

ⁱThe DECiPHER

The *education* domain of municipal influence

1. Purpose.

This note reviews the potential impact of local education on reducing cardiovascular disease (CVD) in European cities.

2. Rationale.

The aim of DECiPHER is to produce a training package for municipalities which helps decision-makers optimise the mix of citywide programmes and investments to maximise public health impacts. The training package (VET) depends on a cost-benefit model, initially focusing on CVD as the biggest cause of death and disability in Europe. The first work package of DECiPHER led by Sheffield Hallam University, includes work to enhance the extant model of 'downstream' or proximal determinants of health by incorporating 'upstream' or 'distal' determinants of health. Education is one of the six distal domains selected by partners as a potentially important municipal influence on the prevalence of CVD.

3. Method.

This is a preliminary assessment of the scope, scale and potential impact of city investment in education. First we develop a schematic model, then second, plug-in evidence from 22 scientific studies to populate the model.

4. Role and influence of European municipalities.

Municipalities have influence (and often a constitutional/legal *competence*) over the education domain either by (i) providing a strategic framework for development (ii) directly providing schools, nurseries and other education services (iii) purchasing services from contracting agencies, or (iv) influencing the investment programmes and services of *partner* agencies.

In a response to an EU Green Paper on migration and mobility,ⁱⁱ the Council of European Municipalities and Regions defined education widely as '*a concept that is not limited to schools only, but includes day care facilities for children, family centres, cultural and sports centres.*ⁱⁱⁱ However, pro tem, the scope of our domain is limited to city schools for children between the ages of 3-19, segmented into nursery school (pre-5 Sheffield, pre 6 Udine, pre 7 Turku) primary (5-11, Sheffield; 6-11, Udine, 7-15, Turku) and secondary 12-18, Sheffield; 12-14 + 15-19 (high school) Udine; 16-18 Turku).

Over the past two decades, two counter-trends have determined the degree of municipal scope and influence on school education.^{iv} *First*, devolution from central, regional and provincial government has transferred power and influence to

municipalities, especially in Scandinavian countries. The education authority in Sheffield is traditionally dominated by the municipality and devolution in Sweden and Finland has transferred this competence to municipalities. In Italy the education authority for primary and secondary education is controlled by municipalities but the provincial government manages higher school education. For example, teachers in Italy are employed by central /regional government; in Sweden and England by either the municipality or the school board, in Finland by the school board. Overall public expenditure on schools is determined centrally in Italy, locally in Finland and Sweden and by the municipality or school board in England.

Second, a trend towards school autonomy has reduced the scope of municipal control. The current position on school autonomy for EU27 is tabulated in *Key data on education in Europe* reported by the European Commission.^v School boards have decision-making power over the school educational plan in 10 of the EU 27 including Italy and England: in Finland and Sweden the power depends on the extent of devolution from the municipality. There is a compulsory minimum curriculum in every state, set by central government in 23 states, including Finland, England, and Italy and Sweden. School boards have full autonomy over both the curricula content of optional subjects in half the EU27 (including Finland, Italy, England and Sweden) and full autonomy over choice of teaching methods in all member states.

5. Three pathways to reducing CVD: socialization, health promotion in the school setting and curriculum.

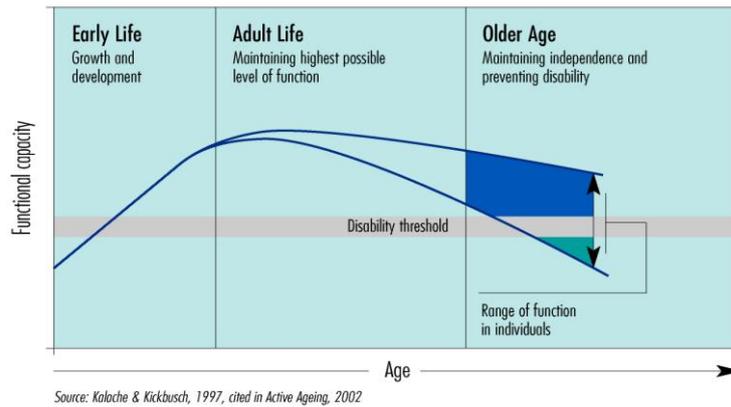
We must take account of two contextual issues when seeking the specific contribution of schools' education to reducing the risk of CVD.

