

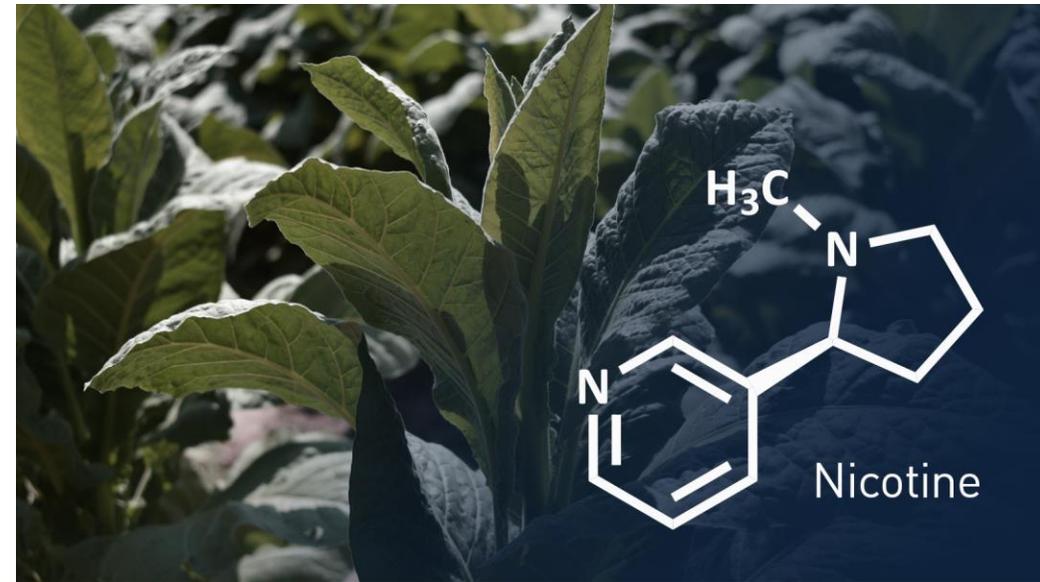
Smoking Cessation: **'BREAKING FREE'**

November 25, 2025

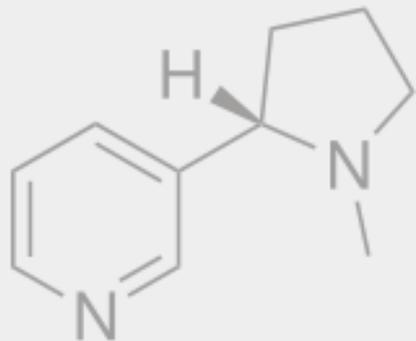


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The story of Nicotine



On a neurochemical level, nicotine induces a variety of central nervous system, cardiovascular, and metabolic effects.



Neurotransmitter

Effects

Dopamine	➔	Pleasure, appetite suppression
Norepinephrine	➔	Arousal, appetite suppression
Acetylcholine	➔	Arousal, cognitive enhancement
Glutamate	➔	Learning, memory enhancement
Serotonin	➔	Mood modulation, appetite suppression
β-Endorphin	➔	Reduction of anxiety and tension
GABA	➔	Reduction of anxiety and tension

NICOTINE DEPENDENCE

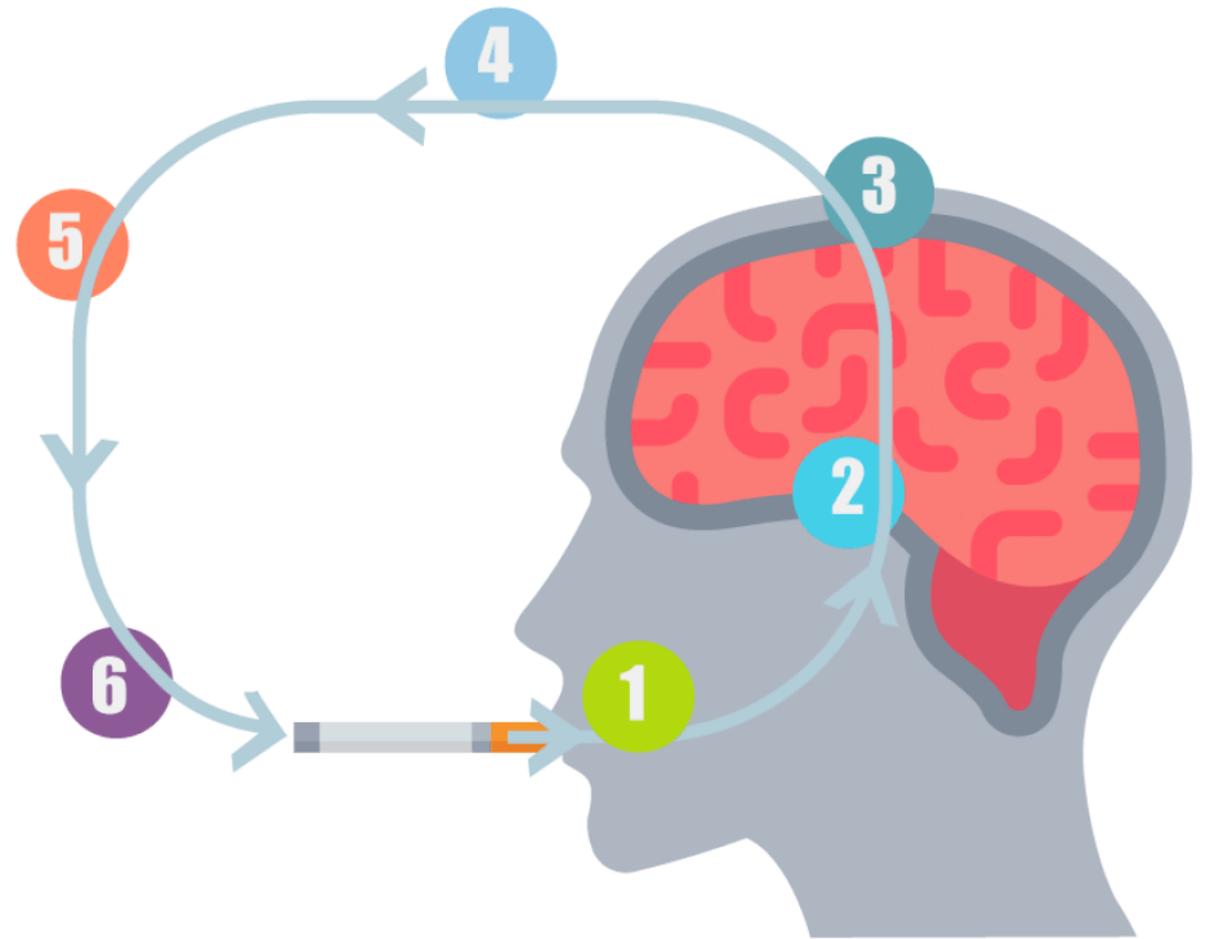
Nicotine from smoking can reach the brain in 11 seconds. Dopamine is released in the nucleus accumbens and prefrontal cortex.

