

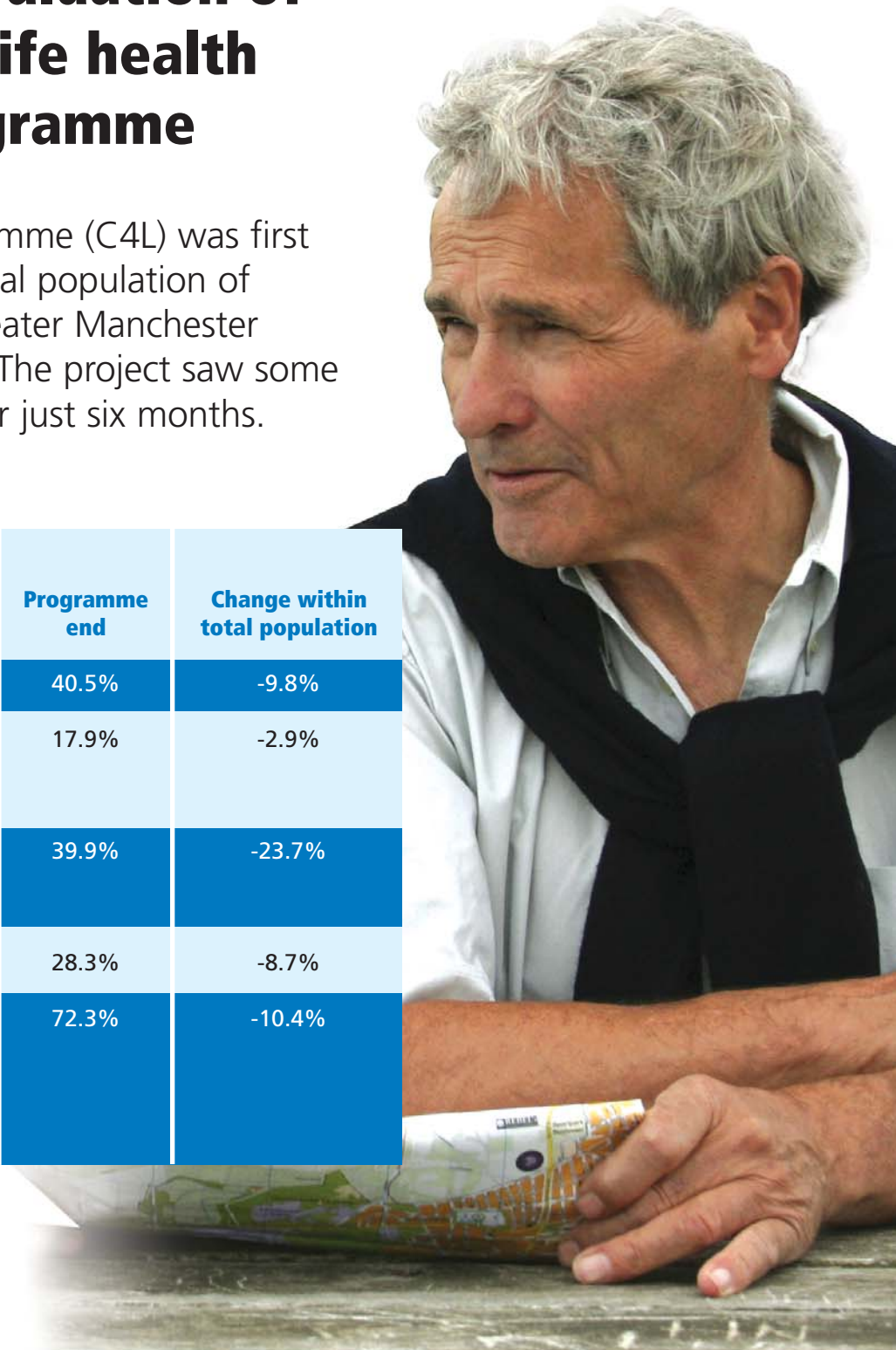


Connecting the dots

An economic evaluation of the Connect 4 Life health promotion programme

The Connect 4 Life programme (C4L) was first piloted amongst the general population of Tameside & Glossop in Greater Manchester between 2005 and 2006. The project saw some very impressive results after just six months.

