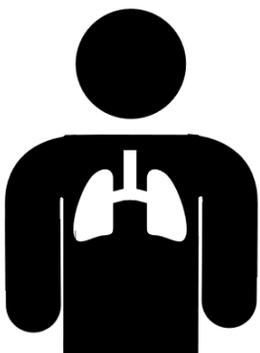


Nicotine & Tobacco Risks and American Adolescents

Jennifer Salerno, DNP, CPNP, FAANP

A review of nicotine and tobacco use among American adolescents,
the evidence for change—AND how we can make a difference.





The State of Nicotine and Tobacco Use

Nicotine and tobacco use in adolescent populations remains a primary concern in healthcare. In a December 2019 supplement to the Morbidity and Mortality Weekly Report (MMWR), the Centers for Disease Control and Prevention (CDC) reported that *“tobacco use is the leading cause of preventable disease, disability, and death in the United States. Most tobacco product use begins during adolescence.”*¹ This report found that:

- In 2019, an estimated 53.3% of high school students (8 million) and 24.3% of middle school students (2.9 million) reported having ever tried a tobacco product.
- Nearly one in four adolescents (23.0%) had used a tobacco product during the past 30 days.
- Among all students, perceiving no harm or little harm from intermittent tobacco product use (use on some days but not every day) was 28.2% for e-cigarettes, 11.5% for smokeless tobacco products, and 9.5% for cigarettes.

And according to an annual survey from the National Institutes of Health (NIH), National Institute on Drug Abuse² of drug, alcohol and cigarette use in 8th, 10th and 12th graders, about 37% of 12th graders reported vaping in 2018, compared with 28% in 2017 and vaping of each substance increased. This includes nicotine, flavored liquids, marijuana, and hash oil. New data from 2019³ shows more than 1 in 4 students in 12th grade; 1 in 5 in 10th grade, and 1 in 11 in eighth grade vaped within the last month.

This paper will explore the data on risk factors that contribute to adolescent nicotine and tobacco use, review current evidence-based guidelines for adolescent risk screening, and present new data from a nicotine and tobacco risk assessment and counseling tool developed specifically for the adolescent population.

Evidence-based Recommendations for Adolescent Risk Prevention & Screening

The world's leading health organizations and policy makers understand the importance of reducing adolescent risk factors and have developed evidence-based guidelines and recommendations to help address this gap-in-care:

ORGANIZATION	ADOLESCENT SCREENING RECOMMENDATION
American Medical Association	– Annual comprehensive screening for risk factors
American Academy of Pediatrics	– Annual screening including psychosocial/behavioral assessment & drug/alcohol use assessment
US Preventive Service Task Force: AHRQ	– Screening for depression, tobacco use/prevention , and sexual activity
American Academy of Family Physicians	– Screening for sexual activity, depression, tobacco use
American College of Preventive Medicine	– Annual comprehensive screening for risk factors – across all visit types



Additionally, the CDC recommends that: **“screening for risky behaviors (e.g., nicotine or tobacco use) and potential untoward consequences of these behaviors (e.g., health complications due to vaping or cigarette use), provision of interventions to help mitigate consequences, and provision of clinical reproductive health services are essential.”**⁴ And this same recommendation calls for the expanded use of health information technology (HIT) to improve the delivery of preventive services to our nation's adolescents – and for more collaborative public health surveillance in order to monitor the effectiveness of these quality improvement efforts.

Prevention in Action: Evidence from the Field

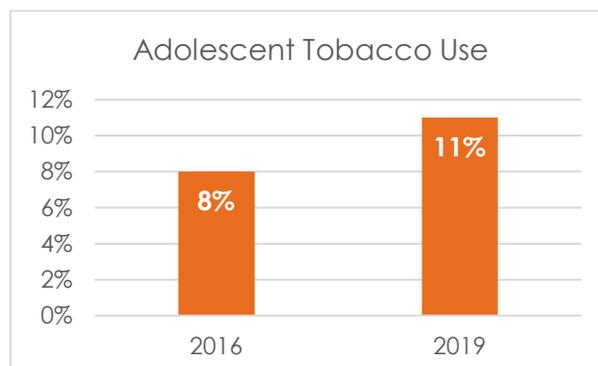
Overall, 90% of tobacco addiction begins during adolescence,^{5,6} resulting in significant health and economic costs. Tobacco use in adolescents can result in a number of adverse health outcomes later in life, including cancer of the lungs, larynx, mouth, esophagus and throat, bladder, kidney, liver, stomach, pancreas, colon and rectum, and cervix.⁷ Tobacco use is also a risk factor for development of cardiovascular disease,⁸ stroke,⁹ chronic obstructive pulmonary disease (COPD)¹⁰ type 2 diabetes,¹¹ and is a primary trigger of asthma even in second-hand form.¹²

