An Electronic Linkage System for Health Behavior Counseling
Effect on Delivery of the 5A’s

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Background: A variety of factors limit the ability of clinicians to offer intensive counseling to patients with unhealthy behaviors, and few patients (2%–5%) are referred to the community counseling resources that do offer such assistance. A system that could increase referrals through an efficient collaborative partnership between community programs and clinicians could have major public health implications; such was the subject of this feasibility evaluation.

Methods: At nine primary care practices, an electronic linkage system (eLinkS) was instituted to promote health behavior counseling and to automate patient referrals to community counseling services. Patients were offered 9 months of free counseling for weight loss, smoking cessation, and problem drinking at a choice of venues: group counseling, telephone counseling, computer care, and usual care. The delivery of behavioral counseling, measured by the 5A’s (ask, address, advise, assess, agree, arrange) and patients’ reported experiences with eLinkS, was examined.

Results: For 5 weeks eLinkS was used, until high referral volumes depleted counseling funds. Of the 5679 patients visiting the practices, 71% had an unhealthy behavior. Of these patients, 10% were referred for intensive counseling from a community program, most often for weight loss. Counseling and referrals occurred regardless of visit type—wellness, acute, or chronic care. eLinkS was used more often for middle-aged adults and women and by more-experienced clinicians.

Conclusions: The intervention increased the rate at which patients were referred for intensive behavioral counseling compared to current practice norms. Given the evidence that intensive counseling is more effective in promoting behavior change, implementing eLinkS could have substantial public health benefits.


Background

Four unhealthy behaviors—tobacco use, unhealthy diet, physical inactivity, and risky alcohol use—account for approximately 37% of deaths in the U.S.¹ Addressing these behaviors could help stem the rising prevalence and cost of chronic diseases,²–⁴ and clinicians can play a pivotal role. Americans have regular contact with clinicians and value their advice. A clinician’s recommendation to change behavior is widely cited as a motivating factor.⁵,⁶ Guidelines recommend that clinicians use the 5A’s (assess [A1]; advise [A2]; agree [A3]; assist [A4]; and arrange [A5]) to promote healthy behaviors (Table 1).⁶–¹¹

Following such guidelines is difficult for clinicians due to inadequate time, staff, reimbursement, and familiarity with counseling techniques.¹² Few patients report being asked regularly by clinicians whether they engage in unhealthy behaviors.¹³ Intensive counseling, often a necessity to help patients adopt and maintain healthy behaviors, is rarely possible in primary care settings; the percentage of patients who receive intensive counseling is probably less than 2%–5%.¹⁴,¹⁵ Increasing this percentage, even modestly, could have substantial public health implications, given the population-attributable risk of unhealthy behaviors and the benefits of intensive counseling.⁹,¹⁶–¹⁸
Few practices can undertake redesign efforts to systematically offer high-quality behavioral counseling. Exceptional practices and health systems have the infrastructure support, multidisciplinary team members, and staff to follow up with patients and motivate health behavior change, but these conditions are atypical. Ironically, the communities where clinicians practice are often home to programs and services that do offer this level of counseling. Such programs commonly report that local physicians refer few patients.

This study tested the feasibility of an electronic linkage system (eLinkS) to help connect these entities to support behavioral counseling. Utilizing the electronic medical record (EMR) as a platform, eLinkS was designed to (1) help clinicians systematically perform elements of the 5A’s that are feasible in busy practice settings (i.e., asking about health behaviors, offering brief advice, and agreeing on next steps); (2) make it fast and easy to refer patients to intensive counseling outside the office; and (3) establish bidirectional communication between practices and community counselors. This article examines the effects of eLinkS on counseling rates.

**Methods**

**Setting**

Nine primary care practices in the Tidewater region of Virginia were recruited. The practices, members of a single medical group and of the Virginia Ambulatory Care Outcomes Research Network (ACORN), share a common type of EMR (GE Centricity Physician Office) that is managed by a central informatics staff. The practices have used the EMR for 5 to 10 years. Practice size ranged from 1 to 30 clinicians (median = 3), and 48 (87%) clinicians participated in the study. Two sites were solo practices, five had three clinicians, one had eight clinicians, and one (a family medicine residency program) had 30 part-time clinicians and residents.

