



Smokeless Tobacco and other Non-Cigarette Products

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Objectives

- Review NCTP definitions & products
- Discuss prevalence/trends of NCTP
- Identify tools to assess dependence on smokeless tobacco products
- Discuss strategies for addressing this addiction, including pharmacotherapy and counseling

NCTP Definitions & Products



Pipes



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Cigars

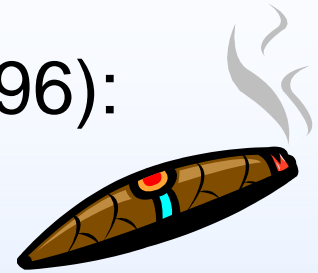


Images from www.trinketsandtrash.org

Cigar Definition

U.S. Department of Treasury (1996):

Cigar



“Any roll of tobacco wrapped in leaf tobacco or any substance containing tobacco.”

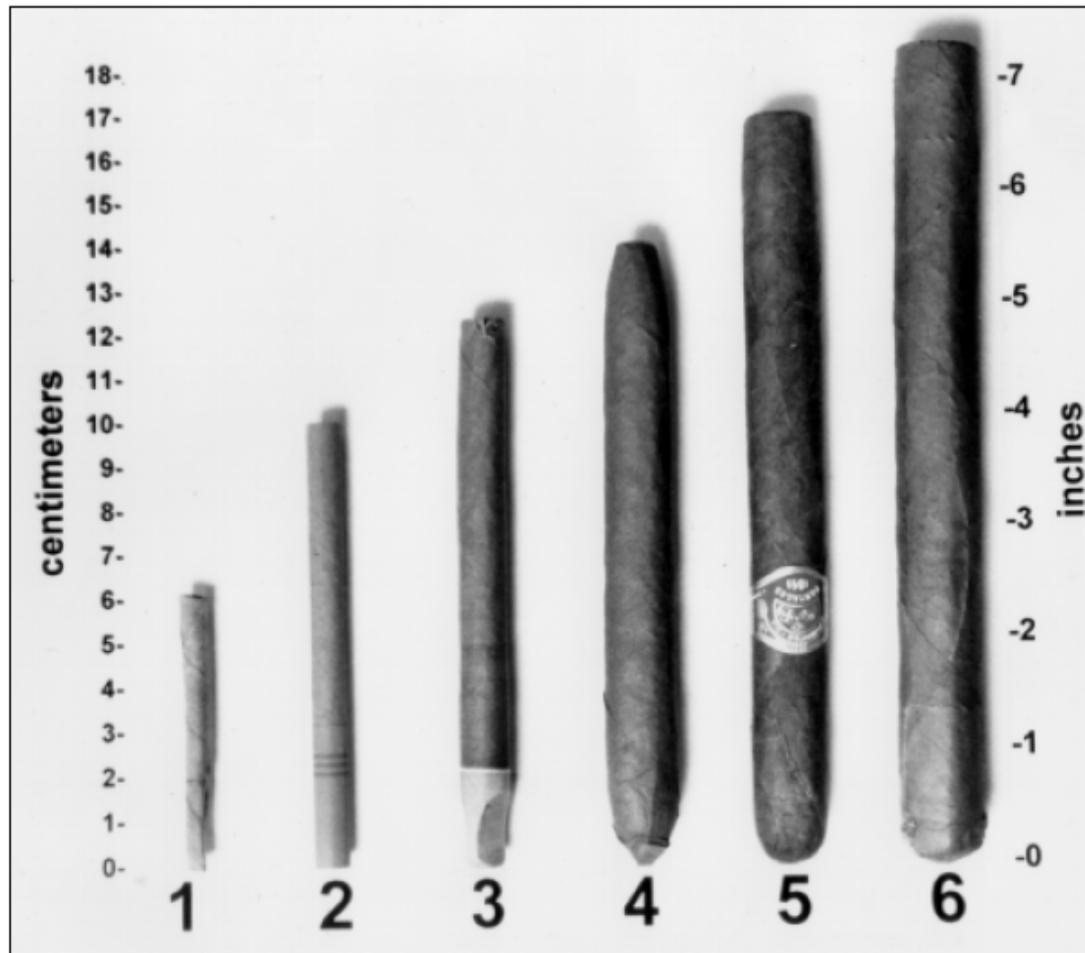
vs.

Cigarette

“Any roll of tobacco wrapped in paper or in any substance not containing tobacco.”

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Types of cigars on the U.S. Market in 1996: (1) bidi (imported from India), (2) little cigar with filter tip, (3) small cigar with plastic mouth piece, (4) regular cigar, (5) and (6) premium cigar.



NCI Monograph 9. Cigars: Health Effects and Trends.



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Smokeless Tobacco

Chewing tobacco

- Loose leaf (i.e., Redman)
- Plugs
- Twists



Snuff

- Moist (i.e., Copenhagen, Skoal)
- Dry (i.e., Honest, Honey bee, Navy, Square)

“Chewing Tobacco” = Cut tobacco leaves



“Snus” = Moist ground tobacco



Type of ST Used in U.S.



■ Chewing Tobacco

■ Snus

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National Survey on Drug Use and Health (NSDUH)

“Spitless Tobacco” – Star Scientific



Product Content

- Ariva = 1.5 mg nicotine/piece
 - Wintergreen
 - Java
- Stonewall = 4 mg nicotine/piece
 - Wintergreen
 - Natural
 - Java

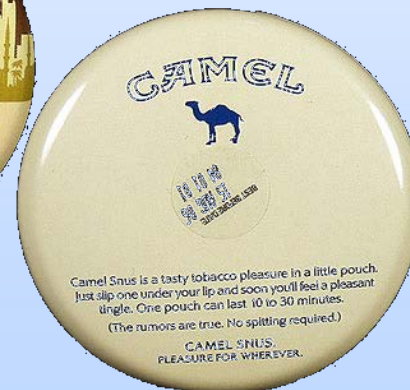


RJ Reynolds's



“Swedish Style” ST

RJReynolds



Phillip Morris (Altria)



“Fully Dissolvables”



Tobacco-less Nicotine Product - Altria

Package of 16
discs, each
containing
about 1.5
milligrams of
nicotine = \$3

Virginia test
market

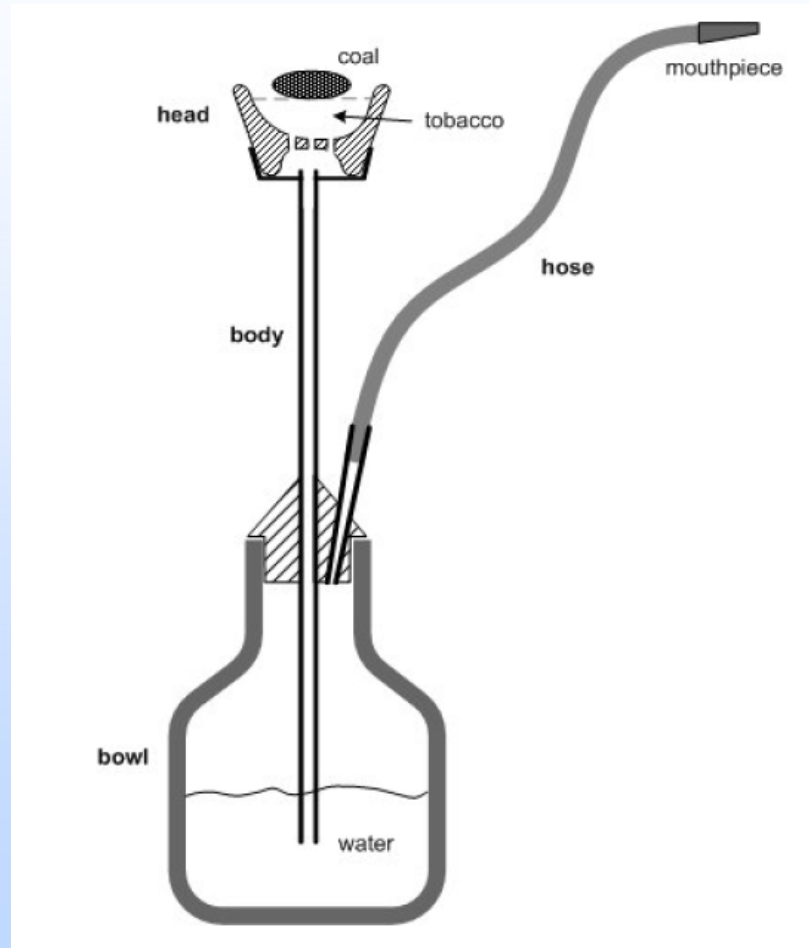


Waterpipe

- Use dates back 4 centuries in Asia & Africa
- Typically consumed socially with friends and family
- Becoming trendy in US among youth
- Hookah “cafes” gaining popularity
- Smoke described as smoother and more flavorful
- Often (mis)perceived as healthier alternative due to water filtration, cooler mouth feel, and reduced irritation



Anatomy of a Waterpipe



Types of Waterpipe Tobacco

- **Maasel/Mu'essel**
Combination of tobacco and molasses, honey or fruit
- **Tumbak/Ajami**
Dark tobacco paste
- **Jurak**
Combination of tobacco and fruits, oils, honey or molasses. May be flavored or flavorless
- Moist tobacco → requires charcoal to keep burning



Hookah tobacco



Charcoal

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Source: Knishkowsky & Amitai. (2005). Pediatrics, 116, e113-e119.



ENDS:

Electronic Nicotine Delivery Systems

aka

“E-cigarettes”



ENDS

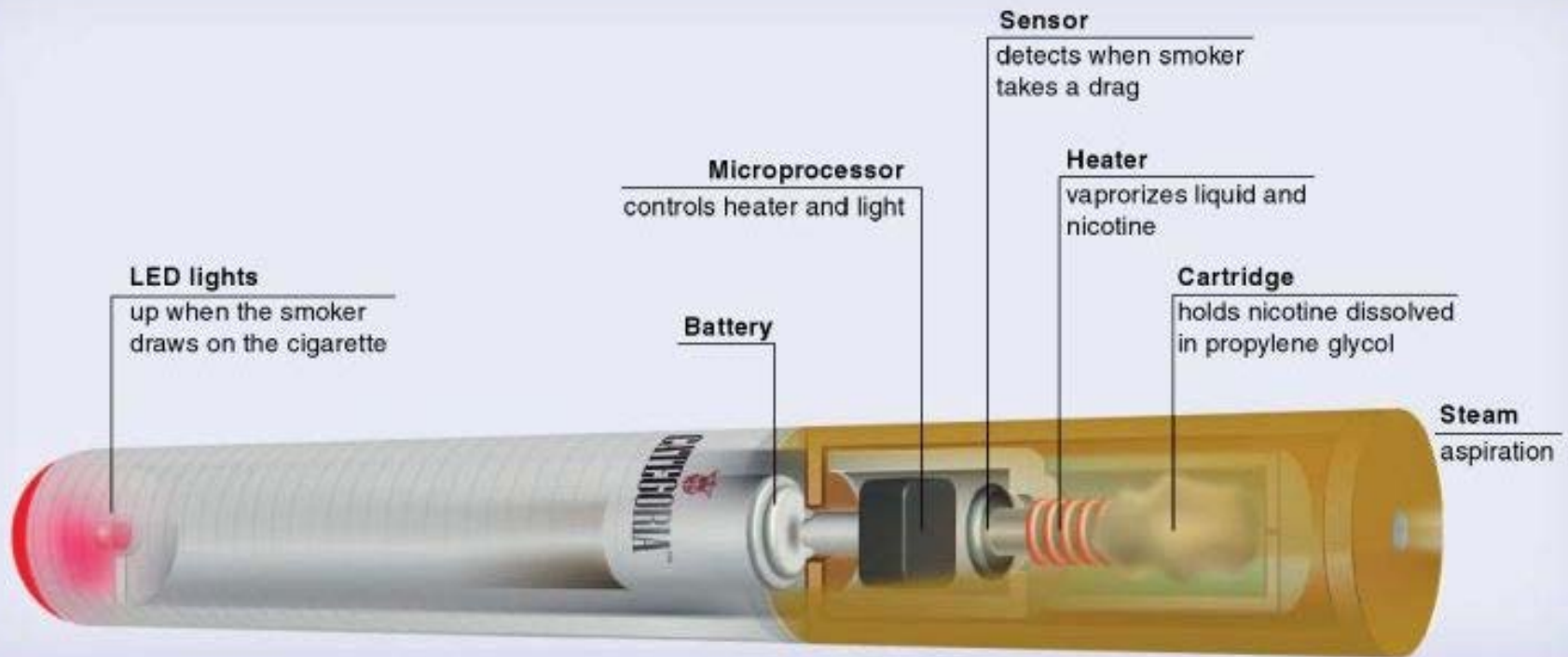
A battery-powered device that provides inhaled doses of vaporized nicotine solution. It is used as an alternative to smoked tobacco products, such as cigarettes, cigars, or pipes.

