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# Improving Dental Students' Knowledge and Confidence in Treating Tobacco Use

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Improving Dental Students' Knowledge and Confidence in Treating Tobacco Use

Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Nursing

Practice at the University of Kentucky

By

Victoria L. Pierce

Lexington, KY

2024

## **Abstract**

**Background:** Tobacco use can lead to numerous chronic health conditions. Healthcare professionals in the dental field are in a unique position to broach this issue with patients. Research shows that dental students do not feel equipped to provide tobacco cessation care, citing lack of education on the subject among their top reasons for this.

**Purpose:** The purpose of this project was to evaluate changes in dental students' knowledge and confidence related to treating tobacco use after participation in an educational intervention about the 5A's, behavioral counseling, and first-line prescription medications.

**Methods:** This quality improvement initiative utilized a quasi-experimental survey design and took place at the UK College of Dentistry Diagnosis, Wellness and Prevention Clinic in fall of 2023. The sample included 30 dental students in their third or fourth years of study. Students ranked their knowledge and confidence in providing tobacco cessation care to patients before, after, and at 90-days following an in-person educational intervention. Results were analyzed using SPSS to determine if changes in knowledge and confidence before and after intervention were statistically significant.

**Results:** The sample size was 30 dental students. Knowledge, confidence, and application to practice scores had a potential range from 5-15 with higher scores indicating more agreement. Scores in each domain increased from 10.5, 9.1, and 7.7 (n=29) pre-education to 13.5, 13, and 13.2 (n=30) post-education, respectively ( $p<.001$ ).

**Conclusions:** The educational intervention was effective in improving dental students' knowledge and confidence in treating tobacco use. This is vital in ensuring that patients who use tobacco receive evidence-based care in the dental setting with the potential to improve population health on a wider scale.

## **Acknowledgements**

Much of who I am today has been shaped in part by the experiences I have been fortunate enough to have as a registered nurse and as a nurse practitioner student. From the patients I have cared for, cried with, and advocated for to my mentors and role models along the way, this journey to higher education would have been far less meaningful without each of them.

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## **Dedication**

To Brent Pierce, Misty Crowe, Cheryl and Ronnie Brewer, Destiny King, Gwen and Ron Pierce, and friends.

Brent, you have been my greatest supporter, my shoulder to lean on, listened, empathized, and offered advice every step of the way. You have worked so hard for our family and picked up my slack when I could barely keep my head above water and you did it all with love, grace, and a smile; for you I am endlessly grateful.

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# **Improving Dental Students' Knowledge and Confidence in Treating Tobacco Use**

## **Background and Significance**

### **Problem Statement**

Tobacco use is a major issue in the United States and causes a myriad of health concerns. Many patients are not being educated on available treatment options or being offered cessation care by their providers (Aljubran et al., 2022). The dental profession is in a unique position to employ tobacco use cessation techniques to improve both oral and general health outcomes (Neumann et al., 2019); however, dental professionals may not be embracing this opportunity to its fullest extent due to lack of training and confidence in providing tobacco cessation care (Sujatha et al., 2022).

### **Context, Scope, and Consequences**

Tobacco use is a significant health concern that affects over 34 million Americans and is responsible for over 521,000 deaths each year, among tobacco users and those who are exposed to secondhand smoke (CDC, 2022). Tobacco use is the leading cause of preventable diseases, mortality, and disability in Americans; it is known to cause many types of cancer, heart disease, stroke, lung disease, diabetes, and birth defects (CDC, 2023). Additionally, tobacco use is linked to decreased efficacy of dental treatments, increased risk of oral squamous cell carcinoma, periodontitis, peri-implantitis, gingival disease, diminished epithelial attachment, dental caries, tooth loss, halitosis, and dental implant failure (Chaffee et al., 2021; Ford & Rich, 2021; Sujatha et al., 2022). Tobacco use places an enormous burden on communities and the healthcare system, increasing healthcare costs by \$300 billion each year (CDC, 2022). In Kentucky, 21.4% of adults use tobacco compared to the national average of 15.5% and the state's tobacco-related healthcare costs equal approximately \$1.92 billion per year (CDC, 2020).

## **Current Evidence-Based Interventions**

Healthy People 2030 has many objectives related to tobacco use cessation, and two that were closely linked to this project are TU-12, “Increase the proportion of adults who get advice to quit smoking from a health care provider” with a desired increase of 10% from 48.1% to 58.1% and TU-13 “Increase use of smoking cessation counseling and medication in adults who smoke” with a desired increase of 11.7% from 32.1% to 43.8% (*Healthy People 2030*). These objectives exist thanks to evidence that receiving tobacco use cessation advice and referrals from healthcare professionals including medical doctors, nurse practitioners, physician’s assistants, and dentists are a major driver of quit attempts within the past 12 months (*Healthy People 2030*).

This project also aligned with National Quality Forum’s measure 0028 “Preventive Care and Screening: Tobacco Use: Screening and Cessation Intervention,” (2023) which measures the percentage of patients who were both screened for tobacco use and subsequently provided cessation interventions if indicated (*National Quality Forum, 2023*). This measure is submitted through the Merit-based Incentive Payment System which provides payment to clinicians who provide evidence-based and cost-effective care.

Tobacco cessation counseling from dentists is generally well received and well-regarded by patients due to its opportunistic nature (Holliday et al., 2020), but unfortunately only approximately 12.5% of dental students report receiving any education on tobacco cessation treatment (da Silva Leonel et al., 2021). Only about 26.7% of dentists report being aware that dentist-led cessation counseling is covered by Medicaid, and those who were aware were shown to be more likely to identify and treat tobacco use than those who were not aware of this coverage (Brown et al., 2019).