(i) *Education or SES*. Though many scientific studies identify a clear negative relationship between education and coronary heart disease, they do not refer to education per se but as a proxy for socioeconomic status, especially in US literature. Davey Smith and colleagues^{vi} distinguish these two determinants in their prospective observational study and conclude that '*CVD was the cause of death most strongly associated with education, while the non-CVD, non-cancer category was the cause of death most strongly associated with adult social class.*' Education may be linked to CVD risk by two pathways, either (a) via SES and better material circumstances (see report on the economy domain) or via health promotion, by improving 'health literacy'^{vii} as an independent determinant of positive attitudes and behaviour.

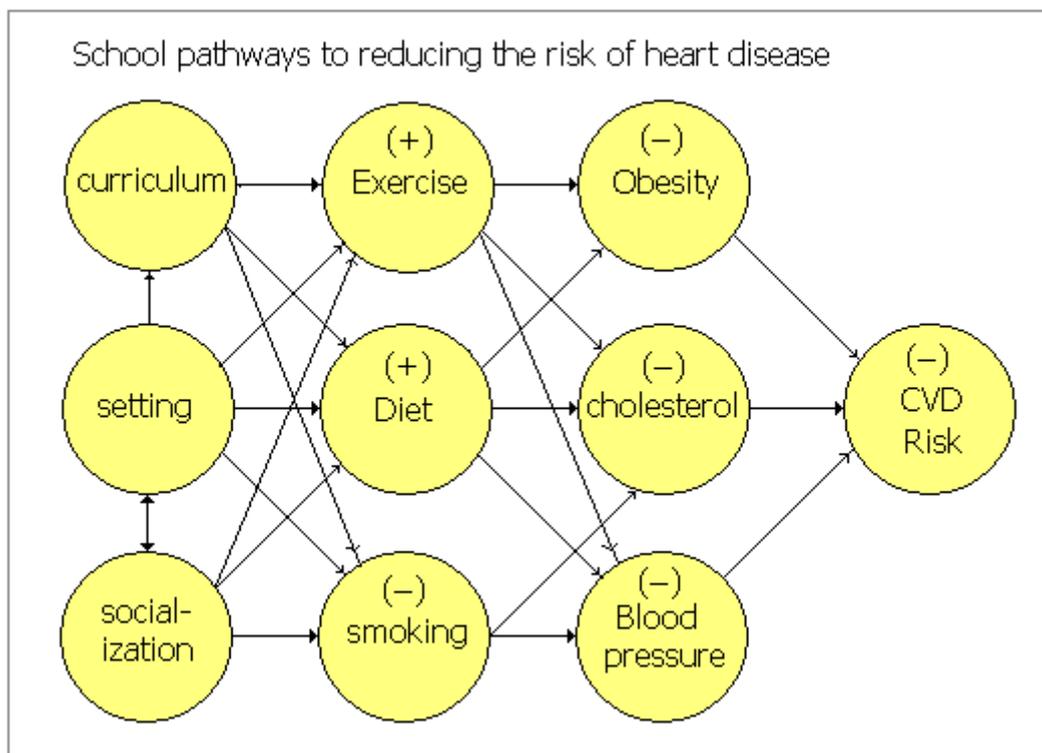
(ii) *Life course*. Very few children have CVD, even fewer die in childhood. Schools programmes will not have an immediate impact on CHD but will have an effect in later life.^{viii ix} Figure 1 shows the familiar life course model developed by WHO^x which focuses on dependency in later life. There are matched by models of chronic disease epidemiology^{xi} which focus on disease and death. These models imply that any costs associated with healthy schools are front-loaded but the benefits (in terms of reduced illness and dependency) are delivered later in the life course.^{xii}

Figure 3

Figure 6: **Functional capacity over the life course**



There is scope for municipalities and their local health authority partners to adopt a 'health promoting schools' approach pioneered by WHO.^{xiii} This is a comprehensive 'whole school' approach. Constituent programmes are designed to discourage children's lifestyles which would lead eventually to CHD.^{xiv} The potential pathways from school interventions to reduction of CVD are easy to identify and illustrated in figure 2. There is also robust scientific evidence which links the intermediate lifestyle segments of the pathways (exercise, diet, and smoking) to the risk factors of CVD (obesity, cholesterol and blood pressure) and modest evidence of impact in later life course.^{xv xvi}



