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Abortion

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Abortion is the most controversial area of family planning. It is the last to achieve academic recognition, clinical understanding and social acceptance. However, it is often the most important method of fertility regulation a community uses in its struggle to control family size.⁹⁸

In reviewing options for the control of fertility, there are a number of reasons for placing emphasis on abortion. Firstly, attitudes towards abortion amongst those who provide family planning are usually indicative of their attitudes towards the wider aspects of the whole subject. Secondly, whether abortion is legal or illegal in a country determines the decisions to be taken over the reversible methods of contraception: for example, the choice of oral contraceptives in older women is highly influenced by whether abortion is accessible and legal, or whether the woman with an unwanted pregnancy is likely to be driven into the hands of an illegal abortionist. Thirdly, sociological and epidemiological evidence from many different localities and cultures demonstrates that abortion is often a first option that a community actually uses as it begins to control its fertility although it is the last which the medical profession and the providers of family planning normally make available.

This chapter documents the universal use of induced abortion, analyses the relation between abortion and contraception in fertility control, reviews legal and illegal techniques and sets induced fetal wastage in the context of reproductive loss as exemplified by spontaneous abortion. It is essential to remember that western medical practitioners are now divided by age into those who qualified when abortion was illegal and those who have only practised against a background of legal abortion. The overall picture of illegally- and legally-induced abortion must be comprehended if the consequences of possible future restrictions of liberal abortion laws are to be understood.

Definition

The medical and legal definition of abortion is the termination of pregnancy before the twenty-eighth week of gestation starting from the first day of the last menstrual period. In the eyes of the law a fetus is not viable until the twenty-eighth week, although there are now rare but recorded cases of survival earlier than this. Abortions may be either spontaneous or induced and induced abortions are subdivided into legal and illegal.

SPONTANEOUS ABORTION

Human reproduction is an exquisitely complex but exceedingly wasteful process. For every oocyte which matures to ovulation there are many thousands which degenerate and die. For every sperm which survives, hundreds of millions are lost. To what extent those two factors are part of a 'survival of the fittest' process of natural selection is not clear. After fertilization has occurred less than half of the gametes survive to implantation and delay the next expected menstrual period, so that for every known pregnancy there is at least one whose existence is totally unknown to the mother. It would seem that the very high wastage of unfertilized ova is a continuation of a 'quality control' mechanism. Approximately 95% of all chromosomally abnormal conceptions among recognized pregnancies are spontaneously aborted.⁷¹ Put another way, 5% of all human conceptions suffer a significant chromosomal abnormality but, owing to the selective effect of spontaneous abortion, the wastage drops to 2.4% at 12 weeks and 0.6% at term.⁵⁴ At a microscopic rather than a chromosomal level, the American embryologist A. T. Hertig studied early human development with great thoroughness. He found that 15% of eggs which are ovulated either failed to reach the tube or were not fertilized, even under optimal conditions, and that of those fertilized which implant in the uterus, only about 40-50% actually survive long enough to cause menstrual delay and lead to recognizable pregnancy.⁵⁰ Immunoassays of urinary gonadotrophins have shown that over a third of women fall pregnant in one cycle of unprotected intercourse, but that 43% of the pregnancies fail to progress as far as a delayed period or a recognizable spontaneous abortion.⁷⁹ Apart from genetic causes of abortion, the developing gamete or embryo is subject to teratological factors which are as yet poorly understood. Even such associations, as with the correlation between thalidomide and limb abnormalities, have not always been recognized immediately. Experimental findings in one species do not necessarily apply to another. Drugs and other

teratological agents may act at one particular stage of development only. In general, the very early stage up to the conclusion of organogenesis, that is about the twelfth week of pregnancy, is the truly susceptible stage. Most teratogens cause a rise either in the abortion rate or in the congenital abnormality rate at birth, or in both, depending on the dose and on the time of pregnancy when they acted. There is a high incidence of spontaneous abortion among women who have a child with anencephaly or spina bifida, and possibly these miscarriages are of fetuses with neural tube defects that do not survive until birth.⁵⁸

The range of potentially teratological agents increases with our knowledge and includes viruses (all of which pass the materno-fetal barrier), drugs and ionizing radiation. Cigarette smoking increases fetal loss and raises the prematurity rate at delivery, which in turn can give rise to mental retardation or other defects resulting from the unavoidable trauma of birth acting on the immature central nervous system.⁷⁹

The effects of coital behaviour, namely the usage of periodic abstinence, have already been discussed (Chapter 7).

Maternal factors which contribute to spontaneous abortion include severe generalized diseases and virulent infections, especially those producing very high temperatures (e.g. malaria). These causes are far less common in both developed and developing countries than previously. Other maternal factors giving rise to abortion include local physical or physiological changes in the genital tract. Certain congenital abnormalities of uterine development predispose to abortion without preventing conception. Uterine fibroids and benign tumours, which are very common in certain racial groups during the second half of reproductive life, are an important cause of spontaneous abortion, especially in those societies where late marriage is the cultural norm. The role of hormone deficiency in spontaneous abortion is more controversial. Progesterone deficiency is responsible in only a very small number of cases and the routine administration of progesterone to women who have had a previous abortion is both illogical, unless deficiency has already been proven, and potentially damaging. It should be remembered that the administration in the 1950s of diethylstilboestrol to pregnant women with a previous history of abortion was responsible for many cases of vaginal cancer in girls of the next generation (see Chapter 10, Overall picture of neoplasia and Pill use).

All obstetricians can recall cases where spontaneous abortion followed a strong emotional shock. Sudden news of death or injury to a loved one in war, or a road traffic accident, may be followed within hours by the onset of abortion. The mechanisms by which such psychological factors work upon the pregnant uterus are of great theoretical interest but as yet they remain

speculative. It is dangerous to argue from work in animals, but certain types of maternal stress predispose to spontaneous abortion, for example mares mated soon after foaling miscarry four times as frequently as those mated later. Serious overcrowding in rodent communities raises the instance of prenatal wastage. Estimates of early fetal loss under different conditions in cattle, horses, sheep and swine vary from 10 to 60%⁸⁸ In monkey colonies the probability of spontaneous abortion is partly related to the length of time that has elapsed since the last delivery. If conception occurs within one month, over one quarter of conceptions abort, but where the interval is over four months the rate falls to 7% of all pregnancies.¹ It seems possible that the same variable, whatever its mechanism, may also be relevant in cases of human abortion.

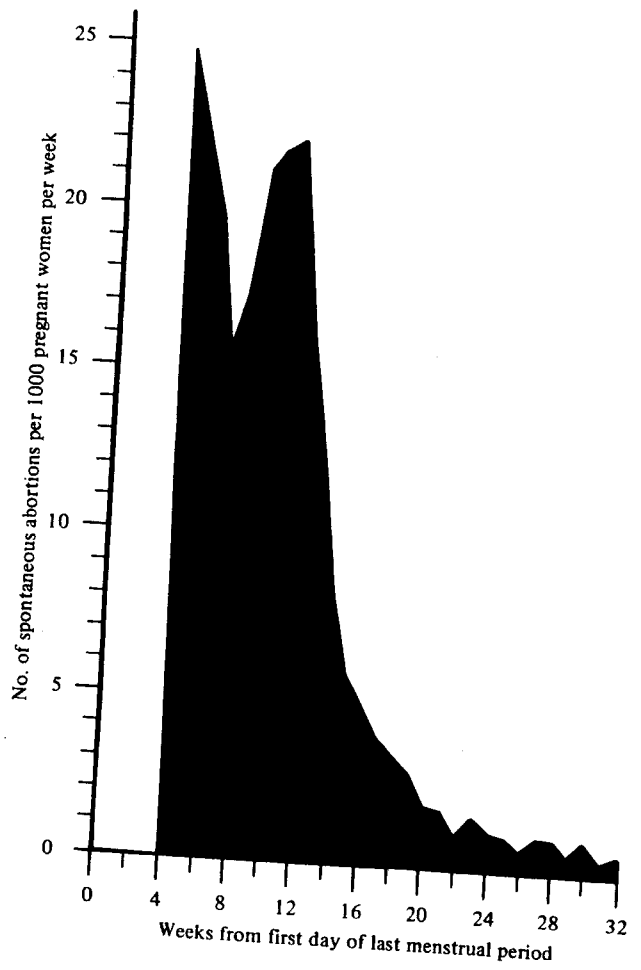
The epidemiology of spontaneous abortion

In the large majority of cases, it is impossible to distinguish clinically between induced and spontaneous abortion other than by relying on the history given by the woman herself. In one hospital on the outskirts of London serving 270 000 people in the early 1960s, between 375 and 400 cases of abortion were admitted annually out of a total of 1500 gynaecological admissions. At that time less than a dozen therapeutic abortions were performed each year.²⁵ On normal medical history taking and clinical findings, evidence of induced abortions was recorded for about 50 cases annually, but in 1965, out of 1384 gynaecological admissions, 397 were cases of abortion and each was interviewed by one person. After the woman's confidence had been gained, 241 actually admitted that the abortion was induced, either by themselves or by someone else acting illegally. Even so, during this period, one severely ill woman of 24 who had borne five children, four of whom were living, was admitted with a septic abortion and then developed renal failure, but maintained right up to the time when the last rites were administered by her priest that her abortion was spontaneous. Yet when the fetus was passed, and she began to recover, a rubber catheter appeared with it.

It is because of such difficulties that few reliable studies surveying the incidence of spontaneous abortion have been completed. In a prospective study on the Hawaiian island of Kauai, women were encouraged to report their pregnancies to study teams soon after missing a period.⁴⁰ Three thousand pregnancy histories were collected over three years and 24% of all pregnancies recognized at the end of the first lunar month of pregnancy ended in abortion. Monthly house visits to all women of reproductive age were made in a group of Punjabi villages in 1965 and 1765 pregnancy histories were collected; a spontaneous abortion rate of 10.5% was

measured.³ As elsewhere, retrospective studies collected in the same area revealed only one-fifth of the fetal loss detected in the prospective studies. Among 12 000 records of pregnancy taken from the Health Insurance Plan of Greater New York covering the years 1958 to 1960, pregnancy losses at differing stages of gestation were analysed.¹⁰⁴ The Plan mainly covered married women of above average income and it was thought that the induced abortion rate was probably lower than average although this assumption must be accepted with caution. The data were analysed as specific abortion rates for each week of pregnancy (Fig. 13.1).

Fig. 13.1. Risk of spontaneous abortion at various stages of pregnancy (12 000 women surveyed, Greater New York 1958-60). (Redrawn from Shapiro, S., Levin, H. S. & Abramowicz, M. (1971). Factors associated with fetal loss. *Advances in Planned Parenthood*, 6, 45.)



In general, a figure of 10-15% spontaneous abortion is widely accepted in clinical practice.^{71, 90, 117, 134} Maternal age is important and spontaneous abortion is most common among the very young, in women over 30 and in women of high parity. Ethnic, nutritional and other variants may be significant but are particularly difficult to analyse statistically.

INDUCED ABORTION

Traditional abortion practices

Abortion is as old as legend. However ancient the civilization, if we have evidence about everyday people, we nearly always have evidence of abortion. Certainly, it was used as long ago as Middle Kingdom Egypt (2133-1786 BC) and excavations at Pompeii yielded a form of vaginal speculum suitable for its performance. The Roman poet Ovid lamented: 'There are few women nowadays who bear all the children they conceive.'⁸⁵ There is only one reference to abortion in the Bible:

If men strive, and hurt a woman with child, so that her fruit depart from her and yet no mischief follow: He shall be surely punished, according as the woman's husband will lay upon him; and he shall pay as the judges determine.

And if any mischief follow, then thou shalt give life for life, Eye for eye, tooth for tooth, hand for hand, foot for foot, Burning for burning, wound for wound, stripe for stripe.³²

This can only be interpreted as indicating that induction of abortion must be regarded as a crime but not as murder.

Among over 300 tribes or cultural groups reviewed by Devereux²³ only one denied using induced abortion as a method of birth control. We cannot know the frequency of induced abortion amongst women in primitive tribes but anthropologists suggest that it is used for social reasons, as by Hottentot women where frequent pregnancies would endanger their ability to work and their mobility, and for personal reasons, such as those of Chagga women who tend to seek abortion when they consider themselves 'too old to continue reproducing' or of Masai women who are said to seek abortion if they find themselves pregnant by an old or unfit man because they fear giving birth to an unfit child. These examples neatly illustrate the difficulty in differentiating between social and personal motivation. Abortion was certainly well known in pre-industrial England.⁷⁵

Traditional abortion practices fall into three categories: medicinal, mechanical and massage. The pattern of traditional abortion

existing in the developed world today, especially in countries where abortion is illegal, is similar to that which obtained in Europe and north America in the nineteenth century and first half of the twentieth century.

