REPORT ON THE RESULTS OF THE GLOBAL YOUTH TOBACCO SURVEY IN KENYA (GYTS KENYA 2001)

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EXECUTIVE SUMMARY

The World Health Organization (WHO) and Centers for Disease Control and Prevention, Office on Smoking and Health (CDC-OSH) US, jointly developed the Global Youth Tobacco Survey (GYTS), to track tobacco use among the youth, in countries across the world using a common methodology and core questionnaire. GYTS is a school-based survey designed to use a two-stage cluster sample, to produce representative data on smoking among school children aged, 13 – 15 years. In Kenya the target group was identified as students attending primary and secondary schools in standard 7, 8, forms 1 and 2. Data collected include the prevalence of cigarette smoking and other tobacco use, access and availability of tobacco products, knowledge and attitudes, exposure to environmental tobacco smoke (ETS), cessation, media advertising and the school curriculum.

GYTS in Kenya was conducted in October 2001. The Executing Agency was the National Referral and Teaching Psychiatric Hospital, Mathari. A two-stage cluster sample design was used to produce a representative sample. All public primary and secondary school with students, aged 13 to 15 years, and having an enrolment of over 40 students, were included in the sampling frame. Twenty-five schools were selected in Nairobi, which is the capital city. Six schools selected in Mombasa, which is an urban area with a strong influence from tourism. Twenty-four schools were selected from the rest of the country, representing mainly a rural setting

All the fifty-five schools selected, participated in the survey, and gave a school response rate of 100 %. Among the 4,581 students sampled, 4,447 responded to the questionnaire, giving a student response rate of 97.1 %. The overall response rate was 97.1%. During analysis, a weighting factor was used to reflect the likelihood of sampling each student and to reduce bias by compensating for differing patterns of non-response. Smoking prevalence rate of students who had ever smoked even one puff was 27.3% in Nairobi, while the average for the whole country was 14.8%. It was found that 16.9 % of all the students were currently using some tobacco product and of these, 8.7 % were smoking cigarettes while 9.9 % used other types of tobacco products. It is estimated that 19.6 % of students, who had never smoked, were likely to initiate smoking the following year. 48% of current smokers and 18% of non-smokers had objects with cigarette brand logos. Below 50 % of the students had been taught in class about the dangers of smoking and causes of smoking by their peers.

An effective Tobacco use prevention school curriculum is necessary, to enhance the Youth Tobacco Use Prevention and Cessation Program. Tobacco control legislation is also required to protect non-smokers especially children and adolescents from the harmful health effects of environmental tobacco smoke also known as second-hand-smoking, by banning smoking in public places. Media advertising of cigarettes and other forms of tobacco should also be restricted while promoting counter-tobacco use advertising and campaigns.

INTRODUCTION

WHO Resolution

Between 1970 and 1995, WHO adopted 14 resolutions on the need for both National and International tobacco control policy. Four of the 14 resolutions are relevant to the Global Youth Tobacco Survey project. WHO member states are encouraged to implement comprehensive tobacco control strategies that includes the following:

1) Measures to ensure that non-smokers receive effective protection, to which they are entitled, from involuntary exposure to tobacco smoke.

2) Measures to promote abstention from the use of tobacco so as to protect children and young people from becoming addicted.

3) Programs of education and public information on tobacco and health issues, including smoking cessation programs, with active involvement of the health professionals and the media.

4) Monitoring of trends in smoking and other forms of tobacco use, tobacco-related diseases, and effectiveness of national smoking control action.

Public Health Impact and Response

Tobacco use is one of the chief preventable causes of death in the world. In 1999 WHO estimated that some 4 million deaths a year were attributed to tobacco, a figure expected to rise to 10 million deaths a year by 2030. By that time, 7 million of those deaths will occur in developing countries if recent trends continue. Recent studies carried out by WHO indicate, rising trend in smoking prevalence rates among children and adolescents, and earlier age of initiation. It has been observed by WHO that, most people begin smoking cigarettes before the age of 18. WHO estimates that, if these patterns continue, tobacco use will result in the deaths of 250 million children and adolescents, most of them in developing countries.

In recent years, WHO, UNICEF, G8 Ministers of the Environment, Ministers Responsible for Youth affairs and many National Health Agencies, have called for concerted action against tobacco use by young people. Comprehensive data and information on tobacco use among young people is not available, in most developing countries. To address this data gap, the WHO through the Tobacco Free Initiative Project (TFI) and the US Centers for Disease Control and Prevention Office on Smoking and Health (CDC-OSH) have developed the Global Youth Tobacco Survey (GYTS), in consultation with a number of countries representing the six WHO regions, which form an important part of a global tobacco surveillance system.

Tobacco Use in Kenya

Commercial farming of tobacco was introduced in Kenya in 1975. Currently over 15,000 small-scale farmers are contracted to grow tobacco in three tobacco growing regions in the country i.e. Meru/Embu, Nyanza and Bungoma. During the last five years tobacco has contributed 45 billion Kenya shillings as tax revenue to the government.

Over 5 billion cigarette sticks are produced annually; most of which are sold locally. Tobacco is grown in areas that can grow cotton and other food crops. With the poor performance of cotton, due to the importation of cheap fabrics, farmers switched to commercial tobacco cultivation. Despite the high contribution in the national revenue in the form of taxes, tobacco farmers have not received any significant improvement in their quality of life.

Tobacco use is significantly prevalent. It is estimated that smoking prevalence among adults ranges between 30% and 60%. Men smoke twice as much as women. The smoking rate increases with age. There are rules, which prohibit smoking in public places, including Public Buildings, however these rules are not effective, since they are not enforced. Under the Public Health ACT, cigarette manufacturers are required to display on the cigarette packets, a warning about the danger of cigarette smoking. The Ministry of Health has also banned smoking in all health institutions throughout the country. Some service providers have also banned smoking on their premises. There is also a growing number of working places, which have declared smoke free zones.

Kenya commemorates the World No Tobacco Day (WNTD) annually since 1992. This has been one of the major events for raising awareness on the harmful health effects caused by tobacco use. The Ministry of Health has also established the National Tobacco Free Initiative Committee (NTFIC), which is spearheading tobacco control activities in the country. Currently, Kenya in collaboration with WHO/TFI, is implementing the project, Protecting Youth from Tobacco. There are many programs under this project, which are aimed at raising awareness among the youth on the harmful health effects caused by tobacco use and encourage abstinence. Kenya is active in participating in the framework convention on Tobacco control.

The Ministry of Health has drafted a tobacco control Bill, which seeks to restrict the sale of tobacco products to minors and control smoking in public places, with a view to protecting non-smokers especially children and adolescents from second-hand smoking also known as environmental tobacco smoke (ETS).

