

Did you know?

In 1996, sons were 1.5 inches taller than fathers at age 45–54, while daughters were one inch taller than mothers.

The King Edward Memorial Fund

THE RENFREWSHIRE MEMORIAL TRUST TO KING EDWARD VII was founded in 1911 following the death of the king, to raise funds to support schemes for the prevention and treatment of tuberculosis. In the 1960s, the trustees gave their approval to a programme of research in the burghs of Renfrew and Paisley.

The aims of the mass radiography surveys carried out in Renfrew and Paisley were to ascertain the prevalence and incidence of tuberculosis over a 5 year period in two defined populations which were characteristic of west central Scotland, against the possibility that there might be some additional mass measure that could enhance eradication of the disease.

These aims coincided with the need to identify and measure the risks of dying from chronic diseases such as coronary artery disease, other cardiovascular diseases, cancers (particularly of the lung), and respiratory disease. All of these conditions have excess mortality rates in west central Scotland compared with the rest of Scotland, and in Scotland compared with England and Wales. ■



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Celebrating 30 years of the MIDSPAN studies

"I wanted to see a whole population. There was a healthy worker phenomenon, which means that if you characterize a working population you don't get the extremes of blood pressure or cholesterol or respiratory function. So you need the general public and so that was my first experiment, could I do the general population? And it really was a great adventure..."



Victor Hawthorne
in 1971

Victor Hawthorne

VICTOR HAWTHORNE founded the MIDSPAN studies in the 1960s, while working first as a chest physician and then senior lecturer in epidemiology and prevention at the University of Glasgow.

After the Renfrew/Paisley study he headed the Department of Epidemiology at the University of Michigan School of Public Health. He retired in 1991 to continue his work as an international epidemiologist.

Victor was one of the many ex-servicemen and women, 'in old tattered duffel coats', who entered medicine immediately after World War Two. In the 1950s he was working with the mass radiography service tackling the remaining and persistent pockets of tuberculosis in Scotland. Victor describes his involvement with the service, which he would eventually head, 'as the keystone of my career'. By the 1960s, the success



Charles Gillis in
the 1960s

of the campaign encouraged Victor and his colleagues to extend their gaze beyond tuberculosis to a wider range of chronic diseases. ■

Charles Gillis

PROFESSOR CHARLES GILLIS was the founder and Director of the West of Scotland Cancer Surveillance Unit, between 1972 and 2001, at Ruchill Hospital, Glasgow, where the MIDSPAN studies were also based, during his period as Chairman of the MIDSPAN Steering Committee from 1978–2001. ■



Mark Upton

DR MARK UPTON led the MIDSPAN Family Study (originally called FASTCARD) in 1996, while working as Wellcome Trust Clinical Epidemiology Fellow. He is now a GP in Stockton on Tees and remains the main investigator of respiratory aspects of the MIDSPAN Study. ■



Family Study logo

Tiree

The Tiree Study found that **blood pressures were higher on the island than on the mainland.** The difference is unexplained to this day.

Arriving on Tiree



Thank you to...

ALL THE PARTICIPANTS, STUDY WORKERS AND RESEARCHERS in the MIDSPAN studies. We would also like to thank local organizations and the many grant awarding bodies that have supported the studies over the years. ■

ISSUED ON THE OCCASION OF A CONFERENCE TO CELEBRATE 30 YEARS OF THE MIDSPAN STUDY, NOVEMBER 2005.

The MIDSPAN Studies are based in the Sections of General Practice & Primary Care and Public Health & Health Policy at the University of Glasgow.

For further information about any aspect of these studies, please contact

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Or visit our website at <http://www.gla.ac.uk/faculties/medicine/midspan/>

FOR OVER 30 YEARS, the MIDSPAN Studies have provided valuable information about health and disease in Renfrew, Paisley and the west of Scotland.



Professor Graham Watt

They are epidemiological studies, which means that they provide "the big picture", with every participant providing a small piece of a huge jigsaw, describing the patterns and causes of health and disease.

The studies have involved studying large numbers of people at the outset, and then following their records over many years to see who gets what, who doesn't and why. Studies like this get better with age.

The results are not only relevant in the west of Scotland. Because of the large numbers of participants (over 80% of people aged 45–64 in Renfrew and Paisley), the virtually complete follow-up and the basic features of the population – a post-industrial conurbation with very high levels of deprivation, cancer and heart disease – the results are relevant to similar populations in many parts of the world.

