American University Of Armenia

Public Health Program

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Lifetime Health-Monitoring Pilot Program in Sisian town, Armenia

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Armenia

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Executive Summery

Current reports of Ministry of Health of Armenia and other international and local agencies characterize the situation in health care system of Armenia as complex and critical. This situation leads policy makers to reforming and restructuring the health care system.

Effective July 1, 1997, a new system of payment mechanism was established in health care facilities, which provides to those facilities more autonomy in organization of services and revenue generation.

My contacts with community leaders revealed even more uncertainty and confusion than before on how to organize and manage health care services in a most effective and efficient way?

In Sisian town I have found higher commitment of provincial health department with promotion of preventive health care programs in their community. I was offered to develop a strategy for preventive health care in Sisian community. Current situation and poor financing require incorporation of cost-effective preventive programs targeted to specific health needs of certain age groups.

Reviewing epidemiological data, I have found that Coronary Heart Disease is the number one killer both in Armenia and Sisian town in particular.

Literature review has lead to propose lifetime monitoring program on cholesterol screening and follow-up for certain age group at risk of developing disease and for patients possessing risk factors for elevated cholesterol and CHD mortality.

The program consist of proposed implementation plan, recommended interventions, monitoring and evaluation plan.

Proposed budget reflects the potential expenditures for first year program and for the following five years.

1. Abstract

"...Armenian health care system is oversized, expensive to operate and that is not capable of improving the health status. Because central and local government resources are administered

through hospitals, there is attendance for hospital officials to prioritise their own needs above those of primary care facilities. [1]

"There is a decline in outpatient services from 8 visit per person in 1989 to 5.0 in 1994, for home visits from 0.8 per person in 1985 to 0.33 in 1994." [2].

UTILISATION OF PRIMARY MEDICAL CARE UNITS IN ARMENIA*

YEARS	1989	1990	1991	1992	1993	1994
Total # of outpatient visits	28, 045	27, 930	26,871	22,684	20,580	18,868
visit per person per year	8	7.8	7.4	6.1	5.5	5

* data source: Statistic Department of Ministry of Health

Within my business trips in regions of Armenia I have found that there is even higher uncertainty and confusion among community leaders than before on how health system will be organizes and managed in a most effective and efficient way?

The complexity of payment methods is extreme and they unfortunately do not simply divide into Fee For Services (FFS), capitation ,or salary. When setting up a particular payment model, an attempt must be made to balance the population prospective with health care facility's interests.

2. Specific Aims

My contacts with policy makers in Sisian town revealed their commitment to community health programs. Sisian is a small town in the south of Armenia (Syunik Marz) with the population of about 20,000. I have found that Mayor of the town and representatives of provincial health department are highly concerned with the social aspects of reforms. I was told about an attempt in Sisian to structure policy making body representing the political power, the general public and health professionals. One of the main objectives of policy making body will be the reorganisation of primary care, promotion of preventive medicine, which fits the national strategy

of health care reforms, and the introduction of community-based funding of outpatient services provided by health centers.

I have been offered to develop a strategy for preventive health care services in Sisian town.

Health problems and priority statement

While reviewing the available demographic information and epidemiological data, specifically information on the frequency and distribution of major health problems, I have found the Coronary Heart Diseases (CHD)as a major health problem to be addressed. In developing the strategy, it is of great importance to balance between burden of disease, availability of technical methods, administrative and necessary personnel for controlling the disease, and relative cost of various control programs.

Burden of Suffering

CHD is the first leading cause of death in Armenia. According to the data from statistical department of the Ministry of Health there is a stable increase in the mortality rate among people with CHD in Armenia in the past seven years. The mortality rate of people with CHD increased from 240.1 (per 100 000 population) in 1989 to 291.7 in 1996 (refer to APPENDIX A) . Correspondingly the mortality of people with Myocardial Infarction (MI) increased from 47.93 (per 100 000 population) in 1989 to 65.32 in 1996. The mortality of CHD is almost equally distributed among regions of Armenia (in average 2.7 per 1000 population).

