From Good to Great: The Role of Performance Coaching in Enhancing Tobacco-Dependence Treatment Rates

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ABSTRACT

PURPOSE The purpose of this study was to examine the incremental effect of performance coaching, delivered as part of a multicomponent intervention (Ottawa Model for Smoking Cessation [OMSC]), in increasing rates of tobacco-dependence treatment by primary care clinicians.

METHODS In a cluster-randomized controlled trial, 15 primary care practices were randomly assigned to 1 of the following active-treatment conditions: OMSC or OMSC plus performance coaching (OMSC+). All practices received support to implement the OMSC. In addition, clinicians in the OMSC+ group participated in a 1.5-hour skills-based coaching session and received an individualized performance report. All clinicians and a cross-sectional sample of their patients were surveyed before and 4 months after introduction of the interventions. The primary outcome measure was rates of tobacco-dependence treatment strategy (*Ask*, *Advise*, *Assist*, *Arrange*) delivery. Secondary outcomes were patient quit attempts and smoking abstinence measured at 6 months' follow-up.

RESULTS Primary care clinicians (166) and patients (1,990) were enrolled in the trial. Clinicians in the OMSC+ group had statistically greater rates of delivery for *Ask* (adjusted odds ratio [AOR] = 1.69; 95% CI, 1.05-2.72), *Assist* (AOR = 1.64; 95% CI, 1.08-2.49), and *Arrange* (AOR = 2.01; 95% CI, 1.22-3.31). Sensitivity analysis found that the rate of delivery for *Advise* was greater only among those clinicians who attended the coaching session (AOR = 1.65; 95% CI, 1.10-2.49; $P = .02$). No differences were documented between groups for cessation outcomes.

CONCLUSIONS Performance coaching significantly increased rates of tobacco-dependence treatment by primary care clinicians when delivered as part of a multicomponent intervention.

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INTRODUCTION

Smoking cessation is arguably the most powerful preventive intervention available in primary care practice.[1-3] The 5 As strategy (*Ask*, *Advise*, *Assess*, *Assist*, *Arrange*) is the basis for tobacco-dependence treatment in clinical settings; however, integrating evidence-based tobacco-dependence treatment into clinical practice routines remains a challenge.[1-8] The important role of family medicine in addressing tobacco use with patients is well recognized, and multiple international guidelines and reports have identified the need to increase rates of tobacco-dependence treatment in primary care settings.[1-9]

Strategies, including clinician training, electronic health record (EHR) prompts, and adjunct counseling, have been shown to significantly increase rates of tobacco-dependence treatment in primary care settings.[10-14] Meta-analyses show that multicomponent interventions combining several intervention strategies are the reference standard for increasing clinician performance in delivering tobacco-dependence treatment.[1] The Ottawa Model for Smoking Cessation (OMSC) is a multicomponent quality improvement intervention for addressing tobacco use with smokers in clinical settings that has been implemented in more than 350 hospitals

Conflicts of interest: R.D.R. has received speaker and consulting fees from Pfizer and Johnson & Johnson; K-A.M. has received speaker fees from Pfizer; A.L.P. has received speaker and consulting fees from Pfizer and Johnson & Johnson. All others report none.

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and primary care practices in Canada (http://www.ottawamodel.ca).[15-18] The OMSC supports primary care teams with the introduction of a systematic, team-based approach to addressing tobacco-dependence treatment delivery based on 10 best practices.[19] Evaluations of the OMSC in primary care settings have documented a significant increase in clinician delivery of evidence-based tobacco-dependence treatments.[14-15] Despite an overall increase in treatment rates, significant variability in rates of tobacco-dependence treatment delivery can exist among individual clinicians exposed to the OMSC—even within the same practice.[15-16] This variability suggests that the intervention does not take hold among all clinicians in the same way; clinician-level factors may be responsible for some of the observed variance.[20-23]