“Vaping”



ENDS: Basic Structure

Medscape



Source: Expert Rev Resp Med © 2012 Expert Reviews Ltd

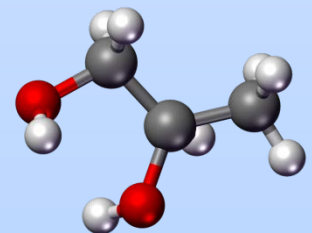




ENDS – Liquid Solution Composition

Substance	Recipe 1	Recipe 2	Recipe 3	Recipe 4	Recipe 5
Propylene glycol	85%	80%	90%	80%	<65%
Nicotine	6%	4%	2%	0.1%	<3%
Glycerol	2%	5%	-	5%	<20%
Tobacco essence	-	4%	4.5%	1%	<5%
Essence	2%	-	1%	1%	<5%
Organic acid	1%	-	-	2%	<1%

Propylene glycol: pharmaceutical solvent, food additive, moisturizer (cosmetics & toothpaste), hand sanitizer, non-toxic antifreeze, deodorants, aircraft de-icer.



“E-Juice” or “Smoke Juice”

- Total nicotine = 720 mg
- Lethal nicotine dose =
- 40–60 mg (0.5-1.0 mg/kg)





PREV

Totally Wicked 30ML

NEXT



Propylene glycol

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Made in the heartland of Wisconsin and shipped to your doorstep

The finest liquid for any e-cigarette is

America's Smoke Juice™

Enter keywords

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[Winter Storm Causing Delays-2/9/10](#)

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Vegetable glycerine



SWISS DARK - One of six amazing new flavors

RED OAK™

A PG-Free Smoke Juice From Johnson Creek

Vapor so intense,
You can skip the chocolates.

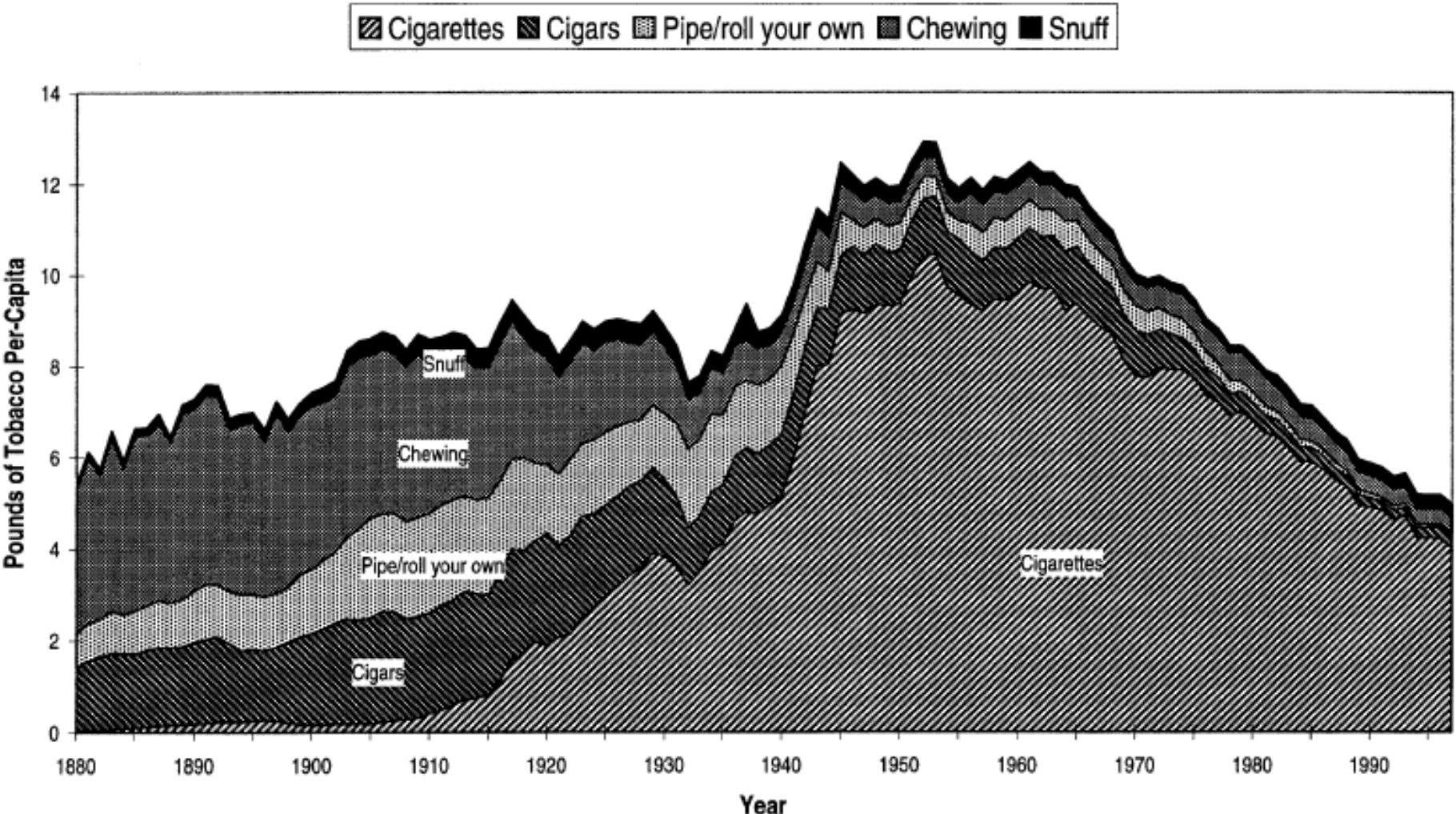




NCTP: Trends & Prevalence

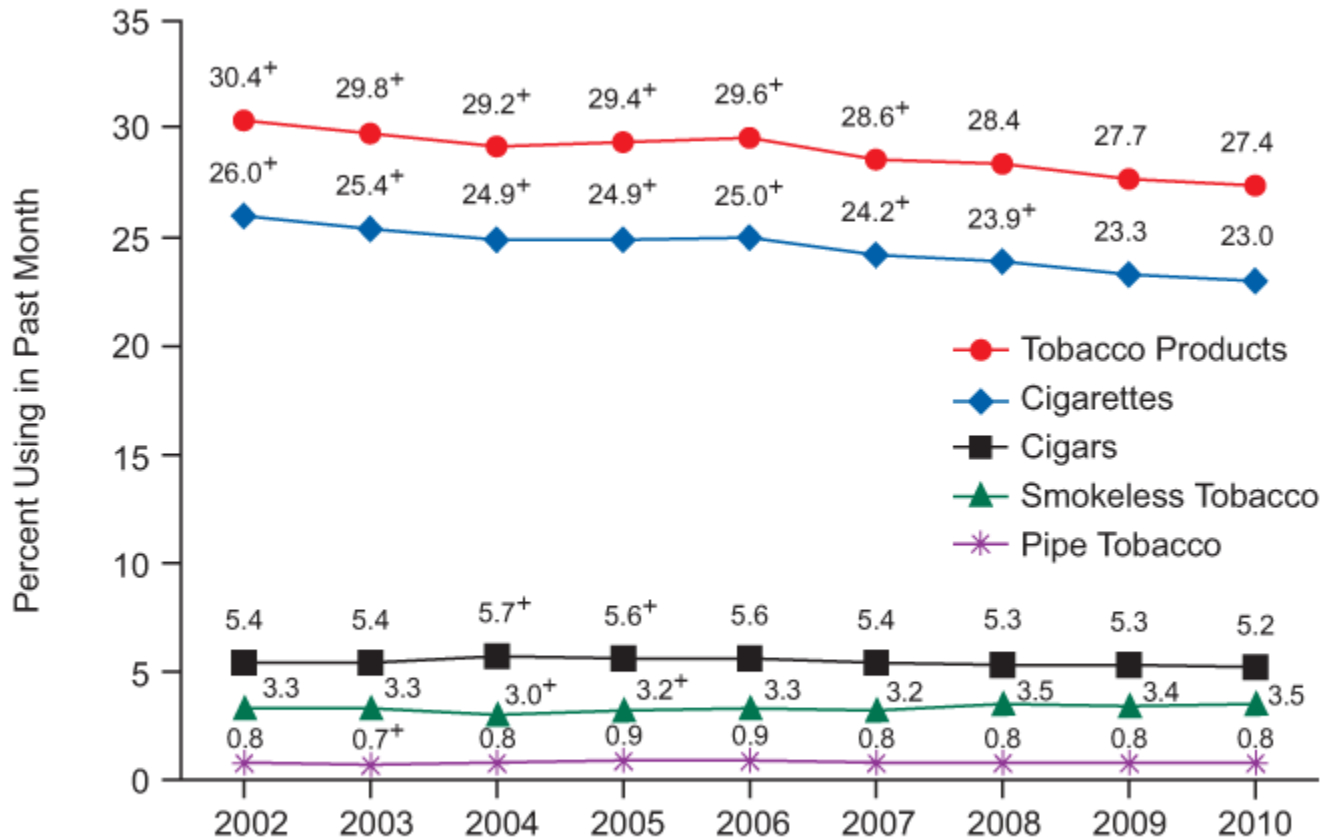


Per-capita consumption of different forms of tobacco in the US 1880-1997



NCI Monograph 9. Cigars: Health Effects and Trends.

Past Month Tobacco Use among Persons Aged 12 or Older

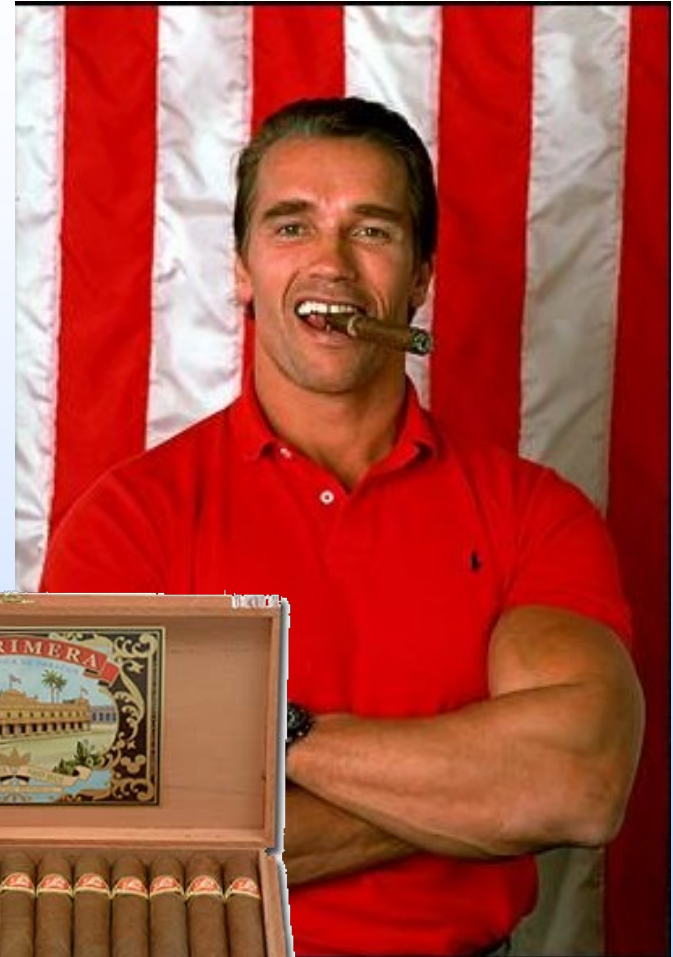


estimate is statistically significant at the .05 level.