The tendency of increasing mortality is reflected in statistical data obtained from Sisian health care facilities (refer to APPENDIX B).

CHD accounts for approximately 2500 deaths each year, and angina and nonfatal myocardial infarction (MI) are a source of substantial morbidity. In 1997 estimated 2553* cases of MI and stroke are projected to cost over $480,000* in medical expenses and lost productivity. *the figures are provided by statistical department of Ministry of Health of Armenia (MOH).

Current situation of health care in Armenia and its financing require incorporation of cost-effective preventive programs targeted to specific health goals of different age

groups.

This study will represents an effort to

- construct an effective preventive procedures targeting specific age group considering existing patterns of medical practice
- figure out the cost of preventive measures for cholesterol
- propose an efficient financing mechanisms including FFS, capitation or "community insurance".

PROGRAM OBJECTIVES

The main objective of the program is

To decrease morbidity, mortality and disability rates caused by coronary heart diseases (CHD) in Sisian by:

- Increasing public awareness and knowledge in prevention of CHDs using publications, TV and radio announcements
- Periodic screening on blood cholesterol level

3. Background

Lester Breslow and Anne Somers developed practical approaches to preventive medicine in the Lifetime health-monitoring program. According to the protocols for young middle age (25 to 39 years) and older middle age (40 to 59 years) the following activities are recommended:
"health goals:

Young middle age

1. To prolong the period of maximum physical energy and to develop full mental, emotional and social potential.
2. To anticipate and guard against the onset of chronic diseases through good health habits and early detection and treatment where effective.

Professional services

1. Two professional visits with the healthy person-at about 30 and 35 - including tests for hypertension, anaemia, cholesterol, cervical and breast cancer, and instruction in self-examination of breasts, skin, testes, neck and mouth.

2. Professional counselling regarding nutrition, exercise, smoking, alcohol, marital and other aspects of health-related behavior and lifestyle.

   Older middle age

1. To prolong the period of maximum physical energy and optimum mental and social activity, including menopausal adjustment.

2. To detect as early as possible nay of the major chronic disease, including hypertension, heart disease, diabetes and cancer, as well as vision, hearing and dental impairments.

   Professional services:

1. Four professional visits with the healthy person, once every five years -at about 40, 45, 50 and 55- with complete physical examination and medical history, tests for specific chronic conditions.

2. For those over 50, annual tests for hypertension, obesity and certain cancers." [3].

   Serum Cholesterol and Risk of Coronary Heart Disease. Epidemiological, genetic, and clinical studies support a causal relationship between blood lipids (usually measured as serum levels) and coronary atherosclerosis. "Extended follow-up of large cohorts (predominantly middle-aged men) provides evidence that CHD risk increases in a continuous and graded fashion, beginning with cholesterol levels as low as 150-180 mg/dL(this association extends to cholesterol levels measured as early as age 20 in men). During middle age, for each 1% increase in total cholesterol, CHD risk increases by an estimated 3%. High cholesterol (Ú240 mg/dL) is also a risk factor in middle-aged women, but most coronary events in women occur well after menopause. Expert panels have defined high and "borderline high" (200-239 mg/dL) cholesterol to simplify clinical decisions. Because CHD is a multifactorial process, however, there is no definition of high cholesterol that discriminates well between individuals who will or will not

develop CHD. Due to nonlipid risk factors, persons with cholesterol below 240 mg/dL account for the majority of all CHD events. Among middle-aged men, 9-12% of those with cholesterol 240 mg/dL or greater will develop symptomatic CHD over the next 7-9 years, but most of them have multiple other risk factors for CHD. The excess (i.e., absolute) risk due to high cholesterol (and the probable benefit of lowering cholesterol) increases with the underlying risk of CHD. In a 12-year study of over 316,000 men aged 35-57, the excess CHD mortality attributable to high cholesterol was greatest in men over age 45, and in those who smoked or had hypertension. The increase in CHD mortality associated with a given increment in serum cholesterol was steepest at very high values (>300 mg/dL)."[4]

Elevated blood cholesterol is one of the major modifiable risk factors for coronary heart disease (CHD). Factors such as smoking, hypertension and diabetes are highly associated with a high risk of CHD.