Continuing medical education for tobacco-dependence treatment typically involves a single session using didactic training methods. Tobacco-dependence treatment can be a complex clinical intervention, however, requiring a number of skills; 1-time didactic educational sessions may be inadequate for some clinicians. Active forms of continuing medical education, such as interactive training including audit and feedback, are promising methods for ensuring the implementation of evidence-based guidelines within general practice.[24-26] Evidence from the health care quality improvement literature suggests that reinforcement training and peer coaching may improve physicians' and medical residents' patterns of practice.[27-33]

The primary objective of this study was to compare the incremental effectiveness of clinician performance coaching when delivered as part of a multicomponent intervention (OMSC) on rates of tobacco-dependence treatment in family practice, compared with the multicomponent intervention alone. Secondary objectives were assessments of the effect of the intervention on patient quit attempts and smoking abstinence.

METHODS

Study Design

A cluster-randomized controlled trial was undertaken with family health teams (≥5 clinicians) in the province of Ontario, Canada (Figure 1). The complete research protocol for the trial has been published.[19] Family medicine practices were matched and randomly assigned to 1 of the following intervention arms: OMSC or OMSC plus clinician performance coaching (OMSC+). From each of the participating practices, a cross-sectional sample of eligible tobacco users was recruited before and after intervention to assess clinicians' performance in tobacco-dependence treatment delivery (4 As), patient quit attempts, and biochemically verified 7-day point-prevalence abstinence. The trial was approved by the Ottawa Health Science Network Research Ethics Board.

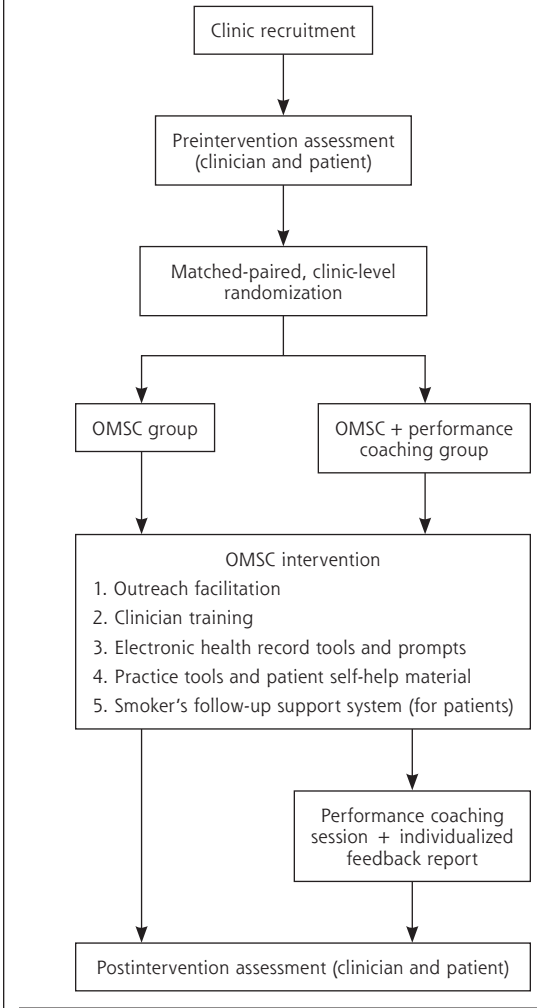
Randomization and Concealment

The average rate for delivery of the *Advise* strategy for each practice at baseline was used to match practices before randomization because previous evaluations of the OMSC have shown imbalance in this variable.[15,16] Randomization was conducted by the Research Methods Centre (University of Ottawa Heart Institute, Ottawa, Ontario, Canada), which was blind to practice identifiers. Patients and research assistants were blinded to their practice's group assignment.

Clinical Model

The OMSC is grounded in the latest evidence-based guidelines for tobacco treatment and uses an adapta-

Figure 1. Randomized controlled trial study design.



