To the Editor.—Regarding the article by Dr Hankinson and colleagues on tubal ligation, hysterectomy, and risk of ovarian cancer, one possible mechanism not mentioned by the authors is that some infectious agent, probably a virus, is being prevented from reaching the ovaries by surgical closure of the route from the vagina to the ovaries. Also noted in their study was a somewhat lessened risk if the partner used condoms, again an argument for an infectious cause. Ascending bacterial infections commonly cause endometritis and salpingitis; surely viruses go where bacteria do not fear to tread. The association of Burkitt's lymphoma with the Epstein-Barr virus, cervical cancer with the human papillomavirus, and Kaposi's sarcoma with the human immunodeficiency virus lend at least some credence to the oncogenic virus theory. A virus inserting itself by mistake in the wrong sequence of DNA or RNA could plausibly cause the production of a tumor cell.

Chris Wahlberg, MD
Austin, Tex


To the Editor.—Dr Hankinson and colleagues have reported that tubal ligation, and perhaps hysterectomy, may substantially reduce risk of ovarian cancer. How this risk reduction might be mediated is unknown, and various mechanisms have been proposed.

There have been inconclusive reports on a "posttubal sterilization syndrome," affecting blood supply, ovulation, steroid production by the ovaries, and menstrual regularity. Moreover, tubal sterilization might prevent contact of the ovary with fluid from the uterus cavity carrying carcino genes, such as talcum powder. In addition, the retrograde menstruation associated with intact fallopian tubes has been linked with salpingitis, endometriosis, and possibly systemic lupus erythematosus; thus, menstrual debris might be a carcinogen. Another possible mechanism to consider is the antitumor action of general anesthetic agents. For example, one study of these agents demonstrated increased production of tumor necrosis factor during their administration, which was four to five times greater than in controls. In another study, halothane potentiated the antitumor activity of interferon gamma. Tubal ligations performed on patients who have just delivered are usually performed under epidural anesthesia, but tubal ligations not associated with pregnancy are performed under general anesthesia; the procedure may last for 30 minutes or more. The duration of general anesthesia during hysterectomy is even longer.

Therefore, it would be worthwhile to see if reduced risk of ovarian cancer might be associated with other surgical procedures performed under general anesthesia, such as tonsillectomy or appendectomy. Such a study might further define the biologic mechanism of the observed ovarian cancer risk reduction.

Steven Lehrer, MD
Mount Sinai Medical Center
New York, NY

In Reply.—In response to Dr Myers, we unfortunately do not have data on the type of hysterec tomy procedure performed (vaginal or abdominal). In response to Dr Silver, we asked women about their use of contraceptive foam or jelly on the first three study questionnaires. Only 6040 women reported use in 1976; reported use decreased on each subsequent questionnaire. In a multivariate analysis controlling for other ovarian cancer risk factors, the relative risk associated with use of foam or jelly was 0.60 with wide 95% confidence limits (0.24, 1.46); thus, further follow-up will be needed. As described in our article, we agree that a possible mechanism is the prevention of ovarian exposure by contaminants other than talc. We do not concur with Dr Wahberg's observation that our data indicate a protective effect of condom use; the relative risk, although less than 1.0, was not near statistical significance. Dr Whitmore makes an important point. The influence, if any, of tubal ligation on other outcomes should be assessed; these data may lend insight into possible biologic mechanisms and are crucial in making overall risk-benefit decisions. In our article, we do not suggest that tubal ligation be used specifically to reduce risk of ovarian cancers; rather,