THE FORTNIGHTLY CLUB

of

REDLANDS, CALIFORNIA

Founded 24 January 1895

Meeting Number 1897

December 1, 2016

Abortion, A New Look at an Old Practice

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Assembly Room, A. K. Smiley Public Library

ABORTION—A NEW LOOK AT AN OLD PRACTICE

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Fortnightly Club, December 1, 2016

Summary.

This paper compares the practice of abortion prior to 1973 (the year of *Roe v Wade*) to that of the present, tracing the changes and developments that have occurred in the last 43 years. It emphasizes how abortion occurred when it was illegal, and how illegal abortion might look now, if it were reinstated.

New pregnancy tests, ultrasound evaluation of uterine contents, new tests for genetic diseases and fetal anomalies, and in-vitro fertilization are all presented. The changes in methods of abortion and contraception are considered. All of this occurs on the backdrop of the history of abortion laws that are now in place, and those that were once enforced.

The auditor is introduced to the terminology of pregnancy and abortion, abortion facts, and trends.

We now have much more sophisticated means to evaluate and monitor the contents of the womb. This has led to better management of pregnancy complications, but also would provide better tools for enforcement of abortion ban(s).

We have developed new technologies in genetics, infertility, and contraception. These allow much better means for women to plan, conceive, and assure the birth of a normal child, but also have created serious ethical dilemmas for those who believe that life begins at conception, and that all life should be preserved and protected.

There are now new non-surgical methods to accomplish abortion which are much safer and require less involvement by professionals, but which would be much more difficult to police, even with the new means that are available to allow the state to follow pregnancy outcomes closely.

Introduction.

No two people who hear this paper will have the same beliefs and positions about abortion, and this paper is not an attempt to change any beliefs or positions. It is not about the morality of abortion, nor is it an attempt to debate when life begins or ensoulment occurs. It will be an attempt to compare the practice of abortion prior to 1973, when abortion was illegal in the US, to that of today's legal abortion, with particular emphasis on changes that have been effected by new technologies, and the issues that would arise should we try to make abortion illegal again.

Conception, embryonic and fetal development, and terminology of pregnancy.

Menstrual cycles average 28 days from day one of bleeding to day one of the next bleeding. During the first 14 days, an egg is selected and matured within a blister inside the ovary known as a follicle. About day 14, the follicle ruptures, the egg is released from the surface of the ovary, and is drawn into one of the Fallopian tubes where it is fertilized within 18 hours by entry of a single sperm. Conception occurs about 24 hours later, when the chromosomes of the sperm and egg unite to form a unique embryo. The embryo floats free in the tube and uterus for about a week, and then burrows into the lining of the uterus, forms a placenta, and at this point, day 21, pregnancy begins and the unique hormone of pregnancy, HCG (human chorionic gonadotropin) appears in the mother's blood.

Pregnancy lasts for an average of 267 days from conception and 280 days (40 weeks) from the first day of the last menstrual period (LMP) until delivery at term. It is standard to date pregnancies from the LMP because women can usually recall this date, but do not usually know when they conceived.

Quickening is the point in pregnancy at which the woman can feel the fetus move inside her womb, and it occurs at about 20 weeks in women who haven't experienced it before, and as

early as 18 weeks in women who know what it feels like. Prior to Roe v Wade, it was the only true evidence of a living fetus within the uterus.

It has also long been customary to divide pregnancy into three trimesters of about 13 weeks each. The first trimester is the embryonic period, where the embryo forms its structures. The second and third trimesters are called the fetal period, reflecting the growth and maturation of a conceptus that now possesses all parts of its anatomy and is called a fetus.

The division between the second and third trimesters at about 27 weeks was convenient also because at this point the fetus had a chance to survive on its own outside the womb. However, the point of pregnancy at which survival can occur outside the womb (with a lot of help from modern medicine in most cases) has gradually been lowered in the past 40 years from about 27-28 weeks to the current 22-23 weeks.

Terminology of abortion.

