Methods: All centres undertaking diagnostic cardiac catheterisation, in England and Wales during 10 years 1990–99, were invited to participate in the study. Each centre reported numbers of procedures performed each month and details of complications and deaths, as they occurred. Complication and death rates were calculated for the main diagnostic procedures and for each participating hospital and time trends in complications were examined.

Results: Forty one cardiac centres contributed and reported 211 645 diagnostic procedures in adults and 7582 paediatric procedures. The majority (89%) of diagnostic catheter studies in adults were left heart studies with coronary arteriography. The overall complication rate for adult procedures was 7.4, with 0.7 deaths per 1000. The complication rate for paediatric procedures was similar but mortality rather higher; 7.1 and 1.4 per 1000 respectively. Complication rates varied between centres but with no significant association with caseload. Death rates were higher in low volume centres. The most common complications were arrhythmias (36%) but ischaemic complications accounted for more deaths (42%). Time trends across the decade showed both complication and mortality rates decreasing; from 9.5 to 4.5 and from 1.4 to 0.4 per 1000 respectively.

Conclusion: Complication rates of diagnostic catheterisation are low but neither negligible nor irreducible. Although voluntary audit of cardiac catheter complications is useful there is clear need for a more formal reporting system in all cardiac catheter laboratories.

AGE PERIOD COHORT ANALYSIS OF TRENDS IN CARDIOVASCULAR RISK FACTORS IN VORARLBERG HEALTH MONITORING AND PROMOTION PROGRAMME 1985–2002

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Background: The extent to which variations in cardiovascular disease relate to clinical intervention or secular declines in risk factors merits increasing attention but few datasets are powerful enough and with sufficient follow up to assess this question.

Objectives: To evaluate secular or birth cohort related trends in cardiovascular risk factors, body mass index (BMI), total cholesterol, systemic blood pressure, glucose, and smoking pattern between 1985 and 2002.

Design: Prospective cohort follow up and linkage study.

Participants and Setting: First visit measurements in over 167 000 adult men and women (mean age 42 (SD 15) years) screened for cardiovascular risk factors as part of a standardised primary care assessment in Vorarlberg province of Austria.

Methodology: Data were categorised in five year bands according to year of birth (ranging from 1900–1984) and chronological age (from 20–84 years). Risk factor levels at 10th, 50th, and 90th percentiles were estimated for each band.

Results: BMI showed a small but systematic increase over time in both men and women in all age groups and percentiles; for instance 50th percentile value at age 45–49 years was 25.70 for men born between 1940–44 and 26.20 for those born between 1950–54. For women the comparable values were 24.24 compared with 25.81. Total serum cholesterol was trending downwards at all ages in men and women, 50th percentile value at age 45–49 was 230 mg/dl for men born between 1940–44 and 226 mg/dl for those born between 1950–54. For women the comparable values were 217 mg/dl and 212 mg/dl respectively. Plasma glucose level also increased consistently, 50th percentile value for males 45–49 years was 86 mg/dl, rising to 95 mg/dl and for females 85 mg/dl rising to 90 mg/dl. There was no alteration in systemic blood pressure values. Smoking rates deceased over time in males aged 25–44 years and those over 60 years but were comparable in middle aged groups. In women, rates fell over time only in 25–34 year olds.

Conclusions: This very large primary care based dataset confirms secular changes in risk factor patterns unrelated to subsequent treatment and provides support for the view that population level trends are contributing significantly to the variations in coronary heart disease rates seen to date. The contrast to the findings in blood pressure trends seen in other recent studies may be explained by methodological considerations including digit preference or may reflect a real halt in previously beneficial trends, given the rising overweight and obesity patterns.

SECULAR TRENDS IN HEART RATE IN YOUNG ADULTS FROM 1949–2004: ANALYSES OF CROSS SECTIONAL STUDIES

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Background: Increased heart rate in early adulthood is a predictor of later cardiovascular risk. Heart rate may therefore have potential for monitoring and predicting cardiovascular health, and, in addition, is straightforward to measure. However, to date, secular changes in heart rate have not been reported.

Objective: To investigate secular trends in resting heart rate in young adults.

Design, Setting, and Participants: A series of cross sectional samples of first year undergraduates (5562) aged 16–24 years who attended Queen's University Belfast from 1949–2004, and underwent health checks at the university health centre.

Main Outcome Measure: Resting heart rate.

Results: Crude aggregate data for 1949–59 showed a decline in heart rate in males and females over this time. Using data from 1975 onwards, both unadjusted and fully adjusted analyses—controlling for age, BMI, height, smoking, and physical activity—provided strong evidence of a U-shaped association between heart rate and year of entry to university in both sexes ($p<0.001$): heart rate initially declined and then increased from the mid-1980s to 2004. Using all available data demonstrated that in male students heart rate declined from a high of 78.4 beats per minute (bpm) in 1949–54 to 68.9 in the early 1980s, thereafter rising to 74.1 bpm in 2001–04. For females, the corresponding heart rates were 78.9, 68.5, and 77.0 bpm. Physical activity levels in both sexes dropped from 1975–2004 ($p<0.01$).

Conclusions: The decline in heart rate in young adults occurring as least 50 years ago and continuing until the 1980s is consistent with other favourable findings on cardiovascular health in this age group, and with the long term declines in cardiovascular mortality. The more recent surge in heart rate, which could not be accounted for by decreasing physical activity, and widely reported increases in overweight in young individuals prompts concern that recent long term cardiovascular health gains may be reversed. Measurement of heart rate in population health surveys would provide a simple tool to assist in monitoring cardiovascular health.

Policy, implementation, and evaluation I

THE EFFECT OF THE LEGISLATIVE BAN ON SMOKING AND SMOKING RATES AMONG BAR WORKERS

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Background: Bar worker health has gained a lot of attention in Ireland due to the ban on smoking in workplaces including bars. It is expected that the smoking ban had a positive effect on the smoking behaviour of Irish bar workers. There is concern about the widening gap in mortality and morbidity between the managerial and professional social classes, and those with lower levels of education. As bar workers are a heterogeneous group comprising of owners, managers, part and full time staff (including students), social class and educational status can vary widely. Although the overall number of smokers from 1999–2003 (SLAN, 2003) has decreased, this is not occurring at the same rate for males and females across all sectors in society or for all age groups.

Objectives: To determine the prevalence of smoking among bar workers in Cork City. To examine the influence of social class, education, sex, and age on smoking behaviour in Irish bar workers. To determine if the legislative ban has had an effect on smoking behaviour and the role of social class, education, sex, and age.

Method: A follow up study on bar workers (random, n=129) and catering staff (control) from Cork City was conducted before (January–March 2004) and one year after (January–March 2005) the implementation of Europe's first legislative ban on work place smoking. The study is part of a larger national study on bar workers' health, including participants from Cork, Dublin, Galway, and N Ireland. Data obtained