

# Improving Cessation Rates: An Evaluation of the Ambulatory Nicotine Cessation Program

## Project Overview

Nicotine is a dangerous and addictive drug that is associated with high blood pressure, accelerated heart rate, and increased risk of heart attack and cancer<sup>1</sup>. In Colorado, a 2015 state-wide survey found that 16% of the population (600,000) reported using nicotine, resulting in direct annual health care costs of 1.89 billion dollars<sup>2</sup>. Evidence-based treatments for smoking cessation include counseling and seven medications approved by the FDA, including five forms of Nicotine Replacement Therapy (NRT) and two non-nicotine medications (NNM)<sup>3</sup>. Nicotine cessation support in the form of combined behavioral and pharmacotherapy interventions increase cessation by 82% on average, compared to minimal intervention or usual care<sup>4</sup>.

The Ambulatory Nicotine Cessation Program (ANCP) was established to increase primary care patient access to nicotine cessation support through personalized treatment for nicotine users. ANCP went live at the end of 2019, promoting combined behavioral and pharmacotherapy interventions to increase nicotine reduction.

## Evaluation Objective

Utilizing data from electronic healthcare records (EHR), as well as ANCP team member interviews and participant surveys, this project aimed to evaluate the impact of the ANCP on access to cessation support, reduction in nicotine usage, and nicotine cessation.

## Program Elements

Access to ANCP typically begins with a referral from a medical provider to ANCP. Patients may also discover the program from targeted outreach from ANCP team members to nicotine users, informing them of the program's offerings. Patients who indicate interest in the program are contacted by a scheduler who sets up an appointment with an ANCP certified tobacco treatment specialist (TTS). The ANCP team consists of one full-time and one part-time TTS, both nationally certified through the National Certification Commission for Addiction Professionals (NCC AP).

An initial TTS consultation takes 60 minutes and provides patients with a comprehensive overview of how nicotine impacts the human body, including negative impacts on the lungs and heart, and how nicotine impacts the brain to drive addiction. TTSs use motivational interviewing to review a patient's history of nicotine usage, and traumas and triggers that may drive use. They also discuss past and current usage, and factors at home and work that may impact cessation success. Sessions are conducted in the patient's preferred language using an interpreter if needed. The TTS is added to the patient's care team in the EHR, and an episode of care is created for the cessation counselling to facilitate multidisciplinary support throughout their course of treatment, including behavioral support referrals and contact between the TTS and other providers on the patient's care team.

Together with the TTS, patients decide in their treatment plan, including frequency of TTS follow-up, medication support, and usage of non-medication tools. Some patients received a bag of behavioral cessation materials, which included a guide to quitting, fidget toys, toothpicks, and candy, to support their cessation attempt. For patients choosing medications and/or NRT, the TTS sends the order for review and sign-off by the patient's primary care provider. Those prescriptions are sent to the patients preferred pharmacy for in-person pick up or home delivery. ANCP TTSs will also provide information on where to get cessation aids without insurance coverage (e.g. over the counter, QuitLine for free NRT). Once the patient feels ready to end program participation, either because they have met their goals or are no longer working towards reduction or quitting, they are graduated from the program.

---

<sup>1</sup> American Heart Association (2015, February 17). *How smoking and nicotine damage your body*. American Heart Association. <https://www.heart.org/en/healthy-living/healthy-lifestyle/quit-smoking-tobacco/how-smoking-and-nicotine-damage-your-body>

<sup>2</sup> Anderson, A. & Calanan, R. (2017). Tobacco use in Colorado: Who are the current smokers?

<sup>3</sup> Office of the Surgeon General. (2020). *Smoking Cessation: A Report of the Surgeon General—Smoking Cessation by the Numbers*. U.S. Department of Health and Human Services. Accessed October 21, 2022, <https://www.hhs.gov/surgeongeneral/reports-and-publications/tobacco/2020-cessation-sgr-infographic-by-the-numbers/index.html>.