Dopamine leaves the system rapidly as well, within minutes.

Dopamine induces feelings of euphoria and pleasure and is responsible for activating the dopamine reward pathway.

Chronic nicotine exposure → neuroadaptation

Upregulation of nicotinic acetylcholine receptors (nAChRs)--
Receptors become less sensitive, requiring higher nicotine doses (tolerance)



1 Nicotine delivered by smoking

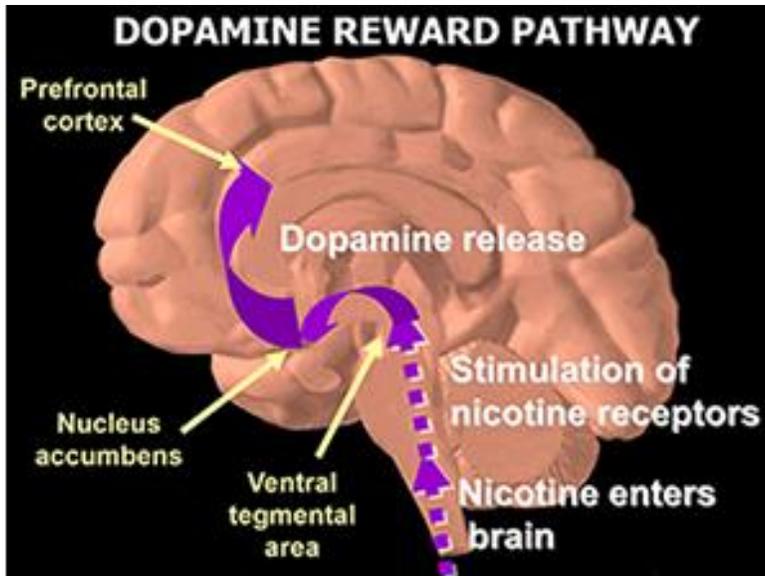
2 Nicotine travels to the brain

3 Nicotine activates nicotinic receptors which stimulates the release of Dopamine

4 Dopamine released, leading to pleasant feelings of calmness and reward

5 Dopamine levels reduce, leading to withdrawal symptoms of stress and anxiety

6 Withdrawal triggers desire for another cigarette



Nicotine addiction

is **not** just a bad habit.

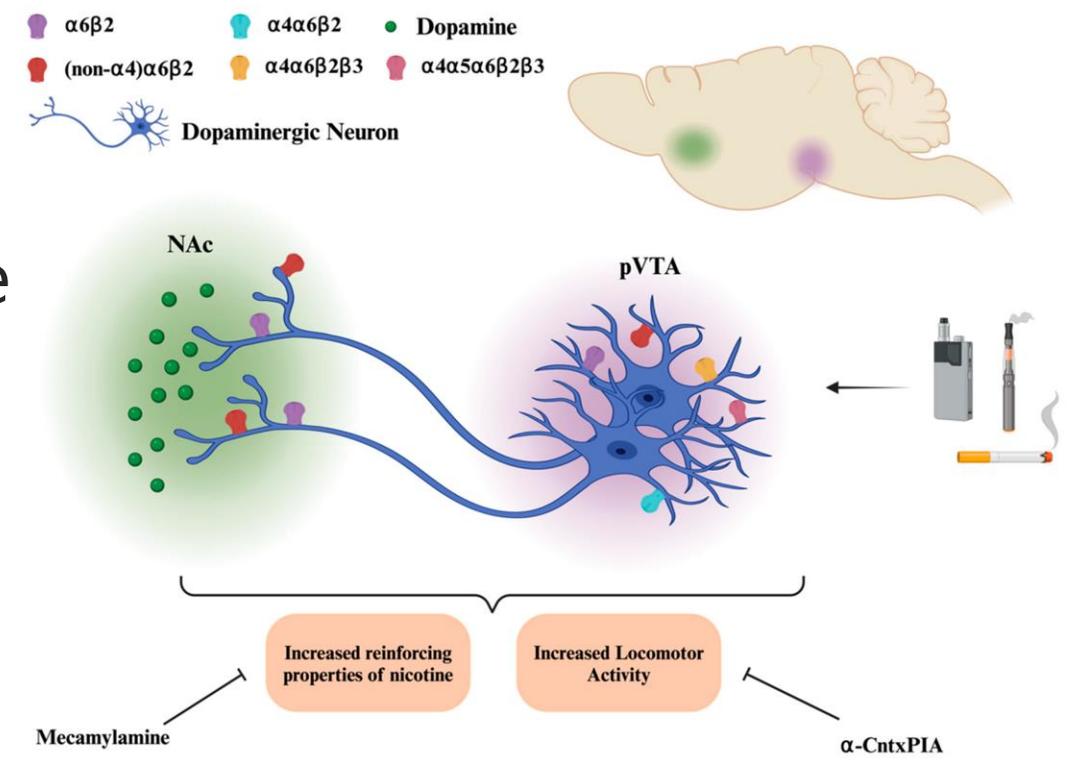
Discontinuation leads to withdrawal symptoms.

Nicotine chronically stimulates the locus ceruleus (main norepinephrine center)

Over time, locus ceruleus neurons become hyper-excitabile

When nicotine stops abruptly → excess norepinephrine release

Withdrawal Symptoms Explained: Anxiety Irritability Restlessness Insomnia Poor concentration (All due to locus ceruleus hyperactivity during nicotine withdrawal.)



