

# A **Blueprint** for Health Records Research in Scotland

## APPENDIX 1

### Examples of Record Linkage Research

#### **The West of Scotland Coronary Prevention Study<sup>1</sup>**

The West of Scotland Coronary Prevention Study (WOSCOPS) was begun in the 1989 to find out whether taking pravastatin (a cholesterol lowering drug) could reduce the chances of getting heart disease.

6595 men with high cholesterol and no history of heart attack were randomised to pravastatin or placebo and followed for about 5 years. The initial results from WOSCOPS showed that pravastatin reduced the risk of heart disease by 21% and were published in the New England Journal of Medicine in 1995.

Subsequently the survivors were followed up using electronic record linkage. Their personal identifiers were linked to hospital discharge records, the cancer registry and General Register Office death records.

The analysis showed that five years of treatment with pravastatin led to an ongoing reduction in coronary events for the next 10 years. The result is confounded by statin use in the intervening years post trial. As this was not accounted for, it may be that pravastatin is even more effective than these results suggest. It may also be that continuing treatment beyond five years would increase the benefit. This study is the largest with the longest follow up to demonstrate the safety and benefit of status.

#### **Accurately defining the Dangers of Passive Smoking<sup>2</sup>**

Makay *et al* (2010) used electronic records to determine whether the ban on smoking in public places in Scotland influenced the rate of hospital admissions for childhood asthma. Routine hospital administrative data were compared from before and after legislation was introduced in 2006. Before the legislation, admissions for asthma had been increasing. After implementation of the legislation, there was a mean reduction in the rate of admissions of 18.2% per year.

The reduction was apparent among both preschool and school-age children in Scotland. This work shows that the passing of smoke-free legislation in 2006 has reduced the rate of respiratory disease in populations other than those with occupational exposure to environmental tobacco smoke.

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<sup>1</sup> New England Journal of Medicine 2007; 357; 1477-86

<sup>2</sup> New England Journal of Medicine 2010; 363; 1139-45

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### **Metformin: a new approach to cancer treatment and prevention?**<sup>3</sup>

Record linkage databases were used to investigate the properties of metformin, a drug widely given to patients with type 2 diabetes. By linking a diabetes clinical information system and a database of dispensed prescriptions it was found that taking metformin may be associated with reduced risk of cancer in patients with type 2 diabetes. This research, published in 2006, has led to global interest in the potential use of metformin in the prevention and treatment of cancer. The original Scottish research has been the stimulus of over 20 clinical trials in the US and elsewhere looking at the use of a drug used to treat diabetes for over 50 years for cancer patients.

### **Time of birth and patient safety**<sup>4</sup>

Data from the Scottish morbidity records, Stillbirth and Infant Death Survey, and birth certificate database of live births in Scotland, were linked to determine the effect of time and day of birth on the risk of neonatal death at term.

Researchers studied 1 039 560 live births between 1985 and 2004 and counted all neonatal deaths in the first four weeks of life that were unrelated to congenital abnormality. In particular they looked at a subgroup of deaths ascribed to lack of oxygen during delivery.

They concluded that delivering an infant outside the normal working week was associated with an increased risk of neonatal death at term ascribed to intrapartum anoxia: 4.2 per 10 000 vs 5.6 per 10 000. Even after excluding elective caesarean deliveries the attributable fraction of neonatal deaths ascribed to lack of oxygen associated with delivery out of hours was 26%.

### **Association of benzodiazepines with road traffic accidents**<sup>5</sup>

Barbone *et al* linked accident data from Tayside Police with a database of dispensed prescriptions in Tayside to investigate whether there is an association between road-traffic accidents and the use of psychoactive drugs. The community health index was allocated to all prescription items and to all road-traffic accident records as a common identifier. The exposure was calculated to antidepressants, benzodiazepines and other psychoactive drugs.

For each case the odds of having an accident while exposed to one of the drugs were compared with the odds of having an accident while unexposed. Researchers found that

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<sup>3</sup> BMJ 2005; 330; 1304-05

<sup>4</sup> BMJ 2010; 341; c3498

<sup>5</sup> The Lancet 1998; 352; 1331-1336

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users of anxiolytic benzodiazepines were at significantly increased risk of road-traffic accidents and that this risk

increased with increased dose. In addition zopiclone (which acts in the same way) is also associated with an increased risk of accidents.

The authors calculated that if users of anxiolytic benzodiazepines did not drive, 1577 accidents would be prevented and 110 lives saved in the UK every year. This led to a change in the label for anxiolytics in relation to their use and driving.

### **Record linkage used to investigate cancer scare<sup>6</sup>**

Recently concern has been raised about a new, synthetic form of insulin called insulin glargine (or Lantus insulin). A German study suggested a possible link between use of insulin glargine and increased cancer risk. So SHIP researchers used record linkage to determine whether patients taking insulin glargine have a greater cancer risk than those on other types of insulin.

The team used SCI-DC, a national clinical diabetes database, to find the records of people who had had any insulin therapy. The relevant records were linked to cancer registry data. They compared people taking insulin glargine only, insulin glargine with other insulins and other insulins only. The incidence of all cancers and cancers at specific sites (breast, colon, prostate, pancreas, lung) was compared among the three groups.

Overall, there was no difference in cancer incidence between those receiving any insulin glargine and those not receiving insulin glargine. But it does seem that there are more cases of cancer in general and breast cancer in particular, among people who take insulin glargine only. These data are likely to be explained by prior differences between patients who take insulin glargine alone versus those who don't rather than to be due to the insulin glargine itself. Nonetheless the data warrant further inquiry and a larger European wide study is underway at present.

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<sup>6</sup> Diabetologia. 2009 ;52(9):1755-65