<sup>4</sup> Patnode, C., Henderson, J., Thompson, J., Senger, C., Fortmann, S., and Whitlock, E. (2015). Behavioral Counseling and Pharmacotherapy Interventions for Tobacco Cessation in Adults, Including Pregnant Women: A Review of Reviews for the U.S. Preventive Services Task Force. *Annals of Internal Medicine*, 163(8), 608-621.

## QUANTITATIVE ANALYSIS

### Methods Overview

The quantitative analysis characterizes and compares the patient characteristics, treatment characteristics, and nicotine-related outcomes between three groups: patients that had an initial consult with ANCP but did not enroll in the program (initial consult only), patients that enrolled in the program but did not graduate within 180 days of their initial consult (non-graduates), and patients that graduated from ANCP within 180 days of their initial consult (graduates). For this evaluation, graduation was defined as a flowsheet status of “Graduated” or “Inactive – Complete,” as recorded by the TTS. Additionally, nicotine-related outcomes were compared by program engagement (1-2 follow-up visits versus 3 or more follow-up visits) and by initial Fagerström score<sup>5</sup> indicating low, low/moderate, moderate, and high dependence on nicotine. This analysis was limited to patients who indicated they use cigarettes, excluding patients using only other nicotine products. The evaluation period began December 1, 2019, and ended March 31, 2023.

### Results

Over this 40-month evaluation period, ANCP had 400 patients with initial consultations meeting our evaluation criteria. Two hundred thirteen of those patients (53%) had follow-up visits but did not graduate within 180 days and 56 (14%) patients had follow-up visits and did graduate within 180 days. Patient demographics and nicotine usage history were similar between groups, except for the average number of previous quit attempts, which was higher among graduates.

**Table 1: Patient characteristics between groups**

	<b>Graduates</b> N = 56	<b>Non-Graduates</b> N = 213	<b>Initial Consult Only</b> N = 131	<b>p-value</b>
<b>Standard Demographics</b>				
Medicaid coverage	20 (35.7%)	95 (44.6%)	63 (48.1%)	0.30
Caucasian	40 (71.4%)	127 (59.6%)	77 (58.8%)	0.49
Female	34 (60.7%)	127 (59.6%)	74 (56.5%)	0.81
Hispanic ethnicity	7 (12.5%)	21 (9.9%)	10 (7.6%)	0.57
Primary language is English	56 (100.0%)	213 (100.0%)	129 (98.5%)	n/a
Urban county of residence	56 (100.0%)	213 (100.0%)	129 (98.5%)	n/a
Age, mean (StDev)	53.7 (13.8)	49.7 (13.4)	50.8 (13.2)	0.13
<b>Comorbidities</b>				
Asthma	7 (12.5%)	24 (11.3%)	18 (13.7%)	0.79
Chronic obstructive pulmonary disease	11 (19.6%)	28 (13.1%)	15 (11.5%)	0.32
Type 1 diabetes	0 (0.0%)	4 (1.9%)	2 (1.5%)	0.59
Type 2 diabetes	9 (16.1%)	37 (17.4%)	24 (18.3%)	0.93
Cardiovascular disease	11 (19.6%)	24 (11.3%)	17 (13.0%)	0.25
Hypertension	23 (41.1%)	82 (38.5%)	54 (41.2%)	0.86
<b>Nicotine Usage at Initial Consultation</b>				
Age started nicotine use, mean (StDev)	17.2 (5.8)	16.6 (4.4)	16.3 (4.2)	0.44
# of previous quit attempts, mean (StDev)	3.9 (5.7)	3.0 (2.8)	2.3 (1.6)	<0.01
Fagerström score, mean (StDev)	4.1 (2.2)	4.4 (2.1)	4.4 (2.2)	0.05
Last quit attempt was within past 6 months	14 (25.0%)	30 (14.1%)	14 (10.7%)	0.19
Uses multiple types of nicotine	2 (3.6%)	4 (1.9%)	3 (2.3%)	0.75
Reported cigarettes per day, mean (StDev)	13.5 (8.6)	14.3 (8.2)	12.8 (9.5)	0.32
First cigarette is within 5 minutes of waking	19 (33.9%)	63 (29.6%)	31 (23.7%)	0.22

Note: StDev = standard deviation; Chi-square test used for categorical variables; ANOVA used for numeric variables

<sup>5</sup> Fagerstrom, K. O., & Schneider, N. G. (1989). Measuring nicotine dependence: A review of the Fagerstrom Tolerance Questionnaire. *Journal of Behavioral Medicine*, 12, 159-182.