BACKGROUND TO THE GLOBAL YOUTH TOBACCO SURVEY

UNF Project

The WHO, Tobacco Free Initiative (TFI) was awarded a grant, by the United Nations Foundation for International Partnerships (UNFIP), as a tobacco prevention grant, to initiate a joint project with UNICEF titled "Building alliances and taking action to create a generation of tobacco free children and youth". The aim of the project is to pull together the evidence, technical support, and strategic alliances necessary to positively address the negative impact of tobacco and to encourage and support children and adolescents in leading healthy and active lives free of tobacco. The project initially focused on a small group of developing countries, one from each WHO six Regions, and drew upon the combined technical expertise and operational resources of a number of UN agencies in particular WHO, UNICEF, and the World Bank. The agencies were to work together with the global scientific community, governments and non-governmental agencies, institutions and health systems within countries, the media, and with young people to show that together they can make a difference on this important public health issue.

The project was conceived as a dynamic and interactive process, whereby the activities and products of each phase are used to inform and guide activities in the subsequent phases. The project was to consist of three distinct, but overlapping phases. The first phase focused on harnessing the evidence for action: synthesising the existing evidence from countries; undertaking new areas of research to support actions; and establishing the research-based evidence for developing future actions.

The second phase was the activating phase. Country Activating Groups (CAGs), with broad membership, were formed in each of the participating countries as the coordinating and implementing mechanism at the country level to select and develop the components of a comprehensive country-based approach, to addressing tobacco use among children and young people. Opportunities to promote the exchange of experiences and issues between countries and global activities have been developed and strengthened.

WHO and UNICEF technical staff from country offices, headquarters and regional offices, and other technical partners (e.g., The World Bank and the US Centers for Disease Control and Prevention Office on Smoking and Health) have played a key role in supporting the country-level work, in particular: through assistance with the identification, development and dissemination of program support tools and resources; with guidance of specific tobacco control strategies, with suggestions and strategies for involving, young people in the project activities. In addition, WHO and UNICEF were to ensure that tobacco is included as a component of existing programs they operate within the countries and any plans or agreements they develop with relevant governments. The third phase, involved, taking the project to scale: producing and disseminating resources; strengthening regional capacity to sustain activities; integrating the products and results of the project into ongoing tobacco control work at the national, regional and global levels; transferring technology and experience between countries and regions and strengthening Co-operation and collaboration at all levels.

The overall coordination of this project has been through WHO. Harnessing the evidence, for action phase of the project is coordinated by WHO, in collaboration with identified research experts from a range of developing countries. The activating phase is coordinated by UNICEF country offices, with technical support and assistance from WHO.

Seven countries were selected to participate in the activating phase of this project: China, Jordan, Sri Lanka, Fiji, Venezuela, Zimbabwe, and Ukraine. UNICEF and WHO supported a group of countries in the Caribbean and pacific regions to participate in the technical elements of the project, using their existing resources. As a first step in this Phase, WHO and CDC organized a small technical meeting in Geneva on 7-9 December 1998 to plan for the development and implementation of an initial baseline assessment of youth tobacco use in each country using a school survey instrument, the Global Youth Tobacco Survey (GYTS). The purpose of the meeting was to work with a key tobacco control expert from each country to develop a suitable instrument to use for the survey in the respective countries. The survey was intended to enhance the capacity of countries to design, implement, and evaluate the tobacco control and prevention programs for young people, which is to be initiated at the country level. By end of 2002 over 150 of the 191 WHO member states will be active in GYTS. The survey questionnaire was designed to have a "core" set of questions to be used by all the participating countries, but also to be flexible to include questions on specific issues and individual needs of each of the participating countries (i.e., optional questions). The GYTS core questionnaire includes questions on: tobacco use, knowledge and attitudes, access to tobacco products, media and advertising exposure, school curriculum, cessation and environmental tobacco smoke (ETS).

The GYTS

The GYTS is school-based survey, which focuses on adolescents aged 13 – 15 years in (in Kenya, std. 7 – form 2). It assesses student's attitudes; knowledge and behaviors related to tobacco use and ETS exposure, as well as youth exposure to prevention curriculum in schools, community programs and media messages aimed at preventing and reducing youth tobacco use. The GYTS provides information on where tobacco products are obtained and used, information related to the effectiveness of enforcement measures. School surveys are useful tools in gathering data as they are relatively inexpensive and easy to administer, tend to report reliable results and refusal are significantly lower than in household surveys. The most common approach for this specific population has been the self – administered questionnaire. Therefore, all the above, reasonably justify why a school based survey has proved to be most appropriate.

Objectives

The GYTS is a school-based tobacco specific survey that focuses on students aged 13-15 years. The objectives of this survey are:

1) To document and monitor prevalence of tobacco use including cigarette smoking, and current use of smokeless tobacco, cigars or pipes.
2) To better understand and assess students' attitudes, knowledge and behaviors related to tobacco use and its health impact, including: cessation, environmental tobacco smoke, media advertising, minors' access to tobacco and the school curriculum.
3) To guide the development of effective and appropriate Youth Tobacco prevention and control programs.
4) To inform the Public Health Community and policy makers to support tobacco prevention and control programs.

The GYTS will attempt to address the following issues,

a) To determine the level of tobacco use among the youth.
b) To estimate age of initiation of cigarette use.
c) To estimate levels of susceptibility to become cigarette smokers.
d) To ascertain the level of exposure to tobacco advertising.
e) To identify key intervening variables, such as attitudes and beliefs on behavioural norms with regard to tobacco use among young people, which can be used in prevention programs
f) To assess the extent to which major prevention programs are reaching school-based populations and establish the subjective opinions of those populations regarding such interventions

Contents of GYTS:

1. Smoking status of youth
2. Age of initiation of cigarette use
3. Number of cigarettes smoked in lifetime
4. Frequency of smoking
5. Likelihood of smoking
6. Knowledge and attitudes towards smoking
7. Knowledge and attitudes towards cessation
8. Exposures to environmental tobacco smoke (ETS).
9. Access to cigarettes
10. Exposure to media and advertising
11. School curriculum

METHODS

Sample Design.

The GYTS Kenya 2001 was a school-based cross-sectional survey, which employed a two-stage cluster sample designed to produce a nationally representative sample of students, aged 13-15years. School going youth between standard 7 and form two were identified as the target group. All public primary and secondary schools, in the country, with enrolment of over 40 students, were incorporated in the sampling frame.

Stage 1: selection of schools.

