Trends in the methods used for suicide in Northern Ireland

P S Curran, D Lester

Accepted 7 November 1990.

SUMMARY
As domestic gas was made less toxic in Northern Ireland during the period 1960–1988, it was used less often for suicide. During the same period, as car ownership increased, the use of car exhaust for suicide increased in popularity without there being a corresponding decrease in the use of other methods. Part of the temporal variation in suicide rates in Northern Ireland may be accounted for by the relative availability of lethal methods for suicide.

INTRODUCTION
Curran, Finlay, and McGarry\(^1\) documented that the suicide rate in Northern Ireland rose gradually in the 1960s, dropped in the early 1970s, and since then rose steadily up to 1986. The rise in recent years was most marked for males aged 25 to 34 years of age.

They also examined the trends in the methods of suicide in Northern Ireland over the same time. The use of domestic gas decreased from 1960 to 1986, until by 1986 it was the least favoured method. The use of poisons and drugs increased during the 1960s, dropped in the early 1970s and has risen since then, becoming by 1986 the second most favoured method. Hanging, by 1986 the most favoured method for suicide, showed a similar trend. Suicide by firearms remained steady until the mid 1970s, after which the rate has risen steadily.

Various explanations have been proposed for the changing suicide rates over time in a nation, including changing economic\(^2\) or social\(^3\) conditions, and for Northern Ireland civil disorders. Clarke and Lester\(^4\) have speculated on the role that the availability of lethal methods might play in the temporal variation of suicide rates by particular methods, even to the point of affecting the overall suicide rate. For example, it is now generally accepted that the decline in the English suicide rate in the 1960s and early 1970s was due to the detoxification of domestic gas as the gas industry switched from coal gas (which contains carbon monoxide) to natural gas (which does not). Not only did the suicide rate using domestic gas decline to virtually zero, but the overall suicide rate declined by about one-third.
Clarke and Lester documented the effects of the detoxification of domestic gas, the detoxification of car exhaust emissions (by the introduction of emission controls), the ownership of firearms and the availability of cars on the suicide rates of Australia, England and Wales, the Netherlands, Scotland, and the USA, both over time and over regions.4 They concluded that the availability of a method for suicide certainly affects the use of that method and, on occasions, seems to have an impact on the overall suicide rate, particularly if the method studied is a popular one for suicide (as was domestic gas in England and the use of firearms in the USA).

From 1964 to 1988 there were 2168 suicides in Northern Ireland, of which 702 were due to solid and liquid poisons, 395 to hanging, 365 to drowning, 256 to firearms or explosives, 209 to domestic gas, 111 to other gas (mainly car exhaust), 38 to cutting or piercing instruments, 31 to jumping and 61 to other methods. It is possible to obtain rough estimates of the availability of three of these methods for suicide: domestic gas, car exhaust, and firearms. The present study explores the relationship between these measures of availability and the use of those methods for suicide.

For domestic gas, the major detoxification was between 1964 and 1968 (personal communication from the Department of Environmental Health). From 1960–1964 the carbon monoxide content ranged from 18 percent to 22 percent. (It is difficult to be precise here, since each region had its own gas company). Between 1964 and 1968, the range for carbon monoxide content was 12 percent to 20 percent, and from 1968 the range was only four to seven percent. Thus, domestic gas was certainly less toxic after 1968. For car exhaust emissions, the ownership of cars in Northern Ireland increased steadily from 1964 to 1968, from 0.13 to 0.28 cars per capita. For firearm ownership, no direct measures are available. Cook has suggested two indirect indices of firearm ownership, the percentage of homicides committed with firearms and the accidental death rates from firearms.5 He argued that if more guns were available in a community, both of these indices would be higher.

METHODS

Data on the deaths each year in Northern Ireland were obtained from the Department of Health and Social Services (General Register Office). Data on suicides due to car exhaust fumes are not specifically listed, but rather for "gases not in domestic use", of which the vast majority are from car exhausts. Data on car ownership were obtained from the Department of Finance and Personnel, and information on domestic gas supplies from the Department of Environmental Health.

