

# Mayo Model: Tobacco Dependence Treatment in Pregnancy

Jennifer S. B. Moran, MA, TTS

Mayo Clinic

Nicotine Dependence Center

# Learning Objectives

- Describe the conceptualization of tobacco dependence as a chronic disease
- Describe the core elements of the Mayo treatment model, including addictions and pharmacotherapy education, cognitive behavioral strategies, and relapse prevention applied during the perinatal period

Well...everyone knows smoking  
is bad...

But how bad is it?

# Worldwide

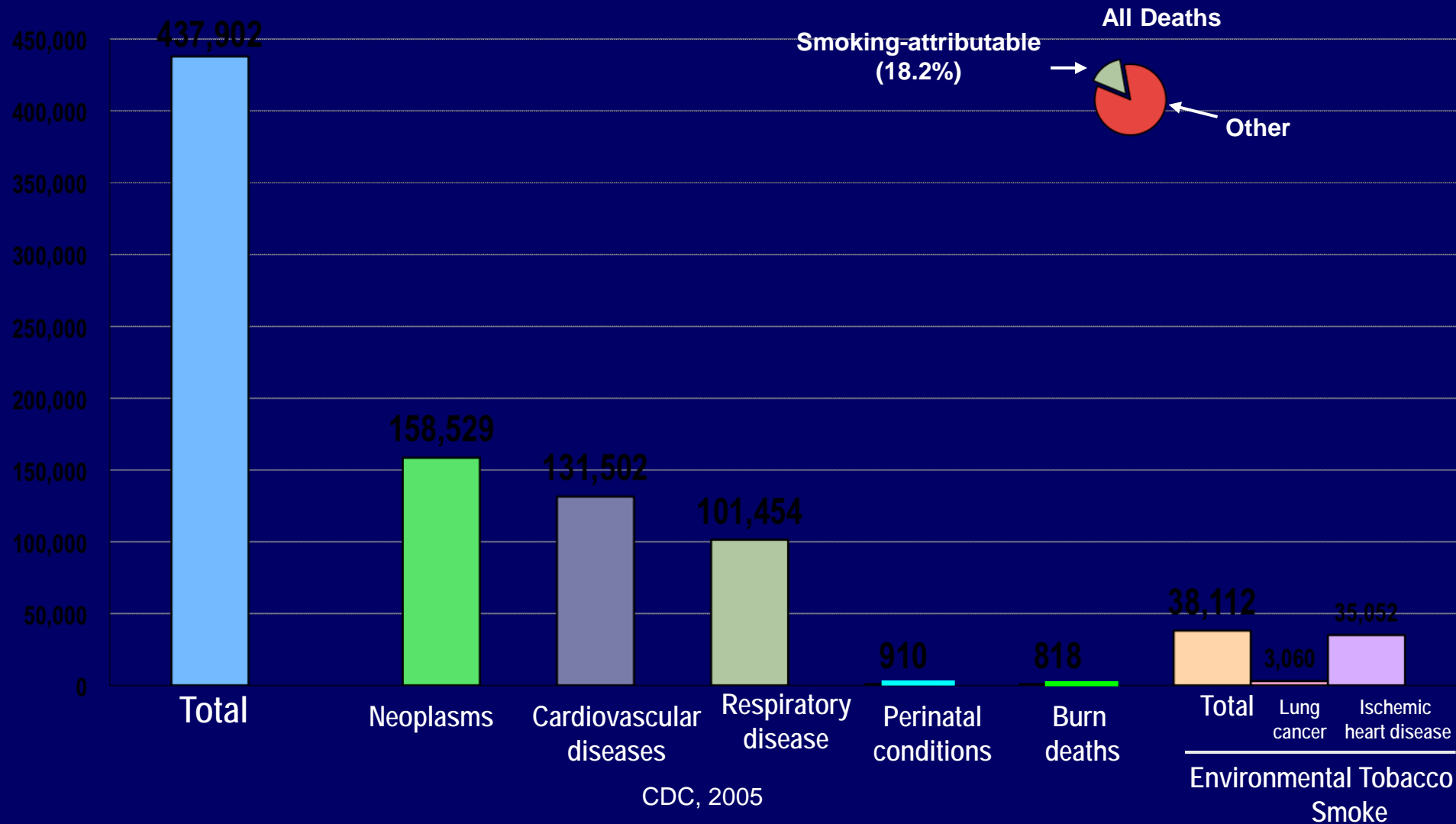
- Currently 5 million deaths per year
- By 2025 projected 10 million deaths per year
- Tobacco use may kill 1 billion people in the world during this century
- Most of those people have not yet started to smoke

# The tobacco epidemic

- ◆ **Cigarettes cause nearly one in five deaths in US** (Mokdeed et. al. 2004)
- ◆ **Cigarettes kill one in three beginning smokers** (CDC, 2006)
- ◆ **There are effective treatments for tobacco dependence that are underutilized** (Fiore et. al. 2000)

# Smoking-Attributable Mortality, 1997-2001

Number of average annual deaths



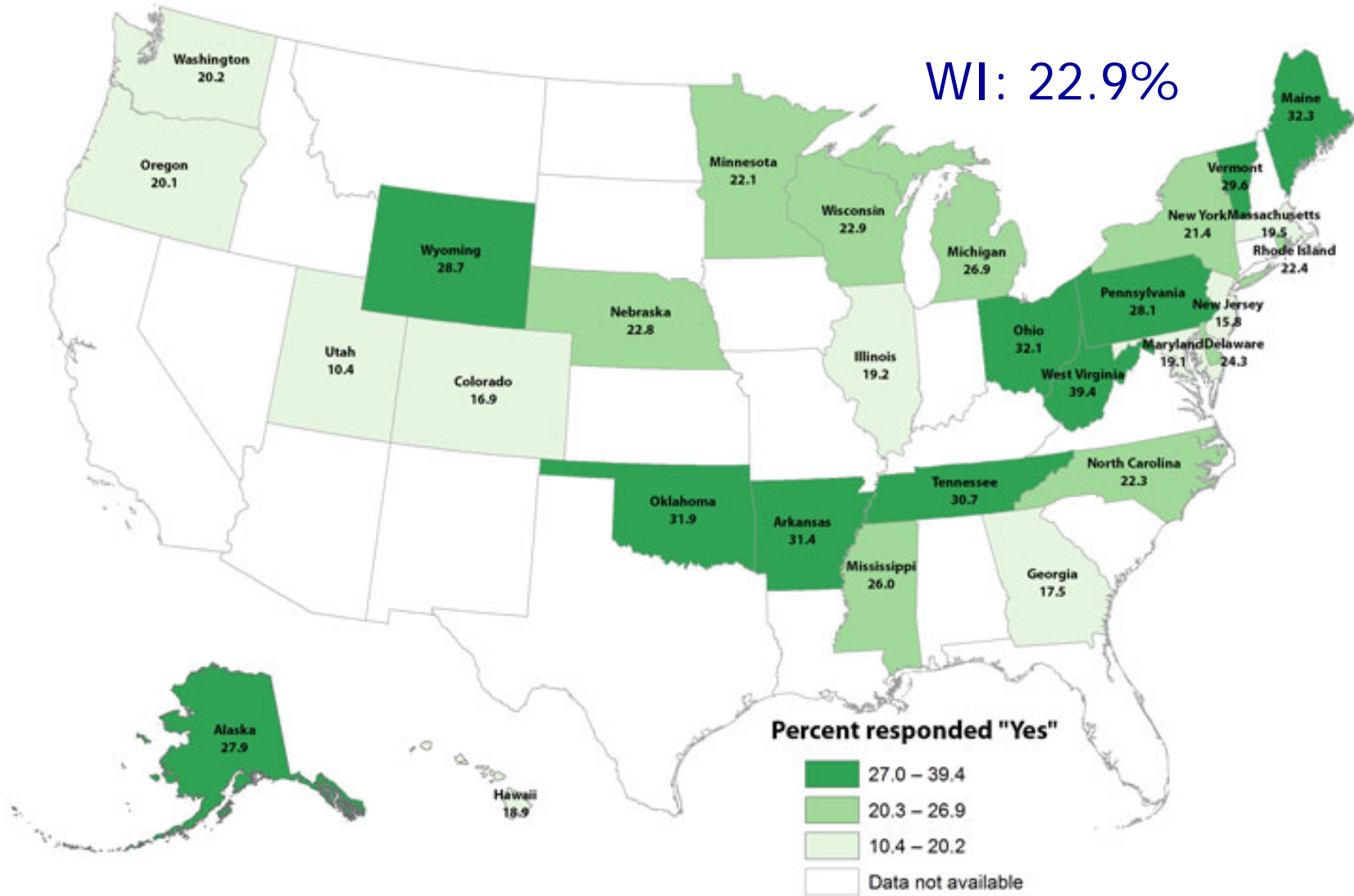
# Unique Profiles = Unique Treatment Focus