Since adolescents are more likely than adults to quickly transition from tobacco experimentation to addiction, screening and provision of cessation counseling and resources early on is critical to reducing the likelihood of tobacco addiction in adulthood.¹³ However, despite recommendations from leading national health organizations to screen adolescents for risky behaviors during healthcare visits,¹⁴⁻¹⁷ preventive care for risk behaviors remains far below recommended levels. This is due to reported barriers of healthcare providers' time to conduct healthcare visits, healthcare providers' skills and confidence, and teen engagement.¹⁸⁻²⁴

Overcoming barriers with technology

The Rapid Adolescent Prevention Screening (RAAPS) is a cloud-based risk screening system that was developed at the University of Michigan for providers working with adolescents. Currently in use at over 400 sites (with most of these sites delivering care to underserved adolescents), the **RAAPS system has a database of over 360,000 surveys—providing a unique view of adolescent risk behavior and trends in the United States.**

For example, data from RAAPS show tobacco use increased by 27% from 2016 to 2019.





Although the vast majority of physicians believe it is their responsibility to educate their patients about risk factors, provide support regarding risk behavior issues, and help patients adhere to recommended regimens,²⁵ few have enough time to provide such interventions.²⁶ Studies confirm that healthcare providers rarely ask adolescents specifically about their health risk behaviors, and little time is spent delivering preventive care.^{20, 22, 25-28}

In real-world practice, the delivery of risk-reduction counseling for adolescents varies widely and is highly dependent on the experience of the individual provider, his or her knowledge of clinical guidelines, subconscious biases, and personal comfort level across risk topics. In this era of managed care, preventive services are increasingly needed to improve adolescent health and reduce costs.²⁹ Data like this led to the development of a nicotine and tobacco use assessment and counseling intervention.

Adolescent Counseling Technology for Nicotine & Tobacco (ACT-NT) is a standardized assessment and counseling tool developed for adolescents to identify the inter-related factors contributing most to nicotine and tobacco use and provide evidence-based risk reduction counseling. ACT-NT identifies which nicotine products an adolescent is using, how often and why. Identifying what triggers nicotine usage (peer influence, stress, addiction) and what might motivate them to make a positive change in their use is critical in providing a tailored, effective action plan to quit.

Developed with funding from the National Institutes of Health (NIH), ACT-NT was created to provide an engaging platform for adolescents while ensuring quality, evidence-based cessation coaching that works with professionals—as a stand-alone tool or as part of a healthcare visit—optimizing their time to properly address nicotine and tobacco risk.

Preliminary ACT-NT data showed that among adolescents reporting vaping and that used ACT-NT there was a:

- **34% decrease in the use of nicotine products after 1 month**
- **44% reduction after 3 months AND**
- **50% of adolescents took steps to reduce or quit using**

ACT for Change: Evidence from the Field

Using Technology to Improve Risk Reduction Counseling of Adolescent Risky Behaviors: Combatting Adolescent Tobacco Use in Michigan School-based Health Centers (SBHC)

In real-world practice, the delivery of risk-reduction counseling for adolescents varies widely and is highly dependent on individual healthcare providers' experience and expertise, knowledge of clinical guidelines, subconscious biases, and personal comfort level across risk topics. A web-based nicotine and tobacco use assessment and counseling module (ACT-NT) was developed in an NIH Phase I project to be used by adolescents as part of their routine healthcare visit. ACT-NT provides technology driven tobacco and nicotine assessment, education, and tailored risk reduction counseling to adolescents, supporting them in reducing their use. At the same time a comprehensive visit summary and an adolescent's action plan for reduction or cessation is populated for the healthcare provider, thereby freeing up limited visit time previously focused on fact finding and documentation to focus on the steps needed



for the adolescent's success. In an NIH Phase II project—with data collection from October 2017 to January 2020—Possibilities for Change evaluated the ACT-NT developed in Phase I using a randomized controlled trial. This project had 2 aims 1) assess the ability of ACT-NT to improve the health outcomes of those adolescents who use tobacco and nicotine and 2) assess the usability by adolescents and healthcare providers within busy practices.

