

INSTITUTE FOR
HEALTH & RECOVERY

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The Environmental Toll of the Vaping Epidemic: Addressing the Toxic Impacts of E-Cigarette Waste on Behavioral Health Populations

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We have no financial interests or relationships to disclose.

About the Institute for Health & Recovery

The Institute for Health and Recovery (IHR) helps people heal, strengthen their relationships with loved ones, and thrive. We support people navigating complex and intersecting challenges: substance use, trauma, mental health and medical needs, isolation, poverty and housing instability, and child welfare and justice system involvement. Our services are rooted in compassion and lived expertise—supporting people across all dimensions of identity and experience.

We know that with hope, support, and meaningful connection to others, recovery and healing are possible for every person.

Since 1990, IHR has developed, scaled, and delivered services that foster connection, resilience, and growth. Our training and consultation services support other providers, organizations, and systems in making meaningful and lasting change. To learn more about IHR and all of our services, visit us at www.healthrecovery.org.

IHR's Tobacco Projects

Behavioral Health Engagement on Nicotine Addiction (BHENA)

Tobacco Addictions Policy and Education (TAPE)

IHR's BHENA and TAPE Projects are leaders in helping substance use and mental health treatment programs in MA, the U.S., and Canada to address tobacco/nicotine dependence with clients and staff through consultation, technical assistance, and training.

The BHENA Project is an initiative funded by the MA Department of Public Health, Massachusetts Tobacco Cessation and Prevention Program (MTCP) and works with behavioral health organizations and social service agencies.

The TAPE Project is funded by the MA Department of Public Health, Bureau of Substance Addiction Services (BSAS) and works with BSAS licensed programs in the statewide treatment delivery system.

Both projects offer the following services:

- Staff training: virtual and on-site
- Program consultation and technical assistance
- Training and ongoing technical assistance for TECs
- Resources and referrals

Learning Objectives

By the end of this session, participants will be able to:

- Describe the disproportionate impact of nicotine addiction on behavioral health populations and marginalized communities.
- Describe 2 immediate and 2 long-term health concerns to individuals and to their surrounding environment.
- Name 3 best practices for safe storage and disposal of e-cigarettes.

A Note on Language

E-cigarettes or electronic nicotine delivery systems (ENDS) go by many names — the most common name is “e-cigarette,” but other terms include e-cigs, vapes, vape pens, mods, and tanks.

For the purposes of this session, we refer to the entire category as “e-cigarettes.”

Throughout this presentation, ‘tobacco’ and ‘nicotine’ products refer exclusively to **commercial products** manufactured for recreational use.

We recognize and respect that sacred tobacco holds distinct cultural, spiritual, and ceremonial significance for many American Indian and Alaska Native peoples and Indigenous communities.