OMSC = Ottawa Model for Smoking Cessation.

tion of the well-known 5 As model, which includes the following[15,16]: (1) *Asking* all patients about their smoking status; (2) delivering personalized *Advice* to quit smoking to all smokers and offering support with cessation; (3) *Assisting* patients ready to quit smoking by developing a personalized plan for quitting that involves scheduling a dedicated visit to deliver evidence-based counseling to support cessation, set a quit date, select a quit-smoking pharmacotherapy, and provide self-help material; and (4) *Arranging* follow-up support, which includes counseling and management of pharmacotherapy to prevent relapse, for 2 to 6 months. Follow-up is typically scheduled monthly after a patient's quit date. Patients had the option to receive additional telephone-based support between clinic appointments.

Ottawa Model for Smoking Cessation Intervention

The OMSC intervention model supports teams in implementing the 5 As clinical model by using a quality improvement process focused on the introduction of the OMSC 10 Best Practices for delivering tobacco-dependence treatment (Table 1).[18] All teams were exposed to this multicomponent intervention that combines several evidence-based strategies including (1) outreach facilitation, (2) clinician training, (3) EHR tools and prompts, (4) practice tools and patient self-help material, and (5) smoker's follow-up system.[5,10,11] Table 2 provides a description of the OMSC intervention components.

Ottawa Model For Smoking Cessation Plus Clinician Performance Coaching

The OMSC+ group received the same multicomponent intervention as the OMSC group. In addition, general practitioners and nurse practitioners received a supplemental 1.5-hour coaching session approximately 4 weeks after the launch of the OMSC at their clinic and received an individualized performance report. The performance coaching intervention was delivered in a group format, at each practice location, by a trained tobacco-dependence treatment specialist using a standardized facilitation guide. Given that clinician self-efficacy (ie, confidence) is associated with rates of tobacco-dependence treatment delivery, this intervention was designed to influence the following 4 factors known to affect self-efficacy: (1) skills training, (2) personal experience, (3) modeling of behaviors, and (4) positive social or environmental supports.[34,35] During this session, clinicians identified personal barriers as well as success strategies for tobacco-dependence treatment delivery. The session facilitator introduced 7 techniques that clinicians could use in their practices to address known barriers, with a particular focus on addressing patient resistance, ambivalence, stress, and mental health issues.[18] Peer-to-peer exchange and role modeling were used as teaching techniques.[34]

Data Collection

All participating clinicians and patients provided written informed consent. The characteristics of practices and clinicians were collected at baseline. At each practice, before implementation of the intervention, consecutive patients arriving for appointments were screened for eligibility. Eligible patients were aged ≥18 years, smoked an average of at least 5 cigarettes per day, were scheduled for an annual examination or nonurgent medical appointment with a physician and/or nurse practitioner, and were able to read and understand English or French. Patients were not required to be ready to quit smoking to be eligible to participate. All patient participants completed an exit survey after their clinic visit and were contacted by telephone 6 months (±2 weeks) after their clinic visit to assess cessation outcomes. After practices had implemented the intervention for at least 4 months, postimplementation data were collected from clinicians via a follow-up survey and from a second cross-sectional sample of patients using procedures identical to those used at baseline.

Outcome Measures

The primary outcome was rates of clinician tobacco-dependence treatment delivery of 4 of the 5 As (*Ask*, *Advise*, *Assist*, *Arrange*). We chose not to examine the *Assess* component in the present study to reduce

Table 1. OMSC 10 Best Practices

1. Clinic task force formed
2. Clinic tobacco-control protocol developed
3. Tobacco use queried and documented for all clinic patients
4. Training in tobacco-dependence treatment completed by clinicians in past year
5. Specific staff identified to provide tobacco-dependence treatment
6. Self-help materials available to patients, family members, and staff
7. EHR or other real-time prompt in place to inform GP/NP of patient smoking status, advice delivery, and quit plan consult forms
8. Process to follow-up tobacco users for at least 2 to 6 months after clinic visit
9. Process to evaluate quality of program implementation in place
10. Process to provide feedback to practices about clinic performance in tobacco-dependence treatment delivery

EHR = electronic health record; GP = general practitioner; NP = nurse practitioner; OMSC = Ottawa Model for Smoking Cessation.