Abortion is a correct medical term used to describe any pregnancy that ends before 20 weeks from the LMP for any reason. Miscarriage is often used because of the negative connotations of the word abortion, but medically, there is no such thing as a miscarriage.

A spontaneous abortion occurs without any outside intervention. An induced abortion occurs with outside intervention, deliberately or accidentally.

Deliberate, induced abortions are elective or therapeutic. Therapeutic abortions are performed to preserve the health or life of the mother.

If an abortion results in the complete passage or removal of all products of conception (POC), it is said to be complete. If any POC remain in the uterus, abortion is incomplete, and may be completed surgically or non-surgically, using medications.

When a pregnant woman has uterine bleeding, she is said to be in a state of threatened abortion. If the bleeding is so severe as to threaten her well-being, or if the membranes have

ruptured, or if the cervix has dilated, abortion is said to be inevitable, and will usually be completed deliberately. An ectopic pregnancy outside the uterus is a form of inevitable abortion because, except for freakishly rare situations, it cannot be saved. The Catholic church allows treatment for ectopic pregnancy and other indirect causes of abortion such as removal of a cancerous uterus, but not for rape or incest or to save the life of the mother if direct abortion is the consequence.

Vital Statistics.

Any fetus born alive (with a heartbeat and attempts to breathe) is counted as a live birth, regardless of gestational age. Live birth before 20 weeks is incredibly rare. A fetus born dead before 20 weeks is an abortion, after 20 weeks it is a stillbirth. A neonatal death is a death occurring within the first 28 days of live birth. A birth certificate is issued for all live births, and a death certificate is issued for stillbirths and neonatal deaths, but not for abortions.

Abortion facts.

In the United States, about one half of pregnancies are unintended, and about half of these are aborted. From available data, these proportions have not changed much in at least 100 years. Three in 10 women have had at least one abortion by age 45. Fifty-nine percent of abortions in 2014 were obtained by patients who had had at least one previous birth, 12% were teens, 61% were in their 20's, 54% were married or cohabiting, and 51% had used a contraceptive the month they conceived.

In 2011, 1.06 million abortions occurred in the United States, of which 90% took place in the first trimester, 6% took place between 13 weeks and 15 weeks of gestation, and 4% took place at 16 weeks of gestation or later. Only 1.3% of abortions were performed after 20 weeks of gestation.

History of Abortion Laws in the United States.

During the eighteenth and early nineteenth centuries, abortion before quickening was legal under common law, and illegal after quickening. Before quickening abortions were considered "restoration of menses", and were usually accomplished by various herbs, including savin from juniper bushes, ergot, Seneca snakeroot, pennyroyal, cotton root, and tansy. This was originally accomplished by women at home, who learned how to make the various potions for themselves by word of mouth. Administration was by mouth or vaginal sponge. However, by the mid-1800's production of these abortifacients had become commercialized.

The first antiabortion statute was passed in New York in 1828. Early laws were enacted more as poison control measures designed to protect women from toxic abortifacients.

Medical practice before the 1850's was largely unregulated and very unsophisticated. With the founding of the American Medical Association (AMA) in 1847, organized medicine quickly moved to establish its credentials as the main legitimate source of medical information and practice. In 1848 it created a board to analyze quack remedies and nostrums and to enlighten the public in regard to their nature and danger, and in 1857 initiated a crusade to make abortion at every stage of pregnancy illegal. By 1880 all states had passed laws against all abortions except those necessary to preserve the life of the mother, thus winning recongnition for organized medicine's views and interests and increasing state control over the practice of medicine.

Since 1869 the Catholic Church has considered the conceptus-embryo and fetus-a person from the moment of conception. Moral considerations also became dominant in the surge of anti-abortion legislation enacted in the second half of the nineteenth century and many laws were a reaction to public revulsion to proliferation of newspaper advertising and reporting of scandals in commercial and entrepreneurial abortion practices.