Cigar Smoking



Total U.S. cigar consumption 1880-1997 and significant events in the use of cigars

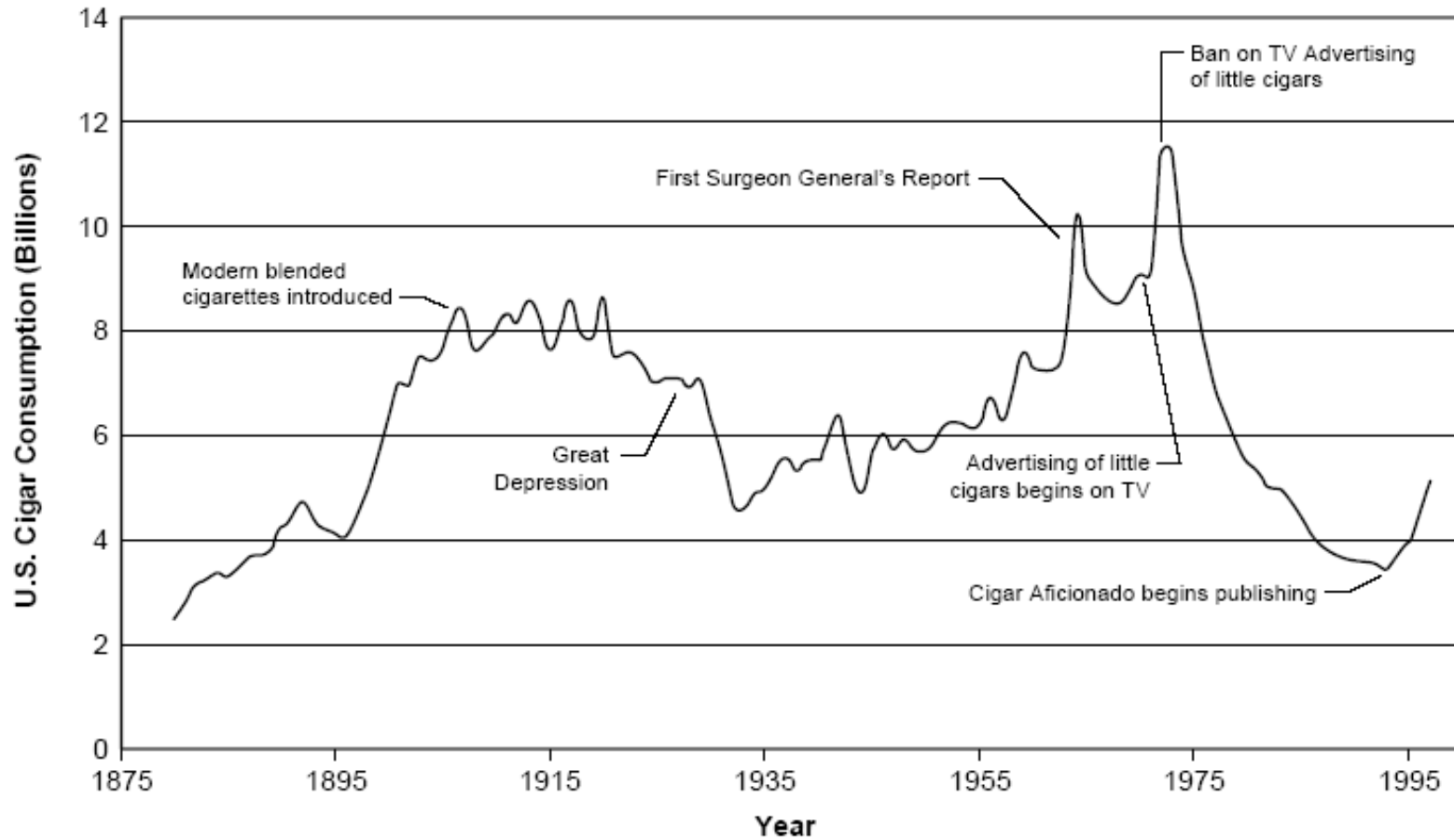
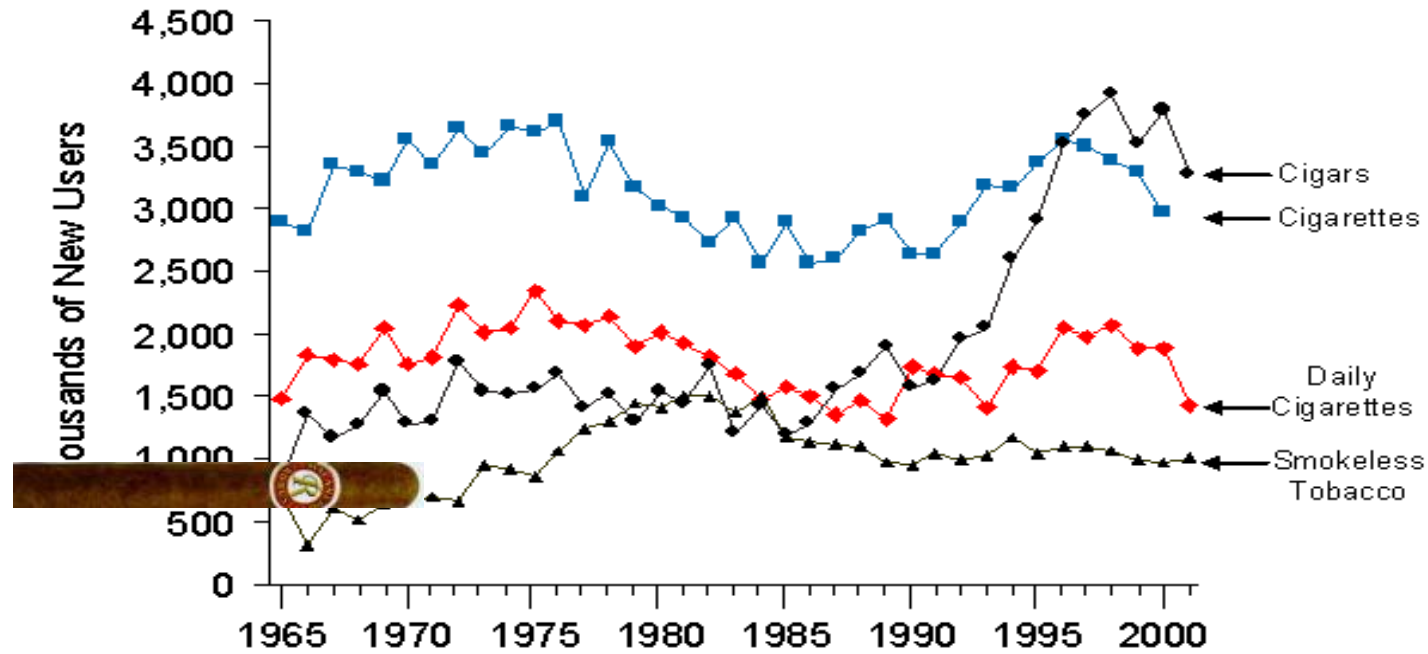


Figure 6.4 Annual Numbers of New Users of Tobacco: 1965–2001

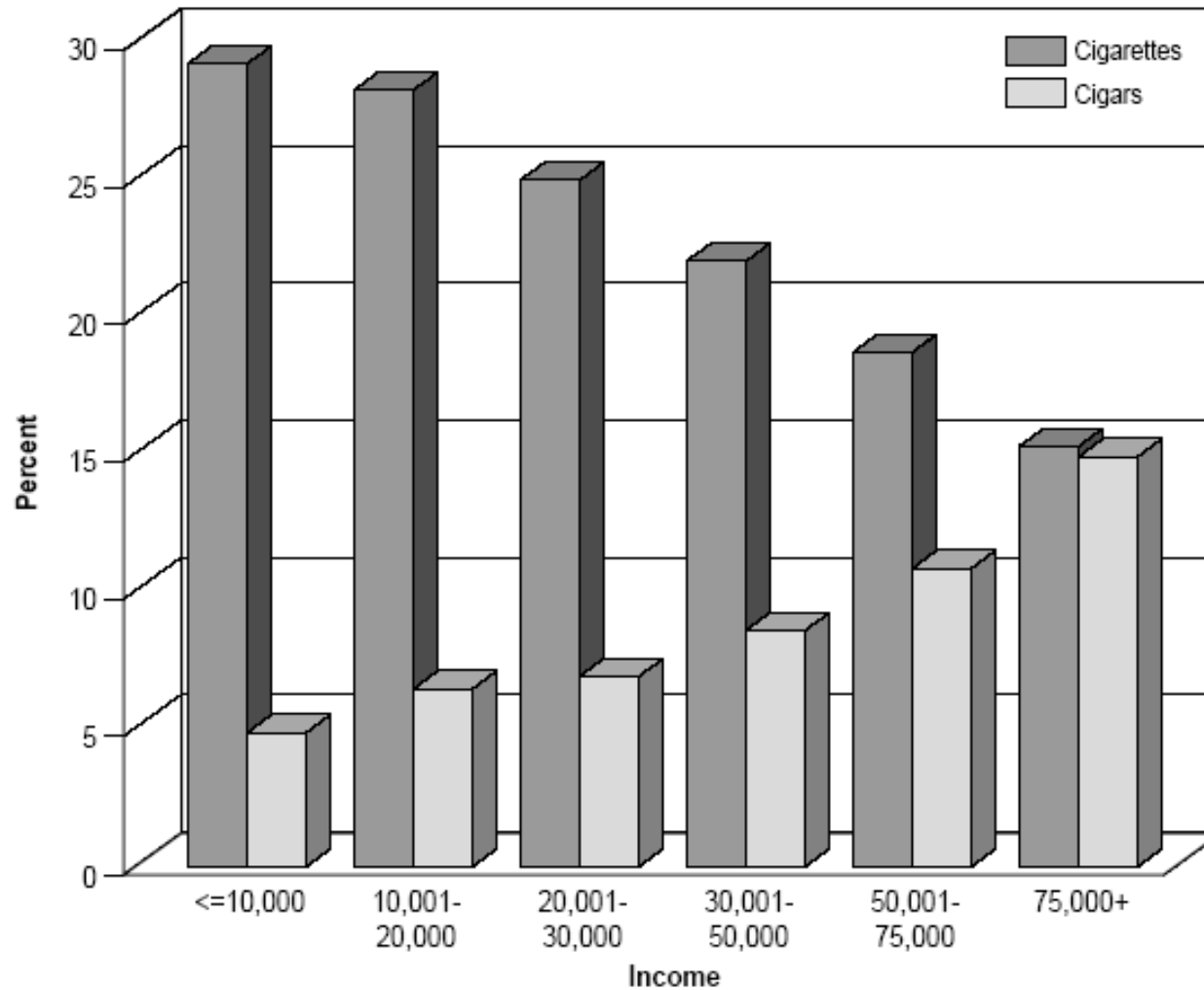


< 18 years of age group constituted an increasingly greater proportion of the number of new cigar smokers:

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SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2002.
The Monitoring the Future Study, University of Michigan, 2001 and 2002.

Prevalence of current cigarette and cigar smoking among California males of different incomes, 1996



NCI Monograph 9. Cigars: Health Effects and Trends.

SAMSHA

Percentages of Persons Aged 12 or Older Using Smokeless Tobacco in the Past Month, by Demographic and Geographic Characteristics: 2002 to 2007



Demographic and Geographic Characteristic	Past Month
Age Group in Years	
12 to 17	2.2%
18 to 25	5.0%
26 or Older	3.0%
Gender	
Male	6.2%
Female	0.4%
Race/Ethnicity	
White	4.1%
Black or African American	1.4%
American Indian or Alaska Native	7.1%
Native Hawaiian or Other Pacific Islander	2.9%
Asian	0.6%
Hispanic or Latino	0.9%
Two or More Races	2.9%
County Type	
Large Metropolitan	1.9%
Small Metropolitan	3.7%
250,000 to 1 Million Population	3.2%
<250,000 Population	4.7%
Non-Metropolitan	6.6%
Urbanized	5.5%
Less Urbanized	7.1%
Completely Rural	8.4%
Region	
Northeast	1.7%
Midwest	3.7%
South	4.2%
West	2.4%

Waterpipe

- After cigarettes, waterpipe use is the most common form of tobacco use among university students
- Predominantly young, males
- 30% ever use & 8.4% current use
- Used in a social context
 - More common in fraternities/sororities
- Most smoked < 2 years
 - 10% daily
- Most perceive less addictive and harmful
 - 67% said “cigarettes more harmful”



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Ward KD, et al. *Nicotine Tob Res.* 2007 Dec;9(12):1339-46.