- Suspended quitters
- Those who intend to quit for good
- Spontaneous quitters
- Those who quit in response to a planned intervention
- Those who cut down

## The Percentage of Mothers Who Smoked 3 Months before Pregnancy, PRAMS States, 2008

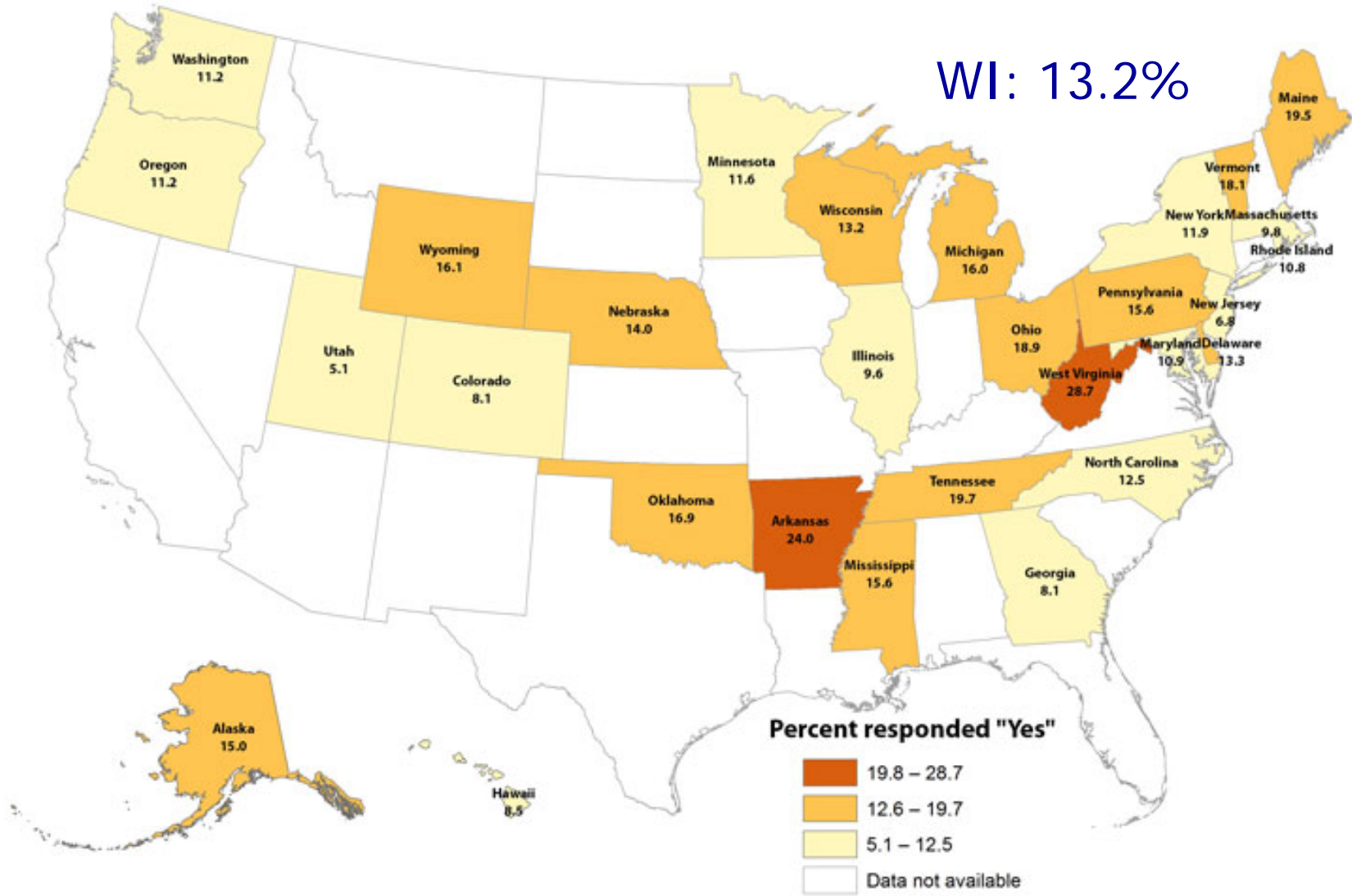
WI: 22.9%





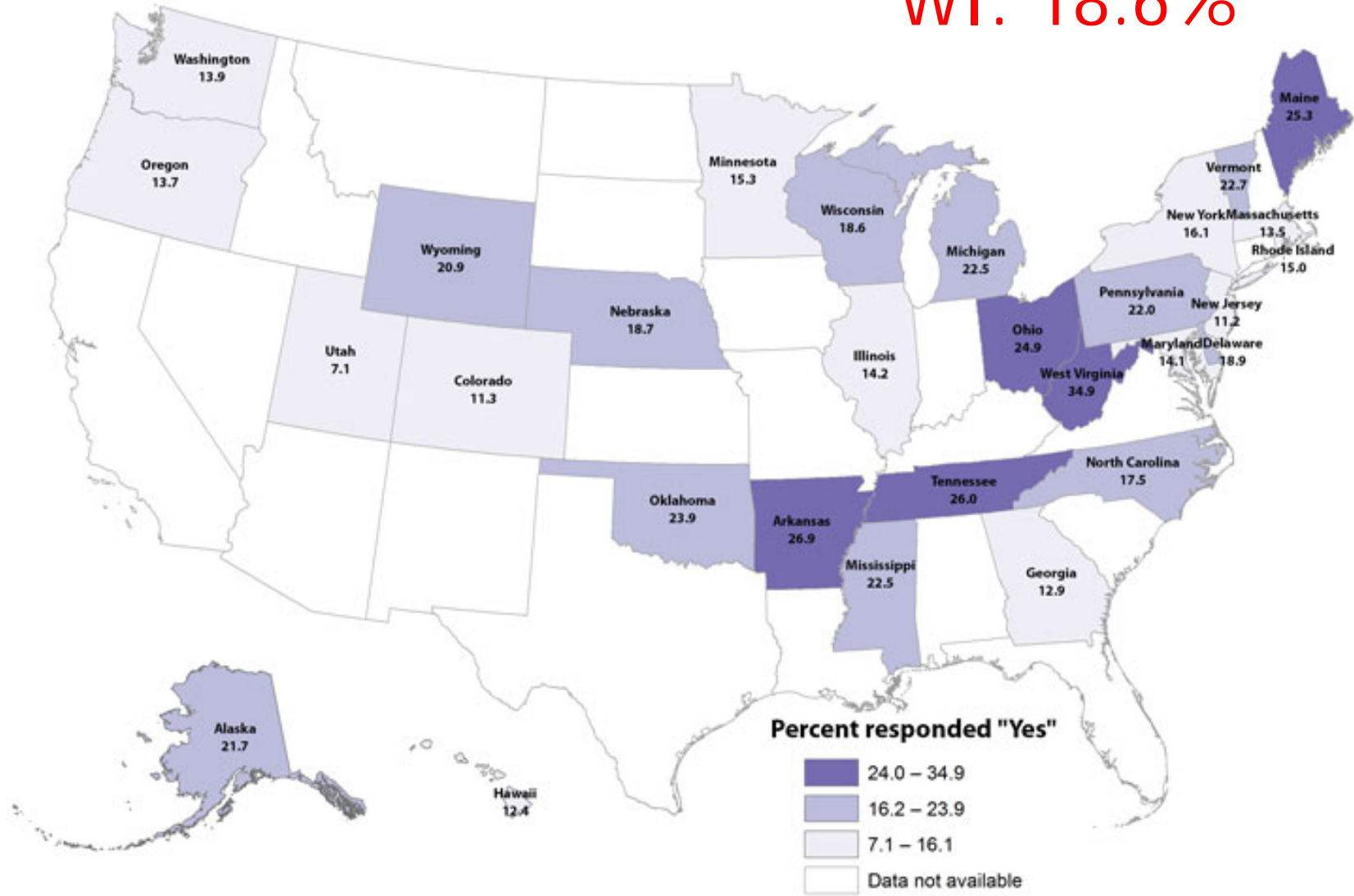
# The Percentage of Mothers Who Smoked the last 3 Months of Pregnancy, PRAMS States, 2008

