



FIGURE: Percentage of women breast-feeding at three months by smoking rate.

confounders, we used discriminant function analysis. Low birth weight, mother's smoking rate, and reported illness of infant were selected in the analysis as independent variables. Parity, educational level, partner's occupation (ranked by the Congalton seven-point scale) and reported lack of sleep were not selected in the analysis as independent predictors of feeding status.

This study was small, *post hoc* and included an incomplete set of the factors which conceivably might confound an association between maternal smoking and a shortened duration of breast-feeding. However, the study was prospective, confirmed self-reported smoking by biochemical testing, and minimized potential confounders by comparing current smokers with former smokers.

The association of smoking and the early cessation of breast-feeding was dose-dependent, was independent of measures of social class and infant well-being, and was in the right time order.

Evidence exists of several biological mechanisms by which smoking may influence breast-feeding. Women who smoke after birth have lower circulating levels of prolactin<sup>6</sup> and, in animal studies, nicotine has been shown to interfere with the suckling-induced release of prolactin.<sup>7</sup> Nicotine is known to inhibit lipogenesis strongly,<sup>8</sup> including presumably the production of breast milk. One study has reported that smokers' infants are more likely to suffer from colic,<sup>9</sup> presumably nicotine-induced, so fretfulness and "poor feeding" by the infant may also contribute to the early cessation of breast-feeding by women who smoke.

We conclude that maternal smoking is a major cause of the early cessation of breast-feeding, and a factor of particular concern at a time when smoking rates among young women are rising.<sup>10</sup> (It is interesting to speculate on the extent to which the social-class differences in the duration of breast-feeding that were alluded to by Baghurst<sup>1</sup> and Hitchcock and Coy<sup>11</sup> are attributable to differences in smoking rates.)

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### New cigarette-packet warnings: are they getting through?

To the Editor: In October 1985, the Federal Minister of Health, Dr Blewett, announced on behalf of all state and federal health ministers that an agreement had been reached for new, more explicit warnings of the health risks of smoking to be placed on all cigarette packets. The new warning became effective in Victoria on September 1, 1986, from which date all cigarette packets that are so must carry one of the following labels prominent on the face of the packet: "Warning — Smoking causes lung cancer"; "Warning — Smoking causes heart disease"; "Warning — Smoking causes lung damage"; and "Warning — Smoking reduces fitness". As a subscript, each warning carries the statement "Health Authority Warning". The final set of warnings that was adopted was somewhat

of a compromise, as public-health officials reportedly had recommended including as well "Smoking kills" and "Smoking is addictive". The new warnings are presented in larger print and they replaced the long-standing "Warning — Smoking is a Health Hazard".

Since most cigarette advertisements depict packets of cigarettes, the new warnings are seen not only on packets but also on advertisements for them. In order to comply with the deadline, both packets and advertisements that bore the new warnings started to appear several months before September 1, 1987.

The results of two household surveys of adult (16 years of age and more) Victorians that sought to determine their degree of knowledge of the current cigarette-packet warnings are reported here. As a baseline, the first of the two surveys was conducted on a sample of 582 persons in September and October 1986, after the new labelling regulations had been announced but nearly a year before they were to come into force. The second survey was conducted in September and October 1987 on 1154 persons shortly after the introduction of the new labelling provisions. The survey was carried out by a large market research company by means of methods that have been described previously.<sup>1</sup>

Each person was asked the following open-ended question: "As far as you know, what do the health warnings on cigarette packets say?" as part of more general surveys on smoking which were designed to monitor the effects of the Quit Campaign in Victoria.<sup>2,3</sup>

The major findings are presented in Table 1 in which it can be seen that, in both survey years, 86% of respondents knew at least one health

Table 1: Knowledge of health warnings on cigarette packets before (1986) and after (1987) change in warnings