Description of Work: ACT-NT acts as a virtual health educator providing interactive, technology-driven tobacco assessment and reduction counseling to adolescents, individualized to their positive responses in the assessment as well as self-reported stage of readiness to change their behaviors. A text message reminder component maintains adolescent engagement and supports treatment adherence for up to 3 months.

ACT-NT Includes 3 Critical Components:



755 adolescents in twelve school-based health centers (SBHCs), eight intervention and four control, participated in the project as part of the routine care they were receiving at their SBHC. 460 adolescents were assigned to the *treatment* group and received the intervention of RAAPS and ACT-NT and 295 were assigned to the *control* group and received only RAAPS.

Aim 1: Evaluate the real-world utility of ACT-NT in the lives of adolescents and the healthcare providers who care for adolescents.

Key question: How did adolescents and healthcare providers experience the ACT-NT intervention?

There were similarities and differences in the way adolescents and professionals experienced the ACT-NT intervention. The similarities in the way the professionals and adolescents perceived the strengths of the intervention included **building trust in professionals and changing the perception of risk in adolescents**. The timing and pacing of the intervention and follow-up sessions were perceived more often as strengths by the adolescents, as they generally perceived that the timing, pacing and follow-up were adequate and appropriate.

"I was thrilled to have a tool that could evaluate tobacco use, evaluate nicotine use, and educate about that – it kind of runs itself. That was a very positive thing for us as clinicians."

Key question: Did ACT-NT improve communication between adolescent and provider (from both perspectives)?

Yes. The findings revealed that the majority of professionals and adolescents perceived that the ACT-NT was effective in helping adolescents to build trust in the professionals working with them. The professionals and adolescents also generally perceived that the ACT-NT was effective in changing the perception of risk in adolescents. The change in perception of risk was perceived to encompass decreasing tobacco and nicotine use habits, and not necessarily ceasing use. The adolescents generally perceived that the ACT-NT was eye-opening in correcting their perceptions on tobacco and nicotine, and in being aware of the



effects on one's health. **Changing adolescents' perception of risk was perceived to be achieved through education and empathy.** The majority of the professionals in both the interviews and focus group perceived that technology-based education and messaging included in ACT-NT helped provide tangible information to participants understanding of the risks of tobacco and nicotine.

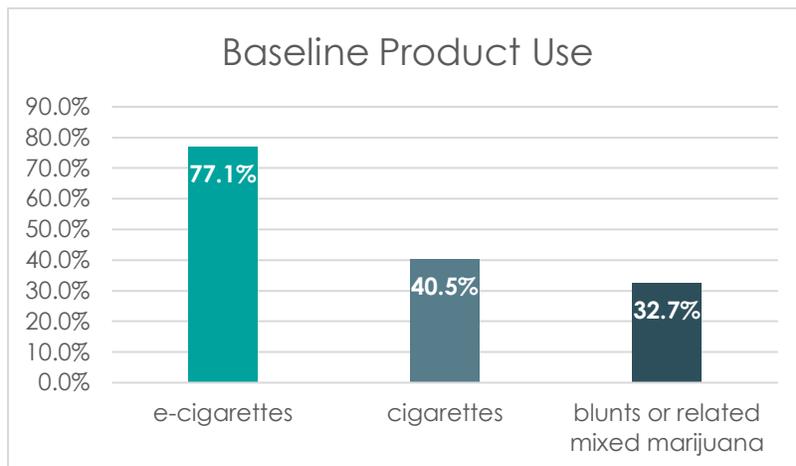
Despite some missed follow-ups, adolescents generally felt the first intervention session with ACT-NT was sufficient to be “eye-opening” in terms of correcting whatever misinformation they might have about tobacco use and tobacco addiction. Five participants explicitly stated the success of the intervention in terms of helping them to quit smoking, adding that they started using alternatives to smoking or physical activities to distract their urge to smoke. One shared, “Yes, I don't vape or smoke anymore. I use the Nicorette gum every now when I get the urge.”

