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consumption, a result of reduced maternal food consumption.

Our statement that our results are in conflict with Cerklewski's regarding the effects of zinc supplementation on the growth-depressive effects of lead is not inappropriate. The conflict we refer to is that fetal growth could not be significantly increased by zinc supplementation in our study,<sup>2</sup> while Dr. Cerklewski observed an almost complete reversal of growth retardation with zinc supplementation.<sup>4</sup>

Finally the data we refer to as forthcoming concern the effects of zinc supplementation on maternal and fetal accumulation of lead and essential trace elements. This work is not yet completed.

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### Smoking, weight gain, and nutrition during pregnancy

To the Editors:

Meyer<sup>1,2</sup> has subjected my work<sup>3,4</sup> and that of Davies and associates<sup>5</sup> to detailed scrutiny and dismissed our observations that cigarette smoking can lead to decreased maternal weight gain during pregnancy. Therefore, it is more than a little ironic that the most recent data from the Ontario Study that she uses in this controversy strongly support a conclusion quite the opposite of hers, repeating past history in the Ontario Perinatal Mortality Study, which initially concluded, "There was no indication, either, of higher perinatal mortality among infants born to mothers who smoked."<sup>6</sup>

Comprehensive theories of the mechanisms for the toxicity of maternal cigarette smoking on the fetus must account for the markedly stronger effects with lower social status. For instance, when we scrutinized the data of the 1958 British Perinatal Mortality Survey, we found that the excess perinatal mortality with smoking in those of upper social status (classes I and II) was 12.9% but was over three times as high (44.0%) in classes IV and V.<sup>7</sup> Other smaller studies have consistently shown a differential effect of smoking by social status.

Interpretation of the data in Meyer's Table IIIA<sup>2</sup> appears straightforward. At term and with the assumption that the dichotomy of weight gain between those gaining more or less than 20 pounds is an undistorted index of the distribution of weight gains, smoking is unrelated to weight gain in private patients; heavy smoking is very strongly related to poor weight gain in public patients, and light and moderate smoking is moderately related (I suspect that the relationships would emerge more clearly if the data were age standardized, since lighter smokers are likely to be younger than control

Table I. Perinatal mortality related to smoking

	Perinatal deaths/1,000			Risk, relative to nonsmokers	
	Packs of cigarettes/day			Packs of cigarettes/day	
	0	<1	1+	<1	1+
Private patients	20.8	25.6	27.1	1.25	1.30
Public patients	29.8	35.8	52.1	1.20	1.75

subjects and heavier smokers, older.) In any case, as will be clear from the following data, it is the outcome for the heavy smokers that requires further explanation.

In order to test the statistical significance of the relationship of cigarette smoking to weight gain among public patients, the numbers of subjects in each cell are needed. In the absence of a response to my repeated requests to Meyer, I have had to estimate numbers of subjects and have assumed that 35% were delivered at 38 to 39 weeks' gestation and the remainder, at 40 weeks or later. If those smoking under one pack a day averaged eight cigarettes per day and those smoking a pack or more smoked, on the average, 24 cigarettes per day, for public patients the  $\chi^2$  for linear trend, according to the method described in Armitage's text, was 8.15 ( $p < 0.01$ ), and the total  $\chi^2$  was 8.46. The  $\chi^2$  for the departure from linear trend was 0.01. Thus, among public patients, there was a highly significant relationship of the proportion of women gaining less than 20 pounds at term with increasing amounts of smoking.

The data of Table I were taken from Fig. 8 of Meyer and associates,<sup>2</sup> based on the same Ontario study. Neither the devastating mortality among infants of public patients smoking one or more packs of cigarettes daily nor the relative sparing of infants of the private heavy smokers is accounted for by the patterns of either the distribution of low birth weight or placental complications (see Table II).<sup>8</sup>

Is it possible that the private patients smoking one or more packs a day may have protected their offspring by sustaining weight gain?

Our recent finding<sup>9</sup> in a poor, public clinic population that nutritional supplementation reversed the lowered birth weight associated with heavy smoking gives direct evidence that smoking can interact with nutrition in affecting the growth of the fetus. These results strengthen the possibility that nutrition may, in part, be mediating the differential effects of cigarette smoking across social class on both birth weight and perinatal mortality.

Thus, deficient weight gain during pregnancy does occur in smoking, particularly with descending social status, parallel with effects on birth weight and perinatal mortality. Also, there is now direct evidence that