Induced Abortion as a Contributing Factor in Maternal Mortality or Pregnancy-Related Death in Women

An important factor in the abortion debate is the claim made by important elements in the medical profession that legal abortion is safer than childbirth. For example, an article entitled "The Public Health Effects of Legal Abortion in the United States" is highlighted by the statement that "over the past decade, the replacement of unintended births and illegal abortions by legal abortions, has averted perhaps 1500 pregnancy-related deaths." More recently, the American College of Obstetricians and Gynecologists stated in a 1996 publication (without citing any authority in support) that "abortion is 25 times less likely to result in maternal death than carrying a pregnancy to term." A report issued by the Council of Scientific Affairs published in the Journal of the American Medical Association stated, "legal-abortion mortality between 1979 and 1985 was 0.6 deaths per 100,000 procedures, more than 10 times lower than the 9.1 maternal deaths per 100,000 live births between 1979 and 1986." The most recent pregnancy-related mortality figures published by the Centers for Disease Control (CDC) for 1987-1990 report mortality from legal abortion to be 0.63 per 100,000 induced abortions and a mortality rate from live births to be 5 per 100,000 live births which is about an 8 fold difference. "Many of the deaths where there is a live birth are most likely due to cesarean section." Consent or informational forms provided to women at abortion facilities also routinely make the claim that abortion is safer than childbirth. This mortality data, however questionable or inaccurate, is one of the major reasons for the claim that legal abortion is "safer" than childbirth for women.

Incidence of Death of Women from Legal Abortion According to CDC

According to CDC, the incidence of death of a woman from per 100,000 legal abortions varies considerably. CDC data for the period of 1972-87 reports that black women and women of other races are significantly more likely to die from legal abortion than white women. (2.9 vs. 0.9) Women aged 35-39 are significantly more likely to die from legal abortion than women 19 years of age or younger. (2.5 vs. 1.0) Gestational age at the time of abortion is an important variable ranging from 0.4 at 8 weeks or less, 0.8 at 9-10 weeks, 1.4 at 11-12 weeks, 2.9 at 13-15 weeks, 9.3 at 16-20 weeks, and 12.0 at 21 weeks or greater. The type of procedure also affects the reported incidence of death from legal abortion and ranges from 0.5 for suction and sharp curettage to 3.7 for evacuation (apparently D&E) to 7.1 for instillation procedures. Thus, the available CDC data indicates that the risk of death from abortions at 16-20 weeks or above or from instillation procedures is higher than the risk of death from live birth (5 per 100,000 live births). Also, there is evidence that a considerable number of deaths of women from legal abortion are not reported to the CDC or may be misclassified by the CDC. For example, the New York City Health Department, apparently relying on data likely to have been provided by the Alan Guttmacher Institute, reported that 146 women died from legal abortion between 1981-1984, yet CDC only reported 42 deaths from legal abortion during that same period. This would raise the overall incidence of death from legal abortion from 0.8 per 100,000 legal abortions as reported by CDC during this period, to 2.8 per 100,000 legal abortions.

Although the above cited statistics are those which are officially available, none of the data can be considered to provide an accurate assessment of pregnancy-induced mortality. Death certificates frequently do not provide a check-off box to state whether or not the woman was recently pregnant, and the doctor completing the death certificate may not know or may not choose to disclose the information. Data is provided by a system of voluntary reporting because of a lack of mandatory reporting. Different definitions of maternal death or pregnancy-related death may apply between the CDC and reporting states. Deaths, once reported, may also be misclassified for a variety of reasons. Thus, there is good reason to believe that deaths due to induced abor-
Further, in addition to the lack of accurate statistics, none of the reports take into account the effects of induced abortion increasing the risk of death in subsequent pregnancies. There is considerable scientific evidence to suggest that the following potentially life-threatening complications of pregnancy are statistically increased in pregnancies following induced abortion. These include: placenta previa, retained placenta, abruptio placentae and obstetric infection. There is substantial evidence that the effects of induced abortion contribute to an increase in the number of deaths due to a subsequent ruptured ectopic pregnancy. In addition, there are negative psychological effects of induced abortion, including suicide, which may result in an increased likelihood of a pregnancy-related death. Negative psychological effects also may lead to behavior, such as increased smoking, alcohol or drug use, which increase the mortality risk of women in pregnancy. Finally, carrying a pregnancy to term appears to have a protective effect on a subsequent pregnancy by lowering the risk of life-threatening complications, such as hypertensive disorders. Each of these conditions is discussed below.

