

x 3403

National Cancer Institute (U.S.)

8004



WORLD HEALTH ORGANIZATION
ORGANISATION MONDIALE DE LA SANTÉ

SMO/86.4

ENGLISH ONLY

NCI/WHO STUDY ON THE HEALTH EFFECTS AND ECONOMIC
IMPLICATIONS OF TOBACCO CONSUMPTION
IN SELECTED DEVELOPING COUNTRIES

Fourth Advisory Committee Meeting
Geneva, 2-5 June, 1986



CONTENTS

	<u>Page</u>
1. INTRODUCTION	2
2. EVENTS TO DATE	2
3. SUMMARIES OF SUB-GROUP DISCUSSIONS	4
4. SCHEDULE OF EVENTS FOLLOWING THIS MEETING	5
ANNEX 1 Reports from sub-groups:	
a) Economics of tobacco production	7
b) Health economics	15
c) Epidemiology	16
ANNEX 2 Empirical questions that should yield data items	22
ANNEX 3 List of participants	25

Smoking

Tobacco

Brazil

Egypt

Thailand

The issue of this document does not constitute formal publication. It should not be reviewed, abstracted or quoted without the agreement of the World Health Organization. Authors alone are responsible for views expressed in signed articles.

Ce document ne constitue pas une publication. Il ne doit faire l'objet d'aucun compte rendu ou résumé ni d'aucune citation sans l'autorisation de l'Organisation Mondiale de la Santé. Les opinions exprimées dans les articles signés n'engagent que leurs auteurs.

1. INTRODUCTION

The purpose of this joint study by the World Health Organization and the U.S. National Cancer Institute, Bethesda, is to provide an objective analysis of the projected economic impact of cigarette smoking in selected developing countries, with a special emphasis on cancer and, in particular, lung cancer.

There is already a considerable amount of information available on the balance between the economic gains from tobacco production/manufacture and the losses arising from health expenditure and the costs of lost productivity in the developed countries, which has shown there to be an unfavourable balance in these countries; a further study would add little to what is already known. In many developing countries, however, the immediate benefits of tobacco production are easily although sometimes superficially gauged but the long term effects of tobacco consumption on health and on productivity - and the burdens that these bring to the country's economy - are less clearly seen or understood.

In view of this it was decided that a study which would outline the balance between gains and losses: the advantages accruing from tobacco production and manufacture on the one hand and the economic burden of expenditure on ill health along with losses due to foregone productivity on the other, in selected developing countries and projected to the year 2000, would be extremely valuable.

A meeting was, therefore, called in Geneva with the objectives of reviewing the situation, introducing the representatives from the chosen countries and bringing the Advisory Committee up to date with activities since the last meeting by presenting and discussing data so far obtained, identifying data gaps and planning the next phase of the work.

On behalf of the Director-General, Dr V.J. Grabauskas, Director of the Division of Noncommunicable Diseases, opened the meeting by welcoming the delegates. He mentioned that the study had been carefully planned during the past few years in negotiations between WHO and NCI and through Advisory Committee meetings but that this was the first occasion all three had met together with representatives from the collaborating countries. These three countries had been selected because of availability of data, geographical location, dedication of the national investigators and the manifest backing given to the project by the national authorities.

Dr Grabauskas pointed out that it is the developing countries to which the tobacco industry looks for developing its markets and that such development will bring in its wake what is a clearly foreseeable epidemic of disease. Although both WHO and NCI are primarily concerned with health protection, economic issues cannot be disregarded in considering the many issues concerned with tobacco use.

In concluding, Dr Grabauskas referred to the resolution of the recent World Health Assembly which gives a stronger than ever mandate to WHO to investigate the health issues related to tobacco consumption and he felt sure that this meeting would be a starting point in providing answers to some of these issues.

2. EVENTS TO DATE

The title of the study may appear limiting but the scope and nature of the work remain the health and economic effects of tobacco consumption and production with particular reference to three developing countries.

The goals of the study are to describe and analyze the economics of tobacco production and manufacture and of tobacco consumption in the three developing countries with the aims of (a) developing a model which could be used for continuing studies in other developing countries and (b) providing an impetus to the primary aim of improving health.

Since the last meeting when two separate areas of work were considered, the health-related data and the production data, direct contacts had been made with experts in the three countries and the nature of the work and data requirements discussed with them.

In the realization that the majority of the preliminary data on tobacco production and manufacture, and information on questions concerned with import and export would be available from sources such as FAO, USDA, and the World Bank, and since the principal WHO contacts in the countries were primarily concerned with health data, the discussions in the countries had ranged over the following areas:

1. Demographic data.
2. Smoking: prevalence and consumption. The scope and nature of surveys to date and the possibilities for other surveys. Information on age, sex, duration of habit, amounts smoked and types of tobacco use.
3. Mortality, numbers and rates from smoking-related diseases, in particular from cancer of trachea, bronchus and lung, coronary heart disease and chronic bronchitis and emphysema. An assessment of the accuracy of the data and the possibility of obtaining information on the smoking status of decedents.
4. Morbidity from smoking-related diseases by age and sex and by smoking status. Periods of disability and degree of disability.
5. Medical care. Availability of data on use of different types of medical care used by the various smoking-related disease conditions. Costs of different types of medical care, if possible per case and overall.
6. Employment. Discussions were concerned with employment participation rates, wage rates and sex differentials.
7. Social security. These discussions were concerned with how health care is funded in each country. Insurance or social security systems, their funding and benefits.
8. Time scale for the work, number of people needed to be involved and an approximate cost of carrying out the work.

At the third meeting of the Advisory Committee several countries had been considered and the final choice was Brazil, Egypt or Tunisia, and Thailand. Tunisia had been included because a study had been published which appeared to form a basis on which to build further for this project. Similarly from work carried out in Argentina it seemed that data from there might be used. After studying the reports from these countries in more detail it was clear that neither could be used.

A summary of the meetings in the three countries was circulated with the agenda. As a result of the meetings, a considerable amount of data is already to hand awaiting a preliminary analysis. Some examples of this data were also circulated.

