gender for the follow-up simulation.

The simulated patients were blind to the provider group assignment. The first simulation was audio taped. The second simulation was video-taped so that providers could receive feedback from trainers to further improve their communication skills while watching their own interactions with the simulated patient.

#### 2.3.2. Actual medical visits

After training was complete for intervention providers, we implemented a study utilizing actual patients to determine whether the training continued to be effective under natural conditions. This trial utilized the results from a health risk assessment (HRA) to focus the communication in the annual medical visit on the determinants of risk behavior (such as experience of childhood adversity) and their relationships to short-term health outcomes and quality of life (see Helitzer et al., forthcoming, for a description of the HRA intervention). The

medical dialogue for all study visits was audio-tape recorded. Fig. 1 depicts the provider assignment, training, measurements and the timing of all study components.

### 2.4. Measures

#### 2.4.1. Coding of medical visit communication

The study's simulations and actual medical visit recordings were coded with the Roter Interaction Analysis System (RIAS). The RIAS is a widely used coding system with demonstrated reliability and predictive validity in studies of patient–physician communication [36,42–44]. This system assigns each complete thought expressed by the patient and physician to 1 of 37 mutually exclusive and exhaustive codes or categories of communication. These categories can be manipulated to reflect groups of exchange representing 3 recognized functions of the medical interview: data gathering (open and closed biomedical and psychosocial questions), patient education and counseling about biomedical and psychosocial topics, and relationship building through emotionally responsive exchange (empathy, concern, approval, and reassurance) [45]. A fourth function of partnership building (seeking patient opinion, asking for understanding, and checking for understanding through paraphrase and interpretation) is also reflected [22].

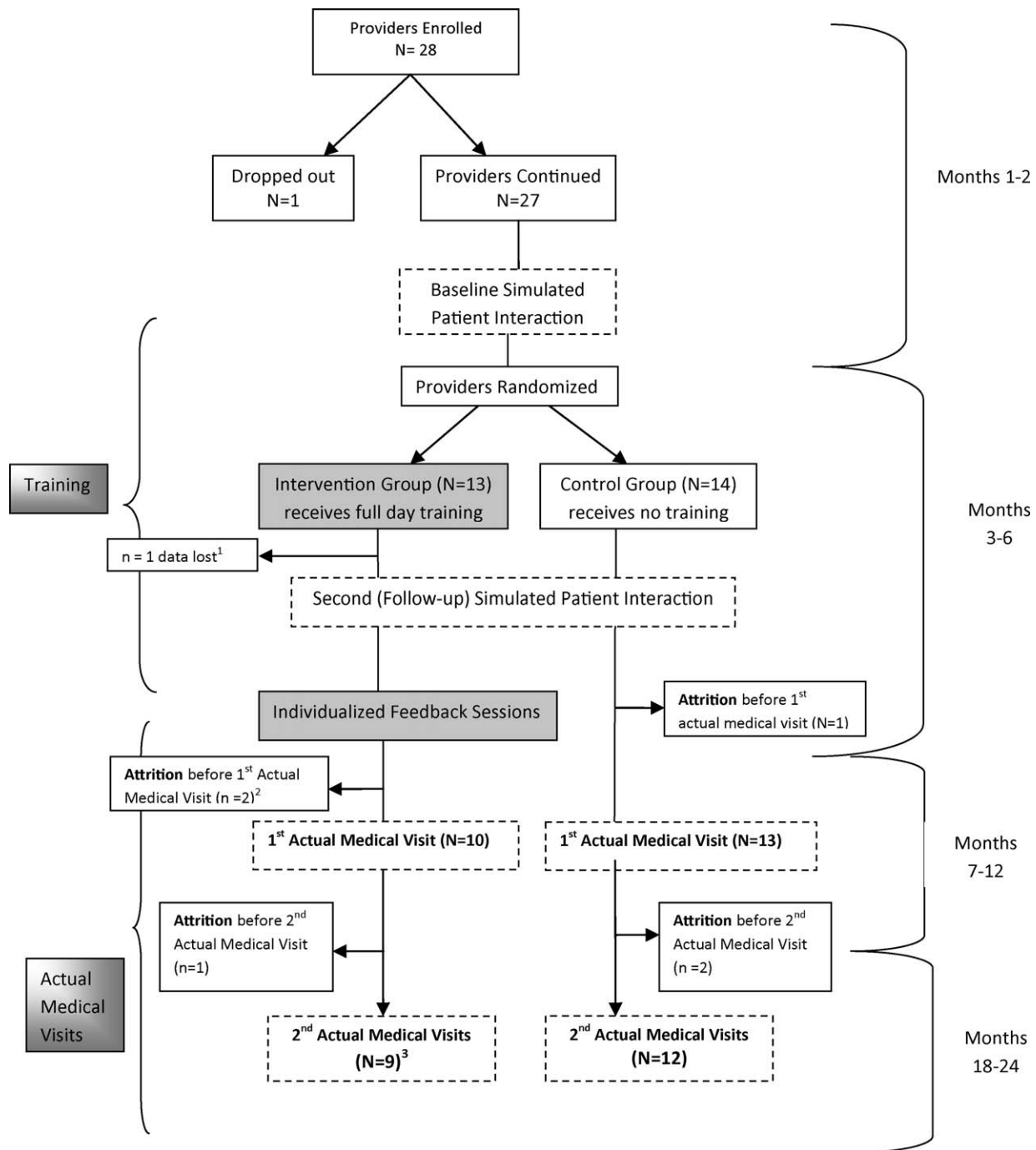
Individual RIAS codes were combined to create a patient-centeredness summary score; a ratio of all codes relating to socio-emotional and psychosocial elements of exchange (all partnership building, psychosocial information and counseling, relationship building, positive, negative, and social talk by providers and patients, all physician open-ended questions, and all patient questions) divided by codes that further the biomedical agenda (the sum of all physician and patient biomedical information and counseling, orientations, and physician closed-ended questions) [36]. This summary score was used as a dependent variable in the analyses of the training and actual medical visit data (range = 0–5).