Table 1: Health Risk Factor	Baseline	Programme end	Change within total population
Smoking	50.3%	40.5%	-9.8%
Excess alcohol consumption	20.8%	17.9%	-2.9%
Physical inactivity (sedentary or minimal activity)	63.6%	39.9%	-23.7%
High levels of stress	37.0%	28.3%	-8.7%
Low levels of fruit and vegetable consumption (less than 5 portions per day)	82.7%	72.3%	-10.4%



Background to Connect 4 Life

Tameside & Glossop PCT together with vielife developed the C4L programme to specifically target men and women in the 50-64 years age range who had no medical conditions but who had two or more risks factors for developing chronic disease in the future. Individuals were invited to enrol in the programme through targeted communications from their General Practitioners and publicity in the local press and local radio.

The initial programme lasted six months and involved a health risk assessment lead by health coaches, the development of a personalised health report for each participant and ongoing counselling sessions by telephone and in person. Each participant set personal health goals with their coach and were directed to relevant local initiatives to help them achieve these goals (such as smoking cessation services and community physical activity courses). Throughout the programme regular communication was maintained by the mailing of monthly "health packs" focusing on key areas of health & well-being - stress management, physical activity, pain management and alcohol awareness.

One hundred and seventy two individuals took part in the initial programme with the majority (83%) completing the full six months. As can be seen from **Table 1** there were dramatic improvements in health risk status for programme participants, especially in the areas of (i) smoking, (ii) physical activity and (iii) nutritional balance.

However, the question arises as to what these changes really mean to the local community and to the local healthcare delivery service. To answer these questions the project group enlisted the services of Fourth Hurdle, a leading health economics consultancy, to help quantify the impact the observed changes in health status within the group would have upon quality of life, life expectancy and healthcare costs.

Health economics - introducing the QALY

Utilising existing published research on the economic benefits of health status change and health promotion, together with the results of the C4L programme we were able to estimate the impact of the initiative on three main areas, (i) the development of future cardiovascular disease (heart disease and stroke) within the group, (ii) life expectancy and (iii) quality of life.

One of the fundamental aspects of health economics is the QALY, the Quality Adjusted Life Year. This is a calculated measure that not only looks at how many extra years of life an individual gains through an intervention (for example due to a new drug treatment, or in this case through changes in health related behaviours) but also the quality of those extra years.

Each additional life year gained is assigned a "utility score" from between zero and 1. This score is an assessment of the quality of life experienced by that individual. A score of 1 indicates perfect health and a score of zero indicates death.

An example might be an individual who gains three extra years of life by taking a new treatment, but they have a considerable amount of pain during those three years. They might be assigned a utility score of 0.5 and hence their QALY gain from taking the new treatment is 3 multiplied by 0.5, which equals 1.5 – they gain the equivalent of one and a half good quality extra years of life.

For the economic analysis of the C4L project we looked at the impact of the observed changes in five of the health risk factors assessed. **Table 2** shows the five areas used in the analysis.

Table 2:
Areas of health improvement in the C4L programme used in the economic analysis of programme benefit

Smoking
Alcohol consumption
Physical activity
Stress
Consumption of fruit & vegetables

Cardiovascular disease

The Framingham cardiovascular risk equation was used to estimate the baseline and study-end 10 year risk of developing cardiovascular disease (heart disease and stroke). The Framingham Heart Study is a large research project that began in 1948 that has followed thousands of individuals over time. The data from the study has enabled researchers to accurately predict the chances of developing heart disease or stroke over a 10-year period based upon risk factors such as smoking, blood pressure and cholesterol levels as well as non-modifiable factors such as age and gender.

Table 3 shows how the future chances of developing heart disease and stroke has reduced in the C4L population because of improvements in smoking status across the group.

Therefore, for every 100 people enrolled in the C4L programme we would expect a reduction of 0.58 new diagnoses of heart disease and 0.15 strokes over the coming 10 years due to reductions in smoking brought about by the programme.





Alcohol consumption

Research data shows that individuals who consume excess alcohol (i.e. outside of recommended national and international guidelines) are twice as likely to die within any given period of time than those individuals who do not. Based upon this fact and knowing what the expected mortality rate within our age group of population would be (based upon national statistics) we estimated the excess death rate from alcohol consumption in the C4L population before and after completing the programme. The reduction in deaths over the next 10 years per 100 people taking part in the C4L programme was calculated as 0.21.

Physical activity

Lack of regular physical activity has been shown to be a major contributor to many chronic diseases and to increase the chances of premature death. Individuals who are sedentary are almost 30% more likely to die in any given time compared to those who are regularly active (even at only moderate levels). Using this data in a similar way to the calculation performed on alcohol consumption we calculated that for every 100 people enrolled in the C4L programme we would expect 0.37 fewer deaths over the coming 10 years due to improved activity levels.

