RESEARCH

Smoking quit rates among patients receiving pharmacist-provided pharmacotherapy and telephonic smoking cessation counseling

Jill M. Augustine*, Ann M. Taylor, Martin Pelger, Danielle Schiefer, Terri L. Warholak

ABSTRACT

Objectives: Tobacco use is the nation’s leading cause of preventable illness and death, causing a significant burden on the health care system. Many cessation pharmacotherapy treatment options are available to help smokers quit, including nicotine replacement therapies (NRTs) and prescription medications. Research indicates that pharmacists are able to provide a positive benefit to smokers who want to quit through pharmacologic and nonpharmacologic interventions. The aim of the present work was to examine the quit rates among participants who received smoking cessation pharmacotherapy and pharmacist-provided telephone-based quit counseling services.

Design: Retrospective database review of enrolled participants.

Setting: Telephone-based pharmacotherapy and medication counseling services offered from a medication management center.

Participants: State employees who voluntarily contacted a medication management center for smoking cessation services after receiving promotional flyers.

Main outcome measures: Long-term quit rates at 7 and 13 months were determined by means of patient self-report in response to questioning. Smoking cessation was considered to be a success if the patient reported not smoking for the past 30 days.

Results: A total of 238 participants were included in the review. Thirty-nine participants completed the program after the first treatment, 12 participants after the second treatment, and 4 participants after the third treatment. Two patients completed the program more than once. Eighty-five participants (36%) reported results at 7-month follow-up; of these, 43 (51%) were smoking free. A total of 44 participants (18%) reported results at 13-month follow-up; of these, 24 participants (55%) reported being smoking free. There were no significant differences in the percentages of smoking-free participants at 7 or 13 months, regardless of their first treatment (P = 0.06 and 0.345, respectively).

Conclusion: Successful quit rates were higher than previously demonstrated with other telephone-based smoking cessation programs. Therefore, pharmacist-provided telephone-based counseling may be beneficial in helping patients to quit smoking. Future research is warranted to examine the benefits of these types of programs.

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Cigarette smoking constitutes a major public health problem, and its effects on our nation’s population and respective health care system are staggering. Smoking prevalence has decreased considerably in the past 3 decades. However, 42 million Americans (18.1%) are current smokers; approximately 21% of adult men and 16% of adult women smoke. The annual economic costs of tobacco use exceed $289 billion. An enormous task remains to decrease smoking prevalence to 12%, meet the Healthy People 2020 goal. Approximately 70% of adult smokers report wanting to quit smoking, and 43% attempted to quit once in the past year. In general, most tobacco users have made serious attempts to stop smoking. Moreover, smokers with a higher number of...
Cigarette smoking is the most preventable cause of morbidity and mortality in the United States. Each year, millions of smokers attempt to quit, but only a small percentage are successful in the long term. Pharmacists are the most accessible health care providers and the ones who may have regular interactions with smokers who wish to quit.

Pharmacists are in a prime position to provide smoking cessation counseling and support to smokers who want to quit. Studies suggest that pharmacists are effective in helping smokers quit. Quit rates range from 12% to 46%, depending on self-report or verification by chemical testing, in studies involving pharmacist interventions. A recent meta-analysis by Saba et al. found that patients who received a pharmacist intervention showed better abstinence rates compared with the standard care group (relative risk [RR] 2.21, 95% confidence interval [CI] 1.49–3.29), with abstinence rates measured from 1 to 12 months. Even among self-reports, abstinence rates (measured from 1 to 12 months) were better in patients with a pharmacist intervention compared with usual care (RR 1.66, 95% CI 1.08–2.54).