In addition to the standard RIAS codes, 21 communication proficiencies (shown in Table 3) that were related to the training content were documented as present or absent during the simulated patient interactions. These generic skills were chosen for training evaluation under the assumption that they would translate easily into proficiency in specific content discussion when the actual medical visit portion of the study began, and because one of the generic codes (003: elicitation of family history contributing factors) reflects attempts on the part of the provider to introduce discussion of ACE.

A 'proficiencies summary score' was computed as the sum of the 21 present/absent scores, and used as a dependent variable in the analysis of the training data (range = 0–21).

During the actual medical visit, discussion about 7 content-specific risk domains was documented as present or absent in the medical dialogue, substituting for the general 21 proficiencies measured at training. These topics were selected to reflect the domains included on the HRA: 'diet, weight and exercise', 'risk-taking behaviors', 'substance use', 'depression, anxiety and stress', 'suicide and violent behavior', 'adverse adult events', and 'adverse childhood events'.

In order to ensure satisfactory inter-rater reliability, a random sample of 10% of all of the tapes was re-coded by a second coder. As in several other studies, the coding system demonstrated adequate inter-coder reliability for basic RIAS coding (average reliability greater than .85 based on a Pearson Correlation Coefficient between coders) [36]. Of the 21 skill categories, 100% agreement was reached on 17; 91% agreement was reached on the remaining four categories. Eleven tapes from the actual medical visits were re-coded to analyze the coding of the content-specific domains; the agreement between coders was 100%.



**Fig. 1.** Provider assignment, training and measurements. (Dotted lines indicate assessment activities; shadow boxes indicate intervention trainings.) <sup>1</sup>Recoding error resulted in lost data. <sup>2</sup>Attrition rates analyzed for between-group differences using a chi-square test and found to be non-significant. <sup>3</sup>All “N’s” reported here reflect providers who had  $\geq 1$  patients enrolled; however providers who had only one patient visit are not included in the analysis.

## 2.5. Statistical analyses

Several different analyses were undertaken with the training data (patient-centeredness and 21 proficiencies) and the actual medical visit data (patient-centeredness and 7 content-specific risk domains).

