

A Practical Approach to Assist the Adolescent E-Cigarette User

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- *I have no relevant financial relationships with the manufacturers of any commercial product or provider of commercial services discussed in this CME activity*
- *I do not intend to discuss an unapproved or investigative use of a commercial product/device in my presentation*



LEARNING OBJECTIVES

- Provide an evidence-based and practical approach to the individual adolescent e-cigarette tobacco user
- Suggest a paradigm to address adolescent tobacco use
- Offer one treatment approach to specific adolescent and young adult tobacco use clinical scenarios



Changes in Practice

- As a result of attending this session, I encourage you to incorporate an organized clinical approach to screening adolescents for tobacco use and practically approach the individual tobacco user to formulate a unique evidence informed cessation plan or refer for further treatment



What is a Practical Approach?

- Meet the Adolescent where they are:
 - Ready to Quit?
 - Risk Reduction?
 - Move closer to ready to quit?
- Obtain an appropriate history
- Validated adolescent tobacco use screening tools
- Consider if medication is warranted
- Intervention
- Arrange follow up



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What is a Practical Approach?

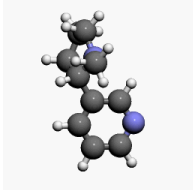
- Performed in an ambulatory or other setting
- Can be incorporated into your current patient flow and system of care
- Uniform Process that is reproducible each visit
- If beyond your scope, you know where and when to refer for further treatment



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What is Nicotine?

Nicotine Molecule



- Drug
- Stimulant
- Highly Addictive
- Causes changes in brain chemistry
- Found in tobacco products



Nicotine is a Harmful Chemical

- Nicotine is neurotoxic and has demonstrable negative effects on the developing brain
- In adolescent animals causes cell death, altered neurochemistry in cortex and hippocampus, interferes with learning, increases anxiety, increases opioid consumption and sensitizes the adult brain to nicotine which furthers use
- In humans, nicotine exposure in adolescence is associated with increased nicotine use, learning problems, risk behaviors, marijuana use, anxiety, depression

Means of Nicotine Delivery Shifted

- We have moved from combustible tobacco products such as cigarettes as the preferred means of nicotine delivery for adolescents to an electronic form of nicotine delivery as the primary choice for new smokers
- The earlier the exposure to nicotine, the worse the effects on the brain the more likely to develop addiction
- **Higher nicotine in electronic nicotine delivery systems combined with easier to smoke and flavorful products have led to more and younger smokers and a shorter pathway to nicotine addiction for adolescents and young adults**

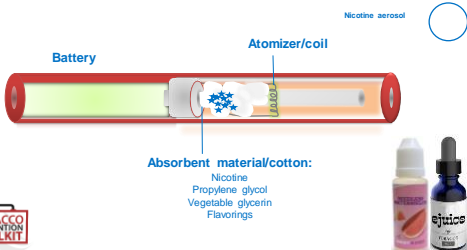
Electronic Nicotine Delivery Systems



Image Source: FDA

Cig-a-Likes * Vape Pens * Mods * Advanced Personal Vaporizers * E-cigs/Pipes * Pod Systems

What Are E-Cigarettes?

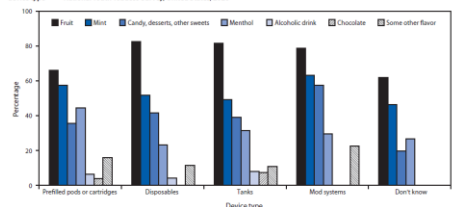


Flavors



MMWR 69:37
September 18, 2020

FIGURE. Percentage of flavor types used by current (past 30-day) flavored e-cigarette users among U.S. middle and high school students,* by device type† — National Youth Tobacco Survey, United States, 2019