Warning statement	Percentage giving response			
	Total		Smokers only	
	1986	1987	1986	1987
Pre-1987 warning "Health hazard"	83%	70%	92%	62%
Warnings from September 1987				
"Lung cancer"	2%	27%	1%	51%
"Reduces fitness"	0	15%	0	33%
"Heart disease"	2%	15%	0	32%
"Damages lungs"	0	7%	0	17%
Product information 1986 and 1987				
Statement of tar content	2%	1%	3%	2%
Other responses				
"Causes cancer"	1%	5%	2%	7%
Other	2%	3%	4%	3%
Total giving at least one warning	86%	86%	97%	97%

warning and, among smokers in particular, 97% of respondents were able to provide the text of a health warning. Table 1 also shows that smokers tended to be the most knowledgeable. Whereas, over all, in 1986, 83% of respondents stated correctly that "health hazard" was the warning, among smokers 92% of persons were correct about this. Yet, in 1987, when "health hazard" had been superseded, 70% of persons over all still mentioned it; among smokers, only 62% of respondents said that "health hazard" was the current warning. (In a sense, this may have been accurate for smokers who still were using old stock with old packaging.) As expected, virtually no one specifically mentioned the new wording of the warnings in 1986.

However, in the 1987 survey, which was only a few weeks after the new warnings came into

force, many people were able to recall the warning unaided. For every new warning, the recall of smokers exceeded the over-all proportion that could recall a warning: for "lung cancer" it was 51% of smokers; for "reduces fitness", 33% of smokers; for "heart disease", 32% of smokers; and for "damages lungs", 17% of smokers. In 1987, 5% of respondents over all and 7% of the smokers mentioned "cancer" rather than lung cancer specifically, and a few gave other answers that were inaccurate.

By voluntary agreement with the tobacco industry, product information about the tar, nicotine and carbon monoxide content of cigarettes has been printed on the sides of cigarette packets for several years. However, very few persons mentioned this as a health warning.

The fact that lung cancer was by far the most

commonly-identified new warning is probably due to the previously-high salience of lung cancer as a smoking-related disease.<sup>1</sup> Another influence may have been a very vivid antismoking advertisement that was screened on Victorian television shortly before the survey.<sup>2</sup> The advertisement ("Coroner") was designed to attach a highly negative emotional significance to the packet warning "Smoking Causes Lung Cancer". A similar advertisement featured the heart-disease warning.

It was possible to see if the intention to give up smoking were related to the knowledge of warnings by cross-tabulating the knowledge of warnings with a question on smokers' estimates of how likely they were to give up smoking in the next three months. As seen in Table 2, the mention of "lung cancer" and "reducing fitness" were associated with an intention to give up smoking, but the mention of "heart disease" and of "damages lungs" were not. Table 2 also shows a trend, which did not reach statistical significance, of an association between the intention to quit smoking and the number of health warnings that were recalled.

Table 2: Knowledge of new health warnings in 1987 related to intention to give up smoking

Warning	Intention	
	Likely to quit (n = 139)	Unlikely to quit (n = 174)
Item correct		
"Causes lung cancer"	58%	46%
"Reduces fitness"	40%	28%
"Causes heart disease"	32%	31%
"Damages lungs"	19%	16%
Number correct		
None	21%	30%
One	26%	28%
Two	34%	29%
Three	16%	12%
Four	3%	1%
One or more	76%	70%

\*Chi-squared test;  $P < 0.05$  for association between warning mentioned and likelihood of quitting.

These data provide an early indication that the new health warnings are getting through, particularly to smokers. They also suggest that a knowledge of the warnings may be associated with an intention to quit. Defined as a subjective probability of action,<sup>4</sup> this measure has been shown to be predictive of actual quitting in an Australian prospective study.<sup>3</sup> Therefore, it appears that the introduction of the health warning on cigarette packets is a useful adjunct to the over-all public-health programme to reduce smoking. However, it is presumably important that supplementary advertising or other measures be used to maintain the impact of the warnings over time.

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