WI: 13.2%



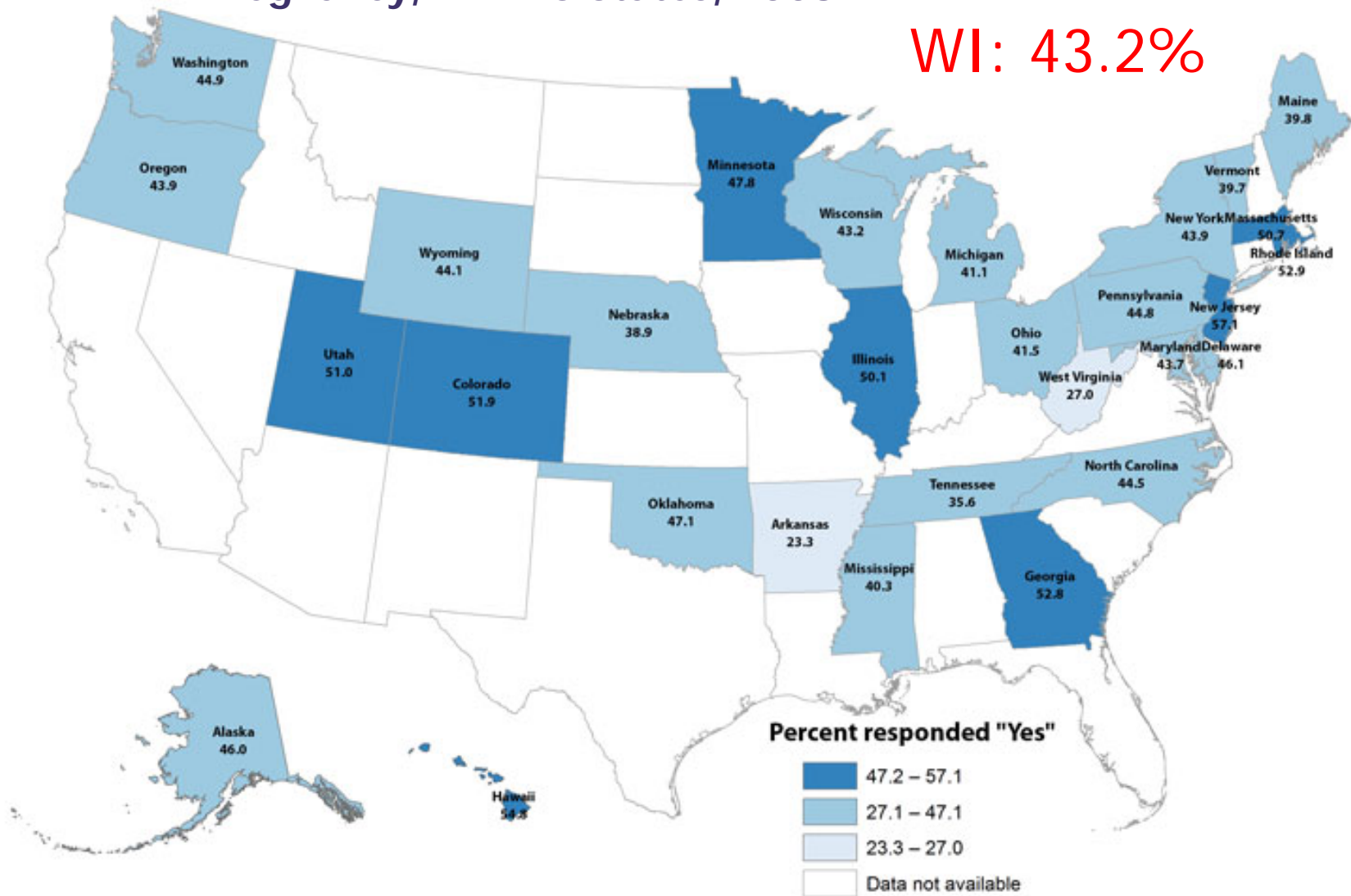
# The Percentage of Mothers Who Smoked After Delivery, PRAMS States, 2008

WI: 18.6%



# The Percentage of Mothers Who Quit Smoking During Pregnancy Among Those Who Smoked Before Pregnancy, PRAMS States, 2008

WI: 43.2%



# Widely Varied Statistics

- Different definitions of "quitting"
- Accurate disclosure of smoking status
- Varying efficacy of different interventions

Quinn et al. Mat..& Child Health May 2006  
Russel et al. Nic & Tob Rsch April 2004



# Epidemiology

- 65-80% of women who were abstinent during pregnancy start smoking again before the baby is one year old
  - 45% at 2-3 months postpartum
  - 60-70% at 6 months
  - As much as 80% by one year

# Pregnancy – a Catalyst for Change & Important Differences

- Concerns about the developing fetus motivate lifestyle modifications
  - Opportunity – “I always intended to quit anyway”
  - VS.
  - Imposition – “I had no intention of quitting smoking”

# Your Patients



# Spontaneous Quitters

- Women who smoked prior to conception, but quit on their own shortly after becoming pregnant and before entering prenatal care
- Remarkably successful: with little or no formal intervention, 65-81% confirmed abstinent at the end of pregnancy - up to 6 months after quitting
  - Compare to 45% abstinent at 6 months in a highly motivated, symptomatic population of post-myocardial infarction patients

(Solomon & Quinn Nic&Tob Rsch 2004)



# Suspended Quitters

Intention to quit only for the length of the pregnancy

- A time limited “restriction” of smoking vs. an “intentional” behavior change
- Focus on quitting to protect the health of the baby
- Little development of meaningful coping skills that other quitters may acquire

# Spontaneous Quitters and Continuing Smokers: Important differences

## Spontaneous quitters

- Having first child
- Planned pregnancy
- Early prenatal care
- Nausea in 1<sup>st</sup> trimester
- Intending to breastfeed
- Previous miscarriage
- Less nicotine dependent
- More previous quit attempts
- Higher SES
- More education
- Partnered/Married
- Strong belief in the harm to the baby
- Privately insured

# Spontaneous Quitters and Continuing Smokers: Important differences

## Continuing Smokers

THE ROANOKE TIMES  
Monday, September 20, 2004



STEPHANIE KLEIN-DAVIS | The Roanoke Times

Mellisa Williamson, 35, a Bullitt Avenue resident, worries about the effect on her unborn child from the sound of jackhammers.