Concurrently with the direct approaches to the countries, a collection of available data on the three countries had been made in Washington and IARC, Lyon, and a considerable amount of information was made available. After the country representatives had presented an overall view of the information availability in each of their countries, the committee formed three sub-groups to consider the country data and further data requirements in three categories:

1. The economics of tobacco production.
2. Health economics.
3. Smoking and epidemiology.

Reports from the three sub-groups are contained in Annex 1.

3. SUMMARIES OF SUB-GROUP DISCUSSIONS

(a) Agricultural Economics Group

A considerable amount of the required data can be obtained without direct reference to the countries, from sources such as: USDA, FAO, IMF, World Bank, and the U.S. Department of Commerce. There is some information, however, which will have to be provided by an economist in the country. This could be listed as follows:

1. Description of agricultural practices, land use, labour use, use of chemical fertilizers, herbicides and pesticides. Tobacco's share of the use of these facilities and share of the farm production - included here would be production costs and gross returns. Information on farming subsidies (subsidies on inputs, preferential credit schemes, advisory services). Costs and returns of alternative crops.
2. Description of processing, manufacture and distribution, use of technology, labour and capital. Costs and value added in processing and manufacture, income in marketing and advertising expenditure if available. Information on manufacturing subsidies.

These data could be taken from farm enterprise budgets and agricultural research institutes or university departments. It is hoped that the local economist could locate and supply farm enterprise budgets.

A list of "Empirical questions that should yield data items" is contained in Annex 2 which may give helpful guidance.

b) Health Economics Group

Two categories of cost were detailed by the sub-group:

Direct costs which represent the diversion of the society's resources to the treatment of disease (detection, treatment, rehabilitation) and hence an expenditure.

Indirect costs which represent the lost resources (lost or foregone productivity - current and future - due to disability and mortality) and are less clearly measurable than the direct costs, although in some countries they can be far greater.

Long term treatment and survival will involve high expenditure costs and short term treatment followed by death will involve high values for lost resources. Thus different smoking-related diseases will involve different ratios of the two types of cost.

It also became clear that different ways of approaching the assessment of health care costs could be different in the three countries.

The health economist on the committee thought that the assistance of a health economist was needed in each country. The alternative solution which was accepted was that a general economist be employed in each country to obtain the required local information on the tobacco industry and, with the assistance of a WHO health economist who would visit each country to help identify the data needed, also obtain the data available for the health economics analysis. The way of approaching health costs could be different in the three countries.

c) Epidemiology Group

The requirements from the countries fall into two categories: Consumption data and health data, and the situation for each country is different.

1. Brazil

i) If more smoking prevalence data could be obtained, perhaps by a small survey, to supplement the 1978 data, it would be a very valuable addition to the available data, and any other information on smoking prior to 1978 may be useful.

ii) A considerable amount of additional health data assembled after the group meeting fulfilled many of the requirements outlined at the meeting.

2. Egypt

i) There is a considerable amount of smoking prevalence data available which covers recent years - the latest data still need to be translated from the Arabic, i.e., the 1986 data.

ii) The absence, or unreliability of the mortality data leaves the questions: can any further information be found, and can any more accurate data be obtained - perhaps for a municipal population? A clinic survey, suggested by Dr Omar, may provide some useful information on morbidity, as well as the cost data which will be forthcoming from it.

3. Thailand

i) A smoking survey by age and sex in which individuals were questioned rather than the head of household would be very valuable, if such a survey was feasible.

ii) Information on smoking-related diseases other than cancer would be useful.

4. SCHEDULE OF EVENTS FOLLOWING THIS MEETING

1. As soon as possible the country coordinators will identify an economist for their country to obtain the locally available economic data on the tobacco industry and to assist with the health economics data. An assessment of the time this economist will require and the cost of his services will be discussed with WHO.

2. WHO/NCI will identify a health economist to visit the three countries and brief the local economist on the most satisfactory approach for dealing with the situation in his country.

3. WHO will begin to analyze existing data and maintain correspondence with the country representatives to clarify or upgrade the data and, if possible, obtain any that might be missing.

4. WHO will prepare a preliminary report by February 1987 to be considered by the Advisory Committee in March 1987.

5. Draft report, June/July 1987.

6. Final report, September 1987.

REPORTS FROM SUB-GROUPS

a) Economics of Tobacco Production

The production and distribution of tobacco and tobacco products creates both costs and benefits for the society. Farmers produce tobacco because they think that their net returns are greater in producing tobacco than in other uses of their land, labour and capital resources. Those who smoke do so because they derive some pleasure from it, or they believe that the costs of quitting are too high to incur. Both income and employment are created by processing, manufacturing and distribution of tobacco and tobacco products.

Yet tobacco production and distribution also bring costs. Some costs are paid by the farmer as he purchases tobacco seed or other inputs, or applies his labour to tobacco production rather than other activities. Other costs are incurred by consumers as their health is affected by tobacco consumption. Some costs may be paid by the society, such as health care costs that are financed by government. Some costs are incurred now, but may be largely paid by future generations, such as the costs of deforestation from use of wood in curing tobacco.

The theoretically correct measure of the net social benefit of an economic activity is the "consumer surplus" that arises from the production and distribution of the goods. Consumer surplus is a measure of the amount of benefit derived by consumers from the product, above and beyond the cost they must pay for its purchase. This measure of net social benefit assumes that the cost to the society in producing and consuming the product is exactly offset by the amount that consumers pay for the product. For tobacco it is clear that the net benefit to the society of tobacco consumption cannot be measured in this way, because: (1) the price of the product does not include costs such as the health costs of smoking or the environmental effects of tobacco production; (2) the data for making these calculations are not available, even ignoring the costs that are not captured in product prices.

Nevertheless, it is important, and possible, to gain more understanding of the economic significance of tobacco. The health costs of smoking can be estimated, and the economic benefits that result from tobacco production and distribution can be identified and calculated.