Pharmacist interventions vary across studies and may include behavioral counseling, pharmacologic counseling (i.e., medication counseling only), or a combination of these. Research has shown that pharmacist-delivered interventions involving behavioral support and pharmacologic interventions are beneficial for smoking cessation. One study found that patients (n = 101) who participated in a face-to-face, pharmacist-driven group behavioral support program and pharmacotherapy had a significantly higher rate of smoking cessation compared with those receiving a brief 5-minute telephone conversation and pharmacotherapy (28% vs. 11.8%; P = 0.041). Another study conducted in Japan found that patients (n = 28) receiving medication counseling at the point of sale (e.g., nicotine patches) and at 3-month follow-up did not have a significantly higher quit rate compared with patients receiving medication counseling solely at the point of sale (45.5% vs. 31.2%; P = 0.730). In a study by Chen et al., veterans (n = 1006) who participated in an intensive pharmacist-managed telephone clinic had a higher quit rate compared with veterans receiving the standard of care (16.1% vs. 9.5%; P < 0.001). To our knowledge, the present study is the first to evaluate an intensive pharmacist-driven telephone-based smoking cessation program with treatment-specific follow-up as part of a medication therapy management program.

The primary objective of this study was to evaluate the quit rates of state employees who use smoking cessation pharmacotherapy and pharmacist-provided telephone counseling quit services.

This study was a retrospective database review of participants enrolled in a smoking cessation program supported by the University of Arizona College of Pharmacy Medication Management Center (UAMMC). This retrospective review used deidentified data, so it was deemed to be exempt by the university’s institutional review board.

The UAMMC provides smoking cessation pharmacotherapy support to State of Arizona employees through their pharmacy benefit management coverage. Employees were notified about the program via monthly mailings, medical and pharmacy benefits plan materials, and during benefits reenrollment. Participants voluntarily contacted the UAMMC program when they were ready to quit smoking. When a patient starts the program, he or she is “enrolled” (see Enrollment below). Participants who enrolled in the smoking cessation program before December 1, 2012, were included in the present analysis. Participants who were less than 18 years of age or those who contacted the UAMMC for smoking cessation information only (i.e., not pharmacotherapy or counseling) were excluded.

As part of the enrollment process, participants were asked a series of questions to discern current smoking habits, previous quit attempts, and life stressors. The questions were selected
Quit rates in pharmacist cessation program

A UAMMC pharmacist subsequently contacted the participant via telephone at key points during treatment (e.g., to monitor for adverse events, medication dosage changes, treatment adherence); the key contact points vary by therapeutic product and are based on anticipated medication dosage change and/or potential for an adverse event. For example, if the first treatment option selected is nicotine replacement patches, follow-up would occur at 7, 21, 35, and 56 or 70 days after enrollment. Adverse events were recorded in the patients’ charts but were not accessible for this study. All participants, regardless of pharmacotherapy treatment, were contacted 7 and 13 months after initial enrollment to determine smoking status (e.g., quit or not quit). At any point during the program, participants were able to leave the program or switch pharmacotherapy products. These outcomes were tracked by the UAMMC to guide follow-up telephone calls. Additionally, participants were eligible to reenroll in the program; this was an important step in acknowledging the continuing struggle that many smokers face when attempting to quit smoking. Although participants were eligible to reenroll as many times as necessary, no one reenrolled more than 3 times over the course of the 3-year program.

Results

Participants

Baseline characteristics

A total of 238 participants were included. The average participant age was 51.5 years (±12), and 59% were female (n = 141; Table 1). The majority of participants were white (n = 182; 76%) and non-Hispanic (n = 203; 84%) and had some college (n = 100; 41%) or a college degree (n = 66; 27%). There were no significant differences in characteristics of participants at enrollment based on 7-month follow-up results (P > 0.05).

Smoking habits and pharmacotherapy use

Most participants (n = 225; 93%) reported smoking daily (Table 2). Of those, almost two-thirds of daily smokers reported smoking 0.5 to 1 pack per day (n = 139; 62%). Four of the daily tobacco users used chewing tobacco, not cigarettes. Several participants (n = 8; 3%) stated they only smoked “some days,” with the number of days ranging from 4 to 24 days per month. Current use of NRT or medication was low. At enrollment, 36 participants (15%) used an NRT: 13 (37%) were using varenicline and 5 (14%) the nicotine replacement patch. When asked about previous use of NRT or medication, 106 participants (44%) had tried nicotine replacement patches, 85 participants had tried varenicline (35%), and 71 participants had tried nicotine replacement gum (29%).

to help better understand patients’ previous smoking cessation attempts, medical history, and key factors influencing smoking behavior (e.g., familial support, current stressors, and smoking cessation persistence). The selected questions were derived from an enrollment questionnaire consisting of a series of questions that callers are asked when they initially contact the Arizona Smoker’s Helpline (ASHLine), Arizona’s official smoking quit line.