Medicinal methods

Most societies have, or have had, a range of drugs and herbs which it is hoped will end an unwanted pregnancy. Emmenagogues are substances which are intended to bring on a delayed period and abortifacients are materials which will terminate an established pregnancy.

In Britain both types of medicine were sold until the 1960s and even today remain available in European countries, such as Spain, where abortion is still illegal. In the developing world widespread sale continues from Peru, through Africa and Asia, to the Philippines. Sometimes, emmenagogues are explicitly labelled, but often their purpose is so well known that no explanation is needed. It is probable that most preparations are ineffective and the frequent appearance of beetroot, raspberries and potassium permanganate in emmenagogues may be for no better reason than that they are red. Belief in sympathetic magic must account for the fact that solutions of gunpowder have been drunk as abortifacients. Preparations containing ergot, quinine and lead may all have had some genuine effect as abortifacients but they also caused many cases of maternal death (lead poisoning acquired in this manner was a common phenomenon in nineteenth century England) and fetal damage such as blindness and deafness.⁹⁸ Savin, or oil of juniper, was a well-known abortifacient to the Greeks and Romans and Nicholas Culpeper (1616–1656), writing in *The Complete Herbal* says 'to describe a plant so well known is needless, it being in almost every garden'; he adds that 'inwardly it cannot be taken without manifest danger, particularly to pregnant women and to those subject to flooding'.⁹⁸

Help her make manslaughter, let her bleed,
Never want for savin for her need.²⁶

The use of emmenagogues and abortifacients continued in Britain until recent times. In a love-letter to Prince Edward, later to be King Edward VIII, the actress Lily Langtree wrote: '... my own darling, I am not sure yet... there must be something wrong or what I took would have made me... please go to the chemist and ask how many doses one ought to take a day as I must go on taking it...'¹⁰⁵

In 1965 Cole conducted a survey of abortion drugs on sale in herbalists, chemists and rubber goods shops in Birmingham and found that of 40 randomly selected outlets investigated, no less than 31 sold preparations

for facilitating abortion.¹³ It was concluded that most of these preparations had 'no effective abortifacient function' but that there was some risk of the drugs taken by the mother damaging the fetus in addition to the risk of poisoning the mother herself.

Mechanical methods

Where abortion is illegal, surgical services still exist. Indeed, there are usually meaningful and accessible services for each socio-economic group. The wealthy can afford the high fee which physicians charge where abortion is illegal. The poor go to traditional midwives, slum doctors or lay people who have developed an appropriate technique.⁵⁷ For pregnancies around and after the third month the intrauterine introduction of a urinary catheter or similar flexible device is the technique used in most places. In Latin America it is called the *sonda*. It has the advantages of only involving one operator and of not producing, at any single moment in time, so much pain that local or general anaesthetic is necessary. It almost invariably produces the desired result and it is readily and cheaply available. The catheter technique has the disadvantage that abortion takes 1–2 days to occur once the foreign body has been inserted and that infection is common during this interval, particularly in circumstances encountered by most illegal operators. The separation of the placenta and the delivery of the fetus can be slow and haemorrhage is the second great risk of the method.

Practices in the contemporary developing world mirror those which were used in the West during the century prior to abortion law reform. Van de Warkle described curettage and intrauterine injection of fluids in New England in the 1870s. One practitioner charged US \$10 and, complained van de Warkle, 'takes his pay in instalments'.¹²⁸

A sample of illegal abortion techniques which had been used upon or by women admitted to a hospital on the outskirts of London immediately before the liberalization of the British Abortion Laws is illustrated in Table 13.1.²⁵ Of the 734 patients who admitted illegal abortion, 381 were married. Just over 10% claimed that they had induced the abortion themselves but possibly some of these claims were false and made in order to protect a husband or a lover. A large number of the women had also tried various advertised tablets or potions without success and these were not recorded.

In the 1970s, Gallen interviewed 106 illegal abortion practitioners in the Philippines. Most of their clients were young married women (average age of 29 years) and whenever possible they patronized the services of a practitioner in their own community.⁵⁷ Over 75% of the abortions were performed within the first trimester.

was not a secret: other people knew about it, her husband as well as relatives and friends. Few women appeared to suffer shame or guilt. The vast majority were Roman Catholics who attended church regularly but religion apparently had little influence on their decision. Up to the time of the abortive pregnancy 68.5% of the women were using no form of

Table 13.1 *Techniques of illegal abortion in one London Hospital 1964-68*

Technique	Number of patients
<i>Drugs alone</i>	(17)
Quinine Tablets with purgatives	9
Ergot extracts with purgatives	3
Purgatives alone or with alcohol	5
<i>Vaginal Douching only</i> (all self-administered)	21
<i>Transcervical injections</i>	(218)
Soap solution	36
Potassium permanganate solution	30
Utus paste	24
Toothpaste	18
Hypertonic saline (Brine)	16
Whisky	4
Boiled water	14
Solution or paste unknown to woman	76
<i>Intrauterine instrumentation</i>	
A. Sharp	(86)
Deliberate rupture of membranes at 16 weeks or more	6
Crochet hooks	12
Uterine sounds	4
Thin lead pipe	1
Surgical artery clamps	2
Fine ovum forceps (cord cut)	21
Unknown to woman	40
B. Introduction of soft foreign bodies into uterus	(116)
Male rubber catheter	31
Nylon cord	20
Plastic-covered curtain cord	2
Multiple IUDs	10
Other soft tubing	38
Material unknown to woman	5
<i>Dilatation of cervix and curettage</i>	(6)
With general anaesthesia	5
Analgesics only	1
<i>Technique totally unknown to woman</i>	270
Total	734

contraception but after the abortion 61.3% did so. The majority of the abortion practitioners were Roman Catholic women (mean age 47 years) and all were, or had been, married and most had large families (average 4.5 children). Less than one-third of these practitioners had attended college and a fifth had received no formal education at all. They each performed an average of 12.7 abortions per month. Despite the fact that they were well known as practitioners of abortion less than 1 in 5 had ever been harassed by the police. Only one woman had ever been imprisoned and this was simply overnight. She was released the following morning for lack of evidence.

In the Philippines now, as in western countries in the past, the majority of women first try to abort themselves, or at least try to induce delayed menstruation, using one of many medications that are widely available, including hormonal 'pregnancy tests'. It is suggested that at least 100 000 induced abortions occur in Manila alone. The situation is similar in other developing countries. In Seoul, the capital of Korea, which has a population of about 5 million, there may be as many abortions annually as in the whole of England and Wales with a population of 50 million. In Mexico, in 1978, there were 2.5 million births and an estimated 0.6-0.7 million induced abortions.⁵⁷

In Britain at the turn of the century, the use of a crochet hook manoeuvred inside the uterus to disrupt the embryo was a common method of abortion. This technique is still much practised in the Howrah district of Calcutta. The preferred instrument is identical in all respects because crochet work is one of the cottage industries of the city. In rural India, abortion by the insertion of a fire-hardened straight twig is commonly practised. The introduction of foreign bodies such as the rolled bark of trees is also commonly used in India, and was the technique in Europe 50 years ago, the bark of the slippery elm being most used.

The transcervical intrauterine injection of fluid is a fairly recent form of abortion because it requires a suitable form of syringe or water pump. The rubber-ball 'enema' syringe was commonly used in Britain and the United States until very recently. In the Caribbean, Coca Cola is the preferred liquid.

Massage abortion

Massage abortion (Fig. 13.2) is a procedure well known in the Orient from Burma to the Philippines and south to Indonesia,⁵¹ though it is virtually unknown in the West. In these countries, massage is a traditional treatment for many illnesses and is also used after delivery. The pressure

normal and may involve literally stamping on the woman's abdomen as she lies on the floor. Pain is commonly a limiting factor in a procedure which may need repeating on several successive days. Haematuria, malaena and an appendicitis-like syndrome of fever, abdominal pain and board-like rigidity have been described as complications. Sometimes hysterectomy is necessary to deal with uterine damage.

Nearly 50% of all abortions in the Philippines are procured by abdominal massage, though the introduction of a catheter into the uterine cavity is used by about one-third of practitioners, plant preparations by 5% and surgical dilatation and curettage by 5%; various combinations of methods account for the remainder. Gallen concludes that in the Philippines 'abortion is a drastic, commonly expensive, sometimes dangerous event of great personal significance, but it is largely invisible to society'.⁵⁷

In both urban and rural Thailand, induced abortion appears to be common, readily available and an open procedure.¹²⁰ Most of those who perform abortions are respected members of their local community. Eighty per cent of induced abortions in the survey conducted by Tongplaw were done by massage, which is almost universally known to village women. It is estimated that a quarter of a million massage abortions are performed annually.

The number of women who resort to abortion, even when it is illegal, is a

Fig. 13.2. Massage abortion.



powerful demonstration of the popular demand for fertility control worldwide.

Consequences of abortion legislation

Incidence of illegal versus legal abortions

Liberal abortion laws (discussed in Chapter 15) are nearly always associated with a rising number of legal abortions and this often continues for several years.^{8, 17, 18, 84, 93, 116, 126} There is strong evidence, from statistics on births and registered abortions relating to residents of New York State following a total repeal of previously restrictive abortion law in July 1970, that the *total* number of abortions did not change greatly, while the use of contraception actually *improved*.¹¹⁴ For the most part, the rise in legal abortions after the introduction of liberal legislation appears to be a process of transferring previously illegal operations to the legal sector. The situation in England and Wales, following the implementation of liberal legislation in 1968 supports this picture. The birth-rate is accurately reported and although no reliable statistics on the number of illegal or *legal* abortions prior to 1968 is available, good data exist from that year onwards because notification of abortion is compulsory and failure can lead to prosecution. The number of known abortions performed on residents of England and Wales therefore rose by at least 80 000 between 1967 and 1970 but this had a minimal effect upon the birth-rate, which was already declining, and unless 80 000 criminal abortions were being performed in England and Wales immediately prior to the change in the law, the only other possible explanation is a sudden nationwide alteration in sexual habits accurately synchronized to the legal change. Clearly, Mr Roy Jenkins, the Home Secretary in 1967 when the Bill was being debated, was essentially correct in his estimate of 100 000 illegal abortions occurring annually in Britain. In a similar way, in 1965 the birth-rate in the Northern Italian province of Piedmont was 13.4 per 1000 total population, almost exactly equal to the Hungarian birth-rate of 13.1 per 1000 total population for the same year, although contraceptives at that time were even less readily available in Italy than in Hungary. The marriage rate and age structures of the two societies were comparable and therefore it seems likely that the illegal abortion rate in North Italy paralleled the legal abortion rate in Hungary, which at that time exceeded the live birth-rate by a factor of 1.35.

The total or partial reversal of a previously liberal law does not immediately mirror the change from illegal to legal abortion, because while women can transfer from back-street operators to legal clinics rapidly, it

takes some time for illegal networks to re-establish themselves and become known. In October 1966 Rumania tightened up its law, which had permitted abortion on request, and the number of legal operations fell to one-twentieth of that found earlier while, nine months later, the birth-rate doubled. However, as illegal abortionists set themselves up, so the birth-rate fell: and the number of women dying from abortion rose^{20, 93, 116, 126} (Fig. 13.3).

All the evidence suggests that social and economic factors primarily determine the number of induced abortions occurring in a society at any specific time, while the law determines how these abortions shall be performed and consequently the death rate to women. A simple law allows most terminations to occur early in pregnancy, a complex law, and especially one requiring committee decision, delays operation. Whatever the law, some groups, especially young teenagers, seek abortion later than more mature women. Menopausal women are also likely to seek abortion late because they may have failed to recognize that they are pregnant (see Fig. 13.4).

How many abortions are done?

