THE KILKENNY HEALTH PROJECT

A PILOT PROGRAMME FOR
CORONARY HEART DISEASE PREVENTION
IN IRELAND


The main sponsoring organisations of the Kilkenny Health Project were:

Health Promotion Unit of the Department of Health
Irish Heart Foundation
The National Lottery
South Eastern Health Board
Voluntary Health Insurance Board

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WELL DONE, KILKENNY!

It is impossible to list everyone who helped the Kilkenny Health Project. We received financial support and sponsorship from many companies and organisations, some of which are listed on the previous page.

In addition many groups and individuals generously gave of their time to organise and to speak at meetings and to participate in Project activities. These included teachers, doctors, public health nurses, dentists, social workers, hospital staff, pharmacy staff, shopkeepers and many volunteers around the county. There was a tremendous response also from those who were chosen to take part in Project surveys. The willingness to contribute for the good of the community was remarkable, even by Kilkenny standards.

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The staff of the Kilkenny Health Project were efficient and creative, hardworking and loyal, but above all enthusiastic, good-humoured, welcoming and helpful to all who came in contact with the Project.

One final task remains for the Kilkenny Health Project - to provide information to a wide audience about the achievements of the Project. A major report is being presented to the Minister for Health with recommendations for the strengthening of preventive activities which would promote health and improve the quality of life for Irish people. The application of the lessons learned from the Kilkenny Health Project would, I believe, provide the most lasting and sincere thank you to all who have given so generously to the Project since it was established in October 1984.

Too many people in Ireland die or become ill in youth and middle age from diseases associated with modern lifestyles. Many of these diseases are preventable. The Kilkenny Health Project has made an important contribution towards health promotion in Ireland.

To everyone who participated in the Project in any way, a most sincere 'thank you'. I wish you good health!

Dr. Emer Shelley, Project Leader, Kilkenny Health Project.
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SUMMARY

Coronary heart disease (CHD) is an important cause of premature sickness and death in Ireland. Mortality, particularly in Irish men, has declined slowly in comparison with the large reductions which have been achieved in other developed countries.

The Kilkenny Health Project was launched in March 1985 as a community programme for CHD prevention among the population of County Kilkenny. The baseline survey confirmed that there were high levels of factors associated with CHD. There was however a low level of awareness of CHD as an important but potentially preventable cause of morbidity and mortality in middle age in Ireland.

The health promotion programme in Kilkenny aimed first of all to raise awareness of CHD and of the Kilkenny Health Project. The Project supported efforts to make the environment more conducive to healthy behaviour, for example, by the distribution of 'No Smoking' signs. Regular articles were published in the Kilkenny People newspaper and newsletter provided more detailed information. Interviews on radio Kilkenny reinforced the health messages. Statutory and voluntary organisations, as well as members of the public, supported and participated in Project activities. Community meetings were held with a wide range of organisations. There were annual events such as a Quit Smoking Competition and a 10K Road Run.

Emphasis was placed on training of health professionals to increase the quantity and effectiveness of preventive activities which they carried out as part of their everyday work. Some public health nurses established community groups to support behaviour change. The Kilkenny Faculty of the Irish College of General Practitioners established the Health Assessment, which measured factors associated with CHD in over 8,000 men and women aged 30 to 49 years.

Post-primary schools participated in a Working Party which co-ordinated health education programmes in schools. These were implemented in about half of the schools and the schools ensured that parents were informed in advance. The Project produced and distributed some materials to primary schools.

The post-programme surveys in County Kilkenny and in County Offaly found important improvements in levels of blood cholesterol, blood pressure and smoking. These changes were in general similar in the two counties. There was less of an increase in the prevalence of obesity in Kilkenny. There were also greater dietary changes in Kilkenny and larger increases in knowledge about factors associated with heart disease.

It is concluded that it is feasible to implement community programmes for health promotion in Ireland and to obtain the support of health and
education professionals and of the public. It is recommended that programmes at national level should utilise the resource materials which have been developed by the Kilkenny Health Project. Comprehensive integrated health promotion programmes should focus on the needs of the young, the less well educated and on the socially and economically deprived.
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1. INTRODUCTION

The Kilkenny Health Project was launched in March 1985 as a community research and demonstration programme to prevent cardiovascular diseases in the population of County Kilkenny, Ireland. The purpose of this report is to provide an overview of the Kilkenny Health Project, its background, development and outcomes. A more detailed report on the Kilkenny Health Project is being submitted to the Minister for Health. More specific aspects of the Project and of the findings of the Project surveys will be published as articles in the medical literature.

To put the Kilkenny Health Project into context, mortality trends from cardiovascular diseases will be presented and recent evidence relating to treatment and prevention of these diseases will be summarised. The Project aims, design and baseline survey findings have been published but will be summarised here. The process of the health promotion programme will be described briefly and some findings of the post-programme surveys will be presented. The lessons from the Project will then be discussed, with emphasis on what has been learnt which would enable the development of more effective and efficient programmes for the prevention of lifestyle-related diseases in Ireland in the future.

2. FACTORS ASSOCIATED WITH CORONARY HEART DISEASE

The World Health Organisation (WHO) Expert Committee which reported in 1982 on the prevention of coronary heart disease (CHD) was of the opinion that "the major determinants of population rates of CHD had now been identified: an inappropriate national diet aggravated by physical inactivity and overweight (reflected in the mass raising of blood lipids and blood pressure), and widespread cigarette-smoking". ¹

¹ References to the literature quoted are available on request.
Since then additional evidence has come to light in respect of factors associated with CHD. There has been a focus not just on total fat in the diet but on the balance between the different types of fatty acids consumed. This is particularly important in the Irish context where total fat as a percentage of total energy is no greater than in some other developed countries where CHD rates are lower; available evidence suggests however that a very high proportion of fat in the Irish diet was of the saturated type. For many years, the focus was on the ratio of polyunsaturated to saturated fats as a means of lowering levels of total blood cholesterol in the population. Recently, there has been increased awareness that monounsaturated fatty acids, as contained in olive oil, are not neutral but can contribute to the maintenance of low levels of total cholesterol in the blood, without reducing levels of HDL-cholesterol (the "good" cholesterol). Polyunsaturates are necessary to provide essential fatty acids but consumption of very large quantities may be hazardous. There is also increasing evidence that consumption of antioxidant vitamins, such as vitamin C and vitamin E may limit the damage to arteries which results from high levels of cholesterol in the blood. Again, this is important in the Irish context, in view of the low consumption of vegetables, fruit and polyunsaturates, the main sources of such antioxidant vitamins. In recent years more has also been learnt about the contribution of genetic factors to abnormal lipid metabolism and to the development of atherosclerosis.

Factors associated with CHD may interact with each other and current thinking stresses the need for attention to all risk factors. Cigarette smoking and hypertension are more damaging in the presence of a raised blood cholesterol (hyperlipidaemia). Drugs used to treat hypertension may themselves aggravate lipid abnormalities. Cigarette smoking increases the blood clotting factor fibrinogen and may help explain the risk of coronary and other vascular events in smokers. Moderate levels of physical activity can reduce risk of a coronary event. In populations with other risk factors for CHD,
raised body weight is associated with increased risk. Risk is increased especially in those whose weight is distributed around the waist and hips, possibly due to abnormal insulin metabolism.

Thus a great deal of evidence is now available about the aetiology of CHD. However, little has changed in terms of lifestyle advice to the public. A heart healthy lifestyle includes a diet which contains a wide variety of foods, is low in total fat, contains a balance between the different types of fatty acids and is adequate in antioxidant vitamins. Risk is also reduced by the avoidance of tobacco, by regular exercise, such as brisk walking, and by the maintenance of optimum body weight for height.

3. PROGRESS IN TREATMENT OF CHD

In recent years important breakthroughs have been made in the treatment of CHD. At the time of an acute event, drug treatment within the first few hours can dissolve the clot and improve blood flow to the heart muscle, thereby reducing mortality. Methods have also been developed whereby narrowing of coronary arteries can be flattened and improvements in coronary blood flow thus achieved without open heart surgery. There is also increasing evidence that alterations in lifestyle can slow the rate of progression and even bring about regression of atherosclerosis.

Improvements in treatment, including those referred to above, can be expected to make important contributions to delaying CHD mortality in the future. The potential effectiveness of treatment services is limited however by the mass nature of the disease and by the very high mortality in the early minutes and hours of an acute event. This means that high quality treatment services must be complemented by appropriate primary (prevention of risk factors) and secondary (at early stages of disease) preventive measures in order to reduce morbidity (sickness) and mortality (death) from CHD and related diseases in the community.
4. CARDIOVASCULAR DISEASES IN IRELAND

The largest category of deaths in Ireland is cardiovascular disease, mainly heart disease and stroke. These diseases are the largest cause of death in middle-aged men and the second largest cause of death, after cancer, in middle-aged women. Within the cardiovascular diseases, the largest proportion of deaths is due to coronary heart disease (CHD), with many of the remainder being due to cerebrovascular disease or stroke.

The mortality data presented here were obtained from the WHO and have been age-standardised to the standard European population, to take account of changes in the age structure of populations over time and of differences in age structure between different countries. Total mortality rates increased in Irish men aged 30-69 years during the 1960s, despite decreases in mortality from causes such as tuberculosis and stomach cancer (Figure 1). This was largely due to an increase in mortality from CHD in Irish men in the 1950s and 1960s (Figure 2). Since 1974, rates have been declining slowly in Irish males. There may be an acceleration in the rate of decline in the late 1980s, though data for several more years will be required to confirm this.

The rate of decline in CHD mortality in middle-aged men in Ireland compares unfavourably with that in other developed countries. Rates in the United States were very much higher than in Ireland in the 1950s and the 1960s (Figure 3). By the late 1980s rates in the United States were considerably lower and declining at a faster rate than in Ireland. Similar lower and rapidly declining rates were also seen in Canada. The trends in Australian males have been very similar to those in the United States. Rates were very much higher in males in Finland in the 1960s but have been declining to the extent that by the late 1980s, rates in Finnish men were very similar to those in Irish men. Similarly, rates in Scotland and Northern
Ireland were higher than in Ireland from the 1950s onwards. By the late 1980s the gap was narrowing, so that rates in those countries were approaching rates in Irish men (Figure 4).

Mortality rates from all causes and from CHD have been declining slowly in Irish women aged 30-69 years since the 1950s (Figures 1 and 2). The rate of decline, however, compares unfavourably with that in the United States, Canada, Finland (Figure 5) and Australia. It remains to be seen whether rates in Northern Ireland women will approach those in Ireland (Figure 6).

In common with many other developed countries, mortality from stroke (cerebrovascular disease) has been declining in Ireland, in men since the late 1960s and in women since the late 1950s (Figure 7). While the cause is unknown, likely explanations relate to improvements both in nutrition and in treatment of hypertension.

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**Figure 1** Age-standardised mortality rates from all causes for Irish men and women aged 30 to 69 years, 1950 to 1988.
Mortality data give an estimate of the important contribution of the cardiovascular diseases to potential years of life lost in middle age. In addition, these diseases are an important cause of morbidity. There were 51,422 attendances at out-patient clinics for cardiovascular diseases in acute public hospitals in Ireland in 1990.

The Hospital In-Patient Enquiry recorded 11,094 discharges with a diagnosis of CHD in 1989, with a mean length of hospital stay of 9.4 days. An important proportion of the CHD hospital discharges relate to men in middle age - 3635 of the 11,094 discharges in 1986 related to males aged 45-64 years, while 3769 related to women at all ages. The Irish Cardiac Surgery Register recorded 1,573 procedures in adults in 1991, of which 1,188 were first coronary artery bypass graft operations.
Figure 3  Age-standardised mortality rates from coronary heart disease in men aged 30 to 69 years from Ireland, the United States, Finland and Canada, 1950 to 1988.

Figure 4  Age-standardised mortality rates from coronary heart disease in men aged 30 to 69 years from Ireland, England and Wales, Northern Ireland and Scotland, 1950 to 1988
There were 4,650 discharges reported to HIPE in 1989 with a diagnosis of stroke. There is a long length of hospital stay with this condition, at a mean of 19.2 days in 1989, which reflects the extent of disability in those who survive the acute event. For many, hospital care is followed by a lengthy period of rehabilitation in the community, perhaps associated with attendance at community-based health care facilities. A proportion are transferred to long-stay hospital care.

Cardiovascular diseases continue to be an important cause of mortality and morbidity in Irish men and women. Compared to other developed countries, the rate of decline in mortality from CHD has been slow in Ireland.