* Flavor type use among current (past 30-day) users of flavored e-cigarettes was determined by answers to the question "What flavors were the e-cigarettes that you have used in the past 30 days? (Select one or more)." Response options were "Fruit," "Mint," "Candy or sweets," "Tobacco," "Chocolate," "Alcoholic drink such as wine, coffee, beer, or other cocktails," "Candy, desserts, or other sweets," and "Some other flavor not listed here." (Note: In responses with not-assessed, data for "Some or spiced" are not shown because of statistically unreliable estimates due to unweighted denominator <50 or relative standard error >30% across all device types.)
† Device type use among current e-cigarette users was determined by answers to the question "Which of the following best describes the type of e-cigarette you have used in the past 30 days? If you have used more than one type, please think about the one you use most often." Response options were "A disposable e-cigarette," "An e-cigarette that uses prefilled pods or cartridges (e.g., JUUL)," "An e-cigarette with a tank that you refill with liquid," "A mod system (an e-cigarette that can be customized by the user with their own combination of batteries or other parts)," and "I don't know the type."
‡ The following data were statistically unreliable and not shown due to unweighted denominator <50 or relative standard error >30%: use of chocolate flavor types among current flavored e-cigarette users of disposable e-cigarettes, mod systems, or those who reported "I don't know the type" for device type; alcoholic drink flavor types among current flavored e-cigarette users of mod systems or those who reported "I don't know the type" for device type; and "Some other flavor" among current flavored e-cigarette users who reported "I don't know the type" for device type.

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Has Covid-19 impacted e-cig use?

- 56% of e-cig users changed their patterns during pandemic
 - 32% Quit
 - 35% Reduced amount of nicotine used
 - 18% Increased use
 - 8% increased cannabis use
 - 7% switched to other tobacco products

Guthrie SM, Lempert LK, Halpern-Felsher B. Underage Youth and Young Adult e-Cigarette Use and Access Before and During the Coronavirus Disease 2019 Pandemic. JAMA Network Open. 2020;3(12):e2027572

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The paradigm of combustible tobacco use cessation: Adolescents are not Adults

- Adolescent smokers:
 - Are more likely to be non-daily smokers (NHSDA, Kandel et al., 1997...)
 - Have more variable smoking patterns (NHSDA, Kandel et al., 1997...)
 - Smoke fewer cigarettes per day (NHSDA, Kandel et al., 1997...)
 - Smoke less intensively/inhale less (NHSDA, Kandel et al., 1997...)
 - Are less often classified as "dependent"/lower cotinine levels (Kandel et al., 1997...)
 - May provide less accurate self-report (NHSDA, Kandel et al., 1997...)
- Adolescents have little success with adult approaches.

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Adult vs. Adolescent Tobacco Users

- Adults use tobacco in order to maintain a steady state of nicotine (NRT helps)
- Adolescents use tobacco for non-addictive reasons at first:
 - Bored (NRT does not help)
 - Stress (NRT does not help)
 - Distress (NRT does not help)
 - Social (NRT does not help)

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Adult Treatments are "safe" and NOT effective for adolescents

- Because Adolescents do NOT smoke like adults and so do not have adult nicotine dependence

KEY POINT:

It is not the chronological AGE of the patient that determines treatment, it is the *Dependence on Nicotine*

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Should we treat e-cigs like cigs?

- Electronic Nicotine Delivery Systems (ENDS) provide more nicotine in a more pleasurable way than combustible tobacco
- Nicotine levels are higher and nicotine toxicity is now much more common in younger adolescents than they were with combustible tobacco before ENDS

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The paradigm of Adolescent electronic cigarette use

- Adolescent smokers:
 - Now begin smoking earlier
 - Tolerate more nicotine more quickly with ENDS (e-cigs)
 - Inhale more often and smoke more intensively more quickly
 - Become “dependent” more quickly
 - Become “Adult-type” smokers while still adolescents
 - Need help with accurate self-report
- *Adolescents may have more success with adult approaches.*

Individual Approach in the Office

- Appropriate Tobacco History
- Identify intermittent (Adolescent type) or Chronic (Adult type) of tobacco user
- Evidence of Nicotine Addiction via Validated Surveys for Adolescents
 - Hooked on Nicotine Checklist (HONC)
 - Modified Fagerstrom Tolerance Questionnaire
- Counseling/ Brief Intervention
- Consideration of Medication Assisted Treatment

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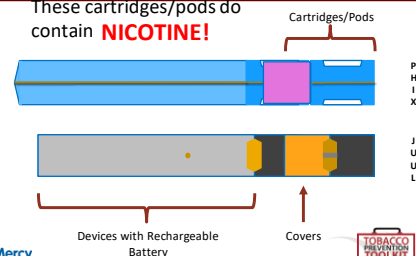
Appropriate Tobacco History