Adapted with permission from Papadakis S, Cole AG, Reid RD, et al. Increasing rates of tobacco treatment delivery in primary care practice: Evaluation of the Ottowa Model for Smoking Cessation. *Ann Fam Med.* 2016:14(3):235-243.

Table 2. Summary of OMSC Multicomponent Intervention Components

Component	Description
Outreach facilitation visits	Trained outreach facilitator works with each primary care clinic over a 3-month period to implement the program
	7-step facilitation process used to introduce OMSC 10 Best Practices. Facilitators act by supporting clinics as follows:
	Review current clinic practices for delivery of evidence-based smoking cessation intervention and complete needs assessment
	Provide information and recommendations on integration of evidence-based smoking cessation strategies into clinical practice
	Facilitate development of clinic tobacco-dependence treatment protocol for integrating evidence-based smoking cessation strategies into all clinic appointments
	Define roles and responsibilities of clinic staff for delivering evidence-based smoking cessation treatments
	Support communications and training activities for members of clinic staff
Clinician training	Frontline physicians and nurse practitioners participate in 3-hour training session providing information and skills training for addressing tobacco use with patients in the context of a busy primary care practice setting
	Key staff responsible for delivering quit plan visits (eg, nurse, nurse practitioner, pharmacist) attend intensive 1-day training session teaching how to conduct quit plan and follow-up visits based on evidence-based practice
Electronic health record tools and real-time prompts	Real time point-of-care reminders (eg, standard smoking-status questions) introduced and embedded in vital-sign screening forms and prompts to document smoking status and deliver brief advice
	Standardized check-list style smoking cessation consult forms embedded into EHRs to guide tobacco treatment delivery for advice, quit plan, and follow-up visit
Practice tools and patient self-help material	All materials designed to support intervention delivery and reduce amount of face-to-face time required to support tobacco-dependence treatment delivery. Materials include the following:
	Patient tobacco use survey to document smoking history
	Patient self-help quit plan booklet for smokers ready to quit
	Patient self-help booklet for smokers not ready to quit
	Clinic waiting room posters and materials
Smoker's follow-up support system	Patients ready to quit referred to smoker's follow-up system including 5 triage calls or e-mails delivered over a 2-month period (3, 7, 14, 30, 60 days after quit date) by automated program. Patients struggling with quit attempt had additional telephone-based support arranged from trained smoking-cessation counselors, and as required, changes to their quit plan coordinated with primary care clinician

EHR = electronic health record; OMSC = Ottawa Model for Smoking Cessation.

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respondent burden. The study exit survey asked patients whether or not (binary scale: yes, no) at today's clinic appointment their physician or another member of the team asked them about their smoking status (*Ask*), advised them to quit smoking (*Advise*), provided assistance with quitting (*Assist*), or arranged follow-up support (*Arrange*). For the *Assist* strategy, supplemental data were collected regarding the type of assistance (eg, providing self-help materials, setting a quit date, discussing or prescribing smoking-cessation drugs). Patient exit interviews have been used in most previous evaluations of tobacco-dependence treatment interventions in primary care; they have been shown to be more reliable than clinician self-report.[36]

Patient self-reports of quit attempts lasting 24 hours or more after their index visit, 7-day point-prevalence abstinence (not having smoked even a puff in the past 7 days), and 12-week continuous abstinence (not having smoked even a puff from week 14 up to week 26) were assessed at the 6-month telephone follow-up interview.[36] The NicAlert saliva cotinine test was used for biochemical validation (>10 ng/mL) of smoking status.[37,38] Participants were mailed the NicAlert test, instruction sheet, and a prepaid package for returning the kit. Patients lost to follow-up were assumed to be active smokers.[37]

Sample Size and Analysis

Sample-size calculations were adjusted for the cluster-randomized controlled trial design and informed by previous OMSC evaluations.[15,16] All calculations were based on a 1-sided test with 80% power, an α level of .05, and intraclass correlation coefficients (ICCs) of 0.05 for 4 As and 0.01 for cessation.[39] Sample-size calculations indicated that 10 practices per group with 60 patients per practice were required to detect a minimum difference of 10% between intervention groups for 4 As delivery and 5% for smoking abstinence.