Missing the target

PERHAPS THE MOST important finding from the MIDSPAN study has been the observation that current **NHS guidelines for identifying people at high risk of Coronary Heart Disease** (based on information from the Framingham Study in the United States), are **much less effective in identifying people at high risk, who live in deprived areas, than they are at identifying such people in more affluent areas.** The consequence is that **life saving and life-prolonging treatments, such as cholesterol-lowering drugs, are prescribed less often in deprived areas than they should be** (based on need), with the effect of widening inequalities in health. ■

This short report describes the principal features and results of the MIDSPAN studies, with much more information available via the website. I hope you will agree it covers a wealth of information and experience and is to be celebrated, not only as a treasure chest of scientific findings and continuing research opportunities, but also as testimony to the good-heartedness and community spirit of the people of west central Scotland. ■

Professor Graham Watt
Chair of the MIDSPAN Steering Committee, University of Glasgow

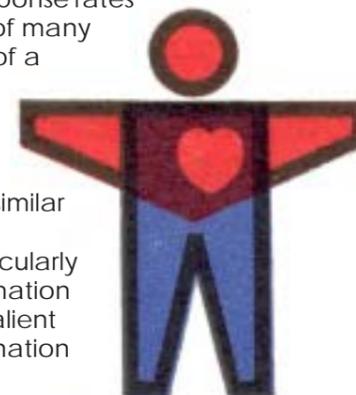
Strengths of the MIDSPAN Studies

MAJOR STRENGTHS OF THE MIDSPAN STUDIES were the **very large numbers of participants** and the **inclusion of women**, at a time when other UK epidemiological studies included only men. An unplanned consequence of high response rates in a defined area was the inclusion of many **married couples** and the possibility of a subsequent family study. **Goodwill, study loyalty, and the support of local family doctors** made this a reality. Having **occupational as well as general population cohorts** in a similar location was another strength. The Collaborative Study data were particularly suited for life course studies as information

was collected on socioeconomic factors in childhood and early adulthood. A salient feature of the whole enterprise has been continued **follow-up** either by re-examination or more comprehensively, by **linkage to NHS mortality, cancer, and hospital discharge registers.** MIDSPAN has continued to attract the interest and participation of researchers from many disciplines and centres. ■

Did you know?

The measurement most strongly associated with **premature mortality** from all causes was **lung function** – in effect, how hard a person could blow into a tube.



Original MIDSPAN logo

The studies...

The **MAIN STUDY (1964–1968)** involved 13 factories throughout central Scotland and 4000 people aged 15 to 70, of whom more than 500 were women.

The MIDSPAN team then visited the Hebridean island of **TIREE (1967)** to record the health details of all 532 residents over the age of 15, plus 230 of their relatives who had settled on the mainland

The **COLLABORATIVE STUDY (1970–73)** is an occupational cohort study of 6022 men and 1006 women recruited from 27 workplaces throughout the central belt of Scotland. About 50% of participants were re-studied in 1977

The **RENFREW/PAISLEY STUDY (1972–76)** is a general population study of 15,402 middle-aged men and women, comprising 80% of residents aged 45-64 living in Renfrew and Paisley. About 50% of participants were re-studied in 1977–79. 200 surviving participants also took part in the PREVAIL Study of healthy ageing from 1999.

The **FAMILY STUDY (1996)** involved 1040 sons and 1298 daughters aged 30–59, whose parents both took part in the original Renfrew/Paisley Study. 556 surviving parents provided blood samples for DNA analysis in the TWOGEN study (2002). In 2003, daughters provided information on the birth weights of 1800 infants – grandchildren of the original cohort.

What did it involve?

All studies involved a similar cardiorespiratory screening examination, with long term follow up, initially via death certificates, but then via cancer registrations and since 1996, via records of hospital admissions. All information is held confidentially, and analysed anonymously.

Scientific papers

By October 2005, the MIDSPAN studies had resulted in 150 scientific papers, including 18 in the *British Medical Journal* and nine in the *Lancet* – see the MIDSPAN website (<http://www.gla.ac.uk/faculties/medicine/midspan/>).

TOP AUTHORS

George Davey Smith	78 papers
Carole Hart	74 papers
Victor Hawthorne	68 papers
David Hole	50 papers
Charles Gillis	28 papers
Graham Watt	28 papers

Who paid for it?

The original Renfrew/Paisley study was funded by the Renfrewshire King Edward Memorial Fund, and the Scottish Home and Health Department. We are also glad to acknowledge support from the Western Region Hospital Board, Argyll & Clyde and Greater Glasgow Health Boards, Chest, Heart and Stroke Association, Scottish Chief Scientist Office, NHS Cardiovascular R&D programme, Wellcome Trust and Economic and Social Research Council. ■

Results

▶ BASELINE RESULTS

Compared with previous studies in the UK, men in the Renfrew/Paisley study had shorter stature, higher blood pressure, a higher proportion of smokers continuing to smoke, lower forced expiratory volume in one second (FEV1), more angina (Rose questionnaire), higher breathlessness on effort, and more chronic bronchitis. Compared with men, Renfrew/Paisley women had higher plasma cholesterol, lower FEV1, fewer ever smokers, and higher breathlessness on effort.

▶ CAUSES OF DEATH

By March 2004, 75% of men and 61% of women in the Renfrew/Paisley Study had died. Commonest causes of death were:

MEN

Coronary heart disease	34%
Cancer	29%
Stroke	11%
Respiratory disease	10%

WOMEN

Cancer	28%
Coronary heart disease	26%
Stroke	16%
Respiratory	9%

▶ STROKE

MIDSPAN has contributed to the understanding of stroke epidemiology, particularly in women, for whom there was very little previous information.

