Tobacco dependence as a chronic disease: Clinical and public health perspectives

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Learning objectives

At the end of this presentation the participations will be able to

- Identify the physical, psychological and social aspects of tobacco use
- Describe the health impact from the tobacco epidemic
- Describe the physiology of tobacco dependence
- Explain how tobacco dependence fits into a chronic disease model
Everybody knows smoking is bad, well 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
TOBACCO WILL KILL OVER 175 MILLION PEOPLE WORLDWIDE BETWEEN NOW AND THE YEAR 2030

Cumulative tobacco-related deaths, 2005–2030

## Daily cigarette smoking 2009

<table>
<thead>
<tr>
<th>Country</th>
<th>Men (%)</th>
<th>Women (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UK</td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td>Russia</td>
<td>53%</td>
<td>18%</td>
</tr>
<tr>
<td>China</td>
<td>43%</td>
<td>2%</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>14%</td>
<td>4%</td>
</tr>
<tr>
<td>Chile</td>
<td>43%</td>
<td>29%</td>
</tr>
<tr>
<td>Brazil</td>
<td>18%</td>
<td>11%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>5%</td>
<td>1%</td>
</tr>
<tr>
<td>South Africa</td>
<td>17%</td>
<td>5%</td>
</tr>
</tbody>
</table>
The tobacco epidemic

- Cigarettes cause nearly one in five deaths in US (Mokdad 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)
On one point, however, there is nearly complete consensus of opinion, and that is that primary malignant neoplasms of the lungs are among the rarest forms of disease.
1900-2005 U.S. Per Capita Cigarette Consumption

and 1930-2005 Age Adjusted Lung Cancer Death Rate per 100,000

NCHS Vital Statistics; Death rates are age-adjusted to 2000 US standard population.
Smoking-Attributable Mortality, 1997-2001

Number of average annual deaths

- **Total**: 437,902
- **Neoplasms**: 158,529
- **Cardiovascular diseases**: 131,502
- **Respiratory disease**: 101,454
- **Perinatal conditions**: 910
- **Burn deaths**: 818

Smoking-attributable (18.2%)

Other

CDC, 2005

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Medical Complications of Tobacco

All cancer

- Cigarette smoking – 30% of all cancer deaths

- Risk of cancer death 2 x higher in smokers and 4 x higher in heavy smokers

- Smoking causally linked to cancers of lung, larynx, oral cavity, esophagus, pancreas, bladder, kidney, stomach, and uterine cervix

US Dept. Health and Human Services, 2004
Medical Complications of tobacco
Coronary Artery Disease

- Smoking causes coronary artery disease
  - Over 130,000 CVD deaths per year due to smoking
  - >35% occur before age 65
  - JCAHO core measure

- Increased likelihood of a heart attack

- Increased sudden death if there is an MI

US Dept. Health and Human Services, 2004
Numerous health effects

- **Respiratory diseases**
  - Chronic obstructive pulmonary disease, Pneumonia, Respiratory effects in utero, Respiratory effects in childhood, adolescence, and adulthood, also cough, wheezing, and respiratory infections

- **Reproductive effects**
  - Fetal death and stillbirths, Lower fertility, Low birth weight, pregnancy complications

- **Cataract**
Health effects

- Hip fracture, low bone density
- Peptic Ulcer disease, Crohns disease
- Poor surgery outcomes
  - Diminished wound healing and Bone mending
- Poor diabetes outcomes
  - Circulatory problems, insulin resistance and worsened glucose control
- Impaired medication metabolism
- Fire

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Bryan of California
with his wife Judy and son, Scott.
He died at age 50 from lung cancer
Johnnie dying from lung cancer.

Audrey Mae of Mississippi died from a tobacco-related illness.
Linda started smoking at 12. She died at age 47, leaving behind a husband, daughter, and new grandbaby. She thought smoking would make her thin.