CDC worked with the Research Co-ordinator to select the participating schools from an electronic file, consisting of a list of all schools in the sampling frame with their respective enrolment data, obtained from the Ministry of Education. Schools were selected with a probability proportional to enrolment size. This meant that large schools were more likely to be selected than small ones. Fifty-five schools with a target survey population of 4000 students were selected. 25 schools were selected in Nairobi an urban area, 6 in Mombasa an urban area, with strong influence from tourism and 24 from the rest of the country, which is predominantly rural setting. This facilitated a representation from both the urban and rural areas.

Stage 2: selection of classes. . In each selected school, the number of streams in each class, standards 7, 8 or form 1 and 2 were listed. From this list, classes were randomly selected based on the random start provided by CDC on the school level forms. In each school, depending on the number of classes listed one or two or three of those classes were selected. In each class selected, all students present were eligible for the survey.

The Questionnaire

This consisted of 57 'core' questions and 8 'optional' questions making a total of 65 questions. The core questions allow for comparison between countries and regions, and the optional questions allow for specific issues pertaining to Kenya. All questions had responses to choose from and apart from four questions that asked for background information such as age, gender, class and religion, the rest solicited information on the use of tobacco i.e. prevalence, access, brands of cigarettes and other tobacco products, knowledge and attitude towards smoking, environmental tobacco exposure, cessation, media and advertising and school curriculum. The questionnaire was pre-tested before it was administered in schools.

Data Collection

A training workshop for the Research Co-ordinators, representing ten African countries, of the WHO/AFRO region, was held in Harare, between June 5 – 7, 2001. The aim of the session was to familiarise the Research co-ordinators with the standard methodology to be used in all the countries, in implementing the GYTS. Tasks of the Research Co-ordinator were explained. These included overall management of the project, sample design and working in liaison with CDC to select the schools, development and pre testing of the country specific questionnaire, liasing with the various agencies to procure permission and ensure smooth implementation of the survey, making the initial contact with and securing participation of the selected schools, procurement of all supplies, recruiting of survey Administrators, training them and assigning them to selected schools, shipping of answer sheets to CDC for analysis and writing of the country report.

Because GYTS is a school-based survey, co-operation of the Ministry of Health and the Ministry of Education was necessary, especially the latter since government schools are under its immediate control. Although the Director of Education granted permission, to execute the survey, permission and co-operation had also to be obtained from the various Provincial Directors of Education and the respective School Heads.

Eleven Survey Administrators were identified and recruited by the Research Co-ordinator. These were mainly university students on vacation. The research co-ordinator organised a one-day training session for all the survey administrators, at Mathare hospital. The training covered the procedures to be followed prior to, during and after the survey. The survey administrators were issued with the necessary stationery and equipment for the survey and assigned to specific schools, five schools per person, they were also required to make contacts with the head teachers of the assigned schools in order to schedule the survey.
The survey was conducted between 11th and 24th of October 2001. During survey administration, one machine-readable answer sheet and a questionnaire were given to each student. Because the survey procedures were designed to ensure anonymity, students were not required to write their names on the Answer Sheet, or provide any other kind of identifying information. Two types of forms were filled by the survey administrators in respect of each school participating, the School-Level Form and the Classroom Level Form. The School-Level Form contained the name of the School, the sample size, and the School ID, the grades taught and the grades surveyed in the school, as well as the total number of eligible classes. The Classroom Level Form also showed the School name, the sample, the School ID and the Class ID. These two forms provided the necessary identification information and were the primary data management forms. The survey was conducted in class during normal lesson and duration of 45 minutes was allowed. On completion the survey Administrators delivered the completed answer sheets together with the documentation forms to the Research Co-ordinator who upon checking and confirming delivered them to CDC for scanning and analysis.

Analysis
During analysis, a weighting factor was applied to each student record to adjust for non-response and the varying probabilities of selection. The programs SUDAAN and EPI-info were used to compute rates and 95% confidence intervals for estimates. A weight was associated with each questionnaire to reflect the likelihood of sampling each student and to reduce bias by compensating for differing patterns of non-response. The weight used for estimation is given by:
W=W1*W2*f1*f2*f3*f4

Where,
W1=the inverse of the probability of selecting the school
W2=the inverse of the probability of selecting the classroom within the school
f1 =a school-level non-response adjustment factor calculated by school size category (small, medium, large)
f2 =a class-level non response adjustment factor calculated for each school
f3 =a student-level non response adjustment factor calculated by class
f4 =a post stratification adjustment factor calculated by form

RESULTS

Of the 4581 students sampled, 4447 students responded to the questionnaire, giving a student response rate of 97.07%. All the schools sampled participated giving a school response rate of 100%. The overall response rate was 97.07%

Table 1: Prevalence Percent of students who use tobacco, Kenya GYTS, 2001

Category	Ever Smoked Cigarettes, Even One or Two Puffs **(ESMOKER)**	Current Use			Never Smokers Susceptible to Initiating Smoking **(SUSCEPNS)**
		Any Tobacco Product **(CTOB)**	Cigarettes **(CSMOKER)**	Other Tobacco Products **(OTOB)**	
Region 1-3 (Total)	14.9 (± 3.3)	13.0 (± 2.8)	7.2 (± 2.4)	8.5 (± 2.1)	19.7 (± 6.3)
Male	21.0 (± 3.9)	15.8 (± 4.0)	10.1 (± 3.7)	9.3 (± 2.7)	21.7 (± 7.7)
Female	8.5 (± 3.8)	10.0 (± 3.4)	4.2 (± 2.5)	7.7 (± 2.4)	18.0 (± 5.8)
Region –1 (Total.)	27.3 (± 5.4)	15.5 (± 3.1)	9.5 (± 2.8)	9.4 (± 1.9)	20.2 (± 4.8)
Male	37.2 (±7.6)	19.8 (± 4.3)	13.6 (± 3.7)	10.9 (± 3.0)	20.7 (± 5.7)
Female	17.5 (±3.6)	11.2(± 2.1)	5.3 (± 2.1)	7.9 (± 1.9)	19.6 (± 4.7)
Region –2 (Total.)	14.5 (±13.2)	9.9 (± 2.0)	5.4 (± 3.9)	6.3 (± 1.1)	17.6 (± 5.3)
Male	16.2(± 14.5)	8.6 (± 2.5)	5.2 (± 4.5)	4.5 (± 4.9)	17.9 (± 7.9)
Female	12.9 (± 10.9)	11.6 (± 4.1)	5.8 (± 3.1)	8.5 (± 4.2)	17.4 (± 1.6)
Region –3 (Total.)	14.5 (± 3.4)	12.9 (± 2.9)	7.1 (± 2.5)	8.5 (± 2.2)	19.7 (± 6.5)
Male	20.5 (± 4.0)	15.8 (± 4.1)	10.1 (± 3.9)	9.3 (± 2.8)	21.8 (± 8.0)
Female	8.1 (± 4.0)	10.0 (± 3.5)	4.1 (± 2.6)	7.6 (± 2.5)	18.0 (± 6.0)