A general consistency has been found between trends in factors associated with CHD and trends in disease, which is considered to support causal hypotheses. Some populations have had a persistent fall in risk factors and in mortality, others a rise followed by a fall in both while others appeared to reach a plateau in mortality which was explained by a parallel trend in risk factor changes. It has been estimated that medical and surgical interventions resulted in almost 40% of the decline in mortality in the United States while 54% was due to reductions in risk factors associated with changes in lifestyle. Because of refinements in treatment, the contribution of medical and surgical treatment to delaying mortality may have increased since then. Considering the financial and other costs of treatment, primary prevention remains the approach of first choice for the improvement of mortality rates at population level.
Figure 5  Age-standardised mortality rates from coronary heart disease in women aged 30 to 69 years from Ireland, the United States, Finland and Canada, 1950 to 1988.

Figure 6  Age-standardised mortality rates from coronary heart disease in women aged 30 to 69 years from Ireland, England and Wales, Northern Ireland and Scotland, 1950 to 1988.
Figure 7. Age-standardised mortality rates from cerebrovascular disease in Irish men and women aged 30 to 69 years, 1950 to 1988.
5. STRATEGIES FOR PREVENTION

There have been numerous reports from expert groups which have examined the evidence on factors associated with CHD and the results of intervention trials to reduce CHD. Most documents concluded that the multiple factors associated with CHD need to be addressed with a combination of high-risk and population approaches. The target population mean cholesterol is 5.2 mmol/l in most reports, with values of 6.5 mmol/l considered to be high and thorough investigation recommended at levels above 7.8 mmol/l. WHO criteria for hypertension are accepted in most reports (normal 140 / 80 mmHg, borderline 140 - 159 / 80 - 94 and hypertension at 160 / 95). Opinions differ on the level at which raised blood pressure should be treated. There is unanimity on the advisability of abstaining from the use of tobacco. A body mass index (BMI) (weight / height\(^2\)) of greater than 25 is considered to confer an increased risk and more pronounced obesity to be an independent risk factor. Most reports also recommend that vigorous exercise at least three times weekly is desirable.

Nutrition guidelines published by the Food Advisory Committee in Ireland in 1984 and republished by the Health Promotion Unit of the Department of Health in 1987 were similar to those published internationally. The dietary recommendations for the general public were that energy intake and expenditure should be balanced to achieve optimal body weight. The contribution of total fat to dietary energy should be reduced to an average of 35%. Those identified as being at risk of CHD were recommended to reduce total fat intake to 30% of total energy and to substitute some polyunsaturated fat for saturated fat. The committee also recommended that alcohol consumption should not exceed 5% of total energy intake, that dietary fibre should be increased to approximately 30 g/day and that salt intake should be reduced from 12 to 10 g / day. These guidelines are currently being reviewed by the Nutrition Advisory Group.
Because the majority of cases of CHD occur in the mass of the population who are not at high risk but contribute the most cases because of their large numbers, the WHO Expert Committee (1982) considered that a comprehensive plan for prevention has three components: (1) a population strategy to alter the lifestyle characteristics which underlie the mass occurrence of CHD; (2) a high-risk strategy with health care support to reduce risk in those identified as being at extra risk; (3) secondary prevention to prevent recurrence of disease in those who have already had a CHD event. These approaches are seen as complementary rather than alternative preventive strategies.

The WHO Expert Committee (1982) concluded that

"Effective population prevention of CHD can only come about through national policy, planning, development and commitment. Specific efforts against heart disease, as against cancer and other major diseases, are considered justified because of the nature and size of the problem, requiring a special effort to achieve significant progress. Preventive efforts against CHD should be seen as part of a more general programme against non communicable diseases. Control of CHD risk factors could lead at the same time to the reduction of respiratory disease, some cancers, diabetes, etc. Policymakers should see this as an argument reinforcing the case for efforts against CHD, and the different components of prevention should effectively complement and strengthen each other." 

The slow rate of decline in mortality from CHD in Ireland contrasts starkly with the important reductions which have been achieved in other developed countries. The slow rate of progression of the disease, the high proportion of deaths which occur in the early minutes of an acute coronary event, the advanced state of the disease when it becomes symptomatic and the difficulties in reversing the disease process all point to the importance of strengthening preventive strategies in addition to providing access to clinical services. Given the mass nature of the disease in high
incidence countries, the evidence that CHD is preventable through changes in lifestyle and in the environment, and the evidence that healthy lifestyles would be associated with reduced incidence of other chronic diseases, it is imperative that national strategies be developed to prevent CHD and to promote health in Ireland. The findings of the Kilkenny Health Project can make important contributions to the development of such strategies.

6. COMMUNITY PREVENTION PROGRAMMES

By the mid-1980s there was increasing concern that Ireland, and particularly Irish men, had not shared in the decline in CHD mortality rates which had occurred in other countries. In addition, there was evidence that a community "research and demonstration programme" would be an effective approach to CHD prevention. The first such projects were in Finland (the North Karelia Project) and in the United States (the Stanford Three Community Study) in the 1970s. Following on their apparent success, a further phase of more sophisticated programmes was implemented in the 1980s in other countries, including the United States and Germany. These programmes all had a defined population, the 'intervention' community, in which there were special surveys and an intensive education programme. In addition each had a defined population, the 'reference' or 'control' community, in which similar population surveys were carried out but with no additional education programmes such as were done in the intervention community.

The community programmes for CHD prevention which were implemented in the 1980s used more sophisticated research designs in order to ascertain the extent to which risk factor changes in the intervention communities could be attributed to the prevention programme. Education methods were based on modern theories of communication aimed at bringing about changes in behaviour. In the United States, the Stanford Five City Project made extensive use of the mass media. The Minnesota Heart Health Program placed
emphasis on the facilitation of behaviour change by individuals, through the mass media and direct services, through the health services and through community development. The Pawtucket Heart Health Programme majored in the implementation of the programme through community volunteers. The North Karelia Project in Finland continues to develop its community activities while many of its initiatives, including mass media approaches, influenced the development of health promotion initiatives at national level.

Since the early 1970s there has been a preventive orientation in Finland, with expansion and development of primary health care services. This has been associated with a series of scientifically sound population surveys, the results of which have been communicated effectively to the Health Ministry, to health professionals and to the public. In addition, there have been regular surveys of health habits and of cardiovascular risk factors among young people. CHD mortality rates have continued to decline in men and women in Finland, so that by the late 1980s rates in men were similar to those in Ireland; mortality rates in Finnish women have been lower than in Irish women since the early 1970s. It is not possible to estimate the extent to which the orientation of the primary health care services and the health promotion and research activities in North Karelia have influenced the important changes in morbidity and mortality which have occurred at national level.

The Stanford Five City Project has published the outcome in terms of changes in factors associated with CHD in the intervention and reference populations. After 30 to 64 months of education, statistically significant net reductions (decline in the intervention group minus the decline in the reference group) favouring the intervention communities were found. The decline in the average levels of plasma cholesterol was two per cent greater in the intervention communities, the decline in blood pressure was four per cent greater and the decline in smoking rate was 13% greater.
than in the reference communities; these reductions were compatible with important decreases in total mortality risk scores and CHD risk scores. After 64 months there were declines of 7.4 and 5.5 mmHg in systolic and 5.0 and 3.7 mmHg in diastolic blood pressures in the cohort (follow-up) and independent (new sample) surveys in the intervention cities; there were greater net declines ranging from 1.1 to 3.8 mmHg in the intervention compared to the reference cities. The authors note that, though these net declines appear small, changes of this magnitude are important from a public health perspective. The independent survey groups were found to have gained significantly less weight in the intervention than in the reference communities (0.57 kg compared to 1.25 kg) over 6 years.

The Stanford group has also published on the association in the control communities between factors associated with CHD and level of education, in the direction of higher risk among those with lower education. With declining levels of factors associated with CHD, there was no evidence of a decrease in the disparity between the education groups over an eight year period. The least advantaged groups were also found to have the highest prevalence of factors associated with CHD in the Scottish Heart Health Study.

Other U.S. projects have published extensively on their activities e.g. on the development of a supermarket-based nutrition education programme in association with the beef and pork industry, on counselling strategies, and the training of health professionals and lay volunteers in blood cholesterol screening and education programmes, the short-term reductions achieved in cholesterol levels after "low-intensity" intervention and the effectiveness of a community smoking cessation contest which coincided with a statewide contest.

The research group in Minnesota have made important advances in health promotion among young people. No information is
available on the outcome of the Pawtucket Heart Health Program. The group has however published a report on the improvements which have occurred over time in cardiovascular health awareness, knowledge and behaviour in a reference community. These changes were attributed to national mass media health campaigns.

There are considerable difficulties in the design, implementation, analysis and interpretation of community research and demonstration programmes. However the alternative to well designed, systematically applied and carefully evaluated research and demonstration programmes would appear to be no action at all. Given that a community-wide strategy is necessary and justified over a sustained period in order to reduce the mass population burden of atherosclerosis, it may be concluded that a community research and demonstration programme be an important component of national strategies to prevent coronary heart disease and to promote health.

While the Kilkenny Health Project learnt a great deal from the projects which were implemented in other countries, and indeed received generous moral, scientific and practical support from some of them, it has to be acknowledged that there were important ways in which Kilkenny was different to other community programmes. The first difference was the "greenfield" situation which existed in Ireland. Little was known about the prevalence of the main factors associated with CHD until the results of the baseline survey in Kilkenny became available. The level of resources in Kilkenny was also of a different order of magnitude when compared to other projects. Thus, while projects in Ireland can learn a great deal from the health promotion methods used in other countries, caution should be exercised in making comparisons between the Kilkenny Health Project and other community research and demonstration programmes.
7. **THE KILKENNY HEALTH PROJECT**

The Kilkenny Health Project was established as a pilot programme for cardiovascular disease prevention in Ireland. The main goal of the Project was to reduce by 20% over 10 years the mortality rates from CHD (International Classification of Diseases (I.C.D.) Codes 410-414) and from cerebrovascular disease (I.C.D. codes 430-438) in those aged 35 to 64 years resident in County Kilkenny. It was planned that the health promotion programme would last for five years. The goal was expressed for a ten year period because it was not considered feasible to attain important mortality reductions over a shorter time span.

The aims of the Project were as follows:

1. To undertake a community health programme to modify the environment and behaviour of a defined population, in order to reduce risk factors for CHD.

2. To evaluate the impact of the programme in altering knowledge, attitudes and behaviour in relation to specific risk factors for CHD and stroke i.e. smoking, hypertension, diet (including lipid levels) and alcohol consumption, body weight and physical activity.

3. To evaluate the impact of the programme in altering the specific risk factors for CHD and stroke.

4. To monitor the incidence and prevalence of clinical CHD and the incidence of stroke throughout the period of the programme and to compare this with available reference data.

5. To assess the programme which is developed as a potential model for health promotion in the remainder of the country.

A set of objectives were agreed for smoking prevention, control of high blood pressure and the promotion of healthy eating and physical activity. Outcome targets were derived from the findings of the baseline survey in Kilkenny. The targets numerically stated the desired changes in knowledge and awareness, health behaviours,
health promotion and CHD risk factors. The outcome targets for risk factors are summarised in Table 1.

Table 1 Baseline survey results in 1985 and outcome targets for 1990

<table>
<thead>
<tr>
<th></th>
<th>1985</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cigarette smoking prevalence</td>
<td>28.0%</td>
<td>23.0%</td>
</tr>
<tr>
<td>Systolic Blood Pressure,</td>
<td>141.9</td>
<td>138.0</td>
</tr>
<tr>
<td>mean, mmHg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total cholesterol, mean,</td>
<td>6.0</td>
<td>5.8</td>
</tr>
<tr>
<td>mmol/l</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prevalence obesity*: males</td>
<td>13.5%</td>
<td>11.0%</td>
</tr>
<tr>
<td>females</td>
<td>19.7%</td>
<td>16.0%</td>
</tr>
<tr>
<td>&quot;Heart Healthy” Exercise**</td>
<td>21.4%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Other leisure activity</td>
<td>35.1%</td>
<td>46.0%</td>
</tr>
</tbody>
</table>

† Additional cleaning of the data accounts for minor discrepancies between these and previously published data.
* Obesity defined as Body Mass Index (Kg/m²) >30.0 males and >28.6 for females.
** Regular episodes of activity lasting 20 to 30 minutes causing sweating or breathlessness.

The overall design of the Project is set out in Figure 8. The health promotion programme was undertaken in County Kilkenny, after a baseline survey. A similar survey was done in County Offaly to act as a reference area, a county of similar characteristics to Kilkenny, but with no contiguous borders and under different health services management.

The Kilkenny Health Project started in October 1984 and was officially launched in March 1985. The baseline survey started in Kilkenny in February 1985 and was finished in County Offaly in August 1986. The health promotion programme started in Kilkenny in September 1985 and will continue until December 1992. The post-programme surveys started in May 1990 and February 1991 in County Kilkenny and in County Offaly respectively.
A register was established to record fatal and non-fatal CHD and stroke events in County Kilkenny and in County Offaly. Registration procedures comply with the protocol of WHO’s MONICA (monitoring cardiovascular disease trends) Project. Registration started on a pilot basis in October 1986. Full event registration started on January 1st 1987 and continues to December 1992.

