Nicotine

A potent (average cig. contains .5-2 mg, only about 20% absorbed) and toxic (LD= ~60 mg.) stimulant with an even worse route of administration

Nicotine Basics – easily absorbed

• Non-tolerant user experiences symptoms of mild nicotine poisoning:
  – Pale, sweaty
  – Dizzy, weak in the knees
  – Nausea, intestinal cramps
  – Sympathetic & CNS arousal
• Sufficient nicotine can quickly kill you (seizures, respiratory paralysis) (kids, pets and farmers most at risk thru accidental ingestion)

Drug Action of Nicotine

• Fits & stimulates ACh receptors ("nicotinic receptors") → cortical arousal
• Sympathomimetic → body activation
• Secondary release of DA in pleasure system (addicting, mood-elevating, depression relieving effect)
• Decreased muscle tone → feelings of relaxation

Cigarette smoke contains:

☠ ~500 gaseous compounds including carbon monoxide (CO), ammonia, hydrogen cyanide and benzene → coronary heart disease (CHD) risk
☠ About 3,500 different compounds as particles
  ☠ Nicotine – addictive, psychoactive component
  ☠ Tars – carcinogens and co-carcinogens → Lung disease and Cancer risk

What causes the major health consequences of smoking?

• increases heart rate and blood pressure
• constricts blood vessels
• hardens the arteries (arteriosclerosis)
• increases risk of clotting
• increases in blood cholesterol & fatty deposits
• decreases oxygen carrying by blood
• disrupts the ability of the cilia to clear lungs
• deposits carcinogens and co-carcinogens
Risk: Cardiovascular Disease
> 200,000 deaths/yr
• Risk of coronary heart disease & heart attack doubles (quadruples in heavy smokers)

Risk: Respiratory Disease
• Lung Cancer (~115,000 deaths/yr)
• Chronic Obstructive Lung Diseases like emphysema & bronchitis (~82,000/yr)
• Increased respiratory infections

Other Effects of Smoking
• Increases risk of almost every cancer
  — Pancreas, liver, bladder
  — Cervix, colorectal
  — Voicebox, mouth, throat
  — Lung cancer spreads to other locations
• Increased stroke and other vascular disease
Macular degeneration of center of retina
• Gum disease; tooth decay & loss
• Aging of skin, wrinkles, psoriasis
http://www.youtube.com/watch?v=3aleF5lj4Dk

Other Smoking Concerns
• Passive smoking (second-hand smoke) is a serious problem
  — Almost 60 percent of U.S. children aged 3–11 years—or almost 22 million children—are exposed to secondhand smoke.
  — Secondhand smoke exposure causes about 3,000 lung cancer deaths and 46,000 heart disease deaths annually among adult nonsmokers in the United States.
  — If you live or work full time in a smoking environment, you are likely to have blood levels of smoking chemicals equivalent to a light smoker

Fetal Tobacco Syndrome
• Smoking during pregnancy produces a dose-dependent decrease in oxygen to the baby, resulting in:
  — shorter, lighter babies with smaller heads
  — dose-related risk of miscarriage, placental problems, bleeding, stillbirth, prematurity, neonatal death
  — some studies show small but consistent increases in SIDS, learning difficulties, hyperactivity and ↓IQ in kids born to smoking moms vs non-smoking moms, and ↑risk of conduct, oppositional defiant and substance abuse disorders as they get older but some of these may be related to genetic factors
  — Health problems increase with continued smoking in home.

Myth of the Safer Cigarette
• To maintain customer satisfaction, filtered cigarettes use a high T/N tobacco, counteracting the benefit of the filter and raising the toxicity of sidestream smoke.
• Low T/N numbers on pack are NOT accurate reflections of the T/N user gets
http://www.youtube.com/watch?v=yZ7_Tor33Ms
• http://www.cancer.gov/cancertopics/factsheet/Tobacco/light-cigarettes
What About Smokeless Tobacco?