Primack BA, et al. *Nicotine Tob Res.* 2012 May 28.

Odds of Trying Waterpipe, Snus, or ENDDs (n = 3158)

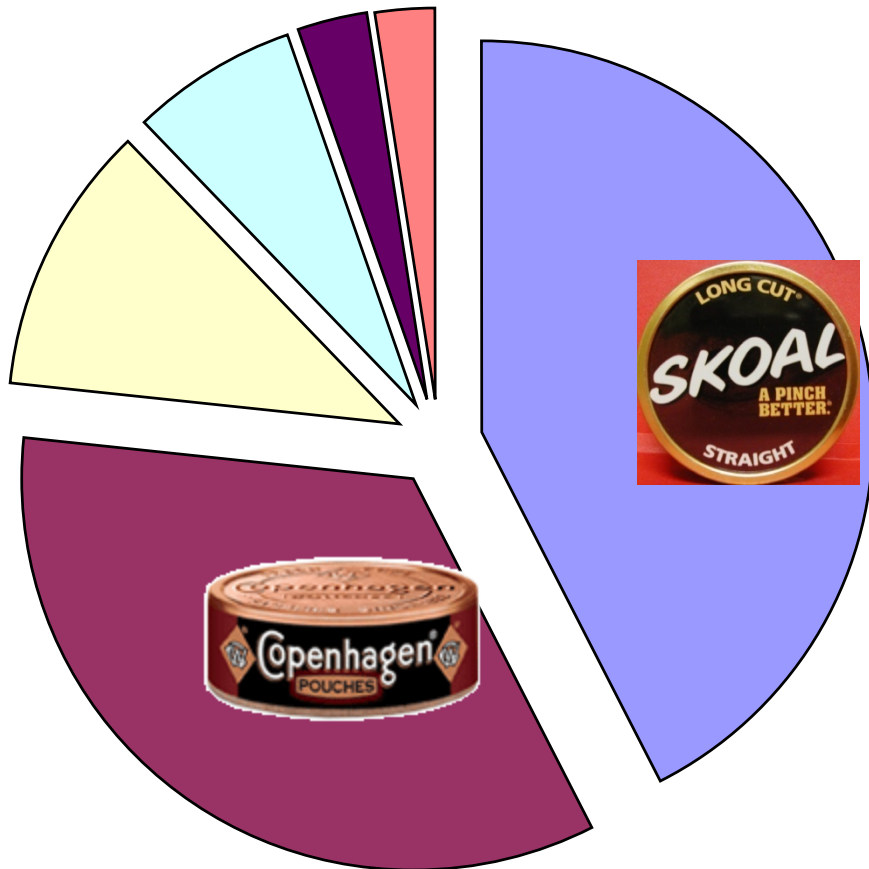
Predictors	Have tried one of these products adjusted OR (95% confidence interval)
Smoking status	
Former smoker	2.71 (2.06, 3.56)
Nondaily smoker	6.13 (4.02, 9.33)
Daily smoker	5.53 (4.03, 7.58)
Region	
Northeast	1.68 (1.16, 2.42)
Midwest	1.65 (1.20, 2.28)
West	1.80 (1.36, 2.39)
Age	
18–24	2.18 (1.60, 2.97)
Sex	
Males	3.51 (2.77, 4.45)
Education	
High school	1.58 (.99, 2.51)
Some college	2.67 (1.69, 4.22)
College degree	2.04 (1.26, 3.30)

Model also included race, not significant. Reference groups were as follows: never smokers, south region, 25 years of age and older, females, and no high school degree.

*Lifetime Use

McMillen R, et al. Use of emerging tobacco products in the United States. *J Environ Public Health*. 2012;2012:989474.

Preferred Snus Products



- Skoal
- Copenhagen
- Kodiak
- Timber Wolf
- Red Seal
- Grizzly



National Survey on Drug Use and Health

E-Cigarettes





Leader of the Pack

blu ELECTRONIC CIGARETTE

Leaders know freedom never goes out of style. Control when and where you want to smoke with blu electronic cigarettes. blu produces no smoke and no ash, only vapor, making it the ultimate gadget and the smarter alternative to regular cigarettes.

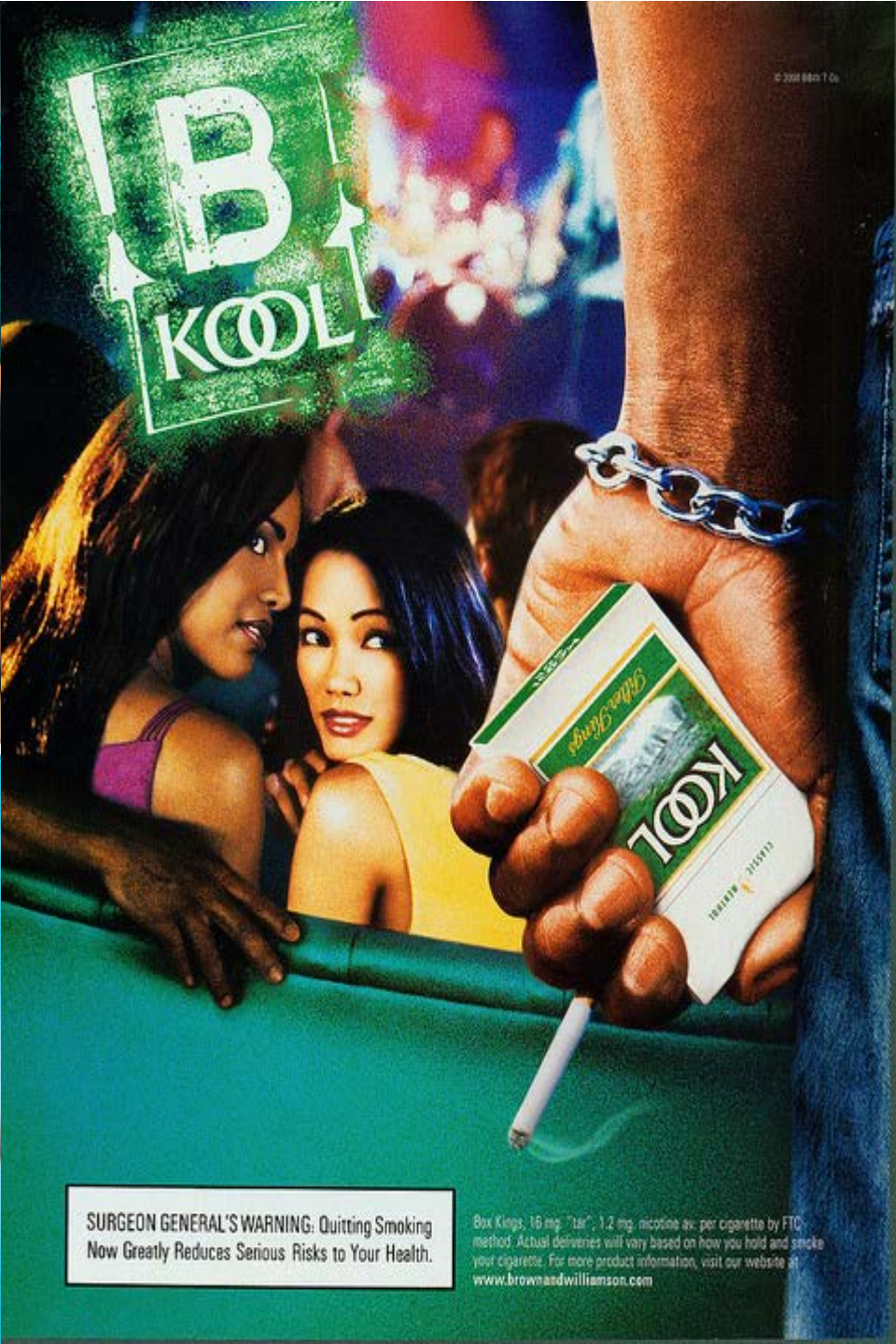
blucigs.com



New blu Smart Pack

Available Now at:

18+ only. CALIFORNIA PROPOSITION 65 Warnings: This product contains nicotine, a chemical known to the state of California to cause birth defects or other reproductive harm.

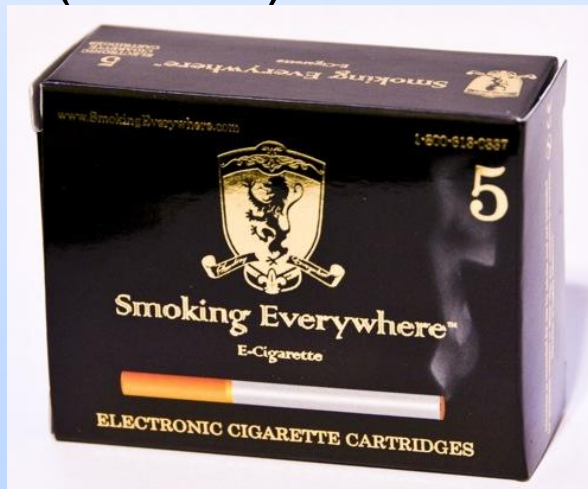


SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.

Box Kings, 16 mg. "tar", 1.2 mg. nicotine av. per cigarette by FTC method. Actual deliveries will vary based on how you hold and smoke your cigarette. For more product information, visit our website at www.brownandwilliamson.com



- In 2009, FDA's Center for Drug Evaluation, Division of Pharmaceutical Analysis (DPA) analyzed:
 - 2 samples of electronic cigarettes & components from two leading brands
 - 18 of the flavored, nicotine, and no-nicotine cartridges
 - Nicotine inhaler (control)







- DPA's analysis:
 - Diethylene glycol in one cartridge @ 1%
 - Ingredient used in antifreeze & toxic to humans
 - Tobacco-specific nitrosamines (TSNA's) in 1/2 of samples
 - Human carcinogen
 - Tobacco-specific impurities detected in a majority of the samples tested
 - May be harmful to humans





- E-cigarette cartridges labeled as “no nicotine”
 - Low levels of nicotine present in all cartridges tested, except one.
- 3 different E-cigarette cartridges
 - Same label
 - Markedly different amount of nicotine with each puff.
 - Range: from 26.8 to 43.2 mcg nicotine/100 mL puff
- One high-nicotine cartridge delivered 2 x as much nicotine as the nicotine inhaler