“I first thought using nicotine was better than using tobacco. I'd say they're both probably equally as bad, that you probably shouldn't be doing either of them.”

It also helped create a “personal touch” (relay empathy). Some adolescents perceived that ACT-NT helped them share most honestly with professionals about their use. Furthermore, adolescents were positively impacted by their perceived empathy from ACT-NT as it translated to them feeling the professionals working with them were also more empathetic. When adolescents perceived that professionals empathized with their nicotine and tobacco use, they tended to make positive behavior changes.

Aim 2: Evaluate the success of ACT-NT in promoting smoking cessation in tobacco-using adolescents.

Use of tobacco and nicotine products during the 3 months prior to participating in the ACT for Change project was reported by adolescents (n=755). Over three-quarters of the adolescents reported use of e-cigarettes, about 40% reported use of cigarettes and about one-third of the youth reported use of blunts or related mixed marijuana products. On average, use of approximately **2 different products** were reported.

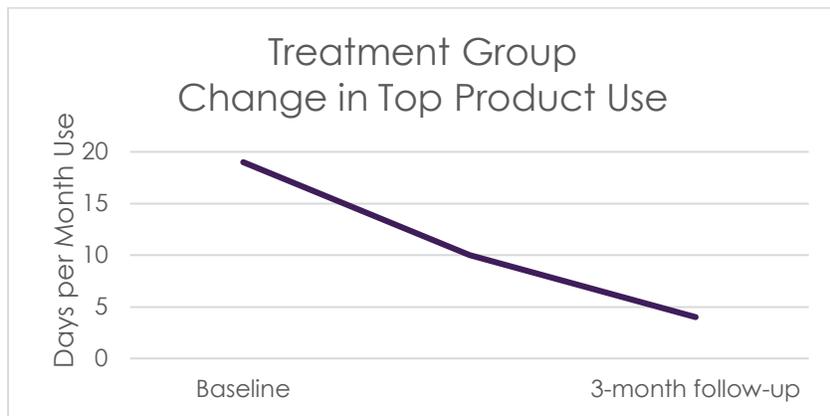


A primary outcome of interest was monthly use (number of days of use in the previous 30 days) of the tobacco or nicotine product identified by the adolescent as used most often “top



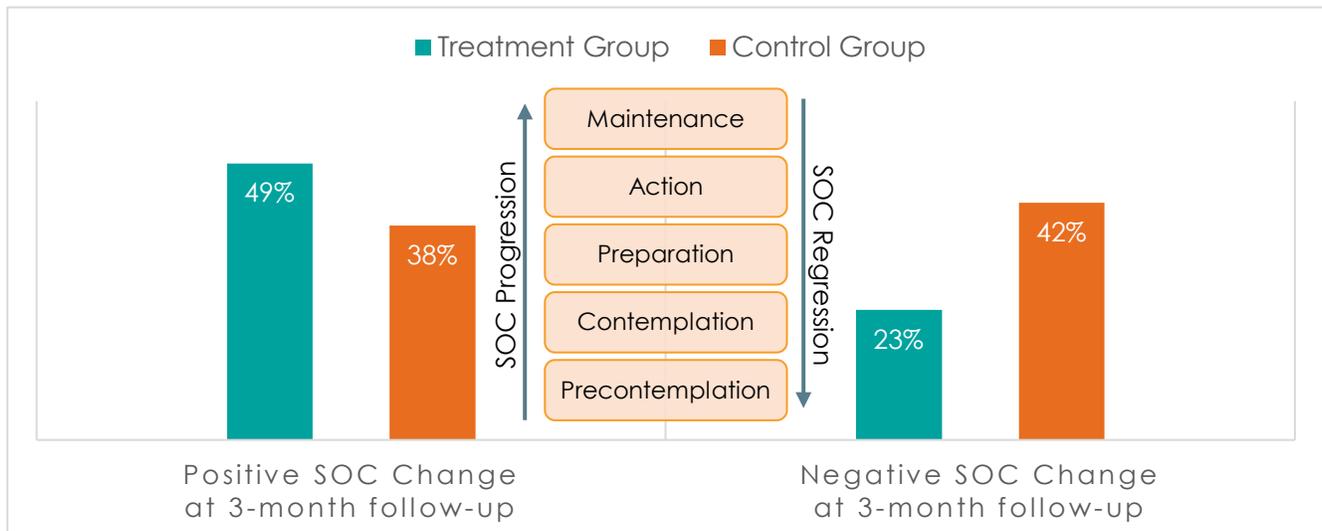
product". **In the treatment group, there was a significant decrease in median number of days per month use of the top tobacco or nicotine product from baseline to 1-month follow-up visit** ($Z = -3.63, p. < .01$). In the control group there was a decrease in median days per month top tobacco or nicotine product use between baseline and second visit, however the decrease was not significant ($Z = -1.98, p. > .01$).