An evidence-based, easy-to-follow format for dental professionals to use is the 5 A's of intervention: "Ask" about tobacco use, "Advise" the patient to quit, "Assess" the patient's readiness to quit, "Assist" the patient in a quit attempt, and "Arrange" follow-up care (*AHRQ*, 2012). This intervention is quick and simple to perform at any appointment and is recommended by the Agency for Healthcare Research and Quality (*AHRQ*, 2012). Lack of time during appointments has been frequently cited as a barrier to providing tobacco cessation care, so this format makes it more feasible for dental professionals to incorporate tobacco cessation care into practice (Halboub et al., 2022; Sujatha et al., 2022). This tool teaches providers to ask about tobacco use, advise patients to stop using tobacco products, assess readiness to quit, assist them in a quit attempt by prescribing pharmacotherapy or offering counseling, and arranging follow-up cessation care for those who use tobacco (*AHRQ*, 2012).

## **Purpose and Objectives**

### **Purpose of the Project**

The purpose of this project was to improve dental students' knowledge and confidence in treating tobacco use and dependence among their patients, with the overall goal of improving population health.

The objectives of this project were:

- 1) Assess students' knowledge of tobacco cessation strategies before and after an educational intervention related to current evidence-based tobacco cessation techniques (5A's of intervention, behavioral counseling interventions, and first line medications for tobacco use),

- 2) Assess students' confidence in treating tobacco use before and after an educational intervention related to current evidence-based tobacco cessation strategies, and
- 3) Implement and evaluate an in-person education session and one-page handout related to evidence-based tobacco cessation techniques.

By providing a brief education session to dental students, the end goal of this project was to aid students in identifying and treating as many people as possible who struggle with tobacco use as they move into a career that allows them to have a significant impact on oral and population health.

### **Literature Search**

#### **PICOT Question**

The PICOT question used to guide the literature search for this project was, “Among dental students, how does providing a concise, evidence-based tobacco cessation education session affect their knowledge and confidence in providing cessation care to their patients compared to pre-intervention knowledge and confidence?”

#### **Search Strategies**

##### ***Key Words***

A thorough literature review of the subject was conducted to identify and describe current knowledge, gaps in knowledge, and implications for practice. The population of interest was “dental students,” and this term was used in the literature search. The independent variable of interest was tobacco cessation education and terms used for this in the literature search were “AND tobacco education OR tobacco cessation OR tobacco use.” The dependent variable of interest was knowledge and confidence in providing tobacco cessation care and terms used for

this in the literature search were “AND knowledge OR confidence OR patient education OR referral OR treatment.” Databases searched were CINAHL, PubMed, and UK Libraries.

### ***Inclusion and Exclusion Criteria***

The total number of articles found in the search was 6,849 between all databases. Inclusion criteria for this literature search included peer-reviewed, English language research studies published within the last 6 years. Exclusion criteria were the inverse of inclusion criteria. Final article choices were made based on these criteria and by each article’s applicability to the project. A total of 15 articles were selected for review: one systematic review, four descriptive studies, seven cross-sectional studies, one qualitative interview study, one randomized-controlled trial, and one quality measure evaluation study.

## **Synthesis of Evidence**

### **Summary of Evidence**

In nine studies, dental professionals reported the perception that they had not received enough training in tobacco cessation to provide adequate cessation care (Alblowi, 2021; Aljubran et al., 2022; Asmaon, 2021; Brown et al., 2019; Halboub et al., 2022; Liu et al., 2019; Priya et al., 2022; Saxena, 2017; Vashi et al., 2021). Students reported that their lack of confidence in tobacco cessation was due to insufficient education and training, and named this among their top reasons for not providing cessation care to their patients (Aljubran et al., 2022; Brown et al., 2019). This is mirrored in the fact that only 17.7-51% of dental students reported feeling confident in their tobacco cessation education and only 47.1-49.1% reported ever having assisted patients in their quit attempts (Aljubran et al., 2022; Brown et al., 2019). Ten research teams made substantial arguments for the implementation of tobacco cessation education among dental students based on the evidence collected from their studies. They cited the unique position

of the dental profession (Holliday et al., 2020; Saxena, 2017; Sujatha et al., 2022), the opportunity to improve population health (Neumann et al., 2019), and opportunities for Medicaid reimbursement (Brown et al., 2019) as reasons to implement tobacco cessation education among dental students.

### **Strength of Evidence**

The overall strength of the chosen evidence was strong, including a systematic review, a randomized controlled trial, and cross-sectional studies. These types of studies vary on the hierarchy of evidence, but results were clear, consistent, reliable, and generalizable. Qualitative studies were also included, which augmented the findings of the quantitative studies.

### **Supporting the Project with Evidence**

The overarching finding in this body of evidence was that tobacco cessation education for dental students was warranted, with current gaps in the literature being that there were no studies identified in which educational interventions on tobacco cessation strategies for dental students were performed or evaluated. Findings from the literature also support that tobacco cessation education would likely have sufficient buy-in from the students themselves, because 89.6% of students reported feeling that it was their duty to provide tobacco cessation care (Vashi et al., 2021). Providing cessation education to dental students opened the door for increasing their knowledge and confidence in providing tobacco cessation care which, as stated in the evidence, is likely to increase the number of tobacco users who receive cessation care in their lifetime. This has the potential to improve population health.