The abortion rate per 1000 women is usually highest in the years of highest overall fertility (18–24) while the abortion ratio per 1000 preg-

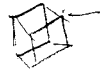
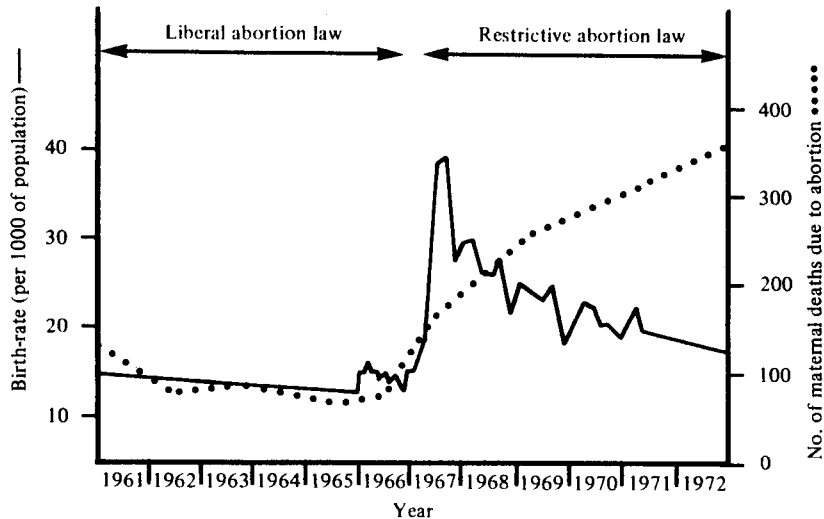


Fig. 13.3. The effects of abortion legislation in Rumania. (After David, H. P. & Wright, H. H. (1972). Abortion legislation: the Rumanian experience. *Studies in Family Planning*, 2, 205.)



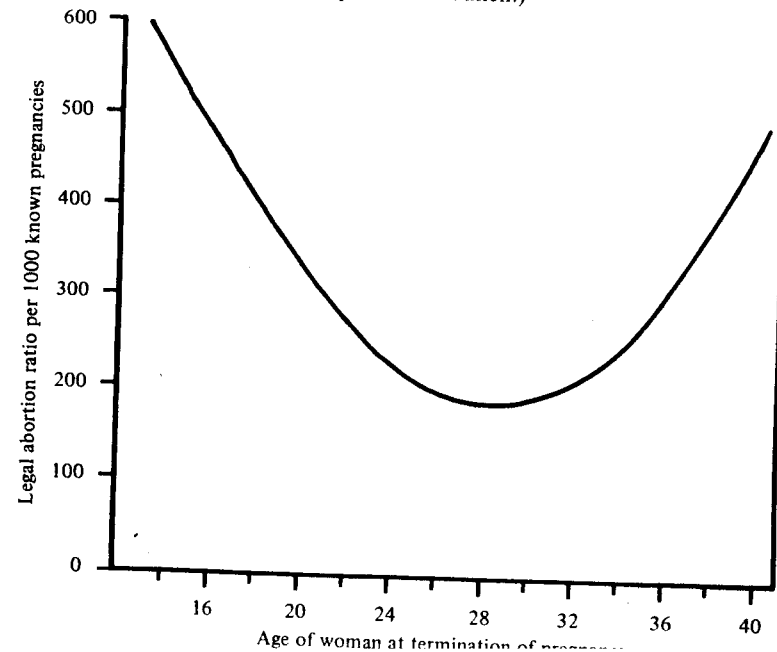
nancies is greatest at the extremes of fertile life, that is amongst young teenagers and women over 40 (Fig. 13.4).^{116, 123}

Abortion is common: more than 7 million legal operations were performed in the US between 1973 and 1981. In 1979, 1 560 000 abortions were performed; 35% of the women were aged 20–24 and 30% were 19 years old or less. More than half the women were nulliparous and only 6% had three or more children. The legal abortion rate of the black population is approximately twice that of the white population.¹¹⁵

In 1979, 120 611 legal abortions were performed on women resident in England and Wales. More than half the women were unmarried, a quarter were between 20 and 24 years old and 27% were 19 or younger.

Important differences exist in the pattern of legal abortion, and, by inference, of illegal abortion, in different countries and at different times in the same country (Table 13.2). When a society begins to control its fertility (as happened in Korea and Taiwan in the 1960s or England and the US during the period 1880–1900), both the use of contraception and the resort to abortion appear to rise. As the birth-rate falls further, so abortion levels appear to peak (as happened in Japan after the Second World War or is

Fig. 13.4. The relation between the proportion of pregnancies ending in legal abortion and the age of the pregnant woman (US data). (Data from Tietze, C. (1981). *Induced Abortion: a World Review*, 1981. New York: Population Council.)



happening in some parts of contemporary Latin America). Finally, when the demographic transition is fully established (as in contemporary Europe, the United States and Japan), contraceptive practice continues to rise and abortion rates fall, but the need for abortion is never eliminated^{98, 126} (Fig. 13.5). The rate at which society passes through this 'hump' is greatest when contraceptive services are readily available and is probably assisted by liberal laws which enable women who have abortions to be immediately offered contraceptive services. In Tunisia, the total number of abortions may have declined since abortion was made legal and contraception (including sterilization) was made available.⁸² In Russia, however, contraceptive services are practically non-existent and as a result abortion rates continue to be persistently and exceptionally high. In countries with poor contraceptive services and illegal abortion (for example Burma and Peru), the suffering associated with abortion and the total loss of fetal life remains greatest.

Subgroups within society may behave in much the same way as larger groups such as countries. Requena demonstrated that throughout Latin America it is not those totally lacking education but those with an elementary school background who have most abortions.^{100, 129} They are the groups where fertility first begins to decline rapidly, and they are the groups who adopt contraceptives but make many mistakes. Those with the privilege of at least high-school education enjoy a further decline in fertility but use contraceptives more effectively so have a lower abortion rate (Table 13.3). The young unmarried in western society are also learning to control

Table 13.2. Patterns of legal abortion (selection countries 1978-79)

Country	Legal abortion rate per 1000 population	Birth-rate per 1000 population	Abortion ratio per 1000 known pregnancies
Canada	2.7	16	148
Czechoslovakia	6.2	19	264
England and Wales	2.4	12	156
France	2.9	14	170
India	0.5	34	12
Japan	5.3	16	271
Poland	4.2	20	179
Romania	18.8	20	498
United States	7.0	15	303

Source: Tietze, C. (1981). *Induced Abortion: a World Review*, 1981. New York: Population Council.

Abortion rates

some time Romania

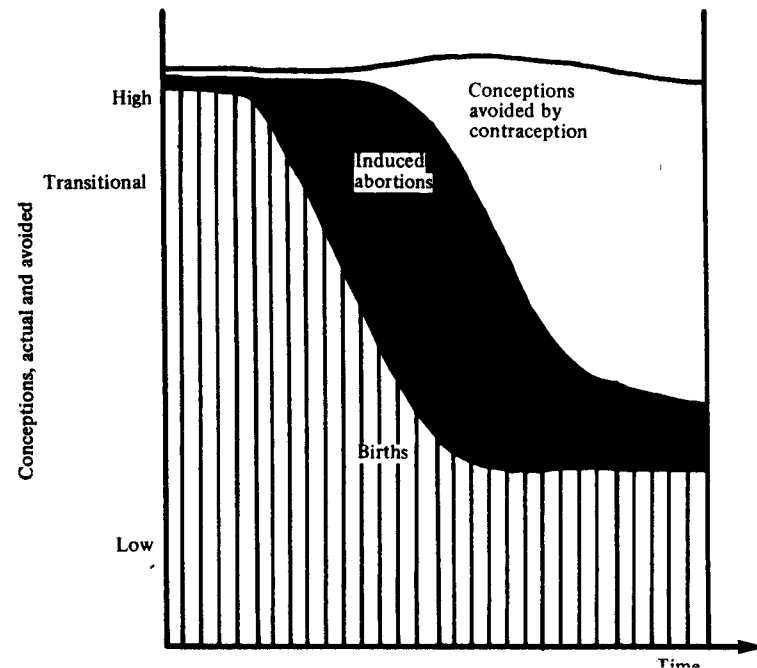
their fertility for the first time, and, like their married grandparents or women in contemporary Latin America, they are experiencing a high abortion rate while striving to improve their contraceptive practice. The number of woman having legal abortions appears to be determined not by the availability of abortion but by the pre-existing cultural norms of the

Table 13.3. Induced abortion by educational level in three Latin American cities. (Figures show the percentage of women reporting one or more illegally-induced abortions)

Education	Santiago, Chile	Bogota, Columbia	Mexico City, Mexico
None	27.3	26.0	29.6
Elementary only	39.3	28.0	34.2
High school and beyond	24.3	19.1	24.8

Source: Requena, M. B. (1971). The problem of induced abortion in Latin America. In *Proceedings of the International Population Conference of the IUSSP*, vol. 3. Liege, Belgium: International Union for the Scientific Study of Population (IUSSP).

Fig. 13.5. Abortion during the demographic transition.



country (Table 13.4): the abortion laws in Singapore and England and Wales are virtually identical, yet abortion rates for young women are very different, reflecting different patterns of chaperonage. In addition, the earning power of the young and parental expectations are very different in the two societies.

Who has abortions?

Most women seek abortions because they feel that they cannot give a child, if born, the love and care they believe it deserves. Abortion is a private act and in many ways an altruistic one, even if it can still arouse dismay in others and sometimes shame in the woman concerned. Most abortions represent a woman's desire to control her own fertility.

Few abortions are carried out because continuation of the pregnancy might threaten the pregnant woman's life since with technical improvements in obstetrics this dramatic situation becomes rarer each year. Young unmarried girls, particularly Roman Catholics from well-to-do areas, are sometimes at higher than average risk of suicide.²⁸ A small number of abortions are carried out because of rape or incest and an increasing, but still small, proportion because of evidence that the fetus may be abnormal.⁴⁷

Recent advances in fetal diagnosis coupled with elective abortion are making a substantial impact in reducing the risks of delivering an abnormal baby in industrialized countries. Amniocentesis and karyotyping can detect Down's syndrome¹¹¹ and other chromosomally determined defects. Other tests will detect a number of biochemical abnormalities. Routine amniocentesis is now offered in Britain to those women whose fetuses are at

Table 13.4. Incidence of legal abortion by marital status (selected countries 1978-79)^a

Country	Currently married (%)	Previously married (%)	Never married (%)
Canada	26.0	9.9	64.1
United States	26.4	—	73.6
England and Wales	37.9	11.4	50.7
Singapore	75.7	1.0	23.3
Czechoslovakia	80.1	7.3	12.6

^a Marital status is given at time of termination.

Source: Tietze, C. (1981). *Induced Abortion: a World Review, 1981*. New York: Population Council.

particular risk of genetic abnormality, to virtually all women pregnant for the first time at the age of 35 or over and all pregnant women over the age of 40. Neural tube defects, including anencephaly and spina bifida, occur at a rate of 1-3 per 1000 births. In 1972 Brock & Sutcliffe reported increased amounts of α -fetoprotein in amniotic fluid from pregnancies with neural tube defects.⁷ Subsequently, raised α -fetoprotein in maternal serum was shown to be a satisfactory preliminary screening test for the abnormality. During screening for raised serum α -fetoprotein in 12000 women in Scotland, 75 were selected for amniocentesis and as a result 34 were aborted. In every case the aborted fetus had major defects.¹²⁴ The quality control in the testing laboratories must be high.¹³³ The confirmatory amniocentesis carries a small risk of inducing miscarriage, tests can only be done after about the sixteenth week of gestation and second-trimester abortion must be ethically acceptable to the woman and the obstetrician.⁴³ Nevertheless, such developments are a natural extension of the process whereby spontaneous abortion screens out abnormalities and will become increasingly significant. Already, current techniques have the potential of reducing the risk of an older woman (aged 35-44) bearing an infant with a severe birth defect to a level comparable with that of a younger woman. For a woman over 45, screening can reduce the risk of abnormality, but it will still be higher than that of a younger woman.⁴¹ In the future, transcervical methods of diagnosis which can be done earlier in pregnancy may be developed and the range of detectable defects (e.g. sickle-cell disease and thalassaemia) will continue to expand. Hysteroscopy and direct visualization of the fetus is already a useful tool in technologically advanced centres.

Techniques of abortion

Post-coital and menstrual therapy

The post-coital use of steroids is reviewed in Chapter 10 and of IUDs in Chapter 11.

Several chemicals may act as emmenagogues although only prostaglandins (PGs) have reached the stage of clinical trials for the medical induction of a late period. The presence of PGs in menstrual fluid was demonstrated by Pickles in 1957⁹¹ and in 1971 Karim showed that menstruation can be induced by the vaginal application of PGs⁶¹ though the quantities required are large and the side-effects unacceptable for routine use. Prostaglandins also make the smooth muscle of the gut and bronchi contract, so side-effects include vomiting, diarrhoea and asthma-like attacks. The earlier in pregnancy that PGs are used, the higher is the

dose required and the worse the side-effects.⁶² Despite these disadvantages, because of their effectiveness, PGs do open up the possibility of eventually becoming what Ravenholt defined in 1968 as the most essential missing element in fertility control, namely: 'a non-toxic and completely effective substance or method which when self administered on a single occasion would ensure a non pregnant state at completion of a monthly cycle.' To achieve that goal the desired uterine effects must be separated from the unwanted and burdensome side-effects.