N/B Region-Nairobi, Region-2 Mombasa and Region-3 Rest of Kenya except Nairobi and Mombasa**.**

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About 15% of all the students ever smoked cigarettes, with significant difference in gender for the entire country, Nairobi and the rest of Kenya. There was no significant difference by gender for those who ever smoked cigarettes in Mombasa (Table -1). At least one out of ten students (13%) currently use any tobacco product with 7.2% currently smoking cigarettes and 8.5% using other form of tobacco products. There was statistical difference by gender for the current tobacco use in Nairobi, both for current any tobacco product and current cigarette smoke. One in five students (19.7%) indicated they were likely to initiate cigarette smoking during the next year with no significant difference in gender, in all regions.

Table 2: School Curriculum, Kenya GYTS, 2001

Category	Percent taught dangers of smoking **(CORE50C)**	Percent discussed reasons why people their age smoke **(CORE51C)**
Region 1-3 (Total.)	77.5 (± 3.7)	57.3 (± 5.1)
Male	77.7 (± 3.6)	56.8 (± 3.7)
Female	77.3 (± 4.5)	57.9 (± 7.4)
Region -1 (Total.)	72.6(± 7.8)	53.2 (± 5.7)
Male	74.4 (±5.6)	52.1 (± 4.2)
Female	71.0 (± 12.4)	54.4 (± 10.0)
Region -2 (Total.)	76.8 (±4.3)	54.3 (± 9.8)
Male	80.3 (± 4.6)	54.3 (± 7.0)
Female	71.9(± 6.9)	54.5 (± 13.9)
Region -3(Total.)	77.7 (± 3.8)	57.4 (± 5.4)
Male	77.8 (± 3.8)	57.0 (± 3.9)
Female	77.6 (± 4.7)	58.0 (± 7.7)

N/B Region-Nairobi, Region-2 Mombasa and Region-3 Rest of Kenya except Nairobi and Mombasa

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Four out of five of the students (77.5%) had been taught about dangers of smoking in the past one year. Over half of the students (57.3%) had discussed reasons, why people their age smoke (Table 2). There was no significant difference in gender; however, there was statistical difference between those who had been taught in class and those who had actually discussed the topic in class.

Table 3: Cessation, Kenya GYTS, 2001

Category	Current Smokers	
	Percent desire to stop **(CORE35A)**	Percent tried to stop this year **(CORE36A)**
Region – 1-3 (Total)	73.5 (± 10.8)	70.2 (± 7.6)
Male	77.1 (± 13.6)	78.0 (± 10.1)
Female	68.1 (± 15.5)	48.8 (± 19.2)
Region – 1 (Total)		77.1 (± 9.0)
Male		75.7 (± 10.7)
Female		80.0 (± 15.5)
Region – 2 (Total)		74.3 (± 7.8)
Male		95.0 (± 6.8)
Female		35.1(± 42.1)
Region – 3 (Total)		69.7(± 8.1)
Male		78.0 (± 10.8)
Female		47.0 (± 20.3)

N/B Region-Nairobi, Region-2 Mombasa and Region-3 Rest of Kenya except Nairobi and Mombasa

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Seven out of ten students (73.5%) who currently smoke cigarettes, stated that they currently desire to stop smoking, or that they tried to stop smoking during the past year but failed (70.2%) Table 3. There was no statistical difference by gender, for the entire country, Nairobi and the rest of Kenya. There was no significant difference by gender in those who had tried to stop smoking this year in Mombasa.

Table 4: Environmental Tobacco Smoke, Kenya GYTS, 2001

Category	Exposed to smoke from others in their home		Exposed to smoke from others in public places		Percent think smoking should be banned from public places		Definitely think smoke from others is harmful to them	
	Never Smokers **(CORE32A)**	Current Smokers **(CORE32B)**	Never Smokers **(CORE33A)**	Current Smokers **(CORE33B)**	Never Smokers **(CORE34A)**	Current Smokers **(CORE34B)**	Never Smokers **(CORE31A)**	Current Smokers **(CORE31B)**
Region I-3 (Total)	22.2 (± 2.3)	74.6 (± 9.4)	38.4 (± 3.8)	79.2 (± 4.5)	41.9 (± 8.2)	46.8 (± 11.7)	51.7 (± 5.6)	38.2 (± 9.8)
Male	23.9 (± 3.9)	70.8 (± 13.5)	41.9 (± 3.7)	81.2 (± 3.8)	44.0 (± 9.9)	51.0 (± 13.0)	55.8 (± 8.6)	42.9 (± 10.7)
Female	20.6 (± 3.8)	83.2 (±13.1)	35.2 (± 5.3)	73.7 (± 10.0)	40.1 (± 8.7)	37.9 (± 19.8)	48.1 (± 5.8)	27.5 (± 9.6)
Region 1 (Total)	25.0 (± 4.5)	61.0 (± 7.1)	44.8 (± 4.2)	81.3 (± 8.6)	57.5 (± 7.5)	44.0 (± 5.2)	59.3 (± 4.0)	36.3 (± 7.0)
Male	24.5 (± 5.3)	57.0 (± 8.0)	42.9 (± 5.4)	79.5 (± 12.0)	55.9 (± 8.5)	45.8 (± 7.5)	59.1 (± 4.2)	36.6 (± 8.6)
Female	25.2 (± 5.7)	72.2 (±12.7)	46.0 (± 5.7)	87.8 (± 11.0)	58.8 (± 9.0)	40.7 (± 12.6)	59.4 (± 5.7)	34.2 (± 13.3)
Region 2 (Total)	24.9 (± 7.0)	58.4 (±12.4)	40.9 (± 6.8)	84.0 (± 13.8)	33.5 (±13.4)	50.3 (± 13.7)	45.8 (± 13.9)	59.0 (± 22.2)
Male	22.4 (± 9.7)	32.3 (± 23.0)	36.1 (± 9.0)	79.4 (±22.0)	38.5 (± 18.8)	50.9 (± 7.3)	44.0 (± 14.3)	62.8 (± 33.7)
Female	28.7 (±12.4)	94.3 (± 7.9)	47.2 (± 15.5)	88.7 (± 5.1)	28.0 (± 13.5)	47.0 (± 29.8)	48.3 (± 13.5)	57.6 (±26.2)
Region-3 Total	22.1 (± 2.3)	75.3 (± 9.9)	38.2 (± 4.0)	79.0 (± 4.7)	41.6 (± 8.5)	46.9 (± 12.3)	51.6 (± 5.8)	38.1 (± 10.3)
Male	23.9 (± 4.0)	71.7 (±14.1)	42.0 (± 3.8)	81.2 (± 4.0)	43.8 (± 10.3)	51.2(±13.6)	55.9 (± 8.9)	43.1 (± 11.2)
Female	20.4 (± 4.0)	83.5 (±13.8)	34.8 (± 5.5)	72.9 (±10.6)	39.7 (± 9.1)	37.6(±20.9)	47.7 (±6.0)	26.8 (± 10.0)