Stages of Development of addiction:

1. Forming Attitudes and Beliefs about Tobacco
2. Trying Tobacco
3. Experimenting with Tobacco
4. Regularly Using Tobacco
5. Becoming Addicted to Tobacco

This process generally takes about 3 years.

Nicotine Dependence Itself a Chronic Illness



"There's someone in my head, but it's not me." - Pink Floyd 1973

Other Psychological Effects

Conditioning occurs over many years after exposure to things in the environment, which stimulate the user to want a cigarette or other forms of tobacco. People learn to manage their emotions with tobacco.

The act of tobacco use may become one of the daily activities, (in the morning, with drinking tea or relaxing after a meal..etc..). These **“triggers”** are the reason why quitting might be difficult.

Patterns of behavior are very difficult to change.

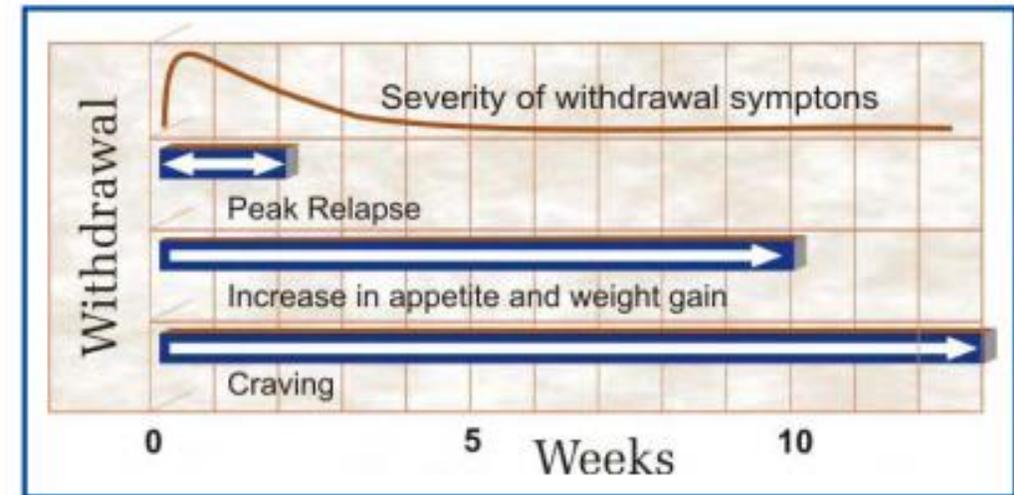


Withdrawal symptoms.

Withdrawal begins within a few hours of the last cigarette and manifests as:

- Dysphoric or depressed mood
- Insomnia
- Irritability, frustration, or anger
- Anxiety
- Difficulty in concentrating
- Restlessness
- Decreased heart rate
- Increased appetite or weight gain

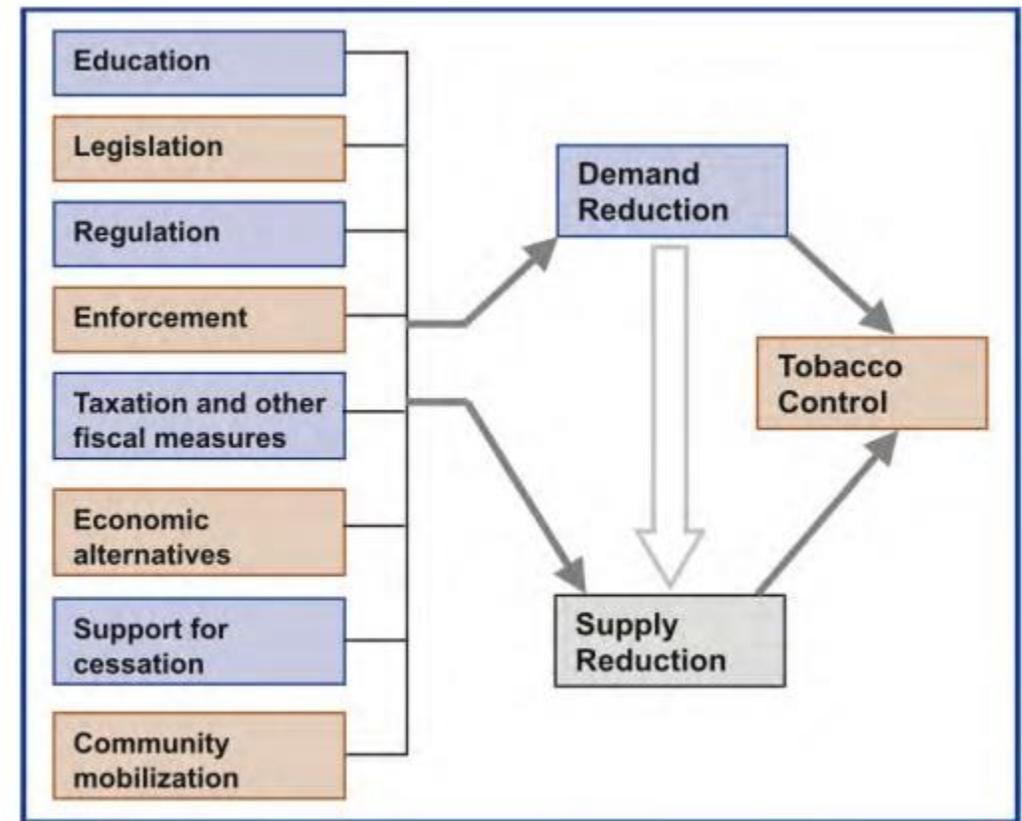
Most symptoms peak 24–48 hr after quitting and subside within 2–4 weeks.



Strategies for tobacco control:

General: Interventions at the national level: WHO FRAMEWORK CONVENTION ON TOBACCO CONTROL (Revise previous lecture).

Specific: At the level of the individual: interventions: promoting tobacco cessation.



Courtesy: ReddyKS, GuptaPC, Report on tobacco control in India, July 2004 'Tobacco control-what works?' 255-320;



At the level of the individual

Effective treatments that can produce long-term or even permanent abstinence exist.