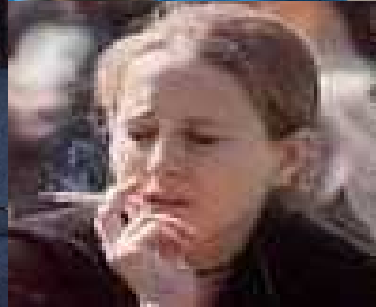
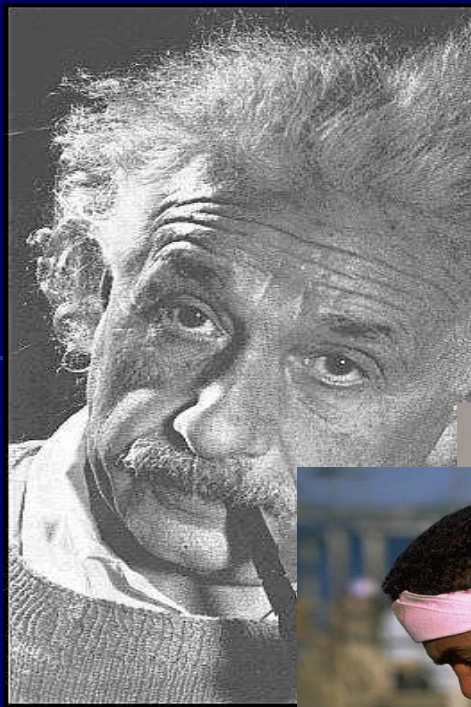
- Smoked with previous pregnancies
- More saturated smoking networks
- Smoking partner
- More life stressors
- Weaker belief in the harm to the baby from maternal smoking
- Lower SES, less education

# Principles of Treatment

## The Mayo Model

Addictions Information  
Cognitive/Behavioral Elements  
Pharmacotherapy  
Relapse Prevention





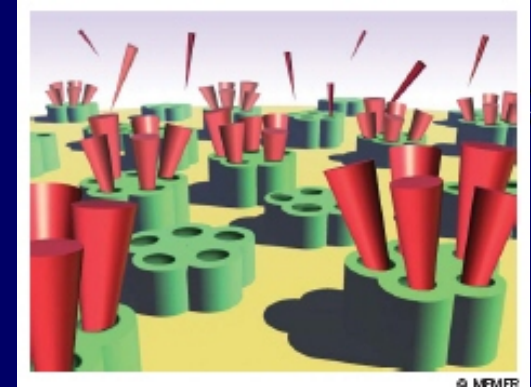
# It Is A Disease

“Not a Bad Person with a Bad Habit, but a Good Person with a Difficult Disease”

--Tom Gauvin, NDC Counselor

# Nicotine Addiction: "A Brain Disease"

- Physical Dependence of nicotine = receptor 'irritability'
  - Psychological Dependence:
    - "Conditioned Response" to Cues
      - The Five Senses
      - Emotions (positive and negative)
    - Cues trigger neurotransmitter release
    - Anticipation of Nicotinic receptor activation and Dopamine release
- ➔ Craving/Urges

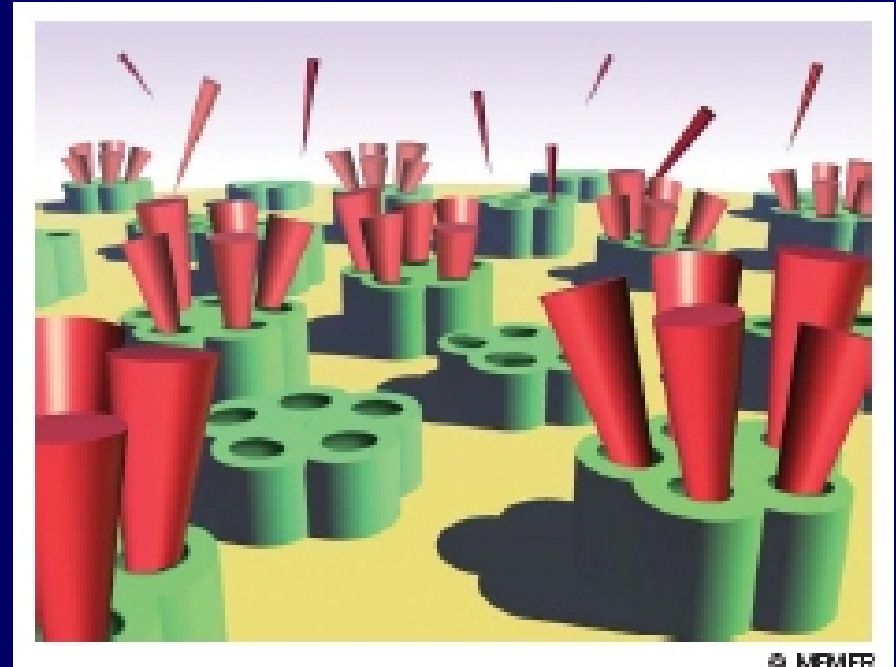
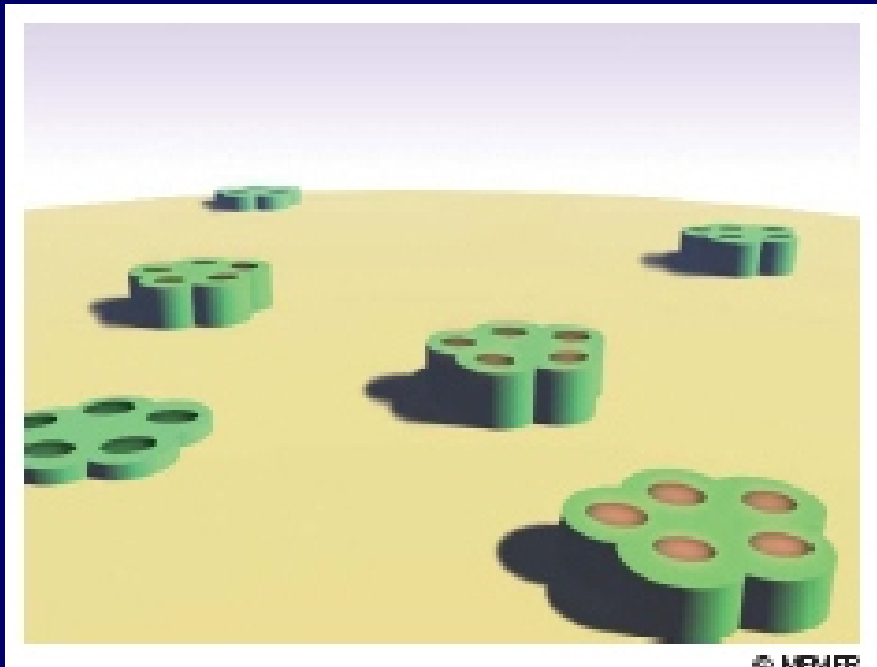


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# Nicotine Addiction: "A Brain Disease"

"Up-Regulation"

Increased numbers of Nicotinic receptors



# Characteristics of an Addictive Drug:

Addictiveness of a Drug is Dependent on:

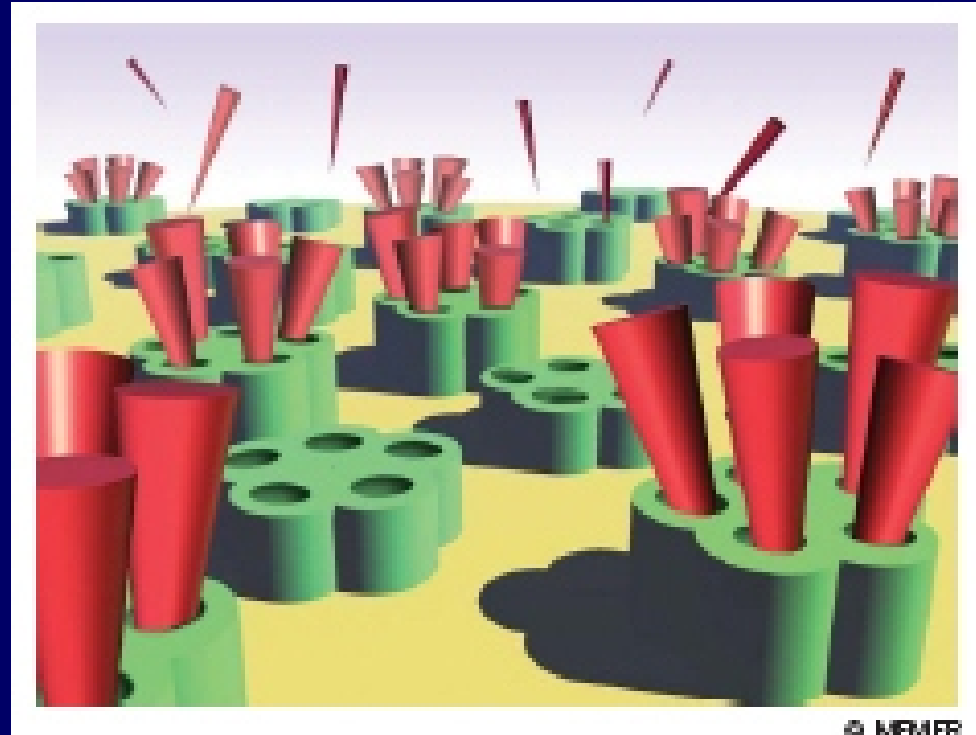
- The concentration of the drug achieved
- The rapidity with which that concentration is achieved
- The magnitude of the drugs effects

(How widespread the effects of the drug are on the organism)



# Characteristics of Nicotine lead to Reinforcement of Use & Addiction

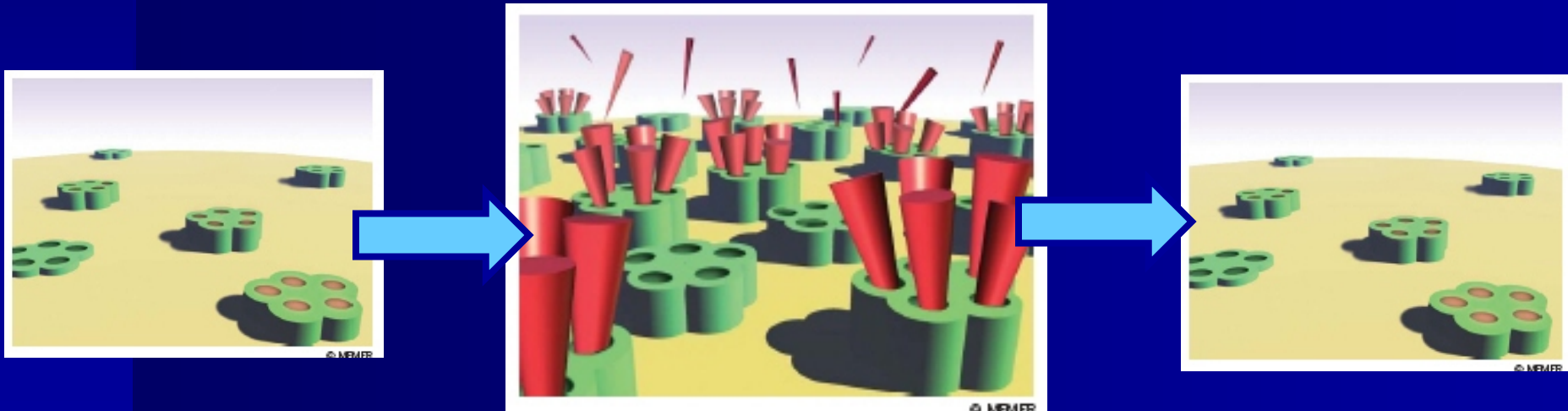
- High concentrations of nicotine within 7-10 seconds
- Half-life = 90-120 min.
- Able to respond quickly to additional doses
- "Euphoria" without "Intoxication"
- Behavior reinforced multiple times daily



**It has Symptoms**

# Withdrawal Syndrome or "Abstinence Syndrome"

Pathophysiologic disturbances which result when a drug to which an organism is physically dependent is stopped.



# Withdrawal Symptoms

- Insomnia
- Restlessness
- Anxiety, Irritability, Frustration, Anger
- Difficulty concentrating
- Sad, depressed mood
- Increased appetite



# Withdrawal Symptoms

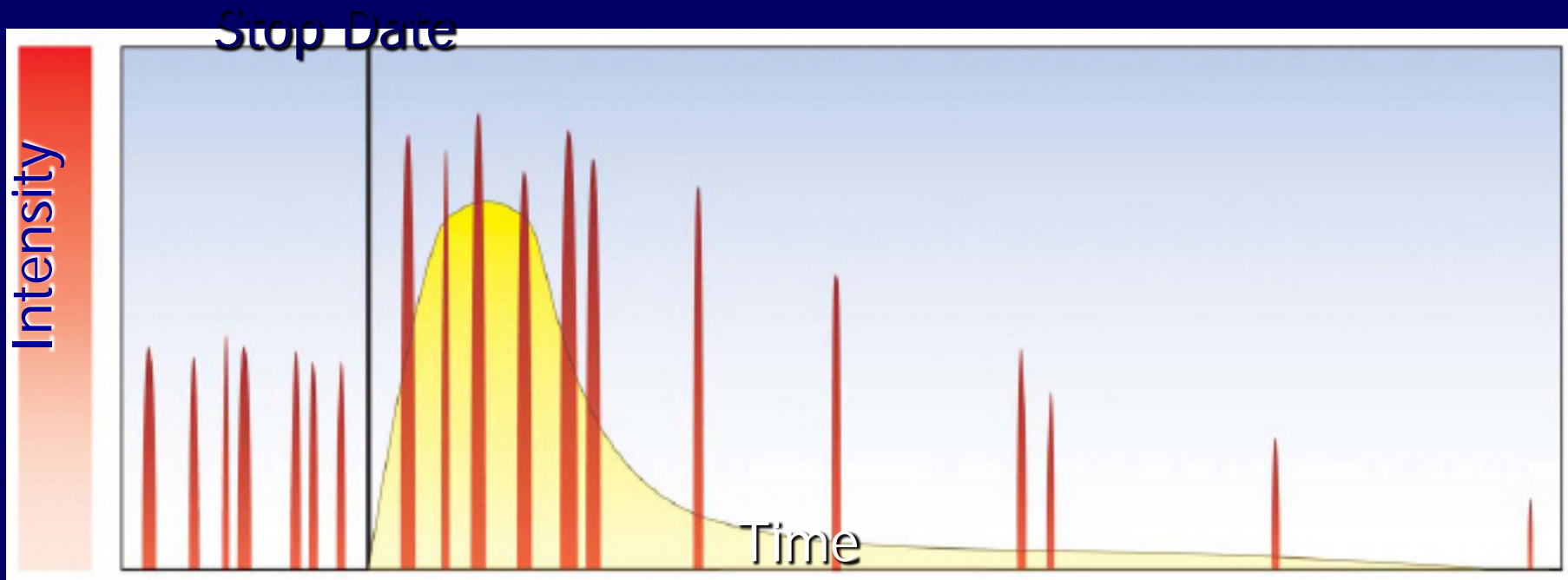
- Headache
- Mouth ulcers
- Nausea
- Constipation
- Diarrhea