Health Effects of ENDS

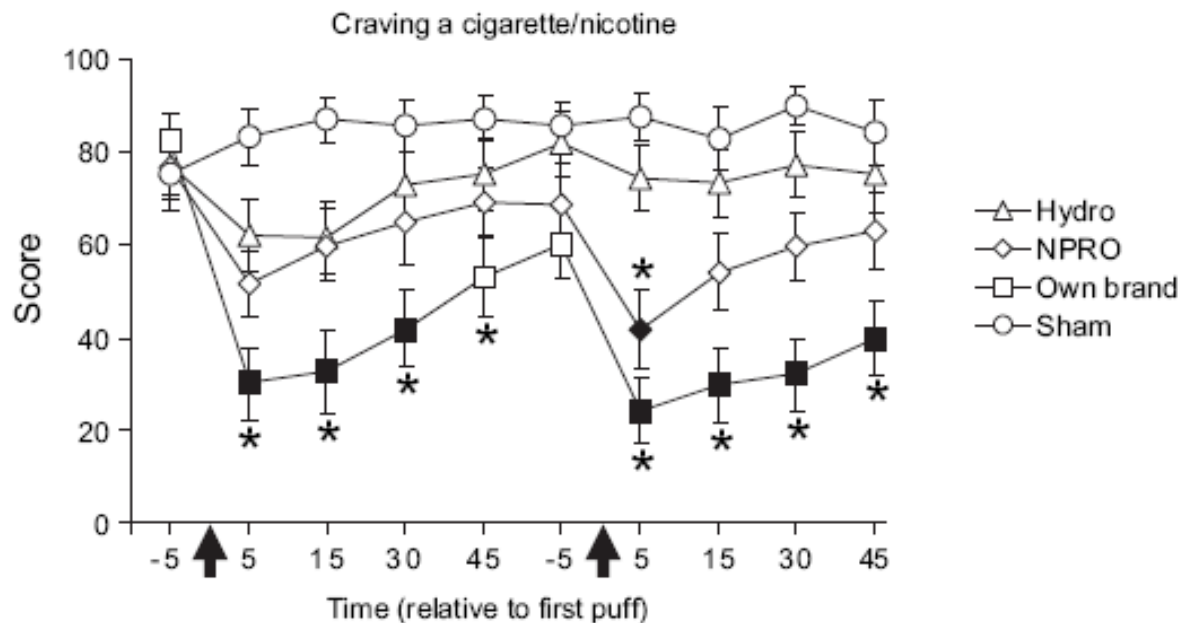
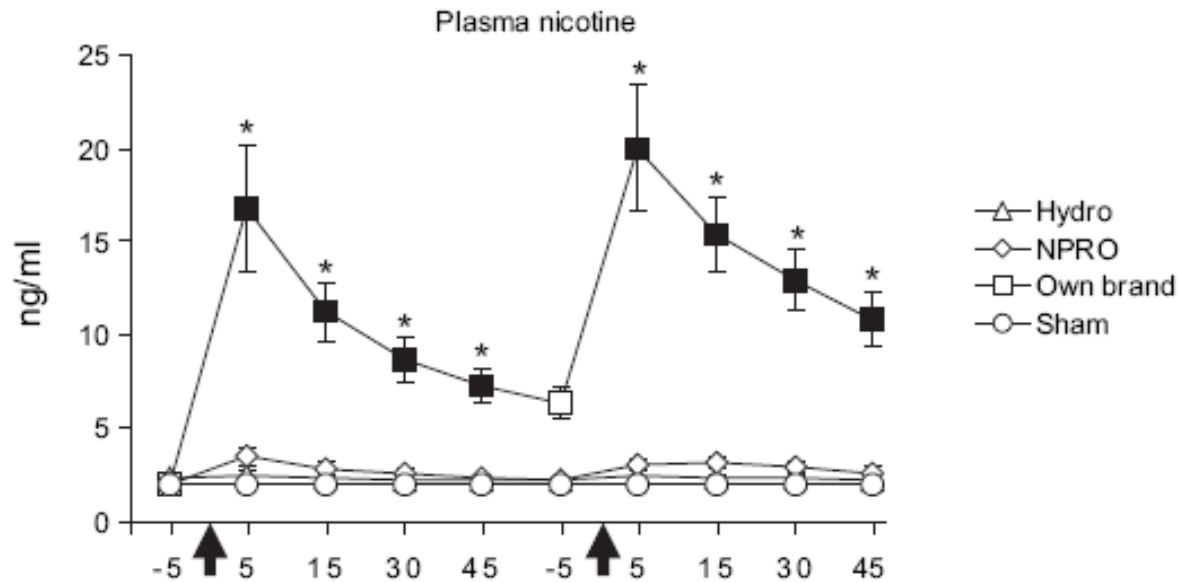
- Research limited
 - Short-term and long-term
- Two unpublished studies analyzing short-term effects
 - Significant increases in airway resistance within 5-10 minutes of E-cigarette use
 - Found in both non-smokers and daily smokers

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Gennimata SA, Palamidas A, Kaltsakas G, et al. Acute effect of e-cigarette on pulmonary function in healthy subjects and smokers. Presented at the European Respiratory Society's Annual Congress. September 2 2012

Vardavas et. al (2011). Acute pulmonary effects of using an e-cigarette: impact on respiratory flow resistance, impedance, and exhaled nitric oxide. *Chest*; Prepublished online. DOI 10.1378/chest.11-2443

Crown 7 Hydro



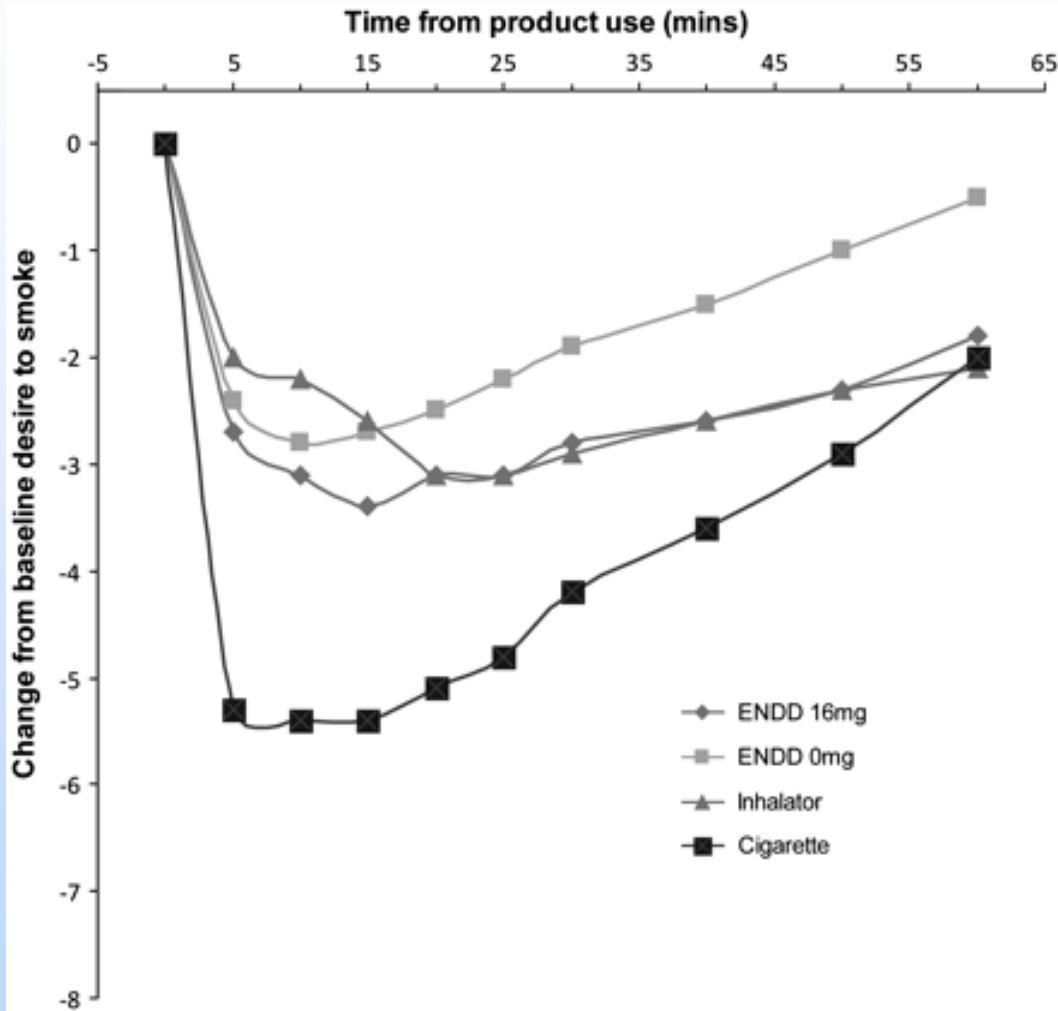
Njoy NPRO



Eissenberg T. Tob Control. 2010 Feb;19(1):87-8..

ENDS: Effect on desire to smoke

Bullen C, et al. *Tob Control* 2010;19:98-103 doi:10.1136/tc.2009.031567



40 participants were randomised to use ENDS containing 16 mg nicotine, 0 mg nicotine, nicotine inhaler or usual cigarette on each of four study days 3 days apart, with overnight smoking abstinence before use of each product.

January, 2010


Judge Orders F.D.A. to Stop Blocking Imports of E-Cigarettes From China

By DUFF WILSON

Published: January 14, 2010

A federal judge on Thursday ordered the [Food and Drug Administration](#) to stop blocking the importation of electronic [cigarettes](#) from China and indicated that the devices should be regulated as tobacco products rather than drug or medical devices.

SIGN IN TO RECOMMEND

 TWITTER

SIGN IN TO E-MAIL

 PRINT

- Appeal denied April 2011... FDA will not pursue further
- E-Cigarette regulated as tobacco product, not a drug
- FDA expected to offer further guidance in 2013

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Big Tobacco Entering ENDS Market

- Lorillard purchases Blu Cigs - April 2012
- Reynolds American testing an electronic cigarette called Vuse
- Philip Morris has been in negotiations with Ruyan Group
 - Manufacturer of the original *e-cigarette*

ENDS Summary

- ENDS- “e-cigarettes”- electronic nicotine delivery systems
- Deliver nicotine solution by heating and vaporizing for inhalation
- Safety concerns have been raised
- No evidence to support use as a treatment to help smokers stop smoking
- Legal status in the US– regulated as tobacco
 - FDA yet to reveal regulations



Health Impact of NCTP



Adjusted relative risk* (95% CI) of death

Sustainer = No switching

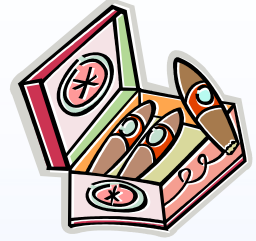


Deaths from	'Sustainers'		
	Never smoked	Pipe only	Cigarettes only
Men (n=16 932 aged 20–49 years)			
All causes	1.00	1.99 (1.73 to 2.27)	2.44 (2.27 to 2.62)
Ischaemic heart disease	1.00	3.07 (2.35 to 4.00)	3.17 (2.69 to 3.73)
Stroke	1.00	1.54 (0.84 to 2.82)	2.30 (1.71 to 3.11)
Cardiovascular disease	1.00	2.49 (1.99 to 3.10)	2.81 (2.48 to 3.20)
Lung cancer	1.00	10.32 (5.55 to 19.18)	16.78 (10.31 to 27.33)
Other smoking related cancer	1.00	1.47 (0.99 to 2.18)	1.95 (1.59 to 2.38)

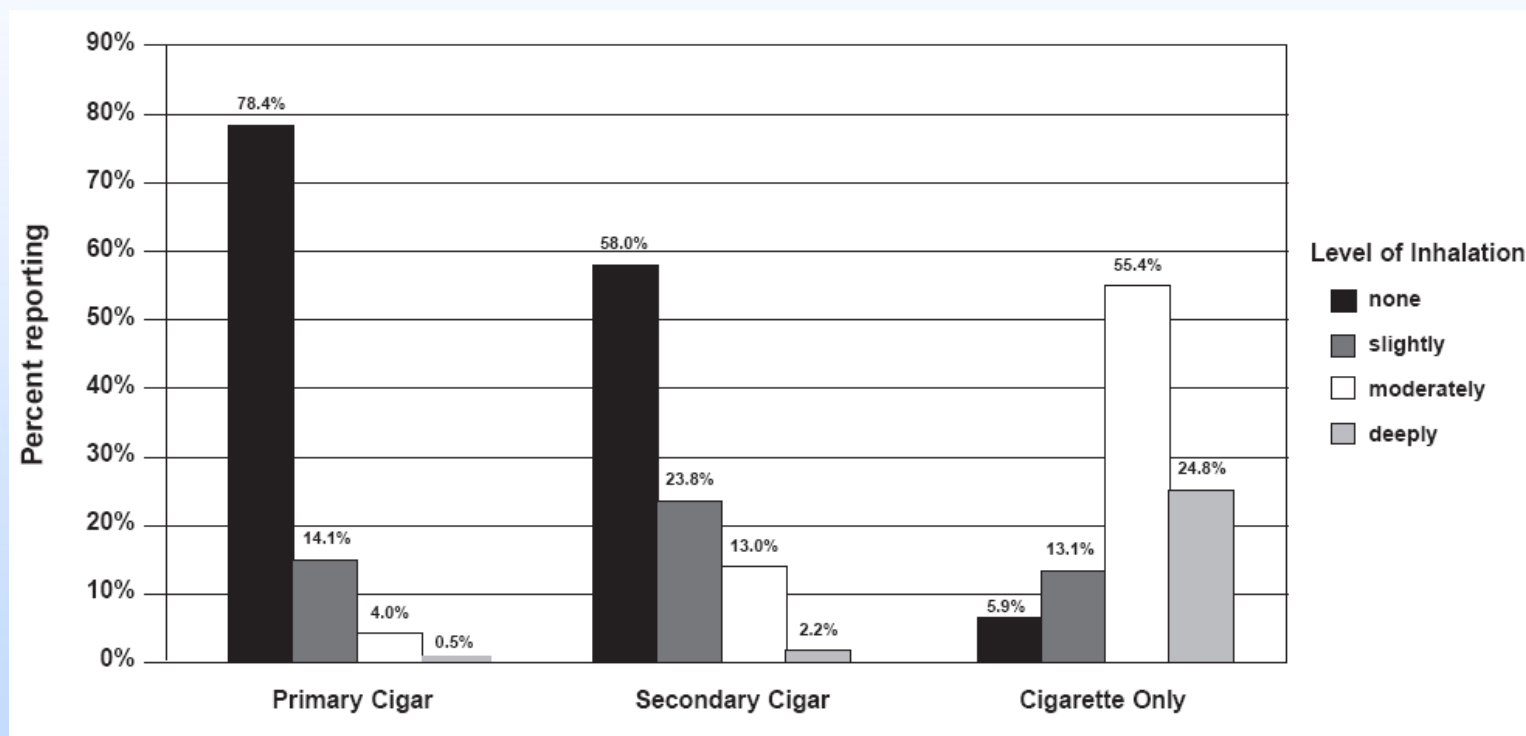
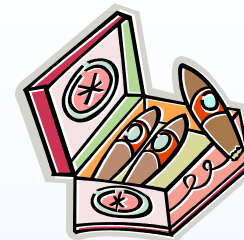
Tverdal et al. Tob Control 2011;20 123-130

