Israel's Prevention Programs and Screening Policies for Cardiovascular Disease

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Synopsis ....

For all four broad ethnic groups in Israel, mortality rates declined over the last decade for both ischemic heart disease (IHD) and cerebrovascular disease (CVD), the first and third most important causes of death in the country. The four broad ethnic groups consist of persons born in Israel, Asia, North Africa, and Europe. Mortality data also indicate a low male to female ratio in mortality from IHD, a definite female predominance in mortality from CVD, and high mortality rates for IHD and CVD in males and females born in North Africa. Morbidity data, especially incidence, are scarce for CVD in both sexes and IHD in females.

The feasibility of preventive intervention needs to be tested under the specific conditions of Israel. Although a multiple risk factor trial in Jerusalem showed that such a program can be conducted in a primary care framework, it clearly still needs to be tested in clinics rather than in a model teaching institution.

The best place for intervention would seem to be the primary health care system, which has almost complete access to the country's population. Kupat Holim (the Health Insurance Institute of the General Federation of Labour) is attempting systematically to identify and manage hypertension patients.

To date, management of acute coronary disease has been emphasized in Israel. Although additional resources are needed for primary prevention services, other options are suggested for obtaining those services.

T HAT EPIDEMIOLOGY CAN CONTRIBUTE to the determination of health policy, the development of health services, and consequent improvement of health is no longer a subject for debate (*1*). A clear and unequivocal message elicited from epidemiologic studies, such as the relationship between cigarette smoking and carcinoma of the lung, gives policymakers a basis on which to decide and act. It is much more complicated, however, when several factors are involved in epidemiologic studies or there are contradictory interpretations of results. Such complications may well be present in much of today's epidemiology of cardiovascular disease in general and in Israel specifically.

In this paper I will address questions that epidemiologists have raised about ischemic heart disease and cerebrovascular disease in Israel, with special reference to prevention. The concept of prevention I use here is the process by which the progress of a disease can be halted in an individual or a group of persons. In addition to primary prevention, aspects of secondary prevention (early diagnosis and treatment and the management of acute disease) and tertiary prevention (rehabilitation) will be discussed.

In this context, what do policymakers require to make decisions on the need for prevention efforts or to introduce a screening program? The criteria of Wilson and Jungner (*2*) suggest the following as a working framework:

- The health problem should be significant to the community in terms of its extent or seriousness.
- The process of development of the disease in the individual and the community should be at least partially understood so that persons at risk and factors that might be susceptible to intervention can be identified.
- The diagnostic tools to be used to identify persons and factors should be available, acceptable, effective, and efficient.
- There should be proven methods of intervention at different stages of the disease that will be acceptable to the community and economically feasible to the country or community.

Certain aspects of prevention that are clear cut, such as the identification and management of hypertension, need not be discussed in detail. Some of the major questions to

be discussed concern whether the data necessary for decisionmaking are available or perhaps there is still uncertainty about them.

Relevant Epidemiology

Epidemiologic data have been derived in Israel from different types of studies:

Mortality data. Although this is the most widely available epidemiologic information, it must be used with caution because of the almost total lack of post mortem confirmation of death certificate diagnoses in Israel.

Morbidity studies. The Israel Ischemic Heart Disease Study (3) provided information on the prevalence and incidence of ischemic heart disease (IHD) in 10,000 male civil servants. The Kiryat Yovel Community Health Study (4) also examined IHD in males, but in a small, defined Jerusalem community. There is a scarcity of morbidity data, especially on incidence, of IHD in females and of cerebrovascular disease (CVD) in both sexes.

Risk factor studies. Except for previously mentioned studies (3,4), the relationship of risk factors for cardiovascular disease to later abnormalities has been lacking frequently in studies in Israel.

Intervention studies. Few studies have been undertaken. Subsequent to the Kiryat Yovel study, a program for control of multiple cardiovascular risk factors showed a change in certain factors, but the effect on morbidity and mortality was not clear (5). Kupat Holim, the nation's largest Sick Fund, has begun a program to identify and treat persons with hypertension. It is now being extended to the whole country, although its influence on events still has not been examined (6).

Cardiovascular Disease Mortality

Several aspects are relevant to prevention:

• There was a decline in mortality rates for both IHD and CVD in the Jewish population of Israel over the last decade (7–9). Mortality rates for all four broad ethnic groups in the country declined, as shown in the table (9–10). The broad ethnic groups consist of persons born in Israel, Asia, North Africa, and Europe. The total Jewish population of Israel in 1978 was 3.1 million, of whom 795,100 were born in Europe or America, 340,100 in North Africa, 301,700 in Asia, and 1,670,000 in Israel. The total non-Jewish population was 565,900.