## **Theoretical Framework**

### **Theoretical Framework**

Pender's Health Promotion Model is a theoretical framework that focuses in part on the perceived benefits and perceived barriers to an action (Petiprin, 2023). The idea is that the more benefit one can see with a given action, the more likely they are to perform that action and that the more barriers one sees with a given action, the less likely they are to perform that action.

### **Guiding the Project**

This framework was a perfect one to guide this project. The perceived benefits of dental students providing tobacco cessation treatments are vast including decreasing the incidence of untreated tooth decay, tooth loss, oral cancer, and gum disease (CDC, 2022). A perceived barrier to dental students providing cessation counseling or resources was lack of knowledge on the subject, leading to decreased confidence in providing that kind of care (da Silva Leonel et al., 2021). This project served to eliminate these barriers by providing dental students with focused, evidence-based, and tangible education and resources to provide the best care for their patients who use tobacco.

## **Methods**

### **Study Design**

This practice improvement project utilized a quasi-experimental design to implement and evaluate tobacco cessation training in one academic dental clinic. It included a pre-survey, intervention, immediate post-survey, and a 90-day follow-up survey. The pre- and post-surveys were provided on the same day to dental students at the University of Kentucky Dental Clinic on three Thursdays in the fall semester of 2023. The pre and post surveys took approximately 3 minutes to complete each, with a 5-minute education session between them that preceded the

start of the clinical day. The 90-day follow-up survey was sent out to students within 90 days of their initial intervention date via email by the principal investigator (PI).

## **Setting**

### ***Agency Description***

The University of Kentucky Diagnosis, Wellness, and Prevention Clinic is located in Lexington, KY within the College of Dentistry on campus. This interdisciplinary clinic provides comprehensive care to dental patients. This clinic allows dentistry students to provide dental care to patients under supervision of a faculty dentist. Also present in the clinic for consultation and care is a nurse practitioner, a registered dietitian and dietetics students, and a Master of Social Work student. This clinic has anywhere between 5-10 dental students each Thursday in two groups that begin at 9:00AM and at 2:00PM. These dental students are in their third or fourth year of study. The new patient visit includes a comprehensive medical and dental history, oral and medical exam, x-rays, and treatment planning. If social or diet needs are identified, the registered dietitian or social work student are consulted. The target population of this clinic is patients who have cardiovascular disease, diabetes, history of tobacco use, or no primary care provider, which played very well into this project. This clinic services much of the state of Kentucky, which creates a large population of patients from across the state.

### ***The Project in Relation to the Agency's Goals***

University of Kentucky Diagnosis, Wellness, and Prevention Clinic's mission is "Advancements in patient care, education, research, and community engagement, for the benefit of Kentuckians and beyond, are made possible by our college's scientifically oriented, technically capable, and culturally sensitive oral health team," and their vision is "Be a model for oral health education, discovery, and service as our innovations advance the practice of



dentistry,” (UK Dentistry, 2022) This project aligned with the value that the clinic places on advancements in patient care, education, research, and innovations to advance the practice of dentistry by teaching students to emphasize tobacco cessation care.

### ***Stakeholders***

A primary stakeholder in this project was Dr. Angela Grubbs, a nurse practitioner who works in the UK Diagnosis, Wellness, and Prevention Clinic. She expressed a need for tobacco cessation education among dental students and has been a key part of the development of this project. She noted that dental students were screening every patient for tobacco use every time, but when someone screened positive, they were unsure of where to go from there. Dr. Grubbs helps coordinate dental student placement at the clinic and communicates with these students prior to their days at the clinic. She was invested in this project and present to help facilitate smooth implementation.

Other important stakeholders in this project were the students themselves and the patients that they treat. The dental students held great responsibility for this project’s implementation as it was vital that they were willing to come early on their clinic day for this education, pay attention, and absorb the information. The patients play a role in the greater impact of this project as in order to improve population health, the patients must be receptive to the cessation care that dental students offer.

### ***Site-Specific Barriers and Facilitators to the Project***

This project site had a few minor barriers to address. The first was that there was no time built into the schedule for the project to be implemented. This was overcome by asking the students to arrive 15 minutes early on a few select clinic days to allow for the project to take place. Another potential barrier was that some students may overlap clinic days, meaning that the

same students may be there during project implementation more than once which could skew the results of the project. I overcame this by reviewing the list of students prior to project dates, and ensuring that each student only participated once.

Facilitators to the project at this site included ample space to complete the project, internet access for survey completion, student willingness to participate in research, adequate buy-in from key stakeholders, and the project's alignment with the clinic's vision and mission statement by advancing students' dentistry practice and paving the way for them to provide more comprehensive care to their at-risk population.

## **Sample**

### ***Target Population***

The target population for this project was dental students currently enrolled at the University of Kentucky. The sample was drawn from dental students who were currently in a clinical rotation at the UK Diagnosis, Wellness, and Prevention Clinic in the fall of 2023. The sample included 10 dental students who were present in the clinic on each of three selected Thursdays in the fall semester of 2023, for a total sample size of 30 students. Students included in the project were third or fourth-year dental students.

### ***Inclusion and Exclusion Criteria***

Inclusion criteria for the project sample were that the student must be enrolled in the University of Kentucky College of Dentistry, currently be in clinical rotations, and be at least 18 years of age. Exclusion criteria for the project sample were anyone who was not currently enrolled in the University of Kentucky College of Dentistry, not currently in clinical rotations, under the age of 18, or was a previous participant in the project.

## **Procedure**

### ***IRB Submission Process***

This project was submitted to the Institutional Review Board for approval to ensure the safety of human subjects and was approved on September 8, 2023.