Pre-training differences were tested for significance using independent group *t*-tests to ensure that there were no pre-treatment differences between the intervention and control groups. The efficacy of training was then tested with two split plot analyses (one each for the patient-centeredness summary

score and the proficiencies summary score) using pre- and post-training as repeated measures and group membership (intervention vs. control) as a between-subjects factor. For both variables, Cohen’s *d* was calculated as the difference between the time one and time two means for each group.

For the analyses of the patient-centeredness summary score in the actual medical visit data, linear mixed models were used to test for between-group differences at both time points separately. These analyses allow for the random (physicians) and nested (physicians nested within group) effects. For the 7 content-specific risk domains which were scored as “present” or “absent”,

**Table 3**  
Communication proficiencies assessed during training phase.

Code	Name	Examples of utterances
001	Identification of problem (example: stress)	It sounds like things are really tough for you. This sounds like a lot of (stress).
002	Elicits contributing factors	What is making you feel this way—do you know? When you're having trouble falling asleep, what are you thinking about?
003	Elicits family history contributing factors	Is there a reason why you don't see your parents? Did your father drink heavily?
004	Elicits values, beliefs about problem	So you don't necessarily see things the same way as your mother did—is that right?
005	Elicits (current) coping strategies	How are you coping with things/the stress right now? What do you do to relax?
006	Elicits other (current) support system information	Do you have friends who you can talk to about this?
007	Asks depression screen questions	Would you say you have been feeling down in the dumps? Would you describe yourself as feeling sad, depressed or unhappy for more than 2 weeks?
008	Assess readiness for change	Have you been thinking about leaving your husband? Are you ready to make a change?
009	Discuss pros/cons of change	So you think it'd be better for your son if you left—is that right? And how about your health—are you thinking your health might also improve?
010	Discuss barriers, obstacles to change	Do you think you'd be able to support yourself if you left [husband]? So this is something you've tried to do before—what happened?
011	Discuss solutions to barriers	Do you have any family that could help temporarily?
012	Discuss available therapies, services	There are support groups, counseling services.
013	Offer of help, support of doctor (non abandonment)	And I can always be reached, so I want you to call me. We will continue to work together on this.
014	Discuss costs, insurance, paperwork for proposed therapies	The costs of seeing a therapist are the same as the co-pay for this visit today. Your insurance will cover it.
015	Doctor gives materials	These booklets may be useful for reference.
016	Patient asks for materials	Do you have any materials for me to read?
017	Discussion of follow-up plan, another appt.	I'd like to see you again in 2 weeks.
018	Doctor asks for commitment to plan	Do you think you'll be able to come back then?
019	Discussion of family/friend involvement	Would it help if your husband came along next time?
020	Referral/other professional	I'd like you to see Dr. C. My nurse will make an appointment for you.
021	Referral/other resources	Here's a web site that may help you to understand this better.

generalized estimating equations were utilized to test for between-group differences at both time points separately. GEEs are appropriate for nested designs with dichotomous outcomes.

Effect size for the analysis of patient-centeredness in the actual medical visits was calculated as Hedges 'g' (the standardized difference between the groups accounting for within-cluster variance).

For all analyses, effect size measure for the control group was used as a baseline for a practice effect (i.e. the control group's difference was interpreted as the effect of practice on post-training and scores from second actual medical visits) and was subtracted out of the effect size measure of the intervention group.

All statistical tests were evaluated for significance using an alpha of .05.

### 3. Results

#### 3.1. Pre- and post-training simulated interactions

The efficacy of the training was examined in terms of differences in provider communication proficiencies, and in the patient-centeredness summary score, which was used as a dependent variable in analyses.

No significant pre-training differences were found between the groups. As is reflected in Table 4, the interaction of time by group

was significant, indicating that providers who received the training showed significant and differential improvements on both these variables; (interaction significance tests: proficiencies summary score,  $F(1,24) = 5.86, p < .05, d = 1.60$ ; patient-centeredness summary score,  $F(1,24) = 7.67, p < .05, d = .86$ ).

#### 3.2. Actual medical visits

At the first actual medical visit, the result of the linear mixed model analysis revealed a significant difference in scores, favoring the intervention group providers, on the RIAS-based summary measure of patient-centeredness,  $F(1, 20.59) = 8.43, p < .01$ . Hedges 'g' for this effect was .68.