Every patient who uses tobacco should be offered at least one of these treatments:

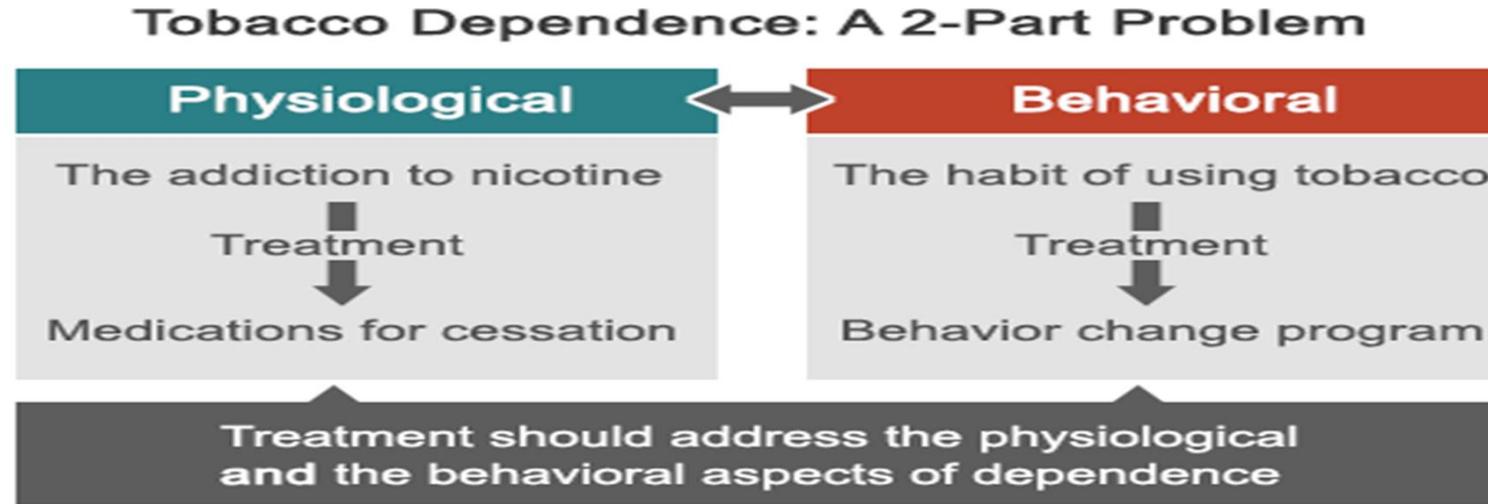
1. Patients willing to try quitting tobacco use should be provided with treatments identified as effective.
2. Patients unwilling to try quitting tobacco use should be provided with a brief intervention designed to increase their motivation to quit

Intervention Works!

Intervention from health professionals has been shown repeatedly, in randomized controlled trials, to increase the percentage of tobacco users who stop and remain abstinent for 6 months or more.

This is highly cost-effective.

