The Global Legacy of Tobacco
A Cross-Curricular Survey

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Wild tobacco (Nicotiana rustica)  

Cultivated tobacco (N. tabacum)

Any of various plants of the genus Nicotiana, esp N. Tabacum, native to tropical America and widely cultivated for their leaves, which are dried and processed chiefly for use in snuff or smoking.

Smoking-Caused Diseases

Cancers
- Oral pharynx
- Larynx
- Esophagus
- Lung
- Pancreas
- Kidney and Ureter
- Bladder

Chronic Diseases
- Stroke
- Coronary heart disease
- Aortic aneurysm
- Atherosclerotic peripheral vascular disease
- Chronic obstructive pulmonary disease (COPD)
Worldwide Projections

- Tobacco kills nearly 10,000 people every day, 3.5 million a year.

- 10 million annual deaths by 2030, 7 million occurring in developing countries.

- By 2020, 12% of all deaths globally (more than HIV, TB, maternal mortality, car accidents, suicide and homicide combined).
History Teachers?
Tobacco History

5000-3000 BC  First cultivation
1 BC          Early Use in the Americas, including smoking, chewing and tobacco enemas
Tobacco History

1492 “Discovered” by Columbus in the Americas
Tobacco History

1604  King James I
      increases import tax by 4,000%

1612  John Rolfe plants first commercial crop in Virginia

1619  Africans brought to Virginia as indentured tobacco workers
Tobacco History

1884 JB Duke signs contract with Bonsack

1906 US Food and Drugs Act - nicotine removed from act after industry lobbying

1910 Duke’s American Tobacco Co. controls 92% of world tobacco business

1912 Book matches perfected by Diamond Co.
Social Studies Teachers?
Growing the Market

1912 Monograph on lung cancer published by Dr. Isaac Adler

1914-18 WWI - Cigarettes included in rations
Public Relations and the Tobacco Industry

1917: World War I and “making the world safe for democracy”

1920s: Bernays: “fathered the link between corporate sales and social causes”

1929: Lucky Strike Campaigns: “Torches of Freedom” and The “Green Ball”
“Torches of Freedom” March - 1929

The “Green Ball” - 1934

The Green Ball

Uniting Art, Fashion and Beauty
FOR THE BENEFIT OF THE
NEW YORK INFIRMARY
FOR
WOMEN AND CHILDREN

The Waldorf-Astoria
Thursday, October 25th
AT NINE O’CLOCK

Tableaux of Famous Paintings with a Green Motif
Recreated in Living Pictures
and
Fashion Show of Original Models in Green especially
designed by American and French creators and inspired
by Masterpieces of Art

Games—Tableaux and Fashion Show—Supper—Entertainment
Dancing until Three o’Clock

MUSIC by NAT HARRIS and his EMBASSY ORCHESTRA

Reservations and Tickets
THE GREEN BALL COMMITTEE, Room 1535, Chrysler Building
TELEPHONE VANDERBILT 3-9456

Tye, The Father of Spin, 1998
Tobacco Use in the US, 1900-1999

*Age-adjusted to 2000 US standard population.

Economics Teachers?
The Changing Epidemic

I don’t think it’s news to the North Carolina farmers that the American public as a whole is smoking less. We ought to think about opening up markets, breaking down barriers rather than erecting new tariffs, new quotas, and things of that sort.

Vice President Dan Quayle, 1990
# Transnationals and the Global Economy

<table>
<thead>
<tr>
<th>Altria Group Net Revenues 2006 (millions USD)</th>
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<tbody>
<tr>
<td>USA Tobacco</td>
</tr>
<tr>
<td>International Tobacco</td>
</tr>
<tr>
<td>North American Food</td>
</tr>
<tr>
<td>International Food</td>
</tr>
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</table>
Market Expansion

• Investing in state-owned tobacco companies
• Direct acquisitions
• Licensing out tobacco brands for non-tobacco products ("brand stretching")
• Hiring high-powered lobbyists/consultants
• Advertising and promotion
KUWAIT: 400,000 smokers
HONG KONG: 880,000 smokers
CHINA is the big prize: 300 million smokers
Economic Burden

• Medical costs
  – Ambulatory care
  – Hospital care
  – Prescription drugs
  – Nursing home
  – Neonatal medical expenditures

• Productivity losses due to:
  – morbidity
  – disability
  – premature mortality
Tobacco Consumption and Malnutrition in Bangladesh

Figure 1  Men’s monthly cigarette expenditures versus per capita monthly expenditure for basic needs, 1997. Cloth, clothing.