# Timeline of Nicotine Withdrawal & Tobacco Cravings

For most smokers, withdrawal symptoms last for a few weeks and then resolve. Cravings can be frequent and intense early, but become less intense and less frequent over time



# DSM 5 Substance Use Disorder

2-3 Moderate

4+ Severe

## CRITERIA

- Tolerance
- Recurrent use resulting in failure to fulfill role obligations
- Recurrent use in hazardous situations
- Continued use despite problems
- Withdrawal or use to avoid withdrawal

# DSM 5 Substance Use Disorder

2-3 Moderate

4+ Severe

- Using more or longer than intended
- Persistent desire or unsuccessful attempts to stop or reduce
- Great deal of time spent using, or recovering
- Important activities given up to use
- Continued use despite knowledge of problems caused by use
- Craving



**It is Treatable**

USPHS Clinical Practice Guideline 2008

<http://www.surgeongeneral.gov/tobacco/>

CLINICAL PRACTICE GUIDELINE



# Treating Tobacco Use And Dependence

**AHRQ Publ 00-0032**

U.S. Department of Health and Human Services  
Public Health Service

# USPHS Guidelines

## 10 Recommendations

1. Tobacco dependence is a chronic disease
  1. requires repeated intervention
  2. multiple attempts to quit.
2. Systems should identify and treat all tobacco users.
3. Tobacco dependence treatments are effective. Every patient willing should use counseling and medications.
4. Brief tobacco dependence treatment works.

# USPHS Guidelines

## 10 Recommendations

5. Individual, group, and telephone counseling are all effective.
6. All patients should be encouraged to use medications unless contraindicated.
7. Counseling and medication are effective alone and more in combination.

# USPHS Guidelines

## 10 Recommendations

8. Telephone quitline counseling is effective.
9. If a tobacco user currently is unwilling to make a quit attempt, use motivational treatments.
10. Tobacco dependence treatments are both clinically effective and highly cost-effective.
  1. Insurers and purchasers should ensure that all insurance plans include counseling and medication as covered benefits.

# E P E

## Elicit-Provide-Elicit

- Elicit what the patient already knows
- Provide information in a neutral, nonjudgmental fashion
- Elicit the patient's interpretation

**“How do you feel about the possibility of ending your tobacco use?”**

Strengths Perspective:  
“bumps along the road” vs.  
mistake, failure, relapse

# Key Treatment Components:

## Cognitive-Behavioral

### Thoughts

- "Smoking isn't an option"
- "I happily see myself as a nonsmoker"
- "I can do this."

### Behaviors

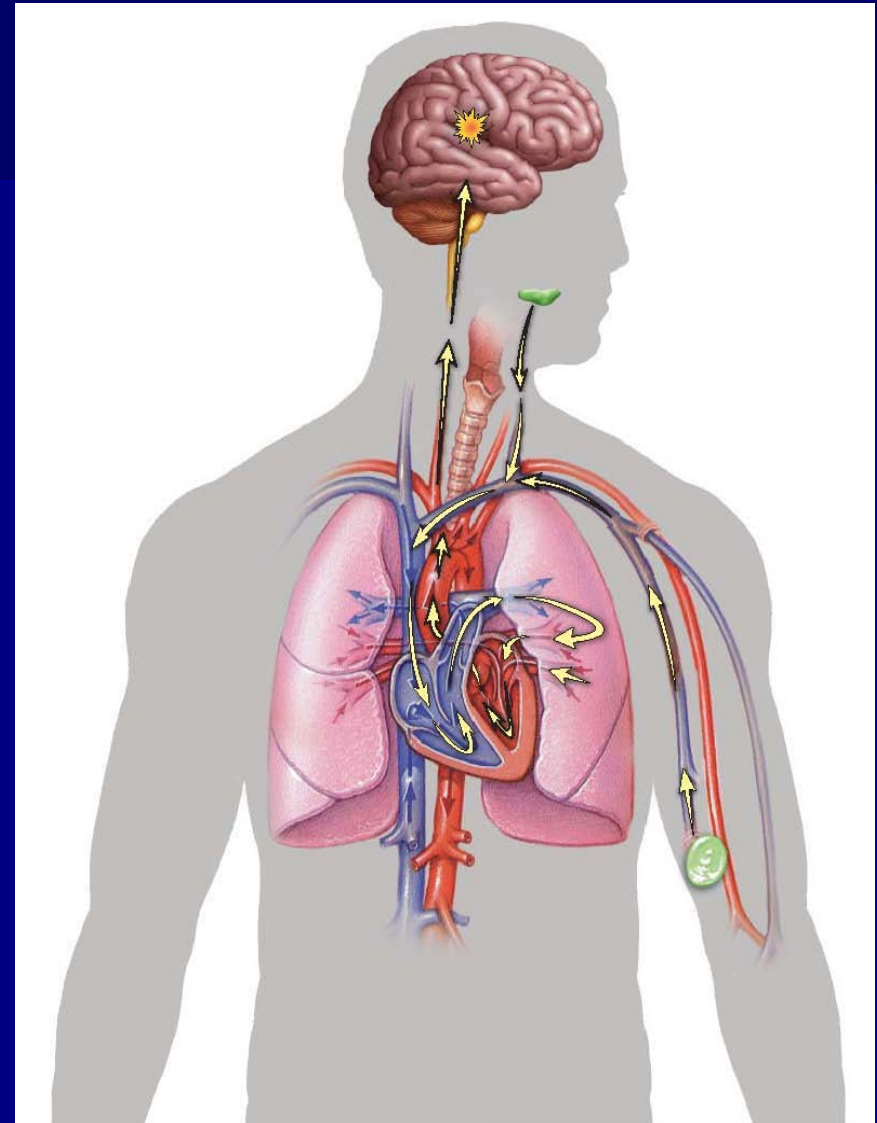
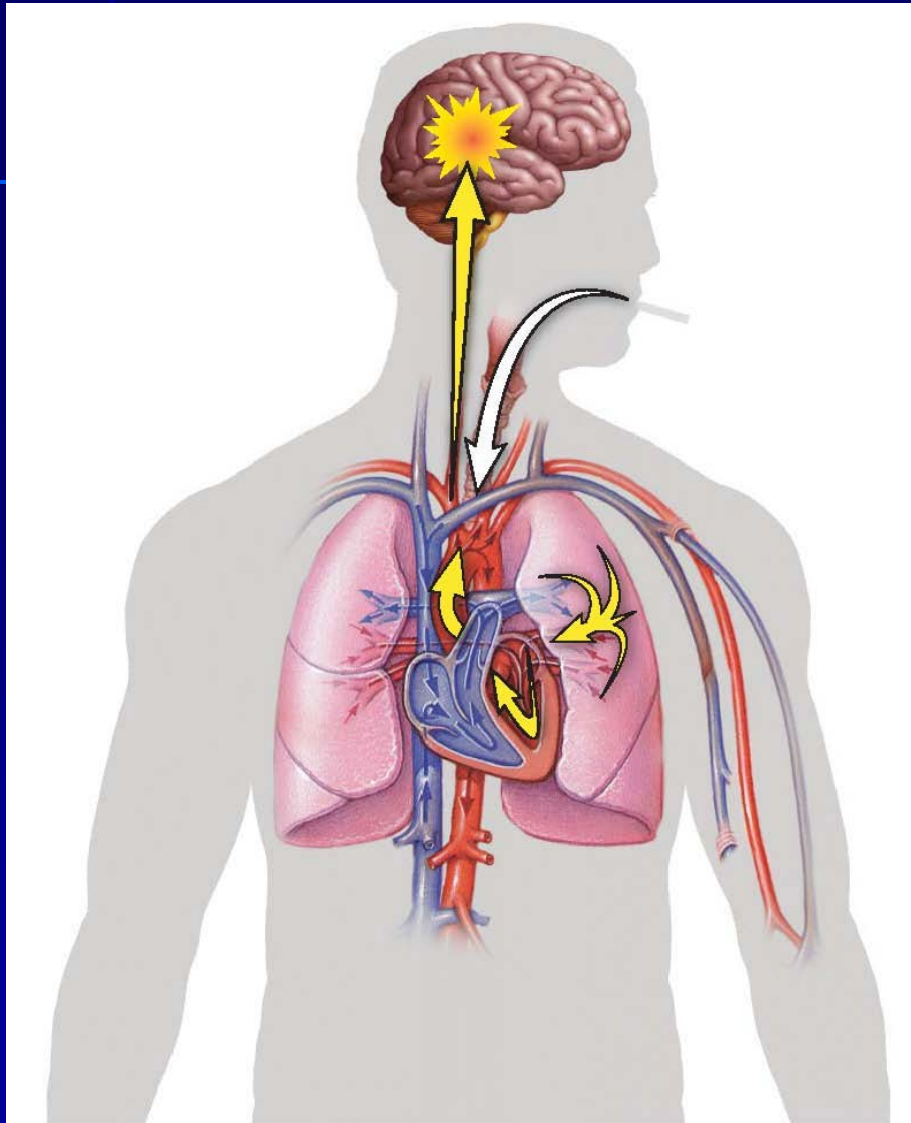
- Alter routines
- Behavioral substitutes
- Problem-solving skills



