

light bender and that the inequality seen in the images might result from its off center position. Now Roberts asks if the radio data are compatible with the model presented by Young and collaborators for a gravitational lens effect by an overlying galaxy and an overlying cluster of galaxies. The cluster would distort the simple effect of the single bright galaxy. The bright galaxy can serve as a slightly off center gravitational lens, thus accounting for some of the irregularities between the images. As Burke puts it, "A fortunate circumstance seems to have occurred," a very particular geometry. The cluster could serve as a diffuse gravitational lens operating something like a real glass lens, as Roberts puts it. In this very particular geometry only the single quasar A and B is yielding double images. The other objects in the radio map, which are part of the galaxy cluster C, D and E, are beyond the points or are too far away from the refracting galaxy to produce secondary images. That would explain most of the radio pictures.

But there is still the question of two jets on the main images A and B that do not seem to be equal to one another. It could be the prime variations in the original underlying single quasar (the object that is being imaged) are responsible for the different appearances of the two jets at different times. However, it could also be that the underlying quasar is a single quasar with an extended radio source associated with it and the geometry is such that only the quasar is doubled but the extended source is not so that the jet seen in A is part of the original quasar while the jet seen in B is something else. There might be no secondary image of the jet on A. The B jet might not be associated with the underlying quasar at all but with the refracting galaxy.

The off centered geometry means that the rays responsible for the B image come through the galaxy instead of around it and therefore the B jet might be part of the refracting galaxy and only appear to be associated with the B image of the underlying quasar. There are other questions. How close does the A jet actually come to the A quasar? Is it really related to it? Are there other secondary images: for example, secondary images of C and D made by a black hole in the center of the bright galaxy?

If future studies cause general agreement that this is gravitational lens effect, then its being done by a cluster of galaxies is very exciting. For decades astronomers have worried about the "missing mass," the mass of nonluminous matter in galaxies and clusters. By the laws of dynamics this mass has to be there, yet it is difficult to estimate. Study of geometry of gravitational lens effects could put some definite numbers on the amount of this mass and its role in the dynamics of galaxies and clusters. □

## Smoking alarm: Women in danger

An epidemic of lung cancer among women has now begun, says the 12th report on smoking prepared by the Department of Health, Education and Welfare. "This report is one of the most alarming in the series," Secretary of HEW Patricia Roberts Harris told Congress.

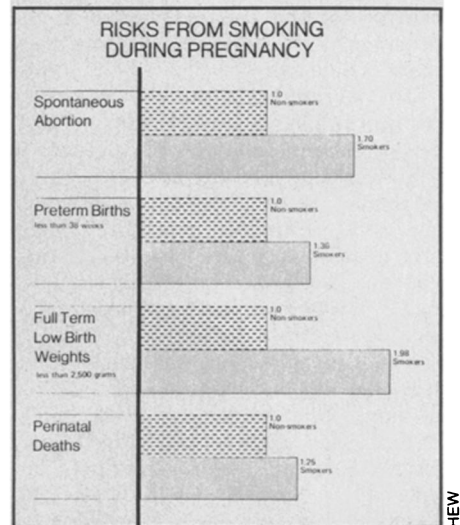
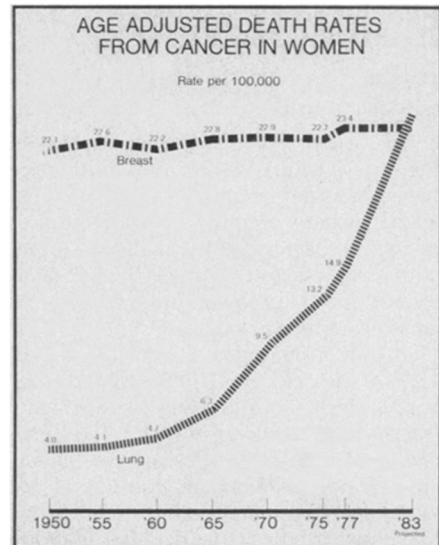
The report, released by Surgeon General Julius B. Richmond, focuses on cigarette smoking by women. Because smoking patterns of women have differed from those of men, the health effects of smoking were first documented for men. "The apparently lower susceptibility to smoking-related diseases among women smokers is an illusion reflecting the fact that women lagged one-quarter century behind men in their widespread use of cigarettes," the new report says.

In addition to examining incidence of disease, the report suggests that women may start smoking, continue to smoke, quit smoking and fail to quit smoking for somewhat different reasons than men do. Understanding such differences may be crucial to helping women, as well as men, avoid or stop smoking. Overall, smoking is declining in the United States, with the exception of the group of older adolescent and young adult women. More women than men aged 17 to 24 years of age now smoke. Finally, the report compiles a wide variety of evidence indicating that a woman's cigarette smoking has adverse effects on pregnancy and the health of her newborn baby.

Cigarette use by women became widespread during World War II, 25 to 30 years after widespread smoking by men. However, with each generation, smoking characteristics of the sexes have become more similar. For instance, the average age at which young women and young men begin to smoke regularly is now virtually identical. Richmond says that within three years lung cancer could overtake breast cancer as the cancer killing the most women.

Among the other findings of the report:

- The proportion of the population that smokes has declined both among men and women; the 1979 overall smoking prevalence of 32.2 percent is the lowest in at least 45 years.
- Death rates for women smokers increase with amount smoked; the mortality rate is 1.63 times higher for a two-pack-a-day smoker than for a nonsmoker.
- Employed women who smoke report more days lost from work due to illness and injury than do nonsmoking women.
- Women smokers have 2.5 to 5 times greater likelihood of developing lung cancer than do nonsmokers. Occupational exposures boost smoking-related diseases among women, as among men. Women smokers exposed to asbestos, for



instance, have an excess of lung cancer, and those exposed to cotton dust run higher risk of developing acute responses, bronchitic syndromes and reduced pulmonary functions than do nonsmokers.

- Female smokers have twice the prevalence of peptic ulcers as that observed in nonsmokers.

- Babies born to women who smoke during pregnancy average 200 grams (6 ounces) lighter than babies born to comparable nonsmokers; the more the woman smokes, the greater the reduction in birth weight. Up to 14 percent of the early deliveries for premature babies in the United States may be due to maternal smoking.

- Women are more likely than men to smoke in order to reduce stress.

- Men with advanced education and professional occupations have taken the lead in quitting smoking, but smoking prevalence remains high among women in administrative and managerial positions and in the health professions.

"Cigarette smoking, an early sign of woman's social emancipation, is now a major threat to her personal health and her ability to bear children," concludes Richmond. □