The analysis of the 7 content-specific risk domains showed a significant difference between the intervention and control groups in the discussion of adverse childhood events, Wald's  $\chi^2(1) = 6.83, p < .001$ . Both of these differences favored the intervention group.

At the 1-year follow-up visit, the intervention group's significantly higher patient-centeredness summary score was sustained,  $F(1, 17.16) = 5.48, p = .032$ . Hedge's  $g$  for this effect was .69. Additionally, there continued to be a significant group effect, favoring the intervention group, for the discussion of adverse childhood events, Wald's  $\chi^2(1) = 6.01, p < .001$ . None of the other content-specific risk domains showed differences in frequency of discussion between the groups. All means are shown in Table 5.

**Table 4**  
Use of communication proficiencies and patient-centered communication during the training phase with simulated patients.

Measures of medical dialogue	Study group	Time one pre-training mean (SD)	Time two post-training mean (SD)	Time one vs. time two $p$	Group $\times$ time interaction $p$	Effect size $d$
Use of 21 targeted skills—all skills combined <sup>a</sup>	Intervention ( $n = 12$ )	6.58 (1.93)	12.83 (3.61)	$p < .001$	$p = .026$	1.60 <sup>b</sup>
	Control ( $n = 14$ )	6.50 (2.95)	8.36 (3.67)	ns		
Patient-centeredness <sup>c</sup>	Intervention ( $n = 12$ )	1.96 (1.04)	3.56 (1.35)	$p = .011$	$p = .041$	.86 <sup>b</sup>
	Control ( $n = 14$ )	2.18 (1.04)	2.38 (1.04)	ns		

<sup>a</sup> Sum of 21 proficiencies coded as 0: absent vs. 1: present; range of possible scores is 0–21.

<sup>b</sup> Net effect of training in standard deviation units after subtracting out an estimated practice effect.

<sup>c</sup> Range of possible scores is 0–5.

**Table 5**  
Discussion of the 7 HRA content areas and patient-centered communication at 1st and 2nd actual medical visits.

Content area discussed <sup>a</sup>	Group	1st actual medical visit mean (SD)	Group difference <sup>b</sup> <i>p</i> effect size	2nd actual medical visit mean (SD)	Group difference <sup>c</sup> <i>p</i> effect size
Diet, weight and exercise <sup>a</sup>	Intervention (I)	.93 (.09)	ns	1.00 (.00)	ns
	Control (C)	.93 (.15)		.93 (.16)	
Risk-taking behaviors	(I)	.62 (.33)	ns	.35 (.40)	ns
	(C)	.58 (.36)		.48 (.36)	
Substance use	(I)	.70 (.26)	ns	.71 (.21)	ns
	(C)	.82 (.26)		.67 (.35)	
Depression, anxiety and stress	(I)	.79 (.28)	ns	.65 (.37)	ns
	(C)	.72 (.25)		.74 (.29)	
Suicide and violent behavior	(I)	.09 (.18)	ns	.07 (.19)	ns
	(C)	.07 (.15)		.00 (.00)	
Adverse adult events	(I)	.24 (.31)	ns	.16 (.19)	ns
	(C)	.11 (.15)		.12 (.18)	
Adverse childhood events	(I)	.43 (.19)	<i>p</i> < .001 <i>d</i> = 1.16	.30 (.17)	<i>p</i> < .001 <i>d</i> = 2.81
	(C)	.16 (.22)		.02 (.06)	
Patient-centeredness	(I)	3.67 (1.30)	<i>p</i> < .01 <i>g</i> = .68	3.30 (1.19)	<i>p</i> < .05 <i>g</i> = .69
	(C)	2.42 (.67)		2.55 (.69)	

<sup>a</sup> The means shown are weighted means for the frequency with which each content area was discussed (averaged within one provider over all his/her patients).

<sup>b</sup> 1st actual medical visit differences are reported to show that training gains were maintained into the clinical setting among the intervention group providers.

<sup>c</sup> 2nd actual medical visit differences are reported to illustrate lasting effects of training/effects of optional workshops.

#### 4. Discussion and conclusion

This study was designed to determine both the efficacy and effectiveness of training to increase patient-centered communication, communication proficiency and discussion of targeted topics by primary care providers. Efficacy was assessed by analysis of physician interactions with simulated patients. Effectiveness was assessed by analysis of physician interactions in the clinical setting with their patients.