Cardiovascular disease mortality rates declined for all four broad ethnic groups in the country. The greatest relative drop was for persons born in Israel and the smallest for persons born in Asia.

Percentage drop in standardized mortality rates in Israel, 1969–78[1]

Born in—	Ischemic heart disease		Cerebrovascular disease	
	Male	Female	Male	Female
Israel................	37.3	33.8	47.4	43.8
Asia.................	13.4	14.3	16.7	26.0
North Africa..........	20.2	30.1	32.1	41.7
Europe..............	22.4	24.0	36.9	34.3
Total Israeli Jewish population.........	19.9	12.4	33.0	36.3

[1] SOURCE: Epstein and Zaaroor (9).

The greatest relative drop was in persons born in Israel, for both IHD and CVD and in both sexes, and the smallest was in persons born in Asia. Mortality rates for CVD dropped more than rates for IHD. Despite these decreases, IHD ranks first and CVD ranks third among causes of death in Israel.

The reasons for these drops in mortality rates are not clear and will be discussed in a section on risk factors. It should be stressed, however, that the case fatality rate for IHD in Israel has been relatively low, even before the widespread introduction of coronary care units. Medalie and coauthors (11) reported a possible difference in the case fatality rates for cardiovascular diseases between ethnic groups. Although it was not statistically significant, males born in North Africa had the highest case fatality rate.

• Kark reported a low male to female ratio for IHD mortality in Israel (12). In addition, the male predominance in CVD mortality rates reported in most countries is reversed in rates for all four broad ethnic groups in Israel (9).
• There are important differences in IHD and CVD mortality rates among the four broad ethnic groups (9). Mortality rates for those born in Israel or Europe and America are similar to those for the overall population of Israel (substantially higher rates for IHD in both sexes, as compared with CVD; much higher IHD rates in males and CVD rates in females). Among persons born in Asia, there is much less difference between the two diseases because of a lower rate of IHD mortality. Among those

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born in North Africa, CVD mortality rates for both sexes are the highest of any group; there are almost no differences between the sexes in IHD mortality rates.
• The proportion of deaths due to cardiovascular disease seems to be increasing in the Moslem, Druze, and Christian populations of Israel in recent years (13).

Cardiovascular Disease Morbidity

Few morbidity data exist for cardiovascular diseases, especially for women. Data from the Israel Heart Disease Study of 10,000 males show a higher prevalence and incidence of myocardial infarction (MI) in persons born in Europe or Israel than in those born in North Africa or the Middle East, who had the lowest rates (11). Morbidity figures for persons born in North Africa did not mirror their high mortality figures (9). The low male to female ratio for IHD reported in the mortality data (12) was also reported for the prevalence of CVD in the Kiryat Yovel study (14).

The morbidity data at hand do not throw any light on questions raised by analysis of the mortality data. In addition, there are almost no data on CVD morbidity in population groups. Librach and coauthors (15) reported no difference in stroke morbidity between the sexes in an Israeli institution for the elderly.

Cardiovascular Disease Risk Factors

Only a small proportion of the many risk factor studies conducted in Israel have a bearing on cardiovascular disease mortality or morbidity data reported.

For studies of blood pressure and hypertension, it is important to note that:

• A high prevalence of hypertension was reported for immigrants from the Atlas Mountain region of Morocco in 1957 (16);
• Findings in the Israel Ischemic Heart Disease Study did not show higher levels in males born in North Africa (17); and

• A high prevalence of hypertension was found among North-African-born persons in a stratified sample of male and female Jews ages 30–59 (18).

Lipids. Early studies showed that low levels of lipids were associated with low prevalence rates of IHD (19,20). This observation agreed with the prevalence data of the Israel Ischemic Heart Disease Study (21). The lipid levels were lowest in the persons born in North Africa and highest in those born in Europe. The study's 5-year incidence data also showed a positive relationship with total cholesterol and low-density lipoprotein-cholesterol (LDL–C). In the Lipid Research Center Study in Jerusalem, the levels of plasma cholesterol were lower in North African-born men than in their Israel- or European-born counterparts, but there were no differences among the women (22). Among their 17-year-old children, the same differences were found in both sexes (23).