Multilevel models account for the clustered design. A 3-level generalized linear mixed model estimated the effect of the intervention for each outcome measure with the following levels: patients (level 1), clinicians (level 2), and clinics (level 3). Wald tests were used to obtain *P* values, adjusted odds ratios [AORs], and 95% CIs. Both practice-level ICCs (ie, variation between practices) and clinician-level ICCs (ie, variation between individual clinicians) were calculated. ICC is measured on a scale from 0 to 1, with a value close to 0 indicating that the clusters were similar.[38] Data analysis was conducted on an intention-to-treat basis (ie, all clinicians and all patients as allocated to the intervention). Sensitivity analysis examined attendance at the

Table 3. Clinician Performance in 4 As Delivery and Patient Outcomes at Postintervention Assessment by Intervention Group

	OMSC				OMSC+			
Parameter	Pre n = 540	Post n = 394	AOR (95% CI)[a]	*P* Value[b]	Pre n = 583	Post n = 473	AOR (95% CI)[a]	*P* Value[b]
4 As delivery								
Ask	47.3	55.9	1.45 (1.10-1.92)	.009	46.8	65.7	2.40 (1.83-3.14)[c]	<.001
Advise	38.1	48.1	1.63 (1.20-2.11)	.001	42.5	53.5	1.71 (1.31-2.24)	<.001
Assist	35.1	42.8	1.44 (1.09-1.91)	.011	33.3	53.9	2.62 (1.99-3.45)	<.001
Set quit date	12.4	12.1	1.03 (0.68-1.55)	.898	11.2	18.7	1.93 (1.33-2.79)	.001
Self-help	10.0	11.1	1.19 (0.77-1.84)	.444	10.8	19.4	2.05 (1.42-2.98)	.001
Discuss medications	25.5	26.9	1.11 (0.81-1.51)	.517	26.1	37.1	1.87 (1.41-2.50)	<.001
Prescribe medications	8.7	8.8	1.11 (0.68-1.80)	.670	9.1	12.2	1.47 (0.96-2.27)	.080
Arrange	12.2	13.4	1.10 (0.73-1.66)	.649	10.3	22.5	2.66 (1.84-3.84)	<.001
Patient-level outcomes								
Quit attempts	29.0	30.0	1.01 (0.75-1.36)[c]	.934	27.8	35.0	1.41 (1.07-1.86)[c]	.015
7-day point-prevalence abstinence (self-reported)	4.6	9.1	2.18 (1.25-3.82)[c]	.006	6.0	6.5	1.13 (0.65-1.96)	.669
7-day point-prevalence abstinence (biochemically validated)	0.0	2.8	...	...	0.3	2.5	13.03 (1.65-102.84)[c]	.015
6-month continuous abstinence	4.1	6.6	1.75 (0.92-3.30)	.086	4.0	4.8	1.30 (0.69-2.45)	.423

AOR = adjusted odds ratio; OMSC = Ottawa Model for Smoking Cessation; post = postassessment; pre = preassessment.

[a] Controlling for clinic-level variance between clusters, patient sex, patient education, and self-reported anxiety or depression; based on inclusion of 15 clinics unless otherwise indicated.

[b] *P* value based on Wald statistic.

[c] The estimated G matrix for clinic-level variance was not a definite positive, so clinic-level variance was not included in this model.

coaching session. All analyses were conducted using SAS 9 (SAS Institute Inc).