Figure 2  Per capita monthly expenditure: actual and with men’s monthly cigarette expenditures allocated across categories (national average), 1997. Cloth, clothing.

Tobacco Consumption and Poverty

• Engine for economic development or drain on scarce resources?

A pack of Marlboro or equivalent international brand will buy...

For the price of 20 Marlboro you could buy...
...one and a half kilograms of cucumbers in Georgia...
...a dozen eggs in Panama...
...four pairs of cotton socks in China...
...a dozen coconuts in Papua New Guinea...
...one kilogram of fish in France, Ghana or Moldova...
...six kilograms of rice in Bangladesh.

The Tobacco Atlas, WHO, 2002
Economics of Tobacco Farming

• Auction, contract system
• Limited number of buyers
• Buyers establish “grade” of tobacco
• Loan programs from buyers – deeper in debt

*Golden Leaf, Barren Harvest. Campaign for Tobacco Free Kids, 2001*
Tobacco Production: Health Effects

• Exposure to pesticides
  “From the day the nursery is laid to the day the pay cheque is collected, the farmer inhales an assortment of chemicals...To make matters worse, the farmer has no protective gloves, gas masks, gum boots...tobacco nurseries are situated near water masses most times at the source...as the farmer waters his chemical drenched seedbed, the water flows back to the river...”

• Exposure to tobacco leaf (green tobacco sickness)

Golden Leaf, Barren Harvest. Campaign for Tobacco Free Kids, 2001
Tobacco Production: Environmental Impact

- **Soil depletion:** nitrogen, phosphorus, potassium depleted from the soil, making it useful only with the addition of fertilizers
- **Deforestation:** Trees cut down to provide land for cultivation, as fuel for the curing process, to build curing barns.

Proportion of total annual deforestation attributable to tobacco

*Golden Leaf, Barren Harvest.* Campaign for Tobacco Free Kids, 2001
Evidence suggests that when multinational tobacco companies have entered new markets, consumption has increased (reduction in price of imported cigarettes, increased and more sophisticated advertising, lobbying against tobacco control measures).

Basic issue: are changes in trade agreements (e.g., excluding tobacco) needed in order to successfully control tobacco use worldwide?
Health Teachers?
Evidence on Tobacco and Health

- Clinical studies
- Rising mortality
- Early case-control studies
  - Doll and Hill
  - Wynder and Graham
  - Levin and colleagues
- Prospective cohort studies
Alton Ochsner (1896-1981)
“There is a distinct parallelism between the incidence of cancer of the lung and the sale of cigarettes, and it is our belief that the increase is due to the increased incidence of smoking and that smoking is a factor because of the chronic irritation that it produces.”

Alton Ochsner, October, 1945
1950s - Three Key Case Control Studies

Morton Levin publishes study linking smoking and lung cancer in JAMA

Ernst L. Wynder and Evarts A. Graham publish study in JAMA in which 96.5% of lung cancer patients interviewed were smokers

Richard Doll and Bradford Hill publish study in BMJ finding that heavy smokers are 50X more likely to get lung cancer
First Report of the Surgeon General on Smoking and Health
Chemistry Teachers?
What the [tobacco] industry wants people to believe is that a cigarette is nothing but a natural product grown in the ground, ripped out, stuffed in a piece of paper and served up. It's not. It's a meticulously engineered product. The purpose behind a cigarette ... is to deliver nicotine -- an addictive drug.

Jeffrey Wigand
## The Changing Cigarette

<table>
<thead>
<tr>
<th>Year</th>
<th>Technological Alteration</th>
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</thead>
<tbody>
<tr>
<td>1913</td>
<td>Introduction of the American Blend</td>
</tr>
<tr>
<td>1940s</td>
<td>Change in cigarette length</td>
</tr>
<tr>
<td>1954</td>
<td>Introduction of filter tips</td>
</tr>
<tr>
<td></td>
<td>Reconstituted tobacco added to blend</td>
</tr>
<tr>
<td></td>
<td>Addition of flavorants</td>
</tr>
<tr>
<td>1950s</td>
<td>Porous wrapper in wider use</td>
</tr>
<tr>
<td>1960s</td>
<td>Expanded blends reduce total volume</td>
</tr>
<tr>
<td></td>
<td>Introduction of ammonia technology</td>
</tr>
<tr>
<td>1970s</td>
<td>Ventilation and dilution techniques perfected</td>
</tr>
<tr>
<td>1980s</td>
<td>Further change in length</td>
</tr>
<tr>
<td>1990s</td>
<td>Alternative smoking prototypes</td>
</tr>
</tbody>
</table>