The use of NRT and other treatments were similar between the graduates and non-graduates, but graduates had higher engagement rates (Table 2).

**Table 2: Treatment characteristics for patients with follow-ups within 180 days of initial consult**

	Graduates N = 56	Non-Graduates N = 213	p-value
<b>Treatment and Tools</b>			
Both NRT and NNM chosen at initial consult	34 (60.7%)	123 (57.7%)	0.85
Both NRT and NNM reported used at 2/3 of follow-up visits	7 (12.5%)	12 (6.1%)	0.33
Receipt of behavioral tools	27 (48.2%)	117 (54.0%)	0.31
<b>Engagement with ANCP</b>			
3 or more follow-ups completed	24 (42.9%)	57 (26.8%)	0.03
Days in program, mean (StDev)	99.2 (41.4)	93.7 (48.8)	0.44

Note: StDev = standard deviation; Chi-square used for categorical variables; ANOVA used for numeric variables

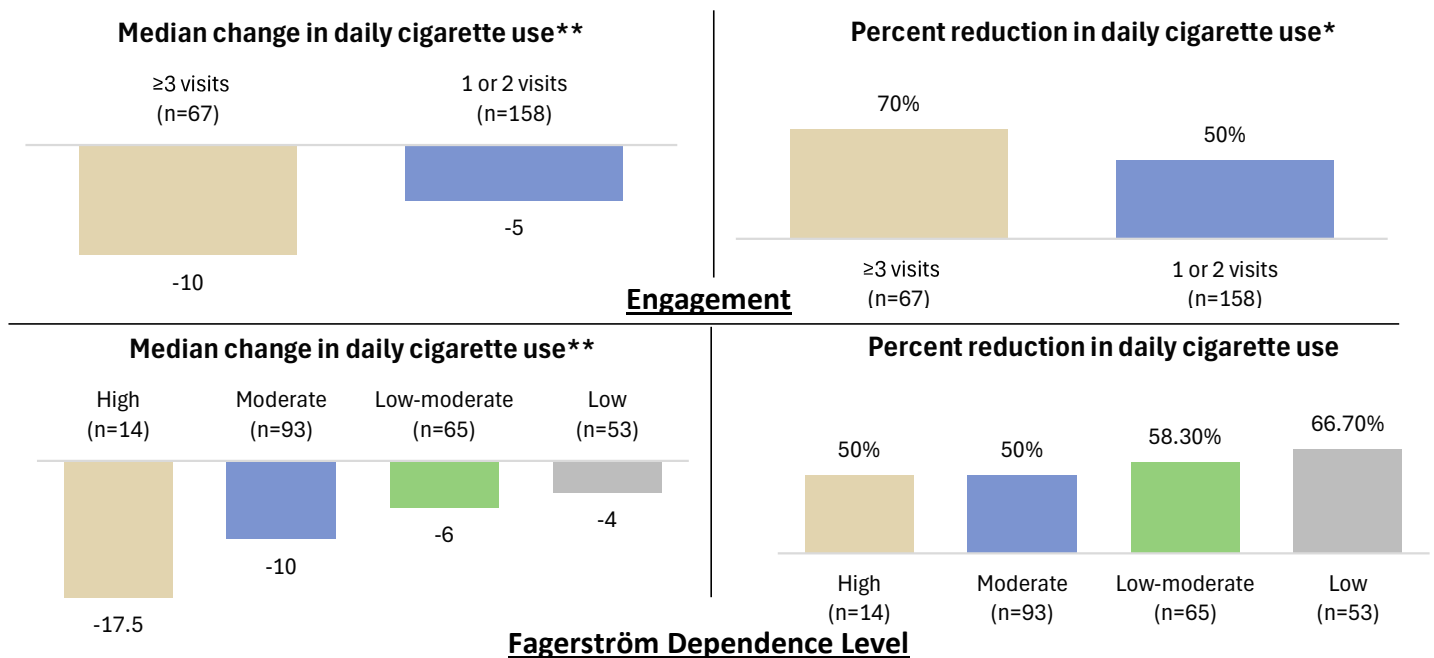
As might be expected, program graduates reported an average 98% reduction in cigarettes per day, compared to a 34% reduction for non-graduates (Table 3).