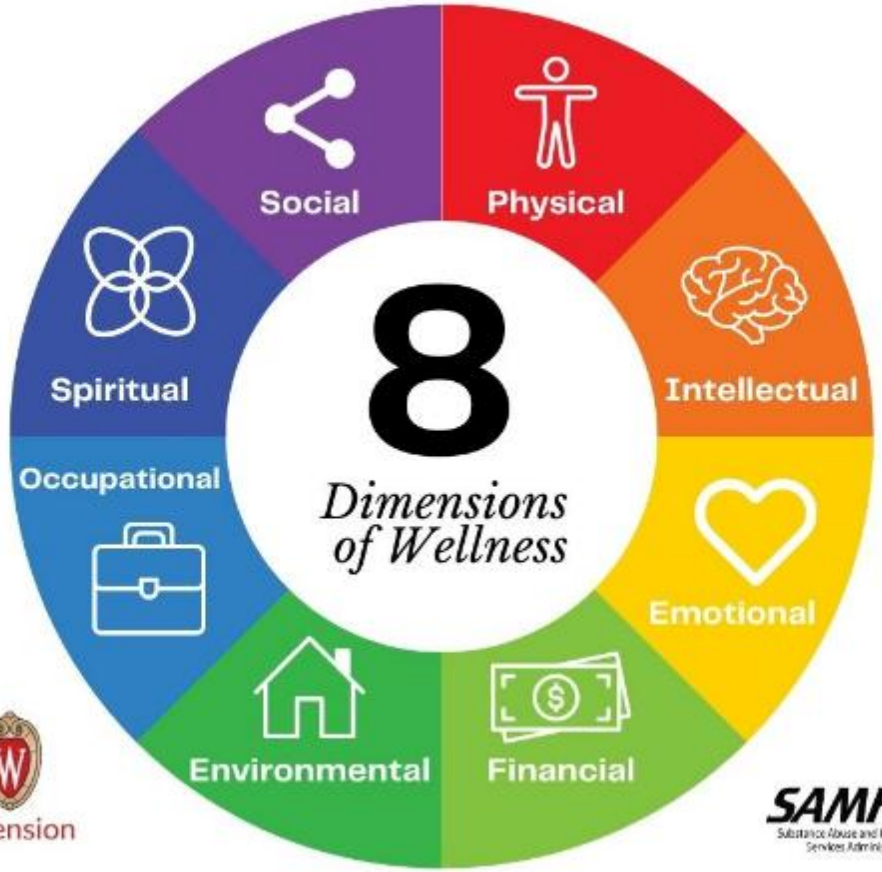
wherever you are!

Agenda

- The Wellness Connection: E-Cigarette Use Trends and Behavioral Health
- What's in a Vape? Products, Exposure, and Health Impacts
- Understanding E-Cigarette Waste, Emissions, and Pollution
- Environmental Wellness
- Strategies for Reducing E-Cigarette Harm and Supporting Cessation

The Wellness Connection: E-Cigarette Use Trends & Behavioral Health

SAMHSA's 8 Dimensions of Wellness Model



Core Concepts



- Creating balance
- Embracing support from others
- Valuing healthy routines & habits

(SAMHSA, 2016)

Tobacco Use Is a Health Equity Issue

Smoking prevalence in the **overall U.S. adult** population: **11.5%**

GROUPS OF PEOPLE DISPROPORTIONATELY AFFECTED BY TOBACCO USE INCLUDE:

- Substance Use Disorders
- Mental Health Conditions
- Trauma, Violence
- HIV/AIDS
- Lower SES, Less Education
- Racial & Ethnic Populations
- Gender Diverse Individuals
- LGBTQIA+

2 – 5 times more likely to smoke cigarettes

(Centers for Disease Control, 2023)

Health Equity Considerations in E-cigarette Use

Prevalence in general U.S. adult population (18-49): 13%

POPULATIONS OF PEOPLE MORE LIKELY TO VAPE

- Substance Use Disorders
- Mental Health Conditions
- Young Adults & Adolescents
- Lower SES, Less Education
- People who smoke cigarettes
- Uninsured or on Medicaid
- LGBTQIA+
- American Indian/Alaska Natives
- Native Hawaiian/Pacific Islander
- Biracial

Multiple product use is also a significant concern

(Birdsey, 2023; Al Rifai, 2020; Qeadan, 2023; Gallup, 2023; Gubner, 2016; Hrynowski, 2023; National Center for Health Statistics, 2019-2023; Kramarow, 2023)

Vaping Prevalence Among Youth and YAs With Behavioral Health Conditions

Significantly more likely to:

- Vape and vape frequently
- Engage in dual use
- Including dual use of vaping nicotine and THC or illicit substances

3x more likely to vape

(Dragiecevic & Carthan, 2025; Teo et al., 2026)

What's in a Vape? Products, Exposure, & Health Impacts

The Evolution of E-cigarettes

2007:
The first "cig-a-like" e-cigarettes appear on the market



2010:
Mods and tanks



2015-2016:
Pod-based products



2018-2021:
Disposable e-cigarettes take over



2023-2025
New "smart" e-cigarettes raise concerns



truth initiative
freedom from nicotine addiction

Cheaper, Stronger, Bigger

Between 2017 and 2022, disposable e-cigarettes:

- Dropped in **price** by nearly **70%**
- Increased nearly **3x** in **nicotine strength** and **5x** in e-liquid **capacity**

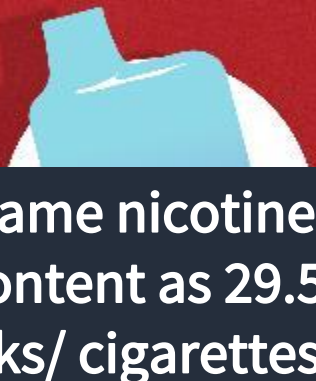


(Diaz, et al., 2023)
Image: (TruthInitiative.org)

Stanford MEDICINE
REACH Lab

CIGS IN AN E-CIG

TOBACCO PREVENTION TOOLKIT

1 Pack of Cigarettes = ~22mg of Nicotine	1 JUUL Pod = ~41.3mg of Nicotine	1 Vuse Pod = ~90mg of Nicotine	1 Elf Bar = ~650mg of Nicotine
			
AMOUNT OF NICOTINE IN **~20** CIGARETTES	AMOUNT OF NICOTINE IN **~37** CIGARETTES	AMOUNT OF NICOTINE IN **~82** CIGARETTES	AMOUNT OF NICOTINE IN **~590** CIGARETTES
			