To address the issue is worth to start from recommendations of Major Authorities.

In the Multiple Risk Factor Intervention Trial (MRFIT) [5], which was designed to measure the effects of risk factor modification and cardiovascular morbidity and mortality, screened over 400,000 individuals, concluded that the 6-year risk of death from CHD in normotensive, non-smoking, middle-aged men with blood cholesterol levels less than 182 mg/dL was one fourth that of men with blood cholesterol levels greater than or equal to 245 mg/dL. Epidemiological studies have shown that cholesterol lipoprotein subfractions play an important role in CHD. Low Density Lipoproteids (LDL)-cholesterol is directly and High Density Lipoproteids (HDL)-cholesterol is inversely associated with CHD incidence.

American Academy of Family Physicians [6] recommends that adults (19 years of age and older) should have measurement of nonfasting or fasting total blood cholesterol performed at least every 5 years.

American College of Obstetricians and Gynecologists [7] - Adults (19 years of age and older) should have cholesterol measured every 5 years until 64 years of age, and then every 3 to 5 years thereafter.

American College of Physicians [8] recommends that the total cholesterol to be measured at least once in early adulthood and at intervals of 5 or more years up to age 70. The LDL and HDL cholesterol and serum triglyceride levels should be measured in individuals with an elevated total serum cholesterol level. The decision to perform these additional tests should be individualised. Factors to be taken into account include age, gender, number of other cardiovascular risk factors, and the patients' willingness to comply with drug and dietary treatment of hypercholesterolemia.

Canadian Task Force on the Periodic Health Examination [9] - There is insufficient evidence for the inclusion or exclusion of universal screening for hypercholesterolemia in a periodic health examination. Nonetheless, case-finding through repeated measurements of the nonfasting total blood cholesterol level should be considered in men 30 to 59 years of age. Individual clinical judgement on whether testing is appropriate should be exercised in all other circumstances.

According to the **National Cholesterol Education Program (NCEP) of the National Heart, Lung, and Blood Institute [10]** adults (20 years of age and older) should have a measurement of total blood cholesterol at least once every 5 years; HDL-cholesterol should be measured at the same time if accurate results are available. **Lipoprotein analysis should be performed for all patients with CHD**. In patients without CHD, lipoprotein analysis should be performed in any of the following circumstances: 1) if the total cholesterol is 240 mg/dL or above; 2) if the total cholesterol is 200 to 239 mg/dL and the patient also has two or more CHD risk factors; 3) if the patient has an HDL-cholesterol less than 35 mg/dL.

A meta-analysis of cholesterol-lowering trials performed mainly in middle-aged men has shown that lowering blood cholesterol through diet or drug therapy significantly reduces the risk of CHD

death and nonfatal myocardial infarction. In secondary prevention trials among those who have

had a myocardial infarction, the reduction in CHD mortality is associated with a reduction in total

mortality.

4. Methods

For methodology development essential epidemiological data were collected (refer to

APPENDIX C)

Proposed program

Program	Target Population:	Target Area:	Target Facilities:

Components			
Public Education	8,000 people (age 20-60)	Sisian town	Health care facilities of Sisian, Media means
Screening on cholesterol (every 5 years)	2633 people	Sisian town	Sisian central polyclinic
Screening on cholesterol and lipoproteins(every year), Cholesterol lowering therapy	180 MALE patients with CHD	Sisian town	Sisian central polyclinic
Screening on cholesterol and lipoproteins(every year, Elevated cholesterol lowering therapy	66 female patients with CHD	Sisian town	Sisian central polyclinic

The program components consist of public education on CHD risk reduction including cholesterol screening recommendations and cholesterol screening of people of age groups considered to be risky, and primary and secondary prevention interventions for patients with CHD.