RESULTS

Recruitment Flow

Fifteen practices and 166 clinicians were enrolled in the trial. The study was conducted from September 2013 to May 2015. The patient sample comprised 1,123 eligible smokers who participated in the preassessment and a second cross-sectional sample of 867 smokers who participated in the postassessment. Six-month telephone follow-up data were available for ~77% of patients at both the pre- and postassessments, with no between-group differences. The Consolidated Standards of Reporting Trials (CONSORT) study flow diagram is shown in Supplemental Figure 1, http://www.annfammed.org/content/16/6/498/suppl/DC1.

Practice, Clinician, and Patient Characteristics

There were no differences in practice and clinician characteristics between intervention groups (Supplemental Table 1, http://www.annfammed.org/content/16/6/498/suppl/DC1). Patient characteristics are presented in Supplemental Table 2, http://www.annfammed.org/content/16/6/498/suppl/DC1.

Rates of Tobacco-Dependence Treatment Delivery

Both the OMSC and OMSC+ groups documented significant increases in rates of *Ask*, *Advise*, and *Assist* between the pre- and postassessments (Table 3).

Clinicians in the OMSC+ group had statistically greater performance in the rates of *Ask* (AOR = 1.69; 95% CI, 1.05-2.72), *Assist* (AOR = 1.64; 95% CI, 1.08-2.49), and *Arrange* (AOR = 2.01; 95% CI, 1.22-3.31) compared with the OMSC group (Table 4). No significant difference was observed in the rates of *Advise* in the intention-to-treat analysis.

A total of 34% of clinicians randomized to the OMSC+ group did not attend the performance coaching session, owing to annual leave, maternity leave, or illness. Sensitivity analysis found that rates of *Ask* (AOR = 1.51; 95% CI, 1.01-2.26), *Advise* (AOR = 1.65; 95% CI, 1.10-2.49), and *Assist* (AOR = 1.50; 95% CI, 1.03-2.19) were significantly greater among clinicians who attended the coaching session compared with clinicians who were not exposed to performance coaching (Supplemental Table 3, http://www.annfammed.org/content/16/6/498/suppl/DC1).

Clinicians who documented lower performance at baseline (<40%) had greater overall increases in rates of *Ask* and *Advise* relative to higher-performing clinicians

Table 4. Clinician Performance in Tobacco-Dependence Treatment Delivery at Postassessment by Intervention Group

Parameter	OMSC (n = 394)	OMSC+ (n = 473)	% Delta	AOR (95% CI)[a]	*P* Value	ICC Clinician	ICC Clinic
4 As delivery							
Ask	55.9	65.7	9.8	1.69 (1.05-2.72)	.03	0.126[b]	0.025
Advise	48.1	53.5	5.4	1.42 (0.82-2.46)	.22	0.129	0.045
Assist	42.8	53.9	11.1	1.64 (1.08-2.49)	.02	0.089[c]	0.027
Set quit date	18.9	25.7	6.8	1.70 (1.09-2.65)	.02	0.037	0.035
Self-help	11.1	19.4	8.3	2.01 (1.15-3.52)	.02	0.072	0.043
Discuss medications	26.9	37.1	10.2	1.75 (1.15-2.65)	.01	0.069	0.026
Prescribe medications	8.8	12.2	3.4	1.44 (0.85-2.42)	.18	0.002	0.026
Arrange	24.7	35.6	10.9	2.01 (1.22-3.31)	.01	0.036	0.050
Patient-level outcome							
Quit attempts[d]	30.0	35.0	5.0	1.36 (1.00-1.84)	.05	...	...
7-day point prevalence abstinence (self-reported)[d]	9.1	6.5	–2.6	0.73 (0.43-1.26)	.26	...	...
7-day point prevalence abstinence (biochemically validated)[d]	2.8	2.5	–0.3	1.05 (0.42-2.64)	.92	...	...
Continuous abstinence	6.6	4.8	–2.2	0.82 (0.40-1.67)	.58	0.038	0.030

AOR = adjusted odds ratio; ICC = intraclass correlation coefficient; OMSC = Ottawa Model for Smoking Cessation.