Csapo suggested that a double-impact dose of PGs was particularly effective in early pregnancy^{15, 16} and several clinical trials using PG F₂α derivatives have been conducted with the PG F₂α being administered in the form of vaginal pessaries and intramuscular injections.^{8, 76} Usually the procedure is successful but occasionally the surgical evacuation of the uterus is also necessary to complete the abortion. The use of prostaglandins to induce menstruation is not yet a routine, service procedure. On the one hand increasingly effective analogues are discovered every year.³¹ On the other hand major manufacturers are increasingly afraid of pursuing research in this field and there is a serious danger that one of medicine's greatest immediate needs at global level will go unfulfilled, not because of lack of scientific know-how, but because of protests by a vocal minority in certain western countries.

Surgical techniques

Historical development. Dilating the cervix and scraping the uterine contents in early pregnancy has been practised since pharaonic times. There have been three fundamental improvements in techniques over the last one hundred years or so. From the time of Lister aseptic technique has greatly reduced the risk of infective complications. The introduction and improvement of anaesthetics, first general and then local, has meant not only that the woman is relieved of severe pain but also that the operator is able to proceed slowly and calmly, dilating the cervix in a gentle and as far as possible atraumatic manner, thus enabling full removal of the uterine contents and reducing the likelihood of cervical damage. Recently, the technique of vacuum aspiration (VA) has made uterine evacuation simple and remarkably safe.

In 1863 James Simpson, who introduced chloroform to Europe and gave it to Queen Victoria during childbirth, described a technique of 'drycupping' the interior of the uterus to bring on menstruation during early intervals of amenorrhoea.¹⁰⁶ This suction technique was rediscovered by the Russian Bykov in 1927 but its use disappeared when the Russian law was made more stringent in 1936.⁹ In 1958 Wu and Wu in China

reintroduced vacuum aspiration, which spread to Japan, China, Russia and parts of Eastern Europe by the late 1950s and the 1960s.¹³⁵ In 1967 Dorothea Kerslake began to use suction termination in Britain and by 1969, 45% of all early terminations were being performed in this manner.⁶⁵ The advantages of suction over the more conventional curettage or scraping of the uterus are now firmly established, not only for early termination of pregnancy but also for the treatment of incomplete abortion.⁹⁸ The technique is more gentle, thereby less damaging, and more thorough because the suction is effective even if the operator has failed to approximate the suction curette closely to every part of the uterine cavity.

Anaesthesia. Termination can be performed under local, spinal or general anaesthesia. Before 8 weeks since the last menstrual period, when VA can be completed without cervical dilatation, it can be conducted without anaesthesia at all if the woman and the surgeon so wish, or with sedation such as intravenous (5-7.5 mg) diazepam. About 30% of western women who had menstrual regulation (see below) without anaesthesia rated it a painful procedure and pain was most likely in the nulliparous and particularly in those who proved not to have been pregnant.¹¹²

In a high volume clinic, with a specialist anaesthetist present, rapid general anaesthesia (with facilities for resuscitation and tracheal intubation if needed) has been safely used in hundreds of thousands of cases. Anaesthetics, including halothane and trichloroethylene, which relax smooth muscle are best avoided.

Local anaesthetic by paracervical block is simple, safe and satisfactory for vacuum aspiration and for dilatation and curettage (D and C) when these methods are used simply to terminate a pregnancy. Injections should be given at the reflexed vaginal epithelium, that is at the junction of the cervix and vagina, and a total of 10 ml of 1% lignocaine should be given in two or four doses at 1 cm depth at the 4 and 8 o'clock or 2, 4, 8 and 10 o'clock positions respectively (Fig. 13.6).

Five deaths due to local paracervical anaesthesia were reported in the US between 1972 and 1975 and most or all involved overdose or hypersensitivity.⁴⁴ Care must be taken to determine that the woman is not allergic to lignocaine and to avoid injection into a blood vessel by drawing back the plunger before each injection. It is essential to wait at least 2 min by the clock for the anaesthetic to work.

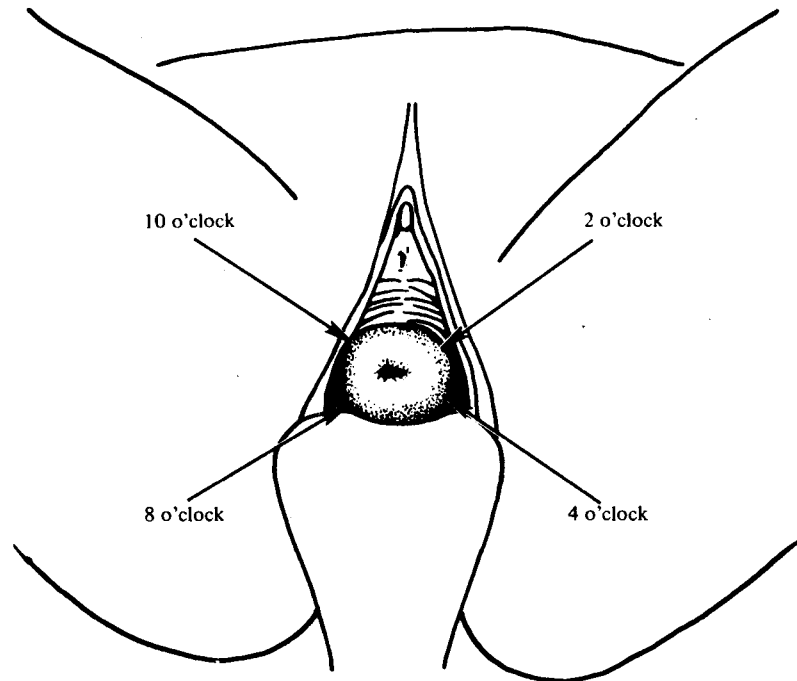
Cervical dilatation. Most of the immediate and some of the long-term risks associated with abortion derive not from emptying the uterus but from entering it. When dilatation is

Hanbin Ambler dilators, which are tapered, are preferable to Hegar dilators, which require greater pressure for equal dilation.

For well over a century, laminaria (compressed stem of the seaweed *Laminaria digitata*) tents have been used by surgeons to dilate the cervix slowly. (In parts of Yugoslavia dried asparagus used to be used for the same purpose). Their use is widespread in Japan and Korea, and they have a long history in Britain⁹⁹ and are becoming increasingly well known in the US for the induction of abortion (and also full-term labour¹¹⁹). Tents are inserted under sterile conditions 6–12 h before surgery and secure a slow, largely painless, even dilation so that on removal a 10 mm cannula or metal dilator can be inserted easily. Infection is a danger if the tents are left in situ for too long. For more advanced pregnancies the cervix can first be dilated to 12 mm and then packed with tents which will slowly dilate it much further and are unlikely to tear it.

It has also been observed that although laminaria tents swell, they exert little external pressure and the process of dilatation is not comparable to expanding a wooden wedge with water to split off stone in a quarry, but rather to the slow driving out by pressure of interstitial fluid. With this in

Fig. 13.6. Injection sites for local anaesthetic in termination of pregnancy. (Woman in lithotomy position.)

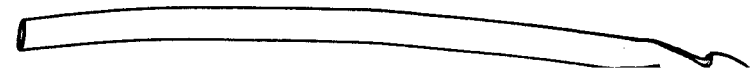


mind, the International Fertility Research Program (now Family Health International) has developed an osmotic dilator of a cellular plastic impregnated with 0.7 g of magnesium sulphate. This performs better than conventional laminaria, is cheaper, quality control is simpler and it may be applicable to brief (2–4 h) use, so that it can become part of a day-care service (see under Day-care abortion).

Menstrual regulation. Menstrual regulation (MR), menstrual aspiration, very early suction abortion and pre-emptive uterine aspiration are all terms used to describe suction aspiration of uterine contents when the first missed menstrual period is less than 14 days overdue. This arbitrary definition was accepted because the routine diagnosis of pregnancy cannot be established with certainty and this has considerable medico-legal importance in some parts of the world, particularly in Latin America and several Commonwealth nations where definitive abortion procedures still fall under restrictive statute laws (see Chapter 15).

In 1961, Harvey Karman, a Californian lay psychologist who was appalled by the misery he found amongst the unwillingly pregnant, began to abort women *extra legem*. Not being conditioned by a formal medical training, he approached the problem of abortion with an open mind, and, lacking the facilities to give general or even local anaesthetics, he sought to apply the principles of vacuum aspiration using a very small-bore tube to avoid dilating the cervix.⁹⁸ He chose soft and pliable tubing for curettes and a hand-held syringe to form the vacuum. Up to this time all suction curettes had single openings, which often became blocked. Karman introduced two openings (Fig. 13.7) in his curette and so overcame this problem. An additional advantage is that the pliable tubes tend to be deflected and to curl up inside the uterine cavity rather than to perforate the wall of the uterus as any rigid instrument may do. Thus, as far as very early pregnancy is concerned, Karman's ingenuity solves three problems at one stroke: the need for anaesthesia to dilate the cervix (this being the painful part of dilatation and curettage), the problems of blockage of small-bore tubes and the danger of perforation with a fine instrument. The technique was first published by Karman & Potts in 1972.⁶³ Menstrual regulation is quick and simple.^{66, 70, 127} Anaemic women and women with a known blood coagulation disorder should only be operated on in a hospital.

Fig. 13.7. The Karman curette.



Careful pelvic examination is necessary to check the history of amenorrhoea and exclude fibroids, gross uterine abnormalities or pelvic inflammatory disease. The equipment is cheap and robust³⁷ and does not require elaborate facilities or specialist operators. Paramedical workers or even traditional midwives can perform MR safely after adequate training and so long as they refer any doubtful, complicated or potentially difficult cases to a gynaecologist. The greatest danger of MR is over-confidence in an operator who has neither the skill nor the facilities to cope with a surgical complication or who lacks the experience and confidence to estimate the duration of a pregnancy.

For carrying out MR, a good light, a clean room and a firm table are necessary. With the woman in the lithotomy position, a speculum is passed and the cervix cleansed with a suitable disinfectant. She need not be draped nor the operator gowned but a no-touch technique is essential. The cervix must be stabilized, if possible with an atraumatic instrument. The syringe is drawn back and the valve closed and set aside before a 4- or 6-mm cannula is passed gently through the cervix: the larger the cannula that can be used, the less the chance of a failed procedure. The cannula should be used to sound the uterus, once again checking the duration of pregnancy. (Table 13.5). Sounding to an excess depth should suggest an error in dating the pregnancy, fibroids or uterine perforation and it may be necessary to refer a woman receiving MR in a simple facility to a better-equipped institution.

With the cannula in the uterus (often liquor will begin to drain) the charged syringe is attached with a firm twist to ensure an airtight lock, and the valve opened. The products of conception rapidly enter the syringe and the walls of the uterus should be gently curetted by 'in-and-out' stroking motions accompanied by rotation of the syringe and attached cannula to ensure that all parts of the uterine cavity are curetted. If the syringe fills or the vacuum is lost, the syringe should be detached, emptied and recharged.

Table 13.5. Assessment of the duration of pregnancy: clinical findings and embryonic growth

Days since LMP	Length of embryo (mm)	Uterine length (sounding) (cm)
28	<1	7
42	4-5	7-8
56	15	8-9
70	30	9-10
84	60	10-11

If the cannula blocks it should be removed and cleaned with a sterile swab or instrument. No additional instrumentation is necessary and MR can usually be completed in 3-5 min. Discomfort varies from little to moderate,¹¹² and cramping pains may be severe towards the end of the procedure. Local anaesthesia, if needed, is given in the same way as for routine vacuum aspiration. The fine-bore aspiration technique can be used to treat incomplete abortion, for endometrial biopsy and for routine curettage for dysfunctional bleeding.

Uterine perforation is rare and excessive blood loss requiring transfusion was not encountered in closely monitored series (Table 13.6).³⁶ Pregnancy can continue after any abortion but the risk is slightly greater in the case of MR than in routine first-trimester procedures and it is essential that the woman clearly understands the need to return if the signs and symptoms of pregnancy persist. Experience has shown that the use of a 4-mm cannula is particularly likely to end with a failure to terminate the pregnancy and it is recommended that 6 mm should be the smallest size used. The operator must also be alert to the risk of ectopic pregnancy.