Periodic screening for high blood cholesterol is recommended for all men ages 35-65 and women ages 45-65 (TOTAL 2600). Literature review shows that there is insufficient evidence to

recommend for or against routine screening in children, adolescents, or young adults. There is also insufficient evidence to recommend for or against routine screening for other lipid abnormalities.

All patients with Coronary Heart Disease (CHD) (total of 246) should receive periodic screening on total cholesterol and lipoproteins every year and counselling regarding other measures to reduce their risk of coronary disease.

Two approaches can be taken to lower the risk of CHD in the community population. One is a clinical approach that identifies individuals at high risk who need intensive intervention efforts. The second is a public health (population) approach that aims to shift the distribution of CHD in the entire population to a lower range through dietary change, smoking cessation, stress coping and exercising. This program proposes to use two approaches, because they are complementary, and together represent a co-ordinated strategy for reducing coronary risk.

Positive Risk Factors to elevated cholesterol will be determined for each patient and corresponding screening and follow-up mechanism will be developed. For that purpose the risk factors measuring table (refer to APPENDIX D) should be compiled. Factors are categorised as risky and not risky in accordance with their contribution to elevated cholesterol and CHD. For analytical purposes each factor will worth of 1 point in risk score calculation. Therefore, the range of risk scores will be from 0 to 10. The risk scores of patients will be recommended to use for project impact analysis which will described in analysis section.

People who will undertake the screening test on cholesterol will be categorised for lifetime monitoring (refer to APPENDIX E).

If TC is 200 or less, and HDL is 35 or greater, LDL is 130 or below the patient is within the recommended range. Patient has to maintain a healthy lifestyle, and confirm his/her result with a repeat measurement by the physician within five years.

If Total Cholesterol (TC) is 200 - 239, and/or HDL is 35 or less, LDL is 130 - 159 with two or more risk factors, or coronary heart disease, the patient is approaching a level considered high

which indicates a greater risk for heart disease. His/her results with a repeat measurement by physician within one year.

If TC is >240, and/or HDL is less than 35 , LDL is 159 or higher with two or more risk factors, or coronary heart disease, the patient is above the recommended range. His/her results with a repeat measurement by physician within two months.

IMPLEMENTATION PLAN FOR YEAR 1998. (refer to APPENDIX F).

Institutional Capacity

At the previous times of Soviet system the screening on serum cholesterol level was periodically conducted among high risk groups of developing CHD. Currently the central polyclinic is able to arrange laboratory supplies to carry out screening tests. According to the data collected from several polyclinics and Sisian polyclinic as well, the total cost of one screening test will vary from $0.9 to $1.

Also, the firm named "Delta" provides cholesterol test kits available in the market with the price of $10 per kit. This kit is compiled for 30 tests on total cholesterol level. Although the test kits for cholesterol only determine the total cholesterol level, they are extremely useful because if total cholesterol level is high, then it is likely that the LDL level will be high.

Accuracy of Screening Tests

Total cholesterol can be measured in venipuncture or finger-stick specimens from fasting or nonfasting individuals. Due to normal physiologic variation and measurement error, a single measurement may not reflect the patient's true (or average) cholesterol level. Stress, minor illness, posture, and seasonal fluctuations may cause serum cholesterol to vary 4-11% within an individual [11].

It is important to physicians to follow the provided guideline(refer to APPENDIX G) of cholesterol screening. The is compiled using external sources [6], [8], [12].

Effectiveness of Early Detection

The cholesterol screening should be accompanied with significant improvements in dietary knowledge, fat consumption, average cholesterol levels, and CHD mortality.

The primary evidence to support cholesterol screening is the ability of cholesterol-lowering interventions to reduce the risk of CHD in patients with high cholesterol. These benefits are now well established for persons with pre-existing atherosclerotic vascular disease: "In individual trials and overviews of studies enrolling persons with angina or prior myocardial infarction (MI), cholesterol-lowering treatments slowed the progression of atherosclerosis, reduced the incidence of CHD, and reduced overall mortality."[13]

Recommended interventions

Increased emphasis on coronary heart disease risk status is a guide to the type and intensity of cholesterol-lowering therapy and focus more attention to HDL as a risk factor; and increased emphasis on physical activity and weight loss as components of the dietary therapy for high blood cholesterol.