The long-term relationship of lipid levels to IHD and total mortality is more problematic. Goldbourt and Kark concluded after exhaustive review that "these findings in Israeli studies cast some doubt on the advisability of attempting large-scale modification of cholesterol levels in the population of this country" (10).

Smoking. In Israel there is little controversy over the importance of smoking to IHD. The relevance of smoking is not limited to preventive programs for adults. Recent studies showed that 40–50 percent of adolescents already smoke (24,25), indicating that current educational techniques used to discourage smoking have not been particularly successful.

Diet. The Israeli diet is characterized by low total fat intake, low saturated fatty acid intake, high polyunsaturated to saturated fatty acid ratio (P:S ratio), and high carbohydrate intake relative to persons in the United States and in Europe. The Israeli diet resembles diets proposed in the United States and European countries to reduce lipid levels. The diets of Israel's broad ethnic groups vary. Both the Israel Ischemic Heart Disease Study (26) and the Lipid Research Center Study (27) showed that adults born in North Africa tended to have higher P:S ratios than adults born in Europe. P:S ratios were similar for persons born in Israel and North Africa. The European-born group consumed more total fat, more saturated fatty acids, and fewer carbohydrates than persons born in North Africa and Israel.

Thus, the relationship between these dietary data and lipid levels, IHD morbidity, and IHD mortality is problematic. Persons born in Israel have high P:S ratios and high IHD mortality rates, as do those born in North Africa. In addition, levels of total fat and saturated fatty acid intake have increased in the Israeli population in

general over the past few years, while IHD mortality rates have decreased (9).

Physical activity. Studies in Israel have shown a relationship between physical activity on the job among members of kibbutzim (28) and among civil servants (29) and the incidence of IHD. However, translation of these findings into a policy of promoting physical activity is not being contemplated.

Other risk factors. Other diseases, especially diabetes, almost certainly increase the risk of cardiovascular disease. Management of the disease is important in itself; the pros and cons of diabetes screening are beyond the scope of this paper.

A significant relationship between obesity and IHD incidence was shown in the Israel Heart Disease Study (29). The relationship of obesity to hypertension, diabetes, and lipid levels makes weight control important to any prevention program. Other risk factors, including personality, other psychosocial characteristics, and hardness of the water, have been identified, but their relevance to Israel or the possibility of change is doubtful.

Summary. The known risk factors for IHD, and especially for CVD, can explain only a relatively small part of the variance in IHD and CVD mortality and morbidity in Israel. Much more needs to be done to investigate other environmental, behavioral, and genetic factors that may be placing the population at risk.

Cardiovascular Disease Intervention Studies

One of the criteria essential to making a decision on preventive action is the availability of a proven method of intervention. Although controlled trials for each program may not be necessary in every country, the feasibility of intervention needs to be tested under the specific conditions in Israel.

The multiple risk factor trial in the Kiryat Yovel area of Jerusalem showed that such a program can be conducted in a primary care framework, but it clearly still needs to be tested in clinics, rather than a model teaching institution (5). The attempt of Kupat Holim to introduce systematic identification and management of persons with hypertension is a program that addresses a single risk factor (6).

Clearly then, intervention is possible, but its content and the group to be served must be determined.

Discussion

Despite the drop in mortality from IHD and CVD in Israel, both diseases remain major causes of death, mor-

bidity, and disability. Decisions about the role of preventive action, including screening, in Israel's health service system are not easy. The epidemiologic evidence is not always clear cut:

• Mortality data point to (a) a fall in mortality from IHD and CVD that cannot be explained on the basis of preventive action, (b) a low male to female ratio in mortality from IHD and a definite female predominance in mortality from CVD, and (c) high mortality rates for both conditions in males and females from North Africa.
• Data from morbidity studies do not add to the understanding of the mortality data.
• Intervention to reduce hypertension is worthwhile because of its feasibility and its effect on both IHD and CVD. A nationwide program will require screening to identify persons who need to be tested for possible treatment. The best place for programs would be the primary health care system, which has almost complete coverage of the population. Silberberg and coauthors (6) demonstrated that such programs are feasible, although the resources needed for a nationwide program must be available. The question does arise, however, should a special risk group of persons born in North Africa (especially women) be defined?
• There is little doubt about the need to intervene in cigarette smoking. Recent evidence would seem to indicate that primary action should attempt to prevent development of the habit in children and adolescents. Certainly there has been no drop in the rate of cigarette smoking in those age groups, and the substantial rise in the number of girls who smoke is disturbing. Recent legislation in Israel has attempted to control cigarette advertising, although it is still too early to assess the effects.
• The relationship of lipids and diet to heart disease is problematic. The conflicting nature of some data for Israel should be viewed against the results of the Multiple Risk Factor Intervention Trial (MRFIT) research, which are equivocal at best (30). If, as Stallones indicated (31), the MRFIT mortality data are not strong evidence for changing the diet of Americans, it is difficult to justify that recommendation for Israelis. Although this would seem to preclude the need to screen the population concerning eating habits, there is a definite place for community-level action on the possible dangers of obesity and the increasing saturated fat in the Israeli diet.