Regarding current smoking habits, participants were asked the following questions. 1) Do you smoke every day, some days, or not at all? 2) How frequently do you smoke (i.e., how many daily cigarettes or how many days did you smoke over the past 30 days)? and 3) Do you plan to quit within the next 30 days? Quit attempts were assessed by asking participants about any current or previous use of nicotine replacement therapy (NRT; i.e., nicotine patch, gum, or lozenges) or medications (i.e., bupropion extended release or varenicline). For the life stressor questions, participants were asked to use a 10-point scale for their responses, with 1 indicating less agreement and 10 complete agreement with the question. The questions included the following. 1) How are you doing personally? 2) How have things been going in your relationships? 3) How have things been going for you socially? and 4) How are things in your life overall?

During the initial enrollment period, a UAMMC pharmacist reviewed the patients’ previous quit attempts, any potential contraindications or medication allergies, and his or her medical history (e.g., heart attacks, strokes, seizures, depression, etc.). Then the pharmacist reviewed smoking cessation products, side effects, and administration to help select the best pharmacotherapy product for his or her first treatment. Next, the pharmacist contacted the participants’ primary care provider for a prescription (if necessary) to initiate therapy.

A UAMMC pharmacist subsequently contacted the participant via telephone at key points during treatment (e.g., to monitor for adverse events, medication dosage changes, treatment adherence); the key contact points vary by therapeutic product and are based on anticipated medication dosage change and/or potential for an adverse event. For example, if the first treatment option selected is nicotine replacement patches, follow-up would occur at 7, 21, 35, and 56 or 70 days after enrollment. Adverse events were recorded in the patients’ charts but were not accessible for this study. All participants, regardless of pharmacotherapy treatment, were contacted 7 and 13 months after initial enrollment to determine smoking status (e.g., quit or not quit). At any point during the program, participants were able to leave the program or switch pharmacotherapy products. These outcomes were tracked by the UAMMC to guide follow-up telephone calls. Additionally, participants were eligible to reenroll in the program; this was an important step in acknowledging the continuing struggle that many smokers face when attempting to quit smoking. Although participants were eligible to reenroll as many times as necessary, no one reenrolled more than 3 times over the course of the 3-year program.

Smoking cessation

The UAMMC pharmacy team considered completion of the smoking cessation program to be successful when the patient indicated that he or she had been smoking free for the past 30 days. Because participants were able to enroll in the program more than one time, smoking cessation was assessed at the end of each enrollment period.

Each participant was contacted via telephone 7 and 13 months after initial enrollment to determine his or her smoking status. Participants were asked to self-report if they had used any tobacco products within the past 30 days. If the participant reported that he or she had not used any products, UAMMC pharmacists considered it to be a successful quit. Analysis was conducted to determine differences in long-term quit success (at 7 and 13 months) based on initial pharmacotherapy selection (i.e., first treatment).

Data analysis

Participants’ quit attempts and baseline information were captured electronically in a spreadsheet during enrollment. Participant identifiers were removed before analysis. Descriptive statistics were used to determine differences in the baseline characteristics of participants based on their 7-month follow-up response. Chi-square analysis was used to analyze differences in the proportion of patients who achieved each outcome based on pharmacotherapy selection. Spearman rho correlations were used to analyze if there was an association between participants’ life stressors responses and the number of cigarettes smoked daily. Intent-to-treat analysis also was used. If a participant enrolled multiple times, the outcome of their final enrollment was used. Data were analyzed with the use of Stata SE, version 12 (College Station, TX). An a priori alpha level of 0.05 was selected for all statistical tests.
Life stresses
Participants’ self-reported life stresses were highly negatively skewed, based on the 1-to-10 scale with 1 indicating less agreement with the question. The median responses for each question are presented in Table 1. Additionally, there was no correlation between participants’ responses to their life stresses and the number of cigarettes smoked per day (correlations ranged from 0.04 to 0.07).