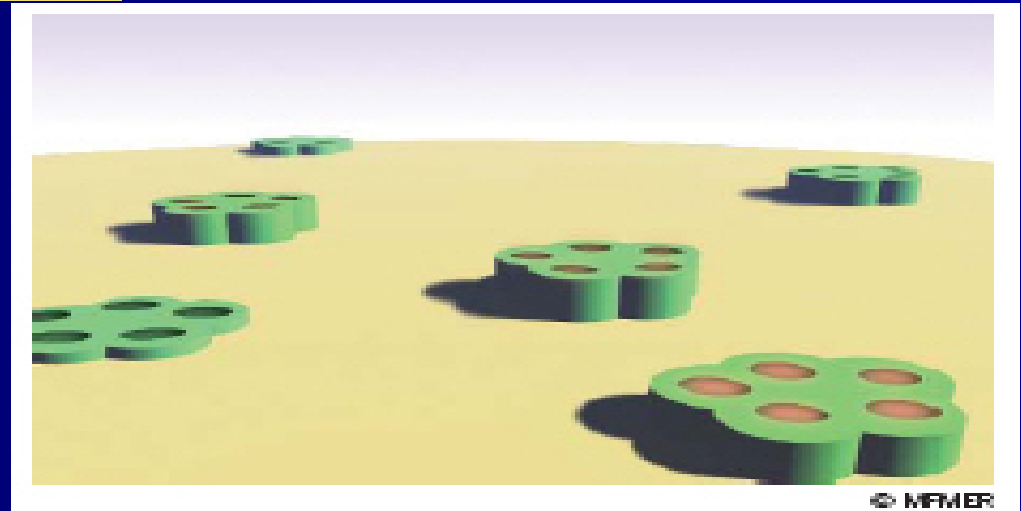
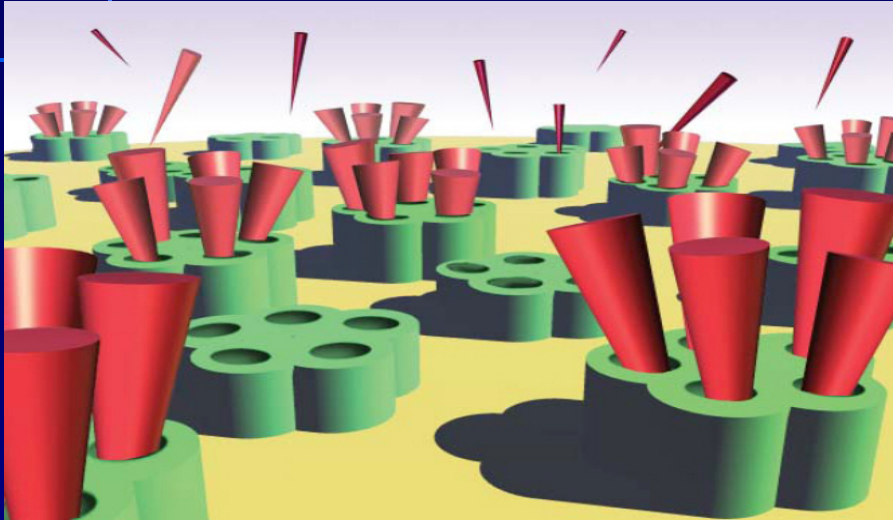
# Key Treatment Components: Pharmacotherapy



# Nicotine Dependence Education



# Why it's so hard to quit



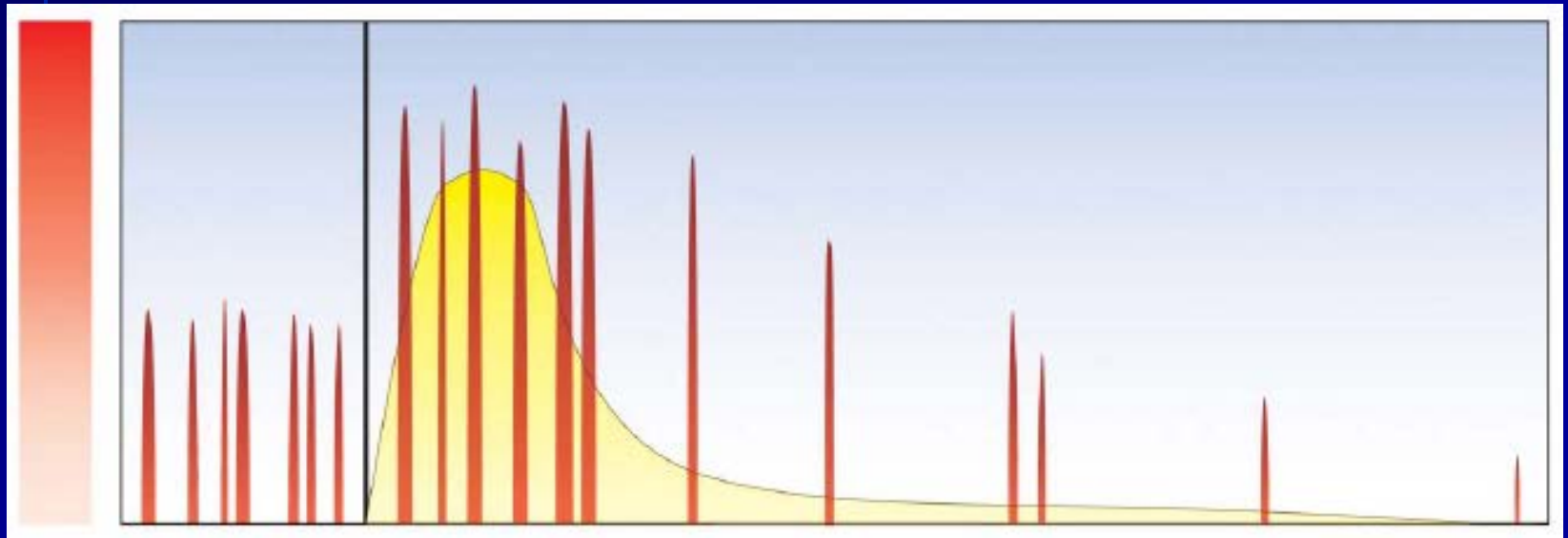
# First-Line Pharmacologic Therapy

- Non-Nicotine Therapy
  - Bupropion
  - Varenicline
- Nicotine Replacement Therapy
  - Nicotine patch
  - Nicotine gum
  - Nicotine lozenge
  - Nicotine nasal spray
  - Nicotine inhaler