Ignoring the health costs of tobacco, it is possible to analyze some of the social benefits and costs that arise in the agricultural sector from the production and distribution of tobacco. The value of tobacco produced, the value of cigarettes consumed, the amount of cigarette taxes and other aggregate measures of economic activity do not accurately portray the economic significance of agricultural production, because the costs of the production are not included. Similarly, taxation of tobacco products might be an important source of government revenue, although the amount of tax is not a benefit to the society because it is simply a transfer of resources from the private to the public sector. The tax is simply a convenience for the government because it can avoid the need to raise that revenue from some other type of tax, although it is also possible that the tax is used as a means of redistributing income in the society. Yet it is possible to produce some rough measures of the significance of tobacco production, processing, manufacturing and distribution.

Logically, this discussion could be divided into several parts: (i) an overview of the "tobacco economy" in a country, using aggregate data to simply describe what exists; (ii) a more detailed analysis of the net benefit of agricultural production activities; (iii) an analysis of the role of tobacco taxation in the general system of public finance; (iv) analysis of the effect of tobacco production and consumption on the foreign exchange position of the economy; (v) an analysis of the employment generated by tobacco processing, manufacturing and the distribution of tobacco products.

Aggregate data: Overview

Data that describe the amount or value of tobacco production do not measure the economic importance or benefits of tobacco. Likewise, data on the amount of land area occupied by tobacco do not indicate the importance of tobacco income to farm families or the degree to which tobacco production is competitive with the production of food crops. Nevertheless, such data do provide a general overview of economic activity that involves tobacco. These data do not indicate the net benefits of tobacco production, and in no way measure the economic impact of expanding or eliminating tobacco production. The data are useful only in providing a general "picture" of activity in the tobacco sector of the agricultural economy.

Data needed	Data source
1. Description of tobacco production system: a) description of the agricultural practices b) how land and labour are used in agricultural production of tobacco c) use of chemical fertilizers, herbicides d) the timing of labour use e) tobacco's share of total agricultural production f) recent trends in production	1. a) national ministries of agriculture and national agricultural universities; FAO; USDA and other similar sources in Washington, D.C. b) same as (a) c) same as (a) d) same as (a) e) same as (a) f) same as (a), but especially USDA
2. Description of tobacco processing, manufacturing and distribution system: a) technology, capital use, employment and value added in processing activities b) technology, employment, use of capital and value added in manufacturing of tobacco products c) description of the distribution system for tobacco products: employment and income in marketing tobacco products, including advertising expenditure if available.	2. a) national ministries of planning, economics or finance; some data may be available from USDA; World Bank may have some data if project research has been done; national/regional universities in the country; state tobacco agency or private companies. b) same as (a) c) same as (a)

Data needed	Data source
<p>3. Public policy on tobacco production, processing, manufacturing and distribution:</p> <p>a) price support programme for tobacco leaf, land allotments or production quotas?</p> <p>b) subsidy for inputs used in tobacco production, such as extension services, credit, seed/fertilizer or other inputs</p> <p>c) subsidies or other policies to encourage the manufacture of tobacco products; this includes the operation of both publicly-owned and privately-owned manufacturing</p> <p>d) government role in the distribution of tobacco products; amount of subsidy, if any.</p>	<p>3.</p> <p>a) national ministry of agriculture; possibly USDA; possibly FAO; national/regional agricultural university; tobacco company or government monopoly; some potential from other sources such as World Bank or national ministry of economic planning.</p> <p>b) same as (a)</p> <p>c) same as (a)</p> <p>d) same as (a)</p>
<p>4. Taxation of tobacco and tobacco products:</p> <p>a) type and amount of taxes on tobacco leaf, if any, or on inputs used in cultivation</p> <p>b) type and level of taxes on imports of leaf or manufactured or processed tobacco product</p> <p>c) type and amount of taxes on manufactured product, e.g., excise or sales tax on cigarettes</p> <p>d) revenues from tobacco sector, compared to revenues from all sources</p> <p>e) changes in these types and amounts of tax over time</p> <p>f) net earnings of national tobacco company, if any.</p>	<p>4.</p> <p>a) national finance ministry; national ministry of planning; national ministry of agriculture; much of these data are available from various sources in Washington, D.C., such as USDA, World Bank and others, also IMF and U.S. Dept. of Commerce.</p> <p>b) same as (a)</p> <p>c) same as (a)</p> <p>d) same as (a)</p> <p>e) same as (a)</p> <p>f) same as (a)</p>
<p>5. International trade:</p> <p>a) exports of tobacco leaf and processed or manufactured product</p> <p>b) amount and value of imports of tobacco leaf and processed or manufactured product</p> <p>c) tobacco earnings and expenditure of foreign exchange, compared to totals for the nation.</p>	<p>5.</p> <p>a) USDA; national ministry of finance or economics; various other sources in Washington, D.C.</p> <p>b) same as (a)</p> <p>c) same as (c)</p>

Agricultural production

The value of agricultural production of tobacco can be measured with aggregate data. Yet the total value of all tobacco produced is not a measure of the contribution of tobacco to the agricultural economy or the society. The total value of product is, at most, a measure of gross benefits - the costs of producing that tobacco must also be considered. Farmers obviously receive more for the product than it costs them to grow it, otherwise farmers would not continue to grow tobacco. The costs of production can be estimated by farm-level data.

The costs of seed, fertilizer, land, labour and other inputs are measured in farm management studies. Yet subtracting these costs from the gross value of production does not give a complete accounting of net benefits of producing tobacco, because both the product price and the input prices may reflect subsidies provided by government or tobacco companies. For example, a company may subsidize fertilizer used by tobacco farmers. The subsidy effects must be separated from the prices paid or received by the farmer, to more accurately reflect the actual value of the input or product to the society.

The net returns to the tobacco farmer must also be adjusted to reflect costs of goods that are used in tobacco production but are not priced in the economy. Environmental effects are the most common type of costs that are not priced in the economy. For example, curing tobacco may result in a serious loss of forests in some countries, and the cost of this deforestation should be counted as a cost of tobacco production. Similar environmental costs may be incurred from the use of chemical pesticides or herbicides or the soil erosion that might occur in the production process. In discussing the net environmental costs from tobacco, one must take account of any environmental costs of alternative agricultural production activity.