**Complications of Pregnancy Related to a History of Induced Abortion**

According to the most recent published statistics of the Centers for Disease Control (CDC) for pregnancy-related deaths for 1987-1990, 168 U. S. women died from hemorrhage where there was a live birth, 28 died where there was a stillbirth, 17 died where the baby was undelivered and 40 died where the birth outcome was unknown. Among these deaths 19 were reported to have died as a result of placenta previa and 4 died from retained placenta and products of conception and 35 died from abruptio placentae.

Among other reasons of death from hemorraging in the instances listed above were uterine rupture/laceration (31), disseminated intravascular coagulation (37), uterine bleeding (67), and other or unspecified reasons (65).

### Placenta Previa

An epidemiological study of placenta previa in the U. S. which analyzed data from the National Hospital Discharge Survey for 1979 through 1987 and from the Retrospective Maternal Mortality Study (1979-1986) found that placenta previa complicated 4.8 per 1000 deliveries annually and was fatal in 0.03% of the cases. The risk of placenta previa increased with increasing age of women and was 1.3 times higher in black women compared to white women. Women with placenta previa were 13.8 times more likely to have abruptio placentae, 3.9 times more likely for cesarean delivery, 2.8 times more likely to have fetal malpresentation and 1.7 times more likely to have postpartum hemorrhage.

Researchers at Vanderbilt University Hospital reported up to a 7-15 fold increase in placenta previa after the legalization of induced abortion. If women were having their first delivery since a first trimester induced abortion the incidence was 4.6%, while the incidence of placenta previa among women with prior spontaneous abortion was 1.6%, compared to an overall incidence of 0.3%. A two to threefold increase in the incidence of placenta previa was also reported by Eastern Europe hospitals following liberalization of abortion in the 1960's. A British study found a statistical association with repeated uterine instrumentation, including D & C or evacuation of retained products of conception, but not for previous termination of pregnancy. Other studies have also found a statistically significant increase in placenta previa following induced abortion compared to other pregnancy outcomes.

More recent studies have also found an increased risk of placenta previa following abortion. A population-based case-control study conducted in Washington state using 1984-1987 birth certificate data of 486 white women with a pregnancy complicated by placenta previa compared to 1598 randomly selected controls without placenta previa found, after adjustment for confounding variables, including smoking, that there was an elevated risk of placenta previa of 1.28 with one or more prior induced abortions (1.28, 1.00-1.63, CI 95%) and 1.30 for one or more prior spontaneous abortions (1.30, 1.01-1.66).

Several studies have shown little or no risk of placenta previa from prior induced abortion. However, many of these studies did not control for confounding factors such as marital status, ethnicity, method of payment or order of induced abortion and thus may have reported spurious results.

### Retained Placenta

Retained placenta is a major risk factor for major obstetric hemorrhage. According to a British study of 37,497 women who delivered in 1988 in National Health Service maternity units, retained placenta was 13.7 times more likely to result in major obstetric hemorrhage (1000 ml. blood loss or more) compared to controls (13.7, 5.92-31.8, CI 95%). The overall incidence of 1000 ml. blood loss or more was 1.33%. It was stated that a blood loss of this magnitude might lead to maternal death.