A proportion of women who undergo MR will not have been pregnant.⁶ Up to 14 days' menstrual delay nearly 30% of MRs may be unnecessary. However, even though the number of redundant operations is cut down by asking women with negative pregnancy tests to return some days later, it must also be recognized that any delay in operating produces a measurable increase in complication rates. The decision is likely to depend on the

Table 13.6. Menstrual regulation (immediate and delayed complications reported from a 21-country multicentre study 1972-76)

Complication	Rate per 1000 Number operations	
<i>Immediate (112888 cases)</i>		
Uterine perforation (definite)	3	0.2
Uterine perforation (suspected)	1	0.1
Cervical laceration	2	0.2
Blood loss in excess of 100 ml ^a	51	4.0
<i>Delayed (11309 cases followed up 2-4 weeks after MR performed)</i>		
Continuation of pregnancy (positive pregnancy test)	111	9.8
Fever (requiring antibiotics)	95	8.4
Repeat curettage for bleeding	101	8.9
Undiagnosed ectopic pregnancy	2	0.2

^aNo patient required transfusion.

country's law, medico-legal practices and the emotional choices of the woman and the surgeon.

In certain special circumstances, very early abortion may lead to a rushed and possibly incompletely-accepted decision. For example, single women with a good and stable relationship with the putative father may be ambivalent and adequate time for discussion and possibly counselling may not have elapsed; in such circumstances adequate time to decide is an essential part of good treatment.

Perhaps the main drawback of MR is its simplicity! Unfortunately, gynaecologists and those working in abortion clinics who acquire considerable expertise in first-trimester abortion rarely perform menstrual aspiration. In Britain it is rarely used because abortions are limited to defined clinical facilities and by the time women are referred it is too late to use the procedure. In the US a larger experience has been accumulated but prices have never dropped to the \$25 or \$50 that a 5-min procedure with a \$15 piece of apparatus deserves. Globally, Lafe estimates, 5 million MRs may have been performed by the end of the 1970s.^{73, 94} In Calcutta the procedure is offered for US \$2-3 and in the Philippines, Indonesia and parts of Africa and Latin America it is beginning to be used widely. The technology is appropriate to the developing world as it is cheap, safe, simple and robust. In Malaysia one practitioner performed 5000 consecutive MRs with one syringe and with only one woman requiring hospital admission (for perforation). Paradoxically, MR has still to reach its full potential in western countries where abortion is legal.

Emptying the uterus before the woman knows for certain that she is pregnant profoundly changes the emotional, legal and ethical aspects of early abortion. Gynaecologists investigating involuntary infertility frequently perform a diagnostic curettage of the uterus during the 10 days before the next expected period and all will recall having inadvertently performed an early abortion when it was least desired. It is known that many seemingly normal menstrual periods are in fact very early abortions. Using the name 'menstrual regulation' alters the rules of the game which people play in relation to abortion. To describe such an important human problem in terms of a game may seem out of place but neither the general public nor the medical profession are logical in their attitudes to abortion. Politicians, lawyers, doctors and women in need all distort reality. It is not practical to write about abortion in a Bangladeshi newspaper in a straightforward way, but it has proved acceptable to hold a much-publicized conference on menstrual regulation in Dacca and MR is now counted as part of the government family planning programme. It is not prudent to have even a whispered discussion of the role of abortion in

family planning in the Philippines or Latin America, but it generates immediate and widespread interest to discuss menstrual regulation.

Vacuum aspiration. Dilatation of the cervix and vacuum aspiration (VA) in early pregnancy (under 12 weeks from last menstrual period) is now accepted worldwide as the optimum technique for early abortion.^{22, 30, 53, 67, 68, 97} Women with renal, cardiac or other serious disease, fibroids, uterine anomalies, pelvic infection, *severe* cervicitis, anaemias and blood coagulation disorders can all have VA, but require specialist treatment and full hospital facilities.

Careful pelvic examination is essential and is probably the most important step in the whole procedure. By about 40 days after the last period, the fundus of the uterus may be palpated as being more globular in shape. When the firmness of the cervix is traced upwards with the internal examining hand and the uterine isthmus is passed prior to slight palpable enlargement of the fundus, this is known as Hegar's sign and is valuable in diagnosis of early pregnancy.

The woman should be counselled so that she understands the nature and possible implications of abortion and makes a free and informed choice. Enquiry should be made about post-operative contraceptive choices and the option of inserting an IUD at the time of abortion considered. The possibility of a technical failure and continuing pregnancy should always be emphasized and also the need to return if signs of infection or undue bleeding occur.

Most operators find that the cervix is best exposed with a short-bladed, bivalve speculum (warmed to body temperature if local anaesthesia is used). After cleansing (as for MR) the cervix should be immobilized and the uterus sounded. If, after bimanual assessment and uterine sounding the pregnancy is found to be very early, say under 7 weeks from the date of the last menstrual period (LMP), it may be possible to introduce a 6-mm cannula without having to dilate the cervix. At a later state, or when a nulliparous cervix is unusually tight, dilatation will be required but should always be done to the smallest degree consistent with full uterine evacuation. Up to about 9 weeks from LMP, soft cannulas with outside diameters up to 8 mm are suitable and add to safety. After 9 weeks semi-rigid cannulas allow the aspiration of fetal and placental tissues more readily. The technique is suitable in the hands of most operators up to about the fourteenth week but the cervix should never be dilated beyond 12 mm if further childbearing is contemplated. Electric vacuum pumps are convenient and efficient, a negative pressure of 600 mm (30 inches) of

lacking, suction produced by an assistant-operated reverse action bicycle pump is perfectly satisfactory.

When the vacuum is switched on and the cannula begins to 'grip' it should be moved inwards and outwards in the direction of the uterine axis and also rotated about its own axis. Aspiration is continued until the uterine wall can be felt all round. Signs of completed evacuation are (a) the appearance and amount of the evacuated products, (b) the presence of a slight froth in the aspiration bottle and (c) most significant of all, a gritty feeling of the suction curette being gripped by the walls of the empty uterus.

The advantages of vacuum aspiration over cervical dilatation and uterine curettage are that it is quicker, more complete in removal of tissue, involves less blood loss, results in fewer complications and is more easily performed with local anaesthesia.

It is unwise to prophesy future developments in medical technology but there are some surgical procedures, such as appendicectomy, which appear to have reached an end-point and where further technical improvement seems unlikely. Such a procedure is vacuum aspiration for the termination of early pregnancy.

Dilatation and curettage. Dilatation of the cervix and curettage of the uterine cavity (D and C) was for generations the accepted way of treating incomplete abortions and of performing first-trimester therapeutic abortions in centres where these were done. Local anaesthesia can be used but a very gentle technique is needed. The diagnostic potentiality of examination under anaesthesia is sacrificed, so the method is suitable only when the diagnosis and duration of pregnancy are certain. When terminating a pregnancy by this technique, particularly in very early pregnancy (8 weeks or less) it is essential to curette methodically the *entirety* of the uterine cavity otherwise a small piece of placental tissue may be left behind and a further curettage may later become necessary for continued bleeding and/or pain. It used to be taught that a blunt curette should be used for fear of perforation. In practice, uterine perforation almost invariably occurs as the instrument, be it sound, dilator, forceps, or curette is being introduced. Perforation almost never occurs during the return or truly 'curetting' action and therefore a sharp curette, which is lighter, more sensitive and more efficient than a blunt one, is actually safer for these very reasons. Similarly, experienced operators will rarely utilize oxytocic drugs because they know that good uterine contraction with full control of bleeding will occur spontaneously when the whole of the conceptus has been removed and this very typical contraction, occurring without the use of an oxytocic drug, is a useful indicator that the procedure is complete. Oxytocic drugs

Day-care abortion

Until the recent world revolution in abortion legislation the subject of abortion was medically taboo. No ambitious young doctor seeking advancement published papers of his experience or of an innovative technique in abortion. There were, of course, doctors all over the world who specialized in doing abortions clandestinely, sometimes illegally and sometimes stretching the existing laws so as to be at least quasi-legal. There was, therefore, an almost total lack of information about abortion morbidity and mortality. The medical establishment in western countries believed that abortion was a dangerous operation, although their colleagues in Russia, Japan, China or Yugoslavia could have easily reassured them. When abortion first became legal in the West it was entirely an in-patient hospital procedure performed under the control of, and often personally by, a specialist gynaecologist. In practice the performance of abortion under general or local anaesthesia calls for specialized training and for constant awareness of potential risks but does not require the skill of a fully trained gynaecologist. Indeed, because of its repetitive nature, the operation may not hold the full attention of a highly skilled specialized surgeon (Table 13.7).

In the late 1960s the British Government set up an impartial committee

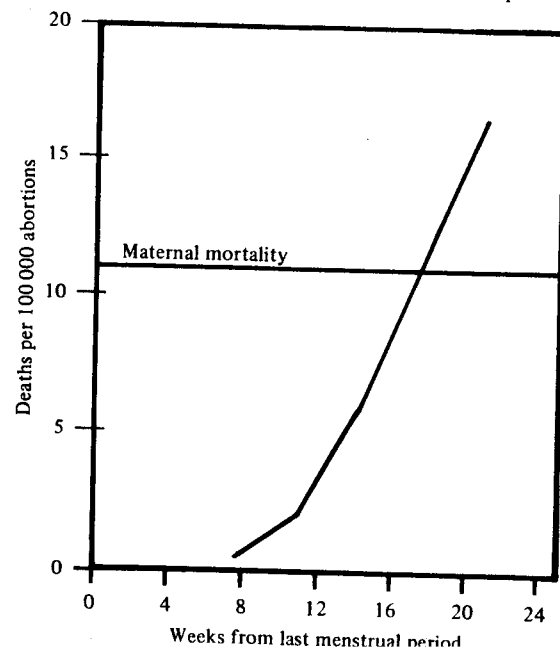
Table 13.7. *Incidence of complications in high and low volume abortion facilities*

Complications	Day-care abortion unit (US 1970-72)		Specialist hospital care (UK 1968-70)	
	Number of cases	Rate per 1000	Number of cases	Rate per 1000
Perforation (without sequelae)	36	1.4	14	12.0
Perforation (needing laparotomy)	13	0.5	6	5.0
Hysterectomy	1	0.03	2	1.6
Infection (temperature of 38°C or more for 24 h)	391	15.0	321	270.0
Total number of abortions	26 000		1182	
Percentage performed at 12 weeks and less	100		78	

Sources: Stallworthy, J. A., Moolgasker, A. S. & Walsh, J. J. (1971). Legal abortion: a critical assessment of its risks. *Lancet*, ii, 1245; Nathanson, B. M.

under a High Court Judge, Mrs Justice Lane, to examine the workings of the Abortion Act in Britain.¹³⁶ One of the recommendations of this committee was that abortion counselling and the performance of simple early abortion were tasks admirably suited to the specially trained general practitioner. The committee also recommended that day-stay, ambulatory operation facilities be provided rather than women be admitted to hospital for in-patient treatment. Unfortunately these recommendations have never been implemented in Britain, where more than half of all abortions are provided by the private sector which, with minor exceptions, is still prohibited from day-stay abortion care. In the United States a totally different situation developed. Here, for financial reasons, out-patient care was adopted from the very beginning and, similarly, local anaesthesia has been very widely used, certainly throughout freestanding abortion clinics. These clinics, staffed by personnel specializing in abortion have produced excellent and relatively cheap abortion services with extremely low morbidity and mortality rates.^{78, 81, 96} Highly successful out-patient abortion clinics have been established in the Netherlands where they flourish despite a restrictive law.

Fig. 13.8. The risks of induced abortion at varying stages of pregnancy (US 1970s). (Modified from Tietze, C. (1979). *Induced Abortion: A Fact Book*. New York: Population Council.)



Out-patient abortion facilities are particularly applicable to the developing world, but within that world there is such a shortage of medical services that it is to be hoped that paramedical staff and perhaps traditional practitioners will be utilized after a short course of training. Several experimental schemes have shown such staffing to be safe and efficient.

The key to safe abortion is early operation (Fig. 13.8) and services should be established with this in mind. For example, the Nordic countries were early in legislation for abortion but the bureaucratic system forcing the woman to appear before an abortion committee (often on at least two occasions) led to inordinate delays with high mortality and morbidity simply because operations were being performed far later than need have been the case. To a lesser extent the British situation is similar except where, on local initiative, special abortion units have been set up within the National Health Service, thereby avoiding the delay usually associated with referral by the family doctor to the hospital specialist.² In Kingston, on the outskirts of London, approximately 5000 day-stay abortions have been done by family practitioners working in a special unit, but, although successful, this remains unusual.