RESULTS

Domestic gas

From 1964 to 1968, the average number of suicides using domestic gas each year in Northern Ireland was 21.0; from 1969 to 1973 the average was 5.8 per year (Table I). The suicide rate from domestic gas dropped from 2.06 per 100,000 per year in 1964 (the peak year during the period) to 0.39 in 1973 and 0.19 in 1987. The last supply of coal gas in Northern Ireland stopped in 1988,
and the suicide rate using domestic gas dropped to zero that year. It is clear that the availability of toxic domestic gas did have an impact on the suicide rate using domestic gas. A critical question is whether people switched to alternative methods for suicide once domestic gas became less toxic and accounted for fewer suicides.

For the ten year period from 1964 to 1973 the slope of the linear regression line for the domestic gas suicide rate was negative (−0.19), while the slope of the linear regression line for suicide by all other methods was also negative (−0.05). While the suicide rate by domestic gas decreased during this period, so did the suicide rate by all other methods. Thus there is no evidence up to 1973 that as people used domestic gas less often for suicide they switched to other methods.

### TABLE I

| Suicide rates by domestic gas and other methods |
|------------------------------------------------|
| Suicide rate (per 100,000) | Domestic gas | Other methods |
|---------------------------|--------------|---------------|
| 1964                      | 2.06         | 3.36          |
| 1965                      | 1.16         | 3.61          |
| 1966                      | 1.55         | 3.97          |
| 1967                      | 1.48         | 5.10          |
| 1968                      | 0.87         | 5.73          |
| 1969                      | 0.56         | 5.49          |
| 1970                      | 0.26         | 3.67          |
| 1971                      | 0.26         | 3.18          |
| 1972                      | 0.39         | 2.66          |
| 1973                      | 0.39         | 4.18          |

### Car exhaust

Car ownership increased steadily from 1964 to 1988 (Table II). The suicide rate using car exhaust also increased from 0.14 to 0.82 per 100,000 per year from 1964 to 1988. The slope of the linear regression line for the 25 year period was 0.024 (Pearson correlation coefficient 0.77). Thus the suicide rate using car exhaust increased significantly over the 25 year period. The suicide rate by all methods other than car exhaust also rose over the period, with a linear regression slope coefficient of 0.10 (Pearson correlation coefficient 0.46). Again there was no evidence of switching; as car exhaust became more popular as a method for suicide other methods did not become less popular.

### Firearms

The suicide rate using firearms and explosives rose during the period from 0.27 per 100,000 per year to a peak of 2.15 in 1988 (Table III). In contrast the percentage of homicides using firearms and explosives peaked in 1974 (96.2% of all homicides), as did the accidental death rate from firearms (0.79 per 100,000 per year). The correlation between the
percentage of homicides using firearms/explosives and the suicide rate using firearms/explosives was not significantly different from zero ($r = 0.16$, df = 19), and neither was that between the accidental death rate from firearms and the suicide rate using firearms/explosives ($r = -0.30$, df = 23).

**DISCUSSION**

This study indicates that the suicide rate in Northern Ireland was affected by the availability of car exhaust and toxic domestic gas. When domestic gas was detoxified the use of that method for suicide declined without there being an increase in the use of other methods for suicide. Similarly, as motor cars became more available, the use of car exhaust fumes for suicide became more common without there being a reduction in the popularity of other methods for suicide. Thus there is no evidence that people switched methods for suicide as the availability of other methods changed. It may be that the increasing use of car exhaust fumes for suicides during the period studied was related to the decreasing toxicity of domestic gas and that some of those who might have used domestic gas for suicide may have switched to car exhaust fumes instead. It should also be noted that suicide by means of domestic gas was not as common a method for suicide during this period as it was in England and Wales. In Northern Ireland, domestic gas suicides accounted for only 9·6 per cent of suicides from 1964 to 1988, and car exhaust fumes accounted for only 5·1 per cent of the suicides.