Same nicotine content as 29.5 pks/ cigarettes

A New Generation of Products: “Smart” Vapes

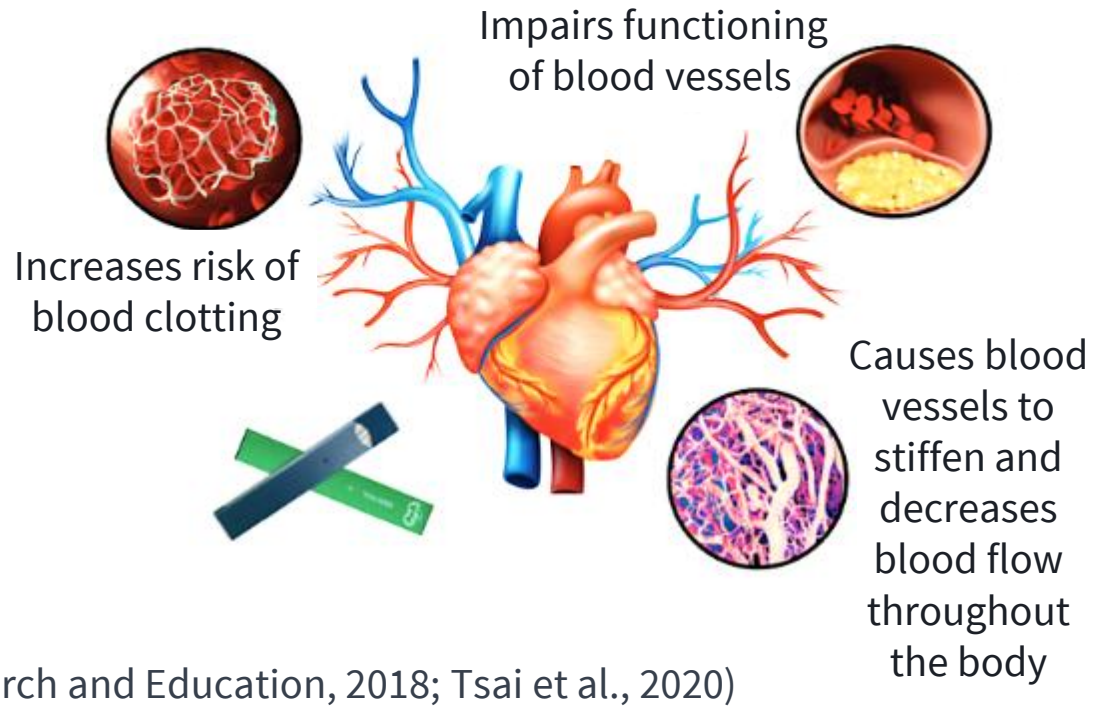




Images: amevape.com, 2025; eightvape.com, 2025

Daily Vaping Can Increase Cardiovascular Disease

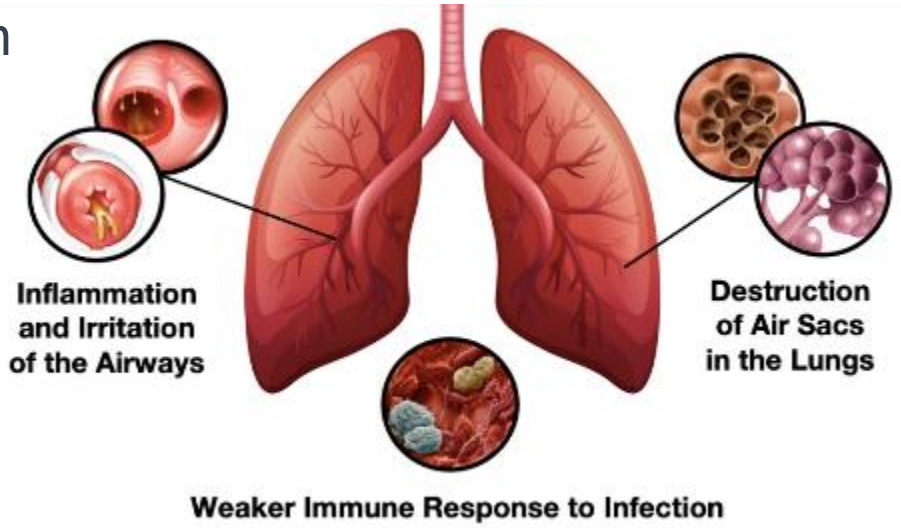
- Daily vaping **nearly doubles** the risk of heart attack
- Daily **DUAL USE** increases heart attack risk by **5X**



(Center for Tobacco Control Research and Education, 2018; Tsai et al., 2020)
Image: (E-CIGS/Vapes & Pod-based. Tobacco Prevention Toolkit, n.d.)

Daily Vaping Can Increase Risk of Lung Disease

- Chronic lung disease – **asthma, bronchitis, emphysema** – can develop within 3 years
- Lung scarring, lung collapse
- Daily **DUAL USE** more than **triples** lung disease risk



(Bhatta & Glantz, 2019; Tsia et al., 2020; Wetherill, et al., 2023; Xie, et al., 2020)
Image: (E-CIGS/Vapes & Pod-based. Tobacco Prevention Toolkit, n.d)

Secondhand Vaping Aerosol Exposure



The amount and type of toxins released into the air depend on multiple factors:

- ✓ Brand of e-liquid
- ✓ Voltage of device
- ✓ # of people vaping
- ✓ Frequency & intensity

WHO IS AT GREATEST RISK?
Infants, children, pregnant women, those with lung conditions

(Correll, 2023)

Understanding E-Cigarette Waste, Emissions, & Pollution

Production of Vaping Products Impacts the Environment

- Energy-consuming process
- Ingredients imported from low- and middle-income countries
- Impacts air quality, water, land use, and animals
- Climate change



(Ngambo et al., 2023; Image: New York Times)