Many organisations and individuals were involved in the implementation of the Kilkenny Health Project, including funding and sponsoring organisations, the Board of Directors, Finance, Scientific, Steering and Education Committees, Kilkenny Health Project staff, and the many professionals, voluntary organisations and individuals in Kilkenny who were involved in Project activities.
8. FINANCIAL COSTS OF THE KILKENNY HEALTH PROJECT

Total expenditure on the Kilkenny Health Project from 1984 to 1992 inclusive was £1.87 million. Of this, £1.21 million (64.6%) was spent on the health promotion programme, nearly £257 000 (13.8%) on registration of CHD and stroke, and almost £404 000 (21.6%) on the population surveys in 1985/1986 and 1990/1991 in Counties Kilkenny and Offaly. Except for the final eighteen months of the Project, the Project Leader's salary was included in the health promotion expenditure, though time was also spent in managing the research programme.

The largest proportion of expenditure was on personnel. The staff were as follows: Project Leader, Education Officer, Project Dietitian, Administrative Officer and Medical Officer (Registers). Three secretarial staff were employed; 2 1/2 for the health promotion programme and 1/2 for the registers. During the surveys in Counties Kilkenny and Offaly in 1985/1986 and 1991 there were two survey nurses and a survey secretary. In 1990 for the Kilkenny survey, because there were two groups being surveyed (those surveyed in 1985 and a new sample), there were four survey nurses and two secretaries. A data processor was employed during the last two years of the Project. Some expertise, such as in statistics and communications, was obtained on a consultancy basis.

At the outset, the major allocation of funds was from the Medico Social Research Board and later from the Health Research Board. Subsequently, the largest allocation was part of the National Lottery funding distributed by the Department of Health. Thus approximately £1,558,000 came from funds at the discretion of the state. Some of the State's expenditure was recouped in income and value added tax. The Irish Heart Foundation was the other major funding body. Altogether, £271,000 was donated by the Irish Heart Foundation. The remainder of Project income consisted of sponsorships, for example, the annual Avonmore 10K Road Run which was organised in
association with the Kilkenny City Harriers, the annual Quit Smoking Competition for which prize money was donated by the Voluntary Health Insurance Board, and the Integrated Oral Health Project which was sponsored by Colgate Palmolive (Ireland). Fees charged to clients referred for dietary counselling who were not eligible for services under the General Medical Services Scheme contributed a small proportion of income. Health education materials were sold on request, particularly in the later years of the health promotion programme, to health agencies outside Kilkenny but were charged so as to cover costs rather than to generate income.

The expenditure detailed above represents the financial costs incurred by the Kilkenny Health Project. Rent on the Kilkenny Health Project office was paid by the South Eastern Health Board. Administrative and accounting support were provided at no cost to the Project by the South Eastern Health Board. The cost of cholesterol estimations for those surveyed in Kilkenny and for many of those examined in the Health Assessment Programme were borne by the Biochemistry Laboratory in the Regional Hospital, Ardkeen, Waterford. Costs of participation by staff from other agencies, including the South Eastern Health Board, in education and preventive activities and in Project committee meetings are not included. The weekly article in the Kilkenny People newspaper and the weekly slot on local radio were provided to the Project free of charge. A personal computer and two word processors were donated to the Project by Digital. Mainframe computing facilities were made available by University College Dublin. Office facilities were provided for the research programme at nominal cost by the Department of Epidemiology and Public Health Medicine and Epidemiology, University College Dublin and by the Department of Epidemiology and Preventive Medicine, Royal College of Surgeons in Ireland.

The Health Assessment Programme was carried out as a joint undertaking with the Kilkenny Faculty of the Irish College of General Practitioners. This programme was separately funded. Total donations
to the Health Assessment Programme were £115,000 from 1985 to 1990. The Voluntary Health Insurance Board was the major sponsor of this programme, donating a total of £95,000. Donations were also made by Bristol Myers Squibb and by Rhone Poulenc Rorer.

The Health Assessment Programme was provided free to all who wished to avail of it and who were within the age range 30 to 49 years, regardless of their usual method of payment for general practitioner services. Most of the expenditure on the Programme was to general practitioners for assessments carried out - 8,166 men and women aged 30 to 49 years were assessed by the end of September 1992. The assessment process included initial recruitment, completion of the questionnaire and physical measurements, the taking of a venous blood sample and dispatching it to the laboratory at Regional Hospital, Ardkeen, reappraisal of the individual in the light of all the findings, provision of counselling and arrangement of follow-up as appropriate. While the hospital laboratory recouped some of the costs from those liable for hospital charges, most of the cost of the blood cholesterol measurements were borne by the laboratory.

It is difficult to make direct comparisons of the resources available to the Kilkenny Health Project with those available to other cardiovascular disease research and demonstration programmes. With differences in the organisation of health services, involvement in project activities may be covered by other budgets to a greater or lesser extent. However the funding of the Kilkenny Health Project compared poorly with the funding of Projects in Finland, the United States and Wales. The structure of the Irish health services has not to date facilitated reorientation to give greater priority to prevention and to health promotion as recommended by the World Health Organisation to achieve the Targets for Health for All in Europe. The epidemiological research network is also weak in Ireland. These structural differences meant that the resources available to the Kilkenny Health Project were less
but needed to stretch to cover activities that could be funded in other countries by health service and collaborating agencies.

However, it must be acknowledged that the funds available to the Kilkenny Health Project were large in the context of Irish expenditure on health promotion, though small as a proportion of overall expenditure on the health services. It was judged useful for a country like Ireland to test what it was possible to achieve in a community programme using available resources. In this context, it would be more likely that successful innovations could be extended to other areas. Thus, it was considered ethical to proceed, despite the lower probability of positive outcomes due to resource constraints.

9. EVALUATION

The intensity of evaluation which is appropriate for a health promotion programme depends on the extent to which the activities are innovative and on the novelty of the programme within the particular setting. The following types of evaluation were of particular relevance to the Kilkenny Health Project:

**Formative evaluation:** produces information which is used during the developmental stages of a programme to improve the programme. A pilot study, perhaps comparing alternative approaches would be classified as formative evaluation.

**Process evaluation:** involves documentation and description of specific activities. Evidence may be obtained from staff and consumers. The findings may feed back as part of formative evaluation to improve programme delivery.

**Summative evaluation:** provides a summary statement of a health promotion programmes effectiveness over a specified period of time.
Its purpose is to enable decision makers to plan and to allocate resources.

Formative evaluation was assisted by the results of the baseline survey of the adult population. This information was supplemented by the study of attitudes towards coronary heart disease. Additional information was obtained from a seven day weighed dietary survey in a sample of Kilkenny adults. Shoppers’ comprehension of nutrition terms was studied. A survey was also undertaken of attitudes and health-related behaviours among post-primary school pupils. Community analysis identified relevant organisations and resources within County Kilkenny. Education materials were developed in response to the expressed need of health professionals and later materials took account of the use and feedback from earlier ones.

Process evaluation during the programme took account of the outcome of events, feedback from the public, professionals and committee members. Regular postal surveys provided information on the level of awareness of the Project in Kilkenny and on any trends in reported changes in behaviour. Project planning was flexible to allow for the continuous alteration of plans according to the outcome of trial programmes and requests for activities.

The summative evaluation of the Project is provided by the difference, if any, in risk factor changes between the pre- and post- programme surveys in independent population samples in County Kilkenny and in County Offaly. While the main goal of the Project was expressed in terms of CHD mortality, it was recognised that the modest size of the population and the relatively short follow-up period may preclude early demonstration of this. Registration of CHD and stroke events in Counties Kilkenny and Offaly has monitored trends in incidence from 1987 to 1992 inclusive. Additional information will be obtained from the 1990 follow-up study of those surveyed in Kilkenny in 1985 - the Cohort Study and from the repeat survey of post-primary school pupils.
10. **THE COMMUNITY**

Kilkenny was chosen as the county in which to implement the community programme to reduce risk factors for coronary heart disease. This county has a history of community development and is well known for its civic spirit and county pride. There is a mixture of urban and rural communities in the county. It is accessible to the academic and other national institutions which are located in Dublin which is necessary for the support and development of this type of programme. The South Eastern Health Board, in whose area Kilkenny is located, were willing to collaborate with the Project.

The County is located in the South East Region of Ireland. County Kilkenny had a population of 70,806 at the 1981 Census and this increased to 73,186 at the 1986 Census. There was a further small increase in the population of County Kilkenny to 73,613 at the 1991 Census.

In 1986, almost a quarter, 24%, of the population lived in Kilkenny City and environs. There were 4 towns with populations of 1,000 to 1,500 people, 9 towns with populations between 500 and 1,000 and 7 villages with populations of less than 500. Including those who lived in the suburbs of Waterford city, 45% of the population of County Kilkenny lived in urban areas. The remaining 55% of the population lived in a completely rural setting.

The age structure of the population was very similar to that for the country as a whole. In 1986, 46% of the population were aged under 25 years, 11% were aged 65 years or older, while the remaining 43% were aged between 25 and 64 years.

At the 1986 Census of Population it was estimated that 24% of the labour force in Kilkenny were engaged in agriculture or forestry, 30% were in manufacturing or other productive sectors and 46%
were in commerce or in the service or other sectors. The main manufacturing industries are related to agriculture, with over 1000 people involved in the food industry and a further 400 in the production of beverages. This reflects the presence of a major dairy processing plant at Ballyraggett, Co. Kilkenny and a brewery in Kilkenny City. In addition, many of the farmers produce sugar-beet for the sugar factory in nearby Carlow.

It was estimated that unemployment in Kilkenny increased from 10.1% of the labour force in 1981 to 16.2% in 1984. At the 1986 Census of Population, 17.0% of the male and 12.9% of the female labour force, or 15.9% of the total labour force, were unemployed. In 1986, 30.1% of females aged between 15 and 64 were in paid employment.

The total mortality rate for County Kilkenny at baseline was very similar to the national rate and to the rate for Leinster. Leinster is the most heavily populated of the four provinces of Ireland and is the province in which Dublin and Kilkenny are located.

In 1985, there were 95 deaths in males and 51 deaths in females aged 25-64 and residents in Kilkenny County. There were a further 123 deaths in males and 77 in females aged 65-74. Of these 346 deaths, 132 (38%) were caused by ischaemic and other forms of heart disease. In addition, there was one death attributed to hypertensive disease, 26 were caused by cerebrovascular disease and a further 7 deaths were due to "other diseases of the circulatory system".

11. FACTORS ASSOCIATED WITH CHD AT BASELINE

The findings of the baseline survey in Kilkenny have been published and are summarised in Table 1 on page 16. Some of the results are also presented in Section 13 with the findings of the other

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Kilkenny Health Project 26
major surveys carried out by the Kilkenny Health Project. In summary, the baseline survey confirmed that average levels of blood cholesterol were high in Kilkenny, as were blood pressure and body weight. Cigarette smoking prevalence was similar for men and women, 27%. Participation in physical activity was low.

In order to expand the available information on diet at baseline, a detailed *Dietary Survey* was carried out using the seven day weighed intake method.³ The survey was carried out during the summer of 1985 and involved 30 men and 30 women aged 35 to 44 years, randomly chosen from a larger sample selected from the electoral register. Energy intake was 12.5 MJ (2976 kcals) per day in men and 8.4 MJ (2000 kcals) in women. Total energy intake was high in Kilkenny males when compared to groups surveyed in the United Kingdom. The relatively high energy intake in Irish men reflected a high consumption of bread and potatoes when compared to the U.K. groups. In Kilkenny, fat contributed 36.0% and 39.1% of the total energy intake of men and women respectively. Alcohol accounted for six per cent of the total energy in men and 1.5% in women. When only calories from food were considered, 38.8% of energy was derived from fat in men and 39.7% in women.

Mean daily calcium intake was five per cent less than the recommended daily allowance (RDA) of 800 mg. The mean daily intake of iron in women was 10.3 mg, lower than the RDA of 14 mg. The RDA for vitamin C was not being consumed by 13% of men and 27% of women. The consumption of a heart healthy diet is compatible with the attainment of the RDAs for these nutrients. The findings of the seven day weighed dietary survey were used when planning nutrition education programmes in Kilkenny.

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The Survey of Post-primary School Pupils was carried out in the Spring of 1987 in order to provide baseline information on health behaviours in young people.4

Of the 445 pupils surveyed, 22% were current smokers; 11% smoked daily, 4% smoked weekly and 11% smoked less often. The prevalence of current smoking increased with age; 47.8% of 17 year-old boys and 25.5% of 17 year-old girls were current smokers.