Management of smoking cessation



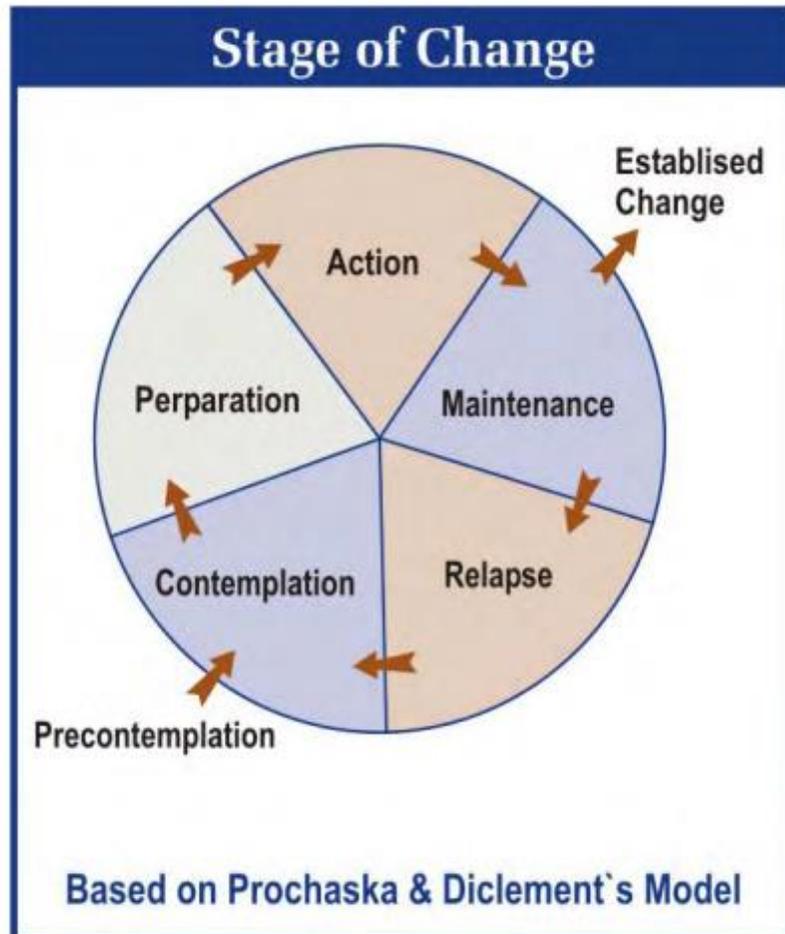
Behavioural therapy

Medication management

Behavioral change

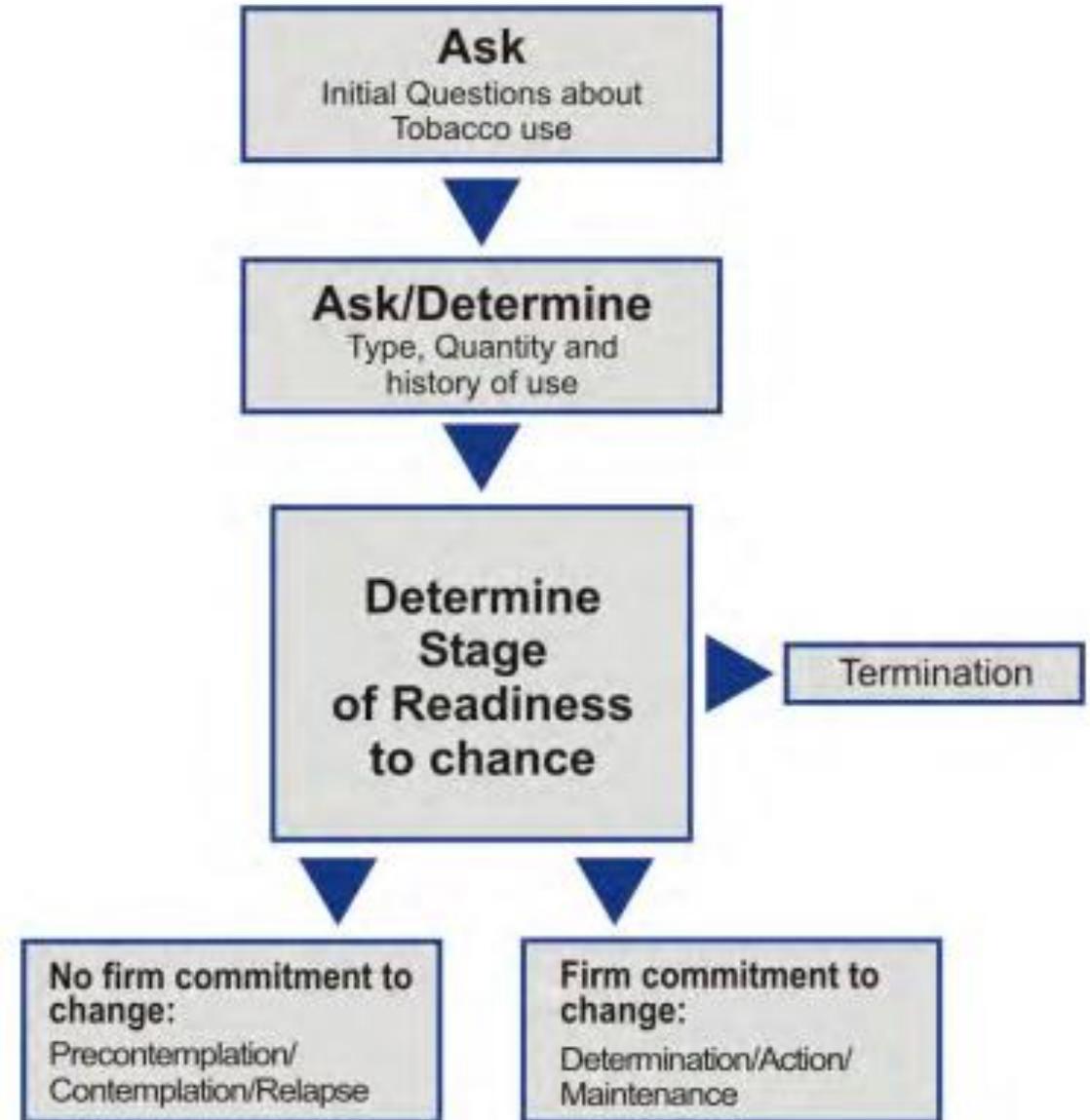
Stages of change: **pre-contemplation, contemplation, preparation, action, maintenance, and termination.**

In order to increase the likelihood of success, Assessment of an individual's readiness to change should be done; and specific interventions are tailored to the person's stage of change.



Stage	Definition
1. Precontemplation	No change planned for the next 6 months
2. Contemplation	Intention to make a change in the next 6 months
3. Preparation	Intention to make a change in the current month
4. Action	Smoke stop less than 6 months ago
5. Maintenance	Smoke stop more than 6 months ago
6. Relapse	Step backwards from any stage to one of the stages 1-3

Solutions to the problem:



ASK, ASSESS...

Two pieces of information are important:

a) whether the person uses tobacco currently and if yes,

b) whether the individual is interested at present in cessation.

The highest possible score = 10
0 to 2 Very Low Dependence
3 to 4 Low Dependence
5 Medium Dependence
6 to 7 High Dependence
8 to 10 Very High Dependence

Fagerstrom Addiction Scale for Smokers

	Points
<u>How soon after you wake up do you smoke your first cigarette?</u>	
Within 5 minutes	3
6–30 minutes	2
31–60 minutes	1
After 60 minutes	0
<u>Do you find it difficult to refrain from smoking in place where it is forbidden, e.g., in church, at the library, in cinema, etc.?</u>	
Yes	1
No	0
<u>Which cigarette would you hate most to give up?</u>	
The first one in the morning	1
All others	0
<u>How many cigarettes per day do you smoke?</u>	
≤10	0
11–20	1
21–30	2
≥31	3
<u>Do you smoke more frequently during the first hours after waking than you do during the rest of the day?</u>	
Yes	1
No	0
<u>Do you smoke if you are so ill that you are in bed most of the day?</u>	
Yes	1
No	0

Medication management:

Clinicians should encourage all patients attempting to quit to use effective medications for tobacco dependence treatment.

The three classes:

1. NRT Nicotine Replacement therapy
2. Psychotropics
3. Nicotine agonist

Patients who should not be offered pharmacotherapy

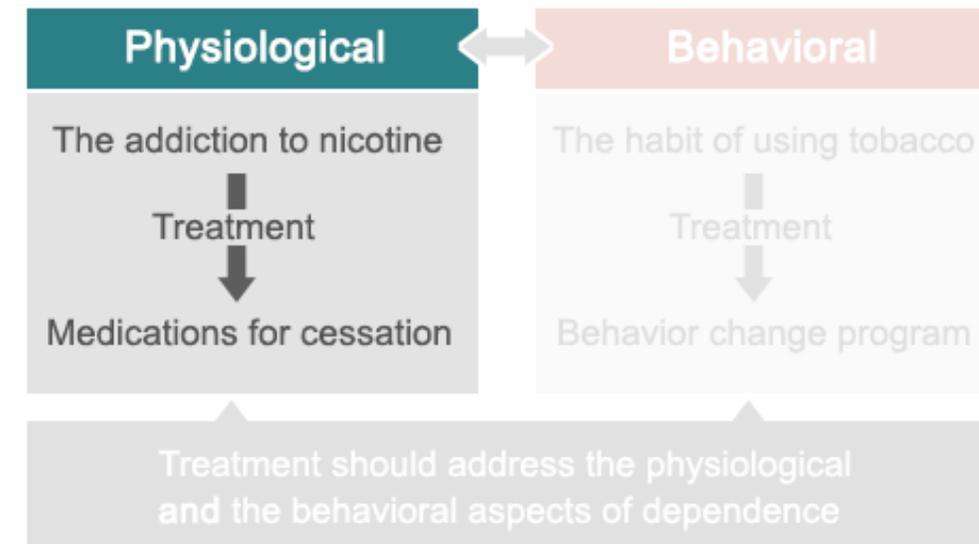
- Pregnant or breast-feeding women. Pregnant smokers should be offered person-to-person psychosocial interventions that exceed minimal advice to quit
- Smokeless tobacco users
- smokers with cardiovascular conditions
- Have medical contraindications
- Patients smoking fewer than 10 cigarettes per day (light smokers)
- Adolescents

In each of these populations, the recommended treatment approach is behavioral counseling.