##### 4.1. Efficacy of training

These results support the conclusion that the provider training was efficacious at improving patient-centeredness communication, and at increasing provider communication proficiencies. Effect sizes for both these changes in the trained group immediately post-training were 'large' to 'very large' by commonly accepted standards. This result is consistent with a large-scale review which found that those training interventions defined as 'high intensity' (defined as >1 contact with trainees, involvement of research personnel, and more than one delivery modality), produced significant improvements in the communication behaviors of physicians, particularly the asking of more open-ended questions and fewer bio-medically focused questions [37].

The RIAS-based patient-centeredness summary score reflects a variety of communication elements covered extensively in the training. In addition, the results of the analysis of provider communication proficiency show that training resulted in differential improvements among the intervention providers in the performance of the 21 communication skills. Given that training focused on both of these areas, it is not surprising that the intervention group demonstrated such a large increase on these variables, even after subtracting out an estimated practice effect.

It is worth noting that causal inferences about differences between intervention and control providers are weakened because the control group was not given a 'placebo' intervention. In ideal circumstances, control providers would have been offered a day-long psycho-educational seminar on a different topic. There is also the possibility that other non-specific effects related to group

assignment may have occurred. These effects can be both positive, such as intervention providers changing behaviors as a result of being in the treatment arm; or negative, such as control group providers experiencing a 'demotivation' effect as a result of randomization to the control group, which had other drawbacks such as inability to accrue CME credits. A clear drawback for studies such as these is that it is challenging to blind participants (in this case, providers) to their group assignment and thus the causal inference drawn is open to challenge.

##### 4.2. Effectiveness of training in the clinical setting

In the actual medical visits at both the initial visit and 1-year follow up, there were large and significant differences between the intervention and control groups in patient-centered communication and in the discussion of adverse childhood events. We interpret these results to indicate that the gains achieved after the training were maintained in the clinical setting, and perhaps enhanced by the optional workshops with the intervention group. Providers who attended the mid-intervention optional workshop (between medical visits 1 and 2) were motivated to maintain their skills. Further, many stated that they believed additional discussion and role playing would reinforce their proficiency in discussing difficult subjects within the actual medical visit.

Due to data collection and coding protocols, we were unable to examine whether the patient or the provider initiated the discussion of childhood adverse events. In addition, the health risk assessment (HRA) that patients filled out prior to their annual medical visits included questions about childhood adversity, possibly priming patients to raise these issues with their physicians regardless of the physicians' group assignment. Despite the fact that some of the intervention group providers expressed discomfort discussing adverse childhood events and were concerned about raising this topic in a brief primary care encounter, the results suggest that the training provided skills to engage in this discussion no matter whether the topic was raised by the patient or the provider.

The available literature on provider training in communication skills suggests that while brief trainings can be effective, longer trainings, or those with follow ups that reinforce original training

topics are more effective [46,47]. Training gains that occurred with the one-day exposure to the group training session and one-on-one feedback using the video-taped post-training sessions with the simulated patients indicate that intensive training was sufficient to change and maintain the improvement in communication behaviors.

When the study was proposed, the numbers of providers in the two clinical departments was approximately 90. 30 providers left the institution prior to the start of recruitment, greatly reducing the available number of providers from whom to recruit. Of the 60 eligible providers, less than half initially agreed to participate; those who did not cited concerns about the time burden and loss of confidentiality due to tape-recording. In addition, providers in this university practice were generally unfamiliar with health services research and its potential benefits to their practice. Those who did agree to participate were therefore more motivated to overcome these barriers and thus may represent an unusual population, which limits the generalizability of our results.

#### 4.3. Practice implications

The results of this study suggest that primary care providers can be trained to achieve and maintain gains in patient-centered communication, communication skills and discussion about adverse childhood events. In this study, the gains were maintained over a period of 24 months.