The prevalence of drinking alcohol also increased with age. Overall, 22% drank at least once a month, 28.2% of boys and 15.8% of girls. Beer was consumed at least once a week by 12% of boys and a further 18% drank it at least monthly; 5% of girls were weekly beer drinkers and a further 8% drank beer at least monthly. The increase in the use of alcohol with age was very much steeper in boys than in girls. At age 17 the prevalence of drinking at least once a month was 66.7% in boys compared to 26.9% in girls. Overall 32% of boys and 19% of girls had been intoxicated on at least one occasion.

The younger age groups ate crisps and chips more often, boys ate more chips, fried food, hamburgers and snack foods and girls ate more fruit.

Regular participation in sport declined with increasing age and boys participated more than girls; 52.2% of boys engaged in sports at least 4 times a week compared to 24.4% of girls. Daily participation fell from 30.4% of 13 year-old boys to 21.8% of those aged 17 years. In girls the decline was from 20.5% of 13 year-olds to 1.8% of 17 year-olds.

It was concluded that there was considerable scope for improvement in health behaviours relevant to the aetiology of lifestyle-related diseases. Education within post-primary and primary schools was supported by the Kilkenny Health Project. A further survey was carried out in 1992 by Dr. Orlaith O'Reilly and colleagues in public health medicine in County Kilkenny, in association with the Kilkenny Health Project. The analysis is now being carried out and will permit estimation of the extent to which health behaviours have changed among young people in Kilkenny during the lifetime of the Kilkenny Health Project.

The relationships between health behaviour, attitudes, and cultural factors were examined by Mr. Ronan Conroy in a small community (population 200+) in County Kilkenny - The Attitudes Study. We asked people about typical local beliefs and practices, as they saw them, as well as asking questions about the person's own beliefs and practices.

Cancer and arthritis were named as the most important illnesses. CHD was not seen as a common problem and was not named as a major cause of death locally. People did not recognise any aetiological factors, either inherited or environmental. They were aware of the main factors named by medical professionals, except for hypertension, but were sceptical about the strength and consistency of the relationships involved. They could adduce no evidence from their daily lives to support medical claims about risk factors such as smoking and diet. In addition, many of them pointed out that so many things had been condemned at one time or another that one simply could not comply with all the 'dos and don'ts'. Conflicting claims by different 'experts' were also cited as indicating that no-one really knew what was "good" or "bad" for you.

Acute CHD was seen as a traumatic event - the 'natural' and abrupt failure of the heart as a pump, signalling that the body has come to the end of its natural lifespan. The fact that many fatal attacks result
in death within a period of hours, often in a previously 'healthy' individual, reinforced this view. Only acute episodes of CHD were seen as 'heart disease'. The medical concept of a slow, silent, but preventable occlusion of the coronary arteries was alien to the local concept. The concept of CHD prevention was therefore at variance with the prevailing concept of CHD.

The disparity which we found between medical and lay views of heart disease underlines the importance of studying the cultural context in which health problems occur. Without an understanding of this context, we might have embarked on a campaign directed at knowledge of the factors which cause CHD. Our study revealed, however, that the problem was not so much the lack of knowledge of risk factors as a lack of awareness that CHD was an important health problem in Ireland and a lack of belief in the effect of personal actions on lifespan.

Dr. Patricia McDonald carried out a study, as part of the European Community Europe Against Cancer Programme, to examine the relevance of the Kilkenny Health Project to cancer prevention.

CHD and cancer share diet as a common risk factor. Diet has been estimated to be important in the aetiology of about 35% of all cancers. While less is known about the association between diet and cancer, the evidence suggests that the type of diet which is associated with lower prevalence of CHD, i.e. low in fat and high in fruit and vegetables, would also be associated with reduced incidence of some common cancers.

Tobacco smoking is also associated with CHD and with cancer. It has been estimated that 30% of cancer deaths may be attributed to tobacco smoking. Cancer of the lung accounts for 22% of Irish cancer deaths. Although laryngeal cancer is rare in Ireland, the excess risk for smokers is 20 to 40 times that of the non-smoker.
Smokers also have an increased risk of cancer of the upper digestive tract, bladder cancer and cancer of the pancreas.

Heavy alcohol consumption is associated with an increased risk of CHD and is important in the aetiology of raised blood pressure. An excess consumption of alcohol is associated with an important increase in risk from a number of uncommon cancers which together accounted for approximately 8% of cancer deaths in Ireland in 1987. Excess alcohol consumption and smoking together exert a large synergistic effect on risk for some cancers.

Obesity is another factor which is common to the aetiology of CHD and of cancer. Obesity has been associated with cancer of the endometrium (the lining of the uterus) in women and may also be associated with cancer of the breast. A weak association has been found between cancer of the colon and physical activity.

It was concluded that healthy eating habits, the avoidance of tobacco and of excess alcohol consumption and the maintenance of appropriate body weight constitute a lifestyle which promotes heart health and reduces the risk of many of the cancers with the highest incidence in Ireland.

12. THE HEALTH PROMOTION PROGRAMME

12.1 HEALTH PROMOTION

The WHO document "Targets for Health for All", which was produced for countries in the European Region, considers disease prevention to be an important component of health and public policy. The aim is to give people a "positive sense of health" with emphasis on health promotion as well as on the prevention of disease.

Health promotion has been defined as:
"The process of enabling individuals and communities to increase control over the determinants of health and thereby improve their health".

The Ottawa Charter which was drawn up by the First International Conference on Health Promotion states that there are basic prerequisites to health, such as food, income and social justice. Good health is a resource but advocacy may be required to make conditions favourable for health. Interested groups have a responsibility to mediate between different interests in society for the pursuit of health. Health promotion involves action at five different levels: building healthy public policy, the creation of supportive environments, strengthening community action, the development of personal skills and the reorientation of health services.

Many of the concepts of health promotion have been incorporated into the design and implementation of community programmes for the prevention of cardiovascular disease.

12.2 STRATEGIES IN KILKENNY

The Kilkenny Health Project interpreted its brief fairly broadly. It was recognised that people do not experience behaviours relevant to CHD and its prevention in isolation from other aspects of their lives. Thus 'stress' does not appear to be a strong independent risk factor for CHD at population level. Nevertheless, people may cope with stress in ways which are detrimental to their physical health. Conversely, eating a healthy diet and taking regular physical exercise may help people to cope with psychological distress.

The physical as well as the social and economic environment can militate against the choice and maintenance of health promoting behaviours. For example, roads in country areas can be narrow, with poorly maintained margins, making it unpleasant and
dangerous for pedestrians. Canteens in the workplace may offer a limited choice of food, offering high fat, low fibre foods, with a poor choice of salads or fresh fruit and vegetables.

Environmental changes to make it easier to make healthy behaviour choices were encouraged where possible. 'No smoking' signs were distributed to shops, restaurants etc. A greater variety of food became available in Irish shops during the lifetime of the Project. We encouraged people in Kilkenny to try these new foods so that higher consumption would further increase availability.

The education programme aimed to empower health professionals and community groups to develop skills in imparting health messages. This approach enabled messages to reach far greater numbers of people and to be tailored as appropriate to the group or individual. This approach also strengthened a resource which would be available in the community after the formal completion of the Project.

12.3 MESSAGES

Project messages pointed to the importance of CHD in Ireland but in addition, the extent to which morbidity could be prevented. It was emphasised that it was not necessary to make major changes but that apparently minor, incremental alterations could lead to short-term improvements in physical and mental well-being. In order to demonstrate that healthy behaviours were compatible with Irish culture and were socially acceptable, case studies were frequently used, in newspaper articles and on radio. People, particularly those with a high profile, were interviewed about their lifestyle, about changes they had made and their opinions, tips etc.

In addition to changing attitudes, it was necessary to provide more specific information on factors associated with CHD and to correct misperceptions. For example, many considered that high blood
pressure would be associated with symptoms such as headaches; information on blood pressure stressed that in most cases it is asymptomatic.

Factual information however is usually insufficient to bring about behaviour change. It is necessary to provide information, not just on 'what' to do, but also on 'how' to do it. Written media, radio and television can play a role in skills training but frequently other media are required, for example, in-store promotions, cookery demonstrations, classes etc. Cues to action were provided by special events, for example, providing the opportunity to walk around a measured course during a 'fun walk'.

Maintenance of the new behaviour was encouraged by continuing to provide media messages and cues to action about the health behaviours and, for smoking, by suggesting ways to plan to avoid that 'first cigarette'.

Every effort was made to avoid negative messages. In a discussion on healthy eating, passing reference might be made to the potentially undesirable effects of a high salt intake on blood pressure. Emphasis was placed on alternative seasonings which would result in food which was tasty and well flavoured.

Credibility of Project messages was enhanced by keeping the recommended changes within the reach of the majority of people. For example, recipes used ingredients which were available in Kilkenny, were similar in cost to existing food purchases, and were presented when seasonally appropriate.

Particular emphasis was placed on physical activity as a desirable route to health enhancement. A high proportion of the population were sedentary at baseline. Walking, particularly in groups, was encouraged as an activity in which people of all ages could engage at most times of the year, requiring little personal equipment or
financial outlay and with the potential for social interaction. Gardening was also encouraged as a creative activity, with which smoking, eating or drinking were incompatible; the production of herbs to enhance the flavour of food in a healthy way could be an added bonus. The role of physical activity in the maintenance of desirable body weight was stressed.

There was great interest in healthy eating. Project advice could be summarised as 'eat a wide range of foods' and 'eat plenty and exercise plenty to maintain desirable weight'. More specific messages related to altering the balance of fats in the diet, increasing consumption of fruit and vegetables, ensuring an adequate intake of calcium and avoiding high sugar snacks in childhood.

It was recognised that current smokers might be alienated if there was constant emphasis on the effects of smoking on health. Most smokers know that smoking is an important cause of chronic illness. Most had tried to stop smoking, perhaps several times. Many considered that as long as they were smoking, there was little point in changing other behaviours. So, messages relating to smoking were provided mainly around the New Year and Ash Wednesday. It was hoped that smokers would tune in to our other health messages and that success in some other area of changing health behaviour might lead to success in stopping smoking.

12.4 HEALTH PROMOTION ACTIVITIES

The health promotion programme in Kilkenny has been described in some detail in previous Project reports, 'Health Promotion in Action' (1987), 'Progress on a Community Heart Health Programme' (1989) and 'Promoting Heart Health in Kilkenny' (1990).

The early tasks of the Project staff were to familiarise themselves with the community and the area, to take account of existing
services and resources. Liaison was established with those working in the media and in the education and health services locally, and where relevant at national level.

Community meetings were held to discuss the prevention of heart disease. At these meetings it became apparent, and was subsequently confirmed when the results of the baseline survey were available, that knowledge of the major factors associated with the development of CHD was moderately good.

An awareness programme was undertaken to inform the population of the importance of CHD as a cause of morbidity and mortality in Ireland and to introduce the Kilkenny Health Project. This involved car stickers, handbills, posters and visits to towns around the county.

Media
Soon after the education programme started, an arrangement was reached with the proprietor / editor of the main local newspaper, the Kilkenny People, that the Project would supply an article each week which would be printed free of charge. The newspaper article was frequently printed along with the Project logo and a banner headline, 'Healthy People'. Competitions were used to attract further interest in the column. The column was used to provide information about a health issue, often one of seasonal relevance or one which would feature in forthcoming Project activities. News items on the Project were included. Some recipes were also included each week under the subheading 'Healthy Cooking'.

In addition to the Healthy People column, the Kilkenny People featured news items and photographs about the Project in its news pages. Occasionally, Project activities were mentioned by local correspondents who sent in news items from locations around the county.
Particularly at the start of the Project, a decision was made to try to limit the amount of information about the Project which was carried in media targeted at audiences outside the county. The aim was to avoid 'contamination' of the reference county and indeed of other parts of the country. This decision was however rescinded, mainly because it was realised that one of the most effective methods of reaching local Kilkenny audiences was via national media channels. However, the coverage of Project events by the national media was not large, mainly because of a perception that they were primarily of local interest.

Some years after the education programme started, local radio was licensed. The Project was given a weekly slot on Radio Kilkenny. This live programme was broadcast on the day after the Kilkenny People newspaper was available in the shops. The topic of the radio programme was the same as that in the newspaper article, reinforcing and expanding on the information given.

**Education Materials**

One of the first tasks of the health promotion programme was the development of *education materials*. Existing education materials were reviewed and suitable leaflets were developed for use with adults in Kilkenny. A set of leaflets was developed for use with adults in Kilkenny, providing information about the main factors associated with CHD.