Day-care or out-patient abortion requires selection of patients. Physically or psychiatrically ill patients should be excluded because they need longer post-operative care, support and observation. Each day-care unit needs access for back-up to the facilities of a fully-equipped gynaecological department. With these two provisos the concentration of facilities within one unit ensures that all members of the team are sympathetic to abortion and experienced in the handling of women at risk of emotional trauma. Abortion counselling and future contraceptive help should be a routine part of the work of such a unit. Experience has shown that the complications of abortion occur either during the operation itself or are those of secondary haemorrhage or infection which manifest themselves some days later and therefore would not, in any case, be detected by routine 24-h hospital in-patient stay.

Mid-trimester abortion

Late abortion can be dangerous and is always disagreeable. Surgical risks rise steeply after the twelfth or thirteenth week and psychological or emotional trauma to the woman is very much increased. In addition, medical and nursing staff associated with abortion invariably find late abortion to some degree stressful. The management of late abortion can be divided into one-step and two-step procedures.

One-step procedures

Uterine evacuation (dilatation and evacuation (D and E)) by the vaginal route is feasible until about the twentieth week of pregnancy. It requires a high degree of surgical skill, adequate anaesthesia (usually general) and full operating room facilities. Laminaria tents reduce the risks of excessive force needed to dilate the cervix but there remains the danger of tearing the internal sphincter, with a risk of cervical incompetence and a threat to future fertility. The extent of this danger calls for assessment by prospective trials; none have yet been reported.

Dilatation and evacuation was used in Britain³³ for many years before it was tried in the US. In 1977 Grimes and colleagues from the US Center for Disease Control demonstrated, in a prospective study of 6213 mid-trimester curettages and 8662 abortions performed by intra-amniotic injections, that the former had less short-term, major complications (0.69 per 100 versus 1.78 per 100).^{10, 46, 113} It also has less complications than the intra-amniotic use of prostaglandins.⁴⁵

Two-step procedures

Induction of late abortion by amniocentesis involves the introduction of a needle via the abdominal wall into the uterine cavity and the drainage of amniotic fluid. In modern practice the technique is not usually attempted before the fifteenth or sixteenth week of pregnancy.⁶⁴ Local anaesthesia only is required. The patient must fully empty her bladder before the procedure is attempted. A needle encased in a piece of fine-bore plastic tubing is introduced and once the amniotic cavity is entered amniotic fluid escapes. At this point the needle is withdrawn and the operator is left with a fine-bore plastic tube leading into the amniotic cavity. Such a tube, not being rigid or sharp, is not likely to perforate the uterine wall or cause damage to the placenta which might lead to mixing of maternal and fetal blood. Once the tube has been introduced the amniotic fluid inside the uterus is drained as fully as possible. At about 16 weeks it is normal to be able to remove about 200 ml and usually 200 ml of a selected solution is then injected.

The instillation of hypertonic saline into the intra-amniotic cavity to induce abortion was first reported by Aburel in 1939 and widely used in Japan between 1946 and 1952; it then fell into disrepute because of high complication and mortality rates.¹³¹ Nevertheless, saline replacement after amniocentesis continues to be widely used in the US. The method is contraindicated for women suffering from cardiac or renal disease.

Hypofibrinogenaemia is always a risk. The introduction of saline usually kills the fetus and is followed by a drop of serum progesterone levels.¹²² A live fetus is very much less likely to be delivered following saline induction than with some other two-step methods of abortion.

Because of the mortality associated with hypertonic saline, instillation of hypertonic glucose solutions was tried in many parts of the world but has been largely abandoned because it is associated with increased infection rates. A replacement solution that is free from serious sequelae, even if injected into the wrong place or if it is for some reason rapidly absorbed, is urea. It has been widely used in England and Wales since its introduction in 1971.⁴³ So far there have been no reported deaths with urea or urea and prostaglandins, although non-fatal complications including a ruptured uterus following urea and prostaglandins have been reported. Amniocentesis, inevitably, is associated with delay between replacement of the amniotic fluid and expulsion of the fetus and placenta. This delay can be shortened by using an oxytocin or prostaglandin intravenous drip.¹⁴ The latter is about as effective as the former but more toxic.

Extraovular injections of soft soap pastes have long been known for both legal and illegal abortion, but were often associated with infection.^{5, 108} Irritants such as rivanol (ethacridine lactate, a yellow dye and antiseptic) have been used as alternatives in some countries such as Russia, Japan and Israel. Recently such irritants have been supplanted by prostaglandins, with or without intra-amniotic urea. The extraovular introduction of prostaglandin F₂α for the induction of abortion, or even for the induction of pre-term labour is now commonly used.⁹⁸ Either a very fine-bore polythene tube is introduced for a considerable distance through the cervix, or else a self-retaining bladder catheter ending in a balloon is passed through the cervix, the balloon is inflated with sterile water to hold the catheter in place and an extra-amniotic injection is made either continuously using some form of drip or pump, or intermittently as a bolus delivered by a syringe.

Davis has used a method where, under sterile conditions and with local or general anaesthesia, the cervix is dilated to approximately 10 mm, a small-bore vacuum aspiration cannula is inserted into the uterine cavity, rupturing the membrane, and, with a low vacuum, the cord will adhere to the cannula and can be pulled down and divided. As with other two-step procedures, the aim is to destroy the placental function; once this is achieved, uterine contractions leading to expulsion of the products of conception will follow. An oxytocin drip can be used.

Hysterectomy is a miniature Caesarean section, and can be done

vaginally or by the abdominal route. Abdominal hysterotomy is very much more dangerous than simple early abortion (Table 13.8). Vaginal hysterotomy has no advantages over D and E because once the cervix has been cut, resuturing rarely restores functional competence. Unlike abdominal hysterotomy, it cannot easily be combined with sterilization.

During 1972-73 in England and Wales, 15 244 cases of hysterectomy or hysterotomy were performed with 8 deaths, a mortality of 52.5 per 100 000 operations. Hysterotomy is rarely if ever indicated as an operation designed primarily for the termination of second-trimester pregnancies.

Hysterectomy, the total removal of the uterus, is even less frequently indicated for abortion. The dangers of hysterectomy are greatly increased when it is undertaken during pregnancy. Where there is a double indication for a termination of pregnancy and for hysterectomy on other grounds, it is safer first to terminate the pregnancy and later to perform the hysterectomy.

It seems that neither man nor nature wants to perform second-trimester abortions. Those methods which involve a short interval between induction and abortion are associated with a high incidence of incomplete procedures requiring a second, surgical emptying of the uterus, while those which involve the misery of slow effect tend to require less surgical intervention. These correlations apply to prostaglandins, which have a relatively quick effect, but may be associated with incomplete procedures, and saline or urea, which have a slower but more often complete effect, as well as to the

Table 13.8. *Mortality of abortion by method (England and Wales 1969-77)*

Year	No. of vaginal terminations	No. of deaths	Rate per 100 000 procedures	No. of hysterotomies and hysterectomies	No. of deaths	Rate per 100 000 procedures
1969	38 948	4	10.3	12 845	11	85.6
1970	68 703	7	10.2	14 159	6	42.4
1971	110 498	5	4.5	12 482	6	48.0
1972	132 819	8	6.0	9 203	6	65.2
1973	134 069	1	0.7	6 041	2	33.1
1974	150 004	5	3.3	4 098	1	24.4
1975	127 281	2	1.6	2 481	0	-
1976	117 761	1	0.8	1 940	0	-
1977	121 165	3	2.5	1 560	4	256.4

Source: *The Registrar General's Statistical Review of England and Wales - Supplements on Abortion for the years 1969-1977*. London: HMSO.

addition of oxytocin, which also speeds up the abortion but tends to result in the procedure being incomplete with retained products needing surgical evacuation.

Complications of abortion

Illegal abortion

Mortality. Speculations about the numbers of illegal abortions performed are always open to error, so the relevant morbidity and mortality rates must involve guesswork. However, better than usual estimates can be made from England and Wales because since 1952 every death of a pregnant or recently pregnant woman in England and Wales, has been automatically scrutinized by the Registrar of Deaths and made the subject of confidential enquiries carried out by an appointed group of gynaecologists who collaborate with the local community physician and make enquiries of every doctor and professional worker who had contact with the woman. An assessment is made of what are termed avoidable factors, these being errors of judgement either by the woman herself or by any of her medical or nursing attendants. The value of these reports depends upon the fact that every such enquiry is totally protected and its findings cannot be used in a legal action under any circumstances. It is possible to admit errors as well as challenge the wisdom of others in the management of the case without fear of damaging a colleague or of reprisal.¹² The system works well and reports are published every three years (Table 13.9). Although these reports are comprehensive, it is still possible that some criminal abortions may have been recorded as spontaneous, because once the woman has died, the secret of interference has died with her.

Table 13.9. *Deaths from abortion in England and Wales 1952-54 to 1976-78: abortion deaths in Triennial Reports on Confidential Enquiries into Maternal Deaths*

Type of abortion	1952-54	1955-57	1958-60	1961-63	1964-66	1967-69 ^a	1970-72	1973-75	1976-78
Illegal	108	91	82	77	98	74	38	10	4
Spontaneous	43	50	52	57	25	25	6	5	2
Legal	2	0	1	5	10	18	37	14	8
Totals	153	141	135	139	133	117	81	29	14

^a Liberal abortion legislation came into force on 27 April 1968.

Overall, in Britain as in other countries where abortion is legal, deaths due to illegal interference have been falling steadily over the past 30 years and, with the implementation of a liberal abortion law in 1968, the fall accelerated dramatically. Probably the fall between 1952 and 1968 was due to the fact that antibiotics had become available, not only to the medical profession but also to illegal abortionists, who were using them widely by 1965.

If we accept the estimate of 100 000 illegal abortions a year in England and Wales then the 74 deaths ascribed as criminal abortions over the period 1967-69 give a mortality rate of 24.7 per 100 000 abortions. If the number of abortions had been constant from 1961 onwards, then over the preceding six years 1961-66 (175 deaths) the rate would have been similar at 29.1 deaths per 100 000. These guesses seem reasonable because the sudden increase in the number of legal abortions performed after 1967 had little or no effect on the birth-rate, strongly suggesting that the increased number of legal abortions replaced an equal number of illegal abortions that were being performed before the reform of the law. Something over 100 000 therapeutic abortions were probably performed in hospitals and nursing homes during the years 1961-66, whereas between 1970 and 1975 the figure rose to 605 334. However, deaths believed to be due to illegal abortion fell from 165 in the first six-year period to only 48 in the second. Thus, transferring an estimated 500 000 abortions from the illegal to the legal sector appears to have saved 117 maternal lives.²⁵ Calculations based on this latter assumption give a mortality rate of 23.5 per 100 000 illegal abortions. Such a calculation is inexact, as it takes no account of possible improvements in contraceptive usage, but each of these approaches gives a consistent order of magnitude which suggests that the death rate from illegal abortion in England and Wales was probably about 25 per 100 000 during the 15 years 1961-75. Inevitably, in developing countries, illegal abortion will be associated with much higher risks.

Morbidity. Illegal abortion was, until 1968, the most common single cause of involuntary infertility in England and Wales²⁴ and the immediate complications of haemorrhage or infection were very common causes for hospital admission. Much chronic pelvic disease followed such abortions.

Legal abortion

Mortality. Abortion is not only one of the most common operations performed, it can also be one of the safest. In every country where abortion is legal and done on a large scale, first-trimester abortion has been associated with remarkably low mortality rates (Table 13.10). The statistical data are as follows:

In most countries the mortality due to legal abortion declines year by year as the medical profession gains experience and as women gain access to the operation at ever earlier stages of pregnancy (see Tables 13.8 and 13.10). The death rate from legal abortion in the US in 1978 was 1 in 200 000 (1 409 600 legal abortions with 7 deaths reported). By contrast, the registered mortality for legal abortion in Denmark 40 years ago was 400 times as high and even in the US in 1970 it was 40 times the 1978 rate.

As death rates fall the proportion of deaths due to complications of anaesthesia, including local anaesthesia, rises. Based on US data, the death to case rate for legal abortions performed at 12 weeks' gestation or less for local anaesthesia is 0.15 per 100 000 while for abortions performed at the same stage under general anaesthesia it is 0.37 per 100 000.⁸⁹ The rate for general anaesthesia may have been inflated by an element of selection in that some women at particular risk may have been deemed unsuitable for local anaesthesia.

However low the risk to the woman, later abortions are always more dangerous than early ones (see Fig. 13.8). Abortions performed after 12 weeks of pregnancy carry more risks because at about that time the fetal head becomes too large to be safely extracted through a cervix dilated to the safe limit for a one-step procedure unless it is first crushed.