Smoking cessation
Overall results
A total of 55 participants completed the smoking cessation program and were smoking free for 30 days. Of these, 39 participants completed the program after the first treatment, 12 participants after the second treatment, and 4 participants after the third treatment. Two patients completed the program more than once.

First treatment
At enrollment, the UAMMC pharmacist and participant mutually decided on the best pharmacotherapy (treatment) to aid in smoking cessation. Of the participants (n = 238) who selected a first treatment option, most chose varenicline (n = 108; 45%) or nicotine replacement patches (n = 59; 25%; Table 3). Overall, 39 participants (16%) completed the first treatment option and were smoking free for 30 days (Table 4). Of the participants selecting varenicline as their first option, 23 (21%) completed the program and were smoking free for 30 days. Of those selecting nicotine replacement patches as their first option (n = 59), 7 (12%) completed the program and were smoking free for 30 days. There were significant differences between the treatment options and outcomes after removing patients who were lost to follow-up ($\chi^2 = 69.62; P = 0.005$). Three-eighths (38%) of participants who were smoking free for 30 days had selected a combination of smoking cessation pharmacotherapy products as their initial treatment option.

Second treatment
Participants were eligible to switch therapies or reenroll in the program on the same or a different therapy. Forty-two participants (n = 238; 18%) had a second treatment option listed and of those who used it, 12 (29%) completed the program and were smoking free for 30 days.
treatment options were varenicline (n = 15; 36%) and nicotine replacement patches (n = 15; 36%). Of those who selected varenicline and nicotine replacement, 4 participants per treatment option (27% of each) completed the program and were smoking free for 30 days. There was no significant difference in the selected treatment options and outcome for the second option treatments.

7- and 13-month follow-ups
Out of the original sample, only 85 participants (36%) reported their smoking cessation status at the 7-month follow-up. Of those, 43 (51%) reported not smoking within the previous 30 days and indicated a quit success. Twenty-three participants who selected varenicline as their first treatment option had successfully quit smoking (58%) whereas 8 of the 23 participants who chose nicotine replacement patches as their first option reported successfully quit smoking (35%) at 7-month follow-up. There were no significant differences between the first treatment option and the outcome at 7 months (P = 0.06).

Out of the original sample, only 44 participants (18%) reported their smoking cessation status at the 13-month follow-up. Of those, 24 (55%) reported that they had successfully quit smoking. Of those who selected varenicline as the first treatment (n = 16), 7 (44%) successfully quit at 13-month follow-up. Of those who selected nicotine replacement patches as their first treatment (n = 13), 8 (62%) reported successfully quitting smoking. There was no significant difference between the first treatment option and the outcome at 13 months (P = 0.345). It is worth noting that there were no significant differences in quit rates based on age or number of cigarettes smoked per day at either the 7-month (P = 0.36 and 0.37, respectively) or the 13-month (P = 0.52 and 0.41, respectively) follow-up.

Intent-to-treat
Given that participants were allowed to enroll in the program multiple times, their last recorded outcome and treatment option was carried forward for the intent-to-treat analysis (Table 5). Therefore, 51 unique participants (n = 238; 21%) completed the program and were smoking free for 30 days. Of those completing the program, 18 (35%) reported that they had successfully quit and 10 (20%) reported a failed quit attempt at 7-month follow-up. At the 13-month follow-up (n = 51), 12 participants (24%) who completed the program reported that they had successfully quit and 8 (16%) had failed their attempt to quit.