Bill on his 75th birthday and the wedding day of his daughter, Donna
Public Health Model

AGENT

ENVIRONMENT

VECTOR

HOST

Incidental Host

Source: U.S. Department of Health and Human Services, 1991
The promotion of an epidemic
Crop of the Americas

Strachey – 1612 Jamestown tobacco from Trinidad seeds – best tobacco there is

1620 cost 3c per pound Orinico plantations and Trinidad

40c per pound at market
Cigarettes the chief vector

- Flue cured tobacco, developed on NC farms in 19th century, produce mild, easily inhaled smoke.
- Burley tobacco add nicotine, flavor, and ability to hold additives
- Maryland tobacco helps keep the cigarette burning
Precursors to the epidemic

- Mass Production
  - Cigarette rolling machine

- Modern Marketing
  - Salesmsenship
  - Advertising
  - Price
  - Product placement

- Portable matches
Trends in Per Capita Consumption of Various Tobacco Products – United States, 1880-2004

Source: Tobacco Situation and Outlook Report, U.S. Department of Agriculture, U.S. Census
Note: Among persons ≥ 18 years old. Beginning in 1982, fine-cut chewing tobacco was reclassified as snuff.
1900-2005 U.S. Per Capita Cigarette Consumption and 1930-2005 Age Adjusted Lung Cancer Death Rate per 100,000

NCHS Vital Statistics; Death rates are age-adjusted to 2000 US standard population.
Tobacco smoke:
a complex and deadly mixture

- Nicotine
  - Vaporized nicotine in free-base form
  - Causes addiction
  - Does not cause the extensive mortality and morbidity

- Tar
  - 7,000 chemicals with over 60 known carcinogens

- Carbon monoxide
DO YOU INHALE?

A frank discussion at last
on a subject that has long been "taboo"

Let sleeping dogs lie! So said the cigarette trade when first we raised the subject of inhalers. But shying an important issue is not Lucky Strike's policy.

Do you inhale? This operation is vitally important... for every smoker inhales—knowingly or unknowingly. Every smoker breathes in some part of the smoke he or she draws out of a cigarette! And the delicate membranes of your throat demand that your smoke be pure, clean—free of certain impurities!

No wonder Lucky Strike dares to raise this vital question! For Luckies bring you the protection you want—because Luckies' famous purifying process removes certain impurities concealed in every tobacco leaf. Luckies created that process. Only Luckies have it.

So whether you inhale knowingly or unknowingly, safeguard those delicate membranes!

"It's toasted"

Lucky Strike®
Cigarettes

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Lady with a Lamp
(1946 Version)

More doctors smoke Camels than any other cigarette

According to a recent Nationwide survey:

Men and women in every branch of medicine—13,397 in all—were queried in the nationwide study of cigarette preference. Three leading research organizations made the survey. The gist of the inquiry was: What cigarette do you smoke, Doctor?

The second favored was not Camel.

The rich, full flavor and cool mildness of Camel's unique blend of costlier tobaccos seem to have won the same favor in medical circles as with millions of smokers the world around. If you smoke a Camel, you too will find that your taste responds to the rich, full flavor of Camel's costlier tobaccos. Try Camel on your "T-Zone"—the naso-oral area—just as cigarettes are traditionally smoked.
FACE THE FACTS!
When tempted to over-indulge
"Reach for a Lucky instead"

Be moderate—be moderate in all things, even in smoking. Avoiding over-indulgence, if you would maintain your health, encounter a fat figure. "Reach for a Lucky instead."

Lucky Strike, the finest Cigarette you ever smoked, made of the finest tobacco—The Cream of the Crop—"IT'S TOASTED."
Lucky Strike has an extra, secret heating process. Everyone knows that heat purifies and so 20,679 physicians say that Luckies are less irritating to your throat.

"It's toasted"
Your Throat Protection—against irritation—against cough.

*We do not say smoking Luckies reduces risk. We do say when tempted to over-indulge, "Reach for a Lucky instead."

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The Evidence builds

- Doll and Hill and Wynder and Graham – 1950-51

Case control studies
- Over 600 cases in each
- Differentiation of risk by duration and amount
- Careful consideration of bias and confounders

- Doll and Hill immediately followed with a large prospective study (Doctor’s study)
"We accept an interest in people’s health as a basic responsibility, paramount to every other consideration in our business."

— Tobacco Industry Research Committee
If you're the 1 in every 3 smokers who needs protection against tars and nicotine...

Look at Kent's proof of greatest filter protection and see why you should change to Kent!

Enjoy Kent with exclusive Micronite Filter... the greatest filter protection in cigarette history!
Filtered cigarettes as a percentage of total cigarette sales

The cigarette smoking public attaches great significance to visual examination of the filter tip material, after darkening, the filter is judged to be effective. While the use of such colour change material would probably have little or no effect on the actual efficiency of the filter tip material, the advertising and sales advantages are obvious.