A history of induced abortion has been found to be a risk factor for retained placenta and postpartum hemorrhage. A study of 285 Chinese women in Hong Kong with a history of multiple induced abortions compared to 285 age matched primigravidas during 1985-1989 found that among women with two or more prior induced abortions the incidence of
retained placenta was 2.9% compared to 0.4% for controls which was statistically significant. If women had three or more induced abortions the incidence of retained placenta was 7.0%. Similarly, primary postpartum hemorrhage was significantly higher among women with two or more prior induced abortions (1.6%) or with three or more previous induced abortions (3.5%) compared to controls (0.8%). Women reporting two or more prior abortions were more likely to be unmarried (11.6% v. 4.6%) and smoke (13.0% v. 1.4%) compared to controls. The percentage reporting that the pregnancy was planned was similar to controls. (50.9% v. 55.8%)20

A Danish study of 7327 women during 1974-75 found that retention of placenta or placental tissue occurred in 7.2% of women without a previous delivery and whose only prior pregnancy ended in induced abortion compared to 2.5%-3.8% of women who had no previous deliveries or pregnancies and who were matched for age and socio-economic status.21 A British study found that the risk of retained placenta and post partum hemorrhage was increased if there had been an intervening abortion.22

**Abruptio Placentae**

Abruptio placentae, the premature separation of the normally implanted placenta, is a potentially life-threatening obstetric complication. Its reported incidence ranges from 4.9 to 12.9 per 1000 deliveries.23 According to the Centers for Disease Control pregnancy-related deaths during 1987-1990, 35 women were identified as having died because of hemorrhage due to abruptio placentae.4

A Boston study by researchers at Harvard University School of Public Health identified 143 cases of abruptio placentae from 1977-1980 which were compared with 1257 randomly selected controls. Unadjusted risk factors for abruptio placentae included chronic hypertension (3.0), history of cervical incompetence (3.5), one or more prior induced abortions (1.3), one prior spontaneous abortion (1.2), two or more spontaneous abortions (2.1), prenatal care begun after first trimester (1.5), pregnancy-induced hypertension (1.7), pregnancy weight gain more than 30 pounds (1.6), 14 or more alcoholic drinks per week/first trimester (2.7), marijuana use during pregnancy at least weekly (3.0), cigarette smoker during pregnancy (1.7), 10-19 cigarettes per day (1.5), 20-29 cigarettes per day (2.1) and 30 or more cigarettes per day (2.9). Adjusted risk factors included at least weekly marijuana use (7.8), maternal age 35 years or more (2.3), cigarette smoker (1.5), cervical incompetence (1.5), prior induced abortion (1.3), low prepregnancy body mass (2.3), and chronic hypertension (3.1).24 Researchers at the University of Tennessee found that nulliparous women were more likely to have abruptio placentae than multiparous women. Also, abruptio placentae was significantly more likely to occur at 30 or less gestational weeks or at 31-36 weeks than at 37-41 weeks gestation.25

**Obstetric Infections Arising in Childbirth Related to a Prior Induced Abortion**

According to the most recent Centers for Disease Control statistics for 1987-1990, there were 191 deaths from infection of which 40 were related to abortion. The remaining deaths from infection included 97 involving a live birth, 20 involving stillbirth, 14 involving undelivered infants, and 18 with unknown outcome. Among the 151 pregnancy related deaths from infection (not including abortion), 88 were attributed to general sepsis, 51 were attributed to other or unspecified infection and 5 were attributed to chorioamnionitis.4

Premature rupture of the membranes (PROM) in pregnancy is a significant risk factor for intra-uterine infection in women.25 In a Norwegian study induced abortion via the suction method followed by curettage in a previous pregnancy, has been found to increase the incidence of premature rupture of the membranes in a subsequent pregnancy intended to be carried to term compared to other prior pregnancy outcomes.26 Studies by Polish and German researchers have found a statistically significant increase in premature rupture of the membranes in pregnancies where women have had a prior legal abortion.15-16 A Swedish study found that women with PROM had significantly increased frequencies of previous genital operations including legal abortion via the suction procedure as well as more cervical operations, lacerations and heavy smokers compared to matched controls.28