Risk factors were related to stroke in women and men in the same manner, which means that preventive programmes can be targeted at women in the same way as in men. In particular former smokers had similar stroke risks to never smokers, emphasising the importance of smoking cessation.

▶ CORONARY HEART DISEASE

CHD mortality rates were quadrupled in people with two or more of Rose questionnaire angina, a previous history of CHD, and/or ECG evidence of ischaemia. Risk–mortality relationships were similar in men and women, with women having coronary events 15 years later than men.

Results

▶ CANCER

The prevalence of respiratory symptoms increased with the number of cigarettes smoked and smokers had a mortality rate twice that of never smokers. Compared with other cohorts, the lung cancer rates in Renfrew and Paisley were higher at all levels of cigarette smoking.

▶ EXCEPTIONS TO THE RULE

Obese smokers are easy to recognise as people at high risk of CHD, but the study also showed many “unwarranted survivors” (i.e. obese smokers who did not get CHD). Usually, they had more favourable profiles of less recognisable risk factors, such as blood pressure or cholesterol. “Unexplained” CHD deaths, in thin, non-smokers were rare, and usually associated with raised levels of other risk factors. These “exceptions to the rule” are interesting, but should not detract from the overall message that the differences in survival between obese smokers and thin non-smokers were dramatic.

▶ RESPIRATORY DISEASE

Impaired lung function, measured directly by blowing into a tube, was the major clinical indicator of mortality risk in men and women for a wide range of diseases – including in life-long non-smokers. Conventional measures of chronic obstructive pulmonary disease (COPD), such as the MRC chronic bronchitis questionnaire, hospital admissions and death certificates, under-estimated this major contribution of respiratory impairment to poor health and premature mortality.

▶ PASSIVE SMOKING

Using linked data for people living at the same address, the Renfrew/Paisley cohort was the first UK study to show the deleterious effects of passive smoking, in terms of reduced FEV1, increased respiratory symptoms and poorer lung cancer and CHD mortality among passive smokers. The Family Study has also provided the first evidence that maternal smoking combines with personal smoking to increase airflow limitation and chronic obstructive pulmonary disease risk in adult offspring.

▶ HEIGHT

Taller people and those with good lung function had less CHD. Leg length was the component of height most strongly associated with CHD risk. Height and FEV1 may both be markers of childhood exposures that influence growth and CHD risk. Greater height was associated with reduced risk of CHD, stroke, and respiratory death. Lung function was an important mediator of the association between height and cardiorespiratory mortality.

Did you know?

Lower birthweight of offspring was associated with **higher parental mortality** from all causes and from cardiovascular disease.

Results

▶ WHAT PEOPLE THINK ABOUT HEART DISEASE

Over a quarter of adult sons and daughters have had the experience of a parent dying from coronary heart disease. The general public differs from health professionals in their perception of a family history of heart disease. For example, working class men required a greater number of relatives to be affected before they perceive that they have a family history. Participants did not always regard themselves as being at risk if they felt different from affected relatives. CHD was perceived to be a male disease, with women remaining invisible in discourses about heart disease. CHD was also seen by some as a ‘good way to go’, compared with a painful and lingering death.

▶ SOCIAL CLASS AND LIFE COURSE

Health and risk of premature death were determined by socio-economic factors acting throughout life. Mortality from stroke and stomach cancer was particularly dependent on social circumstances in childhood, whereas mortality from CHD and respiratory disease was dependent on social circumstances in both adulthood and childhood. Mortality from accidents and violence and from lung cancer was mainly dependent on factors acting in adulthood. Socio-economic and behavioural factors produced a cumulative influence on cardiovascular disease mortality risk. Childhood and adulthood social class, smoking, and heavy drinking explained about two thirds of the population burden of cardiovascular disease mortality in the west of Scotland.

▶ HOSPITAL USE

79% of people experienced at least one acute hospital stay. The proportions of cohort members requiring admission increased over time but the growth in acute admissions was even higher (suggesting increasing rates of multiple admission). For non-survivors, 42% of all acute episodes (55% of bed days) took place during the 12 months before death. Thus, despite the desirability of alternative settings of care for the chronically ill and dying, a high proportion of hospital bed days were required near to the time of death.

▶ OBESITY

Studies of the health effects of obesity are complicated by the effects of smoking and illness on body weight. In the Renfrew/Paisley Study, however, after excluding people who had ever smoked and who died within 5 years, there was a clear association between raised body mass index and mortality. Development of diabetes was strongly related to increasing BMI, even in the mildly overweight. In 1996, about a fifth of adult sons and daughters were obese – a 102% increase in men and a 13% increase in women, compared with parents 20 years earlier. ■

Did you know?

Drinkers of over 35 units per week had **double the risk of stroke mortality** compared with non-drinkers.

Did you know?

The prevalences of **chronic sputum production** and **cigarette smoking** have fallen between the generations, while the prevalences of **hay fever** and **atopic asthma** trebled and doubled respectively.