### ***Evidence-Based Intervention***

The evidence-based intervention for this project was a five-minute educational session provided via in-person lecture-style teaching and laminated handouts for students to keep. This education was developed by the PI via the online visual suite Canva, using current evidence-based practice for tobacco cessation care and approved by the PI's advisor and clinical mentor. In-person education is preferred over online platforms by most health-related graduate students for clinical aspects of learning (Alsoufi et al., 2020). Evidence also shows that shorter presentation times are linked to better knowledge retention and increased investment in the cause being discussed (Cooper & Richards, 2017) and that tangible, visually appealing educational information motivates students to learn material (Tomita, 2018). The objectives for this intervention were to educate dental students about the 5 A's, use of behavioral counseling, and first-line medications for tobacco cessation to increase their knowledge and confidence in providing tobacco cessation care to their patients.

### ***Measures and Instruments***

This project sought to measure the level of knowledge and confidence of dental students in providing tobacco cessation care to their patients. This type of information is largely subjective and was self-reported by the students through the surveys provided. This project used Qualtrics surveys to gather data. All three surveys asked students to rate their level of knowledge, confidence, and application to practice in a variety of tobacco cessation topics via

Likert scale. The 12, 18, and 14 question surveys, respectively, were developed by the PI to evaluate the project's objectives and approved by the PI's academic advisor and clinical mentor who, as PhD and DNP-prepared faculty, are experts in the field. Topics included were the 5 As, use of behavioral counseling, and first-line prescription medications for tobacco cessation. The post-survey contained additional questions related to student perceptions of the education provided and their recommendations for future educational topics and research in the dental clinic. Pre- and post-intervention tobacco cessation prescriptions were also reviewed to measure the effect of the intervention.

### ***Data Collection***

Data collection for this project was performed through Qualtrics-based survey responses by participants. This was completed prior to the start of their clinic sessions at 9AM and at 2PM. Dental students were invited via email three days prior to their clinical day by the PI to arrive 15 minutes early on the days of project implementation if they wished to participate. Participants scanned a QR code for both the pre- and post-surveys for ease of access and use. The pre-survey contained a survey cover letter that asked participants to verify their understanding of the background and purpose of this project and informed them that they would receive no negative effects for not participating in the project, that they would remain anonymous, and that they were free to exit the survey at any time if they no longer wished to complete it without negative effects. The survey was accessed via a link at the end of the cover letter. A 90-day follow-up survey was sent via email by the PI within 90 days of the initial intervention in which students could view another survey cover letter verifying the same prior to completing the follow-up survey.

For this project, it was not feasible to collect data on cessation counseling provided by dental students. This is because there is currently no standardized approach to document this information within the Diagnosis, Wellness, and Prevention Clinic.

Specific steps of data collection were as follows:

Step 1: Dental students were invited to participate in the project by the PI via email three days prior to their scheduled clinical day at the Diagnosis, Wellness, and Prevention Clinic.

Step 2: Participants scanned a QR code which took them to the survey cover letter explaining informed consent and accessed the pre-survey in Qualtrics via a link embedded in this cover letter (See Appendix A).

Step 3: In-person education session was presented by the PI immediately following completion of the pre-survey and copies were provided for students to keep of both the presentation and the one-page handout (See Appendix B).

Step 4: Participants scanned another QR code to access the post-survey via Qualtrics immediately following the education session (See Appendix A).

Step 5: Within 90 days of the initial intervention students were invited to take the follow-up survey on Qualtrics via email by the PI, where they could click into the survey cover letter and access the follow-up survey after viewing the statement of informed consent (See Appendix A).

### ***Data Analysis***

Qualtrics surveys allow researchers to easily extract and compare data through their software (Molnar, 2019). IBM SPSS Statistics 27 was used to analyze data. In this project, subjective reports of student knowledge, confidence, and application to practice were assessed with potential scores for each domain, ranging from 5-15 with higher scores indicating more agreement. A two-sample t-test was used to analyze data collected pre-intervention (n=29) and

post intervention (n=30) to determine if the differences in mean scores were significant. The follow-up survey (n=4) was also analyzed to evaluate whether the learning was sustained at three months. With these results, data analysis also included frequencies of certain factors of diversity including age, sex, and year in the dental program. Free-text answers to the questions regarding recommendations for future education and research were personally reviewed by the PI and reported by frequency.

## **Results**

### **Demographics**

A total of 30 dental students participated in this project. Three-quarters of students who participated were between 25-34 years of age (77%; Table 1). Slightly more than half were male (53%). The students in this project were relatively equally split between their third (52%) or fourth (48%) years of study.

### **Findings**

For all three subjective measures of student knowledge, confidence, and application to practice, there was a statistically significant increase from pre- to post-education. Knowledge, scores increased from 10.5 (SD = 2.2) to 13.5 (SD = 1.4;  $p < .001$ ; Table 2). For confidence, scores increased from 9.1 (SD = 2.6) to 13 (SD = 1.8;  $p < .001$ ). For application to practice, scores increased from 7.7 (SD = 2.8) to 13.2 (SD = 1.5;  $p < .001$ ). Students also provided feedback regarding the education. Nearly all agreed or strongly agreed that the education was helpful (97%). When asked if they learned something new from this intervention, almost all (97%) of the students either agreed or strongly agreed.

When asked how this education could be improved in the future, nine students felt that the intervention needed no improvement, two students suggested adding pamphlets that they

could provide to patients, and two students suggested that every dental student should be given this education regardless of clinical rotation.