Upstream, schools may include health promotion in (a) their curriculum, in (b) the school setting and (c) via socialization. A 'whole school approach' aims to combine all three. For example the natural and social sciences curricula may improve 'health literacy;' dedicated sports is also part of the school curriculum in all EU27; the school setting can promote walking and cycling to school as a counter trend to being driven by car. Schools can also promote a healthy diet by providing healthy school meals and also educating children and how to buy, grow and cook food. Socialization may be promoted in the curriculum and occurs naturally in the school setting. There is evidence that social integration helps prevent health damaging behaviours and reinforces health promotion messages.^{xvii}

There is also evidence that these school interventions have a positive impact on behaviour, though the backcloth in nearly all EU27 countries is bleak. Tobacco smoking has declined, but otherwise there is a negative trend of less exercise, poorer diets and an increase in childhood obesity. The European Commission has highlighted a childhood obesity epidemic in Europe.^{xviii} However, the legendary North Karelia project indicates that a concerted effort to change behaviour at a regional level can produce a dramatic reduction in CVD.^{xix} Our challenge is to isolate the potential impact of school interventions. A systematic review of 30 studies of school programmes to increase fruit and vegetable consumption concluded that '*School schemes are effective at increasing both intake and knowledge.*'^{xx} Increased understanding of the cessation process may help in developing effective tobacco control interventions for novice smokers.^{xxi} There is evidence that adolescent smoking, physical activity, and food choice behaviours are consolidated in adolescence and retained through the later life course.^{xxii} More evidence will become available from the WHO Collaborative Cross-National Study of Health Behaviour in School-aged Children, reported in a special supplement of the International Journal of Public Health.^{xxiii}

6. Cost-benefit: scale & scope

The scale of benefits from a concerted regional programme to address diet, exercise and smoking may be gauged by evidence of the impact of the North Karelia programme. The tables are extracted from the summary produced by the Finnish National Institute for Health and Social Welfare cited below.

Table 1. Main risk factors in North Karelia between 1972 and 2007 among men and women aged 30-59 years

Year	Men			Women		
	Smoking (%)	Serum cholesterol (mmol/l)	Blood pressure (mmHg)	Smoking (%)	Serum cholesterol (mmol/l)	Blood pressure (mmHg)
1972	52	6.9	149/92	10	6.8	153/92
1977	44	6.5	143/89	10	6.4	141/86
1982	36	6.3	145/87	15	6.1	141/85
1987	36	6.3	144/88	16	6.0	139/83
1992	32	5.9	142/85	17	5.6	135/80
1997	31	5.7	140/84	16	5.6	133/80
2002	33	5.7	137/83	22	5.5	132/78
2007	31	5.4	138/83	18	5.2	134/78

Table 2. Mortality changes in North Karelia among 35-64 years aged men in 1970-2006 (per 100 000, age adjusted)

	Rate in 1969-1971	Rate in 2006	Change from 1969-1971 to 2006
All causes	1509	572	-62%
All cardiovascular	855	182	-79%
Coronary heart disease	672	103	-85%
All cancers	271	96	-65%
Lung cancers	147	30	-80%

Age-adjusted mortality rates of coronary heart disease in North Karelia and the whole of Finland among males aged 35-64 years from 1969 to 2006.

Further work is required to ascertain the contribution to these benefits of schools

programmes, taking account of (a) evidence of programme impact on child behaviour and (b) the extent to which healthy behaviour is sustained throughout the life course.

Theoretically the cost of school health promotion programmes could be minimal if there were modification of the existing curriculum, alteration to the school setting and sensitizing socialisation to health promotion messages. DECiPHER partners will elaborate the actual cost of modifying programmes.

7. Summary.

This note lays the foundations for developing the DECiPHER model to include a cost-benefit component of city investment in school education to promote health literacy and healthy behaviour. An initial schematic model suggests three routes to reducing the risk of CVD: increasing exercise, improving diet and sensitizing socialization to health messages. Evidence from a number of social scientific and medical studies indicates the principal routes. The next stage of developing DECiPHER is to combine estimates of impact for each segment of the pathways over the life course.

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