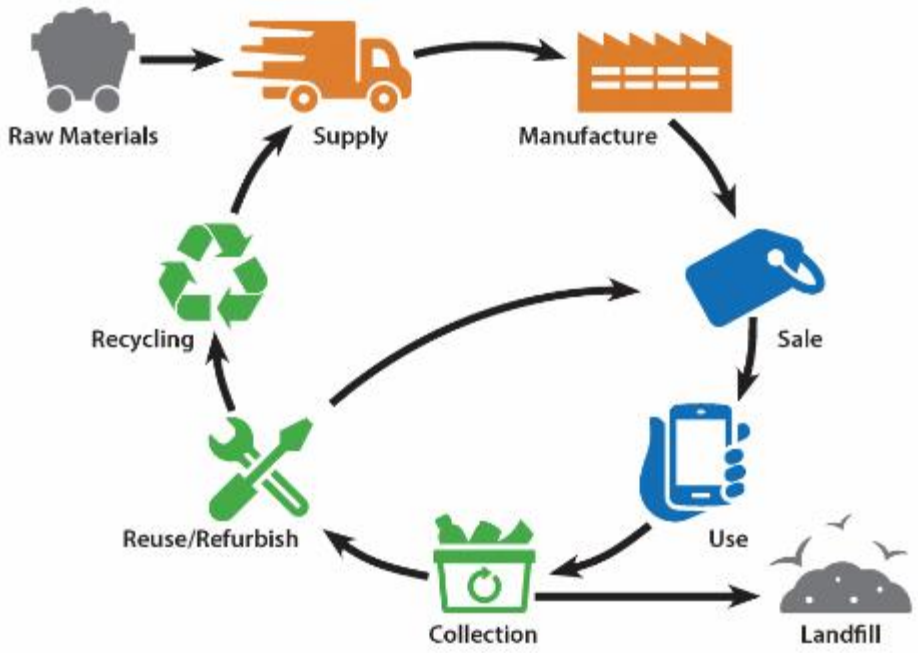
Nicotine and Nicotine Salts

- Considered an acute hazardous waste
- Improper storage/disposal can lead to unintentional exposure
- Improper disposal can lead to nicotine solution to seep into the ground/water



(Public Health Law Center, 2019; Image: Truth Initiative, 2021)

Lithium-Ion Battery Life Cycle



(EPA, 2022)

- Made up of critical materials like cobalt, graphite, and lithium
- If damaged or crushed in transport, it can create a fire hazard

Find out where to recycle old lithium-ion batteries here

Use of Vaping Products Impacts the Environment

- Sources of air pollution
- Large amount of particulate matter and heavy metal emissions
- Secondhand vaping aerosol exposure



(Ngambo et al., 2023; Image: University of California, 2017)

Electronic Waste (E-Waste) Is an Environmental Concern

- Often contain hazardous materials like heavy metals, lead, and mercury
- Lack of technology to properly recycle e-waste
- In the U.S., e-waste is responsible for two-thirds of heavy metals in landfills



(Daley, 2019; U.S. PIRG Education Fund, 2023; Image: Shutterstock, 2016)

Improper Disposal of Vaping Products Impacts the Environment

- Batteries and replaceable capsules containing nicotine residue can leach pollutants into water, air, and soil
- E-cigarettes create various types of waste including:
  - **Acute hazardous waste**
  - **Electronic waste**
  - **Plastic waste**

(Ngambo et al., 2023)



Unlike Cigarettes, Vapes Do Not Decompose

- E-cigarettes won't biodegrade even under severe conditions
  - **1 in 4** (28%) youth believe vape waste is biodegradable
- Break down into microplastics and chemicals
- Even packaging contains plastics



(U.S. PIRG Education Fund, 2023; Vermont Department of Health, 2026; Image: Vapor Voice)

Big Tobacco's Attempt to Become "Green"

- E-cigarettes advertised as "eco-friendly"
- E-cigarette waste has the potential to be a more serious environmental threat than cigarette butts



(Wholf & Fayeulle, 2022; Image: World Health Organization)

Environmental Wellness

What Is Environmental Wellness?

Promotes physical and emotional safety in all your surroundings; including the environment in which you live, work, play, and learn



(Rocky Mountain University, n.d.; Image: Boston University)

What Are Some Examples of Environmental Wellness?



CLEAN AIR



STABLE CLIMATE



ADEQUATE WATER



SANITATION & HYGIENE



SAFE USE OF CHEMICALS



HEALTHY & SAFE WORKPLACES



HEALTH-SUPPORTIVE BUILT ENVIRONMENTS



PRESERVED NATURE

(World Health Organization, n.d.)