Discussion
Successful quit rate was high among our patient population. Based on the intent-to-treat analysis results, 51 participants completed the program and were smoking free for 30 days. Among those who completed the program, 35% (n = 18) had successfully quit smoking at the 7-month follow-up and 24% (n = 12) had quit at the 13-month follow-up. This quit rate is higher than other similar telephone-based programs.11-13 One strength of the UAMMC program is that patients are offered both pharmacotherapy smoking cessation products (e.g., NRT and/or medications) as well as telephone-based counseling and follow-up. Also, the UAMMC program pharmacist was charged with sending communication and a prescription request to the participants’ primary care provider for NRT and/or medications. Having the UAMMC pharmacist contact the prescribers, instead of relying on patients to do so, may facilitate the quitting process because that potential communication barrier is removed. Additionally, this pharmacist-prescriber communication may have reduced the need for an office visit (and the associated health care costs) for the patient as well as their overall burden.

The State of Arizona has the ASHLine, which offers free telephone and Web-based quit services to all residents. The UAMMC pharmacists provided the contact information for the ASHLine to all participants and encouraged them to use these additional resources to aid in smoking cessation attempts. The 2008 Clinical Practice Guidelines for treating tobacco use and dependence highly recommends including medication and counseling, because the combination is more effective than either alone.4 A meta-analysis found that programs combining medication and counseling (in person or via telephone) were more effective (27.6%) than medication alone (21.7%); and counseling plus medication (22.1%) significantly affected treatment outcomes compared with counseling alone (14.6%).4

Another benefit of this program is that the participants were actively engaged and collaborated with the UAMMC pharmacist to select their pharmacotherapy treatments.
After the participant completed the enrollment questionnaire, the UAMMC pharmacist and the participant discussed the patients’ previous quit attempts and which NRT and medications had helped, not worked, or may be contraindicated for his or her comorbid conditions. After that discussion, the UAMMC pharmacist and participant collaborated to select the pharmacotherapy treatment. By having the participants actively involved in the decision-making process, they may have been more willing to continue treatment, especially when cravings or side effects were encountered.6,7,24-27

Participants were also able to switch treatments or add products if it became evident that one treatment was not effective or sufficient. At any time during follow-up, participants were able to switch treatments. Common reasons for switching treatments included side effects, not experiencing satisfactory results, and requesting multiple cessation products (i.e., combination of products). Previous literature has shown that a combination of smoking cessation pharmacotherapy treatments may be effective for smoking cessation.4,6,28,29

Finally, the UAMMC program allowed patients to leave and reenroll as needed. Smoking cessation is a long and difficult battle and involves relapses; that is, smoking cessation is a cyclic process.2,4-6 Although UAMMC pharmacists encouraged participants to remain enrolled in the program, they understood that it may be a challenging process. If a participant chooses to stop participating, UAMMC pharmacists urge the participant to call back and reenroll. Participants may benefit from this opportunity because it parallels the cyclic nature of quit attempts, especially as outside forces or external cues may influence participants to quit smoking.