- **Chewing tobacco**
  - No inhaled gases, but still exposed to carcinogens & addiction
- **Dip**
- **Nasal Snuff**
- **Snus (Scandinavian)** (regulated as a food product)
- **Snus (American)** (unregulated)
  - http://www.youtube.com/watch?v=IF3-gldw9D0
  - http://www.cbsnews.com/video/watch/?id=6362540n

The New “Chew” –
may be more discrete but still addictive & cancer-causing

Withdrawal Symptoms

- Drowsy, depressed, decreased concentration, brain less aroused
- **Restlessness, anxiety, irritability**
- Headache, sweating, decreased HR & metabolism, GI complaints, sleep disturbances
- Craving
- **(Bold items increased if you use caffeine)**
- Behavioral habits may be even more important than withdrawal

Nicotine Transdermal Patch

- 16 & 24 hr,
  - Latter causes more sleep difficulties & vivid dreams
  - Former causes more morning craving.
- 3 doses allow step down in dose when desired.

Nicotine Gum or Polacrilex; Nicotine Lozenge or “Candy”

- Not really gum; chew a little then “park” in cheek; repeat over 30 minutes. Do not consume sodas or other acid beverages while using. Follow directions to be sure you use enough & use long enough to get desired effectiveness.
- Nicotine lozenge should not be chewed. Generic form available.

Nicotrol Nasal Spray

- Fast delivery of a jolt of nicotine (more like a cigarette) but this also means greater risk of dependency on spray
Pharmacological Approaches

- **Nicotine replacement therapies**
  - Nicorette chewing gum
  - Nicotine patch
  - Nicotine inhaler; e-cigarette
  - Nicotine nasal spray
  - Nicotine lozenge
- AVOIDS withdrawal symptoms while breaking behavioral habit – up to double the success rate
- Even if you stay on nicotine replacement, tremendous health benefits by eliminating the other components of tobacco/smoking
- [http://www.youtube.com/watch?v=nASxOVKjciY](http://www.youtube.com/watch?v=nASxOVKjciY)

**Nicotrol Inhaler & E-Cigarettes**

Administered more like a cigarette – satisfies some “behavioral habits” (may be good for some users)

BUT: e-cigs are currently not considered “drugs”, are not regulated by the FDA, have not been tested for safety, nor is there quality control. FDA tests revealed inconsistent nicotine doses and some contain tobacco-associated carcinogens!!

[http://www.msnbc.msn.com/id/46401133/ns/health-addictions/#.UGRvr64w_nh]

**Zyban/Wellbutrin (sustained release bupropion)** (also another antidepressant nortriptyline (Pamelor, Aventyl))
- Seem to relieve mood changes of withdrawal, ↓ craving, ↓ wt. gain and ↑ short term & long-term smoking cessation. Don’t have to be depressed to benefit from these.
- Also evidence that success rate is doubled compared to placebo.
- Combined counseling/support with pharmacotherapies even better.
- [http://www.youtube.com/watch?v=aNgox9EPha0](http://www.youtube.com/watch?v=aNgox9EPha0)

**Newest: Chantix (varenicline)**
- Partial agonist slightly stimulating, then blocking nicotine receptors
- Decreases withdrawal symptoms & produces some nicotine-like effects on mood
- Because Chantix blocks nicotine from binding, smoking is not as reinforcing; quitting is not as aversive
- Side effects: nausea, bizarre dreams, possible neuropsychiatric symps in some (hostility, agitation, depression, suicide)

**Some Behavioral Approaches**

- Stimulus control (avoid smoking situations; make tobacco less available)
- Visualize smoking consequences – think about your dirty black lungs & shrunken coronary arteries each time you light up
- Find “substitutes”: relaxation training, exercise
- Contingency contracting – rewarding your quitting success
- Social support (buddy system; groups)
- Aversion therapy – rapid smoking protocol

**Stop smoking?**

- Two-thirds of smokers would like to quit,
- 30-33% try to quit in any year, 2/3 smoke in two days, 97% in 6 months
- Several attempts typically precede success
- Relapse rate lower in those who do a smoking cessation program. About a 20-30% success (long-term abstinence) on average.
- Over 40% continue to smoke after laryngectomy, more 50% after a heart attack – very powerful addiction