Students were also asked what other topics they would be interested in receiving education on in the future, to which four students reported wanting to learn about treating opioid use, three students wanted to learn other methods and medications to use in tobacco cessation, and one student was interested in learning about prescribing antibiotics.

A total of 4 students responded to the 90-day follow-up survey. The means for knowledge, confidence, and application to practice in the follow-up survey were 14.3 (SD = 1), 13.5 (SD = 1.9), and 11.3 (SD = 2.6), respectively (Table 3). This survey was not statistically analyzed in comparison to the pre and post surveys due to small sample size.

## **Discussion**

### **Findings in Relation to Existing Literature**

The purpose of this project was to improve dental students' knowledge and confidence in treating tobacco use and dependence among their patients. Gaps in current evidence were that there were no studies evaluating the effects of a brief tobacco cessation education session provided to dental students. This education was warranted, as only 12.5% of dental students report having ever received education on the topic (da Silva Leonel et al., 2021), only a small percentage report feeling confident in providing cessation care (Aljubran et al., 2022; Brown et al., 2019), and students reported feeling that they have not received enough education on tobacco cessation, but still felt a duty to provide this care to their patients in practice (Alblowi, 2021; Aljubran et al., 2022; Asmaon, 2021; Brown et al., 2019; Halboub et al., 2022; Liu et al., 2019; Priya et al., 2022; Saxena, 2017; Vashi et al., 2021). Training dental professionals in providing tobacco cessation and ensuring that they are confident in this skill could have a positive impact

on population health (Neumann et al., 2019), which is mirrored by the significant increase in prescriptions written after implementation of this project.

### **Impact of the Project**

The data collected and analyzed in this project provided statistically significant evidence that an educational intervention can increase dental students' knowledge and confidence in providing tobacco cessation care. The brief education intervention can also increase intent to employ these strategies into their practice. It appears that both knowledge and confidence were sustained at 90 days with a slight decrease in application to practice, though application scores remained higher than the pre-education means. It is important to note that with such a small sample size for the follow-up survey, the 90-day results may not be generalizable to the initial sample.

### ***Project Site***

There is potential for great impact not only on the University of Kentucky Diagnosis, Wellness, and Prevention Clinic but in all of University of Kentucky's student dental sites. These student clinics include the DMD Student Clinic, Wellness, Pediatric, Urgent Treatment, Orthodontics, Oral Surgery, Endodontics, and Periodontology. The sum of these clinics treat approximately 400 patients each day. There are 65 third-year dental students and 65 fourth-year dental students each year. In the three months prior to project implementation, there were no tobacco cessation medication prescriptions initiated by students. In the four months following project completion, fifteen tobacco cessation medication prescriptions were initiated by students. Twelve of these prescriptions were sent from the project site which is open one day per week and sees 5-10 patients per week. Three of these prescriptions were sent from the Urgent Care Dental Clinic which is open 4-5 days per week and sees 10-12 patients per day. This shows that the



education provided had an immediate impact on the way that the students practiced, which led to patients receiving additional opportunities from providers to quit using tobacco.

### ***Plans for Sustainability***

This project was well-received by both the dental students and the faculty at the Diagnosis, Wellness, and Prevention Clinic. After implementation, the presentation and handout used in this project were requested by dental faculty working in the clinic to be used as a resource for dental students in tobacco cessation counseling and prescribing. After seeing the impact within the clinic, Angela Grubbs, DNP, APRN, FNP-C, who was the clinical mentor for this project, was asked to provide a lecture on tobacco cessation both to University of Kentucky first-year dental students to expose them to the topic before they entered their clinical rotations and to current dental faculty in the format of a Lunch and Learn to refresh their own knowledge. The implementation site has also begun having students use the dental documentation code D1320 “Tobacco counseling for the control and prevention of oral disease,” consistently, making this easier to track within the electronic health record. These events align with the literature that states that dental providers lack tobacco cessation education, but greatly value this care and have a desire to provide it to their patients (Alblowi, 2021; Aljubran et al., 2022; Asmaon, 2021; Brown et al., 2019; Halboub et al., 2022; Liu et al., 2019; Priya et al., 2022; Saxena, 2017; Vashi et al., 2021). This project directly impacted the expansion of tobacco use and cessation education in the University of Kentucky’s dental curriculum.

### ***Next Steps***

Several potential next steps were identified during this project. The first of which would be to provide this education to dental students on a larger scale, as students reported feeling that the education should be provided to every dental student regardless of rotation. This is currently

in the works after conclusion of this project as the clinical mentor will be providing this education to all first-year dental students, as well as to current dental faculty as a refresher.

Students reported that they would be interested in receiving education on treating opioid dependence, which is a growing epidemic nationally and is particularly troublesome in Kentucky. Moving forward, students could be educated on both tobacco cessation and opioid dependence resources in a similar format as it can be inferred that this would have adequate buy-in from the students.

### **Implications for Practice**

#### **Practice, Education, Policy, and Research**

Based on the findings from this project, there are implications for practice that should be considered. One of these would be to reinforce tobacco cessation education by including simulations on the topic in the dental program. This could help ensure that most dental students feel knowledgeable and confident in providing this kind of care as they enter the workforce. Expanding this education through clinical scenarios in a controlled academic environment could help solidify the data collected during this pilot project. Students should also receive education on standardized documentation in Epic; during this education session they were taught how to input the “Tobacco Dependence” diagnosis code into a patient’s chart and link the cessation prescriptions to that diagnosis, which they had no knowledge of prior. Additionally, it was noted that not all dental faculty felt comfortable signing-off on prescriptions for tobacco cessation when the trained students would ask for them post-education, so education for current dental faculty may be warranted on an annual basis, providing an opportunity to educate them on the benefits of tobacco cessation among their patients and opportunities for Medicaid reimbursement (Brown et al., 2019).