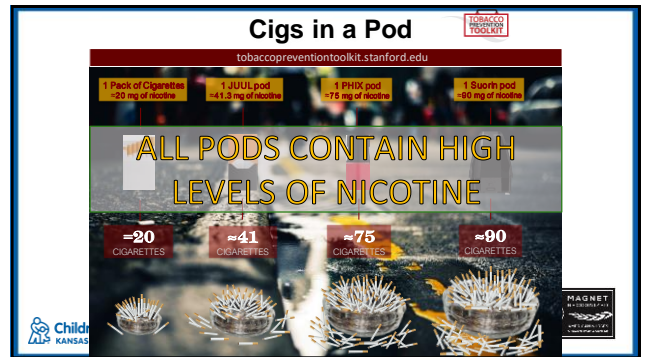
- 7 day or 30-day history
- Cigarettes per day is the usual unit of measure
- Each cigarette is approximately 1mg nicotine
- Cigarettes per day (cpd)=mg nicotine per day
- Many adolescents do not use tobacco every day
- If using e-cigs, must convert to cigarettes per day or know mg of nicotine used

How do I convert e-cigarettes to cigarettes per day?

Anatomy of a Pod-Based System

These cartridges/pods do contain **NICOTINE!**





Tobacco Use History

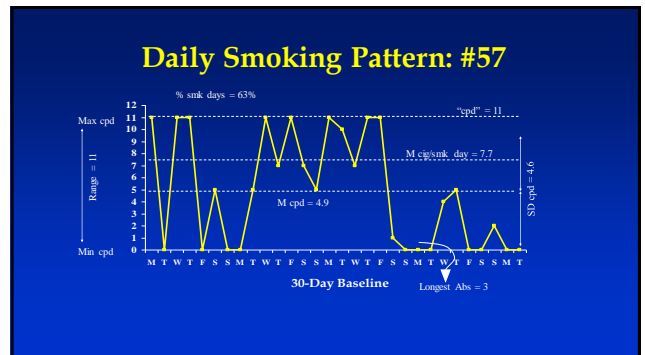
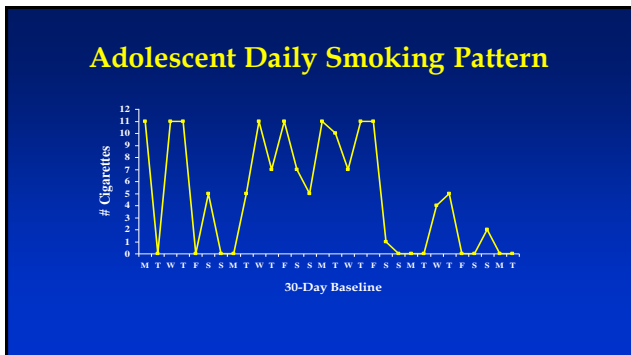
- History of Use
- Type of tobacco and amount per day (cpd or mg nicotine)
- 7- or 30-day smoking pattern
 - Retrospectively via time-line follow-back
 - Prospectively with a daily smoking diary

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 - Hooked on Nicotine Checklist (HONC)
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- Consideration of Medication Assisted Treatment

Hooked on Nicotine Checklist (HONC)

10 yes or no questions; each yes is one point. Any yes is a positive loss of autonomy over smoking, with proposed increased loss of autonomy over nicotine shown with each positive answer

1. Have you ever tried to quit, but couldn't?
2. Do you smoke now because it is really hard to quit?
3. Have you ever felt like you were addicted to tobacco?
4. Do you ever have strong cravings to smoke?
5. Have you ever felt like you really needed a cigarette?
6. Is it hard to keep from smoking in places where you are not supposed to? When you haven't used tobacco for a while ... OR When you tried to stop smoking ...
7. did you find it hard to concentrate because you couldn't smoke?
8. did you feel more irritable because you couldn't smoke?
9. did you feel a strong need or urge to smoke?
10. did you feel nervous, restless or anxious because you couldn't smoke?

References: DiFranza JR, Savageau JA, Fletcher K, Ockene JK, Rigotti NA, McNeill AD, Coleman M, Wood C. Measuring the loss of autonomy over nicotine use in adolescents: The Development and Assessment of Nicotine Dependence in Youths (DANDY) Study. Archives of Pediatric Adolescent Medicine. 2002;156:397-403.