Yet even subtracting the costs of production from gross value and adjusting for subsidies and environmental effects does not provide a measure of net benefits of tobacco production because the resources employed in tobacco production would have been used in some other way had the farmer not chosen to produce tobacco.

For example, the farmer's own labour might have been used in some other agricultural production activity, in some off-farm work, or even for unpaid tasks within the household such as home repairs, or even leisure.

The farmer undoubtedly earns more by producing tobacco than in other activities because he chose to grow tobacco, but the value of the activity to the society is not the total net value of production of tobacco but the amount that the society would lose if the farmer chose the next most profitable farming activity, such as rice or maize production, repairing his fences or tending his cattle, or whatever activity would earn him the next best return for his time and other resources.

Sometimes the returns from this next-best alternative will be very close to the net returns from tobacco. For example, if the labour requirements of the next-best option totally conflict with the labour demands of tobacco, and if the production technology and produce price of the next-best crop provide a very high labour income, then tobacco production will be only slightly preferred to the next-best alternative. On the other hand, if the farmer can make absolutely no other use of his time and resources if he does not grow tobacco, then the return from the next-best option is zero and the net return from tobacco does represent the net benefit to the society.

Thus, to begin to measure the net benefits that result from growing tobacco, it is necessary to know:

1. The gross value of production.
2. The costs of production.
3. The extent to which (1) and (2) are affected by subsidies.
4. The environmental costs of producing tobacco that are not captured by market price.
5. The gross return and costs of production from the next most profitable farm activity.

Data	Source of Data
1. Gross return to tobacco production, farm level	1. Farm enterprise budget for tobacco, usually found only in local university or possibly produced by a tobacco company. Little chance of finding enterprise budgets in USDA or FAO, but these should be pursued in any case.
2. Costs of production, farm level	2. Same as above.
3. Degree of subsidy of:	3.
a) output	a) information on national pricing policy (see Sec. II)
b) inputs (in some cases, it may be impossible to quantify the amount of subsidy but even a descriptive qualitative discussion is important).	b) information on which specific inputs (e.g., fertilizer, credit) are provided by government or by the company. For those inputs, find the price paid by the farmer and the price of the input to other farmers who do not grow tobacco. These data will be available only at the local university or from the tobacco company.
4. Environmental costs (usually only descriptive estimates are available)	4. National ministry of environment or natural resources (also forestry bureau in ministry of agriculture). Pesticides/herbicides used in production are available from local ministry of agriculture, local university, or from tobacco company. Some of this information may be available from USDA and FAO. The health effects of each chemical can be described from data in ministry of health, or from studies by U.S. Environmental Protection Agency.

Data	Source of Data
5. Returns from "next most profitable" agricultural activity.	5. Farm enterprise budgets (see above). Several alternative crop options should be pursued if possible. Labour use, by month, in tobacco production and in production of other crops. Source is the same as farm enterprise budgets. Risk of various options can be described from data on price variability or information on marketing systems.

The data on gross return are readily available, but are not meaningful without other data. The most important data are the farm enterprise budgets for tobacco and the alternative crops. These most important data are not likely to be found at FAO, USDA, or sometimes even in the local university of agriculture. Enterprise budgets are most likely to be found in the agricultural university. Environmental costs can be described; quantification of effects is desirable but not practical because of the extremely high time and monetary costs of such a study. Any quantification that has occurred should be used, of course. The degree of subsidy would be useful to estimate but may be impossible to quantify without great time and monetary expense. A description of the subsidy and its general magnitude and importance is possible.

Processing, manufacturing, and distribution

The processing, manufacturing, and distribution of tobacco products represents economic activity that contributes to national employment and income. Data on the value of manufactured tobacco products are readily available, but these data indicate the gross, not the net, contribution of tobacco to employment and income. For example, the value of cigarettes produced must be reduced by the costs of production in order to arrive at some net contribution to economic well-being. Similarly, the value of employment in cigarette manufacturing must be reduced by the wages that people could have earned in their next-best employment option. Similarly, although the distribution system may include many market vendors who sell cigarettes singly or in packs to the consumer, all of this employment cannot be counted as a net contribution of tobacco to employment in the economy. Many of those same vendors would continue to sell other items (although probably earning a lower net income), others would move into other occupations (probably at lower net wage) and only a portion would be totally unemployed. Thus, it is extremely important to distinguish between the gross income and employment and the net income and employment generated by processing of tobacco leaf and the manufacture and distribution of tobacco products.

Data	Source of Data
1. Employment and total value of product in processing and manufacturing.	1. National ministry of planning or industry; possibly national ministry of agriculture; many possible sources in Washington, D.C., including U.S. Dept. of Commerce and Agriculture; tobacco companies or government monopoly.

Data	Source of Data
<p>2. Employment and income in distribution system.</p> <p>3. Estimates of income and employment potential in other activities.</p>	<p>2. National university of ministries of planning, economics, rural development or agriculture; possibly national tobacco monopoly or private companies; unlikely to be found in Washington, D.C., but possible.</p> <p>3. National ministry of planning, economics or finance; national university.</p>
<p>Note: Each of these items includes many separate data elements, e.g., employment in manufacturing several different types of cigarette or tobacco products.</p>	

Public finance

Tobacco and tobacco products are a convenient source of revenue for many governments. Tobacco taxes are not properly counted as "net social benefits" of tobacco production and use, because the tax is simply a transfer of resources from the private to the public sector of the economy. Nevertheless, tobacco taxes may be important to national or state/local government and should be included in any discussion of the tobacco economy.

Governments may tax tobacco in several ways, such as a tax paid by the farmer on the value of tobacco leaf sold, a tax on imports of tobacco and tobacco products, or a tax levied on each package of cigarettes which is paid by the local manufacturer but is passed on to the consumer of tobacco products. Taxes may be discussed according to several criteria: the yield, or amount collected; the stability of the yield; the extent to which the tax allows the government flexibility in adjusting the tax; the ease of collecting the tax; the incentives created by the tax, such as incentives to smuggle cigarettes into a country to avoid the tax or substitution of one type of tobacco product for another; the incidence of the tax, particularly how much tax is paid by high-income versus low-income consumers. Of course, the amount of the tobacco taxes can be compared to total revenues of the government, and the tobacco tax can be compared to other types of taxes on each of the relevant criteria.