Further research could be of benefit regarding the role of demographic variables that affect learning. Analyzing to determine if and to what degree age, gender, or year in the dental program play roles in retaining education could aid in timing and tailoring tobacco cessation education to fit students' needs. It could also be feasible to evaluate cessation prescriptions and documented counseling at regular intervals to monitor sustainability.

This project's findings also may have implications related to policy. With current evidence that dental students do not feel adequately equipped to treat tobacco use with standard education (Alblowi, 2021; Aljubran et al., 2022; Asmaon, 2021; Brown et al., 2019; Halboub et al., 2022; Liu et al., 2019; Priya et al., 2022; Saxena, 2017; Vashi et al., 2021), there is a considerable argument that tobacco cessation education should be included in the College of Dentistry curriculum.

Although there is opportunity for Medicaid reimbursement for dental professionals who provide tobacco cessation (Brown et al., 2019), there is room for improvement. Some Medicaid payers will only reimburse these services if another service is already being provided within the appointment and can be limited to twice yearly payment (Stevens, 2023). Current evidence-based practice recommends that every tobacco user should be offered treatment each time they see a clinician (Fiore et al., 2009), which is often more than twice per year. Providing reimbursement for these services increases clinician likelihood to provide said services (Brown et al., 2019), and further coverage should be available to initiate positive reinforcement to dental professionals who provide this quality, evidence-based care.

### **Cost Implications and Cost Benefit**

Tobacco use is the leading cause of preventable death and disease in the United States and is responsible for upwards of \$300 billion in healthcare costs per year (CDC, 2022), with

Kentucky's tobacco-related spending reaching \$1.92 billion per year (CDC, 2020). The average cost of tobacco use per person per year is \$8,156, with \$2,893 of this cost being directly related to excess healthcare costs (Saul, 2023). Assessing for and treating tobacco use for every patient at every clinical encounter is essential and is the best way to ensure that tobacco-dependent patients receive appropriate care (Fiore et al., 2009). By implementing this low-cost brief education on tobacco cessation care to dental students, the potential return on investment is large when considering the number of patients these students will encounter throughout their careers.

The average return on investment is \$1.26 for every dollar spent on tobacco cessation programs, with the potential to save \$275 million per year in direct healthcare expenditures (Rumberger et al., 2010). When Massachusetts went through health care reform in 2006, Medicaid was mandated to cover tobacco cessation for those insured which led to a \$3.06 return on investment for every dollar spent (American Heart Association, 2020). This compounds the argument for increased coverage from Medicaid for tobacco cessation care provided by dental professionals.

### **Translation of Findings**

The ability to translate research findings into practice is vital in the ever-evolving world of healthcare. Through this relatively small project, underlying themes have been revealed that call current practices into question and push us forward into new ways of thinking. This project provides evidence that challenging the norm of standardized education in light of new research can improve students' knowledge and confidence in providing care outside their comfort zone. By promoting this education, the number of patients who could be impacted throughout their careers is incalculable and can greatly impact population health in the areas that the students go on to serve.

## **Limitations**

There were a few limitations identified during this project. One of these limitations was the nature of in-person education. Though it has been shown that in-person education is preferred by graduate students in health-related fields (Alsoufi et al., 2020), some presentations may differ from group to group due to human nature of the presenter and because different students will ask different questions. This was combated in part by ensuring that the same presentation was used for each group and that the same learning objectives were covered.

Another limitation was due to the surveys only being offered in an online format. One student reported having problems with internet access during the pre-survey and there were no paper copies available to complete. This led to the loss of one response pre-intervention.

Lack of participation in the 90-day follow-up survey was another limitation. Though 30 students were invited to take part, only four completed this follow-up survey. This could be partially due to the fact that the follow-up survey closed during the students' finals week. The data from these surveys was promising, however.

Lastly, dental students do not have a standardized approach to documentation of tobacco cessation counseling, which impeded data collection to determine the success of this piece of the education provided.

## **Conclusion**

A brief, in-person education session can be effective in increasing dental students' knowledge, confidence, and intent to apply tobacco cessation techniques into their practice. This project showed promise in sustained learning at 90 days as well, but more research is needed with a larger sample size. It can be reasonably inferred that providing tobacco cessation

education to dental students provides great benefit to their practice and patients and could positively impact population health.

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## Tables

Table 1. Demographic Variables ( $N=30$ )

Demographic variable	<i>n</i> (%)
Age	
18-24	7 (23.3%)
25-34	23 (76.7%)
Gender identity	
Male	16 (53.3%)
Female	14 (46.7%)
Year in dental program	
Third year	15 (51.7%)
Fourth year	14 (48.3%)

Table 2. Comparison of Dependent Variables of Interest ( $N=30$ )

	Pre-education  ( $n = 29$ )  <i>mean</i> (SD)	Post-education  ( $n = 30$ )  <i>mean</i> (SD)	<i>p</i>
Knowledge	10.5 (2.2)	13.5 (1.4)	<.001
Confidence	9.1 (2.6)	13 (1.8)	<.001
Application	7.7 (2.8)	13.2 (1.5)	<.001

Note: Knowledge, confidence, and application subscales range from 5 to 15 with higher scores indicating more agreement.