A recent study published in 1995 by researchers at the University of Washington found that a previous induced abortion increased the risk of neonatal sepsis from 1.45-2.20 in a subsequent birth and which was statistically significant. It was suggested by the authors that induced abortion procedures might produce a latent-sub-clinical infection that persists until the next pregnancy, and then is transmitted to the newborn. A higher risk for neonatal sepsis was found in women who had an induced abortion immediately preceding the current pregnancy. The study also observed that infections such as endometritis and pelvic inflammatory disease are well recognized complications of induced abortion.29 In a previous study published in 1986 also by researchers at the University of Washington, it was suggested that having an induced abortion with poor medical care may lead to latent infections, amnionitis and neonatal sepsis. The 1986 study also found that neonates from mothers with intrapartum fever had a 67 fold increased risk of neonatal sepsis.30

Poor medical care at abortion facilities is a frequent occurrence. Many facilities do not screen for the presence of chlamydia trachomatis or other bacteria or viruses at the time of abortion despite the
recommendations of a considerable number of respected medical authorities. If the specific bacteria or viruses are not identified at the time of the abortion, the optimum regimen of prophylactic antibiotics could not be ascertained.

Further, many abortion facilities do not give antibiotics at the time of abortion, although they may provide a prescription. A recent study concluded that antibiotics should be generally provided at the time of abortion and estimated that about one-half of post-abortion infections could be eliminated if this was done. Some facilities provide a prescription for antibiotics but again it may not be the optimum regimen. Also, prescriptions may not be filled due to motivational or economic factors. If symptoms of post abortion infections arise, women may also mistakenly believe that the antibiotics will prevent infections and therefore may not seek medical care. Some, particularly poor women, may not have ready access to medical care.

Even a few days delay in seeking treatment for infections can have a considerable adverse effect on future fertility, and it has been found that women with a history of induced abortion are among those who are likely to delay in seeking medical care even if symptoms of possible infection are present. If medical care is needed it is frequently not done at the abortion facility in part due to reluctance of many women to return there because of negative reactions to abortion. In other instances abortion facility doctors may not be available for follow-up care. Still other abortion facilities rely on unqualified laypeople to respond to follow-up questions over the telephone and thus may not be able to properly identify women needing follow-up care.

Even if optimum methods are utilized, it has been found that antibiotics are only partially effective in eliminating postabortion infections, or, in some cases, may not reduce infections at all. Among the women in which antibiotics are the least effective (possibly 50% effective or perhaps not effective at all) are those under 20, those with no previous births, women with 2 or more sexual partners, and those with previous episodes of pelvic inflammatory disease, gonorrhea or untreated lower genital tract infections. This at-risk group represents a very large segment of women obtaining abortions. For example, according to the most recent Centers for Disease Control statistics for 1993, about 47% of women abort their first pregnancy and approximately 20% were age 19 or younger at the time of their abortion.

Another problem is the substantial number of bacteria, viruses or pathogens which may be present at the time of induced abortion and can result in later life-threatening infections to either mother or child in subsequent births. For example, Group B streptococcus has been identified in women at the time of induced abortion. If present, it results in increased incidence of pelvic inflammatory disease in postabortion women which is evidence that the infection is spread throughout the genital tract by the abortion. The presence of Group B streptococcal disease in women at the time of childbirth has been found to result in a significant increase in premature births, premature rupture of membranes (8.7 fold risk), and intrapartum fever (11.9 fold risk) compared to controls matched for hospital, date of birth and birth weight.