Data	Source of Data
<p>1. Types of taxes on tobacco and tobacco products. The levels of each, such as tariffs; excise tax, sales tax, licensing fees, or others.</p>	<p>1. Some of these data are available from USDA, others from reports of international research groups such as The Economist, others from tobacco industry publications. Much of these data will be available from various sources in Washington, D.C., such as USDA, Dept. of Commerce, Office of the Special Trade Representative, World Bank, and libraries elsewhere. Otherwise this is all available from the Finance Ministry in each country.</p>

Data	Source of Data
2. Yield and stability of yield.	2. Same sources as (1).
3. Flexibility and incentives (precise quantification probably not possible).	3. Some conclusions can be reached simply by noting the type of tax and referring to the large body of previous economic research on general effects. Unless studies have already been conducted, quantification of substitution effects is beyond the scope of the project.
4. Incidence of tax, by income class.	4. Data on prevalence of smoking, by income class (see health data section). Estimates of amount of tobacco product consumed by income class (see health data section). Data on level of tax (e.g., tax per packet of cigarettes, or per pound of tobacco imported).
5. Level of other types of taxes.	5. Same sources as (1).

The most important data are those in items (1), (2) and (5). Most of these data can be obtained in each country from the Ministry of Finance, or from various sources in Washington, D.C. The calculation of incidence is quite easy if the data on smoking behaviour are available by income class; otherwise the incidence calculation is impossible.

Foreign exchange

The effect of tobacco on the foreign exchange position of the country is not properly counted as a "net social benefit" from tobacco production or use. Nevertheless, foreign exchange earnings are important to all governments and are particularly critical to the economic development efforts in many developing nations. Tobacco affects foreign exchange through exports of leaf or processed or manufactured products and by imports or exports of machinery, equipment or supplies used in processing leaf for manufacturing tobacco products. Finally, in some cases special trade agreements or concessional sales may alter the foreign exchange effects of tobacco. The overall importance of tobacco and tobacco products in the nation's foreign exchange situation can be easily detailed.

Data	Source of Data
1. Exports and imports of tobacco and tobacco products.	1. USDA.
2. Special trade agreements or concessional sales.	2. USDA and possibly World Bank; ministry of agriculture, finance or trade.
3. Exports and imports of processing and manufacturing equipment and supplies.	3. USDA, other U.S. government agencies, World Bank, national ministry of finance or trade in each country.

Data	Source of Data
4. Total foreign exchange earnings and expenditure.	4. Various U.S. Government sources; International Monetary Fund; national ministry of finance or trade.

These data are readily available from many sources, both within each country and in Washington, D.C. The least important data are those in item (3), simply because the magnitude of the effect is likely to be smaller than those in (1) and (4). Also, item (2) will not likely occur frequently but could be very important in some cases, such as Egypt, where special arrangements exist.

b) Health Economics

It is suggested that the economic measure of the health effects of smoking be the prevalence-based costs of illness evaluated by the human capital method. This approach counts only medical care resources used in the prevention, diagnosis and treatment of disease and productivity losses resulting from disability, morbidity and mortality. It is recognized that there are other important burdens of illness, intangible costs of pain and suffering, and other deteriorations in the quality of life which may be at least as important as measurable economic costs, but these cannot be quantified in monetary terms by this method. The human capital model is used because it is the one for which the required data are most likely to be available. Other methodologies that more completely measure the burden of illness in economic terms would confront very severe data limitations and cannot be given serious consideration.

Costs of illness include health care costs (direct costs) and productivity losses (indirect costs).

Health care costs

These include costs of: hospital care;
physician service;
tests and therapies;
drugs.

Health care costs of diseases related to smoking (lung cancer, heart disease, chronic obstructive lung disease, other diseases important in a country, such as bladder cancer in Egypt) can be estimated by several means, depending on the availability of data: (1) Total expenditures for each disease if these are available; (2) Observed expenditures per case times the number of cases if these are known for each disease; (3) By the share of the health care budget for each disease. This method can be used to estimate costs for a disease when the total expenditure or the expenditure per case are not known for a disease. Several steps are required:

- (a) Cost per day is derived from the hospital budget divided by the number of days of care (365 times the average daily census);
- (b) The average costs of a patient-physician encounter and various therapies are derived in a similar way by dividing the budget for physician services by the number of patient encounters, and so forth. This still applies if physician care in the hospital is included in the hospital budget;
- (c) The average units of care required per case are multiplied by the average cost per unit of care obtained above and added across the types of care to obtain the average cost per case for each disease. For example, (average length of stay for lung cancer) times (cost per

day) plus (average number of physician encounters for lung cancer) times (average cost per encounter) plus (average number of therapies for lung cancer) times (average cost per therapy) gives (average cost per case of lung cancer).

(d) The average cost per case obtained in (c) is multiplied by number of cases of the disease to obtain the total cost of each disease.

Indirect costs of morbidity

Productivity losses from morbidity can be obtained by multiplying average number of days lost from employment by the average wage to get the average morbidity cost per case for each disease. If the number of work loss days are not known directly, they may be estimated by multiplying the average length of life with the illness by some measure of the reduction in normal work capacity. Morbidity cost per case times the number of cases gives total morbidity cost for a disease.

Indirect costs of mortality

Premature death from disease results in a loss of life and is accompanied by productivity losses because of a reduced length of working life. These losses can be estimated by multiplying years of life lost by the average annual earnings or average wage, and a measure of employment to obtain productivity loss per case for each disease. Years of life lost should be estimated from life expectancy at age of death (not average life expectancy at birth, for example) minus age of death. Mortality cost per case times the number of cases gives total mortality cost for each disease.