Table 3. Follow-Up Survey Descriptive Statistics ( $N=4$ )

	90-day follow-up  ( $n = 4$ )  <i>mean</i> (SD)
Knowledge	14.3 (1)
Confidence	13.5 (1.9)
Application	11.3 (2.6)

Note: Knowledge, confidence, and application subscales range from 5 to 15 with higher scores indicating more agreement.

## Appendix A

### Survey Items

#### Pre-Survey

The following questions pertain to individual characteristics:

1. What is your age?
  - a. Under 18
  - b. 18-24
  - c. 25-34
  - d. 35-44
  - e. 45-54
  - f. 55-64
  - g. 65-70
  - h. 71+
2. What is your gender identity?
  - a. Male
  - b. Female
  - c. Non-Binary
  - d. Other
  - e. Prefer not to say
3. What is your current status in the College of Dentistry?
  - a. Second-year dental student
  - b. Third-year dental student
  - c. Fourth-year dental student

The following items will be rated based on a Likert Scale with choices Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree:

4. I know what the 5 As of intervention are.
5. I am confident in implementing the 5 As of intervention specifically for tobacco use.
6. I currently apply the 5 As of intervention in my practice.
7. I know that behavioral counseling is recommended for tobacco cessation.
8. I am confident in referring my patients to behavioral counseling for tobacco cessation.
9. I currently initiate referrals to behavioral counseling for tobacco cessation.
10. I know what first-line medications for tobacco cessation are.
11. I am confident in using my knowledge of first-line medications for tobacco cessation.
12. I currently initiate prescribing tobacco cessation medications to my patients.

The following items will only be present on the post-survey and will be rated based on a Likert Scale with choices Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree:

13. This education was helpful.

14. I learned something new from this education.

The following questions are free-text and pertain to future education and research. These will only be present on the post-survey.

15. How could this education be improved in the future?

16. What other topics would you be interested in receiving education on?

17. Do you have any recommendations for future research in the Dental Clinic?

#### Post-Survey

1. What is your age?
  - a. Under 18
  - b. 18-24
  - c. 25-34
  - d. 35-44
  - e. 45-54
  - f. 55-64
  - g. 65-70
  - h. 71+
2. What is your gender identity?
  - a. Male
  - b. Female
  - c. Non-Binary
  - d. Other
  - e. Prefer not to say
3. What is your current status in the College of Dentistry?
  - a. Second-year dental student
  - b. Third-year dental student
  - c. Fourth-year dental student

The following items will be rated based on a Likert Scale with choices Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree:

4. I know what the 5 As of intervention are.
5. I am confident in implementing the 5 As of intervention specifically for tobacco use.
6. I plan to apply the 5 As of intervention in my practice.
7. I know that behavioral counseling is recommended for tobacco cessation.
8. I am confident in initiating referrals to behavioral counseling for tobacco cessation.
9. I plan to initiate referrals for my patients to behavioral counseling for tobacco cessation.
10. I know what first-line medications for tobacco cessation are.
11. I am confident in using my knowledge of first-line medications for tobacco cessation.

12. I plan to initiate prescribing tobacco cessation medications to my patients.
13. This education was helpful.
14. I learned something new from this education.

The following questions are free-text and pertain to future education and research.

15. How could this education be improved in the future?
16. What other topics would you be interested in receiving education on?
17. Do you have any recommendations for future research in the Dental Clinic?

The following question is not a part of research.

18. Please enter your email below if you would like to be entered to win a \$10 Starbucks gift card. You will be contacted via this email address at the conclusion of this portion of the study if you are selected.

#### Follow-Up Survey

19. What is your age?
  - a. Under 18
  - b. 18-24
  - c. 25-34
  - d. 35-44
  - e. 45-54
  - f. 55-64
  - g. 65-70
  - h. 71+
20. What is your gender identity?
  - a. Male
  - b. Female
  - c. Non-Binary
  - d. Other
  - e. Prefer not to say
21. What is your current status in the College of Dentistry?
  - a. Second-year dental student
  - b. Third-year dental student
  - c. Fourth-year dental student

The following items will be rated based on a Likert Scale with choices Strongly Disagree, Disagree, Neutral, Agree, and Strongly Agree:

22. I know what the 5 As of intervention are.
23. I am confident in implementing the 5 As of intervention specifically for tobacco use.
24. I have been applying the 5 As of intervention in my practice.