In the treatment group, there was a **significant decrease in median number of days per month use of the top tobacco or nicotine product from baseline to 3-month follow-up visit** ($Z = -4.70, p. < .01$). The median dropped 2 categories, from 10-19 days at baseline to 3-5 days at 3-month follow-up. In the control group there was a decrease in median days per month top tobacco or nicotine product use between baseline and 3-month follow-up (from 3-5 days to 1-2 days), however the decrease was not significant ($Z = -1.77, p. > 0.01$).



Results from this study show promise. There was a **significant reduction in the tobacco or nicotine product used most at both follow-up time points for the adolescents in the treatment group**. While the adolescents in the control group also showed a reduction at both time points, this reduction was not significant.

A secondary outcome of interest was the adolescent's stage of behavior change related to their tobacco and nicotine use. When asked about their motivation to reduce or quit using their tobacco or nicotine top product, adolescent responses were categorized into Stages of Change (SOC):





At the 3-month follow-up visit, 49% of the adolescents in the treatment group showed positive change in their SOC, while only 38% of the adolescents in the control group showed positive change. Furthermore, 42% of the adolescents in the control group showed negative movement in their stage of change compared to 23% of the adolescents in the treatment group.

The study results are promising, especially as this is a value-added intervention. Adolescents in both the treatment and control groups received some level of smoking intervention outside of the project as part of their SBHC visit: in-clinic materials, clinician feedback and risk reduction coaching, in school programs, or community or statewide messaging – particularly related to e-cigarette use and vaping.

An Unexpected Positive Outcome

Additionally, multiple participating school-based health centers (SBHCs) developed partnerships with school administration to incorporate ACT-NT into student-wide cessation efforts. One SBHC partnered with their school to provide a more student-centered approach to addressing tobacco and nicotine use on school grounds. To avoid a suspension, students caught violating the zero-tolerance tobacco policy were given the option to take part in the ACT-NT project. The SBHC professionals spearheading this collaborative program shared this as an example of the benefits of the ACT-NT extending well beyond clinical use.

“Adolescents are more vulnerable. It’s one of the key reasons why an innovative partnership with the school that supports effective nicotine cessation programming is so important.”

In Conclusion: A Call-to-Action

American adolescents are participating in more diverse high-risk behaviors at an earlier age than ever before. To impact this trend and reduce adolescent nicotine and tobacco use, healthcare practitioners and professionals working with adolescents must understand and address a myriad of complex, contributing factors. But most importantly, before risk factors can be reduced – they must first be identified.

However, despite overwhelming evidence supporting the need for adolescent risk screening and recommendations from organizations like those detailed in this report, **adolescent risk screening and risk reduction coaching are not yet standard practice among health care providers in the United States.**

Please join us in a call-to-action for all professionals working with adolescents to:

- Prioritize adolescent health risk and ensure that all adolescents are screened and counseled for their risk factors (*including* nicotine and tobacco use) using a standardized, validated survey – according to nationally-recognized guidelines. Find out more about the ACT-NT assessment and counseling tool at <https://possibilitiesforchange.org/act> or by emailing: info@pos4chg.org



- Provide continuing education on effective adolescent risk reduction strategies that will actively engage adolescents in the behavior change process (such as [Motivational Interviewing](#))
- Develop policies and processes to ensure adolescent engagement and comfort with disclosure (e.g., confidentiality policies) and address necessary workflow modifications to ensure risk screening and coaching is consistently incorporated

By ensuring **quality preventive services are delivered**, we have the power to make a real difference in the lives of teens!



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