This method for estimating costs of illness depends on having an estimate of either the number of cases of each disease or the proportion of total costs that are due to smoking. In the absence of knowledge of the number of cases or proportion of total costs, a plausible range can be used to place upper and lower bounds on the costs of smoking. The method can be summarized as follow: (1) identify smoking-related diseases; (2) estimate the cost per case for each disease; (3) estimate the number of cases related to smoking and multiply by the cost per case to obtain total costs of smoking; (4) as an alternative to (3), estimate the total number of cases of a disease. Multiply by the cost per case to obtain total costs of a disease. Multiply total cost by an estimate of the proportion of costs due to smoking to obtain total costs of smoking.

Several alternative methods for estimating costs of illness have been outlined. The method, or combination of methods, used in each of the three study countries must depend on the data available. Dr Omar plans to conduct a survey of enrollees to a clinic in Egypt to obtain information on smoking status and health care that will assist in this project. It is suggested that similar efforts be carried out in Brazil and Thailand.

Several published studies on methods of estimating costs of illness, estimates of costs of illness, and estimates of costs of smoking in the United States will be given to the country representatives to provide them with additional information and examples of cost of illness estimation.

c) Epidemiology

Questions addressed

- A. Health
1. Usefulness of incidence/mortality data
 2. Cancer only, or other diseases?
 3. Sources: published, or additional data as well.

- B. Consumption
1. Define useful measures: per capita consumption
: procedure data
 2. Differing estimates
 3. Time trends: issues and problems

1. Initial considerations

1.1 Cancer vs. other diseases

Respiratory cancer is a useful marker of tobacco-related disease, and has the advantage of being relatively easy to measure, and available for many countries.

However, it does not provide the full picture of the burden of disease due to tobacco; ischaemic heart disease and chronic obstructive lung disease are quantitatively more important.

Two proposals were offered to cope with this:

i) Note the mortality for other causes (heart disease, respiratory disease) relative to that of respiratory cancer (N.B. The appropriate cause groups which could be extracted have not been defined).

Assume a range of relative risk for smokers vs. non-smokers, based on studies in U.S., Europe, etc., for these causes.

Estimate the proportion of those deaths which are due to tobacco, based on relative risk estimates, and prevalence of smokers in the population.

ii) Assume that total burden of tobacco-related illness is a multiple of lung cancer incidence (x2 was suggested).

For respiratory cancers, it was suggested that the overall objective should be to reconcile (if possible) present levels of incidence/mortality with past trends in tobacco consumption, and to attempt some estimates of their future evolution.

2. Brazil

2.1 Mortality data

National - based on sample only (available to WHO), but poor quality. Rio Grande do Sul (RGS) has much better data for 1970-1982/3. For Porto Alegre (PA) itself, the quality is probably better than the remainder of the State (cancer rates are 50% higher).

Published data include annual numbers, rates by cause/sex (lung, larynx, mouth-pharynx, all cancer, all deaths).

Age-standardized rates have been published for RGS.

Note: Straightforward trends in mortality may be misleading, since there has obviously been quite an increase in registrations of death due to cancer (? better ascertainment of death/cause with time). Trends in lung cancer should be related to trends in all cancers, e.g. :

	All deaths	All cancer	All cancer - Lung	Lung cancer
1970	23029	2255	1899	356
1982	29265	4483	3433	1050
Increase	x 1.27	2.1.99	1.8	2.95

For 1982, mortality for cancer of lung (males) was:

	<u>RGS</u>	<u>PA</u>
Crude	26.8	34.9
Age-standardized rate	38.9	(52.5 - estimated from other 3 figures)

Age-standardized rates for RGS show increase:

	<u>M</u>	<u>F</u>
1970	17	3
1982	39	6.5

2.2 Incidence of cancer

There are four Brazilian Cancer Registries (data given for years underlined):

<u>Place</u>	<u>Years</u>	<u>LUNG</u>		<u>ALL</u>	
		<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
Fortaleza	<u>1978/80</u>	22	5	280	285
Recife	1968-71; <u>1973-79</u>	17	3.5	271	300
Sao Paulo	1969; <u>1973</u> ; (1978)	30	6.5	320	280
Porto Alegre	<u>1979-82</u>	70	11.8	361	262

N.B: The incidence data reconcile fairly well with mortality rates.

2.3 Requirements

2.3.1 Non-cancer mortality (heart disease; respiratory disease) for RGS for a recent period (say, 1980/82) for comparison with cancer data (see above), in terms of numbers, rates; sexes separate.

2.3.2 Cancer mortality for mouth/pharynx; larynx; lung; all cancer; all deaths. By sex, age group (5 years, or 10 years) as numbers plus population at risk,

or

Mortality rates for each individual year, 1970/1982 (Or 3),

or

3 periods: 1970-74; 1975-79; 1980-82/3.

2.3.3 Incidence trends for Sao Paulo (when 1978 data available at IARC)

2.4 Consumption data

2.4.1 Consumption of tobacco, manufactured cigarettes for 1959-1985 (each year). Also as cigarettes per adult.

2.4.2 Prevalence survey for 1978 gives:

Smokers, by age group, sex
For smokers - average consumption, by age group, sex.

e.g., males:

	<u>% smokers</u>	<u>Cigs./day (smokers)</u>			<u>Other tobacco</u>
		<u>10</u>	<u>11-20</u>	<u>21+</u>	
20-34	61	37	48	11	4
35-54	63	27	42	16	14
55-74	58	38	25	13	23

2.4.3 Requirements - is there any data on prevalence of smoking before 1978, even at a semi-anecdotal level?

2.5 Conclusions

Consumption seems to have been high in RGS for some time. There may still be increases in consumption in future (young persons in 1978 smoked more than others). Regular surveys of smoking prevalence are needed. Further rises in the rates in males (already high) and females may be expected (but a study of age-specific time trends will help to resolve this).

3. Egypt

3.1 Mortality data

Available via WHO for 1955-63 and 1970-79. Different denominators were apparently used in these two periods. The figures seem unreliable - rates very low - and for all cancers mortality is falling.

No real faith can be put in these figures, except perhaps in the ratio of deaths from different causes.

