CORRESPONDENCE

Smoking in Pregnancy

SIR,—It seems likely that smokers, in general, lead a markedly different life-style from non-smokers, and that the life-style of the smoking mother during pregnancy may be less supportive of the developing foetus. So it is proper to be cautious in interpreting the association between maternal smoking and perinatal death.

In this context, Professor Burch (*Nature*, **245**, 277; 1973) notes the evidence, and it is strong, that the low-birth-weight babies of smoking mothers are healthier than those of non-smokers. He seems to suggest that this, too, is evidence against the hypothesis that maternal smoking causes perinatal deaths. Is it not more reasonable to interpret it as merely evidence that maternal smoking is not so harmful to the infant as other causes of low birth weight? In general these causes are very powerfully associated with perinatal death: infants weighing 2,500 g and less at birth are sixteen times more likely to suffer perinatal death than those weighing more than 2,500 g (ref. 1).

Suppose that maternal cigarette smoking causes a weight loss of 5% in each baby: and suppose that each such baby has a 25% greater chance of suffering perinatal death than it would have if the mother had not smoked. Then consider that class of babies weighing less than 2,500 g and born to smoking mothers. About half of them are in that class for no reason other than that, having been born to smokers, their weight has been reduced, thus transferring them from the heavier class to the lighter one. *Ex hypothesi*, their probability of perinatal death is 25% greater than it would have been if their mother had not smoked. But it is far less than that of the other babies in that class—those who would have been in that class whether their mothers had smoked or not.

In short, the effect of smoking is to augment that class with some relatively healthy babies. So it seems to me that the observed interaction between maternal smoking and birth weight, far from being mysterious, is exactly what would have been expected on the hypothesis that, besides depressing birth weight, maternal smoking has a rather weak causal association with perinatal death.

One would expect a similar interaction between birth weight and any factor if that factor both depressed birth weight and slightly increased the probability of perinatal death.

Let us consider social class, twinning and race. Babies of low social class have higher perinatal mortality rates and lower birth weights than babies in the upper social classes. For weights greater than 3,000 g there is a steady increase in perinatal mortality as social class declines. In the weight class 2,501 to 3,000 g, however, there is a steady decline in mortality rate as social class declines. And in the weight classes less than 2,500 g, there is further evidence that babies born to upper-class mothers are not the healthiest[2].

Twins have higher perinatal mortality rates and lower mean birth weights than singletons. However, low-birth-weight twins have a better chance of survival than low-birth-weight singletons[3–6].

In the United States non-white babies have lower mean birth weights and a higher perinatal mortality rate than whites. Nevertheless, among low-birth-weight babies, the non-whites have lower neonatal mortality rates than the whites[7]. In regard to stillbirth rates there is also an interaction (Table 1).

Each of these interactions, viewed in isolation, may be perplexing at first sight. But when seen in conjunction with others, there seems a common-sense explanation behind all of them. I suggest that it applies to maternal cigarette smoking too.

Yours faithfully,

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Table 1 Stillbirths (Late Foetal Deaths)/Live Births by Birth Weight and Colour*

	Birth weight (g)								
	1,000 or less	1,001–	1,501–	2,000–	2,501–	3,001–	3,501–	4,001–	4,501–5,000
White	0.655	0.251	0.103	0.030	0.008	0.004	0.003	0.004	0.011
Non-white	0.620	0.264	0.107	0.035	0.010	0.006	0.007	0.013	0.030

* Calculated from official United States data[8,9].

1 Butler, N. R., and Bonham, D. G., *Perinatal Mortality*, 133 (Livingstone, London, 1963).
2 Butler, N. R., and Bonham, D. G., *Perinatal Mortality*, 139 (Livingstone, London, 1963).
3 Ferguson, W. F., *Obstet. Gynec., N.Y.*, **23**, 861 (1964).
4 Hendricks, C. H., *Obstet. Gynec., N.Y.*, **27**, 47 (1966).
5 Gittelsohn, A. M., and Milham, S., *Br. J. prev. soc. Med.*, **19**, 8 (1965).
6 Butler, N. R., and Alberman, E. D., *Perinatal Problems*, 133 (Livingstone, London, 1969).
7 Shapiro, S., Schlesinger, E. R., and Nesbitt, R. E. L., *Infant and Perinatal Mortality in the U.S.: National Center for Health Statistics*, Series 3, **4**, 21 (United States Department of Health, Education and Welfare, Washington, DC, 1965).
8 *Vital Statistics of the United States for 1963, Natality*, **1** (United States Department of Health, Education and Welfare, Washington, DC, 1964).
9 *ibid., Mortality*, **2**, A (1965).

Obituary

Professor E. A. Stewardson

PROFESSOR E. A. STEWARDSON, Emeritus Professor of Physics, Leicester University, who died on August 24, 1973, at the age of 68, was born in 1904, and educated at Hawarden County School, North Wales. He graduated from the University of Liverpool in 1924 with first class honours in physics and took his MSc in 1925. After holding appointments at the University of Liverpool and the National Central University, Chungking, he came to Leicester University College in 1940 and became the first Professor of Physics in 1946. He retired in 1969.

Professor Stewardson's main interest was what nowadays would be called 'atomic physics' rather than 'modern physics' and a great deal of his research was spent on soft X-ray spectroscopy. Over the years he developed considerable experimental expertise in this field and this was to prove a valuable asset in the latter part of his scientific career.

Professor Stewardson was also a keen amateur astronomer and when, in the late 1950s, it was decided that part of the UK space research programme