Benefits of Prioritizing Environmental Wellness

- Reduced stress
- Improved mood
- Reduced burnout
- Stronger social bonds
- Collective responsibility
- Improved nutrition



(Kaznesis, P., 2023; Image: Yale E360)

Social Determinants of Health & Environmental Wellness

- Where people live
- Quality of housing
- Access to green spaces
- Exposure to environmental pollutants
- Ability to advocate for environmental protections



(Healthy People 2030, n.d.; Image: Wellable)

Neighborhood & Built Environment

Factors that impact this domain:

- Housing
- Walkability
- Zip code/Geography
- Playgrounds/Parks
- Transportation
- Safety



(Centers for Disease Control and Prevention, 2024)

Rental/Multi-Unit Housing

- 25% of Americans live in multi-unit housing
- Exposure occurs due to vaping aerosol traveling between units
- Multi-unit housing are often rental properties



(Centers for Disease Control and Prevention, 2024)

Strategies for Reducing E-Cigarette Harm & Supporting Cessation

Barriers to Safe Disposal

- Many e-cigarette device owners believe that it is difficult to find e-cigarette drop-off sites
  - Studies show that many adults **(83%)** dispose their vaping products in the landfill/trash
- No documented baseline standards for end-of-life disposal by manufacturers
- No regulation in place to hold manufacturers accountable for the post-consumer waste they helped to produce

(Truth Initiative, 2021; Sharma et al., 2025; Pourchez & Forest, 2022)

Proper Storage of Used E-Cigarettes

- Follow the Department of Transportation regulations for lithium batteries during storage
- Wear chemical-resistant gloves when handling e-cigarettes
- Each intact e-cigarette should be sealed in a clear plastic bag
- Vials, cartridges, and pods should be sealed in a clear plastic bag
- Intact batteries should be sealed in a clear plastic bag
- Bulging or leaking batteries should be placed in a bucket of sand to prevent a fire

(Public Health Law Center, 2021)

Best Practices for Safe Disposal

- Turn off the device and remove the rechargeable battery
- Store all items in a cool, temperature-controlled environment, within a container that is sealed and labeled for hazardous waste
- Deliver the sealed container of e-cigarette waste to a local hazardous waste facility or a licensed disposal company at least every 90 days
- Do not rinse e-cigarette items
- Always be careful handling products

Never throw rechargeable batteries or cartridges into the trash/recycling bin

(FDA, 2020)

Adopting an E-Cigarette Disposal Program

- Contact your local waste departments about their household hazardous waste (HHW) program.
- Standardize your behavioral health programs' process for the disposal of e-cigarette devices, refills, and e-liquids.
- Increase client/staff awareness of the environmental dangers posed by discarding e-cigarette waste.

(Truth Initiative, 2021)

Ways to Reduce Nicotine Dependence

- Delay the first cigarette or vape session of the day
- When reaching for a cigarette/vape, stop and think, *"Can I skip this one?"* Wait 5-10 minutes before acting
- Smoke less of each cigarette than you normally would/take fewer hits from a vape than normal
- Carry only enough cigarettes to get through the day
- Try a vape with a lower level of nicotine
- Use short-acting nicotine replacement therapy (NRT), such as NRT gum or lozenge to help manage cravings
- Begin practicing new coping strategies

Ready to Quit? Current Best Practices: NRT* + Behavioral Counseling



When combined with behavioral counseling, NRT* can more than double the chances of quitting for good.

*OR use of Varenicline (aka Chantix) or Bupropion (aka Zyban, Wellbutrin)

Prochaska and Benowitz (2016); Smokefree.gov (2024)

Massachusetts' Tobacco and Nicotine Quitline

Free Coaching and Nicotine Replacement Therapy

1-800-QUIT-NOW

En Español: 1-855-DÉJELO-YA

Must be 12+ yrs. for coaching calls and 18+ yrs. for free NRT

- 1 intake call + 5 coaching calls
- 8 weeks of free NRT (patches, lozenge, or gum)
- Text messaging/email support also available
- Participants can also place unlimited calls for support anytime outside of the coaching calls
- People can use this general quitline program even if they aren't quite ready to quit as a way to help build confidence for quitting