[a] Controlling for clinic-level variance between clusters, patient sex, patient education, and self-reported anxiety or depression; based on inclusion of 15 clinics unless otherwise indicated.

[b] $P < .01$.

[c] $P = .05$.

[d] For ICC Clinician and ICC Clinic, the estimated G matrix was not a definite positive; therefore, we could not calculate clinician or clinic ICC.

(Figure 2). Changes in rates of *Assist* and *Arrange* were found to be similar between low- and high-performing clinicians. Clinicians were more likely to *Ask*, *Advise*, and *Assist* if the patient was seen in the clinic for a first visit or annual examination compared with other types of appointments (Supplemental Table 4, http://www.annfammed.org/content/16/6/498/suppl/DC1). Clinicians' beliefs about the importance of cessation were associated with rates of *Ask* (AOR = 4.36; 95% CI, 2.05-9.29; $P < .001$). Patient readiness to quit and smoking-related illness were also associated with 4 As delivery (Supplemental Table 4).

Cessation Outcomes

Multilevel regression analysis showed a borderline effect of intervention group on quit attempts (AOR = 1.36; 95% CI, 1.00-1.84) but no significant effect on patient smoking cessation (Table 4). A small decrease was observed in self-reported 7-day point-prevalence abstinence between the pre- and postassessments in the OMSC+ group. There were no statistically significant differences in rates of smoking abstinence between groups.

Patients were significantly more likely to be abstinent at the follow-up if they were ready to quit smoking in the next 30 days at the index visit, reported high self-efficacy with quitting, did not report anxiety or depression, and had a dedicated smoking cessation visit scheduled at the primary care clinic (Supplemental Table 5, http://www.annfammed.org/content/16/6/498/suppl/DC1).

DISCUSSION

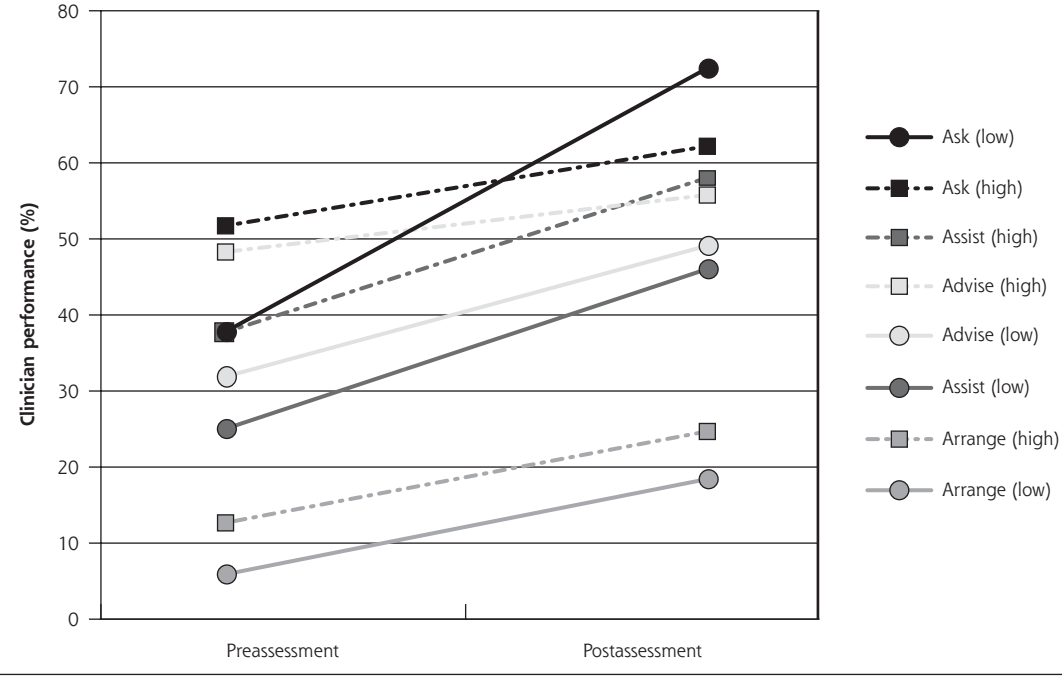
Consistent with earlier evaluations of the OMSC, both of the active-intervention groups increased rates of tobacco-dependence treatment delivery. There was a further incremental increase in the rates of tobacco-dependence treatment delivered by clinicians when the multicomponent intervention was combined with clinician performance coaching. The performance coaching intervention was informed by behavior change theory, quality improvement literature, and previous research. Participants received coaching from both a trained tobacco-dependence treatment specialist and higher-performing peers from their own practice setting. The coaching sessions were well attended, well received, and were easily implemented in the context of general practice. A small number of trials have evaluated the efficacy of reinforcement contact, educational outreach visits, or performance feedback after tobacco-dependence treatment training and found them to be associated with desirable changes in clinician behaviors.[40-46] Evidence from the broader primary care literature has documented the value of educational outreach visits, audits, and feedback.[26-28] Systematic