Another pathogen which may be present at the time of induced abortion is chlamydia trachomatis. If it is present, it also increases the incidence of postabortion pelvic inflammatory disease compared to women without the pathogen. Again, chlamydia trachomatis has been implicated in pre-term labor, premature rupture of membranes and upper reproductive tract postabortal infections. It has now been accepted that Group B streptococci, group A streptococci, E. coli, n. gonorrhoeae, and c. trachomatis can cause infections of the upper female genital tract. Infections of the upper genital tract include amniotic fluid infection and chorioamnion infection and can cause pregnancy related death. For the period of 1979-86 compared to 1987-90, the percentage of pregnancy-related deaths due to infection increased from 7.6% to 13.1%. The percentage of pregnancy-related deaths due to infections where a live birth resulted increased from 7.4% to 12.2% during the same comparable periods. Although studies are not available to determine the precise impact of induced abortion, the spread of infection as a result of induced abortion is implicated in some of these maternal deaths.

Influence of Induced Abortion on Smoking, Alcohol, and Drug Abuse in Pregnancy

The risk of pregnancy complications related to induced abortion is not solely limited to simply having had an induced abortion. Women with a history of one or more induced abortions have been found to be more likely to smoke during subsequent pregnancies intended to be carried to term. One study of white women in Washington state who had delivered a child between 1984-87 found that 18% of women with no induced abortion history smoked during a subsequent pregnancy compared to 28% of women with one induced abortion, 31% with 2 prior induced abortions and 41.6% of women with four or more induced abortions. A study of Swedish women having their first delivery after a second trimester two-stage abortion found that 37.4% smoked 10 or more cigarettes per day compared to 21.1% of parity matched controls and 18.9% of Swedish women generally. A Danish study of pregnant women found that after 28 weeks gestation, 43.1% of women still smoked if the last pregnancy was terminated by induced abortion compared to 32.1% if live birth or 30.2% if women had no previous pregnancy.

There is evidence that this smoking during pregnancy is most likely to be
at least partially related to the adverse psychological effects of prior induced abortion(s). A British study found an association between a previous abortion (legal or illegal) and depression and anxiety in a subsequent pregnancy. An intensification of fears of fetal abnormality was noted in women having had a prior abortion. The study concluded that "unresolved feelings of guilt, grief, and loss may remain dormant after an abortion until they are apparently re-awakened by another pregnancy." Normal anxieties about the now desired fetus are intensified and such fears are often spontaneously interpreted in terms of retribution." A Canadian study also found that women who had a prior induced abortion had significantly higher levels of depressive effect in the third trimester of a subsequent pregnancy compared to women with no prior induced abortion. Higher levels of depressive effect were also found at intervals of 1 month, 6 months and 12 months post-partum among women with a prior induced abortion. A Nigerian study of predominantly Christian and Moslem married pregnant women attending an antenatal clinic also found higher anxiety states and neurotic depression among women with a history of induced abortion compared to women with no previously reported induced abortion.

A depressive reaction during pregnancy has been found to be a risk factor for increased smoking in women as well as other adverse health effects. A study of women recruited from the prenatal clinic at Boston City Hospital during 1984-1987 found that depressive symptoms during pregnancy were significantly associated with increased life stress, decreased social support, poor weight gain, use of cigarettes, alcohol and cocaine.

One adverse health effect from smoking in pregnancy is an increased risk of abruptio placenta or placenta previa which are potentially life threatening. One study followed the course of 53,518 pregnancies in 12 medical schools between 1959 and 1966 and found a 23% lower frequency of abruptio placenta and 33% lower frequency of placenta previa among women who stopped smoking during pregnancy compared to women who continued to smoke during pregnancy. Another study found that there was a 2.6 fold increase in placenta previa if a woman smoked during pregnancy.

A history of induced abortion is also a risk factor for alcohol use in subsequent pregnancies according to a Scottish study where higher levels of alcohol use were reported among women with a history of induced abortion compared to stillbirth, spontaneous abortion or having previously had a mentally or physically handicapped child. Similarly, increased use of cocaine during pregnancy was found among Boston inner-city women with a history of two elective abortions (19% v. 9%) and three or more induced abortions (9% v. 3%) compared to controls. Other studies found similar results.