The Project newsletter **CATCH** (Community Action Towards Community Health) was the biggest item of expenditure in the health promotion programme budget. Though mainly directed towards adults, CATCH had sections aimed at young children and at older children in primary schools. In view of the cost, efforts were made to have issues of CATCH, or sections of it, suitable as an education resource which would be available on an ongoing basis and not just at the time of publication. Some centrefolds, for example a feature on healthy school lunches, were also printed.
separately, at relatively low cost, increasing the value obtained from the expenditure on their development.

Between 20,000 and 22,000 copies of each issue of CATCH were printed. Most of these were distributed along with the Kilkenny People newspaper within County Kilkenny. Copies were distributed separately to areas along the county border.

CATCH, newspaper competitions and other project materials were illustrated by Mr. Hubert Montag, who brought Benjy, the Project mascot, to life. These illustrations aimed to make the materials more interesting and attractive.

The Kilkenny Health Project cookery videos were developed for use by professionals at community meetings. The first video "Healthy Food Choices" demonstrated the healthier food choices available in Kilkenny shops. This video was the overall winner of the British Dietetic Association Healthy Eating Award. The second video "Cooking for Healthy" aimed to demonstrate the preparation of tasty, attractive meals, compatible with healthy eating guidelines. Screening of this with community groups was preceded by the administration of a questionnaire which tested knowledge of the material in the video.

The Kilkenny Health Project cookery books used foods which were available in Kilkenny and which were within the budgets of a reasonable proportion of the population. Five thousand copies were printed of the first cookbook and a further three thousand in a reprint. The second cookbook set out to include recipes for foods which Project staff perceived were infrequently included in Kilkenny diets due to inadequate skills to cook them attractively, such as fish and vegetables. The use of spices and herbs was encouraged in order to increase flavour without relying on salt.
Meetings

Groups meetings were one method of providing more detailed information. One type of meeting involved co-operation with the Irish Countrywomen's Association and with other women's groups. Frequently the groups were willing to organise the venue, publicity and refreshments and to open the meeting to nonmembers of both sexes. The first round of such meetings was intended to provide general information about CHD and about the Kilkenny Health Project. The second phase of meetings used the Project video on choosing healthy food. The third meeting with these groups used the second project video on cooking healthy food. This was supported by a leaflet containing the recipes demonstrated in the video.

The second type of community-based meeting was set up as series of evening classes, frequently under the auspices of the Adult Education section of Kilkenny Vocational Education Committee. Early series were called 'Good Cooking, Good Health'. Over the years these evolved to become known as 'Look Good, Feel Good' classes. These included some exercise, some relaxation and some information about a health topic. Some of the topics were chosen by the groups themselves. One class in these series was presented by a beautician. Towards the end of the Project, some professionals were trained as part of the national 'Lifewise' programme.

A Working Party was established to support the development of health education programmes in post-primary schools. Some schools already had comprehensive programmes and about half of the post-primary schools were represented on the Working Party. The 'Living for Life' programme which had been produced by North Tipperary VEC and the Health Education Bureau was used as a basis for the programme, starting with the first year programme. Teachers adapted the programme as necessary to meet the needs of the pupils.
Communication with parents was considered a priority and each school made its own arrangements to inform parents before classes started. Many of the teachers on the Working Party had attended the Health Education Bureau’s Training Programme in Health Education. A seminar was held for school principals before the Working Party was established and some seminars were later held for teachers. Seminars were also organised by the Project Dietitian with teachers of home economics in post-primary schools.

Some training was also provided for teachers in primary schools. Education materials developed included a 'Snakes and Ladders' game based on the effects of smoking, a leaflet on healthy school lunches and a handbill on the benefits of school milk. The Project Dietitian visited all primary schools, at least annually, delivering that year's leaflet. 'Benjy', complete with cat costume, assisted. A video was produced in 1992 on school lunches, with sponsorship from Golden Vale.

Nutrition education materials were adapted, with permission, from a programme entitled Race to Health developed by the Stanford Heart Disease Prevention Programme. The four lessons in the programme, suitable for nine and ten year-olds, identify the food sources of fat, sugar, salt and fibre and give suggestions for limiting or increasing these elements in the Irish diet as appropriate. The programme is intended to involve parents and others at home, so lessons are designed to be completed primarily as homework, with some parental participation.

The Kilkenny Integrated Oral Health Project - a 'Strategy for Smiles' was developed jointly by Kilkenny dentists, the Department of Community and Preventive Dentistry, Trinity College, Dublin and the Irish Dental Health Foundation, with support from Colgate Palmolive Ireland. Baseline surveys of dental health were carried out in adults and children. During 'Smiles Week' dentists visited schools to give talks and offered free dental examinations at their
surgeries to school pupils. The Project Co-ordinator, Ms. Margaret Murphy, visited schools, particularly six and seven year-olds, preceded by a letter to parents. Information was provided about diet for dental health and about tooth brushing techniques.

Some information and training sessions were held with public health nurses. Some nurses attended a 'group skills' course, along with other health and community workers. Subsequently, successful community groups, with an orientation towards personal development and improved health behaviours, were organised by some of those trained. Public health nurses also participated in a variety of community events, and assisted with measurement of blood pressure and cholesterol.

Where possible, community events were linked to national campaigns, such as the Quit Smoking Competition, which started annually on Ash Wednesday. Sponsored by the Voluntary Health Insurance Board, the winner received a cash prize of £500. Another annual event was the 10K Road Run organised jointly with Kilkenny City Harriers and sponsored by Avonmore Foods plc. The Project responded to requests to provide an information stand at a variety of events, the largest being the annual agricultural show at Teagasc in Kildalton.

Other campaigns included Meat for Health Week (sponsored by CBF Irish Livestock and Meat Board), Seafood Week (sponsored by Bord Iascaigh Mhara) and Shop Smart for Your Heart with the co-operation of shops throughout County Kilkenny.

12.5 THE HEALTH ASSESSMENT PROGRAMME

The Kilkenny Health Project Health Assessment Programme (HAP) was a joint undertaking with the Kilkenny Faculty of the Irish College
of General Practitioners. The objectives of the Health Assessment Programme were as follows:

1. To formalise and standardise the assessment and recording of risk factors for CHD in general practice;

2. To motivate lifestyle change in those in whom risk factors are moderately elevated;

3. To identify and counsel individuals at special risk;

4. To prevent progression and recurrence of disease.

All residents of Kilkenny aged 40-49 were offered a free assessment. In 1989 the health assessment programme was extended to those aged 30-39. The format included measurement of blood pressure, cholesterol and relative body weight; assessment by the family practitioner of the person's diet, exercise habits and alcohol consumption; and recording of relevant family and personal medical history. Patients were counselled on the basis of these investigations.

Of the first 6,394 persons assessed between the beginning of the programme in 1987 and January 1991, there were similar numbers of men and women in each age group. Thirty-six percent of those assessed were in the 30-39 age group, since these only became eligible for assessment three years after the beginning of the service. The data collected by the general practitioners are being examined to identify characteristics of groups found to be at higher risk.

A survey is now planned as part of the Health Assessment Programme to seek general practitioners' views on the process of implementing the programme. It is likely that one of the

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difficulties which will be identified is the low level of resources within general practice in Ireland for counselling and follow-up of those identified as being at increased risk. It has been recognised in the United Kingdom that programmes of this type impose a heavy work load and require more resources than had previously been recognised.

The support of the Project Dietitian was available to the general practitioners for those with obesity or hyperlipidaemia or other nutrition-related diseases relevant to CHD. Patients referred included those identified at the Health Assessment Programme.

It is recognised that those who have already suffered a CHD event are at high risk for a further event. Existing practice in cardiac rehabilitation varies greatly, largely dependent on available resources. It was considered desirable by the Project Steering Committee that a structure be developed to facilitate rehabilitation in the community. This did not prove possible during the Project but is acknowledged as an issue requiring further study and development in the future.

13. FINDINGS OF THE POPULATION SURVEYS

The findings are presented here for the pre- and post-programme surveys in County Kilkenny (1985 and 1990) and in County Offaly (1986 and 1991). Survey methods were similar to those used by the WHO MONICA Project, of which the Kilkenny Health Project is an Associate Member. The samples were chosen by Prof. Brendan Whelan of the Economic and Social Research Institute using RANSAM, a computer-based system for drawing random samples from electoral registers. For each survey, between 2,000 and 3,000 names were chosen. Contact was made by post in order to identify those within the age range 35 to 64 years who were willing to participate in the survey. Non-respondents were contacted by interviewers. Actual survey participants represented between 70%
and 75% of those eligible to participate in the groups chosen from the electoral registers.

13.1 DEMOGRAPHIC FACTORS

Numbers Surveyed
The number of people in each survey by age and sex is shown in Table 2. Altogether 604 were surveyed in Offaly in 1986 and 631 in 1991; 792 were surveyed in Kilkenny in 1985 and 802 in 1990.

Area of Residence
Between 30% and 40% of participants resided in urban areas. The percentage who were from urban areas was higher in County Kilkenny than in County Offaly and increased more in Kilkenny than in Offaly between the two sets of surveys.

Marital Status
Between 80% and 85% of men and women surveyed were married. The percentage who were divorced or separated was slightly higher in women than in men, 0.3% to 4.1%, compared to 0% to 1.3%. The most striking findings in relation to marital status was the higher prevalence of widows compared to widowers in the 55 to 64 year age group. Thus between 3.0% and 8.9% of the oldest age group of men had lost their spouse through death compared to 12.1% to 23.6% of women in the same age group.
### Table 2: Numbers surveyed, aged 35 to 64 years

<table>
<thead>
<tr>
<th></th>
<th>Offaly</th>
<th>Kilkenny</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>312</td>
<td>422</td>
</tr>
<tr>
<td>1991</td>
<td>309</td>
<td>403</td>
</tr>
<tr>
<td>1985</td>
<td>292</td>
<td>370</td>
</tr>
<tr>
<td>1990</td>
<td>604</td>
<td>792</td>
</tr>
<tr>
<td>Women</td>
<td>371</td>
<td>399</td>
</tr>
<tr>
<td>Total</td>
<td>631</td>
<td>802</td>
</tr>
</tbody>
</table>

Response rates: approx 75%

### Table 3: Employment Status - Employed %

<table>
<thead>
<tr>
<th></th>
<th>Offaly</th>
<th>Kilkenny</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td>1991</td>
<td>76</td>
<td>82</td>
</tr>
<tr>
<td>1985</td>
<td>15</td>
<td>22</td>
</tr>
<tr>
<td>1990</td>
<td>49</td>
<td>53</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>53</td>
</tr>
</tbody>
</table>

### Table 4: Family History of Heart Disease %

<table>
<thead>
<tr>
<th></th>
<th>Offaly</th>
<th>Kilkenny</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>38</td>
<td>50</td>
</tr>
<tr>
<td>1991</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>1985</td>
<td>41</td>
<td>54</td>
</tr>
<tr>
<td>1990</td>
<td>39</td>
<td>37</td>
</tr>
<tr>
<td>Men</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>36</td>
<td>37</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>36</td>
</tr>
</tbody>
</table>
Employment Status
The percentage of males at work declined in both counties between 1985/1986 and 1990/1991. The level of unemployment in the two counties changed little between the two sets of surveys but was higher in the reference county (14.7% and 13.6%) than in Kilkenny (7.4% and 7.2%). The prevalence of being retired or on permanent disability, though low in both counties, increased over time; the two categories combined increased from 4.8% of males in the Offaly to 10.6% and from 7.1% in Kilkenny to 10.5%. Thus, the percentage of men in paid employment declined in both counties (Table 3). The majority of women in both counties were occupied with domestic duties. The percentage at work outside the home increased from 15.4% in County Offaly to 19.9% but remained unchanged, 22.2% and 22.8%, in County Kilkenny.

Social Class
In County Offaly approximately 50% of each group surveyed were in social classes I to III and 50% in social classes IV to V. In County Kilkenny, a higher percentage were in social classes I to III in 1985 (58.1%). There was a smaller percentage in social class VI in Kilkenny in 1990 and an increase in social class I, with 62.5% of those surveyed being in social classes I to III.

13.2 FAMILY HISTORY
The percentage of respondents who reported a family history of coronary heart disease declined in both counties (Table 4). This was largely due to a reduction in those reporting a history of heart disease in relatives aged 55 years and older. A strong family history of heart disease, in close relatives with an event under the age of 55 years, was reported in 10% to 12% of all groups surveyed.

13.3 MORBIDITY AND MEDICATION
Myocardial Infarction
A past history of a medical diagnosis of a heart attack was given by more men in County Offaly in 1991, 3.6%, than in County Kilkenny.
in 1990, 2.5% (Table 5). This was particularly apparent in the 45 to 54 year age group, where 4.1% of men in Offaly gave such a history compared to 0.8% in Kilkenny. In the 55 to 64 year age group, the prevalence of such a history was similar in the two counties, 8.9% in Offaly and 8.0% in Kilkenny.