Disease Risks

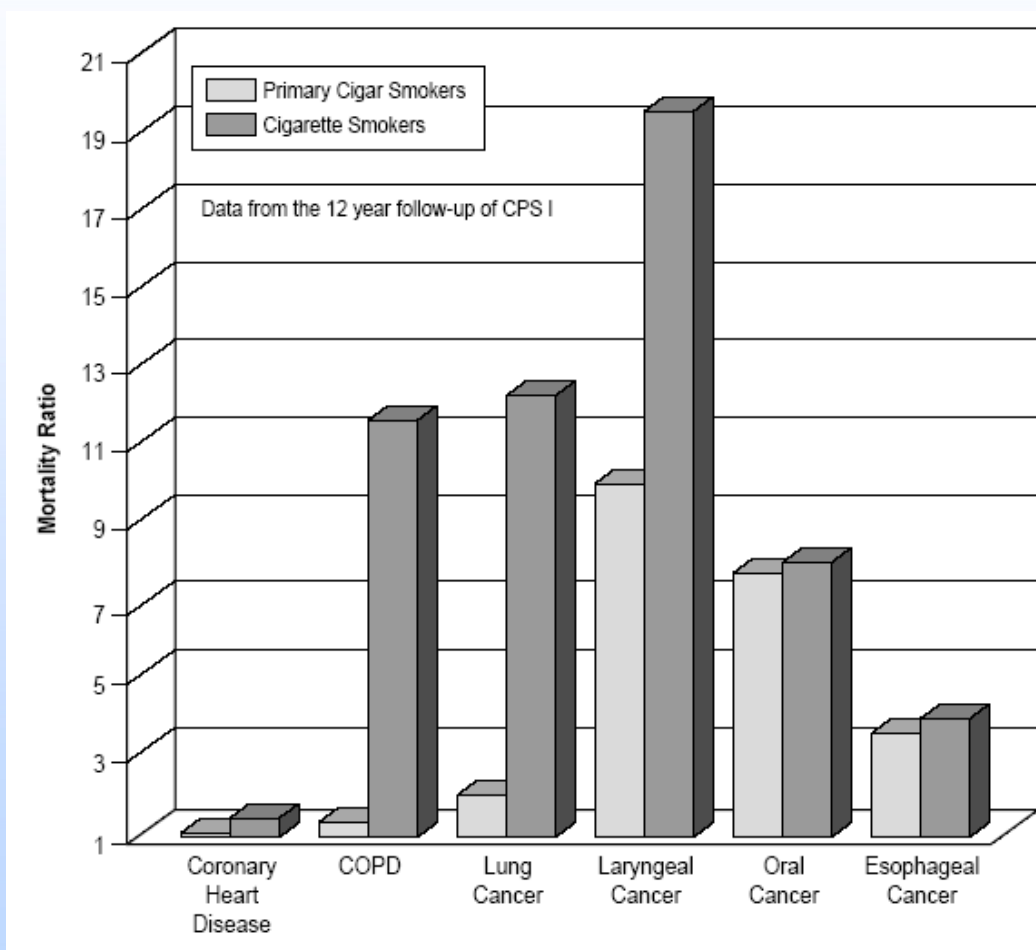
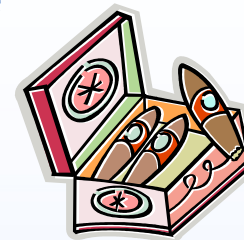
- Tar of cigar is more carcinogenic than cigarette smoke tar
- Morbidity and mortality correlates with:
 - +/- inhalation
 - depth of inhalation
 - number of cigars they smoke



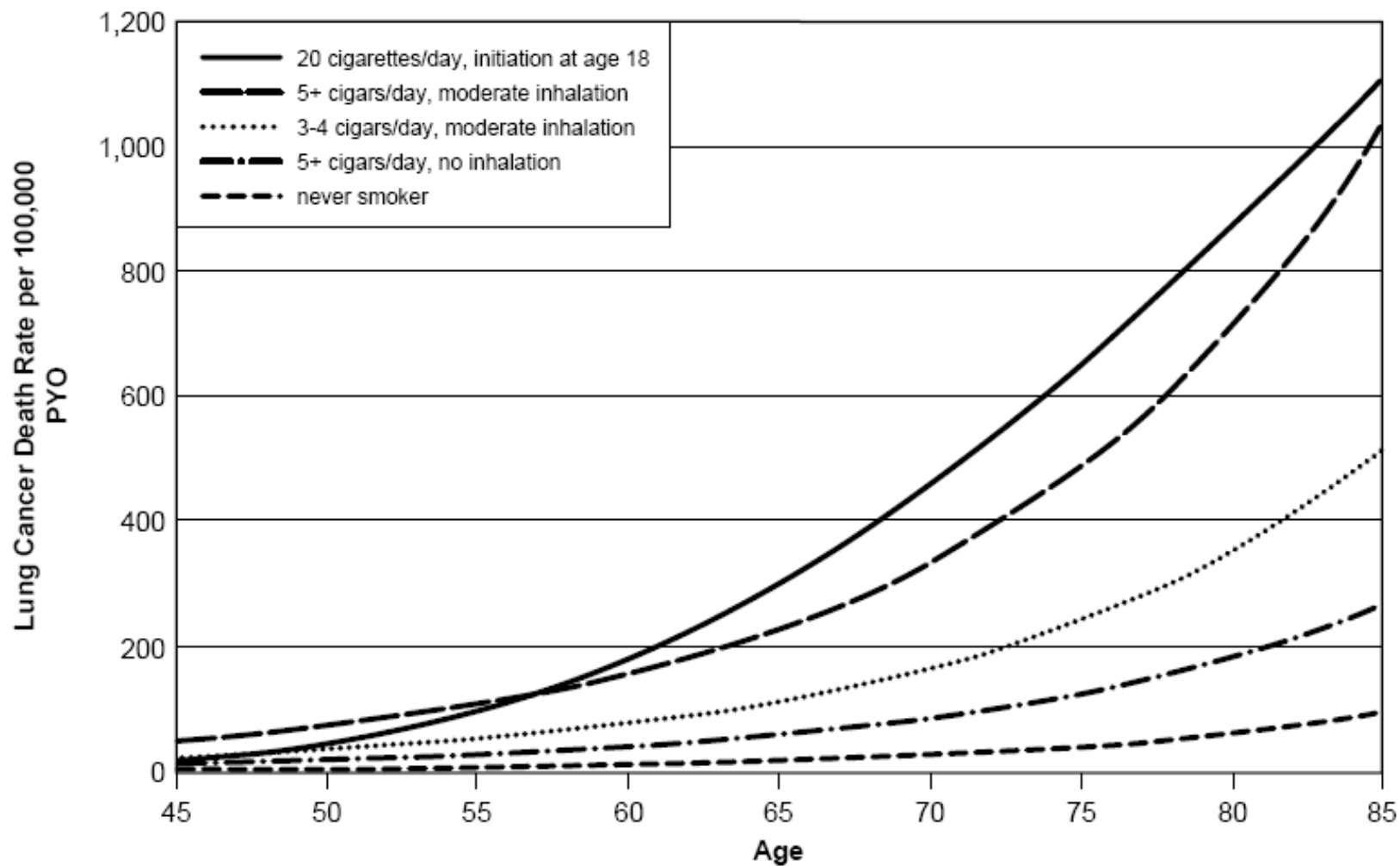
Levels of Inhalation, CPS-1 Study



Mortality Ratios for Cigar & Cigarette Smokers vs. Never Smokers



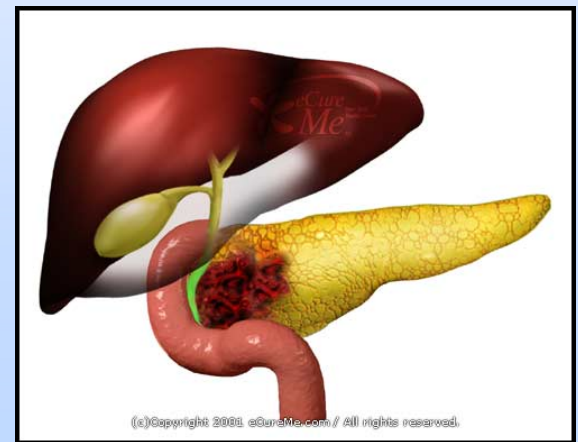
Lung cancer death rates for cigar smokers with different patterns of inhalation and number of cigars per day compared with one pack per day cigarette smokers



NCI Monograph 9. Cigars: Health Effects and Trends.

Cigar Smoking – Pancreatic Cancer Risk

- Compared with never tobacco users, cigar-only smokers have an increased risk for pancreatic cancer
 - OR 1.6 (95% CI: 1.2-2.3)
- Comparable to that of cigarette-only smokers
 - OR 1.5 (95% CI 1.4-1.6)



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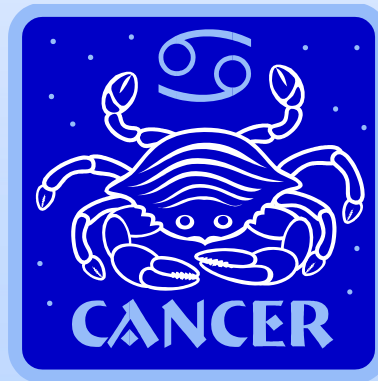
Bertuccio P, et al Ann Oncol. 2011 Jan 18. PubMed PMID: 21245160.

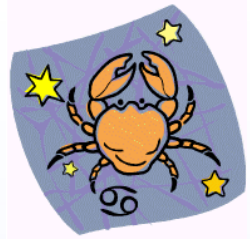
ST – Health Consequences

Report on Carcinogens, 10th Edition, National
Toxicology Program, USDHHS

Smokeless tobacco

“Known to be a human carcinogen”





28 Known Carcinogens in ST

- Including.....
- β -Angelica lactone
- Coumarin
- Ethyl carbamate (urethane)
- Formaldehyde
- Acetaldehyde
- Crotonaldehyde
- Smokeless tobacco and Some Tobacco-specific N-Nitrosamines. IARC Working Group on the Evaluation of Carcinogenic Risks to Humans (2004)
- Tobacco-specific N-nitrosamines (TSNA)
 - N'-Nitrosonornicotine (NNN)
 - 4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK)
 - 4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL)
 - N'-Nitrosoanabasine (NAB)
- Arsenic
- Nickel compounds
- Polonium-210
- Uranium-235
- Uranium-238

Health Effects: Cancers – U.S. Data

Location	OR (95% CI)
Cancer, Mouth and Gum	11.2 (4.1-30.7) ^A
Gum & Buccal Mucosa	4.2 (2.6-6.7) ^B
Larynx	7.3 (2.9-18.3) ^A
Salivary gland	5.3 (1.2-23.4) ^A
Kidney	4.0 (1.2-12.9) ^C
Pancreatic	3.6 (1.0-12.8) ^D

A - Stockwell HG, et al. Head Neck Surg. 1986 Nov-Dec;9(2):104-10.

B - Winn DM, et al. N Engl J Med. 1981 Mar;26;304(13):745-9.