### Table 3
Baseline demographic characteristics of participants based on first treatment selection (n = 238), n (%)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Overall (n = 238)</th>
<th>Varenicline (n = 108)</th>
<th>Gum (n = 21)</th>
<th>Inhaler (n = 1)</th>
<th>Lozenge (n = 13)</th>
<th>Nasal spray (n = 1)</th>
<th>Patch (n = 59)</th>
<th>Bupropion (n = 27)</th>
<th>Combination of products (n = 8)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>238</td>
<td>108</td>
<td>21</td>
<td>1</td>
<td>13</td>
<td>1</td>
<td>59</td>
<td>27</td>
<td>8</td>
<td></td>
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<tr>
<td>Sex</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>0.63</td>
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<tr>
<td>Female</td>
<td>139 (59%)</td>
<td>60 (56%)</td>
<td>14 (68%)</td>
<td>0 (0%)</td>
<td>8 (62%)</td>
<td>3 (0%)</td>
<td>31 (52%)</td>
<td>19 (70%)</td>
<td>6 (75%)</td>
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<tr>
<td>Male</td>
<td>99 (41%)</td>
<td>48 (44%)</td>
<td>7 (33%)</td>
<td>1 (0%)</td>
<td>5 (38%)</td>
<td>2 (0%)</td>
<td>18 (32%)</td>
<td>8 (30%)</td>
<td>2 (25%)</td>
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<td>Race</td>
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<td>White</td>
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<td>84 (78%)</td>
<td>16 (76%)</td>
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<td>10 (77%)</td>
<td>5 (0%)</td>
<td>49 (83%)</td>
<td>22 (81%)</td>
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<tr>
<td>Black</td>
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<td>9 (8%)</td>
<td>2 (10%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>5 (8%)</td>
<td>4 (15%)</td>
<td>0 (0%)</td>
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</tr>
<tr>
<td>American Indian/Native American</td>
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<td>1 (1%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
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<tr>
<td>Asian</td>
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<td>1 (1%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
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<td>0 (0%)</td>
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<tr>
<td>Other</td>
<td>5 (2%)</td>
<td>4 (4%)</td>
<td>1 (20%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
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<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
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<tr>
<td>Refused</td>
<td>15 (6%)</td>
<td>9 (9%)</td>
<td>2 (13%)</td>
<td>0 (0%)</td>
<td>2 (15%)</td>
<td>0 (0%)</td>
<td>1 (7%)</td>
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<td>Hispanic</td>
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<td>0 (0%)</td>
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<td>Grade 8 or less</td>
<td>2 (1%)</td>
<td>2 (100%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
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<td>0 (0%)</td>
<td>0 (0%)</td>
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<tr>
<td>Grade 9 to 11</td>
<td>4 (2%)</td>
<td>2 (50%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
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<td>0 (0%)</td>
<td>2 (50%)</td>
<td>0 (0%)</td>
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<tr>
<td>High school diploma</td>
<td>39 (16%)</td>
<td>14 (36%)</td>
<td>2 (5%)</td>
<td>1 (3%)</td>
<td>3 (8%)</td>
<td>0 (0%)</td>
<td>13 (33%)</td>
<td>6 (15%)</td>
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<tr>
<td>GED</td>
<td>9 (4%)</td>
<td>4 (44%)</td>
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<td>0 (0%)</td>
<td>1 (11%)</td>
<td>0 (0%)</td>
<td>2 (22%)</td>
<td>1 (11%)</td>
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<td>Trade school</td>
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<td>0 (0%)</td>
<td>1 (8%)</td>
<td>0 (0%)</td>
<td>3 (25%)</td>
<td>3 (25%)</td>
<td>0 (0%)</td>
<td></td>
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<tr>
<td>Some college</td>
<td>101 (42%)</td>
<td>47 (47%)</td>
<td>12 (12%)</td>
<td>0 (0%)</td>
<td>3 (33%)</td>
<td>1 (1%)</td>
<td>26 (26%)</td>
<td>8 (8%)</td>
<td>4 (4%)</td>
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<tr>
<td>College degree</td>
<td>66 (28%)</td>
<td>31 (47%)</td>
<td>5 (8%)</td>
<td>0 (0%)</td>
<td>5 (8%)</td>
<td>0 (0%)</td>
<td>13 (20%)</td>
<td>9 (14%)</td>
<td>3 (5)</td>
<td></td>
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<td>Master’s degree</td>
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<td>1 (100%)</td>
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<tr>
<td>Refused</td>
<td>4 (2%)</td>
<td>2 (50%)</td>
<td>2 (50%)</td>
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</table>

Totals may not equal to 100% owing to rounding. Percentages are based on row totals. Abbreviation used: GED, General Equivalency Diploma.