**Table 3: Patient outcomes within 180 days of initial consult**

	Graduates N = 56	Non-Graduates N = 213	p-value
<b>Treatment and Tools</b>			
Smoked a cigarette day of last follow-up	0 (0.0%)	95 (44.6%)	<0.01
Number of reported cigarettes per day, mean (StDev)	0.1 (0.3)	8.5 (6.7%)	
Reduction in cigarettes per day since initial consult, mean (StDev)	13.3 (8.8)	5.6 (6.7)	
Percent reduction in cigarettes per day since initial consult, mean (StDev)	98.4% (8.1%)	34.4% (50.9%)	

Note: StDev = standard deviation; Chi-square used for categorical variables; ANOVA used for numeric variables

As seen in Figure 1, patients with higher ANCP engagement had significantly greater absolute and percent reduction in cigarettes per day compared to those with lower engagement. Patients with a higher Fagerström score at their initial consultation only saw significantly greater absolute reduction in cigarettes per day, which would be expected given their higher initial dependence and higher usage of cigarettes at initial consultation.



Note: \* significant p < .05; \*\* significant p < .01; Mood's Median test used for engagement comparison; Jonckheere test used for Fagerström comparison

**Figure 1. Comparisons for nicotine reduction by program engagement and initial dependence level**

## FEEDBACK FROM TEAM MEMBER INTERVIEWS

Interviews were conducted with two TTSs, and their responses were thematically analyzed into domains of project successes and project challenges.

### Project Successes

TTSs felt that reduction in barriers to care was a key benefit of the program. By eliminating the barrier of payment, the TTS can see any patient that wants to use their services. This opens treatment to all patients, regardless of insurance status or socioeconomic situation. Additionally, by providing service via telephone calls, the program eliminates barriers due to transportation, Internet access, and privacy, meaning more patients are getting access to services. Even getting patients to participate in just an initial phone call is a notable program success. As one TTS shared “[access to information about quitting] is a social justice issue, and even if they don’t enroll, they have to tools to start when they are ready.”

*“There are endless opportunities to serve lots of people who need it. And I'm just really grateful that this program exists and there's funding for it, because it's helped a lot of people.”*

A highlight of the program that team members shared was the personalized nature of the treatment plans. By having dedicated time to discuss the individual needs of the patient, the TTS builds trust and rapport with patients. The TTSs shared that they consistently receive patient feedback that this is the first time a provider has taken the time to listen to their concerns. Providing this connection and care to patients allows the patients to feel comfortable with the TTS and to build the confidence needed to address their quitting goals. One team member shared “quite often patients, at the beginning of the call, they're very, very ambivalent...by the end of the call, they're like, I can't wait to get started.” Another team member stated, “the personalized care [approach] really speaks volumes about this program.”

### Project Challenges

*“We could reach so many more patients if we didn't have those [challenges] and we could break those down.”*

Team members identified program barriers and had suggestions for improvement. One was challenges in getting patients’ prescriptions filled due to lack of insurance coverage, slow turnaround times in getting the prescription signed off by the primary care provider, or hiccups at the fulfilling pharmacy. Early in the program’s implementation, community pharmacies were stocking brands of NRT that were not covered by Medicaid, causing delays in getting patients on treatment. The team worked for years to find a new method and have since started working with one specific pharmacy that provides mail order services.