Three general classes of FDA-approved drugs for smoking cessation:

1. Nicotine replacement therapy (NRT)
 - Nicotine gum, patch, lozenge, nasal spray, inhaler
2. Psychotropics
 - Sustained-release bupropion
3. Partial nicotinic receptor agonist
 - Varenicline

Tobacco Dependence: A 2-Part Problem



Clinicians should consider additional factors including: the number of cigarettes smoked per day (or time to first cigarette), advantages and disadvantages of each product, methods used for prior quit attempts, reasons for relapse, and the patient's own preferences.

Behavioral counseling should be used in conjunction with all pharmacologic therapies.

Cognitive-Behavioral Therapy for Smoking Cessation



**A Practical Guidebook to
the Most Effective Treatments**

Kenneth A. Perkins
Cynthia A. Conklin
Michele D. Levine



NRT:

Provides smoker with nicotine without using tobacco, thereby relieving nicotine withdrawal symptoms.

NRT products differ in the route of delivering nicotine to the circulation.

OTC: nicotine gum, lozenges, patches

Prescriptions : nasal spray, inhalers.

Nicotine patches are more tolerated than nasal spray and provides the most continuous delivery of nicotine replacement therapies.

All forms of cessation medications are twice effective as placebo . Patients are less likely to develop dependence on OTC medication in comparison to the present tobacco use.

Evidence suggests that patients who **use combination NRT are 1.3 times more likely** to remain abstinent when compared with patients who **use single-agent NRT**.

Nicotine Gum



Nicotine Patches



Microtabs



Lozenges



Inhalators



Nasal Sprays



**Combination
NRT**

Long-acting formulation
(patch)

Produces relatively constant
levels of nicotine



Short-acting formulation
(gum, inhaler, nasal spray)

Allows for acute dose titration as
needed for nicotine withdrawal
symptoms

NRT:

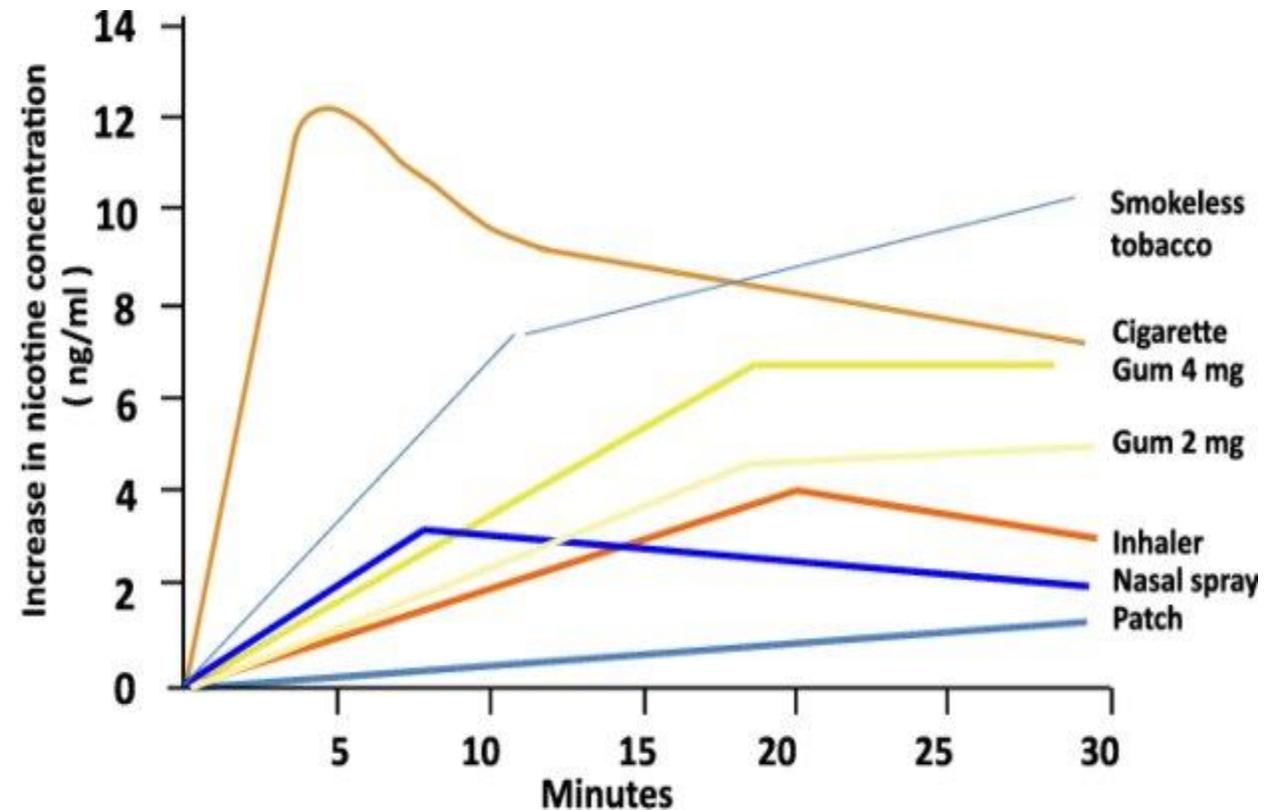
Reduces the physical withdrawal symptoms associated with nicotine cessation. This makes patients more comfortable while they are quitting.

Eliminates the immediate, reinforcing effects of nicotine that is rapidly absorbed through tobacco smoke.

Allows the patient to focus on the behavioral and psychological aspects of quitting, while the NRT products are helping to alleviate withdrawal symptoms.

The ultimate goal for successful quit attempt is for the patient to neither be smoking nor using cessation medications after a certain time period.