NO COST To Use

<http://fhs.bu.edu/assess/edu/honc/>
<https://cancercontrol.cancer.gov/tcrp/tcrp/guide-measures/honc.html>

Hooked on Nicotine Checklist (HONC) --Vaping

10 yes or no questions; each yes is one point. Any yes is a positive loss of autonomy over smoking, with proposed increased loss of autonomy over nicotine shown with each positive answer

1. Have you ever tried to quit, but couldn't?
2. Do you vape now because it is really hard to quit?
3. Have you ever felt like you were addicted to vaping?
4. Do you ever have strong cravings to vape?
5. Have you ever felt like you really needed to vape?
6. Is it hard to keep from vaping in places where you are not supposed to? When you haven't vaped for a while ... OR When you tried to stop vaping ...
7. did you find it hard to concentrate because you couldn't vape?
8. did you feel more irritable because you couldn't vape?
9. did you feel a strong need or urge to vape?
10. did you feel nervous, restless or anxious because you couldn't vape?

References: DiFranza JR, Savageau JA, Fletcher K, Ockene JK, Rigotti NA, McNeill AD, Coleman M, Wood C. Measuring the loss of autonomy over nicotine use in adolescents: The Development and Assessment of Nicotine Dependence in Youths (DANDY) Study. Archives of Pediatric Adolescent Medicine. 2002;156:397-403.

NO COST To Use

Modified for Vaping by AAP Section on Tobacco Control Julius B. Richmond Center of Excellence

CAUTION

- Hooked On Nicotine Checklist looks at autonomy
- Loss of control over behavior does not necessarily mean there is physiologic tolerance to the product
- HONC alone is NOT sufficient to identify those who might benefit from medication such as Nicotine Replacement Therapy

1. How many cigarettes a day do you smoke?
1-Over 20 cigarettes a day (2)
2-About 10-20 cigarettes a day (1)
3-About 1-9 cigarettes a day (0)
4-Less than 1 a day (0)
2. Do you inhale?
1-Always (2)
2-Quite often (1)
3-Seldom (0)
4-Never (0)
3. How soon after you wake up do you smoke your first cigarette?
1-Within the first 30 minutes (2)
2-More than 30 minutes after waking but before noon (0)
3-In the afternoon (0)
4-In the evening (0)
4. Which cigarette would you hate to give up?
1-First cigarette in the morning (1)
2-Any other cigarette before noon (0)
3-Any other cigarette after noon (0)
4-Any other cigarette in the evening (0)
5. Do you find it difficult to refrain from smoking in places where it is forbidden (church, library, movies etc.)?
1-Yes, very difficult (1)
2-Yes, somewhat difficult (1)
3-No, not usually difficult (0)
4-No, not at all difficult (0)
6. Do you smoke if you are so ill that you are in bed most of the day?
1-Yes, always (1)
2-Yes, quite often (1)
3-Yes, sometimes (0)
4-No, never (0)
7. Do you smoke more during the first 2 hours than during the rest of the day?
1-Yes (1)
2-No (0)

Prokhorov AV, Pallonen UE, Fava JL, et al. Measuring nicotine dependence among high-risk adolescent smokers. Addict Behav 1996;21(1):1-20.
<https://cancercontrol.cancer.gov/tcrp/tcrp/guide-measures/mftq.html>

Fig. 1. The FTQ version used in the adolescent sample (scoring is provided in parentheses).

modified Fagerstrom Tolerance Questionnaire mFTQ

1. How many cigarettes a day do you smoke?
1-Over 20 cigarettes a day (2)
2-About 10-20 cigarettes a day (1)
3-About 1-9 cigarettes a day (0)
4-Less than 1 a day (0)
2. Do you inhale?
1-Always (2)
2-Quite often (1)
3-Seldom (0)
4-Never (0)
3. How soon after you wake up do you smoke your first cigarette?
1-Within the first 30 minutes (2)
2-More than 30 minutes after waking but before noon (0)
3-In the afternoon (0)
4-In the evening (0)
4. Which cigarette would you hate to give up?
1-First cigarette in the morning (1)
2-Any other cigarette before noon (0)
3-Any other cigarette after noon (0)
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3-Yes, sometimes (0)
4-No, never (0)
7. Do you smoke more during the first 2 hours than during the rest of the day?
1-Yes (1)
2-No (0)

Fig. 1. The mFTQ version used in the adolescent sample (scoring is provided in parentheses).