**Intervention**

The design of eLinkS reflects early input from clinicians at the study sites, solicited through site visits. The final version functioned as follows:

- **Assess (A1)**: Assess health behaviors and factors affecting behaviors.
- **Advise (A2)**: Provide clear, specific, personalized advice, including harms and benefits associated with behaviors.
- **Agree (A3)**: Select treatment goals and approach based on patient’s needs.
- **Assist (A4)**: Aid patient in achieving agreed-upon goals through self-help, counseling, and adjunctive medical treatments as appropriate.
- **Arrange (A5)**: Arrange follow-up contacts to provide ongoing assistance.

Practices could distribute a flyer in the waiting room that informed patients about the following four referral options, which were available for free for up to 9 months:

- Group counseling was offered in community locations: for weight loss by Weight Watchers; for tobacco use, by the local hospital’s wellness center; and for risky alcohol use, by Alcoholics Anonymous (AA).
- Telephone counseling, offered for smoking cessation and weight loss, was delivered by trained counselors at the University of Kentucky Health & Wellness Program Behavioral Health Improvement Program (BeHIP).
- Computer care provided patients access to an interactive website developed previously by ACORN and to an e-counseling service that ACORN and BeHIP designed for this project. The e-counseling program followed the BeHIP telephone counseling protocol but was used asynchronously online.
- Usual care included options other than the above (e.g., physician counseling, pharmacotherapy, or even inaction).

When staff who take patients to the examination rooms (“rooming” staff) obtained patients’ vital signs and entered them into the medical record, the EMR displayed a screen prompt to remind the staff to enter height, weight, and tobacco-use status (A1). If a patient was overweight or obese (BMI ≥ 25 kg/m²); smoked; or had an EMR entry of risky alcohol use, a prompt appeared when the clinician opened the patient’s record. The prompt asked if the clinician wanted to address the flagged behavior(s) at that visit. If the clinician clicked yes—a step that was classified as Address (Ad)—the EMR would open a form (Figure 1). The form included checkboxes wherein clinicians could document whether they gave brief advice to change behavior (A2); whether the patient was ready to improve and engage in the process (A3); whether the patient wanted to be referred outside the practice to one of the intensive-counseling options noted above (A4); and by what means (telephone, appointment, or e-mail) the patient sought follow-up by the practice (A5).

To allow the clinician to view all of the patient’s unhealthy behaviors, automatic prompts would not display until the rooming staff entered both weight and tobacco-use status. A current or past height measurement also was required for BMI calculation. At any point in any encounter, clinicians could also load the form manually.

The screen displays and the EMR programming were designed to make the interface with clinicians easy and fast, to automate the referral process electronically, and to facilitate proactive counseling. When telephone or group counseling was selected through eLinkS, the EMR automatically e-mailed contact information to the intensive-counseling program staff, who then would contact the patient (rather than having the patient call the intensive-counseling program [reactive counseling]). When clinicians selected computer care, the EMR forwarded an e-mail to the patient with a link to the educational website and instructions for e-counseling. AA referrals were reactive; the EMR would print a list of AA meetings for clinicians to hand to patients.

**Exposure Period**

Training sessions for eLinkS of 1-hour duration were held at all practices prior to launch. The intervention went live on...
April 16, 2006, and was discontinued 5 weeks later (May 22, 2006) when an overwhelming surge in referrals for intensive counseling exceeded available funds. Patients referred to intensive counseling during the exposure period were eligible to receive services for up to 9 months (through February 2007). Weekly feedback reports notified participating clinicians of the number of counseling referrals they had placed.

**Data Collection**

The delivery of the 5A’s (this report’s main outcome variables) was measured by clinicians’ entries in the EMR dialogue box. EMR data were collected for all adults (aged ≥18 years) visiting the practice from 2 years prior to the encounter to 1 year afterward. Dependent variables were either patient-specific (age, gender, and ICD-9 codes for comorbid conditions) or encounter-specific (weight, tobacco-use status, documentation of any alcohol disorder, patient’s stated reason for visit, and Current Procedural Terminology [CPT] codes). The reason for the visit was classified as acute, wellness, or selected chronic conditions, based on the criteria in Table 2.