A history of a heart attack was very much lower in women than in men. None of the women in County Offaly reported such a history and only 0.5% of women in County Kilkenny, all of whom were aged 55 to 64 years (2.2% of that age group).

**Heart Tablets**
Between 3% and 4% of those surveyed were taking 'heart tablets' at the time of interview. This was higher in men, 4.5% in County Offaly at baseline and 4.8% in County Kilkenny. This declined to 4.2% in Offaly and to 4.0% in Kilkenny. There was no change in the prevalence of women taking such medication in Offaly, 2.4% and 2.5% in 1986 and 1991, and a decrease, from 4.1% to 2.5%, in Kilkenny.

The prevalence of taking medication for heart disease increased with age, to 10.1% of men aged 55 to 64 years in County Offaly in 1991 and to 10.9% in County Kilkenny in 1990; the corresponding prevalences in women were 6.8% and 5.6%.

**Other Illnesses**
The prevalence of *diabetes mellitus* increased in both counties between 1985/86 and 1990/91, from 1.7% to 1.9% in Offaly and from 1.0% to 1.6% in Kilkenny.

The prevalence of *intermittent claudication* (pain in the legs when walking, due to poor blood supply) was low, between 0.5% and 1.2% of those surveyed.
The prevalence of stroke was low in this age group. There were lower prevalences in 1990/91 compared to 1985/86, declining from 0.7% to 0.5% in County Offaly and from 0.6% to 0.4% in County Kilkenny.

The prevalence of dyspnoea (breathlessness) on exertion decreased in both counties (Table 6). Those who did not experience dyspnoea increased from 57.0% to 71.0% in Offaly and from 55.9% to 66.4% in Kilkenny. This was largely due to a reduction in the prevalence of those reporting dyspnoea when hurrying on level ground or when walking up a slight hill (grade I), from 29.5% to 19.5% in County Offaly and from 32.6% to 25.6% in County Kilkenny.

13.4 CHOLESTEROL
Mean serum total cholesterol was similar in the two counties at baseline (Table 7); 6.00 mmol/l in men in Offaly and 6.04 mmol/l in Kilkenny, and 5.91 mmol/l in women in Offaly and 6.01 mmol/l in Kilkenny. There was a decline in mean serum total cholesterol in men in County Offaly, to 5.56 mmol/l, but a much smaller decrease in men in County Kilkenny, to 5.95 mmol/l. The decline in mean serum total cholesterol was slightly greater in women in Kilkenny, to 5.62 mmol/l, than in Offaly, which declined to 5.56 mmol/l. Mean serum total cholesterol declined in all age groups in both sexes in both counties, with the exception of Kilkenny men aged 35 to 44 and 55 to 64 years.

The distribution by cholesterol category improved in women in both counties and in men in County Offaly (Table 8). The percentage of men in the low cholesterol group increased to 35.6% (+13.8%) in Offaly but increased only marginally to 22.8% (+1.2%) in Kilkenny. The percentage of men with serum total cholesterol greater than 6.5 mmol/l declined by 12.9% to 17.5% in Offaly; the decline was 3.9% to 28.3% in Kilkenny.
Table 5: Medical History of a 'Heart Attack' in Men, %

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Offaly 1991</th>
<th>Kilkenny 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 - 44</td>
<td>0</td>
<td>0.6</td>
</tr>
<tr>
<td>45 - 54</td>
<td>4.1</td>
<td>0.8</td>
</tr>
<tr>
<td>55 - 64</td>
<td>8.9</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>3.6</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Table 6: Prevalence of Dyspnoea % - MRC Questionnaire

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>37</td>
<td>25</td>
<td>39</td>
<td>29</td>
</tr>
<tr>
<td>Women</td>
<td>50</td>
<td>25</td>
<td>50</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>29</td>
<td>44</td>
<td>34</td>
</tr>
</tbody>
</table>

Table 7: Mean Serum Total Cholesterol, mmol/l

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>6.00</td>
<td>5.56</td>
<td>6.04</td>
<td>5.95</td>
</tr>
<tr>
<td>Women</td>
<td>5.91</td>
<td>5.56</td>
<td>6.01</td>
<td>5.62</td>
</tr>
<tr>
<td>Total</td>
<td>5.96</td>
<td>5.56</td>
<td>60.3</td>
<td>5.79</td>
</tr>
</tbody>
</table>
Table 8: Normal Serum Total Cholesterol Distribution
\%
\(< 5.2 \text{ mmol/l}\

<table>
<thead>
<tr>
<th></th>
<th>Offaly</th>
<th>Kilkenny</th>
</tr>
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<tbody>
<tr>
<td>Men</td>
<td>22</td>
<td>36</td>
</tr>
<tr>
<td>Women</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>39</td>
</tr>
</tbody>
</table>

There was a greater decline in the percentage of women with serum total cholesterol of greater than 6.5 mmol/l in Kilkenny, by 11.0\% to 23.6\%, than in Offaly where the decline was 7.2\% to 23.3\%. More women in Offaly were in the low cholesterol category in 1991 than in Kilkenny in 1990, 41.6\% and 37.1\% respectively.

The prevalence of serum total cholesterol of greater than 7.8 mmol/l declined from 7\% to 3\% in County Offaly. The decline was smaller in County Kilkenny, from 7\% to 5\%, reflecting the small decline, from 7\% to 6\% in men.

The percentage of those surveyed who had ever had their cholesterol checked was higher in County Kilkenny, 52.0\%, than in County Offaly, 29.6\% (Figure 9). The majority of those who had ever had it measured had the check within the three years before the survey. In Kilkenny, there was little difference between the percentage of men who had ever had a cholesterol check, 54.0\%, and that of women, 50.0\%. In Offaly, 38.8\% of men had had a cholesterol check compared to 20.7\% of women.
Figure 9: Percentage of subjects who ever had their cholesterol checked

In County Offaly, there was a strong social class gradient in the percentage of the survey group who had ever had a cholesterol check, from 47.6% in social class I and 42.1% in social class II to 13.3% in social class V and 13.8% in social class VI. While the percentage of those ever having had a cholesterol check was highest in County Kilkenny in social class I, at 60.0%, it was 52.4% in social class V and 50.0% in social class VI, though as low as 43.4% in social class IV.

13.5 BLOOD PRESSURE

Systolic Blood Pressure

An important reduction in mean systolic blood pressure was found in each age/sex group in 1990/1991 when compared to 1985/1986 (Table 9). Overall, the reduction was slightly greater in County Kilkenny than in County Offaly, -6.7 and -6.2 mmHg respectively. The mean systolic blood pressure remained higher in Kilkenny, at 135.2 mmHg, than in Offaly, where the mean systolic blood pressure was 133.7 mmHg. The decline was greater in women than in men, -7.7 mmHg in women in Kilkenny and -6.6 mmHg Offaly, compared to -5.3 mmHg in men in both counties. This resulted in a widening of the gap in mean systolic blood pressure between the sexes, from 6.7 to 8.0 mmHg in Offaly and from 4.5 to 6.9 mmHg in Kilkenny.
### Table 9: Mean Systolic Blood Pressure, mmHg

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<thead>
<tr>
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<td>138</td>
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<tr>
<td>Women</td>
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<td>130</td>
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<td>132</td>
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<tr>
<td>Total</td>
<td>140</td>
<td>134</td>
<td>142</td>
<td>135</td>
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</table>

### Table 10: Prevalence Hypertension, \( \frac{160}{95} \) mmHg or on treatment

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</thead>
<tbody>
<tr>
<td>Men</td>
<td>26</td>
<td>20</td>
<td>23</td>
<td>20</td>
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<tr>
<td>Women</td>
<td>18</td>
<td>18</td>
<td>24</td>
<td>18</td>
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<tr>
<td>Total</td>
<td>22</td>
<td>19</td>
<td>24</td>
<td>19</td>
</tr>
</tbody>
</table>

### Table 11: Treatment of Hypertension, Men and Women, \( \frac{160}{95} \) mmHg or on treatment

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Low, on med.</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>High, on med.</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>High, no med.</td>
<td>13</td>
<td>9</td>
<td>14</td>
<td>10</td>
</tr>
</tbody>
</table>
Diastolic Blood Pressure
The decline over time in mean diastolic blood pressure was greater in Offaly than in Kilkenny, -4.5 mmHg and -0.7 mmHg respectively. Thus, mean diastolic blood pressure was lower in the post-programme survey in the reference county than in Kilkenny, 76.1 mmHg compared to 77.2 mmHg. The decline was greater in men in Offaly, -5.2 mmHg in men and -3.6 mmHg in women. In Kilkenny, the decline was greater in women, -2.0 mmHg in women compared to an increase of 0.6 mmHg in men.

Hypertension
The prevalence of hypertension - either actual, or normotensive (<160/95 mm Hg) on treatment - was similar in the two counties in 1990/1991, at 19.0% in Offaly and 19.1% in Kilkenny (Table 10). The decline in prevalence of hypertension was greater in Kilkenny, -4.4%, than in Offaly, -2.9%. The percentage who were hypertensive but on no treatment was lower in Offaly (46.6%) than in Kilkenny (51.6%). The percentage of those with hypertension in whom levels of blood pressure less than 160 mmHg systolic and 95 mmHg diastolic had been achieved with medication increased, from 21.2% to 31.4% in Offaly and from 19.4% to 31.4% in Kilkenny.

The percentage of survey participants who had their blood pressure measured within the previous two years increased in both counties. The increase was greater in County Offaly, from 74.8% to 81.2% (+6.4%) than in County Kilkenny, from 75.6% to 80.6% (+5.0%). The increase was least (+0.9%) in men in Kilkenny and greatest (+8.8%) in women in Kilkenny.

13.6 SMOKING
The prevalence of current regular cigarette smoking declined in both counties in men and in women between 1985/86 and 1990/91 (Figure 10). There was a greater decline in regular cigarette smoking in men in County Offaly, - 2.7% to 26.5%, than in County Kilkenny, -- 1.5% to
25.8%. In women, the prevalence of current regular cigarette smoking declined more in Kilkenny, by 6.8% to 22.1%, compared to a decrease of 3.5% to 23.9% in Offaly.

The changes in smoking prevalence were not uniform in the different age/sex groups. The prevalence of regular cigarette smoking declined in men aged 35 to 44 years and in men aged 55 to 64 years in Kilkenny. There was an increase in regular cigarette smoking in men aged 44 to 54 years but the prevalence had been low in 1985, at 19.5%, though the increase to 23.1% was counter to the trends in the other age groups. In the reference county, regular cigarette smoking prevalence declined in men aged 45 to 64 years but increased from 28.4% to 34.1% in men aged 35 to 44 years.

In women, there were important reductions in smoking prevalence at all ages in County Kilkenny. In County Offaly, there was only a small decline, from 23.6% to 22.0% in women aged 35 to 44 years and an increase from 25.5% to 28.0% in those aged 45 to 54 years.

Despite reductions in smoking prevalence in social classes V and VI in both counties, the social class gradient in smoking prevalence
persisted in 1990/1991, from 18.8% in social class I in Offaly to 31.8% in social class VI, and from 21.9% in social class I in Kilkenny to 33.3% in social class VI (Figure 11).

![Figure 11: Current cigarette smokers by social class in Kilkenny in 1985 and 1990](image)

13.7 BODY MASS INDEX

The distribution of those surveyed by body mass index (BMI) category is shown in Table 12 (Figures 12 & 13). Changes occurred in different ways in the two counties. In Kilkenny there was a small decline over time in the prevalence of acceptable weight and of overweight, with a 3.0% increase in the prevalence of obesity. In Offaly there was a 9.4% decline in the prevalence of acceptable weight, with a 1.1% increase in the prevalence of overweight and an 8.3% increase to 26.5% in the prevalence of obesity.
### Distribution BMI categories†, Men & Women

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<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>'Acceptable'</td>
<td>34.4</td>
<td>25.0</td>
<td>35.7</td>
<td>34.1</td>
</tr>
<tr>
<td>Overweight</td>
<td>47.4</td>
<td>48.5</td>
<td>47.9</td>
<td>46.5</td>
</tr>
<tr>
<td>Obese</td>
<td>18.2</td>
<td>26.5</td>
<td>16.4</td>
<td>19.4</td>
</tr>
</tbody>
</table>

BMI Males ≤ 25, 25.1 - 29.9, ≥30.0
Females ≤23.8, 23.9 - 28.5, ≥ 28.6
'Acceptable' includes underweight

In Kilkenny, the prevalence of 'acceptable' weight declined in men, from 35.1% to 31.4%, with an increase of 1.7% to 53.1% in the prevalence of overweight and of 2.0% in obesity. In Kilkenny women there was little change in the prevalence of 'acceptable' weight, a decline of 4% in the prevalence of overweight and an increase of 3.6% in obesity. In Offaly, there was a 6.2% decrease in the prevalence of 'acceptable' weight in men, a decrease also, of 4.3% in the overweight group, and an increase of 10.5% in the prevalence of obesity. In women in County Offaly there was also an decrease in the prevalence of 'acceptable' weight, but the increases were distributed both to the overweight group, by 7.3% to 45.7%, and to the obese category, by 5.7% to 28.3%.

