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(Accepted 1 October 1993)

Appendix

Details of the statistical analysis

CAPTURE-RECAPTURE METHODS

An estimate of the total population (N_T) in a simple two source analysis uses information on the relative frequency of duplicate cases (N) and cases in only the first sample (N_1) or the second (N_2) in relation to the number of unobserved cases where $N_T \times (N_1 = N_2) / N$. The assumption that the captures are independently made is crucial in allowing this relation to be determined. In multiple sources recapture analysis the increased information on different multiple captures allows this assumption to be tested and allows models which incorporate heterogeneity among subgroups in the population. These models are analysed with standard log-linear modelling programs,¹⁸ in this case GLIM3.77.¹⁹

MODELLING PROCEDURE

The model allowed for all interactions between subgroups. First order interactions were included for dependencies between subgroups and individual sources and for dependencies between sources. The related higher order interactions were not included. Owing to the special position of the homeless mental health team in relation to mental illness the basic model was extended to include all interdependencies between this source and all combinations of subgroups.

ESTIMATION PROCEDURE

Interactions in the fitted model (apart from those with the homeless mental health team) were removed as being unnecessary if the effect was less than four times its standard error. This was a harsh criterion deliberately used to avoid "overfitting" in such a large model, which would have been likely to inflate the overall population estimate. The retained interactions between sources and subgroups (see text) were strong ($\chi^2=243.6$, $df=8$, $P<0.0001$); the between source dependencies, which were present even after allowing for this subgroup heterogeneity of capture, were by contrast weak and although significant ($\chi^2=25.9$, $df=2$, $P<0.001$) were excluded from the final, conservative model, again to avoid any overfitting. Had they been retained in the estimation procedure the overall population estimate would have been 5% higher but of similar structure. The final model scaled deviance was acceptably close to its degrees of freedom ($\chi^2=338.7$, $df=481$), suggesting a good but not overly close fit and a total population estimate of 3293.

Lifeline Wales: experience with a computerised kidney donor registry

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BMJ 1994;308:30-1

In the United Kingdom about 60 people per million of the population develop chronic renal failure each year and are accepted on to dialysis programmes, but barely half will receive kidney transplants.¹ The shortage of donors is aggravated by the reluctance of relatives to consent to donation in one third of cases.^{2,3} Relatives seem unable to give consent when the donor's wishes are not known. To address this problem various attempts have been made within the United Kingdom to record the wishes of potential donors. Computer registries can retain such information long term and can operate as an extension to the donor card scheme without a change in the law. Lifeline Wales is the largest such scheme in the United Kingdom, and this paper describes its operation over the past six years.

Methods and results

In 1983 a computerised organ donor registry was set up at Manchester University.⁴ Local intensive care units checked the database using personal computers and modems whenever they had in their care a potential organ donor whose wishes were not known. In 1986 the scheme was extended to Wales with funding from the Welsh Office and the Kidney Research Unit for Wales Foundation. Special bilingual donor cards were sent to 1.2 million Welsh homes in 1986, with regular distributions since. The card had a small tear off portion identical with the standard donor card, and this was retained by the person. The other part was returned to the registry office of Lifeline Wales, where personal details were transferred to magnetic tape and sent to Manchester for entry into the computer.

In 1990 the Manchester computer ceased operating and the Lifeline Wales database was transferred to Cardiff. Because the computer terminals in the 15 intensive care units in Wales were seldom used they

Registrations with Lifeline Wales every six months from 1987 to 1993

were withdrawn from service in 1990. Staff now check the database by consulting the scheme's transplant coordinators (WR and JH), who have their own terminal. The donor card was also modified to include a question on blood donation.

One year after launching Lifeline Wales 100 000 potential donors had been registered. The accrual of names has been more gradual since then, reaching 290 640 by January 1993 (figure). About 17 000 new names continue to be added annually. Before 1986 there were about 35 donors each year. Two years after the launch this had increased to 44 donors (representing 20 donors per million of the population), which was the highest regional procurement rate in the United Kingdom. However, only 38 donors were found during 1991 and also 1992. Fourteen people who had registered with Lifeline Wales subsequently died and became organ donors. In none of these cases was the registry consulted because the person who died had been carrying a donor card and his or her views were already known.