All NRT formulation deliver nicotine more slowly and lower concentrations. With transdermal therapies have the lowest absorption.



Source: Balfour DJ & Fagerström KO. *Pharmacol Ther* 1996 72:51-81.

Nicotine gum

Two strength: 4 and 2 mg

If used as monotherapy, the gum should be chewed on fixed schedule and tapered appropriately.

Can be used in conjunction with patch to treat sudden urges.

The gum should not be chewed in response to craving alone , **and should NOT chewed like ordinary gum**, as rush release of nicotine results in GI upset. **It should be chewed slowly.**

Most of nicotine in the gum is gone within 30 minutes.

Patients should not eat or drink for 15 minutes before or while using nicotine gum – esp. coffee., acidic beverages can lower the pH of saliva and reducing the efficacy of buccal absorption.

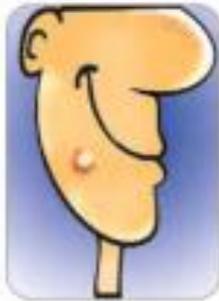
In general, if the patient smokes less than 20 then the 2 mg gum should be used. **If more than 20 cigarettes per day, then the 4 mg strength may be needed. A maximum of 15 pieces of gum can be chewed in any 24-hour period.**



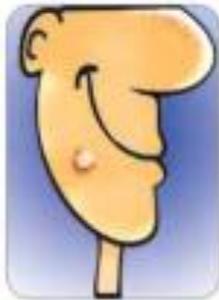
When there is a urge to smoke



Place the grun between gum and inner cheek.



Park the gum between your gum and inner cheek again for another 10 minutes.



Take out a gum from its pack and start chewing it SLOWLY



Let it there for about 10 minutes so that the released nicotine is absorbed.



Swtich it back to the other side and repeat the whole process for third time.



Continue chewing slowly until tingling or peppery taste is felt. (about 5 minutes)



Switch the gum to the other side of the mouth and startt chewing slowly again for about 5 minutes.



After that the gum may be discarded in a safe place away from children and pets.



Nicotine Lozenges

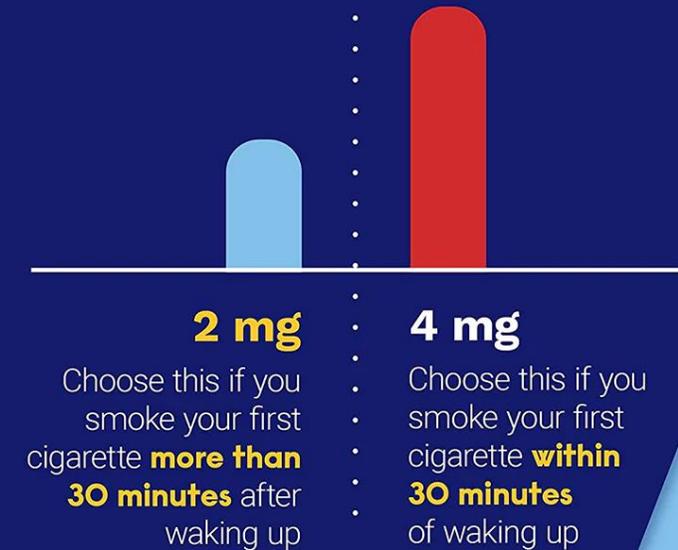


Nicotine Lozenges are new products that have similar efficacy to nicotine gum but it is **easier to use and does not require special technique for optimal use.**

It also delivers more nicotine than equivalent dose of the gum.

Unlike nicotine gum, smokers with dentures or poor dentition can use Lozenges.

Nicorette Lozenge › comes in two strengths



Nicotine patch

It delivers transdermal nicotine steadily. There are patches for 24-hour use and one (brand) is for 16-hour (waking) use.

Helps to *prevent* cravings from occurring

Strength: 7, 14, 21 mg for 24 hours OR 15, 10, 5 for 16 hours. patients who smoke <10 cigarettes/day are suggested to start with 14 mg.



Nicotine patches– Application

- ❑ Apply to non-hairy, clean, dry skin
- ❑ Rotate between sites (this helps to reduce the risk of skin irritation)
- ❑ Choose a flat surface
- ❑ Avoid joints or skin folds
- ❑ Replace the same time everyday

**DO NOT SMOKE WHILE
USING THE PATCH**

Nicotine patch size/strength is reduced over time.
Location is changed to avoid skin irritation.



1st few weeks



Next few weeks



Last few weeks

Inhalation cartridge

The inhalator can be particularly helpful to those smokers who still feel they need to continue the hand-to-mouth movement.

Each cartridge is inserted into the inhalator and air is drawn into the mouth through the mouthpiece.

Inhalators can be used to either reduce the number of cigarettes smoked or as part of a quit attempt.

For the 10 mg inhalator a maximum of 12 cartridges per day can be used.

The amount of nicotine from a puff is less than that from a cigarette. To compensate for this it is necessary to inhale more often than when smoking a cigarette.



Nicorette Inhalator contains nicotine. Stop Smoking Aid. Requires Willpower. Always read the label. UK-NI-2100073



Bupropion (Zyban)

Bupropion sustained-release (SR) tablets are an oral antidepressant medication used as a nonnicotine aid to smoking cessation.

It acts by enhancing central nervous system noradrenergic and dopaminergic release.

A meta-analysis of 31 randomized trials of bupropion monotherapy concluded that bupropion SR doubles the likelihood of smoking cessation

Safety — The most common side effects of [bupropion](#) are insomnia, agitation, dry mouth, and headache.

A more serious side effect is seizure, which can occur because bupropion reduces the seizure threshold.

The drug is contraindicated in patients with a seizure disorder or predisposition to seizure, Depression or any psychiatric illnesses in the past.

BUPROPION SR

Zyban (GlaxoSmithKline); generic

- Nonnicotine cessation aid
- Sustained-release antidepressant
- Oral formulation



Bupropion for tobacco cessation Treatment

bupropion sustained release tablets should be initiated while the patient is still using tobacco.

Why? Because approximately 1 week of treatment is required to achieve steady-state blood levels of bupropion.

Patients should set a "target quit date" within the first 2 weeks of treatment with bupropion , generally in the second week.