**Increased Incidence of Suicide**

Only two deaths from suicide as a result of induced abortion have been specifically reported by the CDC as a pregnancy-related death or maternal mortality. Both of these suicides occurred after second trimester abortion. However, a recent Finnish study of women who committed suicide in 1987-94 within one year of a pregnancy, found that the suicide incidence associated with induced abortion was 34.7 per 100,000 postabortion women compared to postmiscarriage women (18.1), and postpartum women (5.9), and a mean annual suicide rate of 11.3 per 100,000 women generally. The risk of suicide was at its highest during the first two months after end of pregnancy. It was 15% of all deaths in women are suicides. The authors concluded that induced abortion may have a harmful effect on mental health. Other studies have found a significantly higher incidence of psychiatric hospital admissions among postabortion women compared to women with other pregnancy outcomes. A Swedish study found that women with prior psychiatric problems were more likely to commit suicide following induced abortion compared to childbirth. Other research has found that abortion can have an important effect on suicidality. Although data is not available in the U.S. on reproductive history and suicide, the overall suicide rate is 4.6 per 100,000 women. Even at a reduced incidence in the U.S. it is likely that suicide following induced abortion would result in a greater pregnancy-related death rate compared to childbirth.

**Ruptured Ectopic Pregnancy**

Death from ectopic pregnancy is reported to be the leading cause of pregnancy-related death among women in their first trimester of pregnancy. According to CDC statistics 313 women died from ectopic pregnancy during the period of 1979-1986. This represented 12.9% of all pregnancy-related deaths during that period. According to CDC statistics 516 women died from ectopic pregnancy during 1987-1990 and this represented 10.7% of all pregnancy-related deaths during that period. The cause of death was hemorrhage in about 95% of the ectopic pregnancies. The incidence of ectopic pregnancy has risen steadily since 1970 and is now about 2% of all pregnancies among U.S. women in 1992. From 1987-1990 it is estimated that there were about 340,000 ectopic pregnancies in the U.S. During this time 156 women reportedly died from ectopic pregnancy which is about 0.45 per 1000 reported cases.

Induced abortion is both directly and indirectly implicated in death of women from ectopic pregnancy. The direct connection is as a result of neglect in not undertaking prompt pathology tests of scant tissue from an attempted abortion to determine whether or not an ectopic pregnancy was present. According to statistics
from the Centers for Disease Control (CDC) covering the period between 1972-85, 24 women were identified who died from a ruptured ectopic pregnancy shortly after an attempted induced abortion. These 24 deaths represented 4% of the total reported deaths from ectopic pregnancy during that period. The failure to diagnose the ectopic pregnancy prior to leaving the abortion facility was attributed as the cause of death.58

Induced abortion is also implicated in deaths from ectopic pregnancy in other ways. In a recent Italian study, an increased risk (2.7, 0.9-8.7, CI 95%) of ectopic pregnancy was reported in women with a history of pelvic inflammatory disease.59 A Minnesota study which reviewed 22 possible risk factors found an increased risk for ectopic pregnancy among women with a history of pelvic inflammatory disease of 3.3 (1.6-6.6, CI 95%). In the same study the relative risk from induced abortion was 2.5 (1.02-6.1, CI 95%) with univariate analysis which was reduced to 2.1 (0.8-5.9, CI 95%) with multivariate analysis.60 Another study found a clear association between the presence of postabortal ID and retained fetal parts and a five fold increase in ectopic pregnancy compared to uninfected women.61

Multiple induced abortion also appears to be a risk factor for ectopic pregnancy. One study found a crude relative risk of 1.6 for one prior induced abortion and 4.0 for women with two or more prior induced abortions. Use of multivariate techniques to control confounding factors reduced the risk factors to 1.3 and 2.6 respectively. The analysis suggested that induced abortion may be one of several risk factors for ectopic pregnancy, particularly involving women with postabortal pelvic inflammatory disease or multiple abortions. Another study found that women who had one induced abortion had a 1.4 relative risk for ectopic pregnancy and for women with two or more abortions, the relative risk was 1.8.62 A recent Italian study found a statistically significant increase in ectopic pregnancy in women following induced abortion compared with controls which increased with the number of prior induced abortions.63 The increased risk factors for repeat abortion are particularly important because overall about 45% of women repeat abortion and 60% of women under age 30 with a history of induced abortion have now had two or more induced abortions.64

