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Living close to industry

EDITOR,—Ian Harvey describes some of the difficulties of determining whether living close to industry harms people's health.¹ Scottish studies that colleagues and I carried out during the 1970s and 1980s used several techniques for sharpening the focus on this type of epidemiology of small areas.^{2,3}

Firstly, when studying air pollution from local industries, beware overreliance on traditional fixed monitoring sites, which are usually too few and inappropriately located. Concentrations of air pollutants from a fume stack change dramatically within short distances, so that "precise" results from such monitoring sites can lead to misclassification of exposed and non-exposed populations; furthermore, such techniques rarely enable one industry's local pollution pattern to be distinguished from that of another. Keynes's dictum about economics—that it is better to be approximately right than precisely wrong—is also true in environmental epidemiology, and approximate patterns of pollution (notably of metals) can be obtained by use of low technology samplers, including soils and moss bags.⁴ Such samplers are inexpensive, are independent of power supplies, are ignored by vandals, provide a detailed and extensive network of sampling sites where data on pollution are most relevant, can sample for long enough for seasonal variations to be discerned, and can assess past pollution patterns. Low technology samplers indicate the approximate locations of pollution hot spots (and hence the most exposed populations); thereafter, the precise details of toxicological relevance may be obtained from high technology equipment installed where most appropriate.

Next, beware the circular area around a source of pollution. This is much favoured by armchair epidemiologists to define the so called exposed population, but its simple geometry ignores fundamental realities determining exposure to pollution: the directions of winds associated with the pollution; local topography; the height of the fume stack; the consequent extent of the "umbrella effect"; and the pattern gleaned from observations of physicians, environmental health officers, residents, farmers, and veterinarians. Such information permits even the most funds starved epidemiologists to demarcate exposed neighbourhoods reasonably realistically and a priori.⁵ This pilot epidemiology may persuade local authorities to fund follow up studies.

Thirdly, apply Hill's criteria for causation, but be aware that the realities on which these guidelines operate may need probing. For example, a factory that has operated for decades may change its processes or raw materials radically, thereby causing an unsuspected release of pollutants with new toxicological potentials.

Finally, public health practitioners should respond constructively to residents' concerns and to requests for advice or collaboration from environmental health departments. Too often have such opportunities for benefiting the public's health been missed.

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Monitoring effects of deprivation on health

EDITOR,—Recent reports have restated the link between socioeconomic deprivation and experience of poor health.^{1,2} Children are sensitive indicators of deprivation, and their health experience reflects the health inequalities in the wider adult population.³ In our district we have been looking at ways of monitoring the effects of deprivation on the community through the experiences of children, using data from the routine contract minimum dataset.

There were 4037 hospital admissions among 41 152 children (aged 0-15) resident in Kensington, Chelsea and Westminster Health Commissioning Agency from April 1993 to March 1994. The rate of admission was 98.1/1000 children, ranging from 68/1000 to 118/1000 in six localities. Further work to examine these differences looked at admission rates in children under 16 in each of 44 electoral wards within our district. The admission rates varied more than threefold, ranging from 43.5/1000 children to 153.4/1000. When mapped these variations seemed to be related to the variation in the Jarman score for each ward.⁴ This was confirmed when the data were plotted and supported by a highly significant correlation coefficient ($r=0.68$, 95% confidence interval 0.48 to 0.81; figure).

Admission rates per 1000 children aged 0-15 plotted against Jarman scores for 44 electoral wards in London, April 1993 to March 1994

These results show the wide variations in admission rates in children and that these correlate closely with deprivation. This finding may be due to increased use of health care in deprived areas because of social factors or to actual increased morbidity in the child population. Regardless of which point of view is taken, children in deprived areas clearly receive hospital care more frequently than those in other areas, with the attendant disruption of family life and consumption of health resources.

Health authorities need to target deprived areas to examine these trends in more detail. The use of hospital discharge data linked to other sources of routine data presents an opportunity to develop routine ways of monitoring the effects of deprivation

on morbidity and complements the use of mortality indicators for similar purposes.⁵

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Teenage pregnancy and deprivation

EDITOR,—Philip McLoone and F A Boddy highlight the differences in mortality experienced by residents of areas characterised by different degrees of deprivation.¹ Using the same classification as part of a needs assessment of teenage pregnancy (Scottish needs assessment programme), we have studied conception rates among teenagers and the outcome of these pregnancies in relation to deprivation.

The conception rate among teenagers in Scotland rose from 40/1000 teenagers in 1983 to 51/1000 in 1991, falling to 46/1000 in 1993. Data about teenage conceptions (births, miscarriages, and terminations) were obtained from the Scottish morbidity records (SMR2 (maternity hospital discharge records)). Anonymised information about terminations of pregnancy was also obtained from the morbidity records (SMR1 (general hospital discharge records)). The age of a young woman at conception was calculated by subtracting the estimated gestation at the end of pregnancy from her age at delivery and then adding two weeks. Where length of gestation was missing it was assumed to be 40 weeks for births and 12 weeks for pregnancies ending in miscarriage. The deprivation category was derived from the post-code with Carstairs and Morris's 1991 classification of deprivation for Scotland and was assigned to 98.7% of the teenage pregnancies. Population totals of teenage girls by age were taken from data in the 1991 census.

During the three years 1990-92, 33 275 teenage pregnancies were recorded. At all ages (13-19 years) the pregnancy rate increased with deprivation, with a fourfold to fivefold difference in the rate between the women living in deprivation category 1 (most affluent) and those in deprivation category 7 (most deprived) (table). The outcome of pregnancy also varied. The proportions of pregnancies that resulted in the birth of a baby were 36% (260/731) in women in deprivation category 1

Teenage pregnancy rates per 1000 teenagers by age and deprivation category, Scotland 1990-92

Deprivation category	Age (years)				
	13-15	16	17	18	19
1*	3	17	24	31	37
2	5	26	40	53	61
3	7	35	53	67	72
4	9	49	75	94	103
5	12	68	95	116	123
6	11	66	104	122	137
7†	15	88	137	172	170

*Most affluent. †Most deprived.