Postal surveys were mailed 2 weeks after the encounter to all counselees (patients referred to an intensive-counseling option or receiving usual care), and asked respondents to describe the encounter. An established mailing protocol (modified Dillman technique31,32) was used to optimize response rates. Surveys completed by office managers provided information about clinicians, practices, and whether only clinicians or clinician–nurse teams used eLinkS.

**Data Analysis**

Statistical calculations were performed in SAS version 9.1.3. Differences in percentages were tested for significance using Fisher’s exact test. A logistic regression was performed for each of the 5A’s. The initial regressor variables were those that could theoretically influence eLinkS usage: the patient’s age, gender, health behaviors, and comorbidities; encounter type and complexity; and the physician’s age, gender, training, years in practice, and practice site. Variables were retained in the model in a stepwise method that used $p < 0.25$ as the entry criterion and $p < 0.10$ as the retention criterion. The patient was the unit of analysis. Practices were selected purposively, and fixed-practice effects were considered. This study was approved by the IRBs of Virginia Commonwealth University and Riverside Health System.

**Results**

**Study Population**

A total of 5679 adult patients visited the practices during the 5-week exposure period. Their ages (median=53 years); gender (64% female); and frequency of prevention visits (14%) were typical of adult primary care populations (Table 2).33 The frequency of chronic-care visits at other places was lower than published norms (9% vs 44%).33 because only visits for selected reasons met this study’s definition of relevant chronic illnesses. The prevalence of circulatory diseases was similar to the general population’s (34% vs 36%); the prevalence of neoplasms (9% vs 7%) was slightly higher, as was the prevalence of diabetes (15% vs 7%).34 The prevalence of multiple unhealthy behaviors resembled national norms.35 Rates
for overweight/obesity, tobacco use, and risky alcohol use were consistent with local norms.36–38

The postal survey was mailed to 583 counselees and was returned by 358 (61%). The age, gender, weight, and comorbid conditions of survey respondents did not differ significantly from those of nonrespondents. Participating clinicians were not representative of primary care clinicians generally, because a large percentage (44%) were family medicine residents, a group that is younger and comprises more women than nonresidents.39

### Delivery of the 5A’s

The delivery of the 5A’s is depicted in Figure 2.

#### Assess (A1)

Rooming staff collected both BMI and tobacco-use information for 2117 patients, 37% of the 5679 patients who visited the practices (Figure 2). Data were missing more often for tobacco-use status than for BMI. When BMI data were incomplete, the missing information was more often height than weight (97% vs 45%).

#### Address (Ad)

eLinkS prompts appeared for 1860 patients, 1801 occurring automatically and 59 initiated by the clinician. When confronted with these prompts, clinicians elected to open the dialogue box form (address the behavior) for 912 (49%) patients.

#### Advise (A2)

Clinicians advised 537 patients to change their health behavior, 13% of patients with an unhealthy behavior (n=4030) and 29% of patients for whom a prompt appeared (n=1860; Figure 2). A2 was documented for 20% of smokers, 7% of overweight patients, 17% of obese patients, and 13% of problem drinkers.

Respondents to the postal survey reported higher advice rates. Among those referred for weight loss, 75% reported receiving advice on this topic, and more than half reported clinician advice about diet or exercise. Among those referred for smoking cessation, 97% recalled clinician advice about smoking. Fully 86% of counselees considered it appropriate for the clinician to discuss health behaviors, and 54% were unsure whether they would have mentioned the topic if their clinician had not done so.

#### Agree (A3)

Clinicians recorded that 461 patients were ready to improve the targeted behavior, and 441 were engaged in what to do next. This represents 86% and 82%, respectively, of patients who received clinician advice (n=537).