N/B Region-Nairobi, Region-2 Mombasa and Region-3 Rest of Kenya except Nairobi and Mombasa

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A significantly high percentage of current smokers, were exposed to second-hand smoke, as compared to never smokers, both in their homes (74.6% Vs 22.2%) and in public places (79.2% Vs 38.4%) Table 4. There was statistical difference between the never smokers and current smokers, on those exposed to second-hand smoke in all the regions. Almost half of the students, both never smokers (41.9%) and current smokers (46.8%) think that smoking should be banned from public places, with Nairobi having the highest percentage of up to 57.5% for the never smokers and Mombasa 50.3% for the current smokers. Half of the never smokers (51.7%) think smoke from others is harmful to them, while only a third of current smokers (38.3%) think smoke from others is harmful to them. In Mombasa however, six out of ten students who are current smokers think that smoke from others is definitely harmful to them. There is no significant difference by gender in all the Regions.

Table 5: Knowledge and Attitudes, Kenya GYTS, 2001

Category	Think boys who smoke have more friends		Think girls who smoke have more friends		Think smoking makes boys look more attractive		Think smoking makes girls look more attractive	
	Never Smokers **(CORE20A)**	Current Smokers **(CORE20B)**	Never Smokers **(CORE21A)**	Current Smokers **(CORE21B)**	Never Smokers **(CORE23A)**	Current Smokers **(CORE23B)**	Never Smokers **(CORE24A)**	Current Smokers **(CORE24B)**
Region 1-3 (Total)	26.9 (± 5.6)	30.7 (± 8.6)	14.2 (± 3.7)	20.6 (± 8.2)	6.1(± 2.5)	25.4 (± 4.9)	5.5 (± 2.2)	19.3 (± 7.6)
Male	24.4 (± 6.3)	35.1 (± 10.4)	14.0 (± 5.5)	20.0 (± 9.0)	5.9 (± 2.8)	26.9 (± 5.6)	5.5 (± 2.5)	19.2 (± 9.4)
Female	29.0 (± 7.2)	20.7 (± 14.7)	14.4 (± 3.7)	22.5 (± 11.1)	6.4 (± 2.8)	22.3 (± 11.0)	5.6 (± 2.4)	19.9 (± 11.1)
Region 1 (Total)	20.6 (± 3.1)	35.6 (± 7.7)	12.4 (± 3.0)	26.3 (± 8.4)	6.1(± 1.3)	24.3 (± 9.2)	4.1 (± 1.8)	22.5 (± 8.1)
Male	20.6 (± 3.9)	30.5 (± 9.3)	13.2 (± 4.1)	20.0 (± 9.4)	8.0 (± 2.6)	20.5 (± 11.4)	5.3 (± 2.2)	21.4 (± 8.2)
Female	20.6 (± 4.1)	49.6 (± 13.4)	11.9 (± 3.7)	43.0 (± 14.2)	4.5 (± 1.6)	34.5 (± 17.6)	3.2 (± 2.3)	25.7 (± 14.8)
Region 2 (Total)	27.0 (± 1.0)	35.8 (± 28.8)	20.2 (± 4.8)	24.7 (± 14.4)	12.2(± 5.8)	23.6 (± 6.0)	8.1 (± 4.4)	11.2 (± 5.0)
Male	25.6 (± 3.7)	39.4 (± 21.3)	18.2 (± 4.1)	20.2 (± 13.6)	11.1 (± 6.8)	17.3 (± 10.1)	6.7 (± 7.0)	0.0 (± 0.0)
Female	28.8 (± 6.9)	33.6 (± 43.7)	23.6 (± 9.4)	31.8 (± 35.7)	14.0 (± 7.0)	32.8 (± 9.1)	10.2 (± 4.8)	24.9 (± 7.8)
Region 3 (Total)	27.0 (± 5.8)	30.5 (± 9.1)	14.2 (± 3.9)	20.3 (± 8.6)	6.1(± 2.6)	25.4 (± 5.2)	5.5 (± 2.3)	19.2 (± 8.0)
Male	24.5 (± 6.5)	35.3 (± 11.0)	13.9 (± 5.7)	20.0 (± 9.5)	5.8 (± 2.9)	27.2 (± 5.8)	5.5 (± 2.6)	19.2 (± 9.9)
Female	29.3 (± 7.5)	19.2 (± 15.9)	14.4 (± 3.9)	21.5 (± 11.7)	6.4 (± 3.0)	21.7 (± 11.5)	5.6 (± 2.5)	19.6 (± 11.8)

N/B Region-Nairobi, Region-2 Mombasa and Region-3 Rest of Kenya except Nairobi and Mombasa

Write up for this table.

About one third of never smokers (26.3%) and current smokers (30.7%) think boys who smoke have more friends than the non- smokers (Table 5). Only one out of five of both never smokers and current smokers (14.2% v/s 20.6%) think that girls who smoke have more friends than non-smokers. There was no significant difference in all regions by gender. A significantly small number of never smokers think, boys nor girls who smoke are more attractive than non smokers (6.1% v/s 5.5%), with no significant difference by gender. Up to 25% of smokers think boys or girls who smoke are more attractive than non-smokers (25.4% v/s 19.3%) are. There was no significant difference by gender of those current smokers who think that boys or girls who smoke are more attractive than non-smokers in Mombasa are. Generally there was no significant difference between the never smokers and current smokers in knowledge and attitudes