Note especially: Lung : Larynx (males) \approx 1:2

M : F (lung) \approx 2:5:1

3.2 Morbidity - Cancer

Best source (for cancer) the Cairo Metropolitan Cancer Registry (based on cases treated in 16 hospitals). Data available 1973-79.

Note - not suitable for calculation of incidence.

As a % of all cancers:	M	F
Larynx	8.1	1.5
Lung	2.8	0.7

This does not accord well with the mortality data; in particular, the frequency of lung cancer is low. There is no reason to suspect that such cases could be excluded from the registering hospitals.

3.3 Morbidity - other diseases

No data considered.

3.4 Tobacco

Domestic consumption: tobacco, manufacturing - cigarettes. Available for 1959-1985 (requires conversion to per head or per adult).

Prevalence survey: carried out in 1986. Results not fully analyzed (but approximately 35% males (adults) were current smokers).

3.5 Requirements

3.5.1 National Mortality Data. For 1979, by sex, deaths and death rates from cardiovascular and respiratory diseases.

3.5.2 Are there better mortality data available for any municipal populations in Egypt?

3.5.3 Are there any data on prevalence of smoking prior to 1986?

4. Thailand

4.1 Mortality data

National data available to WHO for 1957-1983. But note:

- high percentage "senility and ill-defined conditions"
- rise in all cancer mortality 4-5-fold over 25 years which suggests improving certification (more complete, better diagnosis)

Thus, although there has been an apparent rise in lung cancer mortality, this affects all age groups, and is due mainly to the above effect. However, lung cancer deaths as a percentage of all cancer deaths has increased (from ~9% to ~13-14%).

Conclusion: Some limited use can be made of the mortality data, but their poor quality and possible changes in completeness should always be borne in mind.

4.2 Morbidity from cancer

The best source of data is the National Cancer Registry (NCR), which records cases treated in hospitals throughout the country (143 by 1980). Ascertainment of cancers is not complete, however - ASR for all cancers (male) in 1980 was 46.7 - perhaps only one-half to one-third that expected. There are several other registries for individual hospitals, but these are unlikely to add significantly to the "National Data".

Note that there has been a steady increase in participation in the NCR in its 11 years of existence (1971-1981). Trends of "incidence" over time thus show a steady rise for "all sites". Trends in respiratory cancer should be judged against this - perhaps better expressed as trends in lung cancer as a percentage of all cancers.

For both sexes combined, lung cancer increased in 1971-1980 from 4.5% to 8.5%. Regional variations can be studied (of interest considering the different habits of smoking, especially in Northern Thailand).

4.3 Morbidity - other diseases

No data considered.

4.4 Tobacco

Domestic consumption of cigarettes, etc. - data available for 1959-1985. These need to be converted to consumption per capita (or per adult).

Prevalence survey: Carried out in 1981 (21 680 households). Note that data obtained from household head (or responsible adult), thus much proxy-reporting of smoking habits.

Over age 30, male smoking very high - 70-80% "smokers"
females - 5-12% "smokers"

but number smoked (for smoker) seems quite low:

≤ 10 per day, 54% males, 83% females.

A direct interview survey in the National Cancer Institute included cancer patients, non-cancer clinic attenders (general population) and soldiers. The general population group had a lower percentage of smokers than in the national survey (around 50%) but smokers tended to have a much heavier intake (at age 30-55, average = 20/30/day).

4.5 Requirements

4.5.1 For national mortality data, a convenient recent year (1980). Number of deaths and death rates, by sex. Cardiovascular causes, respiratory diseases.

4.5.2 From NCR:

- a) Trends in tobacco-related cancers (lung, larynx, mouth/pharynx, less oesophagus) as a percentage of all cancers: male and female separately.
- b) Regional variation - same sites, as a percentage of all cancers: male and female separately.

(N.B. These analyses are already available at NCR. Detailed ad hoc analyses are not feasible, since the Registry is maintained only on card indexes).

EMPIRICAL QUESTIONS THAT SHOULD YIELD DATA ITEMS

by

E.M. Lewit
Director of Research and Evaluation
College of Medicine and Dentistry of New Jersey
Newark, New Jersey, United States of America

Tobacco Cultivation

1. Is tobacco currently grown in the country? If not, or if only a very marginal operation, why? Assuming answer is "Yes":

- a) What kinds of tobacco are grown?
 - i) If more than one kind, what are the proportions?
 - ii) Are there climatic or other considerations that limit options in this area?
- b) What share of agricultural output (income) is represented by tobacco?
- c) Is tobacco cultivation concentrated in a limited region of the country?
- d) Is tobacco cultivation growing?
 - i) Rising output from same inputs?
 - ii) Rising output because of different or increasing inputs?
 - iii) Why are more inputs being devoted to tobacco farming?
 - a) Easy move to increase family cash income? Use excess family labour?
 - b) Substitution of tobacco for other crops because of differences in rates of profit?
 - c) Government or other policies designed to encourage the growing of tobacco?
 - 1) Why have these policies been fostered?
 - 2) What alternative crops are being promoted? Are they reasonable substitutes for tobacco?

2. What is the technology of cultivation?

- a) Is technology related to the size of the farm?
- b) What inputs are used?
- c) What is the level of employment on tobacco farms? (by individuals and by man-years?)

3. What is the institutional setting?

- a) Price policy of national government: how are prices determined?
- b) Regulation - if any (production quotas; land allotment, etc.).
- c) Is tobacco grown in conjunction with other crops?
 - i) What crops?
 - ii) Is this part of a crop rotation programme or merely a conglomerate farming enterprise?