English, Spanish, Arabic speaking coaches onsite; 200 other languages available through 3rd party translation services

Specialized Quitline Behavioral Health Program

Behavioral Health Program

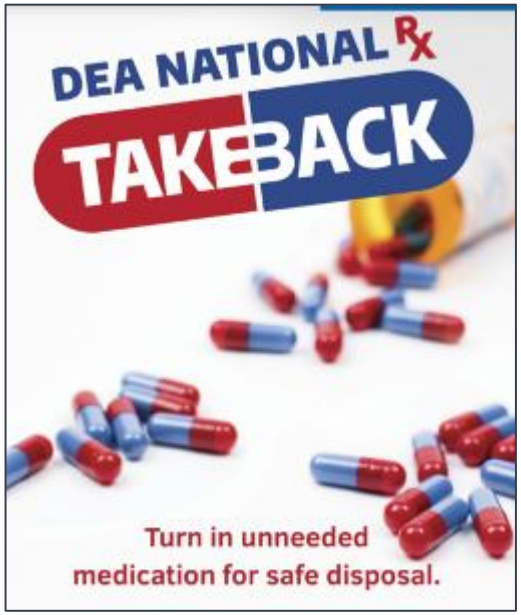
- You are eligible for the Behavioral Health Program if you match the following criteria:
  - Self-report having at least one of the following behavioral health conditions: anxiety, depression, schizophrenia, bipolar disorder, ADHD, PTSD, or substance use disorder.
  - Are 18 years or older at intake.
- You will receive up to seven coaching calls.
- Up to eight weeks of nicotine replacement therapy is provided FREE of charge after speaking with a quit coach if you meet certain medical eligibility requirements.
  - Either patches, gum, or lozenges are shipped directly to your home.
- Written materials are only available in English at this time.



National Prescription Drug Take Back Day

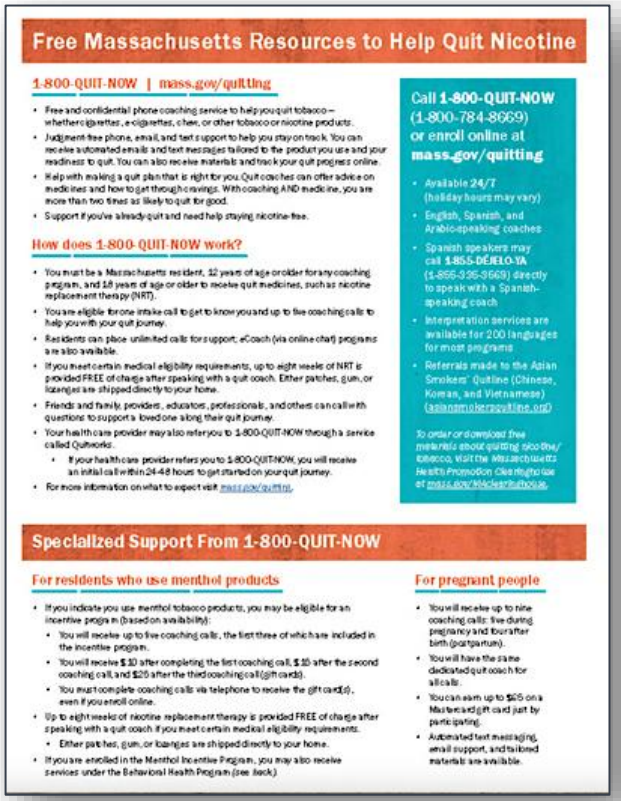
- Annual event organized by the Drug Enforcement Administration
- All ENDS products are eligible (without lithium batteries)
- Next event: April 24, 2027

Find your National Prescription Drug Take Back Day collection site



(Image: DEA)

Quitline Information Materials From the MA Health Promotion Clearinghouse



Free Massachusetts Resources to Help Quit Nicotine

1-800-QUIT-NOW | mass.gov/quitting

- Free and confidential phone coaching service to help you quit tobacco – whether cigarettes, e-cigarettes, chew, or other tobacco or nicotine products.
- Judgment-free phone, email, and text support to help you stay on track. You can receive automated emails and text messages tailored to the product you use and your readiness to quit. You can also receive materials and track your quit progress online.
- Help with making a quit plan that is right for you. Quit coaches can offer advice on medicines and how to get through cravings. With coaching AND medicine, you are more than two times as likely to quit for good.
- Support if you've already quit and need help staying nicotine-free.