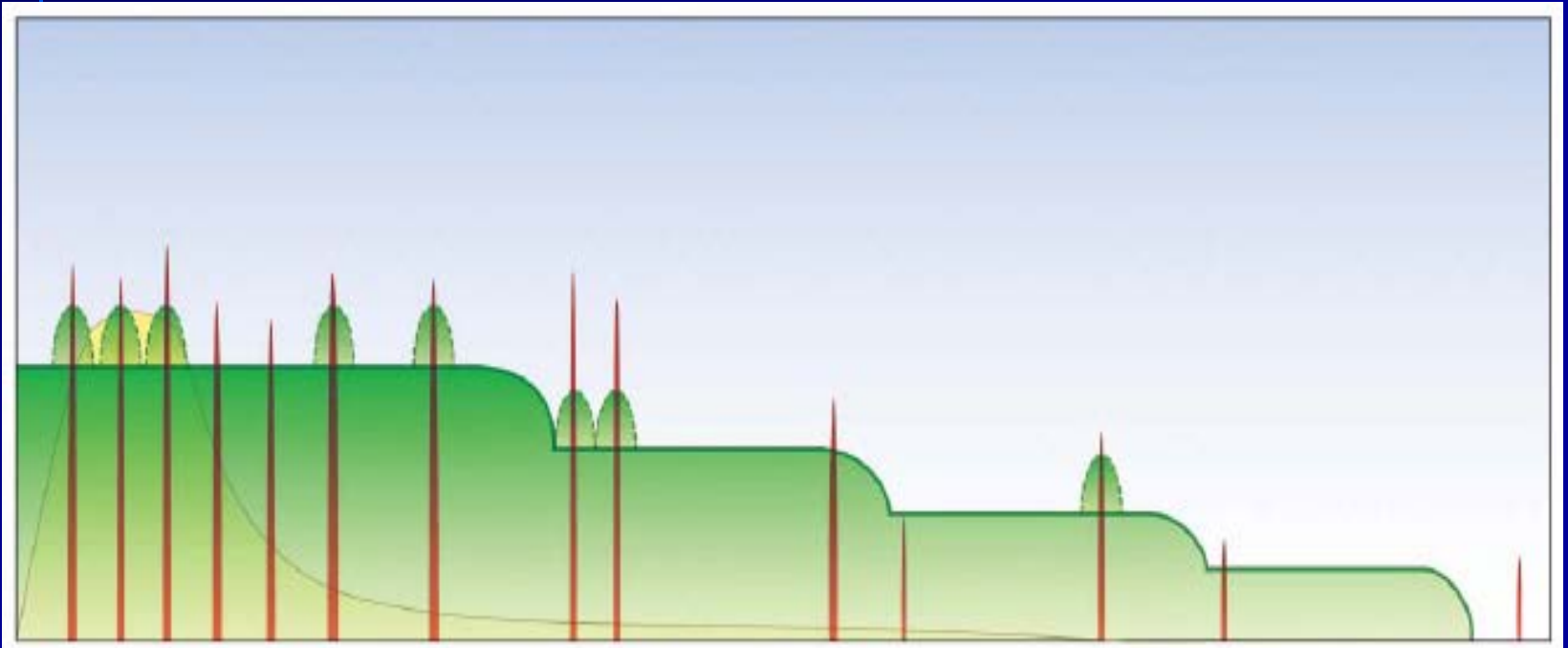
# Rationale for Pharmacologic Therapy

- Success rate doubles
- Manage negative mood states
- Provides opportunity to alter behavior without withdrawal
- Reduce withdrawal symptoms
- Reduces smoking cravings

# Quit Date: Withdrawal Symptoms, Cravings



# Quit Date: Pharmacological Therapy





# American College of Obstetrics & Gynecology *[www.acog.org]*

- If patient is unable to quit using tobacco by psychosocial means, consider pharmacotherapy
- Weigh risks of medication against risk of continued tobacco use
  - Risks of nicotine in the human fetus have not been shown
  - Benefits of NRT in cessation for pregnancy have not been shown

# NRT as an alternative to smoking

- Carbon Monoxide: a known reproductive toxin
  - Fetal Hypoxia
  - Retards Fetal Growth
  - Reduces Fetal Brain Weight
- Oxidant gases, Lead, Cadmium



# Pharmacotherapy in Pregnancy Risk/Benefit Analysis, Benowitz, Dempsey (2004)

- "Our review indicates that the risk of cigarette smoking during pregnancy is far greater than the risk of exposure to pure nicotine. The use of replacement therapy is probably not without risk, although the magnitude of risk to the mother and fetus is unknown... in the meantime, if a woman is unable to quit smoking despite behavioral therapy (and is, therefore, highly addicted), nicotine therapy should be considered."

# Benowitz and Dempsey (2004), continued

- "...nicotine does not appear to be a teratogen in the strict sense of the word (i.e., producing anatomical defects)...the choice between NRT and bupropion should be based mainly on the mother's preference and on contraindications regarding bupropion."

# Pharmacotherapy in Pregnancy

- For women who are not able to quit successfully with behavioral treatment alone...
  - Short acting oral NRT ad lib
  - Nicotine patch in lowest effective dose if oral NRT is ineffective
  - Combination NRT if needed
  - Bupropion alone or added to NRT if needed
- No data on varenicline safety

# Pharmacotherapy

## Nicotine Replacement Therapy

- Introduce as early as possible in pregnancy
- Lowest dose that controls withdrawal symptoms and permits abstinence, and then can increase dose if necessary
- Use products that allow intermittent dosing
  - gum, lozenge or inhaler
  - or take patch off at night

# Pharmacotherapy in Lactation

## Benowitz and Dempsey, (2004)

- “It is unlikely that the low level of exposure {with NRT} is hazardous to the infant. In contrast, good evidence indicates that exposure to environmental tobacco smoke by the respiratory route is hazardous to the infant...On balance the benefits of breast feeding and smoking abstinence during the postpartum period greatly outweigh the risks of {NRT} in the post-partum period.”



# Lactation and Post-partum: Recommendations

- Use lowest effective dose of NRT
- Use intermittent dosing product if possible
- Breast feeding should be delayed as long as possible after use of NRT, OR
- “Pump and Dump” after NRT use
- Bupropion is NOT recommended
- Varenicline is NOT recommended

# Key Treatment Component

## Relapse Prevention

- Individualized
- Red flags/high risk situations
- "Fire plan"
- Follow-up
- Support
- Stress management

# References

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- [Helppregnantsmokersquit.org](http://Helppregnantsmokersquit.org)
  - Pregnancy and post-partum quitline toolkit
- [Smokefreefamilies.org](http://Smokefreefamilies.org)
  - Implementation of *Pregnancy-Specific* Practice Guidelines for smoking cessation
- [Smokefree.gov/fffbam.html](http://Smokefree.gov/fffbam.html)
- [cdc.gov/tobacco/](http://cdc.gov/tobacco/)