Two general groups of patients for hypercholesterolemia therapy are: 1) individuals without evidence of coronary artery disease who are at high risk of developing coronary heart disease (primary prevention), and 2) patients with known coronary disease or other atherosclerotic process and high cholesterol (secondary prevention).

For patients without coronary disease who have moderately elevated serum cholesterol and no other risk factors, the dietary therapy is appropriate.

Public education and Dietary Advice. To examine the clinical benefits of a diet low in total and saturated fat in persons without CHD are multicomponent intervention, which offered dietary counselling, smoking cessation advice. Public announcement means will be used for health education programs.

Proposed dietary therapy

Although such factors as exercise and life-style are important, the first line of attack is diet. That is because certain foods are known to raise cholesterol and others to lower it. So the goal of

dietary therapy is to balance foods to their effect on cholesterol and, even more important, to replace saturated fat with other types of fat -- for example, monounsaturated and polyunsaturated fats.

Today, there are good-tasting, low-fat, low-cholesterol substitutes for most of the things people like to eat.

Instead of fatty meats like pork and salami it is recommended to choose low-fat or non-fat alternatives. Chicken (without the skin), , and turkey are always excellent choices. For baking an cooking, vegetable oils are an excellent substitute for butter.

In addition to lowering the fat in diet, there are some foods that can lower the cholesterol and risk for heart disease! Rather than focus only on the foods that people should eat less of, it will be also better to regularly include these foods which can improve cholesterol level. These foods are: Fish/Seafood, Carrot, Apple, Pear, Onion, Garlic, Fresh Orange, Fresh Grapefruit, and Red Wine. Some of those items, such as fresh orange or fresh grapefruit are not affordable by poor population, however other are available and even are grown by population.

"However, in all patients with coronary heart disease, including older individuals and women, even mild elevations of LDL-cholesterol should be aggressively treated, with a goal of lowering LDL-cholesterol to less than 100 mg/dL" [14].

Although dietary modifications should always be the first line of therapy, drug treatment should be an easy decision in secondary prevention. The available cholesterol-lowering agent nicotinic acid.

Monitoring planning

Provincial health Department will follow-up to check the performance of health care providers. Random spot-checks and periodic patients' records review are recommended to check the screening performance.

Health Department also undertakes the public educational activities , such as local TV educational programs and publications. Proposed intervention methods will be serve as a bases for such programs.

Evaluation plan

I propose an evaluation plan for assessment of effectiveness of this program after first year. Implementation of this evaluation will based on data that will be collected during program implementation. The underlying principle of the evaluation will be the identification of differences between mean risk scores of patients with CHD and testing the significance of that difference. There are 246 patients with CHD and each patient has different rate of "score" related to risk factors. This range of getting scores can be from 0 to 10 (because there are maximum ten risk factors). Mean of getting scores will be calculated based on the formula: μ = (S1 + S2 + S3 + ... S246)/246, where Si is the score of i patient.

It will be more likely that after program implementation mean of risk scores will be decreased compared with mean of risk score before program implementation.

Having the data for 246 patients evaluator may figure out the theoretical sample size using the following formula:

$$n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 \times 2\sigma^2}{\Delta^2}$$

where $Z_{1-\alpha/2}$ = 1.96 (for α = 0.05), $Z_{1-\beta}$ = 1.28 (for 80% power)

σ = range/6 $\Delta = \mu 2 - \mu 1$ difference between means

If the theoretical sample size will be < than 246, it means that for 246 sample size study power is > than 80% and that will indicate the statistical significance of the difference between means.

The same method of analysis may be used for comparisons within different groups of patients.

For example patients may be divided into three groups as it is shown in the table below:

	group #1	group #2	group #3

pre interv.	0-3risk factors	4-7 risk factors	8-10 risk factors

Then, after intervention pre and post mean scores will be compared within one group to identify significance of differences. This analysis will assess the program impact on groups with different risk indicators.