- mFTQ is a Tolerance Questionnaire validated in adolescents and identifies physiologic dependence
- 7 questions; scored 0-9
- 6 or above is highly dependent and may benefit from NRT +/- bupropion
- 3-5 is moderately dependent
- No cost

Prokhorov AV, Pallonen UE, Fava JL, et al. Measuring nicotine dependence among high-risk adolescent smokers. Addict Behav 1996;21(1):1-20.
<https://cancercontrol.cancer.gov/tcrp/tcrp/guide-measures/mftq.html>

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- **Counseling**
- Consideration of Medication Assisted Treatment

Meta-analysis (2008): Effectiveness of and estimated abstinence rates for counseling interventions with adolescent smokers (n = 7 studies)

- Usual Care
 - OR 1.0;
 - Abstinence Rate 6.7%
- Counseling
 - OR 1.8 (1.1-3.0)
 - Abstinence Rate 11.6% (7.5-17.5)

• Brown RA, Ramsey SE, Strong MD, et al. Effects of motivational interviewing on smoking cessation in adolescents with psychiatric disorders. *Tob Control* 2002;11 Suppl 4:10-16.

• Coffey SB, Monti PM, O'Leary Taylor T, et al. Brief motivational intervention for adolescent smokers in medical settings. *ADDIC Behav* 2005;30:567-74.

• Horn K, O'Leary Taylor T, et al. Effects of an emergency department-based motivational tobacco smoking intervention. *Prev Chronic Dis* 2007;4:A06.

• Kelly AM, Lapsworth K. The WFP program: targeted motivational interviewing for adolescent violations of school tobacco policy. *Prev Med* 2000;30(4):460-71.

• Myers MG, Brown SA. A controlled study of a cigarette smoking cessation intervention for adolescents in substance abuse treatment. *Psychol Addict Behav* 2005;19:229-33.

• Robinson LA, Vander Weag MW, Kandel DB, et al. "Start to stop": results of a randomized controlled trial of a smoking cessation programme for teens. *Tob Control* 2002;11 Suppl 4:10-16.

• Robinson LA, Vander Weag MW, Kandel DB, et al. "Start to stop": results of a randomized controlled trial of a smoking cessation programme for teens. *Tob Control* 2002;11 Suppl 4:10-16.

What Works With Teens?

- Adolescent-specific counseling
- Instruction in coping strategies
- School or community based
- Teen involvement
- Adolescent friendly environment

Treatment of the Adolescent Type Smoker

- Adjunctive supports
 - Text QUIT to 47848
 - 1-800 QUIT NOW
 - Mobile phone app TIQ (This is Quitting)
 - <https://teen.smokefree.gov>
- Choose Quit date and Prepare Environment with support of family if possible

Smoking Cessation Interventions in Youth Evidence Base

RECOMMENDED INTERVENTIONS

- Brief Counseling (in person, individual, group)
- Education
- Cognitive Behavioral Therapy
- Phone or distance counseling
- School-Based Programs
- Quit Lines via phone or text

Motivational Interviewing

- Office-based intervention to move along stage of change:
 - Pre-contemplational
 - Contemplational
 - Preparation
 - Action
 - Maintenance
 - Relapse

Smoking Cessation Interventions in Youth Evidence Base

RECOMMENDED INTERVENTIONS IN COMBINATION

- Mobile phone interventions (text message reminders)
- Self-help, non-interactive audio-visual materials
- Increase price of tobacco
- Mass Media campaigns
- Strong local laws / community mobilization

Individual Approach in the Office

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Nicotine Replacement Therapy and Adolescent Patients: Information for Pediatricians American Academy of Pediatrics Section on Tobacco Control

*American Academy of Pediatrics
Julian B. Richmond
Center of Excellence*

- Review of NRT
- Types of NRT
- Dosage and Usage Instructions
- Hooked on Nicotine Checklist for Smoking and for Vaping
- 4 item e-cig dependence scale (higher scores = higher level of dependence)
- mFTQ modified Fagerstrom Tolerance Questionnaire

Smoking Cessation Interventions in Youth Evidence Base

RECOMMENDED INTERVENTIONS IN SELECT CASES

- Nicotine Replacement Therapy (patch, gum, lozenge, primarily) in addicted users 12-18 years of age
- Bupropion alone or in combination with NRT, use with caution

Smoking Cessation Interventions in Youth Evidence Base

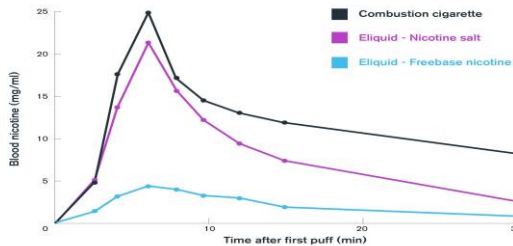
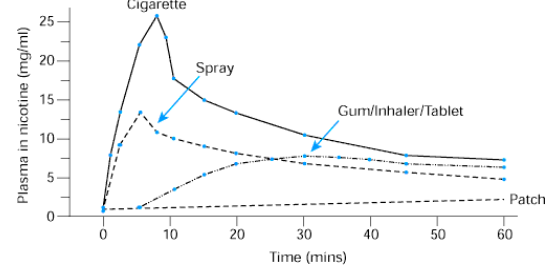
- **NOT RECOMMENDED**
- E-cigarettes for youth combustible tobacco users
- Varenicline not approved for minors; possibly more complications in young adults