C - Goodman MT, et al. Am J Epidemiol. 1986 Dec;124(6):926-41.

D - Muscat JE, et al. Cancer Epidemiol Biomarkers Prev. 1997 Jan; 6(1):15-9.



ST Health Effects: CV Disease



CPS-II



- **Current ST use vs. never* associated with death from:
 - All causes: HR 1.18 (95% CI: 1.08-1.29)
 - CHD: HR 1.26 (95% CI: 1.08-1.47)
 - Cerebrovascular dz: HR 1.40 (95% CI: 1.10-1.79)
- No difference between snuff and chewing tobacco
- Former use did increase the risk of death in any category

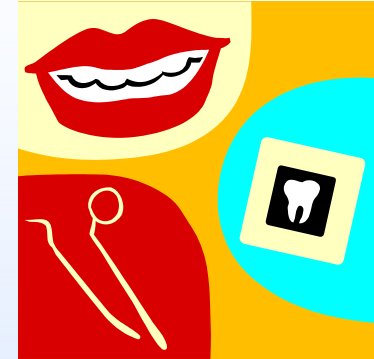
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*Multivariate-adjusted

Henley et al., Canc Cause Control. 2005; 16: 347-358.

ST – Oral Lesions

- Leukoplakia
- Oral cancer
- Dental disease
 - erosion of enamel
 - dental caries
- Periodontal Disease
 - gingival recession
 - soft tissue/hard tissue loss
 - gingivitis



Waterpipe – Health Effects

- 1-hour session involves inhaling 100-200 times volume of smoke from a single cigarette
- Smoke contains CO, heavy metals, and carcinogens
- Charcoal added to keep tobacco burning increases health risks
- Sharing = tuberculosis & hepatitis

WHO. TobReg Advisory Note. Waterpipe Tobacco Smoking

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Google: “who tobreg water pipe”



Waterpipe vs. Cigarette

- Directly compare waterpipe use & cigarette smoking
- 31 participants reporting monthly waterpipe use & weekly cigarette smoking
- Cross-over: 45 minutes with waterpipe (WP) and 1 cigarette
- CO (carbon monoxide): 23.9 ppm WP vs. 2.7 C
- COHb (carboxyhemoglobin): 3.9% WP vs. 1.3% C
- Puff volume: 48.6 L WP vs. 1.0 L C
- Peak nicotine levels were comparable
 - 1.7 times the nicotine exposure²²



Eissenberg T, et al. American journal of preventive medicine. 2009 Dec;37(6):518-23.

Disease Risks

- Burning charcoal is normally placed atop the tobacco to smoke the narghile waterpipe
- Waterpipe smokers thus also inhale large quantities of combustion-generated toxicants



Waterpipe – Health Effects



Single narghile smoking session:

- 50 times the quantities of carcinogens as one cigarette^A
- Many times the formaldehyde, acetaldehyde and acrolein typically found in a cigarette^B
- 2.25 mg nicotine^C
- 242 mg nicotine-free dry particulate matter (NFDPM)^C
- Higher levels of arsenic, chromium and lead than a cigarette^C

A - Sepetdjian E, et al. Food Chem Toxicol. 2008 May;46(5):1582-90.

B - Al Rashidi et al. Volatile aldehydes in the mainstream smoke of the narghile waterpipe. Food Chem Toxicol. 2008 Nov;46(11):3546-9.

C - Shihadeh A. Investigation of mainstream smoke aerosol of the argileh water pipe. Food Chem Toxicol. 2003 Jan;41(1):143-52.

Waterpipe

- Waterpipe tobacco smoking negatively affects lung function
 - Significant reduction in FEV1 compared to no smoking (4% lower FEV1)
 - Trend toward lower FVC (1.38% lower FVC) compared to no smoking
 - No statistically significant difference in FEV(1), FVC, and FEV(1)/FVC compared to cigarette smoking
- May be as harmful as cigarette smoking
- Likely to be a cause of COPD

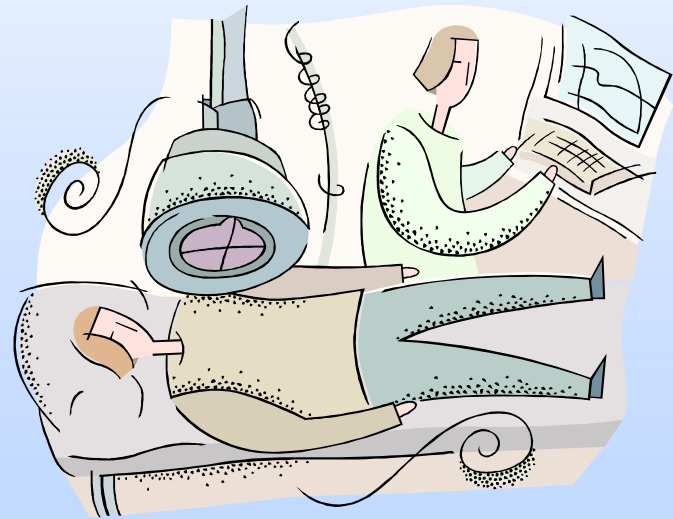


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Raad D, et al. Chest. 2010 Jul 29. PubMed PMID: 20671057.

Waterpipe

- Literature review
 - Cohort, case-control and cross-sectional studies
- Increased risk for
 - Lung cancer
 - Respiratory illness
 - Low birth-weight
 - Periodontal disease



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Warnakulasuriya S. Evid Based Dent. 2011;12(2):44-5. PubMed PMID: 21701545.

MAYO
CLINIC

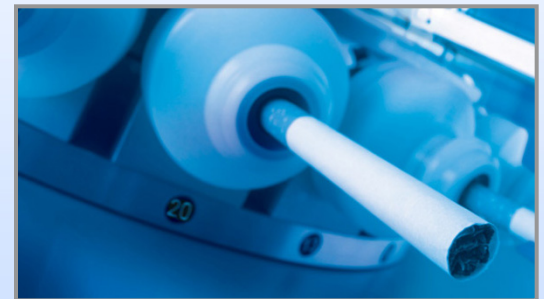


Pharmacology



NCTP Bioavailability of Nicotine (aka “Smoke Yields”)

<u>Type</u>	<u>Nicotine (mg)</u>
Cigarette (filter)	1.1
Pipe	5.2
Smokeless tobacco	
Chewing tobacco	4.5
Moist snuff	3.6
Cigars	
Little cigars, Swishers	3.8
Premium, Macanudo	13.3
4 mg nicotine gum	1.9



Smokeless Tobacco Nicotine “Content”

- 4.8 mg nicotine/gm of moist snuff x 30 gm/can = 144 mg
- 144 mg nicotine/(1.8 mg nicotine/cigarette) = 80 cigarettes
- 80 cigarettes/(20 cigarettes/pack) = 4 packs
- 1 can snuff = 4 packs of cigarettes
- ST Users are exposed to as much, and possibly more, daily nicotine than cigarette smokers



=



Table 1. Tobacco-specific nitrosamines, pH, total and unprotonated nicotine, and minor tobacco alkaloids in smokeless tobacco products.

Product	TSNAs ^a , µg/g dry weight					Alkaloids, mg/g dry weight					
						Nicotine					
	NNN ^a	NNK ^a	NAT ^a	NAB ^a	Total	pH	Total	Free	Nornicotine	Anatabine	Anabasine
<i>New products</i>											
Taboka											
Original	1.05	0.077	0.370	ND ^b	1.50	6.64	21.1	0.844	1.04	3.78	0.149
Green	0.948	0.092	0.292	0.002	1.33	6.85	19.9	1.26	1.02	4.03	0.197
Marlboro Snus											
Rich	1.27	0.259	0.455	ND	1.98	6.83	17.8	1.08	0.438	2.60	0.111
Mild	1.52	0.229	0.234	ND	1.98	6.47	12.8	0.350	0.484	1.82	0.072
Spice	1.56	0.257	0.246	ND	2.06	6.85	17.9	1.13	0.411	2.17	0.097
Mint	3.28	0.215	0.221	ND	3.72	6.58	20.0	0.701	0.454	1.97	0.063
Camel Snus											
Original	1.15	0.270	0.297	0.012	1.73	7.46	28.2	6.09	0.353	1.39	0.164
Spice	1.27	0.157	0.305	0.015	1.75	7.75	25.4	9.16	0.314	1.09	0.183
Frost	1.20	0.267	0.204	0.009	1.68	7.59	23.7	6.40	0.313	0.741	0.103
Skoal Dry											
Regular	3.57	0.360	0.478	ND	4.41	7.23	11.3	1.57	0.345	1.41	0.117
Cinnamon	5.30	0.313	0.572	0.002	6.19	6.85	11.9	0.751	0.324	1.02	0.130
Menthol	2.53	0.279	0.203	ND	3.01	7.18	11.9	1.51	0.386	1.37	0.127
<i>Mean for new products</i>	2.05	0.231	0.323	0.008	2.61		18.5	2.57	0.490	1.95	0.126
<i>Traditional products</i>											
General Snus	1.66	0.464	0.969	0.008	3.10	7.95	16.7	7.69	0.223	0.367	0.072
Copenhagen Snuff	5.12	1.40	1.12	0.152	7.79	7.45	23.0	4.88	0.248	1.43	0.150
Copenhagen Long Cut	3.76	1.10	1.35	0.062	6.27	7.53	26.7	7.14	0.157	0.770	0.037
Skoal Long Cut	4.66	1.64	1.59	0.074	7.96	7.51	25.6	6.03	0.233	1.02	0.049
Kodiak Wintergreen	6.86	1.41	3.58	0.179	12.0	8.23	19.6	12.1	0.164	0.438	0.055
<i>Mean for traditional products</i>	4.41	1.20	1.72	0.095	7.42		22.3	7.57	0.205	0.805	0.073

Note. ^aAbbreviations: TSNAs, tobacco-specific N-nitrosamines; NNN, N'-nitrosoanabasine; NNK, 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone; NAT, N'-nitrosoanatabine; NAB, N'-nitrosoanabasine. ^bND, not detected.

ST Characteristics Affecting Nicotine Blood Concentrations

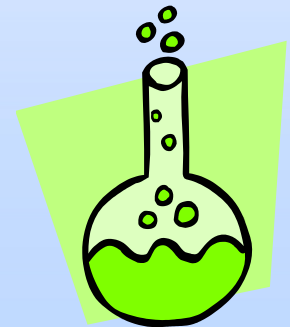
- Concentration of nicotine in ST product
- Size of the tobacco cuttings
 - Long cut
 - Fine cut (higher)
- Ammonium bicarbonate (additive)
 - Lower acid level of product = higher free nicotine
- Acetic acid (additive)
 - Increases salivation – enhances absorption



Richter P, et al. Nicotine Tob Res. 2003 Dec;5(6):885-9.

pH Manipulation by Industry

- October 1994, Wall Street Journal:
- “US Tobacco routinely adds chemicals to its snuff to deliver the free nicotine faster and to make the product stronger.”
 - Larry Story, former UST chemist
- “It (Copenhagen) was brought up to a pH of 7.8 by adding more sodium bicarbonate and ammonium carbonate.”
 - Larry Story, former UST chemist



22

Connolly, G. N. Tob Control 4: 73-79.