Table 6: Media and Advertising Kenya GYTS, 2001

Category	Percent Saw Anti-Smoking Media Messages **CORE41A**	Percent Saw Pro-Tobacco Messages in Newspapers and Magazines		Percent Who Had Object With a Cigarette Brand Logo On It		Percent Offered Free Cigarettes by a Tobacco Company	
		Never Smokers **(CORE47A)**	Current Smokers **(CORE47B)**	Never Smokers **(CORE44A)**	Current Smokers **(CORE44B)**	Never Smokers **(CORE49A)**	Current Smokers **(CORE49B)**
Region 1-3 (Total)	80.2 (± 3.3)	72.8 (± 4.0)	77.9 (± 8.3)	18.5 (± 3.4)	48.5 (± 8.9)	12.1 (± 2.5)	42.6 (± 6.9)
Male	80.3 (± 3.3)	71.2 (± 5.9)	76.8 (± 10.1)	16.5 (± 5.0)	45.7 (± 11.1)	12.6 (± 3.2)	40.6 (± 6.3)
Female	80.1 (± 5.6)	74.4 (± 3.4)	80.1 (± 9.5)	20.4 (± 3.0)	54.4 (± 10.2)	11.7 (± 3.3)	48.5 (± 11.9)
Region 1 (Total)	82.3 (± 2.6)	76.3 (± 3.4)	79.2 (± 7.5)	14.2 (± 3.2)	36.6 (± 7.7)	8.5 (± 2.2)	35.0 (± 8.5)
Male	81.6 (± 3.1)	75.4 (± 3.9)	80.0 (± 8.9)	14.1 (± 4.6)	36.7 (± 10.3)	9.9 (± 4.1)	37.7 (± 9.3)
Female	83.1 (± 3.5)	77.1 (± 4.5)	78.8 (± 12.4)	14.3 (± 3.5)	37.4 (± 9.6)	7.5 (± 1.9)	28.3 (± 15.2)
Region 2 (Total)	83.4 (± 6.7)	83.1 (± 4.3)	81.6 (± 14.2)	13.8 (± 2.5)	23.2 (± 7.4)	13.8 (± 5.2)	25.9 (± 8.6)
Male	85.8 (± 9.4)	83.0 (± 7.1)	94.4 (± 15.6)	11.5 (± 6.6)	17.3 (± 10.1)	13.5 (± 8.7)	20.7 (± 14.4)
Female	81.7 (± 6.5)	83.0 (± 2.7)	65.8 (± 23.7)	17.1 (± 7.3)	32.4 (± 21.9)	14.5 (± 3.4)	35.3 (± 9.9)
Region 3 (Total)	80.1 (± 3.5)	72.6 (± 4.1)	77.8 (± 8.7)	18.7 (± 3.6)	49.3 (± 9.4)	12.2 (± 2.6)	43.1 (± 7.2)
Male	80.2 (± 3.4)	70.9 (± 6.1)	76.6 (± 10.6)	16.6 (± 5.3)	46.2 (± 11.6)	12.7 (± 3.3)	40.9 (± 6.6)
Female	80.0 (± 5.8)	74.2 (± 3.6)	80.4 (± 10.0)	20.6 (± 3.2)	55.5 (± 10.7)	11.8 (± 3.5)	49.6 (± 12.6)

N/B Region-Nairobi, Region-2 Mombasa and Region-3 Rest of Kenya except Nairobi and Mombasa

Write up of this Table.

Eight out of ten (80.2%) students saw an anti-smoking media in the past 30 days (Table 6). Over seven out of ten students both the never smoking students (72.8%) and the current smokers (77.9%) had seen a pro- tobacco message in news papers and magazines in the past 30 days. There was no significant difference in media exposure by gender. Almost half of the current smokers (48.5%) had an object with a cigarette brand logo on it but less than twenty per cent of students who do not smoke cigarettes (18.5%) had such an item. More than four out of ten students who smoke cigarettes currently (42.6%) had been offered free. Cigarettes by a tobacco company representative. 0nly one out of ten students who do not smoke cigarettes had been offered such. There was significant difference by gender among those who were offered a free cigarette. There was no significant difference between the regions.

Table7: Access and Availability, Kenya GYTS, 2001

Category	Percent Current Smokers who Usually Smoke at Home **CORE12A**	Percent Current Smokers who Purchased Cigarettes in a Store **CORE5BB**	Percent Current Smokers Who Bought Cigarettes in a Store Who Were Not Refused Because of Their Age **CORE10A**
Total	23.9 (± 9.3)	35.4 (± 14.5)	68.3 (± 15.4)
Male	26.0 (± 11.5)	37.4 (± 18.8)	77.3 (± 15.0)
Female	19.4 (± 12.0)	31.7 (± 10.8)	47.4 (± 23.0)

N/B Region-Nairobi, Region-2 Mombasa and Region-3 Rest of Kenya except Nairobi and Mombasa

Write up of this Table.

Over one out of five (23.9%) students of current smokers usually smoke at home and more than three out of ten (35.4%) purchase their cigarettes at a store (Table 7). Almost seven out of ten (68.3%) of current smokers who usually buy their cigarettes in a store had not been refused purchase because of their age. There was no significant difference by gender.

Discussion

The Global Youth Tobacco Survey is a school-based survey, whereby in Kenya it was conducted among primary and secondary school students in standards 7- 8 and forms 1-2 respectively. The country was subdivided into three regions, Nairobi, which has a population of over 3million people, is the capital city; Mombasa is the second largest city with a strong influence from tourism. The third category was the rural and small urban centers combined.

The three regions represent different risky behaviors among the youth from urban and rural settings, influence from tourists as well as access to information on tobacco. This survey presents a clear picture of the magnitude of the problem of tobacco use among the youth in the country.

Prevalence

It has been established that most people begin smoking before the age of 18 years, with the median age of initiation less than 15 years in many countries. From this survey it was established that about 15% of the youth have ever smoked cigarettes while 13% of the youth currently use any tobacco product. About 20% of the youth indicated that they are likely to initiate cigarette smoking during the next year. This calculates to over 2 million youth intending to pick up the habit.

Young people frequently experiment with new and sometimes risky behaviors. However, they often do not take into serious consideration, the long-term consequences of such behaviors. For the youth, the risks of tobacco use are perceived to be remote and are out weighed by what they see as the immediate effects. They tend to underestimate the addictive effect of nicotine and the difficulties associated with quitting, believing it is easier for young people to quit than adults are.

Starting to smoke at younger ages increases the risk of death from tobacco smoking related illnesses and lowers the age at which death is likely to occur. It is widely known that tobacco is the most important preventable cause of premature death. Young people who start smoking early in life often find it difficult to quit smoking. Half of persistent smokers who start smoking in adolescence will die from their use of tobacco. Cigarette smoking is associated with heart diseases; cancers of the lung, larynx, mouth, esophagus and bladder; stroke and chronic obstructive airway diseases among others.