The evaluation strategy for public education program is the subject for further exploration. In general it should be directed to measure the changes in knowledge, attitude and behavior of general public toward healthier life style.

5. Potential Adverse Effects of Screening and Intervention. The importance of possible adverse effects of screening has not been systematically studied.

Measurement of serum cholesterol is safe and relatively inexpensive, but widespread screening may have some undesirable consequences.

Researchers report decreased well-being in persons diagnosed with high cholesterol. Other possible adverse effects of screening include inconvenience and expense of screening and follow-up, opportunity costs to the busy clinician, misinformation due to inaccurate results, and reduced attention to diet in persons with accepted cholesterol levels.

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7. Budget (refer to APPENDIX H)

Two methods could be used for costs calculations: the first is the top-down approach, in which overall programme costs will be calculated and then applied as averages to all patients. This approach gives accurate estimates of total costs, the second is the bottom-up approach is the unit cost calculation based on data of spent resources and then calculate total budget for program implementation.

In proposed budget salaries of health care providers are based on per capita payment: $0.03 per person. According to the order of MOH of Armenia effective July 1, Ffs mechanism is not applicable to general practitioners services. For example, one general practitioner who serves in total 1000 population will receive about $30 per month.

PF and SS taxes are those charged by Pension Fund and Social Security Services.

For the first year the number of tests on total cholesterol will be about 3000: 2633 for those at risk of developing diseases and 246 for patients with CHD. As it was mentioned above the cost of one kit (30 tests) is about $10, therefore there will be need of 100 kits for the first year.

For planning purposes it is worth to mention that by the end of the fifth year starting from 1998, the need for tests will be decreased, because only people in acceptable range will be tested once every five years.

As it is shown the total estimated budget for implementation of lifetime monitoring program, specifically cholesterol screening program in Sisian town will cost about $36,000 for five years. It is recommended to Sisian Health Policy Planning Body to propagate community insurance payment mechanism or community funding by periodic payments. For this program if those 4000 households living in Sisian each one will pay $1.8 per year, cumulated resources will be enough for cholesterol monitoring for 5 years (4,000* $1.8 * 5=$36,000).

GLOSSARY

1. **Atherosclerosis** - A type of "hardening of the arteries" in which cholesterol, fat, and other blood components build up in the walls of arteries. As atherosclerosis progresses, the arteries to the heart may narrow so that oxygen-rich blood and nutrients have difficulty reaching the heart.

2. **Cholesterol** - A soft, waxy substance. It is made in sufficient quantity by the body for normal body function, including the manufacture of hormones, bile acid, and vitamin D. It is present in all parts of the body, including the nervous system, muscle, skin, liver, intestines, heart, etc.

   .**Blood Cholesterol** - Cholesterol that is manufactured in the liver and absorbed from the food you eat and is carried in the blood for use by all parts of the body. A high level of blood cholesterol leads to atherosclerosis and coronary heart disease.

   .**Dietary Cholesterol** - Cholesterol that is in the food you eat. It is present only in foods of animal origin, not in foods of plant origin. Dietary cholesterol, like dietary saturated fat, tends to raise blood cholesterol, which increases the risk for heart disease.

3. **Coronary Heart Disease** - Heart ailment caused by narrowing of the coronary arteries (arteries that supply oxygen and nutrients directly to the heart muscle). Coronary heart disease is caused by atherosclerosis, which decreases the blood supply to the heart muscle. The inadequate supply of oxygen-rich blood and nutrients damages the heart muscle and can lead to chest pain, heart attack, and death.

4. **Fat** - One of the three nutrients that supply calories to the body. Fat provides 9 calories per gram, more than twice the number provided by carbohydrate or protein. In addition to providing calories, fat helps in the absorption of certain vitamins. Small amounts of fat are necessary for normal body function.

   .**Total Fat** - The sum of the saturated, monounsaturated, and polyunsaturated fats present in food. A mixture of all three in varying amounts is found in most foods.