#### Assist (A4)

Fully 407 patients were referred for intensive counseling, 10% of patients with an unhealthy behavior or 76% of patients who received A2 (Figure 2). The population that received A4 included 12% of obese patients, 3% of overweight patients, and 8% of smokers; no risky drinkers were referred for intensive counseling. Two thirds of patients who sought intensive counseling

### Table 2. Patient and clinician demographics (n/% unless otherwise noted)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PATIENT</strong> (N=5679)</td>
<td></td>
</tr>
<tr>
<td>Median age, years (range)</td>
<td>53 (18–105)</td>
</tr>
<tr>
<td>Gender (% women)</td>
<td>64</td>
</tr>
<tr>
<td>Reason for visit</td>
<td></td>
</tr>
<tr>
<td>Acute illness/injury</td>
<td>2028 (25)</td>
</tr>
<tr>
<td>Selected chronic illnesses</td>
<td>532 (9)</td>
</tr>
<tr>
<td>Wellness/prevention</td>
<td>657 (14)</td>
</tr>
<tr>
<td>Other</td>
<td>2388 (62)</td>
</tr>
<tr>
<td><strong>Comorbidities</strong></td>
<td></td>
</tr>
<tr>
<td>Circulatory disease</td>
<td>1921 (34)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>533 (9)</td>
</tr>
<tr>
<td>Neoplasm (any type)</td>
<td>826 (15)</td>
</tr>
<tr>
<td>Respiratory disease</td>
<td>2849 (50)</td>
</tr>
<tr>
<td><strong>Behavioral risk factors</strong></td>
<td></td>
</tr>
<tr>
<td>BMI ≥25–29 kg/m²</td>
<td>1415 (25)</td>
</tr>
<tr>
<td>BMI ≥30 kg/m²</td>
<td>2197 (39)</td>
</tr>
<tr>
<td>Current smoking</td>
<td>922 (16)</td>
</tr>
<tr>
<td>Alcohol misuse</td>
<td>286 (5)</td>
</tr>
<tr>
<td><strong>Total number of risk factors</strong></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>1649 (29)</td>
</tr>
<tr>
<td>1</td>
<td>3294 (58)</td>
</tr>
<tr>
<td>2</td>
<td>682 (12)</td>
</tr>
<tr>
<td>3</td>
<td>54 (1)</td>
</tr>
<tr>
<td><strong>CLINICIAN</strong> (N=48)</td>
<td></td>
</tr>
<tr>
<td>Median age, years (range)</td>
<td>37 (26–62)</td>
</tr>
<tr>
<td>Gender (% women)</td>
<td>52</td>
</tr>
<tr>
<td>Clinician type</td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td>23 (48)</td>
</tr>
<tr>
<td>Resident</td>
<td>21 (44)</td>
</tr>
<tr>
<td>Mid-level provider</td>
<td>4 (8)</td>
</tr>
<tr>
<td>Median years in practice (range)</td>
<td>7.5 (2–31)</td>
</tr>
<tr>
<td>Average number of full-time equivalent clinicians in the office (range)</td>
<td>6.3 (0.9–8.0)</td>
</tr>
<tr>
<td><strong>Complete use of eLinkS</strong></td>
<td></td>
</tr>
<tr>
<td>Clinician only</td>
<td>38 (79)</td>
</tr>
<tr>
<td>Team approach</td>
<td>10 (21)</td>
</tr>
</tbody>
</table>

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36 Based on electronic medical record (EMR) data
37 As determined from surveys administered to office managers and participating clinicians (response rate=100%)
38 Reason for visit classification: Acute illness/injury included any self-limited condition (lasting days or weeks). Selected chronic illnesses included chronic disorders for which counseling regarding the three target risk factors might be particularly relevant, including chronic cardiovascular disease, respiratory disease, or diabetes. Wellness/prevention included visits focused on wellness or prevention, but it excluded visits focused on specific wellness screening tests. Other included visits not encompassed by the above categories and those for which the focus could not be determined accurately.
39 Comorbidities were defined by examining the ICD-9 codes in a patient’s EMR database for the index and all prior visits. Patients were classified as having circulatory disease, diabetes, neoplasm, or respiratory disease if their records included an ICD-9 code of 390–459, 250, 140–239, or 460–519, respectively.
40 In clinician only practices, the only involvement of rooming staff with the electronic linkage system (eLinkS) was to collect and record vital signs; the prompts and forms appeared only for the clinician. In team approach practices, both rooming staff and clinicians could access and use the forms.
counseling chose group counseling as the venue, primarily Weight Watchers. Usual care was requested by 176 patients.