We hypothesize that discussion of the underlying or root causes of disease, such as adverse childhood events, is important to improving health outcomes. Providers may be reluctant to talk about these issues because they raise difficult topics for which there may be no prospective treatment options and little evidence that discussing them will have any benefit. Doctors face competing demands within a brief patient visit and are disinclined to spend what limited time they have discussing sensitive topics that may open up “a Pandora’s Box”, putting them in an uncomfortable or awkward position of discussing subjects for which their training has not prepared them. However, there is evidence that the disclosure of traumatic events may reduce patient anxiety and improve patient outcomes [41], whether or not the disclosure involves the primary care provider directly.

The evidence reviewed here demonstrates that improvements can be made in provider communication skills; such skills have shown to be associated with improvement in patient outcomes, such as satisfaction and adherence to provider recommendations [23,27–29]. In addition, training can be useful to help focus interactions on specific content areas, even if those conversations are difficult or sensitive. To our knowledge, no other interventions have been tested to assess whether the gains in patient-centered communication and proficiency in discussing adverse events found in this study may lead to reductions in risk behavior. We are

currently testing these hypotheses in the context of the HRA intervention study.

#### Acknowledgements

We wish to thank the Departments of Family and Community Medicine and Internal Medicine at the University of New Mexico School of Medicine, the providers and simulated patients who participated in this study, and the ACE Study group for their assistance in making this study possible. In addition to the authors, team members who participated in the development of the training and the analysis of the data include (in alphabetical order): Stewart Duban, Denise Ernst, David Graeber, Richard Hough, Arthur Kaufman, Susan Larson, Samara Lloyd, Nancy Oestreicher, Karla Thornton, and Carolyn Voss. Finally, we acknowledge the financial support and personal encouragement of the Centers for Disease Control and Prevention, without which the study would not have been conducted.

#### Appendix A

Dr. O. is a primary care physician at our institution who shared with us the story of one of his patients—an obese woman whom he had been seeing for 14 years. He felt that he had had little success in helping her to address her eating or exercise behavior. In fact, he said, he felt like a failure as a physician with this patient. Dr. Felitti came to our institution in 2002 and Dr. O. was excited to hear the evidence suggesting that adult health risk behaviors like overeating may be related to childhood trauma and/or adversity. He was encouraged by Dr. Felitti to ask the patient whether she had experienced any childhood adversity. She disclosed that she had been abandoned by an alcoholic mother at a young age. She was unable as an adult to develop close and trusting relationships and therefore spent a lot of time home alone, eating. The provider felt that he had a much better understanding of the patient after this discussion and was able to arrive at a completely different recommendation for her focusing not on the obesity but on the development of a meaningful relationship. He encouraged her to adopt a dog who would give her unconditional love. He knew (without discussing this specific fact with her), that the dog would need to be walked, thereby surreptitiously inducing her to exercise. Six months later, she reported being in love with the dog and that she took the dog for a daily walk. Dr. O. noted that her weight had decreased. The patient reported never having spoken about those childhood events before and both parties felt strongly that their relationship was enhanced by an increased sense of trust and understanding. The patient felt ‘heard’ and the physician felt empowered to incorporate that knowledge into a better treatment plan, one that addressed both the patients’ physical health as well as her mental health.

#### Appendix B. Simulated patient case A

##### Case A

*Patient:* Harriett/Harry Stock [hyperactive, impatient, restless, too much exercise, underweight].

Harriet’s husband is Duane, Harry’s wife is Linda, and daughter/son is named Morgan.

*Diagnosis:* Annual visit

*Purpose of case:* Assess the patient/provider interaction with disclosure of traumatic life events.

*Characteristics of the patient:* You are a patient in your 40s with a history of hypertension. You are dressed neatly with light makeup (if a woman). You are cooperative and friendly, seem full of energy, you are constantly tapping your foot through out the visit and use your hands a lot when you talk. You think of yourself as pretty healthy.

Exercise all the time and take vitamins and eat only organic food. UNM recently shifted insurance carriers so you are here to establish with this provider. You also need a refill on your blood pressure meds. (Much later in the visit, you might be asking for a prescription for a sleeping aid because you sometimes have difficulty sleeping.)

*Past medical history:* You have a history of high blood pressure, which was discovered 4 years ago. (For Harriett, this was after the birth of her daughter.) You think it is under control; you are currently taking medication for it (name of drug). No other major health problems. You have no allergies to food or medication. During graduate school you had ulcers. Once you had shingles when you were up for your third year review (2 years ago). High blood pressure was discovered after the birth of her daughter 4 years ago (female). High blood pressure was discovered in an annual physical 4 years ago (male).