School Curricula

A large number of individual evaluations and review articles regarding controlled educational interventions to reduce youth tobacco use have been published. A wide range of evaluation results from experimental and quasi-experimental studies suggest that some of these educational programs resulted in a significant short term reduction in smoking, a delay in initiation, or a desirable change in attitudes towards tobacco use. Many guidelines for developing and implementing school based tobacco prevention programs previously issued by the National Center Institute and Centers for Disease Control and Prevention (CDC) include;

a) That the instructions should provide information on the social influences of and peer norms regarding tobacco use in addiction, to information on the short and long term physiologic consequences of smoking,
b) Program specific training for teachers should be provided and
c) That schools should develop and enforce tobacco free policies, to make sure prevention programs are implemented in a setting with broad policy support.

Schools are an ideal setting in which to provide tobacco use prevention education. School based health education programs should enable and encourage children and adolescents who have not experimented with tobacco, to maintain abstinence from tobacco use, or those who are regular tobacco users. Tobacco prevention education programs may enable them to quit tobacco use. From the survey, four out of five students had been taught about dangers of smoking in the past one year and about half of the students had discussed reasons on why people their age smoke. There was a significant difference between those who had discussed the topic in class and those who had just been taught. Encouraging debates and active participation on the topic of tobacco is very essential and more practical to the student than just being taught in class.

Apart from school curricula, parents should play the major role in educating their children on the harmful effects of drug abuse particularly tobacco use, which is the gatekeeper of the rest of the drugs of abuse. From the survey, only half of the students who smoke had discussed the harmful effects of cigarette smoking with a family member. More than half of the current smokers reported that their parents smoked too. This usually has a great influence on the children's behavior.

Cessation

The results of a number of descriptive studies and focus group studies suggest that many teenage smokers are motivated to quit smoking. It has been estimated that 74% of occasional teenage smokers and 65% of daily users have a desire to quit, although some studies suggest that the success rate among those who do attempt to quit is low. It is however important to intervene to keep occasional smokers from becoming daily smokers.

In this study, seven out of ten students who currently smoke cigarettes stated that they desire to stop smoking while 70.2% had tried to stop smoking during the past year but failed. Although desire to stop smoking is high, the failure rate is also very high. This therefore calls for early interventions.

Many smokers including youth are addicted to nicotine and need assistance in quitting. To comprehensively address the problem of tobacco use among the youth, the focus must be on both prevention and cessation.

Environmental Tobacco Smoke

Environmental Tobacco Smoke (ETS) is a significant risk factor for lung cancer, heart disease, asthma exacerbation and/or induction, respiratory infections and adverse reproductive outcomes, it is therefore important to asses exposure in youth. From this study, a significantly high percentage of current smokers were exposed to ETS as compared to never

smokers, both in their homes and in public places (74.6% Vs 22.2%). Although there have been no significant studies on the economic costs of ETS in Kenya, it is estimated that annual costs are very high. Thus the detrimental economic and health impacts of ETS are colossal and in need of further studies. It has been shown that passive smoking increases the chances of contracting or aggravating tobacco related diseases. The Kenya Government, the community and individuals are making efforts, to prohibit tobacco smoking in public places. For instance, all government premises in the country are now designated No-Tobacco Smoke zones, Kenya Airways which is the National airline, operates only No-Tobacco Smoke flight. Public transport and most of the public places in the country are No-Tobacco Smoke zones. The proposed, Tobacco Control Bill, once enacted will effectively address all these issues.

Knowledge and Attitudes

Increase in positive attitudes towards tobacco use and decreased agreement with statements about the risks of tobacco use has been related to increases in youth tobacco use rate. Parental knowledge and attitudes towards tobacco use is very essential and so are the role models. In the study, about one third of the students thought that boys who smoke had more friends than the non-smokers. This has a great impact on the youth, as peer pressure is very strong amongst the youth. A high percentage of youth that smoke (25%) think that those who smoke are more attractive than the non-smokers are. It is therefore very essential to give correct facts about the harmful effects of tobacco. The acquisition of such information can help monitor the broader or more general impact of media counter-advertising and de-glamorisation campaigns, school curricula and youth empowerment efforts.

Media and Advertising

Sophisticated mass media campaigns that involve essential elements of social marketing and are theoretically driven may well have an effect on the attitudes and behaviours of youth regarding tobacco use. Of all the consumer products, cigarettes are the most heavily advertised and marketed. There is great concern that tobacco advertising and marketing including the distribution of promotional products such as clothing, sporting equipment, and gear for outdoor activities- is positively associated with youth smoking.

Pro-use messages: - Children buy the most heavily advertised brands and are three times more affected by advertising than are adults. The average youth has already been exposed to billions of dollars in imaging advertising and promotions creating a “friendly familiarity” for tobacco products- an environment in which smoking is seen as glamorous, social and normative. The youth are not able to recall virtually any anti-smoking messages on television or in the movies, yet they are able to recall specific movies that portray smoking and are able to identify actors and actresses who smoke in their entertainment roles

Ant-use messages: - An intensive mass media campaign can produce significant declines in both adults and youth smoking and demonstrate that comprehensive educational efforts, combining media, school-based and community based activities can postpone or prevent smoking onset in adolescents.

In the study, eight out of ten students saw anti smoking media messages and also almost the same number had seen pro tobacco messages. There was no significant difference by gender. Almost half of the youth that were current smokers had an object with a cigarette logo on it. About 20% of the non-smokers also had such an item; this is very worrying, as these youth can easily be candidates of tobacco use. About 40% of the students who currently smoke had been offered free cigarettes by tobacco company representative, with only 10% of non smokers having received such free offers. These offers indeed have direct impact on the youth’s attitude and behaviour towards cigarette use.

Access and Availability

It is undeniable that the current state of regulatory, judicial and legislative pressure on tobacco industry and tobacco retailers represents an unprecedented and concentrated assault on youth access to tobacco products. In Kenya, there is no prohibition to children and youth that are less than 18 years in age access tobacco products. As such, the products are easily available to the youth. No child is refused to purchase tobacco products because of his or her age. Parents/guardians who smoke actually sent their underage children to purchase for them this commodity. From the study, a fifth of the smokers actually smoked at their homes, three out of ten purchased their cigarettes at a store. Seven out of ten students who purchase and smoke their cigarettes were never refused to purchase because of their age. As such boys or girls can purchase their tobacco products without being questioned or refused to purchase. Indeed, the accessibility and availability of tobacco products to the youth is not a problem in Kenya. The long awaited tobacco control bill addresses this problem.