Only 64% of postal survey respondents, including the usual-care group, recalled being invited by the clinician to try an intensive-counseling option. Higher percentages reported that the clinician was helpful and provided enough information to make a choice (80% and 87%, respectively). One third cited the clinician’s recommendation over other factors (e.g., convenience) as the primary consideration in selecting an A4 option. When surveyed 2 weeks after the visit, 65% of referred patients indicated that they were still planning to pursue intensive counseling.

Arrangement (A5). Arrangements for follow-up with the practice were made for 306 patients. Office visits, or nurses’ telephone calls to monitor progress, were the preferred arrangements (Figure 2).

Figure 2. Exposure to eLinkS and delivery of the 5A’s to the study population. The above figure depicts the delivery of the 5A’s (ask [A1]; address [Ad]; advise [A2]; assess [A3]; agree [A4]; and arrange [A5]) for health behavior counseling as recorded by eLinkS for all adult patients seen in the study practices during the exposure period (April 16, 2006–May 22, 2006). “This value (4030) represents the number of patients who had (1) either BMI or tobacco use status assessed (n=4923) and (2) abnormal results from this assessment. A denominator of 4030, or 70% of patients seen (N=5679), is used in the text when reporting the number of patients with an unhealthy behavior. Prompts appeared automatically (n=1801) only when (1) both the BMI and tobacco-use status were assessed and (2) the patient had evidence of an abnormality. Clinicians could also manually load the form, if BMI and/or tobacco use status were not assessed, and this occurred for 59 patients. A denominator of 1860 is used in the text when reporting the percentage of patients who were identified by prompts and received counseling. See text for description of counseling options.

Predictors of Use

While all of the practices used eLinkS, significant variation was observed by practice and by individual patient and clinician characteristics. For example, the crude rate for A2 was greater for female patients than for male patients (33% vs 23%, respectively). Even after adjustment (Table 3), ORs for delivering most of the 5A’s were generally greater when patients had unhealthy behaviors and were either female or middle-aged (aged 45–60 years) and when clinicians had had longer tenures in practice. Most of the 5A’s occurred less frequently at acute-care visits, but patients were referred to intensive counseling at all types of visits: 23% at acute-care visits, 26% at chronic-care visits, and 34% at wellness visits. Unexpectedly, the presence of comorbid diseases that benefit from behavioral counseling (e.g., diabetes) was not predictive of eLinkS use.

Discussion

This study was designed to observe whether clinicians would use eLinkS, what options the patients would self-select, and what effect the intervention would have on counseling practices and patients’ behaviors. The results are encouraging. The prompts appeared at more than one third of the encounters (due to the prevalence of overweight/obesity). The use of eLinks was steady throughout its 5 weeks of availability, and occurred at all manner of office visits, not just those devoted to prevention. In semistructured interviews conducted for a qualitative study, clinicians and office managers commented on the usefulness and feasibility of the system, and patients welcomed the selection and quality of the counseling services.

Public Health Implications

Evaluating eLinkS’ effect on health behaviors requires a randomized trial, but this report’s data seem encour-
aging on several grounds. Brief clinician advice (A2) is itself effective in promoting smoking cessation and, potentially, weight loss, and clinicians reported giving such advice at one third of the encounters in which the eLinkS prompt appeared. Patients referred for intensive weight-loss counseling to achieve a comparable referral rate as observed with using eLinkS. Data on the existing rate at which clinicians refer patients for intensive weight-loss counseling to achieve a comparable referral rate as observed with using eLinkS. Simple visits, moderate visits, complex visits, and wellness visits were those receiving CPT codes of 99212/99201, 99213/99202, 99214–99215/99203–99205, 99239x/99238x, respectively. Each age group compared to the 75 age group CPT, Current Procedural Terminology