   .**Saturated Fat -** A type of fat found in greatest amounts in foods from animals such as meat, poultry, and whole-milk dairy products like cream, milk, ice cream, and cheese. Other examples of saturated fat include butter, the marbling and fat along the edges of meat, and lard and the saturated fat content is high in some vegetable oils - like coconut, palm kernel, and palm oils. Saturated fat raises blood cholesterol more than anything else in the diet.

.**Unsaturated Fat** - A type of fat that is usually liquid at refrigerator temperature. Monounsaturated fat and polyunsaturated fat are two kinds of unsaturated fat.

Monounsaturated Fat - A slightly unsaturated fat that is found in greatest amounts in foods from plants, including olive and canola (rapeseed) oil. When substituted for saturated fat, monounsaturated fat helps reduce blood cholesterol.

Polyunsaturated Fat - An highly unsaturated fat that is found in greatest amounts in foods from plants, including safflower, sunflower, corn, and soybean oils. When substituted for saturated fat, polyunsaturated fat helps reduce blood cholesterol.

5**. Gram (g) -** A unit of weight. There are about 28 g in 1 ounce. Dietary fat, protein, and carbohydrate are measured in grams.

6. **Hydrogenation** - A chemical process that changes liquid vegetable oils (unsaturated fat) into a more solid saturated fat. This process improves the shelf life of the product - but also increases the saturated fat content. Many commercial food products contain hydrogenated vegetable oil. Selection should be made based on information found on the label.

7. **Lipids** - Fatty substances, including cholesterol and triglycerides, that are present in blood and body tissues.<p>

8. **Lipoproteins -** Protein-coated packages that carry fat and cholesterol through the blood. Lipoproteins are classified according to their density.

.**High Density Lipoproteins (HDL)** - Lipoproteins that contain a small amount of cholesterol and carry cholesterol away from body cells and tissues to the liver for excretion from the body. Low levels of HDL are associated with an increased risk of coronary heart disease. Therefore the higher the HDL level, the better.

.**Low Density Lipoproteins (LDL) -** Lipoproteins that contain the largest amount of cholesterol in the blood. LDL is responsible for depositing cholesterol in the artery walls. High levels of LDL are associated with an increased risk of coronary heart disease and are therefore referred to as "bad cholesterol.

9. **Milligram (mg)** - A unit of weight equal to one thousandth of a gram. There are about 28,350 mg in 1 ounce. Dietary cholesterol is measured in milligrams.

10. **Milligrams/deciliter (mg/dl) -** A way of expressing concentration: in blood cholesterol measurements, the weight of cholesterol (in milligrams) in a deciliter of blood. A deciliter is about one-tenth of a quart.<p>

11. **Niacin -** A B vitamin essential for energy production in cells. The recommended daily allowance is about 14 mg for adult females and about 18 mg for adult males. When used in massive quantities under a physician's guidance, niacin is considered a cholesterol-lowering medication.

12. **Protein -** One of the three nutrients that supply calories to the body. Protein provides 4 calories per gram, which is less than half the calories of fat. Protein is an essential nutrient that becomes a component of many parts of the body, including muscle, bone, skin, and blood.

13. **Risk Factor** - A habit, train, or condition in a person that is associated with an increased chance (or risk) of developing a disease.

14. **Triglycerides** - Lipids (fat-like substances) carried through the bloodstream to the tissues. The bulk of the body's fat tissue is in the form of triglycerides, stored for later use as energy. We get triglycerides primarily from the fat in our diet.