How does 1-800-QUIT-NOW work?

- You must be a Massachusetts resident, 12 years of age or older for any coaching program, and 18 years of age or older to receive quit medicines, such as nicotine replacement therapy (NRT).
- You are eligible for one intake call to get to know you and up to five coaching calls to help you with your quit journey.
- Residents can place unlimited calls for support; eCoach (via online chat) programs are also available.
- If you meet certain medical eligibility requirements, up to eight weeks of NRT is provided FREE of charge after speaking with a quit coach. Either patches, gum, or lozenges are shipped directly to your home.
- Friends and family, providers, educators, professionals, and others can call with questions to support a loved one along their quit journey.
- Your health care provider may also refer you to 1-800-QUIT-NOW through a service called Quitworks.
  - If your health care provider refers you to 1-800-QUIT-NOW, you will receive an initial call within 24-48 hours to get started on your quit journey.
- For more information on what to expect visit mass.gov/quitting.

Call 1-800-QUIT-NOW (1-800-784-8669) or enroll online at mass.gov/quitting

- Available 24/7 (holiday hours may vary)
- English, Spanish, and Arabic-speaking coaches
- Spanish speakers may call 1-855-DÉJELO-YA (1-855-335-3569) directly to speak with a Spanish-speaking coach
- Interpretation services are available for 200 languages for most programs
- Referrals made to the Asian Smokers' Quitline (Chinese, Korean, and Vietnamese) (asiansmokersquitline.org)

To order or download free materials about quitting nicotine/tobacco, visit the Massachusetts Health Promotion Clearinghouse at mass.gov/MAclearinghouse.

Specialized Support From 1-800-QUIT-NOW

For residents who use menthol products

- If you indicate you use menthol tobacco products, you may be eligible for an incentive program (based on availability):
  - You will receive up to five coaching calls, the first three of which are included in the incentive program.
  - You will receive $10 after completing the first coaching call, $15 after the second coaching call, and $25 after the third coaching call (gift cards).
  - You must complete coaching calls via telephone to receive the gift card(s), even if you enroll online.
- Up to eight weeks of nicotine replacement therapy is provided FREE of charge after speaking with a quit coach if you meet certain medical eligibility requirements.
  - Either patches, gum, or lozenges are shipped directly to your home.
- If you are enrolled in the Menthol Incentive Program, you may also receive services under the Behavioral Health Program (see back).

For pregnant people

- You will receive up to nine coaching calls: five during pregnancy and four after birth (postpartum).
- You will have the same dedicated quit coach for all calls.
- You can earn up to $65 on a Mastercard gift card just by participating.
- Automated text messaging, email support, and tailored materials are available.







www.mass.gov/MAclearinghouse. "Search for Tobacco"

Environmental Wellness Toolkit

YOUR HEALTHIEST SELF

Environmental Wellness Checklist



To reduce toxic substances in your home:

- ☐ Clean with non-toxic products.
- ☐ Dust using a damp rag.
- ☐ Use a wet mop to clean floors.
- ☐ Vacuum with a HEPA filter.
- ☐ Open a window or use a fan to improve air circulation when you're cleaning.
- ☐ Have a good ventilation system.
- ☐ Wash your & your children's hands often.

For other wellness topics, please visit **www.nih.gov/wellnesstoolkits**

NIH National Institutes of Health

[Click here to access the Environmental Wellness Toolkit]

Additional Fact Sheets

1. How to Safely Dispose of E-Cigarettes: Information for Individuals Fact Sheet

2. 5 Tips to Help Avoid “Vape” Battery Explosions

3. Disposing of E-Cigarette Waste: FAQ for Schools and Others

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