Comment

Whether Lifeline Wales has influenced rates of organ donation in Wales is difficult to say because Wales has traditionally scored well: in 1991, for

example, it had the third highest donation rate in the 16 regions of the United Kingdom.⁵ Although nearly 300 000 people have registered, this represents just 14% of the adult population and is somewhat less than the proportion (20%) of people who carry donor cards in the United Kingdom. The recording of attitudes to blood donation has been more successful. Most registrants agreed to be blood donors. In 1992, 2176 names were offered to the blood transfusion service, which subsequently obtained 2181 extra units of blood.

Over the next 10 years the donor registry is likely to enlarge by another 150 000 names. At present, how-

ever, it is too small to have a substantial effect on the numbers of donors.

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(Accepted 12 August 1993)

Use of a telephone advice line in an accident and emergency department

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BMJ 1994;308:31

Members of the public often telephone accident and emergency departments for medical advice. The British Association for Accident and Emergency Medicine has guidelines for handling these inquiries to ensure quality of service.¹ We studied this department's advice line to determine who requests advice, why advice is sought, the quality of advice given, and callers' satisfaction.

Subjects, methods, and results

Telephone calls to our department requesting advice are tape recorded and dealt with by a trained nurse (of at least six months' experience) or a doctor as an additional duty. During the study (19 October to 4 December 1992) we recorded the caller's and patient's names; their relationship; the sex, age, and medical problem of the patient; and the address and telephone number of the caller. Patients were advised to attend our department or their general practitioner or were given some other advice. All callers were then telephoned or sent a questionnaire within 72 hours to find out what action they had taken and how satisfied they had been with the advice. If not fully satisfied they were asked to give their reasons. All advice was assessed by the department's consultants and registrar (CVE).

During the study 145 calls were made, 104 of which were followed up; 41 callers did not respond to a postal questionnaire. The 104 calls concerned 108 patients, half of whom were male; patients' ages ranged from 3 months to 86 years, and 39 were aged 5 years or less. Thirty four calls were made by the patient and 70 by someone else—chiefly mothers (39 calls), fathers (seven), partners (six), and friends (five). Seventy five callers were women and 29 men.

Details of 104 calls to accident and emergency department's telephone advice lines

Caller's relationship to patient	Patient's problem						
	Medical	Minor trauma	Overdose or ingestion	Gynaecological	Problems with plaster casts	Dental	Foreign body ingestion
Self	15	13		2	1	3	
Mother	9	19	7		2		3
Father	3	2	1				1
Partner or spouse	4	2					
Grandmother	1	1	1				
Sister		1	1				
Friend	3	2					
Employer or school	1	1	1				
Other	1	3					
Total	37	44	11	2	3	3	4

Forty six calls concerned paediatric patients (14 years or younger) and dealt with minor trauma (22 calls), medical problems (12), accidental ingestion of drugs or other substances (eight), and ingestion or insertion of foreign bodies (four). The 58 calls concerning adult patients were mostly about medical problems (25) and minor trauma (22), with overdose, problems with plaster casts, and dental problems each having three calls (table).

Fifteen callers were advised to attend their general practitioner and 12 complied; 67 were advised to attend this department and 65 complied; and 22 were given other advice, with which they all complied. Overall, 99 callers complied with the advice, which was given in 78 (75%) calls by a nurse and in 26 (25%) by a doctor. The advice was appropriate in 102 cases. Two callers were given inappropriate advice: one patient with a painful filling was told to attend this department rather than a dentist, and a mother was advised to bring her child who had ingested harmless amounts of antifungal cream to the department.

One hundred callers were fully satisfied with the advice. Two men were partially satisfied because they did not consider it necessary to attend the department as appropriately advised after having been bitten by a pet rat in one case and for dizziness after a head injury in the other. Two mothers whose young children had ingested harmless amounts of drugs were dissatisfied with the advice given; one was inappropriately advised to attend as described in the previous paragraph and the other was correctly advised to take no action.

Comment

There is a public demand for medical advice available over the telephone. The National Audit Office encourages advice lines as a means of encouraging appropriate attendances at accident and emergency departments.² Swedish studies of such a service seem encouraging,³ but American research is less enthusiastic.^{4,5} Our service requires no additional staff and uses a half speed tape recorder costing £80.00 and one 90 minute tape a month to record about 70 calls. We conclude that our advice line is a low cost, safe service that provides public access to health information and encourages consultation with a doctor as appropriate.

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(Accepted 12 August 1993)