Smoking Cessation Interventions in Youth Evidence Base

- **INSUFFICIENT EVIDENCE TO RECOMMEND**
- Other medications: SSRIs, nortriptyline, clonidine
- Internet and social media interactive interventions
- Hypnosis, mind-body therapy, acupuncture

Nicotine Replacement Therapy

- Safe and effective mainstay for treating ADULTS based on the proven assumption that adults smoke to maintain a steady-state of nicotine. By replacing the harmful tobacco with the less harmful nicotine, the addiction is fed without the detrimental health effects
- Nicotine Replacement Therapy has NOT been shown to be effective for Adolescents in general, and best used only in properly selected patients under physician care.



Nicotine Patch

- FDA approved for Smoking Cessation; 8-10 week program – 6 weeks, 2 weeks, (2 weeks)
- OTC for 18 and older, Rx for <18
- 21mg for >10cpd (10mg/day)
- 14mg for ≤10cpd (10mg/day)
- 7mg when tapering;
- Apply 1 patch daily, may use 16 or 24 hours, rotate site

Nicotine Gum

- FDA approved for Smoking Cessation
- OTC for 18 and older, Rx for <18
- Used on as needed basis; "Chew and Park"
- 2mg gum for <25cpd or 25mg equivalent
- 4mg for ≥25cpd
- One piece every 1-2, then 2-4, then 4-8 hours with max of 24 pieces per day. (6 week, 3 week, 3 week).

Nicotine Lozenge

- FDA approved for Smoking Cessation
- OTC for 18 and older
- 2mg if first cigarette > 30min after awakening
- 4mg if first cigarette <30min after awakening
- One every 1-2 hours for 6 weeks, then 2-4 for 3wks, then 4-8 for 3 weeks
- Max 5 lozenges per 6 hours and 20 per day

Bupropion Sustained Release

- FDA approved for smoking cessation
- 150mg pill per day for 3 days then 150mg twice a day
- Start 1-2 weeks prior to quit date.
- Contraindicated in seizure disorder, caution with eating disorders: bulimia, anorexia nervosa
- Anti-depressant side effect profile, black box warning

Bupropion SR and Nicotine Replacement Therapy

- May be considered for use in adolescents with evidence of nicotine dependence and desire to quit tobacco

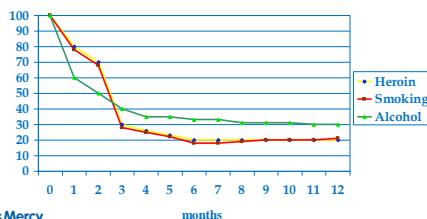
Supervise

- Use of nicotine as a therapy for teenagers should be under the supervision of a physician. In the absence of nicotine addiction, it is possible that administration of nicotine through nicotine replacement in adolescence may lead to untoward long-term psychopharmacologic effects on behavior and biology.
- Adelman W.P. Adolesc Med (2006); 17:697-717

The 6 As

- ANTICIPATE—Routinely Ask parents and anticipate youth
- ASK—Every adolescent Every Visit
- ADVISE—Strong clear message
- ASSESS—Willingness to quit smoking or vaping
- ASSIST—Provide aid to assist with quit
- ARRANGE—Follow up contact in person or by phone

Percent Abstinence Over Time for Drugs of Abuse



Changes in Practice

- As a result of attending this session, I encourage you to incorporate an organized clinical approach to screening adolescents for tobacco use and practically approach the individual tobacco user to formulate a unique evidence informed cessation plan

Acknowledgments

- AAP Julius B. Richmond Center of Excellence
- AAP Section on Tobacco Control
- Alvin Singh MD, Children's Mercy Hospital Kansas City, University of Missouri Kansas City School of Medicine
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- Deepa Camenga, MD MHS FAAP, Yale School of Medicine New Haven CT
- NIH National Institutes of Drug Abuse
- Stanford University Medicine, Tobacco Control Toolkit