Table 13.10. *Mortality: abortion, delivery, surgery*

	Number of abortions	Number of deaths	Deaths per 100 000 operations or deliveries
<i>Legal abortion (selected countries)</i>			
England and Wales (1973-78)	874 000	31	3.5
D and C and VA:			
12 weeks or less	682 200	12	1.8
13 weeks or over	127 800	8	6.3
Amniocentesis	45 900	4	8.7
Hysterotomy and hysterectomy	17 700	7	40.0
Czechoslovakia (1973-79)	606 400	5	0.8
Hungary (1968-79)	1 682 500	22	1.3
United States (1978)	1 409 600	7	0.5
<i>Maternal mortality (selected countries)</i>			
United States (1978)			12.0
England and Wales (1980)			11.0
<i>General surgery (US) (1969)</i>			
Tonsillectomy and adenoidectomy			3.0
Partial mastectomy			74.0
Hysterectomy (not abortion)			204.0
Appendicectomy			

The contrast between the risks presented by illegal and legal abortion – perhaps fifty fold in developed countries and a hundred fold or more in developing countries – is one of the most forceful in the whole of surgery and public health.

Rochat¹⁰¹ and his colleagues interviewed over 1000 health workers in Bangladesh and estimated that they traced about 1 in 15 of all maternal deaths in that country. They suggest that, overall, about 21 000 women die each year from maternity-related causes and that one-quarter of these deaths are due to illegal abortion. This suggests that 2 out of every 10 000 women of fertile age die annually from abortion; the actual abortion mortality rate could not be estimated. There are 12 hospitals in Dacca providing services for at most a few million people and these hospitals report more deaths due to abortion than occur annually in the US.

Morbidity. By and large, operations which carry a low risk of death have relatively few complications and the complications of legal abortion follow the same distribution as the mortality, being least in operations performed early in pregnancy.^{52, 87} However, failure to terminate the pregnancy is a relatively common complication of abortions attempted within 6 weeks of LMP as is incomplete emptying of the uterus. The latter complication may necessitate a further procedure.

Most uterine perforations probably occur at the time of cervical dilatation and are more likely in later abortions than early ones. Haemorrhage can occur at the time of operation, but the need for transfusion is rare and it is no longer routine to cross-match blood for first-trimester operations. Blood loss is slightly greater with general as opposed to local anaesthesia. Once the operation is over and the woman ambulant, there are few immediate risks and routine overnight stay has no logical place. Secondary haemorrhage and infection, however, can occur days, or even weeks, after surgery, the most common cause being incomplete uterine emptying at the time of operation.

The long-term consequences of abortion divide into the outcome of subsequent pregnancies, about which we have inadequate reliable data, and study of possible psychological sequelae. It has been suggested that induced abortions can lead to premature delivery, low birth weight and spontaneous abortion in later pregnancies.¹⁰¹ The subject has proved difficult to study because of irregularities in reporting of prior abortions (whether legal or illegal), the presence of a number of confounding variables (e.g. smoking) and the extreme difficulty in achieving long-term follow-up of women who have had an abortion. Some studies show a small effect on later pregnancies when the woman's first pregnancy ends in

abortion,¹²⁵ but it is possible that abortion merely shifts the proven risk associated with a first pregnancy to the first term delivery. Any effect that does exist is probably limited to those cases where there has been forceful rapid dilatation of the cervix and over-enthusiastic surgical curettage. The variation in the outcome of abortions performed in different centres as reported in the National Institute of Child Health and Human Development Multicentre study supports this hypothesis. A prior D and C abortion, under certain circumstances, can increase the risk of spontaneous second-trimester abortion in later pregnancies⁷⁷ while VA appears to have little or no effect.^{29, 116, 130} One-step cervical dilatation should, if possible, be limited to 10 mm.^{60, 83}

Illegal abortion is associated with subsequent infertility.¹²¹ Undoubtedly, this also occurs with legal abortion (if only when an operation is associated with complications that lead to hysterectomy, something that occurred 24 times in 238 000 legal abortions in Canada) but the risk is too small to measure in epidemiological studies.^{49, 74, 116}

An increase in ectopic pregnancies has been reported after abortion,⁸⁶ but again large-scale epidemiological studies, controlling for possible variables, have not substantiated such claims.¹⁰³

The risks of Rhesus iso-immunization are small early in pregnancy but anti-D immunoglobulin (50 mg before 20 weeks and 100 mg afterwards) is recommended when available.

The literature on the psychological consequences of legally-induced abortion is rambling and sometimes contradictory. Poor sampling and absent or inadequate control groups plague many studies. However, a few careful studies were conducted in the 1970s and it is now accepted that severe depression, or other psychological disturbances which require treatment, are no greater than after childbirth.⁴² Clearly, there is some short-term distress, but few women require in-patient care.³⁸ Among 73 000 abortions surveyed in the US, there were 16 major psychiatric complications, including two suicides. The psychiatric complication rate was 0.2–0.4 per 1000 abortions.¹¹⁸ This compares with an estimated 1.0–2.0 major psychoses requiring hospitalization following childbirth. David, Niels & Holst conducted the most extensive study using computer-linked records of 71 000 term deliveries and 27 000 abortions among all women in Denmark for the year 1975.²¹ The admission rate to psychiatric in-patient care was 1.84 per 1000 abortions within three months of induced abortion and 1.20 per 1000 deliveries within three months of delivery. Both rates were slightly higher than the 0.75 per 1000 calculated for all Danish women aged 15–49. It is important to note that separated, divorced or widowed women stood out as being at greatest risk of psychiatric

complications, having a higher risk of admission following delivery (1.69 per 1000) and considerably higher risk following abortion (6.39 per 1000). It has also been suggested that the risk of distress is greater in repeat abortions.³⁹

Abortion is as likely to alleviate as to precipitate psychiatric disorder, but the medical profession still views the risk of regret and emotional disturbance after abortion with more concern than experience documents. It is revealing of the attitudes of health workers, and of the lay public, that the possibility of psychological disturbance following a legal abortion was scored most highly by psychologists discussing psychoanalytic theories, less highly by health workers in a role-playing situation discussing abortion, more modestly still by those accompanying women having abortions or by the patient herself on the day *prior* to the operation and as least likely of all by the woman one day *after* her abortion.⁴

The interaction between the woman and the doctor is of critical importance in the assessment by the latter of the former's psychological reaction. The woman's emotional response to abortion is influenced by her doctor's reaction on the first occasion when she seeks advice about her unwanted pregnancy, and is further moulded by the response of all those in whose care she subsequently finds herself. Some doctors feel that the woman has sinned, but that they should extend charitable forgiveness and help her. Such doctors may well perform large numbers of abortions since they are overtly 'sympathetic', but women under their care tend to feel grateful but ashamed. Those physicians who expect abortion to be associated with guilt may indeed produce guilt in those they terminate and this may account for the fact that Simon & Senturia, surveying the literature in 1966, found that the incidence of severe guilt following hospital termination had been variously reported as being between 0 and 43% of all abortions.¹⁰⁷

As experience of liberal abortion has spread, there has been an awareness that for many women termination brings genuine relief. The most fulsome rejection of traditional attitudes has come from the US.¹¹ Walter epitomizes the new viewpoint. 'A whole generation of professional health workers refuses to let the myth die out that abortion will irreparably harm a woman. Extensive review of the literature reveals that this has not been true. In fact, for the healthy woman with a happy marriage, abortion is most often truly therapeutic.'¹³²

After an abortion the woman usually experiences a sense of relief and an awareness that many of her pressing problems have been solved (Table 13.11). She can face the future afresh and make new choices. In particular, the unmarried are now able to review their sexual reproductive attitudes

and make positive decisions. This represents an important step forward because many have truly never considered their attitudes on these topics until they found themselves unwantedly pregnant. Many women make new and practical decisions about contraception.

No doctor enjoys performing abortions any more than he or she would enjoy carrying out limb or breast amputations. It is an appreciation of the improvement in the social and emotional health of the woman which can be expected to follow abortion that encourages him or her to operate, having taken account of the physical risks involved. The preliminary assessment and counselling of a woman before abortion, as well as the support of her during and after the procedure, bring the doctor into close contact with the woman and establish the same sort of link between them that is forged by a good obstetrician who cares for a patient throughout pregnancy and delivery.

Children born to women refused an abortion. 'Unplanned', 'unintended' and 'unwanted' are words to be used with care: a planned pregnancy is usually a wanted one but not all unplanned pregnancies are unwanted and a pregnancy that is unwanted at 8 weeks is not necessarily rejected at 8 months. Conversely, child cruelty can follow a pregnancy which was wanted by the parents as well as one that was rejected but where the woman had no access to abortion. Physically 'battered babies' are frequently children who were conceived premaritally³⁴ or are the last born. In addition, battering may begin when the mother falls pregnant again.

There is a wide no-man's land between the small minority of parents who ill-treat their children, or fail to care for them adequately, and the vast

Table 13.11. *Emotional benefits of legal abortion (360 women having first-trimester abortions in London)*

	Before termination	After termination (3 months-2 years)
Psychiatric symptoms requiring treatment	29%	19%
Depression (Hamilton rating scale)	11.67 ± 6.18	4.38 ± 3.95
Interpersonal relationship rated as satisfactory	62%	77%
Sexual adjustment rated as satisfactory	59%	74%

Source: Greer, H. S., Lal, S., Lewis, S. C., Belsey, E. M. & Beard, R. W. (1976). Psychological consequences of therapeutic abortion. *British Journal of Psychiatry*, 128, 74.

majority who love and look after their children. But the small amount of objective study that has been carried out on women who were refused legal abortions appears to demonstrate that children whose mothers had sought unsuccessfully to have them aborted were disadvantaged when compared with other children. Forssman & Thuwe followed up for 21 years 120 children whose mothers had been refused a legal abortion in Sweden between 1939 and 1941.³⁵ They found a number of adverse outcomes when these children were compared with a control group. A more detailed study has subsequently been undertaken in Czechoslovakia of 233 children born to women who sought and were refused a legal abortion on *two* occasions in the same pregnancy, and compared with a control group born over the same years (1961–63) which was matched for sex, birth order and marital status of the mother.^{19, 27} Over 400 physical and psychological factors have been compared. During childhood some differences emerged, with more frequent acute illness and poorer schooling performances among the children whose mother had sought but were refused an abortion. The two groups have now been followed up for 16–18 years and with the passage of time the differences between them have come to assume even greater statistical significance. Such studies provide comments on the aggregate but are of little predictive value for the individual. Overall, the children born to the women who sought abortion are more likely to consider themselves rejected by their mothers than those in the control group; they also believe their mothers are less satisfied with them. They had slightly poorer school marks and more hospital admissions. Their teachers rated them as less conscientious. The group is now on the threshold of its own reproductive life and interestingly, the boys in the group express more conservative views on such issues as unplanned pregnancies than those in the control group, while the girls born to women who sought abortion are more liberal. Overall, individuals, as we have always known, show a great ability to adjust to adverse circumstances, but in the aggregate never totally overcome the misfortune of being 'unwanted'.

ABORTION AND CONTRACEPTION

A woman who has an induced abortion demonstrates that she is fertile and does not want to have a baby. The time of an abortion, an MR or even a late period often becomes a turning-point in a woman's use of contraception, or in her decision to become sterilized. The relation is a two way one: women who use contraceptives are more likely than those who do not to seek abortion should their contraceptive technique fail, while those who have an abortion are often ready to adopt a contraceptive technique

for the first time. The fact that a contraceptive user is more likely to resort to an abortion than a non-user appears to apply to all methods of contraception. In a study from Colombia it was found that, prior to adopting the rhythm method, 13% of pregnancies ended in spontaneous or induced abortion (the figure is consistent with the vast majority being spontaneous), while after using the method, 35% of pregnancies ended in abortion.⁵⁹ In Switzerland, in the 1960s, Catholics had slightly more abortions than Protestants,¹¹⁰ possibly because they used less effective methods of contraception but felt the same need to control family size. In Korea, 80% of IUD users fell pregnant within six months of discontinuing use, but over 50% of those pregnancies ended in induced abortions.⁴⁸

The relation between contraceptive practice and abortion has been clouded for social as well as academic reasons. Family planning in the West emerged against a background of controversy and the early pioneers were forced to separate contraception and abortion so that they could argue that contraception avoided the need for abortion. In real life they are complementary methods of fertility regulation. An observed change in the abortion rate may be associated with a change in the contraception rate in either the same or the opposite direction. Several factors influence such an apparent contradiction. These include: changes in the age distribution of women of reproductive age, the proportion of women who are sexually active, changes in contraceptive practice and switches from previously illegal (and therefore unrecorded abortions) into the area of legal (and therefore countable) operations.