Team members also shared that it is a struggle when primary care providers refer somebody to the program that is not ready to quit. Such patients are more likely to no-show their appointment or decide not to enroll, which takes TTSs away from those that are ready and motivated to quit. As one team member said, “if they're not ready, there's no point...sending them to me isn't going to make them ready.” The team has tried to combat this issue with more targeted outreach, but it remains a challenge, as providers may not be assessing readiness. Also, patients may indicate to their providers that they are ready to quit due to shame or wanting to meet provider expectations, and providers may hope that a conversation with a TTS will spark future quit attempts and ultimate success.

Capacity was also cited as a barrier. Project team members consistently cited feeling like they had too many patients to see in the time they had available. One team member shared “I feel like I'm always dropping the ball in one area. I get caught up here and then I'm way behind on patient calls or vice versa.” The team has attempted to remedy this issue by creating educational videos for patients, that can be viewed any time, assisting with some educational aspects of the TTS sessions. However, the team members also felt that having more team members or being able to utilize more community resources would be beneficial.

## FEEDBACK FROM PARTICIPANT SURVEYS

### Participant Response Rate

Between March and May of 2023, 853 patients referred to ANCP were contacted via the patient EHR portal to provide feedback about ANCP via an online survey. Survey questions focused on engagement, satisfaction with the program, and suggestions for improvement, and were tailored to the number of visits with ANCP (no visit; only initial consult; initial consult plus follow-up visits). Twenty-six participants completed the survey (response rate 3%). Of these 26 responses, 27% came from the no-visit group, 15% from the initial consult only group, and 58% from the follow-up visit group.

### Reported Feelings of Engagement and Satisfaction

#### *No Visit Group Responses*

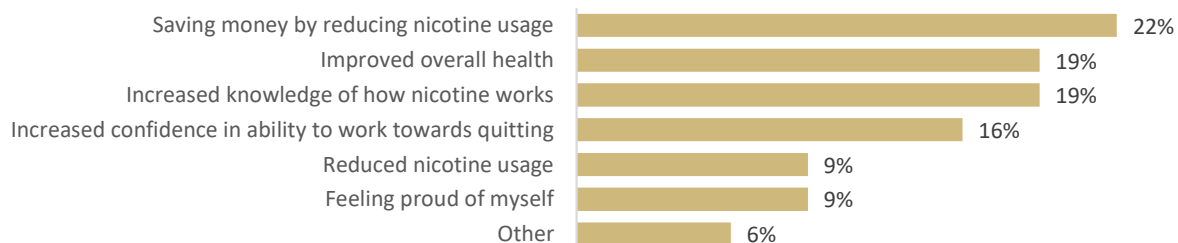
When asked about motivation to not enroll in the program, participants were divided in their responses with some saying they thought they had engaged in the program and it had allowed them to quit, some saying they were able to quit on their own, and one stating that they felt the program was “less than worthless”.

#### *Only Initial Consult Group Responses*

When asked about motivation to enroll and then to stop engaging after one visit, participants responded that while they wanted to work towards quitting, stressful events or poor understanding of the program changed their motivation. One participant stated that “nobody has contacted me,” whereas another stated that they “thought they did everything.”

#### *Initial Consult Plus Follow-up Visits Group Responses*

When asked about motivation and engagement in the program, the number one reason for enrollment was “ready to work towards quitting” (65%). The main reasons for continuing to engage were lack of judgment and support from TTS (20%), nicotine understanding (13%), and seeing progress with quitting (10%). As shown in Figure 2, the most cited impact of the program by participants was the ability to save money.



**Figure 2.** *Patients with follow-up visits perspective of program impact.*

### Notable Successes and Recommendations for Improvement

Overall, participants were satisfied and happy with their experiences with ANCP. Participants with follow-up visits noted positive experiences with the program that they believe led to them quitting or reducing their nicotine usage. The educational component of the program and the personal approach were both noted as highly successful aspects.

Communication was one recommendation for improvement, with some respondents feeling like more regular contact was needed. For people who didn’t have an initial visit and those with only an initial visit, it also appears that there might be some miscommunication and lack of systematic processes for scheduling patients and follow-up contacts.

### Survey Limitations

Limitations of the survey include a low overall response rate and uneven distribution of responses between the three groups. As such, this feedback may not be fully representative of the experiences of all who were referred to ANCP.