In men in County Kilkenny in 1990, there was no increased gradient in the prevalence of obesity with age, being 16.2% in the 35 to 44 year age group, 14.2% in the 45 to 54 year group and 16.0% in the 55 to 64 year age group. In all of the other groups in 1990/91, the prevalence of obesity increased with age, from 14.4% to 32.6% in women in Kilkenny, from 16.7% to 30.4% in men Offaly and from 17.0% to 47.3% in women there.
Figure 12: Percentage of males and females within acceptable weight ranges

Ref County 1986
Ref County 1991
Kilkenny 1985
Kilkenny 1990

Figure 13: Percentage of obese males and females as defined by the R.C.P.I.

Ref County 1986
Ref County 1991
Kilkenny 1985
Kilkenny 1990

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13.8 FOODS CONSUMED

There was no change in either county in the frequency of consuming boiled potatoes. At baseline and at the post-programme surveys approximately 90% of those surveyed consumed boiled potatoes on 4-7 occasions per week.

The consumption of vegetables changed little in the two counties between the two sets of surveys (Table 13). Approximately 90% of the participants reported eating vegetables between four and seven times per week. Most of the remainder ate vegetables one to three times per week.

| Table 13: Consumption per week of vegetables, fruit, chicken and fish, % |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| **VEGETABLES**  |                 |                 |                 |                 |
| None            | 0.8             | 1.6             | 1.1             | 0.4             |
| 1-3             | 9.0             | 9.8             | 4.6             | 5.5             |
| 4-7             | 90.0            | 88.1            | 93.5            | 93.5            |
| 7-11            | 0.2             | 0.5             | 0.8             | 0.6             |
| **FRESH FRUIT** |                 |                 |                 |                 |
| None            | 23.8            | 22.3            | 21.2            | 13.2            |
| 1-3             | 32.7            | 30.6            | 36.0            | 29.9            |
| 4-7             | 43.0            | 31.1            | 42.8            | 50.3            |
| >7              | 0.6             | 16.0            | ~               | 6.6             |
| **FISH**        |                 |                 |                 |                 |
| None            | 29.8            | 28.8            | 30.8            | 21.9            |
| 1               | 57.8            | 53.9            | 52.7            | 56.2            |
| ≥ 2             | 12.4            | 17.3            | 16.5            | 21.8            |
| **CHICKEN**     |                 |                 |                 |                 |
| None            | 35.6            | 19.3            | 38.0            | 15.0            |
| 1               | 47.2            | 47.5            | 50.8            | 56.7            |
| ≥ 2             | 17.2            | 33.1            | 11.2            | 28.2            |

Reported fruit consumption increased over time, more so in County Kilkenny than in County Offaly. The prevalence of never eating fruit
declined from 21.2% to 13.2% in Kilkenny, but declined just a little in Offaly, from 23.8% to 22.3%. The prevalence of eating fruit on one to three occasions per week was similar in the two counties in 1990/1991 - 29.9% in Kilkenny and 30.6% in Offaly. Nearly 20% more Kilkenny participants reported eating fruit four to seven times weekly (50.3% compared to 31.1%). The prevalence of eating fruit seven or more times weekly was however higher in Offaly - 16.0% compared to 6.6%.

The change in fruit consumption in Offaly related to the frequency of eating fruit on four or more occasions per week - non-and low consumers had similar prevalences at the two surveys. In contrast, in Kilkenny, the prevalence of non-and low consumption declined by 14.1%, with corresponding increases in the prevalence of consuming fruit on four or more occasions per week.

There was a similar prevalence of people who did not consume fish in the two counties at baseline, 30.8% in Kilkenny and 29.8% in Offaly. This decreased by only 1% in Offaly but by 8.9% in Kilkenny. Within fish consumers, there was a shift to higher consumption in Offaly, with an increase of 4.9% to 17.3% in those eating fish twice per week. In Kilkenny, there was an increase of 3.5% in those eating fish once per week and of 5.3% in those eating fish twice per week.

The prevalence of eating chicken increased more in County Kilkenny than in County Offaly. The increase in chicken consumers was 23.0% to 85.0% in Kilkenny compared to an increase of 16.3% to 80.7% in Offaly. In Kilkenny, there was an increase of 5.9% in those eating chicken once per week and of 17.0% in those eating chicken twice per week. In Offaly, there was no change in eating chicken once per week and an increase of 15.9% in those eating chicken twice per week.

Between 1% and 2% of each survey group did not consume meat. The frequency of consuming meat changed little in the two counties. About half of each group surveyed at baseline consumed meat on four to seven occasions weekly and there were small decreases over time in this group.
in both counties. The prevalence of eating meat more than seven times weekly was 38.9% in Kilkenny in 1990 and 36.1% in Offaly in 1991.

**Fried foods** were eaten less frequently in both counties in 1990/1991 when compared to 1985/1986. There was an increase in those not eating fried foods of 10.6% to 43.1% in Offaly and of 7.9% to 42.1% in Kilkenny. At the post-programme surveys, 16.3% of people in Offaly and 14.7% in Kilkenny ate fried foods on four or more occasions per week.

There were reductions in **egg** consumption in both counties. The prevalence of consuming seven or more eggs per week decreased by 9.9% to 5.2% in Offaly and by 9.2% to 7.5% in Kilkenny.

No data were collected in 1985 on the type of **milk** consumed, but most would have been whole milk in both areas. In 1990 whole milk was consumed by 66.0% of those surveyed in County Kilkenny compared to 76.4% in County Offaly (Figure 14). There was a correspondingly higher percentage consuming either light or skimmed milk in Kilkenny, 24.5%, compared to 14.0% in Offaly. Similar percentages consumed a mixture of whole and light or skimmed milk, 6.0% in Kilkenny and 6.3% in Offaly.

There were changes in both counties in the type of **spread** used on bread (Figure 15). There were large reductions in the percentage consuming butter in both counties, in Kilkenny from 66.8% to 27.5% (-39.3%) and in Offaly from 71.0% to 33.8% (-37.2%). Fewer in Kilkenny switched to a dairy spread - 12.6% compared to 19.9%. A higher percentage in Kilkenny changed to a low fat spread, 33.1% compared to 19.9%. Similar percentages consumed a polyunsaturated margarine in the two counties at baseline, and the increase in consumption was similar, to 23.1% in Kilkenny and 22.0% in Offaly.
There was a change in the distribution of use of table sugar which was greater in County Kilkenny than in County Offaly. Thus consumption of six or more teaspoons of sugar per day declined from 42.2% to 17.7% (-24.5%) in Kilkenny, compared to a decrease from 37.8% to 20.0% (-17.8%) in the reference county. There was also a greater increase in those not consuming sugar added at table, to 44.3% (+6.2%) in Kilkenny, compared to 43.9% (+2.5%) in the reference county.
13.9 PHYSICAL ACTIVITY

The distribution by category of *leisure* activity was quite different in the two counties at baseline (Table 14). Among men and women in Offaly, the majority were sedentary, 62.5% and 75.3% respectively, while 32.4% and 21.2% took moderate activity at leisure. In Kilkenny, the sedentary and moderately active groups were very similar in size in men and women with 43.4% and 45.9% sedentary and 44.4% and 48.9% moderately active.

In 1990/1991, similar percentages of men in the two counties were sedentary at leisure, 35.7% in Offaly (-26.8%) and 34.3% in Kilkenny (-9.1%). More men in Kilkenny were in the moderate category (60.4% compared to 54.8%) and more men in Offaly were in the heavy activity group (8.2% compared to 4.0%). Fewer women in Offaly were sedentary (40.3% compared to 44.9%) and correspondingly more were in the moderate leisure exercise category (58.2% compared to 52.4%). For men and women combined the distribution by leisure exercise category was very similar in the two counties in 1990/1991.

Those surveyed were asked to categorise their own assessment of their personal *physical condition*. The resulting distributions were very similar in the two counties (Table 15). The prevalence of a self-assessment of very good physical condition was low at baseline - 9.3% in County Offaly and 7.2% in County Kilkenny. There were higher prevalences in the not very good/bad category, 14.1% and 12.4% respectively. The most striking feature of the self-rating of physical condition was the improvement which occurred over time, which was very similar in the two counties. The prevalence of a very good or good self-rating was 63.4% in Kilkenny in 1990, an increase of 26.3%, and 61.3% in Offaly in 1991, an increase of 23.7%. The prevalence of a not very good or bad self-rating declined over time, to 6.7% in Kilkenny in 1990 (-5.7%) and 5.5% in the reference county in 1991 (-8.6%).
### Table 14: Activity at Leisure

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<tr>
<th></th>
<th>Offaly</th>
<th>Kilkenny</th>
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<th></th>
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</thead>
<tbody>
<tr>
<td><strong>MEN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sedentary</td>
<td>62.5</td>
<td>35.7</td>
<td>43.4</td>
<td>34.3</td>
</tr>
<tr>
<td>Moderate</td>
<td>32.4</td>
<td>54.8</td>
<td>44.4</td>
<td>60.4</td>
</tr>
<tr>
<td>Active</td>
<td>5.1</td>
<td>9.5</td>
<td>12.1</td>
<td>5.3</td>
</tr>
<tr>
<td><strong>WOMEN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sedentary</td>
<td>75.3</td>
<td>40.3</td>
<td>45.9</td>
<td>44.9</td>
</tr>
<tr>
<td>Moderate</td>
<td>21.2</td>
<td>58.2</td>
<td>48.9</td>
<td>52.4</td>
</tr>
<tr>
<td>Active</td>
<td>3.4</td>
<td>1.6</td>
<td>5.2</td>
<td>2.7</td>
</tr>
</tbody>
</table>

### Table 15: Participants' Opinions on their Personal Physical Condition, %

<table>
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<tr>
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<th>Offaly</th>
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<tbody>
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<td><strong>V. good</strong></td>
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</tr>
<tr>
<td></td>
<td>9.3</td>
<td>15.2</td>
<td>7.2</td>
<td>14.1</td>
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<td><strong>Good</strong></td>
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<tr>
<td></td>
<td>28.3</td>
<td>46.1</td>
<td>29.9</td>
<td>49.3</td>
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<td><strong>Fair</strong></td>
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<td></td>
<td>48.3</td>
<td>33.1</td>
<td>50.5</td>
<td>29.9</td>
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<td></td>
<td>14.1</td>
<td>5.5</td>
<td>12.4</td>
<td>6.7</td>
</tr>
</tbody>
</table>
14.0  TRENDS IN MORTALITY AND MORBIDITY

14.1  MORTALITY

Based on official death statistics and cause of death as registered on death certificates, age-standardised mortality rates at all ages for men and women combined, for Ireland and for Counties Kilkenny and Offaly, for all causes and for CHD are shown in Figures 16 and 17.

All cause mortality rates were very similar in Kilkenny to those for the country as a whole for most of the time period 1976 to 1989. From 1976 to 1985 there was a tendency for rates in Offaly to be lower than the national rates. In 1986 to 1988 rates were lower in County Kilkenny and higher in County Offaly than the rates for the whole country. This however may be entirely coincidental, the total population sizes for the counties are small, and in 1989 the rates were similar in both counties to the national rates.

The CHD mortality rates are based on smaller numbers and are more subject to chance variation. There was a tendency for rates in County Offaly to be lower and for those in County Kilkenny to be higher than the rates for the country as a whole from 1982 to 1986. From then on rates in the two counties were very similar to each other and to the national rates.
Figure 16: Age-standardised all cause mortality rates for all males and females in Ireland, and in Counties Kilkenny and Offaly

Figure 17: Age standardised C.H.D. mortality rates for males and females in Ireland, Co. Kilkenny and Co. Offaly, 1982-1989
15.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Ireland has been slow to achieve the downward trend in coronary heart disease (CHD) mortality which occurred in some developed countries from the early 1960s onwards. In countries such as the United States of America and Australia, the decreasing mortality rates from CHD in middle age have been associated with declining total mortality rates and increases in life expectancy.

While there have been important advances in relation to the treatment of acute and chronic CHD, morbidity and mortality can most effectively be tackled through preventive strategies applied at population level. Within countries with high mortality, such as Ireland, this means targeting the entire population, who are all at some measure of risk when compared to their peers living in countries with lower mortality. In addition to reducing the incidence of CHD, such a preventive approach would be expected to be associated with reductions in the incidence of cancer and some other chronic noncommunicable diseases.