Impact of pH Manipulation: Long-Term

- Likelihood of choosing a brand with higher nicotine content is related to:
 - Increasing duration of use
 - Increasing intensity of use
 - Frequency of ST use
- ST users who have used higher nicotine-containing products are more likely to report:
 - More nicotine withdrawal symptoms
 - Continued use because of **difficulty quitting**



Waterpipe

- Data indicates that daily waterpipe use of the produced a 24-hr urinary cotinine level of: 0.785 microg/ml (95% CI = 0.578-0.991 microg/ml)
- Daily waterpipe smoking is equivalent to smoking 10 cigarettes (95% CI: 7-13)





Current Recommendations for Treatment



Pipes, Cigars, & Waterpipe



Treatment Options

Non-daily users

- Nicotine gum
- Nicotine lozenge
- Nicotine inhaler
- Nicotine nasal spray

Daily users

- Nicotine patch
- Bupropion SR
- Varenicline





Smokeless Tobacco (ST)



22

Assessing Dependence in ST Users

Number of cans per week

- Strongest correlation with nicotine/cotinine blood concentrations
- Used for dosing guidelines



22

Nicotine Patch Dosing Algorithm for ST Users

	Peak serum nicotine concentrations (ng/mL)	Cans or pouches per week	Patch dose
Low	0-10	< 2	14 mg/d
Intermediate	11-20	2-3	21mg/d
High	> 20	> 3	42 mg/d

22



Ebbert. JSAT. 2004

Bupropion SR: Dosing

150 mg daily for 3-4 days

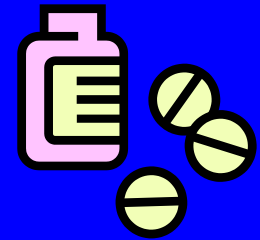
then

150 mg twice a day for 3-4 days

THEN

STOP CHEWING

3 to 12 months – No taper needed



Snuff Substitutes

- Smokey Mountain®
- Golden Eagle®
- Oregon Mint®
- KIK IT®
- Jerky®
- Bacc-Off®





Nicorette “Mini” – 2 mg/4 mg

Generic (large) lozenge

22



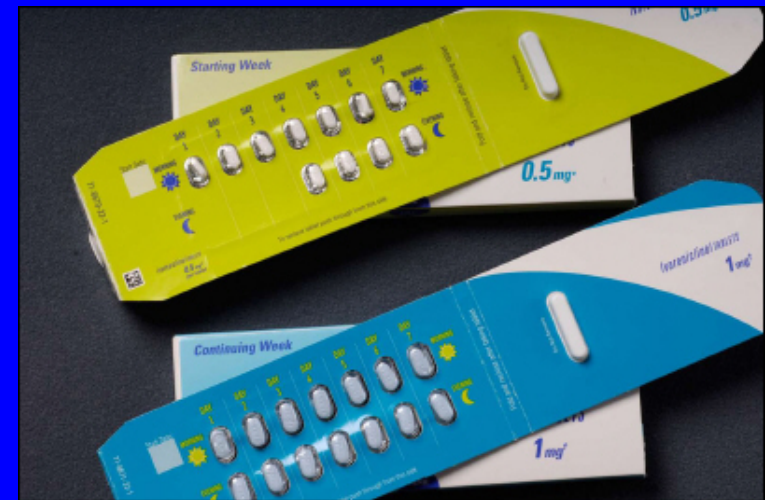
Nicotine Gum

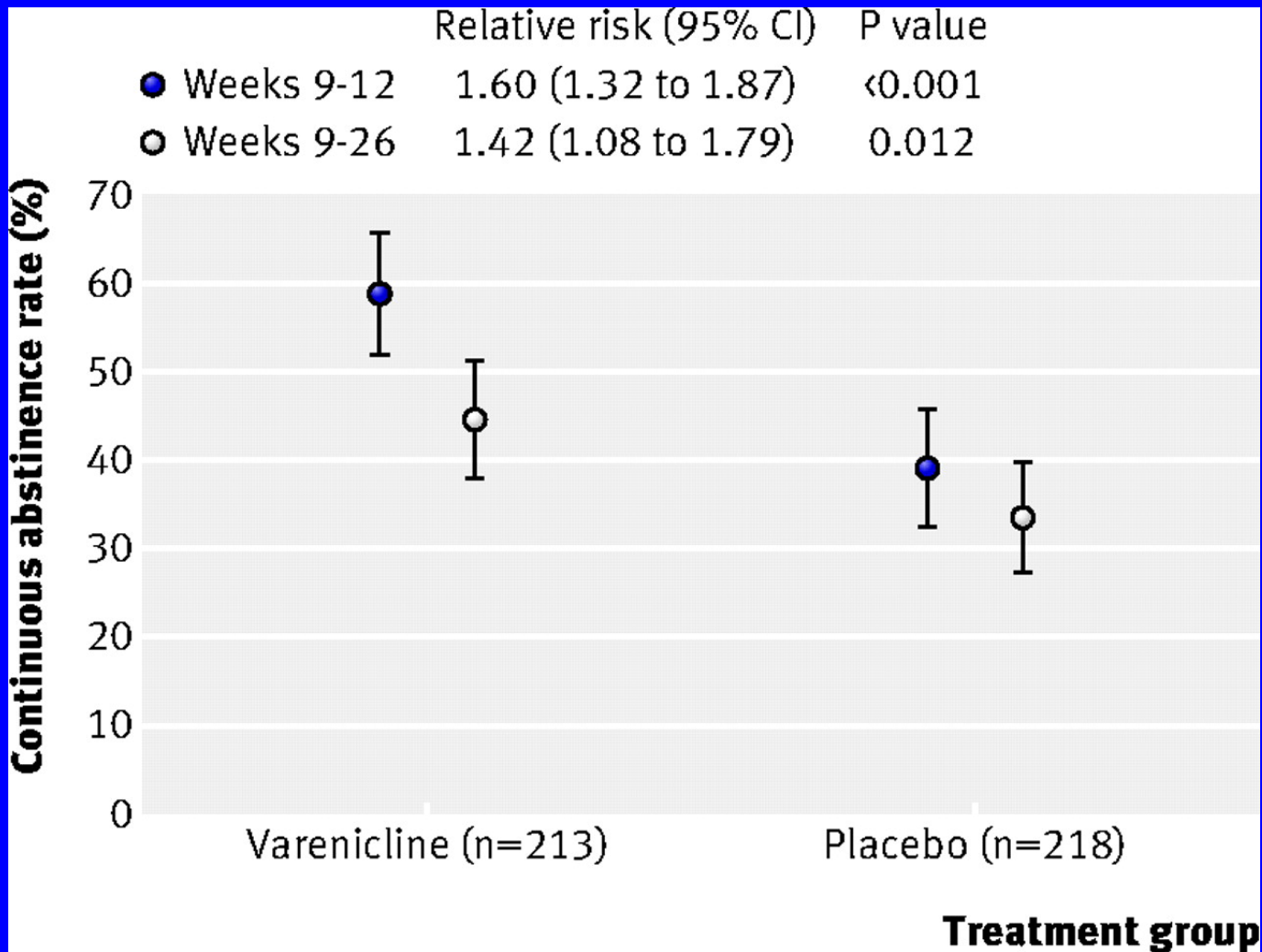
- Monotherapy
 - 2 mg
 - First dip \geq 30 min
 - \leq 2 cans/week
 - 4 mg
 - First dip $<$ 30 min
 - $>$ 2 cans/week
- “Chew and Park”
- Combination with nicotine patch may be optimal



Varenicline (Chantix™) for Snus Users

- Norway (7 sites) & Sweden (9 sites)
- Male/female daily ST users
 - Use at least 8 times/day
- Randomized to:
 - Varenicline for 12 weeks
 - Placebo
- Biochemical confirmation of abstinence
 - Salivary cotinine > 15 ng/mL



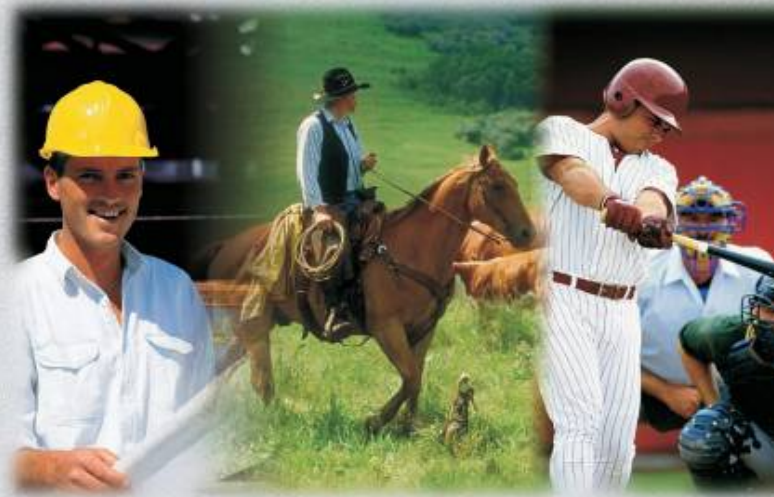


Fagerström K, et al. BMJ. 2010 Dec 6;341.

Facilitator Guide

Y

Your Path to Smokeless Tobacco Freedom



MAYO CLINIC
NICOTINE DEPENDENCE CENTER

Y

Your brain and nicotine: The physical challenge of quitting

You use **chew** for many reasons. One main reason is because smokeless tobacco contains an addicting drug called nicotine. This is the substance that makes it so difficult to stop, even though you want to.



Nicotine from chewing tobacco is absorbed into your bloodstream through your mouth (blue arrows). Nicotine from swallowed tobacco juice is absorbed through the small intestine and then passes through your liver before entering your bloodstream (red arrows). Your heart pumps nicotine to your brain and the rest of your body.

8

You're prepared! It's your quit day!



It's the start of your tobacco-free life

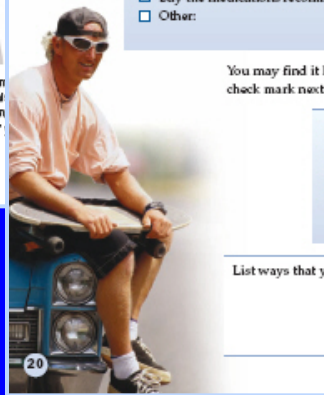
My Quit Date is:

In preparation for today, I will:

- Clean out my car
- Make plans with my support people
- Plan activities or projects
- Dispose of all tobacco (check my gym bag, glove compartment and other storage areas)
- Make an appointment to see my dentist
- Make an appointment to see my doctor for any prescriptions
- Buy the medications recommended by my doctor
- Other:

You may find it helpful to check mark next to each item.

List ways that you will stay tobacco-free.



20

CHEW CHECKS: Use these "chew checks" attached to your tin or pouch with a rubberband. Remove these cards by ticking and writing along the period end lines. Carry these with you and record each time you take a chew — see page 17 for instructions.

As adapted by a111 for the author: Longfellow, 2010

DATE:					
No.	Time of day	New dip/ chew	Add more chew	Mood S = sitting M = moderate L = light	Activity What you were doing at the time
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

DATE:					
No.	Time of day	New dip/ chew	Add more chew	Mood S = sitting M = moderate L = light	Activity What you were doing at the time
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10					



Bupropion
Available doses:
150 mg

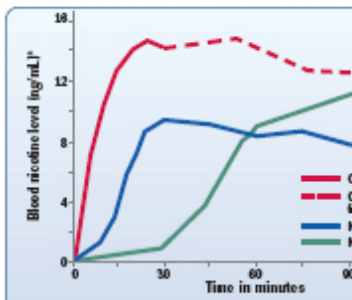
Comments:



Varenicline
Available doses:
0.5 mg
1 mg

Comments:

Blood nicotine levels of chewing tobacco vs. nicotine gum



Nicotine in chewing tobacco is absorbed very rapidly and peaks within 30 minutes. Even after the chew is removed, nicotine is absorbed through the mouth and small intestine. In comparison, the nicotine absorbed through the mouth (from gum) is absorbed much more slowly and often reaches its peak 60-90 minutes after placement.



Normal inside cheek

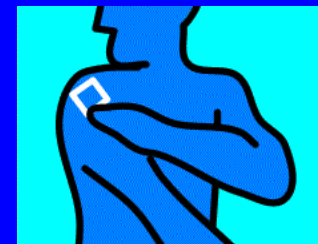
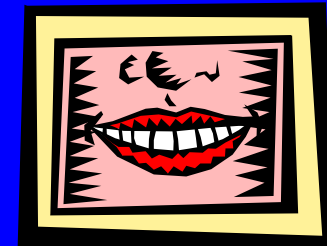


Snuff dipper pouch (where chew is placed)



Recommended ST Treatment Approach

- Bupropion SR
 - Weight gain prevention
 - Craving reduction
- Tailored nicotine patch therapy
 - Craving reduction
 - Short-term (end-of-treatment) abstinence
- Nicotine lozenge (short-term abstinence)
- Nicotine gum (craving reduction)
- Varenicline



Treatment **Not** Recommended for ST Users

- Nicotine inhaler
 - Designed to replicate the tactile sensation of a cigarette
- Nicotine nasal spray
 - Speed of intranasal delivery designed to the speed of delivery of a cigarette



Goals & Objectives

- Review NCTP definitions & products
- Discuss prevalence/trends of NCTP
- Describe NCTP pharmacology
- Discuss NCTP dependence measures/withdrawal
- Review recommended treatments for NCTP