Each extended-release tablet contains:
Bupropion Hydrochloride USP 150 mg.
Usual Dosage:
See accompanying prescribing information.
KEEP THIS AND ALL DRUGS OUT OF REACH OF CHILDREN.
Store at 20°C to 25°C (68°F to 77°F)
[See USP Controlled Room Temperature].
Protect from light and moisture.
ZYBAN® is a registered trademark of GlaxoSmithKline.
Print Medication Guide at:
www.solcohealthcare.com/medguide/bupropion-sr-tablets.pdf
Manufactured by:
Zhejiang Huahai Pharmaceutical Co., Ltd.
Xunqiao, Linhai, Zhejiang 317024, China
Distributed by:
Solco Healthcare US, LLC
Somerset, NJ 08873, USA
Rev.: 02/2022

201403-02

NDC 43547-289-06

Rx only

Twice-A-Day (After Initial Titration)
buPROPion Hydrochloride
Extended-release Tablets, USP (SR)

150 mg

WARNING: DO not use in combination with ZYBAN® or any other medicines that contain bupropion HCl.

PHARMACIST: Dispense the Medication Guide provided separately to each patient.

60 Tablets

This box is FPO to indicate the area to be left uncoated.

Varenicline (Champix, Chantix)

In May 2006, the FDA approved varenicline as an aid for smoking cessation.

A partial agonist at the $\alpha 4 \beta 2$ subunit of the nicotinic acetylcholine receptor.

This drug binds to nicotinic receptors leading to reduction of withdrawal symptoms and decrease rate of cigarettes' nicotine binding to these receptors.

Week 1: Starting dose: 0.5mg once daily for three days, then 0.5mg twice daily for four days.

Smokers have to decide on quit day during this week.

Then

1mg daily for 8-12 weeks.

S.E: nausea, headache, insomnia abnormal dreams, dyspepsia....
STOP immediately if there is suicidal attempts.



High level of smoking addiction

Combination of behavioural therapy with nicotine patches and nicotine lozenges (used for cravings)

OR

Combination of varenicline with behavioural therapy

For patients with ischaemic heart disease with moderate or high level of addiction:

The best approach is to start with **behavioural therapy**

If failed, you can start with nicotine patches

Summary

STRATEGIES FOR

SMOKING CESSATION

CORE
IM

Nicotine Replacement Therapy (NRT)

LONG ACTING NRT	SHORT ACTING NRTs. Combine with nicotine patch for best effect		
Patch Wear for 24 hours at a time. Alternate sites to minimize skin irritation. Dose: If <10 cig/d, start with 14 mg/d If >10 cig/d, start with 21 mg/d Taper down with a regimen that is easiest for the patient Side Effects: vivid dreams, contact dermatitis	Mini Lozenge Allow to slowly dissolve. Do not chew or swallow lozenge. Dose: 2mg/hr for patients who smoke their first cig >30 mins after awakening 4 mg/hr for patients who smoke their first cig <30 mins after awakening Frequency: Every 1-2 hours. Try not to wait for cravings.	Gum Chew minimally, "park" between teeth and cheek. Rechew when tingling is gone and rotate sites. Avoid use with acidic foods. Dose: 2mg/hr for patients who smoke their 1st cig >30 mins after awakening 4 mg/hr for patients who smoke their 1st cig <30 mins after awakening Frequency: Every 1-2 hours. Try not to wait for cravings. Side Effects: GI irritation when chewed	Nasal Spray Can be used once to each nostril every 1-2 hours. Side Effects: can cause nostril irritation Inhaler Take short puffs but keep air in mouth. Do not inhale.

Non-nicotine Replacement Therapy

Varenicline (Chantix) Nicotinic receptor partial agonist designed to decrease cravings, reduce withdrawal, and dampen nicotine-induced reward pathway. Dose: Take one week before quit date 0.5mg daily x 3d, 0.5mg BID x 3d Then 1mg daily for 3-6 months Side Effects: nausea, vivid dreams	Bupropion (Wellbutrin) Nicotinic receptor antagonist and norepinephrine & dopamine reuptake inhibitor. Designed to reduce cravings and withdrawal. Dose: Take one week before quit date 150mg tablet once daily x 3 days. Then 150mg tablet twice daily for 3-6 months Side Effects: lowers seizure threshold, insomnia, dry mouth	Electronic Cigarettes Reserve use until after FDA-approved treatments have failed. Patients should avoid using traditional cigarettes with e-cigs (to minimize adding known harms to unknown harms). Before prescribing e-cigs, discuss a plan for duration of use and when to stop.
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Initial components of assisting with a quit attempt

- 1. Establishing a quit date:** may link it to an important date, encourage the smoker to circle it on the calendar.
- 2. Initial plan:** START plan(S: set a quit date within 2 weeks, T:tell every one ,A: anticipate problems, R: remove tobacco products from the environment, T: take action, daily adjustments of behavior and thinking)
Family should be supportive, smokers should be away during the crucial period.
they should understand that **mood changes** could be experienced.

Anticipate problems(history of nicotine product use): current daily use of nicotine, how many cigarettes daily at the highest amount, brands used, how many quit attempts have been tried, past use of a cessation medication...

Changing behavior and thinking: smoking in early morning while drinking coffee, smoking while relaxing in front of TV.



3. Practical changes to implement:

Fewer than 5% of people who quit without assistance are successful for longer than a year.

Stress management: for people smoke during times of stress

Switching to brands cigarettes High price... less use.

For those using nicotine replacement therapy, the medications should be started on this date.

Symptoms of withdrawal include: " craving" , anxiety, depression, anger, insomnia, increased appetite, weight gain, difficulty concentrated...

Remember: Withdrawal symptoms tend to peak with 24-48 hours after quitting and usually subside within 2-4 weeks.

Tips to prevent relapsing

1. Using positive thinking.
2. Thought control techniques: distracting self or few minutes until craving resolved.
3. Pay attention to the important rule: **there is no such thing as “ just one cigarette”**
4. Avoid triggers and other urges: avoid stress as possible, take a walk, Active exercises, watching TV, using NRT.
5. Finding ways to rewarding self without cigarettes...



https://journals.lww.com/md-journal/fulltext/2024/07050/smoking_cessation_rate_and_predictors_of.69.aspx

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