- iii) If tobacco is part of a farming system, what is the relative importance of tobacco income and labour to the total farm operation?
 - d) Are there substantial government subsidies or other programmes that encourage the growth and development of a tobacco sector?
 - i) What is the nature of these programmes?
 - ii) How do international tobacco control policies affect the returns to tobacco-growing in the country?
 - iii) How much of the crop is sold internationally? How much domestically for use in cigarettes or other types of consumption? How does the quality compare internationally?
 - a) What is potential for up-grading the output or quality of the crop?
 - b) Would the cost of this upgrade reduce the competitive position of the crop?
4. Enterprise budgets (e.g., on a per acre basis)
- a) Gross receipt: What are the gross cash incomes earned by farmers from tobacco?
 - i) What is the yield per unit of input (land)?
 - ii) What is the price and how variable is the price of the crop?
 - iii) What is the quality of the crop? How does it compare with tobacco grown elsewhere?
 - b) Input costs - variable costs:
 - i) Fertilizers, insecticides, herbicides
 - ii) Machinery costs - (includes fuel)
 - iii) Energy and other curing costs
 - iv) Planting costs (seed, bed preparation and weed control)
 - v) Labour costs
 - a) Family workers (time valued at local wage rate)
 - b) Hired labour at cost
 - c) Fixed costs:
 - i) Taxes on land
 - ii) Return on invested capital
 - d) Return to entrepreneurship (management)
5. Effects of tobacco cultivation on natural resources
- a) Is the technology such that land is exhausted in growing tobacco and then farmers move on? Should we, therefore, include the cost of this depletion in our cost estimate?
 - b) Is desertification a problem in this country? Does the exhaustion of the land by tobacco growing accelerate this process? Does the cutting of fire wood for curing accelerate the process?
 - i) What is being done to reverse this process?
 - ii) What are the costs of dealing with this problem?
 - iii) What is the rate of desertification or soil degradation?
 - c) What chemicals are used to cultivate tobacco? Are any potentially very hazardous? To the workers? To the environment? What is the likely timeframe for seeing the toxic effect of these materials? Are they used in growing other crops?

ANNEX 2

- d) If toxic substances are used, what would be the cost of using safer materials?
- 6. How important are incomes from tobacco as compared with other crops?
 - a) What other crops are grown in this area? How do they compare with tobacco? (Need enterprise budget for other crops: same data as needed for tobacco - see 4 above).
 - b) What is the marginal advantage to growing tobacco? (difference between per acre net profit and net profit per acre from most profitable alternative crop).

LIST OF PARTICIPANTS

Dr R. BARROWS
Professor of Agricultural Economics
Department of Agricultural Economics
University of Wisconsin
Henry Taylor Hall, Room 323
927 Lorch Street
Madison, Wisconsin 73706
United States of America

Dr A.M. BRITO MEDEIROS
Service of Prevention of Chronic
and Degenerative Diseases
Department of Health and Environment
of the State of Rio Grande do Sul
Av. Borges Medeiros No. 1501/6
CEP 90 000 - Porto Alegre
Brazil

Dr T. GLYNN
Program Director for Smoking Research
Office of the Director
Division of Cancer Prevention
and Control
National Cancer Institute
National Institutes of Health
Blair Building, Room 101
Bethesda, Maryland 20892
United States of America

Dr J. HIGGINSON
Senior Fellow
Institute of Health Policy Analysis
Georgetown University Medical Center
Suite 220
2121 Wisconsin Avenue
Washington, D.C. 20007
United States of America

Dr R. MILLER
Tobacco Peanuts Group Leader
ASCA-U.S. Department of Agriculture
South Building, Room 3741
Washington, D.C. 20205
United States of America

Dr T.A. HODGSON
Chief Economist
Office of Analysis and Epidemiology
National Center for Health
Statistics
Center Building, Room 2-27
3700 East-West Highway
Hyattsville, Maryland 20782
United States of America

Dr E.M. LEWIS
Director of Research and Evaluation
Office of Primary Health Care
Education
College of Medicine and Dentistry
of New Jersey
New Jersey Medical School
100 Bergen Street
Newark, New Jersey 07103
United States of America

Dr W. LYNN
Acting Director
Technical Information Center
Office on Smoking and Health
Department of Health and Human
Services
Public Health Service
Park Building, Room 1-10
5600 Fishers Lane
Rockville, Maryland 20857
United States of America

Ms M. MASSEY
Project Director
Smoking, Tobacco and Cancer Program
Prospect Associates
2115 East Jefferson Street
Suite 401
Rockville, Maryland 20852
United States of America

Dr S. OMAR
 Professor of Surgical Oncology
 Cancer Institute
 Cairo University
 Cairo
 Egypt

Dr S. PURIBHAT
 Director
 Department of Radiation Oncology
 National Cancer Institute
 Rama VI Road
 Phayathai
 Bangkok 10400
 Thailand

Dr M. SHERIDAN
 Research Assistant
 Institute of Health Policy Analysis
 Georgetown University Medical Center
 Suite 200
 2121 Wisconsin Avenue
 Washington, D.C. 20007
 United States of America

Miss S. SINEENAT
 Department of Radiation Oncology
 National Cancer Institute
 Rama VI Road
 Phayathai
 Bangkok 10400
 Thailand

Dr K.E. WARNER
 Professor and Chairman
 Department of Health Planning
 and Administration
 School of Public Health
 University of Michigan
 Ann Arbor, Michigan 48109-2029
 United States of America

Dr R.W. WILSON
 Director
 Division of Epidemiology and
 Health Promotion
 National Center for Health
 Statistics
 3700 East-West Highway
 Hyattsville, Maryland 20782
 United States of America

WHO Secretariat:

Dr V.J. Grabauskas, Director, Division of Noncommunicable Diseases, HQ, Geneva
 Dr S. Böthig, Chief, Cardiovascular Diseases Unit, HQ, Geneva
 Miss L. Ciaffei, Technical Assistant, WHO Programme on Smoking and Health,
 HQ, Geneva
 Dr R. Masironi, Coordinator, WHO Programme on Smoking and Health, HQ, Geneva
 Dr A. Nissinen, Medical Officer, Cardiovascular Diseases Unit, HQ, Geneva
 Dr D.M. Parkin, Medical Officer, International Agency for Research on Cancer,
 Lyon
 Mr D. Patchett, Consultant, WHO Programme on Smoking and Health, HQ, Geneva
 Dr K. Rothwell, Consultant, WHO Programme on Smoking and Health, HQ, Geneva
 Dr K. Stanley, Medical Officer, Cancer Unit, HQ, Geneva

* * * * *