To date, management of the acute stage of coronary disease has been emphasized in Israel. The rate of 0.03 intensive coronary care unit beds per 1,000 population has been maintained for the past few years. A substantial proportion of Israel's urban population is served by mobile coronary care units. There remains, however, the

> *'Thus, the relationship between these dietary data and lipid levels, ischemic heart disease morbidity, and ischemic heart disease mortality is problematic.'*

need to improve the skill of the people and health professionals in performing cardiopulmonary resuscitation, which is required until the specialist team arrives.

Coronary artery surgery has increased tremendously in recent years. With the addition of a unit in northern Israel in 1983, there are now five units where coronary artery surgery is being performed. Together they perform about 1,000–1,200 bypass procedures a year, which is approximately the requirement estimated by Goor in 1980 (*32*).

The question of rehabilitation as tertiary prevention is vexing. Post-coronary rehabilitation has become accepted policy, but it is concentrated almost entirely in the hospital-based departments of cardiology, which limits coverage and availability. The value of rehabilitating CVD victims is still controversial. Weddell and Beresford (*33*) indicated that few stroke survivors are young and fit enough to benefit from intensive rehabilitation. They stressed the need to identify carefully patients who can benefit from such programs rather than extend service to all stroke victims, especially the very elderly.

Facilities for institutional management seem to be adequate for acute phases of IHD and CVD. Resources are needed, however, for primary prevention (hypertension, smoking, community education on obesity, consumption of saturated fats, and education in and training for community-based cardiopulmonary resuscitation. Assuming that there will be no additional budgetary resources, there are several options:

● Resources could be moved from the hospital and into the community. This is not feasible at present. The coronary care units are functioning at almost maximal capacity; a reduction would require a policy change that would not be acceptable to public health professionals, politicians, or the public. A reduction in the number of surgical operations would also not be acceptable, as the system is only recently reaching a defined goal. It is assumed, however, that the health care system will continue to function at the present levels of coverage and sophistication and that it will be available to all in need. If Israel's economy dictates real cuts in resources, far-reaching changes in the standards of medical care may result, possibly affecting hospital management of coronary disease.

● Resources of other preventive health services—essentially manpower—could be shifted to cardiovascular disease prevention services. For example, some resources could be shifted within the family health clinics, which provide a nationwide service for pregnant women, babies, young children, and school-age children. A major national thrust could be planned around the contact that the preventive service has with mothers and school-children. Educational aims could include prevention of smoking, encouragement of eating habits in children that will lessen the extent of obesity and limit saturated fatty acids in the diet, and emphasis on the rewards of lifelong physical activity. In a country that has achieved admirable results in most areas in infant mortality and other problems usually associated with maternal and child health services, shifting resources to preventive action in cardiovascular disease is certainly possible.

● Kupat Holim provides primary care for 85 percent of Israel's population and has repeated contact with the insured population. Some 75 percent of the insured population are seen each year by Kupat Holim staff, and more than 90 percent are seen every 3 years. These visits could also include screening for high blood pressure. Even with a reduction in the high utilization rates of these services, almost everyone in the insured population could be screened each 3 years with almost no additional resources. The record systems and methods of followup exist. Diet, smoking, and physical activity information could also be taught by clinic staff members; the mass media could be used too. In the clinics, families could be identified whose members are at special risk, because of a family history of IHD or CVD or related risk factors, so that they would get special attention. Persons with conditions that predispose them to IHD or CVD, such as diabetes, could be identified during ongoing treatment of the patient and family. Community physicians in the primary health care clinics should also become the focus for long-term rehabilitation of post-coronary patients, with adequate backup by hospital cardiology departments.