<table>
<thead>
<tr>
<th>Table 3. Regression results—predictors for delivery of the 5A’s</th>
</tr>
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<tbody>
<tr>
<td><strong>AOR (95% CI) for delivery of the 5A’s</strong></td>
</tr>
<tr>
<td>Ask (A1)</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Patient characteristics</strong></td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>18–29 (vs ≥75)</td>
</tr>
<tr>
<td>30–44 (vs ≥75)</td>
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<tr>
<td>45–59 (vs ≥75)</td>
</tr>
<tr>
<td>60–75 (vs ≥75)</td>
</tr>
<tr>
<td>Gender, female (vs male)</td>
</tr>
<tr>
<td>1.8 (1.4–2.4)</td>
</tr>
<tr>
<td>Overweight (BMI ≥25–29 kg/m²)</td>
</tr>
<tr>
<td>2.4 (1.9–3.0)</td>
</tr>
<tr>
<td>Obese (BMI ≥30 kg/m²)</td>
</tr>
<tr>
<td>2.6 (2.1–3.1)</td>
</tr>
<tr>
<td>Smoker —</td>
</tr>
<tr>
<td>Respiratory comorbidity</td>
</tr>
<tr>
<td>1.4 (1.1–1.7)</td>
</tr>
<tr>
<td>Diabetes comorbidity</td>
</tr>
<tr>
<td>1.3 (1.1–1.6)</td>
</tr>
<tr>
<td>Encounter characteristics</td>
</tr>
<tr>
<td>Acute visit (vs wellness)</td>
</tr>
<tr>
<td>1.7 (1.2–2.6)</td>
</tr>
<tr>
<td>Chronic visit (vs wellness)</td>
</tr>
<tr>
<td>1.8 (1.1–3.1)</td>
</tr>
<tr>
<td>Moderate visit CPT (vs simple)</td>
</tr>
<tr>
<td>1.1 (0.8–1.5)</td>
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<tr>
<td>Complex visit CPT (vs simple)</td>
</tr>
<tr>
<td>1.5 (1.0–2.2)</td>
</tr>
<tr>
<td>Wellness visit CPT —</td>
</tr>
<tr>
<td>10.2 (5.8–17.9)</td>
</tr>
<tr>
<td>Clinician characteristics</td>
</tr>
<tr>
<td>Gender, female (vs male)</td>
</tr>
<tr>
<td>0.5 (0.4–0.8)</td>
</tr>
<tr>
<td>Years in practice (1 year)</td>
</tr>
<tr>
<td>1.0 (1.0–1.0)</td>
</tr>
<tr>
<td>Trained clinician (vs resident)</td>
</tr>
<tr>
<td>0.8 (0.5–1.5)</td>
</tr>
</tbody>
</table>

Note: Data fields with no values (—) represent variables not retained in the logistic regression model. Bolded numbers represent significant differences. See Table 2 for definitions of cancer comorbidity, respiratory comorbidity, and diabetes comorbidity. Simple visits, moderate visits, complex visits, and wellness visits were those receiving CPT codes of 99212/99201, 99213/99202, 99214–99215/99203–99205, 99239x/99238x, respectively.

The percentage of patients with unhealthy behaviors who received intensive counseling through eLinkS (10%) appears to exceed practice norms. If approximately 62% of patients are overweight/obese, a clinician who sees 30 patients daily would have to refer 2 patients for intensive weight-loss counseling to achieve a comparable referral rate as observed with using eLinkS. Data on the existing rate at which clinicians refer patients for intensive counseling are sparse. Clinicians refer approximately 1–5% of smokers to quitlines, percentages lower than the referral rate observed in this study (8%). Some studies report that A4 is delivered to 13% to 43% of smokers. However, what constitutes A4 in such studies is variable, and may not equate with intensive counseling as defined here. For example, HEDIS reports a high rate for A4, but any discussion either of medications or strategies to quit can qualify. In contrast, patients receiving A4 through eLinkS participated over 9 months in as many as 70 sessions of up to 120 minutes each. Published A4 rates for weight loss appear significantly lower than for smoking cessation, and equally brief. The
more-extensive counseling offered in this study would
be expected to produce substantially greater effects on
behavior than seems currently possible in ordinary
practices.