Bollinger and Fagerstrom, 1997
What is in a Cigarette: Carcinogens in Tobacco and Cigarette Smoke

- **PAHs**
  - Benzo(a)pyrene
- **Aza-arenes**
- **$N$-Nitrosamines**
- **Aromatic amines**
  - 2-Napthylamine
  - 4-Aminobiphenyl
- **$N$-Heterocyclic amines**

- **Aldehydes**
- **Organic compounds**
  - 1,3-Butadiene
  - Benzene
  - Vinyl chloride
  - Acrylamide

- **Inorganic compounds**
  - Arsenic
  - Chromium
  - Polonium-210

Hoffmann and Hoffmann, 1997
# What is in Tobacco Smoke?

<table>
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<tr>
<th>Disorder</th>
<th>Contributing Agents</th>
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| **Tobacco Dependence** | Major: nicotine  
 |                    | Minor: secondary Nicotiana alkaloids, flavor components      |
| **CVD**           | Major: carbon monoxide, nitrogen oxides, hydrogen cyanide, “tar”  
 |                    | Minor: cadmium, zinc, carbon disulfide                       |
| **COPD**          | Hydrogen cyanide, volatile aldehydes, nitrogen oxides, carbon monoxide, “tar” |
## What is in Tobacco Smoke?

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| Lung and larynx cancer | Major: PAH, NNK  
                          | Minor: polonium-210, formaldehyde, acetaldehyde, butadiene, metals (Cr, Cd, Ni)    |
| Oral Cavity Cancer   | Major: NNN, NNK  
                          | Minor: PAH                                                                          |
| Esophageal Cancer    | NNN                                                                                   |
| Urinary Bladder      | 4-Aminobiphenyl, 2-napthylamine, other aromatic amines                                  |
| Pancreas Cancer      | NNK, NNAL                                                                             |

Hoffmann and Hoffmann, 1997
Ethics Teachers?
• Tobacco marketing
• Excise taxes
• Accepting tobacco industry donations
• Marketing of new tobacco products
• Duty to other countries
Tobacco Control: International Action

• Framework Convention on Tobacco Control
  - Adopted by the World Health Assembly in May 2003, ratified by 173 countries as of 2011
  - Intended to address international and regional issues as well as promote strong national tobacco control policies
  - Encourages countries to:
    - Ban tobacco advertising, promotion and sponsorship;
    - Place health warnings on packages
    - Ban the use of misleading terms such as "light" and "mild";
    - Provide clean indoor air in workplaces, public transport and indoor public places;
    - Combat smuggling;
    - Increase tobacco taxes

Framework Convention Alliance, 2003
Tobacco Control: National Action

- Wide range of national tobacco control programs ranging from comprehensive to extremely limited
- Social, political, economic context contributing to variety of approaches
- To what extent can approaches be applied universally?
Online Resources

• Tobacco Control Supersite: http://tobacco.health.usyd.edu.au/
• Tobacco.org, Tobacco News and Information: http://www.tobacco.org
• Tobacco Free Kids: http://www.tobaccofreekids.org/
• Centers for Disease Control and Prevention: http://www.tobaccofreekids.org/
• Truth Campaign: http://www.thetruth.com/about/
Tobacco Control PSAs

- [http://www.youtube.com/watch?v=HYjbWHbbjjg&feature=related](http://www.youtube.com/watch?v=HYjbWHbbjjg&feature=related)
- [http://www.youtube.com/watch?v=UPaS2pbUWY4&feature=related](http://www.youtube.com/watch?v=UPaS2pbUWY4&feature=related)
- [http://www.youtube.com/watch?v=KmYM3taBVPM](http://www.youtube.com/watch?v=KmYM3taBVPM)
- [http://www.youtube.com/watch?v=-YjrkBYDDQM&playnext=1&list=PLBA91AD1201C42894](http://www.youtube.com/watch?v=-YjrkBYDDQM&playnext=1&list=PLBA91AD1201C42894)