(The study follows:)

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MORTALITY WITH CONTRACEPTION AND INDUCED ABORTION

The following paper was written by Christopher Tietze, M.D., Associate Director, Bio-Medical Division, The Population Council. We are pleased to be able to present it here.

An unwanted pregnancy can be avoided by the use of contraception; an unwanted birth, by induced abortion. Since the ultimate objectives are identical, it is appropriate to compare the two approaches in terms of the risks to the woman's life associated with their use. This can be done by means of a statistical model, based on 100,000 women of reproductive age in fertile unions and exposed to the risk of pregnancy, assuming the following rates of mortality.

1. *Maternal Mortality* from complications of, or associated with, pregnancy, childbirth, and the puerperium, *excluding induced abortion: 20 deaths per 100,000 pregnancies.* This rate corresponds to the current level of maternal mortality in the white population in the United States. Official statistics of maternal mortality in the United States are based only on deaths attributed to complications of pregnancy, childbirth, and the puerperium. Thus defined, the rate of maternal mortality, excluding abortion, was 18 per 100,000 live births in 1964–66.

"Associated" deaths, related to pregnancy and childbirth, but attributed to other causes, e.g., heart disease, are not available for the United States. In England, where such associated deaths are identified and shown separately, they comprise about one-third of the number of deaths attributed to complications of pregnancy, childbirth, and the puerperium. Raising the maternal mortality rate for the U.S. by one-third brings it to 24 per 100,000 live births. Since the number of spontaneous fetal deaths appears to be on the order of one-sixth of all pregnancies and since very few deaths result from spontaneous abortion, an overall risk to life, excluding induced abortion, of 20 per 100,000 pregnancies would seem to be a reasonable approximation.

2. *Mortality* associated with *illegal abortion* induced out of hospital by persons without medical training: *100 deaths per 100,000 abortions.* This is a very rough estimate, and, almost certainly conservative, since it is lower than the maternal mortality rate, excluding abortion, per 100,000 live births for white women in the United States 25 years ago. Fortunately, the precise level of this rate is not relevant to the argument.

3. *Mortality* associated with *legal abortion* performed in hospital, at an early stage of gestation: *3 deaths per 100,000 abortions*, based on current statistics from eastern Europe (73 deaths among 2,567,000 legal abortions in Czechoslovakia, Hungary, and Slovenia, 1957–67).[1]

4. *Mortality* associated with *highly effective contraception: 3 deaths per 100,000 users per year*, based on the studies recently published in Great Britain, on *excess mortality from thromboembolic disease* attributable to the use of *oral contraceptives.* According to the report by Inman and Vessey,[2] the excess mortality from pulmonary embolism, cerebral thrombosis, and coronary thrombosis was 2.2 and 4.5 per 100,000 users for women 20–34 and 35–44 years of age, respectively. A weighted average of these two figures yields an annual excess risk to life of about 3 per 100,000 users.

Line 1 of Table 1 illustrates the reproductive behavior of a group of women neither using contraception nor having recourse to induced abortion.

The interval between two successive conceptions consists of three segments: the period of gestation (G), the anovulatory period following confinement (A), and the average number of ovulatory cycles required for a new conception to occur (O).[3] Of these three segments, the first (G) can be estimated within narrow limits as eight months, allowing for about 15 per cent spontaneous abortions. The anovulatory period (A) is known to vary widely, depending on the extent and average duration of breastfeeding. The present model allows for a range from 4 months without breastfeeding to 14 months with universal and prolonged breast-

[1] C. Tietze, "Abortion Laws and Abortion Practices in Europe," *Advances in Planned Parenthood (v. 5): Proceedings of the Seventh Annual Meeting of the American Association of Planned Parenthood Physicians, San Francisco, California. 9–10 April 1969. (In press.)*

[2] W. H. W. Inman and M. P. Vessey, "Investigation of Deaths From Pulmonary and Cerebral Thrombosis and Embolism in Women of Child-Bearing Age," *British Medical Journal*, 2: 193–199. April 27, 1968.

[3] R. G. Potter, "Birth Intervals: Structure and Change," *Population Studies*, 17: 155–166. November 1963.