Conclusions

Over one in ten youth in Kenya are smoking cigarettes. The age of cigarette smoke initiation is becoming younger, starting to smoke at younger ages increases the risk of death from co Tobacco smoking related causes. What is more worrying, is the high number of those never smokers who intent to start smoking during the following year of this survey, a figure which translates into one in five youths. This figure is very high and it should be of great concern since the younger a person starts smoking, the more likely they would become addicted which will lead to premature morbidity and mortality from tobacco related illnesses.

School based health education programs particularly on the effects of tobacco use are very essential. The students should be encouraged to form health clubs where issues such as drug abuse and tobacco smoking in particular can be discussed. Discussions give lasting impression on youth than when the same issues are just taught in class. The Ministry of Education can develop guidelines for developing and implementing school based tobacco prevention programs in collaboration with the Ministry of Health, the World Heath Organization and other relevant organizations.

Nicotine, one of the chemical compounds found in tobacco is highly addictive. This is the "catch" that hooks smokers to indulge in cigarette smoking. Even if one desires to stop cigarette smoking, it becomes very difficult for one to quit as a result of nicotine addiction. For instance, in this survey, three out four students who had started smoking had tried to stop the habit but failed. The best that can be done for the youth is to give them enough knowledge so that they do not try cigarette smoking.

Passive smoking is a significant risk factor for developing tobacco-related illnesses where the unborn child is also affected. Most of the students who had started smoking had been exposed to environmental tobacco smoke and due to insufficient knowledge on the dangers of tobacco smoke; they easily picked up the habit. Realizing that, almost everyone is becoming a tobacco user as a result of passive smoking, the government of Kenya has put in place some measures to protect the non smoking members of the society, by designating all government buildings in the country and all health institutions as smoke free zones.

Increasing the knowledge about the dangerous effects of tobacco on the society will increase correct attitude towards tobacco use and hence increase abstinence. It is therefore essential to give correct facts about the harmful effects of tobacco, such information will empower the youth to engage in informed discussions on dangers of tobacco use as a result of peer pressure.

Media and advertising has a great impact on the growing mind of the youth. The youth are in the stage of identification and they do easily picks up dangerous habits. Four out of five students surveyed, who were smokers had seen pro tobacco advertisement, while two out of five had been offered free cigarette by a tobacco company representative. These advertisements indeed have a direct impact on the youth's attitude and behavior towards tobacco use.

Tobacco products are easily accessed by the youth as a result; they will easily use the tobacco products since they are readily available to them. Most of the youth that smoke had purchased the cigarettes without any restrictions.

RECOMMENDATIONS

Despite the relatively low smoking prevalence in Kenya, it has been suggested that appropriate strategies should be adopted urgently to avoid increased use of tobacco products, to facilitate decrease in this preventable risk factor, for non-communicable diseases, which are the main causes of death and illnesses, of which Kenya is not an exception.

The following recommendations are considered useful within the Kenyan context:

- Restrict the advertisement of cigarette smoking through billboards, newspapers, radio and television. At the same time increase public awareness campaign on the harmful effects of smoking cigarettes, as well as other tobacco use, through the mass media. Appeal to sporting clubs to promote tobacco free sports by refusing sponsorship from tobacco entrepreneurs and avoid the use of cigarette advertisement in the promotion of their respective sporting activities.

- Enact legislation with severe penalties to restrict or ban smoking in public places, such as, restaurants, cinemas, play parks, supermarkets, public transport, e.g. taxis, buses, steamers, ferries, etc and work towards the banning of cigarette smoking at work places.

- Formulate public policies and enact legislation that regulates tax increases for tobacco products, as well as point of sale and distribution.

- Enact and enforce legislation that prevents minors from purchasing cigarettes and other tobacco products by prosecuting those who sell tobacco products to minors.

- Involve the Ministries of Health and Education, as well as NGO's, in the campaign to promote the cessation of cigarette smoking and use of other tobacco products, especially among youths.

- Design and implement cessation programs for schools and all youth-oriented or affiliated organisations. Cessation programs in schools must be integrated in the school curriculum and should be done on systematic basis.

APPENDIX A: Weighting, Variance Estimation, and Statistical Testing

School, classroom, and student data were weighted to produce total population estimates. The weighting factors reflect the probability of selection, non-response, and post-stratification (gender X grade).

Variances were estimated using general linear variance estimators. This method of computing variances takes into account the complex nature of the design and the classroom cluster effect. It also accounts for sampling with probability proportional to measure of size.

SUDAAN was used to compute standard errors for the estimates. Because the estimates shown in this report are based on a sample, they are subject to sampling error. A measure of the sampling error is given by the standard error. Figure 1 shows the estimated standard error associated with an observed percent. Standard errors for any estimate can be determined by either: 1) locating the intersection of the "x" and "y" axes on the predicted value line; 2) inserting the percentage of interest into the estimated regression equation shown on the figure.

Statistical Testing for Differences

A proportion and its estimated standard error may be used to construct confidence intervals (CI) about the estimate. The CI is expressed as a range (upper and lower bound) around the estimate. The CI contains the average value of the proportion, which would result if all possible samples were produced. The 95% CI suggests that if 100 samples were drawn and CIS. where calculated for each, then the average value of the proportion would be contained in 95 of the 100 CIs.

The test of statistical significance is done by comparing the 95% CI for two percentages. If the CIs. do not overlap then the percentages are significantly different. For example,

1) In Table 1 we can test the difference in the percent ever smoked between males (21.0%) and females (8.5%). The Difference is –

Diff. = 21.0 - 8.5
= 12.5

2) Using the equation for Kenya ($y = -0.0015x^2 + 0.1464x + 0.9444$). The Standard Error (SE) can be calculated for 21.0% and 8.5%.

SE 21.0= $-0.0015(21.0^2) + 0.1464(21.0) + 0.9444$
=3.4

SE 8.5 = $-0.0015(8.5^2) + 0.1464(8.5) + 0.9444$
=2.1

3) The 95% CI for each percent is calculated by multiplying the SE * 1.96.

95% CI for 21.0 =3.4 *1.96
= 6.7
So the upper bound is (21.0+ 6.7 =27.7) and the lower bound is (21.0 – 6.7 =14.3)

95% CI for 8.5 = 2.1 * 1.96
= 4.1
So the upper bound is (8.5+ 4.1 = 12.6) and the lower bound is (8.5 -4.1 = 4.4).

4) Statistical difference is determined by comparing the upper and lower bound range for the two percentages.
a) If the ranges <u>do not overlap</u>, then the two percentages are considered statistically different at the 95% CI level. b) If the ranges <u>do overlap</u>, then there is no statistical difference between the two percentages.

In this example, the percentages 21.0 (27.7 – 14.3) and 8.5 (12.6 – 4.4) do not overlap, thus males are significantly more likely than females to have ever smoked cigarettes.