### Table 4
Outcomes based on first treatment selection (n = 238), n (%)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Varenicline (n = 108)</th>
<th>Gum (n = 21)</th>
<th>Inhaler (n = 1)</th>
<th>Lozenge (n = 13)</th>
<th>Nasal spray (n = 1)</th>
<th>Patch (n = 59)</th>
<th>Bupropion (n = 27)</th>
<th>Combination of products (n = 8)</th>
<th>Total (n = 238)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lost to follow-up</td>
<td>56 (52%)</td>
<td>13 (62%)</td>
<td>1 (100%)</td>
<td>6 (46%)</td>
<td>0 (0%)</td>
<td>33 (56%)</td>
<td>16 (59%)</td>
<td>4 (50%)</td>
<td>129 (54%)</td>
</tr>
<tr>
<td>Completed program</td>
<td>23 (21%)</td>
<td>2 (10%)</td>
<td>0 (0%)</td>
<td>3 (23%)</td>
<td>0 (0%)</td>
<td>7 (12%)</td>
<td>1 (4)</td>
<td>3 (38%)</td>
<td>39 (16%)</td>
</tr>
<tr>
<td>Switched therapy</td>
<td>9 (8%)</td>
<td>1 (5%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>6 (10%)</td>
<td>5 (19%)</td>
<td>0 (0%)</td>
<td>21 (9%)</td>
</tr>
<tr>
<td>Left program</td>
<td>6 (6%)</td>
<td>3 (14%)</td>
<td>0 (0%)</td>
<td>3 (23%)</td>
<td>1 (100%)</td>
<td>4 (7)</td>
<td>1 (4)</td>
<td>18 (8%)</td>
<td>2 (50%)</td>
</tr>
<tr>
<td>Not ready to quit</td>
<td>4 (4%)</td>
<td>1 (5%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>2 (3)</td>
<td>1 (4)</td>
<td>8 (3)</td>
<td>13 (5%)</td>
</tr>
<tr>
<td>Reenrolled</td>
<td>6 (6%)</td>
<td>0 (0%)</td>
<td>1 (8%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>5 (8)</td>
<td>1 (4)</td>
<td>13 (5)</td>
<td>7 (3)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (1%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>2 (3)</td>
<td>2 (7)</td>
<td>1 (12%)</td>
<td>6 (3)</td>
</tr>
<tr>
<td>Medication changes</td>
<td>3 (3%)</td>
<td>1 (5%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0)</td>
<td>0 (0%)</td>
<td>4 (2)</td>
<td>238</td>
</tr>
</tbody>
</table>

Percentages are based on row totals. Totals may not equal to 100% owing to rounding.
There are several limitations to the present study. First, there was no control group to compare the quit rate of participants enrolled in the program with those not receiving the program. Additionally, the participants involved in the UAMMC program actively sought smoking cessation services. This may have skewed the results compared with the general population or participants who do not actively want to quit smoking. UAMMC pharmacists made multiple attempts to contact and follow up with all participants who enrolled in the program to encourage continued smoking cessation. Despite this, a large percentage of participants were lost to follow-up (i.e., were unable to be contacted). It is unclear why those patients may have dropped out of the study or if they are different from those who remained in the program. The authors hypothesized that the high dropout rates are potentially explainable by factors such as: 1) participants’ feelings of guilt or failure for not quitting; 2) participants’ desire solely for free smoking cessation medications (and no program involvement); and 3) perceived burden of participating in program follow-up telephone calls. Given that this was a telephone-based program, all of the results and information were self-reported by participants. However, the UAMMC pharmacists could verify receipt of any treatment medications and subsequent refills. Nevertheless, this limitation may have skewed the results because participants may have felt pressure to report positive results. However, because the program was telephone based, the patient may have felt less pressure to modify his or her responses compared with participants involved in face-to-face laboratory confirmation programs (e.g., clinic visits). Finally, the vast majority of the participants involved in this smoking cessation program were white. Currently, whites are the second most prevalent race represented among current smokers (19.4%), followed by multiple races (26.8%). Nevertheless, this may still limit generalizability.

Conclusion

This smoking cessation program provided by the UAMMC helped smokers employed by the State of Arizona who wanted to quit. In this retrospective review, successful quit rates were higher than previously reported by other telephone-based smoking cessation programs. Therefore, pharmacist-delivered telephone counseling, with subsequent follow-up as an adjunct to pharmacotherapy, may be beneficial in helping patients to remain on their treatment and encourage a greater chance of smoking cessation. Future research is warranted to compare the UAMMC program with other smoking cessation programs, including national quitlines and targeted clinic visits. Nonetheless, this retrospective review provides evidence to support the value of a pharmacist-directed and more comprehensive approach to smoking cessation for patients attempting to quit.

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