Fortunately, a great deal of epidemiological and survey information is now available to document the rise and fall of induced abortion rates as societies pass through the major stages of demographic transition (see Fig. 13.4).⁹⁸ Both induced abortion and contraceptive practice are spreading through much of the developing world at the present time. In Korea, for example, the birth-rate fell by 30% between 1960 and 1968 and induced abortion is estimated to account for one-third of this decline, improved contraceptive use and a rising age of marriage accounting for the remainder.⁹⁷ It is probable that whether the operation is legal or illegal abortion rates will continue to rise in many places for the rest of the century, and perhaps most especially in the shanty towns of the Third World. However, this phase will not last for ever, as is illustrated by Japan, which, since the Second World War, has passed through a second stage where contraceptive practice has overtaken the resort to abortion (Table 13.12).⁸⁰

Very few societies use only abortion to limit family size but when they do they have a great many abortions. For example, only 4.2% of Hungarian

couples rely exclusively on abortion⁷² for family planning, but they contribute disproportionately to the number of abortions taking place in the country. There are reports of women having 10 or even 20 abortions; this is because a woman who is not using contraceptives may have two, or even three, abortions in the same interval of time as it requires to conceive, carry and wean a baby (see Fig. 2.3). At the same time, modern methods of contraception also have their limitations and all have demonstrable failure rates. For example, data from Taiwan show that one insertion of an IUD does not avert one birth (Table 13.13),⁹² yet even a poor method badly used will do a great deal to extend the interval between pregnancies.

The significance of abortion in family planning should come as no

Table 13.12. *Legal abortion and contraceptive practice in Japan (1955–65)^a*

	1955	1960	1965
Legal abortions (reported)	1.17	1.06	0.84
Induced abortions (calculated total)	3.13	3.55	3.10
Number of births prevented by abortion	2.71	3.09	2.74
Number of births prevented by contraceptive practice	1.21	1.97	3.02
Ratio of births prevented by contraception to births prevented by abortion	100:256	100:180	100:104

^a Millions of events.

Source: Muramatsu, M. (1970). An analysis of factors in fertility control in Japan. *Bulletin of the Institute of Public Health, Tokyo*, 19, 97.

Table 13.13. *Limitations of an IUD in the perspective of a fertile lifetime*

Age of women	Additional births observed ^a		
	No family planning	IUDs ^b	Difference
22.5	7.14	6.48	0.66
32.5	3.10	2.24	0.86
42.5	0.38	0.31	0.25

^a Based on programme data from Taiwan.

^b Insertion and reinsertion in first pregnancy interval only.

Source: Potter, R.G. (1971). Inadequacy of a one-method family-planning program. *Social Biology*, 18, 1.

surprise if the experience of contemporary western couples is considered. The present pattern of family building is such that most families have only two to three children, often borne while the wife is still in her twenties. Therefore, it is common for a couple to be faced with 10–15 years of fertile life following the last wanted child. Even with an effective method, such as the Pill or IUD, between a quarter and two-thirds of all couples will have one unplanned pregnancy during this interval and 3–5% of couples will have two.⁵⁵ Among women seeking a repeat abortion in the US, a quarter are using a reasonable method of contraception but have been unlucky enough to have a method failure.¹⁰²

This should not be taken to deny that a great deal can and should be done to offer contraceptive advice following induced abortion. In the US 60% of abortion patients fail to adopt or use a method of contraception adequately and Rovinsky estimated that in 15% of abortion cases the institution performing the operation had failed to offer realistic contraceptive advice.¹⁰² An IUD can be safely inserted at this time (see Chapter 11, Evaluation). Oral contraceptives or injectables can be dispensed before the woman leaves the facility. Voluntary sterilization can be a reasonable choice although care needs to be given to ensure an informed choice is being made and to certain technical aspects of the operation when performed at or around the time of abortion.

Illegal abortionists practically never offer contraceptive advice or referral. It is a reasonable hypothesis to suggest that the total number of abortions may be less in a legal service linked to the ready availability of contraceptives than in a situation in which abortion is illegal and in which those who are not ill enough to enter a public hospital will not be exposed to contraceptive or sterilization advice. Further, an open service, if unequivocally advertised is likely to result in an earlier operation than would a clandestine service.

The interwoven attributes of contraceptive practice and abortion are further illustrated by the way in which they complement one another in the effort to keep the risks of fertility to the user at the lowest level (see Fig. 16.1). A similar relation also affects the costs of health and family planning services. An aggressive service designed to meet the fertility goals of couples purely by extending the choice of contraception might result in few abortions but be so costly that it may be impossible to extend nationwide. For example, a Korean contraceptive project serving only 1400 couples required the part-time assistance of a physician and four full-time nurse-midwives in a country which at the time of the project only had enough midwives to serve 11% of the women in labour.¹⁰⁹ The same fertility goals can be reached more cheaply with integrated abortion and contraceptive

services than with either alone. Invariably, there is a point on the graph of rising costs where providing contraceptives to 80% or 90% of couples, as opposed to say 50% or 60%, will exceed the costs of the extra abortions needed to reach the same fertility goal. There is always intense competition for health resources and, as any programme must rob competing areas, it is an ethical as well as an administrative problem to ask how hard a health service should strive in the difficult task of controlling fertility purely through contraceptive efforts when this investment begins to compete with other curative and preventive services.⁹⁵

In a very real sense, both contraception and abortion are essential for controlling fertility and meeting the goals demanded of modern living. Put another way, a society cannot meet its fertility goals purely by the use of contraception, although many family planning programmes are promoted on this false premise. A society can, however, achieve any desired family size merely by using abortions but some women will need very large numbers and this is not ultimately good for their health; it is also a course which overburdens health services and is emotionally repellent to follow. Theoretically, it would be possible for every couple to accept sterilization as soon as they had the number of children they wanted, but this is unlikely to be acceptable without coercion and would inevitably be associated with disappointment and regret for many because of later changes in their circumstances. Therefore, the combination of reversible methods of contraception and induced abortion will remain necessary elements in fertility control for some while into the future.

EVALUATION

Throughout history, and with increasing force over the past one hundred years, societies have used a combination of contraception and abortion to control their fertility. However, this inescapable choice has not always been understood by academic commentators, administrators of health services, politicians or theologians.

Induced abortion appears to be particularly common in countries (for example those of contemporary Latin America) and groups (for example young unmarried women in Europe or North America) which are learning to control their fertility for the first time. In the early part of the twentieth century, and in nearly all countries, abortion was illegal, but since the middle of the century there has been a revolution in laws and medical practice relating to abortion and today abortion is legally available to almost three-quarters of the world's population; it is not easily accessible so widely.

In the late 1970s and early 1980s visible, passionate groups arose in affluent western societies who were seeking to reverse the liberal abortion legislation of the previous 10–20 years. Therefore, it is important to examine the choices that are, and are not, open for policy-making relating to abortion.

Policy choices

Experience shows that abortion laws have little direct effect on the total number of abortions taking place, but that liberal laws are associated with a dramatic and consistent reduction in deaths and ill health among women who have abortions. In other words, the law on abortion largely determines the number of deaths occurring among adult women having abortions, whereas the socio-economic circumstances and ease of access to contraception are responsible for the level of induced fetal loss.

At the very least doctors and all medical workers must recognize the existence of induced abortion and use its occurrence as an appropriate time to make contraceptive advice available. The International Planned Parenthood Federation (IPPF) unanimously resolved (1971) that 'in those countries in which abortion is legal to seek to maximise the provision of contraceptive services after an abortion' and 'in those countries in which abortion is illegal to seek . . . adequate and socially humane services to treat incomplete abortions and other complications of illegal abortion and that such services be linked with the provision of contraceptive advice'.⁶⁹

Some liberal abortion laws (e.g. that of Britain) define the medical practitioners sphere of action, while others (e.g. that of the US) recognize the woman's need to make an informed choice. However the law is framed, it must permit decision-making, and operation if chosen, to take place as early as possible in pregnancy.

Early legal abortion can present no more risk to the woman than receiving an injection of penicillin. Yet whatever method of abortion is used the risks of operation increase with duration of gestation, rising particularly rapidly after 12–14 weeks. While early vacuum aspiration techniques are outstandingly safe, cheap and easy to provide, there is no pre-eminently satisfactory method of second-trimester abortion. The total number of deaths from abortion of all types has fallen dramatically in England and Wales in the last 50 years (Fig. 13.9) and the bulk of this saving of women's lives has been because fewer have died from illegal abortion.

Ethical choices

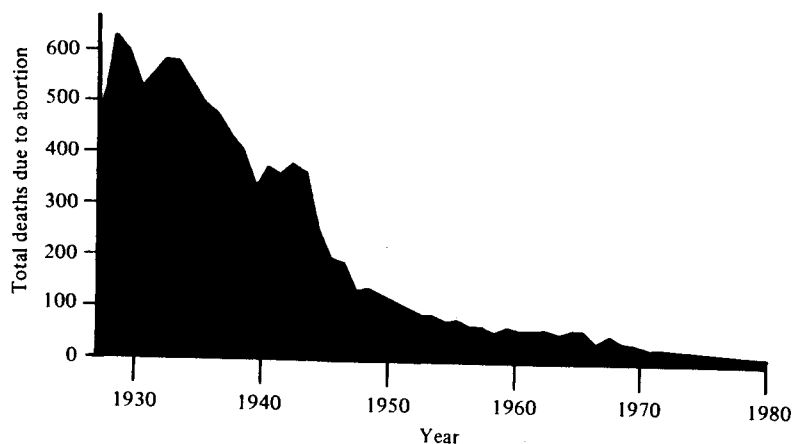
In the last analysis, abortion is a moral problem involving a wholly

threshold of human development, and of the mother, for whom the continuation of an unwanted pregnancy may have profound social consequences. Observation shows that nearly all pregnant women can find themselves in a situation where they will choose abortion as a preferable alternative to the continuation of pregnancy: this is borne out by the fact that virtually all women support the choice of abortion in cases where the fetus can be shown to be abnormal.

The decision of a woman, or a couple, to have an abortion is normally an expression of the fact that at this particular time in their life they feel that they cannot offer a child the love, security and physical support which would meet their ideals: the young unmarried girl feels that she cannot give a baby the life she sees as necessary for its proper happy development; the married woman often feels that another child would take away from her existing children too much of the physical and emotional resources available and would mean that in the future all her children would be to some extent deprived. Abortion is usually an altruistic decision.

Informed choice is essential to any responsible abortion service. Rather than asking, 'was the operation emotionally traumatic?' it may be more useful to ask, 'did the woman/couple make a healthy choice?' or 'did they have all the relevant information they needed to make their decision, in the context in which they found themselves?' or 'do they regret their decision or would they make the same decision again; were they using the decision to hurt themselves or other people: did they learn from the decision?'

Fig. 13.9. Total deaths due to abortion (spontaneous and induced) (England and Wales 1928–80). (Data from Registrar General's *Reports and Report on Confidential Enquiries into Maternal Deaths in England and Wales 1976–1978*. London: HMSO.)



The moral and political attributions of abortion services outweigh such factors as proven mortality rates or the evidence of cost-benefit studies. There can be no doubt that abortion is an ethical problem on which opinions are deeply divided, and it is impossible to visualize any new piece of evidence that would unite opposing camps. There are deep and passionate divisions concerning what is meant by the sanctity of human life; the issues are often entangled with such emotive terms as 'innocent life' and 'the rights of the woman' so that it is difficult to see how such a fundamental conflict can be solved but such a situation is not unprecedented. The religious wars of the sixteenth century ended only when it became universally recognized that they could do so only through tolerance of differing viewpoints on fundamental religious issues. Ultimately this tolerance, born of necessity to stop bloodshed, gained recognition as a virtue which widened the horizons of all. So it may be that on both sides of the abortion debate the adoption of true tolerance might not only help to solve immediate problems but also yield a quantum leap forward in the acceptance of contraception in just those countries and communities where it is most needed.

Until such acceptance is attained, are there any areas of common ground on which reasonable people might agree? Possible there are, providing abortion and contraception are viewed as a totality. One approach is to acknowledge that abortions will occur in all low-fertility societies and are likely to be most common in those in which the birth-rate is falling in response to socio-economic pressures.

Most reasonable people would strive to keep abortion rates low, but would be realistic enough to appreciate that the need for abortion could not be eliminated in the foreseeable future. Everyone would prefer to see abortions performed early, rather than late, in pregnancy.