Stress

Research has shown that chronic stress can have a significant impact upon both mental and physical health. Cardiovascular disease is one area where stress is known to have an adverse effect with the risk of death being 2.2 times for individuals with high levels of stress and 1.53 times for medium levels of stress, compared to individuals with good stress management. The C4L programme had a sizeable impact upon

stress levels within the population as assessed by validated questionnaire measures. This improvement was calculated to reduce mortality from stress related cardiovascular disease over the coming 10 years by 0.41 individuals per 100 taking part in the programme.

Nutrition

The regular consumption of fruit and vegetables at a minimum level of five portions per day has been shown to reduce the future risk of heart disease and stroke. For every increase of one portion consumed the future risk of developing heart disease reduces by 4% and stroke by 6%.

The C4L programme increased the number of people consuming five portions of fruit and vegetables a day by 10.4%, hence the impact of this change can be calculated from the known baseline risk of heart disease and stroke detailed in the "cardiovascular disease" on the previous page. The resultant 10 year reduction in heart disease events per 100 C4L participants is 0.28, and stroke events is 0.08.

Table 4 brings together the results of the analysis for the five key health risks examined. Robust research data is not available for the impact of the changes in alcohol consumption, physical activity and stress on the development of cardiovascular disease, therefore no attempt was made to quantify this, although clearly one would expect these changes to have a positive effect in this area.

Table 3: Future risk of cardiovascular disease in C4L population based upon smoking status

Population	Condition	Number who will develop condition in the next 10 years (per 100 total population)
C4L population BEFORE starting the programme	Heart disease	13.42
	Stroke	2.58
C4L population AFTER completing the programme	Heart disease	12.84
	Stroke	2.44

Table 4: Overall benefit of Connect 4 Life Programme per 100 participants over the coming 10 years

	Reduction in number of new heart disease cases	Reduction in number of new stroke cases	Reduction in number of deaths
Benefit of reduction in smoking	0.58	0.15	-
Benefit of improved fruit & vegetable consumption	0.28	0.08	-
Benefit of reduction in excess alcohol consumption	-	-	0.21
Benefit of increase in physical activity	-	-	0.37
Benefit of reduction in stress levels	-	-	0.41
Total benefit of C4L programme	0.86	0.23	0.99

Cost savings and QALYs

As well as there being no robust quantifiable data on the impact of changes in alcohol consumption, stress and physical activity levels on the development of cardiovascular disease, there is also not much information on how these changes would reduce future medical expenditures, although they clearly would. To this end we concentrated upon the reductions in risk of cardiovascular disease, brought about by a reduction in smoking and an increase in fruit and vegetable consumption, in this group, and the impact this would have upon future costs.

Table 5 shows how these reductions in cardiovascular events would be expected to reduce medical care costs within this group and how the combination of improved life expectancy, through not having a cardiovascular event, and through reductions in mortality from improvements in alcohol consumption, stress and activity levels contribute to improvements in life expectancy and improvements in good quality life.

Discussion

The cost of implementing the C4L programme was £300 per individual, however this cost is offset by the £129 saved through reductions in costs associated with treating cardiovascular disease, giving a net cost of £171.

Across the group the average QALY improvement from participating within the programme was 0.172, i.e. on average, everyone who participated in the programme is predicted to gain an extra 0.172 years of full quality life. The cost per QALY improvement is therefore £171 divided by 0.172, which is £1000.



To put this in context, prescribing lipid lowering drugs to people with high cholesterol to prevent future cardiovascular disease costs approximately £20,000 per QALY improvement, whilst treating people with some of the new anti-cancer drugs costs in the region of two or three times this amount per QALY improvement.

The cost benefit analysis that has been performed on the C4L outcomes is, generally speaking, conservative. No account has been taken for the likely impact of changes in physical activity, stress

and alcohol consumption upon the development of cardiovascular disease or the cost of delivering healthcare services to individuals at high risk in these areas. It is therefore likely that the economic impact of the C4L programme on the individuals and the community as a whole is an underestimate of the true value.

With such a low cost per QALY compared to a number of standard interventions used in the health service it would appear that Connect 4 Life has a bright future.

Table 5: Reductions in cardiovascular events

	Baseline (before the C4L programme)	After C4L programme	Saving
Cost of managing heart disease and stroke within the population	£172,111	£159,256	£12,854 (£129 per individual engaged in the programme)
Total years of life expectancy for the group	1374	1395	21.0
Quality Adjusted Life Years (QALYs) based upon the presence or absence of disease	1041	1058	17.2