APPENDIX H

Budget for 1998 activities

PERSONNEL COSTS:

Polyclinic Staff

General practitioner salaries 3@$30	$	1 080
Nurses salaries 3@ $20	$	720
PF & SS @ 36%	$	648
Total Salaries	**$**	**2 448**
SUBTOTAL PERSONNEL	**$**	**2 448**

Testing

Procurement of test kits 100 @ $10	$	1 000
Testing on cholesterol 246@ $1	$	246
Testing on cholesterol 2633@ $1	$	2 650
Testing on LDL 246 @ $0.5	$	123
Testing on HDL 246@ $0.5	$	123
Total testing	**$**	**4 142**

Public Education

Brochure publication210@$5.0	$	1 050
Mass media(local TV,Radio, Newspaper)	$	1 000
Posters 100@ $1	$	100
Copying materials	$	100
Total public education	**$**	**2 250**
GRAND TOTAL COSTS:	**$**	**8 840**

Estimated budget for 5 years program

	Year	Budget	
	1998	**$ 8 840**	
_____	1999	$ 6 190	6190=8840-2650
	2000	$ 6 190	
	2001	$ 6 190	
	2002	$ 8 840	
Total		**$ 36 250**	

APPENDIX D

RISK FACTORS	NOT RISKY MEASURE	**RISKY MEASURES**		Level of coding
1.Total cholesterol	less than 200 mg/dl	**200-239 mg/dl**	**more than 240 mg/dl**	ordinal
2. HDL level	higher than 35 mg/dL		**lower than 35 mg/dL**	ordinal
3. LDL level	lower than 130 mg/dL	**130 mg/dL-159 mg/dl**	**more than 159 mg/dL**	ordinal
4. Male	less than 45 years of age		**45 years of age or older**	ordinal
5. Female	less than 55 years of age		**55 years of age or older**	ordinal
6. The patient has a family history of heart disease before the age of 55	NO	**YES**		**Nominal**
7. High blood pressure	NO	**YES**		**Nominal**
8. Smoking	NO	**YES**		**Nominal**
9. Diabetes	NO	**YES**		**Nominal**
10. The patient is inactive	NO	**YES**		**Nominal**
Total number of risk factors				

APPENDIX E

	Recommended range(repeat screening within 5 years)	Approaching greater risk (repeat screening within 1 year)	Above the recommended range(repeat screening within 1 year)
Total cholesterol	less than200 mg/dl	200-239 mg/dl	more than 240 mg/dl
HDL level	more than 35 mg/dL	lower than 35 mg/dL	lower than 35 mg/dL
LDL level	lower than 130 mg/dL	130 mg/dL-159 mg/dl	more than 159 mg/dL
Other risk factors		two or more risk factors or CHD	two or more risk factors or CHD

Task	January	February	March	April	May	June	July	August	September	October	November	December
Testing												
Procurement of test kits	▓											
Testing on cholesterol 246 patients		▓	▓									
Testing on cholesterol 2633 people		▓	▓	▓	▓	▓	▓	▓				
Testing on LDL		▓	▓									
Testing on HDL 246@ $0.5		▓	▓									
Therapy		▓	▓	▓								
Public Education	▓	▓										
Brochure publication												
Mass media(local TV,Radio, Newspaper)			▓		▓		▓		▓		▓	
Posters		▓										

APPENDIX G

Physicians'

guidelines for Cholesterol Screening

1.   Patients who are acutely ill, losing weight, pregnant, or nursing should not be screened, as their cholesterol levels may not be representative of usual levels. Because cholesterol levels in patients who have had myocardial infarction within the last 3 months are likely to be lower than usual, results obtained during this period should be rechecked.

2.   Patients need not vary their usual eating habits before undergoing screening for total blood cholesterol or HDL-cholesterol. Patients undergoing lipoprotein analysis should fast (water and black coffee are acceptable) for 12 hours before testing.

3.   If possible, cholesterol tests should be performed on venous blood samples, as cholesterol concentrations measured from finger-stick blood samples may be unreliable.

4.   To prevent an effect of patients pose on the cholesterol value, venipuncture should be carried out only after the patient has been in the sitting position for at least 5 minutes.

5.   In interpreting results, clinicians should be familiar with the effects of medications on cholesterol levels. Anabolic steroids, progestins, bile salts, and chlorpromazine increase blood cholesterol. Clinicians should also be knowledgeable about conditions that may cause increased cholesterol levels, such as hypothyroidism, nephrotic syndrome, diabetes mellitus, and obstructive liver disease.