The use of firearms for suicide did not fit this pattern. For this analysis, indirect measures of firearm availability had to be used, such as the percentage of homicides using firearms/explosives and the accidental death rate from firearms. Had direct measures of firearm availability been available the results might have been different. The availability of firearms to security forces and of firearms and explosives to those opposing the security forces make the indirect measures of firearms availability less valid for Northern Ireland.

These results parallel those found in the USA, where increasing car availability was associated with an increase in the use of car exhaust for suicide, and the detoxification of domestic gas was associated with a reduction in its use for

---

**TABLE III**

Deaths due to firearms

| Year | Suicide rate (per 100,000) by firearms | Accidental death rate by firearms | Homicides by firearms % |
|------|---------------------------------------|----------------------------------|-------------------------|
| 1964 | 0.274                                 | 0.48                             | —                       |
| 1965 | 0.408                                 | 0.14                             | —                       |
| 1966 | 0.404                                 | 0.20                             | —                       |
| 1967 | 0.402                                 | 0.20                             | —                       |
| 1968 | 0.333                                 | 0.20                             | 28.6                    |
| 1969 | 0.264                                 | 0.07                             | 30.0                    |
| 1970 | 0.394                                 | 0.20                             | 57.9                    |
| 1971 | 0.325                                 | 0.39                             | 53.8                    |
| 1972 | 0.325                                 | 0.39                             | 81.8                    |
| 1973 | 0.588                                 | 0.72                             | 85.2                    |
| 1974 | 0.262                                 | 0.79                             | 96.2                    |
| 1975 | 0.394                                 | 0.53                             | 92.6                    |
| 1976 | 0.722                                 | 0.66                             | 95.5                    |
| 1977 | 0.328                                 | 0.33                             | 81.5                    |
| 1978 | 0.591                                 | 0.59                             | 81.0                    |
| 1979 | 0.523                                 | 0.33                             | 70.1                    |
| 1980 | 0.652                                 | 0.33                             | 76.9                    |
| 1981 | 0.715                                 | 0.07                             | 79.5                    |
| 1982 | 0.910                                 | 0.20                             | 82.3                    |
| 1983 | 0.972                                 | 0.45                             | 88.4                    |
| 1984 | 0.397                                 | 0.45                             | 76.8                    |
| 1985 | 1.220                                 | 0.06                             | 60.3                    |
| 1986 | 1.532                                 | 0.13                             | 70.4                    |
| 1987 | 0.352                                 | 0.25                             | 74.4                    |
| 1988 | 2.154                                 | 0.13                             | 76.9                    |

— missing data.
suicide. The failure to find similar associations for firearms also parallels the USA results, although similar indirect measures also had to be used in that country. Some methods for suicide remain steadily available, such as hanging and drowning. The present results suggest that some of the variability of suicide rates over time can be accounted for by changes in the availability of methods.

REFERENCES
1. Curran PS, Finlay RJ, McGarry PJ. Trends in suicide: N. Ireland 1960–1986. *Irish J Psychol Med* 1988; 5: 98-102.
2. Platt S. Unemployment and suicidal behaviour: a review of literature. *Soc Sci Med* 1984; 19: 93-115.
3. Stack S. The effects of female participation in the labor force on suicide. *Sociol Forum* 1987; 2: 257-77.
4. Clarke RV, Lester D. *Suicide: closing the exits*. New York: Springer Verlag, 1989.
5. Cook PJ. The role of firearms in violent crime. In: Wolfgang ME, Weiner NA, eds. *Criminal violence*. Beverly Hills, California: Sage, 1982: 236-91.
6. Lester D. Accidental death rates and suicide. *Activitas Nervosa Superior* 1990; 32: 130-1.