The implications of these proposals should be appreciated and carefully considered by those responsible for health policy. In the future, preventive services should be aimed at the total spectrum of the natural history of the diseases and be located in the community and not in the hospitals, while inpatient services are maintained at their present level relative to the size and age of the population. I should stress that programs of inservice training for physicians, nurses, and other professionals will be required. Including preventive services and community-based cardiopulmonary resuscitation and rehabilitation as part of the clinics' functions will provide an important incentive to the primary care team to improve their stan-

dard of service. Clearly, this is a long-term plan, but with careful planning after innovative decisionmaking the proposed goals can be achieved. In addition, the concentration of these programs in the existing primary care framework would result in greater efficiency and preclude the need for additional large budgetary allocations.

However, the Ministry of Health will have to act in two areas:

• There is an urgent need to formulate and officially pronounce a national policy on preventive services for cardiovascular diseases. The policy would guide program development and use of future additional resource allocations.
• No current morbidity survey of health in Israel exists that can serve as the basis for evaluation of long-range health policy decisions. The validity problems of death certification are multiplied by the extremely low rate of post mortems, and present hospital statistics are years out-of-date. Dever (34) stressed the importance of standardized evaluation of the effect of health policy decisions on both morbidity and mortality. Such evaluation is not possible without valid and reliable up-to-date national data.

In conclusion, the available epidemiologic data provide the basis for policy decisions about prevention programs for IHD and CVD at all stages of their development in the community. These decisions are made at the level of the individual patient, the institution (hospital or clinic), the total community, or the nation. Decisionmakers also need to consider possible changes in the present structure and functions of the health care system in light of the existing economic restraints.

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Epidemiologic Evidence for Cardiovascular Disease Initiatives in Israel and the United States

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This paper is based on Dr. Feinleib's presentation at the Second Binational Symposium: United States-Israel: Interrelations of Epidemiology and Health Policy, held October 17–19, 1983, in Bethesda, Md.

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Synopsis ....

There seems to be much epidemiologic evidence implicating a variety of modifiable risk factors in the occurrence of coronary artery disease. Although "common sense" would imply modification of each of these risk factors, on both an individual and a national basis, in order to prevent the occurrence of coronary artery disease in middle and later life, the direct evidence for a beneficial effect from such modifications is, at present, quite meager. Nevertheless, there seems to be a growing awareness and also a growing change in lifestyle and health behaviors that will tend to accomplish the "common sense" recommendations. It is important that monitoring systems be put in place to document the extent of these lifestyle changes and to evaluate their effect on the continuing trends in coronary artery disease incidence and mortality. Joint efforts in the United States, Israel, and other countries will go far to quantitate these effects in these naturally occurring experiments.

CORONARY ARTERY DISEASE HAS BEEN DESCRIBED as one of the major public health epidemics of the 20th century. First described as a clinical entity in 1912, it was recognized with increasing frequency as being a major health problem, particularly among affluent white males in urban areas of industrialized countries of North America and Europe. By 1940 it was the leading cause of death in the United States, and its frequency continued to rise through the 1950s, reaching a peak in the mid-1960s. During the last 20 years the mortality from coronary heart disease has decreased markedly in the United States and in several other countries, such as Canada, Australia, and Israel, but the rates have remained level in most West European countries and have increased dramatically in Eastern Europe and some countries of the Third World. Although hundreds of millions of dollars have been spent investigating the origins and natural history of this disease, it is far from clear why heart disease has become such a major problem in the 20th century, why it now seems to be waning in some countries, and, indeed, whether the decline in mortality is due to an amelioration of the disease itself or a manifestation of improvements in medical care and improved survival.

During the 20th century there were also dramatic changes in the occurrence of the other major manifestation of cardiovascular disease, namely, cerebral vascular accidents or stroke. Stroke has been the third leading cause of death in the United States for about 50 years, being particularly important in the older age groups. Since at least 1940, however, the age-specific death rates for stroke have been declining steadily in both men and women in the United States. In many areas of the world where coronary heart disease is relatively rare, such as Japan, stroke is often one of the most important causes of death. As with coronary heart disease, it is not yet clear why the patterns of stroke incidence and mortality have varied as they have during this century.

During the last 30 years several epidemiologic studies of free-living populations have been conducted in the United States, Israel, and many other nations to investigate the factors associated with the occurrence of coronary heart disease and its natural history. Some of the factors that are found to affect the incidence of coronary