The Kilkenny Health Project started with a theoretical base built up from experiences in other countries. By the mid-1980s theories had been developed about the ways in which communities and individuals change their behaviours and about education methods to facilitate such behaviour change. Mortality rates from CHD had been particularly high in Finland and in the United States. In both of these countries preventive strategies had included the establishment of community cardiovascular disease research and demonstration programmes. Evaluation of these programmes suggested that they increased the rate of behaviour change within the intervention communities.

CHD remains an important cause of premature sickness and death in Ireland. There is strong evidence that a substantial proportion of this morbidity and mortality is preventable. The lifestyle factors associated with CHD are also associated with other chronic diseases which are important causes of death and disability in Ireland. Disease prevention
and health promotion programmes are most effective when applied at population level, with complementary programmes to identify and help individuals at higher risk.

Analysis of the baseline survey in Kilkenny confirmed that there were high levels of factors associated with CHD. There was a high prevalence of hypercholesterolaemia and of hypertension. Only a minority of those with high blood pressure were being effectively treated. The prevalence of regular cigarette smoking was similar in men and women surveyed. Mean body mass index was high, with a high prevalence of overweight and of obesity. In addition, a large proportion of those surveyed were sedentary during their leisure time.

One of the anomalies identified at the baseline survey was that people had quite good general knowledge of factors associated with the development of CHD but that this had not been translated into changed health behaviours. A community-based study of attitudes confirmed that people were unaware of the importance of CHD as a cause of morbidity and mortality in Ireland. Furthermore they were not aware that the knowledge which they had of factors associated with CHD had any personal relevance. They perceived that lifestyle advice to the public appeared to change or was not consistent and were unconvinced that alterations in their own way of life would be associated with more benefits than costs.

McCluskey’s (1989) study of health beliefs and practices in Ireland was carried out when, apart from stopping smoking, there was little evidence of behaviour change in the direction of reducing risk of chronic disease. These studies of attitudes towards healthy lifestyles should be updated. Perceived barriers to behaviour change should be studied in different social groups in different locations in Ireland. This would provide valuable information for planning future health promotion programmes.

An early strategy of the Kilkenny Health Project was to increase awareness of CHD as an important potentially preventable cause of morbidity and
mortality in Ireland. Project messages sought to reassure that healthy lifestyles were compatible with a high quality of life, were feasible without major financial outlay and were culturally acceptable in Kilkenny. Positive messages were used where possible, illustrated using the experiences of Kilkenny people.

The health promotion programme which was developed in Kilkenny took account of the findings of the baseline studies and of the stated priorities of professionals, community leaders, groups and individuals with whom we met. The activities of the Project were constantly considered from the perspective of the number of people reached, the complexity of the messages which could be communicated, and the costs for the Project.

When the Kilkenny Health Project started there were few leaflets available which had been developed specifically for use in Ireland. A set of relevant leaflets was developed, in response to demand from health professionals. Leaflets, of themselves, are unlikely to bring about important changes in behaviour. They can however be used as an adjunct to advice provided at community meetings or within the health services. Towards the later years of the Project, quantities of project leaflets were requested and provided to people working in other parts of Ireland. It was not considered ethical to refuse to send leaflets to the coronary care unit in the main hospital of the reference county!

The weekly article in the Kilkenny People newspaper was one of the first of the health education activities developed by the Project. This was an important channel of communication because it was the only form of mass media which was targeted specifically at the resident population of County Kilkenny. However, because of the central location of Kilkenny City within the county, the paucity of other large towns within the county and the presence of large towns/cities, such as New Ross and Waterford close to the county boundaries, an important proportion of the population of the county visited towns outside the county to do their weekly
shopping and purchased the local weekly newspaper of that geographic area.

The experience of the Kilkenny Health Project would suggest that a small proportion of the population are avid readers of articles on health. With large geographic coverage however, large numbers of people can be reached at relatively low cost. The readers are likely to be among those who are the 'early innovators' in health behaviours and, by their example, encourage change among their peers. Furthermore, the provision of authoritative, accurate health information can act as an antidote to the large amounts of inaccurate information and misleading carried by the media.

The expenditure on CATCH, the Project newsletter was justified on the grounds that relatively large numbers of people could be reached with more detailed information than could be provided in newspaper articles or on the radio programme. By focusing on specific topics in some issues and by doing separate print runs of some centrefolds, value for money spent on development was increased.

By maintaining a broad approach to our brief, i.e. to reduce mortality and morbidity and health behaviours likely to lead to coronary heart disease, it proved possible and useful to work with a wide range of community groups. Obviously, activities with each group were tailored to meet the expressed needs and wishes of the group, but also took account of the Project agenda. The Kilkenny Health Project videos on healthy food choices and cooking were shown at many of the community meetings.

Co-ordination of media campaigns at national level can greatly increase the effectiveness of local programmes. For example, an attractive series of healthy cooking programmes on national television could be accompanied by the publication of recipes in local newspapers, cookery demonstrations in community schools, at agricultural shows etc. This would greatly increase the effectiveness of both national and local programmes.
Resource materials are available from the Kilkenny Health Project which could be used, in the implementation of a national programme for CHD prevention.

The set of leaflets developed by the Kilkenny Health Project could be adapted for use in other parts of the country. A set of CATCH is available, with articles, quizzes, illustrations, crosswords, etc. which could be used, adapted as appropriate, in future health promotion programmes. The Kilkenny Health Project cookbook and videos are also available.

The Kilkenny Health Project set of newspaper articles could provide ideas and information for articles in future health promotion programmes. Syndication of articles from a central source to locations around the country, where they could be adapted as appropriate, would be an efficient method of disseminating health information to adults.

Adults in Kilkenny gave the highest priority to preventing the emergence of less healthy behaviours among young people. The survey among post-primary school pupils showed that such behaviours increased during the teenage years. Consequently, even though most of the Project objectives related to adults, the support of health education programmes in schools was given a high priority. It was hoped that some of the health messages would be relayed to parents and others at home. There was evidence from the post-programme survey in Kilkenny that the school programmes were discussed at home. The findings of the survey of post-primary school pupils in Kilkenny in 1992 are not yet available. These will provide information on changes in health behaviour among post-primary school pupils between 1987 and 1992. However the programme which was implemented in Kilkenny varied in intensity in different schools, and indeed some schools provided very little health education. There have also been advances in health education methods in recent years.

Evaluated programmes, for example in the Minnesota Heart Health Programme, have shown that peer-led programmes with school-home communication can achieve reductions in the proportions of young
people who develop less healthy behaviours during the teenage years. The development and implementation of comprehensive health promotion programmes in all schools is a priority if we are to reduce the burden of sickness and death in youth and middle age in Ireland. Topics should include personal development, lifestyles and decision making.

The Project worked effectively in co-operation with a wide range of health professionals. The best example is the Health Assessment Programme carried out in association with the Kilkenny Faculty of the Irish College of General Practitioners. After a pilot programme, a format was agreed and the public aged 30 - 49 could avail of heart health checks with their own GP. The computer-coded forms were returned to the Project, on receipt of which, the GP was paid £12.50 approximately. For this, the client was seen twice, once to carry out the examination and take the blood sample for measurement of serum total cholesterol, and on the second occasion for review of the findings of the assessment, with appropriate counselling. To date, over 7,000 people have been assessed. Many of the GPs have examined most of those eligible in their practice.

One of the deficiencies within the Irish health services which was highlighted during the Project was the lack of nursing and administrative back-up within general practice. Thus, much of the health assessment and counselling could have been carried out by appropriately trained nurses. It has been reported from the UK. that effective risk reduction within general practice requires more resources than had hitherto been realised.

Structures in general practice should be examined with a view to increasing the efficiency and effectiveness of the identification, management and follow-up of lifestyle factors which are associated with chronic disease.

The lack of facilities within the community for rehabilitation after an acute coronary event or after coronary artery surgery was also frequently discussed. Ideally, there would be a liaison public health nurse who would visit patients in their homes shortly after discharge from hospital. A
community-based rehabilitation programme could advise patients about a suitable exercise programme, diet, stress reduction etc. Some of this would be through individual counselling and some in group sessions. Quality of life and possibly survival after an acute event would be improved by a structured rehabilitation programme.

Since those who have had a coronary event are at high risk of a future event, the existing situation in relation to rehabilitation should be reviewed. Special attention should be paid to the co-ordination of rehabilitation activities within the community.

Quite apart from their role in the evaluation of the Kilkenny Health Project, the population surveys provide very valuable data on the prevalence of factors associated with CHD and on the trends in those factors over time. Dissemination of information about the findings of the surveys is likely of itself to influence health behaviour and lifestyles in Ireland. Improvements in smoking prevalence and in systolic BP in particular permit a positive message to be put forward. Attention can be focused on important issues such as the very high prevalence of obesity and the continuing social class gradient in relation to factors such as systolic BP.

From the Kilkenny Health Project population surveys we now have valuable information about the levels of lifestyle factors which are associated with chronic diseases in Ireland and about the changes in these factors over time. Further surveys in 1995/1996 would provide very valuable information on the trends in lifestyle, health behaviours and risk factors.

The most striking feature of the data is the extent to which some of the factors associated with CHD have improved over time. There were important improvements in the average levels of blood cholesterol, blood pressure and smoking in both counties. The extent of change was such as to make it difficult to show greater changes in Kilkenny, the intervention county, than in Offaly, the reference county. In some areas in which it is
notoriously difficult to bring about behaviour change, there were greater improvements in Kilkenny, for example, in the prevention of the increase in the prevalence of obesity over time. There were also greater dietary changes and larger increases in knowledge in Kilkenny than in Offaly.

There was of course, considerable "contamination" of the reference county by the Project, through the media, the population surveys, the registers of CHD and of stroke and through contacts between professionals in the two counties. It is possible that being chosen as the reference county stimulated health education and disease prevention activities there.

In order to minimise the spread to the reference area of health messages aimed at Kilkenny, national media were used as little as possible. This was despite evidence that the most effective means of "reaching" people in Kilkenny was via the national media. Furthermore, local media were limited to newspapers until local radio was legalised, several years after the Project started.

It was possible to obtain sponsorship for many of the Project resource materials and events. This greatly increased what could be achieved with the available resources. However, the overall resources available were small in the context of the aims and objectives of the Kilkenny Health Project. This particularly related to the budget for the use of the media, distribution of materials, advertising etc. It was considered reasonable to proceed despite the resource constraints, on the grounds that it was useful for a country like Ireland to test what it was possible to achieve with a low level of funding. This would increase the feasibility of spreading any successful innovations to the rest of the country.

Project resources were stretched due to its "triple agenda". The same staff carried responsibility for development and training, the implementation of the programme in the community and for the evaluation of the Project. Ideally, the evaluation, development of materials and training would have been carried out by a separate team(s). This would have meant that
the prime function of staff "on the ground" would have been direct contact with the community.

The positive attitude of the South Eastern Health Board eased the way for many initiatives. Nevertheless, the Project occurred at a time of financial restraint within the health services. Thus the Health Board was, for the most part, unable to allocate staff, for example public health nurses, to work on Project activities. Staff were however, released to attend training courses etc. The Health Board also appointed Health Education Officers during the Project and this expansion complemented the work of the Project, particularly in relation to health education in schools.

There is a need to reallocate resources within the health sector so as to place greater emphasis on disease prevention and on health promotion. Such funds should be specifically allocated early in the budgetary process. Only the sustained application of resources in a systematic and effective manner, with appropriate evaluation, is likely to make an important impact on existing lifestyles and on the chronic diseases associated with them.

While good work is being done by the voluntary sector and by community groups, it is important that the health sector take a leadership role in the prevention of chronic disease and in health promotion. Co-operation between the sectors could be increased by the establishment of an expert group with representatives from organisations such as the Irish Cancer Society, the Irish Heart Foundation, the Kilkenny Health Project, the Health Boards and the Health Promotion Unit of the Department of Health.

Comprehensive integrated health promotion programmes which aim to reduce mortality and morbidity from lifestyle-related diseases should be implemented at national level, aimed at the community at large and at sections of the community, with a special focus on the needs of the young, the less well educated and on the socially and economically deprived.
A good scientific knowledge of the basis for lifestyle advice and on the process of behaviour change is essential. It is necessary to have an organisation(s) which can respond effectively to dispel confusion arising from misleading statements by "experts" or by those who have a commercial interest in the status quo.

It should be stressed that there were many positive findings from the Kilkenny Health Project, not least the acceptability to the public of a programme of this type. The community, health professionals, other public service organisations and the commercial sector were very positively inclined towards the Project and willing to participate in Project activities. These positive attitudes and interest in behaviour change towards healthier lifestyles increase the likelihood that a national programme for CHD prevention would be successful in increasing the rate of decline in mortality from CHD in Ireland as we approach the year 2000.