With this information, it is possible to calculate the increased number of deaths from ectopic pregnancy due to multiple abortions. If a multiple abortion doubles the risk of ectopic pregnancy then 4% would have a later ectopic pregnancy rather than the overall rate of 2%. If there are about 1.5 million induced abortions annually of which about 45% are repeating abortion, this would add about 13,500 cases of ectopic pregnancy each year and add an additional 6 deaths from ectopic pregnancy. If postabortal PID triples the risk of ectopic pregnancy then 6% of those who would later have an ectopic pregnancy. If there are about 1.5 million abortions with an overall incidence of postabortal PID of 8%, then 120,000 would have an incidence of 6% ectopic pregnancy which means an additional 4800 cases of ectopic pregnancy from which about 2 additional deaths would occur from ectopic pregnancy because of postabortal PID. If these additional deaths (8) are added to the 4% from failure to diagnose ectopic pregnancy at the time of abortion which adds 1-2 deaths per year (40 xen 4%), then, based upon available figures, at least 9-10 additional deaths annually from ectopic pregnancy can be attributed to the effects of induced abortion.

Hypertensive Disorders of Pregnancy and Previous Reproductive History

Hypertensive (high blood pressure) disorders of pregnancy represent a major cause of maternal mortality. Available data suggests that about 10-15% of maternal deaths in Africa, Asia and Latin America are associated with hypertensive disorders of pregnancy, and that about 10% are associated with eclampsia (convulsions).65 According to the most recent data published by the Centers for Disease Control for 1987-1990, 256 U.S. women died from complications from pregnancy-induced hypertension out of a total number of 1453 pregnancy-related deaths during this period which represented 17.6% of all pregnancy-related deaths.4 But despite the considerable importance of pregnancy-induced hypertension, it has been little studied. A literature search of articles related to pregnancy-induced hypertension revealed that, until recent years, only one article had been published in 1958 providing data on reproductive history and the incidence of hypertension in pregnancy. Later single articles on the subject appeared in 1985 and 1986. Since that time a few more articles have appeared, but the subject is still not well studied.

Reproductive history has been found to be related to pregnancy induced hypertension (high blood pressure), and pre-eclampsia (high blood pressure and abnormal protein in urine or edema i.e. excessive water in cells or tissues). For example, pre-eclampsia is more frequently a disease of women experiencing a first pregnancy. A study of birth records in North Carolina during 1988-1989 examined the risk for pregnancy-induced hypertension (PIH) and found that the overall risk of PIH was 43.1 per 1000 births. Having had one child (Parity 1) was protective against PIH compared to no children (Parity 0). (0.4, 0.3-0.4, CI 95%). Blacks and whites were found to be at virtually equal risk. Mothers aged 35 or older were at increased risk compared to mothers aged 20-34 (1.6, 1.4-1.8, CI 95%). Tobacco use was inversely related to PIH (0.6-0.9).66 A Scottish study of 3856 viable first pregnancies and 5749 viable second pregnancies during 1967-1978 found an overall incidence of proteinuric pre-eclampsia of 5.6% for first pregnancies and 1.9% for sec-
second pregnancies. The incidence of mild pre-eclampsia was 26.3% and 17.0%, respectively.