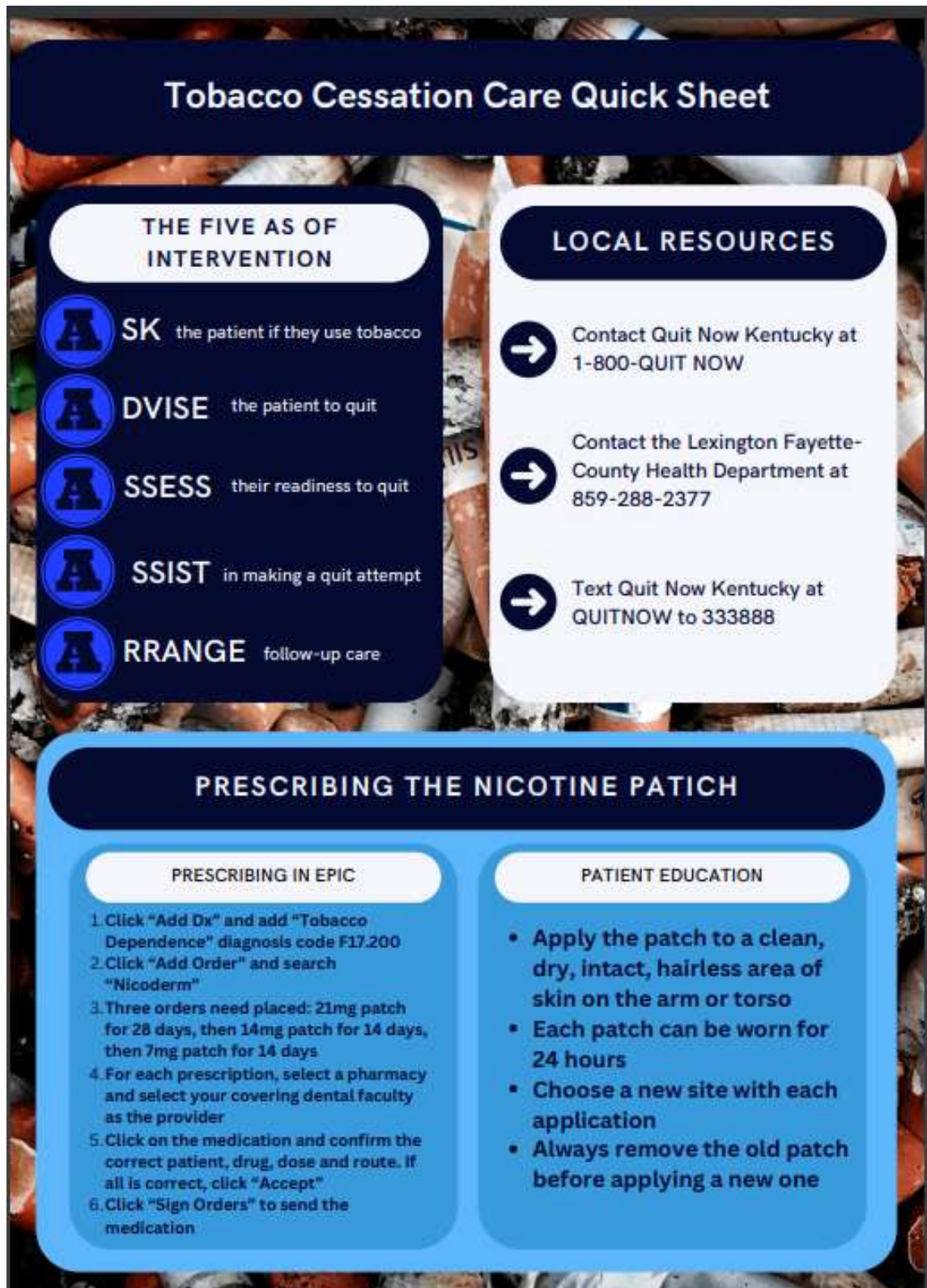


25. I know that behavioral counseling is recommended for tobacco cessation.
26. I am confident in initiating referrals to behavioral counseling for tobacco cessation.
27. I have been initiating referrals for my patients to behavioral counseling for tobacco cessation.
28. I know what first-line medications for tobacco cessation are.
29. I am confident in using my knowledge of first-line medications for tobacco cessation.
30. I have been initiating prescribing tobacco cessation medications to my patients.
31. The education provided during this study directly impacted how I treat tobacco use in the Dental Clinic.

The following question is not a part of research.

32. Please enter your email below if you would like to be entered to win a \$10 Starbucks gift card. You will be contacted via this email address at the conclusion of this portion of the study if you are selected.

**Appendix B**  
Educational Handout Provided to Students

The handout is titled "Tobacco Cessation Care Quick Sheet" in a dark blue header. It is divided into three main sections. The first section, "THE FIVE AS OF INTERVENTION", is in a dark blue box and lists five steps, each with a blue circle containing a white letter 'A': ASK, ADVISE, ASSESS, ASSIST, and ARRANGE. The second section, "LOCAL RESOURCES", is in a white box with a dark blue header and lists three contact options for Quit Now Kentucky and the Lexington Fayette-County Health Department. The third section, "PRESCRIBING THE NICOTINE PATCH", is in a light blue box and is further divided into "PRESCRIBING IN EPIC" (a numbered list of six steps) and "PATIENT EDUCATION" (a bulleted list of four instructions).

## Tobacco Cessation Care Quick Sheet

### THE FIVE AS OF INTERVENTION

- ASK** the patient if they use tobacco
- ADVISE** the patient to quit
- ASSESS** their readiness to quit
- ASSIST** in making a quit attempt
- ARRANGE** follow-up care

### LOCAL RESOURCES

- ➔ Contact Quit Now Kentucky at 1-800-QUIT NOW
- ➔ Contact the Lexington Fayette-County Health Department at 859-288-2377
- ➔ Text Quit Now Kentucky at QUITNOW to 333888

### PRESCRIBING THE NICOTINE PATCH

#### PRESCRIBING IN EPIC

1. Click "Add Dx" and add "Tobacco Dependence" diagnosis code F17.200
2. Click "Add Order" and search "Nicoderm"
3. Three orders need placed: 21mg patch for 28 days, then 14mg patch for 14 days, then 7mg patch for 14 days
4. For each prescription, select a pharmacy and select your covering dental faculty as the provider
5. Click on the medication and confirm the correct patient, drug, dose and route. If all is correct, click "Accept"
6. Click "Sign Orders" to send the medication

#### PATIENT EDUCATION

- Apply the patch to a clean, dry, intact, hairless area of skin on the arm or torso
- Each patch can be worn for 24 hours
- Choose a new site with each application
- Always remove the old patch before applying a new one