Caveats and Confounding Variables
Several elements of this intervention may have en-
hanced the referral rate:

- Intensive counseling was free to patients, eliminat-
ing cost as a barrier.
- Participating practices were experienced with EMRs.
- The intervention employed active prompts; EMR
  vendors prefer passive prompts, which are less effec-
tive but also interfere less with workflow.60–62

Conversely, several factors may have attenuated the
intervention’s effectiveness:

- Displaying prompts only after rooming staff had en-
tered both BMI and tobacco-use data restricted the
number of patients receiving the full intervention.
- eLinkS was operational for only 5 weeks. The early
  shutdown limited patients’ exposure to the interven-
tion over multiple visits, and gave little time for
  clinicians to acclimate to eLinkS and community
  partners.
- Participating clinicians were younger and more in-
experienced than practicing physicians, an artifact
  of including the residency program.
- eLinkS was used more for middle-aged patients and
  women, perhaps because the available services (e.g.,
  Weight Watchers) appealed to this group.
- Problem drinkers received little benefit from eLinkS.
  By protocol, rooming staff assessed BMI and toba-
coo-use status but not alcohol use. Fewer intensive-
counseling options were available for risky alcohol
use, and referrals were reactive rather than proactive.

Other study limitations include the nonrandomized,
pre–post design. While this design was appropriate for
an initial evaluation of feasibility, comparisons among
groups are subject to biases and confounding. Second,
the study involved only nine practices, and the fidelity
of the intervention varied among sites. Third, EMR data
were used to document the 5A’s; clicking an onscreen
response option does not clarify what actually occurred
during the encounter. Finally, the external validity of
the counselee’s survey responses is limited because they
represent a subset of patients.

Conclusion
Collaboration between clinicians and community re-
sources, as occurred here, presents a win–win scenario
for patients, clinicians, and community programs. Pa-
patients obtain more-intensive assistance. Clinicians, who
frequently cannot provide intensive counseling them-
selves,63 welcome an easy means to connect patients
with the help they need. Community programs, which
often struggle to attract clients through media and
advertising, appreciate the influx of referrals from the
medical community.

This process has implications that extend beyond
behavioral counseling. A system like eLinkS that facili-
tates systematic screening and referrals could, with
some modification, help clinicians arrange screening
tests and chronic disease management—all with the
click of a mouse. Clinician–community collaboration
long has been advocated for these purposes,64 but
applying modern technology to make collaboration
easy holds considerable promise.

This work was funded under grant #53769 from the Robert
Wood Johnson Foundation and the Agency for Healthcare
Research and Quality under the Prescription for Health
initiative. The authors thank the practices in Riverside Med-
tical Group that participated in this study: Bruton Avenue
Family Medicine, Eagle Harbor Primary Care, Elizabeth Lakes
Family Practice, Hilton Family Practice, Mathews Medical
Center, Mercury West Medical Center, Patriot Primary Care,
Riverside Family Medicine, and Williamsburg Medical Arts
Family Practice. They also thank the staff of Weight Watchers
(Stephanie Schoemer, MS, RD); Riverside Wellness Center
(Holly Hicks); and BeHIP (Tammy Akins), for their assis-
tance both in arranging intensive-counseling services for the
study subjects and in data collection. They thank Sharon
Flores, MS, for coordinating the project; Amy Burgett, RN, for
interfacing with the practices; Steven Mitchell for database
management; Tina Cunningham, MS, for statistical analysis;
and Kristen Mertz for the EMR programming that underlies
eLinkS. They received invaluable advice and assistance on the
design and conduct of the study and on draft manuscripts
from Carole Hale, Anton Kazel, MD, MPHE, Daniel Longo,
ScD, David Marsland, MD, and Paul Mazmanian, PhD, and
from the following expert consultants: Richard Botehlo, MD,
Russell Glasgow, PhD, John Hickner, MD, MSc, Abby King,
PhD, Jesse Crosson, PhD, and Atif Zafar, MD. They thank
Michael Fleming, MD, MPH, for his attempts to identify
intensive-counseling options for problem drinkers. Finally,
the study received extensive support from the staff of the
Prescription for Health National Program Office (led by
Larry A. Green, MD, and Maribel Cifuentes, RN, BSN); the
Prescription for Health evaluation team at the University of
Medicine and Dentistry of New Jersey (led by Benjamin
Crabtree, PhD, MA, and Deborah Cohen, PhD); the National
Advisory Committee for Prescription for Health; and the
project officers (Sue Hasmiller, PhD, RN, and Laura Leviton,
PhD) of the Robert Wood Johnson Foundation.

No financial disclosures were reported by the authors of
this paper.

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