**Social history:** You work at UNM health sciences campus full time as an assistant professor in the department of neurosciences. Your topic of research is glial cell scanning. You are working on writing lots of grants to get funding for your research, so things have been pretty stressful lately. You are trying to get tenure track, “publish or perish”. You are going up for promotion in 2 years and you have to get enough publications by then or you will lose your job. So you have been exercising a lot to relieve stress. You exercise regimen includes running 5 miles in the morning, 2 h of cardio and weights at the gym in the afternoon, and sometimes, depending on your situation at home, go for another run in the evening, another 2–5 miles.

**Male:** Your wife just had a baby. [Non-drinker, non-smoker, does lots of exercising, you think you have a good diet, doesn't do drugs.]

**Female:** You have a 4-year-old daughter that is taken care of by your husband. He works evenings so he can stay at home with her during the day. [Non-drinker, non-smoker, does lots of exercising, you think you have a good diet, doesn't do drugs.]

**Family history:** Your parents were very healthy. Always pressuring to do well in school and get an education. Your parents argued a lot about how to raise the kids.

**Male:** Dad was very physically abusive to you. You did not think that he liked you much, always argued with your mom about how she mothered you.

**Female:** Mom was very physically abusive to you. You did not think that she liked you very much. She argued with your dad about how he favored you over the male children.

#### Case B

**Patient:** Jane Velarde, Joe Velarde

Jane's husband is Alberto, Joe's wife is Alison.

Children are daughter Sheri, age 15 and son Phil, age 17.

Jane's birth date is October 10, 1950.

[Depressed, heavy drinker (male), smoking pot (female), overweight]

**Diagnosis:** establishing new provider

**Purpose of case:** Assess the patient/provider interaction with disclosure of traumatic life events.

**Characteristics of the patient:** You are a patient age 55 with a history of asthma. You are dressed neatly with light makeup (if a woman). You are cooperative and friendly, but uncomfortable being at the doctor's office. You think you are pretty healthy; always manage to make it to work. UNM recently changed insurance carriers so you have made this appointment to get established with this provider and get a refill on your asthma inhaler (Albuterol, Advair?).

**Past medical history:** You have a history of asthma, you think it's under control; you are currently taking medication for it in the form of an inhaler. No other major health problems. You have no allergies to food or medication.

**Social history:** You have two kids Sheri who is 15 and Phil who is 17. You work at UNM main campus full time (male-maintenance technician), you just got transferred to do work at the President's office where the standards are very high; female-administrative assistant at Office of Student Affairs your office is located in the Student Union Building. You are currently going through some rough times with your marriage, possibly getting separated and/or divorced.

**Male:** Your wife is in the process of moving out and taking the kids with her. She says that you have been verbally abusive to her and the kids and that you drink too much. You don't want her to leave and take your kids; the situation is very stressful and makes you depressed. [Heavy drinker, trying to hide it from family, non-smoker, doesn't exercise (too busy) don't do drugs.]

**Female:** You want to leave your husband and take your kids with you. He has been very verbally abusive to you and the kids and drinks too much. You are not sure if you can afford to leave him and raise your kids on your own. The situation is very stressful and makes you depressed. Social pot smoker [(not at home, only after work with friends), non-smoker (because of the asthma), doesn't exercise (too busy)].

You are somewhat overweight, even though you “watch what you eat”. Sometimes, you just eat just to eat, not because you are particularly hungry, but because it makes you feel better. This is particularly true lately; foods that make you feel better are high in fat and carbs (bread and butter and jam), pasta with cheese sauce, sweets, coffee drinks at Dunkin' Donuts (along with a donut to go), fast food fries or chips, etc., especially when you are smoking pot.

**Family history:** Your mother had many health problems when you were young, you don't really know what they were just that she couldn't really take care of you and your siblings (2 sisters in California). Your father was an alcoholic who was verbally abusive to your mother and the kids. Mom tried to leave with the kids on numerous occasions but was never able to actually do it. Your siblings are in pretty good health as far as you know, they live out of state.

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