There are only a few studies which report the effect of abortion, either induced or spontaneous, on PIH. In a comprehensive and probably the best designed study to date, 29,851 first and second pregnancies in women in Aberdeen, Scotland between 1967-78 were studied by a well-known expert on the subject of pregnancy-induced hypertension. It was found that the incidence of proteinuric pre-eclampsia after early abortion i.e. less than 13 weeks gestation, which was either spontaneous or induced (separately studied), was similar to the population incidence in a first pregnancy. (7.6% v. 5.6%). The study also found that only a pregnancy of 37 weeks gestation or more is likely to offer protection against pre-eclampsia in a second pregnancy, but even then the effect is moderated by the development of pre-eclampsia in the first pregnancy. The incidence of proteinuric pre-clampsia or mild pre-clampsia in the next pregnancy after an induced abortion was 7.6% and 26.7% respectively in contrast to 19.0% and 17.0% respectively where there was a viable first pregnancy prior to the second pregnancy. If the prior induced abortion occurred at 12 gestational weeks or between 13-27 weeks, there was a similar incidence of mild pre-clampsia (26.1% v. 27.2%) as well as proteinuric pre-clampsia (7.8% v. 7.8%) in the second pregnancy. This study did not confirm the earlier findings among Aberdeen women, published in 1958, that an early abortion of the first pregnancy conferred some protective benefit against pre-eclampsia in a second pregnancy. This earlier study of 516 Aberdeen women with a completed pregnancy preceded by one abortion had an incidence of 15.7% with pre-eclampsia as compared to 22.2% among primigravidas and 8.0% among secundigravidas. The type of abortion was later indicated to be spontaneous abortion but is likely to include both spontaneous and induced abortions.

A study of women who gave birth at Northern California Kaiser Permanente Hospital in 1984-85 found that women with a history of therapeutic abortion were 2.16 times more likely to have preeclampsia (1.18-3.96, CI 95%) compared to no therapeutic abortion history which was statistically significant. In contrast to induced abortion, a previous history of spontaneous abortion was found to have had a protective effect (0.48, 0.24-0.95, CI 95%).

In a study of 24,646 women who delivered at Parkland Memorial Hospital during 1977-80, the incidence of pregnancy-induced hypertension was 25.4% in primigravid women, 22.3% among women whose only previous pregnancy terminated in abortion (either spontaneous or induced), and only 10% among women who carried two or more successive pregnancies to viability. Additional completed pregnancies after the first pregnancy did not confer any additional protective effect. It was concluded that the protective effect from abortion was small compared to a completed pregnancy.

A case-control study of the risk factors for eclampsia based upon 66 cases of eclampsia from deliveries at two Houston, Texas hospitals during 1977-1992 was compared to noneclamptic controls in a 1:4 ratio on the basis of hospital and month of delivery. The ratio of eclampsia to deliveries over the study period was 0.63 per 1000 deliveries. Cases of eclampsia were less likely to report prior abortion than controls (8% v. 26%). Whether or not the abortions were induced or spontaneous was not reported. Although the numbers were too small to show statistical significance, it was concluded that nulliparous women with prior abortion (spontaneous or induced) showed no excess risk of eclampsia compared to parous women with no abortion (1.10, 0.34–3.50, CI 95%). The study concluded (perhaps erroneously) that prior pregnancy itself, independent of outcome and preeclamptic/eclamptic conditions, appears to be the protective factor in a subsequent pregnancy.

In summary, the available studies support the claim that a prior viable pregnancy reduces the incidence of PIH in a subsequent pregnancy. It is unclear as to whether or not a prior spontaneous abortion is protective or not against PIH in a subsequent pregnancy. In those studies which separated out induced abortion from spontaneous abortion all showed that prior induced abortion increased the likelihood of pregnancy-induced hypertension. In some studies the study design appeared to be questionable not only with respect to failure to separate induced and spontaneous abortion, but in not controlling for other variables such as age or smoking. Women with a history of induced abortion are more likely to smoke during subsequent pregnancies intended to be carried to term and it has been reported that smoking is somewhat protective against PIH. If so, then the impact of the induced abortion on PIH may not be fully recognized unless researchers control for smoking.

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Footnotes