Kozlowski, 1998
Claude Teague – Chemist RJ Reynolds (from Brandt, 2007)
1964 Surgeon General’s Report

- 10 Advisors to Luther Terry began looking at the evidence in 1962:
  - Over 7000 studies reviewed
  - Great amount of political/economic pressure
All the fuss about smoking got me thinking I'd either quit or smoke True.

I smoke True.
Equivalent toxicity but perceived health benefit

- Design of Marlboro Red and Marlboro Lights
- Nicotine and toxin ingestion equivalent
- Disease burden virtually the same
- Most smokers use “lights”, often with the explicit expectation of reduced risk
- Cigarette market larger because of Lights

NCI, 1998
“The smoker profile data reported earlier indicated that Marlboro Lights cigarettes were not smoked like regular Marlboros…”
“In effect, the Marlboro 85 smokers in this study did not achieve any reduction in the smoke intake by smoking a cigarette (Marlboro Lights) normally considered lower in delivery.”
You can do it!

You've got MERIT

You can switch down to lower tar and enjoy smooth, satisfying taste.

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What we need to know above all things is what constitutes the hold of smoking, that is, to understand addiction.
The cigarette should be conceived not as a product but as a package. The product is nicotine.

Think of the cigarette pack as a storage container for a day’s supply of nicotine:

Think of the cigarette as a dispenser for a dose unit of nicotine:

2) Its rate of combustion meters the dispensing rate, setting an upper safe limit for a substance that can be toxic in large doses.
3) Dispensing is unobtrusive to most ongoing behavior.
DANDY 2
Development and Assessment of Nicotine Dependence in Youth

- 1246 enrolled in 6th grade and followed over 4 years with meetings 3 x per year
  - Baseline
    - 15.4% had a puff, 1.3% used weekly
  - At end of study (cumulative)
    - 29.7% had a puff and 10.4% used weekly
    - Odds ratio for yes to 1 item of DANDY 44.0

- At end of study 38% of those who had a puff were dependent

Defranza et. Al. Susceptibility to Nicotine Dependence: Pediatrics; 120 974-83 2007
- Addictive disorder usually starting in adolescence

- People ‘know smoking is bad’ but underestimate both
  - The true health impact
  - The challenges of addiction

- Effective clinical and public health responses are under-delivered
Public Health Model for Tobacco epidemic

**Tobacco Products**
Cigarettes, other delivery forms as entry or maintenance for epidemic

**Environment**
Culture, Regulation, Economics
Health care system, Education

**Vector: Reduce impact of Tobacco Industry**

**Host**
Exposure, genetic predisposition, treatment factors

**Incidental Host**
Greatest impact upon the spread of the tobacco epidemic

- Smoke free ordinances
- Price increases
- Marketing restrictions
- Truthful and targeted education
- Treatment
Clinical approaches

- Most people who smoke want to stop

- People who do continue to smoke usually don’t feel capable of stopping and living without cigarettes
1. **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.
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.
Asthma

- High genetic predisposition
- Voluntary and lifestyle choices affect course of illness
- Treatment consists of behavioral changes and medication
- Poor adherence affects outcomes
- Outcomes poorest among patients with more SES and comorbidity problems

McLellan, 2000
Chronic disease management

- Establish systems changes to support chronic disease management
  - Consistent screening
  - Medication management
  - Treatment integrated into health-care system
  - Ongoing monitoring and recycling into more intensive treatment as needed
  - Appropriate coverage
Partner with our patients to provide them the care they need.

Open the dialogue.
Relapse after cessation of treatment for asthma, diabetes, or hypertension seen as evidence for treatment effectiveness

Relapse after cessation of treatment for tobacco dependence is seen as evidence of treatment failure!
Scenarios: impact of prevention

Cumulative deaths from tobacco (millions)

Year

1950
1975
2000
2025
2050

If smoking uptake halves by 2020

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Scenarios: impact of cessation

Cumulative deaths from tobacco (millions)

Year

1950 1975 2000 2025 2050

0 70 190 220 520

If adult smoking halves by 2020

If smoking uptake halves by 2020

Peto, 1999

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Summary

- One in five deaths in US caused by tobacco
- Worldwide epidemic is growing
- Tobacco illnesses include
  - 14 types of cancer
  - Coronary artery disease
  - Lung disease
- Smoking cessation dramatically improves health
- Tobacco dependence is best treated as a chronic illness