reviews have found that feedback is most effective when delivered by a respected colleague, presented frequently, and features both specific goals and action plans.[26-28] Performance feedback has also been found to be particularly useful in assisting clinicians with low baseline performance.[26,27] In the present study, we also observed that clinicians with lower baseline performance with respect to *Ask* and *Advise* showed greater overall increases in treatment rates relative to higher-performing colleagues.

The coaching session did not significantly affect 6-month smoking abstinence rates when compared with the OMSC intervention. It is possible that the strength of the intervention program was insufficient in producing clinic-wide patient-level increases in cessation, a finding that has been reported by others.[47-49] Smokers enrolled in the present study were heavily nicotine dependent, and it is likely that more-intensive treatment may be needed to support cessation in this patient population. Importantly, and unlike other evaluations in primary care, our study included all smokers and not just those ready to quit smoking. Patients who scheduled for a quit plan visit were significantly more likely to report abstinence from smoking, suggesting that this is an important component of treatment success. Changes in clinician-level behavior observed among practices exposed to the OMSC can be leveraged to facilitate the uptake of evidence-based treatment in future research.

Our findings should be interpreted in light of certain study limitations. First, the study compared 2 active-intervention arms and did not include a control condition. All participating practices were family health teams in the province of Ontario, Canada; the generalizability to other practice models or to other health care systems would require further examination. The assessment was based on patient report of 4 As delivery, which may be subject to reporting bias. Electronic health record data collection for 4 As delivery was not established in clinics at baseline and as such could not be used to examine pre- and post-rates of 4 As delivery. We reported on data for same-day clinic encounters, and as such our findings may not be comparable to studies or reports that use longer time frames (ie, previous 12 months). Our study provides evidence regarding the value of performance coaching when delivered as part of a multicomponent intervention rather than as a stand-alone intervention. We tested a single coaching session, and it is possible that exposure to additional coaching sessions might further increase the likelihood of tobacco-dependence treatment delivery. The optimal amount and frequency of performance coaching is an area for future research.

Figure 2. Clinician performance in tobacco-dependence treatment delivery at pre- and postassessment in the intervention group according to clinic baseline performance.



Note: Low-performing clinics had a baseline rate of *Advise* <40.5%; high-performing clinics had a baseline rate of *Advise* ≥40.5%.

Identifying and evaluating simple, effective techniques for promoting tobacco-dependence treatment delivery is essential to improving the reach of tobacco-dependence treatment interventions in primary care settings. This study lends support for the integration of performance coaching in the design and delivery of multicomponent interventions to further increase rates of tobacco-dependence treatment delivery, particularly among low-performing clinicians.

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Key words: smoking cessation; primary care; audit and feedback; randomized controlled trial; coaching; quality improvement; knowledge translation; Ottawa Model for Smoking Cessation

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Supplementary materials: Available at http://www.AnnFamMed.org/content/16/6/498/suppl/DC1/.

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