Until about 1930, very little attempt was made to enforce the laws, and there were only a very few prosecutions and convictions. This was probably because medicine was still largely practiced in offices (often in the physician's home) and abortions occurred in the privacy of

women's homes and doctor's offices. Deaths that might trigger an investigation or prosecution were not easily tied to any individual's actions, and the women who had the abortions were not prosecuted.

In the 1930's the practice of medicine moved more into hospitals and clinics, and abortion became more visible. In a celebrated 1939 case in England a prominent obstetrician aborted a 14 year old girl who had been raped by three soldiers, then invited arrest to challenge the law which allowed exceptions only to preserve the life of the mother. In the trial the judge instructed the jury that "preserving the life of the woman" had a broader meaning than merely preventing her imminent death, but required preventing her becoming a "physical or mental wreck." The doctor was acquitted, and a new broadening of the concept of preservation of the mother's life was introduced.

The harshest period of abortion law enforcement occurred during the 1940's, 1950's, and early 1960's. In addition to investigating cases that came to light when a coroner's inquest determined that a woman had died from an abortion, the state began to raid physician-run abortion clinics. Physicians were always available to do abortions and often had operated clinics rather publicly before this time. The medical community knew who they were, sent patients to them, and kept quiet about it.

With the beginning of raids and more vigorous prosecutions, women patients were often forced to undergo gynecological examinations and to testify against the abortion physician. Referring physicians were gradually involved more and more, and this served as a deterrent to referral of patients for safe abortions. The womb and the practice of medicine were no longer private.

A few patients came in the front door to have a legal hospital therapeutic abortion approved by the abortion committee, while thousands of women came through the emergency room for treatment of complications of illegal abortions. The number of women treated for complications at Cook County Hospital in Chicago increased from 1000 per year between 1930 and 1945, to nearly 5000 per year in the 1950's, even though antibiotics were available in the 1950's.

The availability of an abortion provided by physicians thus decreased dramatically during this period, even though abortion demand remained strong. Dangerous abortions at higher cost created an increasing gap between availability of safe abortion to women of means and the poor. This gap largely disappeared in the early years after Roe v Wade, but has begun to appear again in the last 20 years as states restrict access and funding of safe abortion.

In the mid 1950's a small group of physicians and lawyers began to campaign for liberalization of the laws, and were joined by the burgeoning feminist women's movement who declared that safe abortion was part of a right to reproductive freedom.

In 1968 Governor Ronald Reagan signed the Therapeutic Abortion Act in California which made abortion legal if "authorized by a hospital committee that finds the pregnancy will gravely impair a woman's physical or mental health, or where a local district attorney or court finds probable cause to believe the pregnancy resulted from rape or incest." This was but one of a flurry of state laws liberalizing abortion that passed after the *Griswold v Connecticut* decision in 1965 which struck down the Connecticut law prohibiting contraception on the grounds that it violated a woman's privacy.

The same right to privacy was the basis of the 1973 *Roe v. Wade* decision, as the Supreme Court ruled that women, in consultation with their physician, have a constitutionally protected right to have an abortion in the early stages of pregnancy before viability free from government interference.

In 1992, the Court reaffirmed the right to abortion in *Planned Parenthood v. Casey*. However, the ruling significantly weakened the legal protections previously afforded women and physicians by giving states the right to enact restrictions that do not create an "undue burden" for women seeking abortion. At present at least half of the states have imposed restrictions on abortion clinics including, but not limited to, mandating counseling designed to dissuade a woman from obtaining an abortion, requiring a waiting period before an abortion, requiring parental involvement before a minor obtains an abortion, or prohibiting the use of state Medicaid funds to pay for medically necessary abortions.

California Health & Safety Code Section 123462 (2002) states "The Legislature finds and declares that every individual possesses a fundamental right of privacy with respect to personal reproductive decisions. Accordingly, it is the public policy of the State of California that: (a) Every individual has the fundamental right to choose or refuse birth control. (b) Every woman has the fundamental right to choose to bear a child or to choose and to obtain an abortion, except as specifically limited by this article. The state may not deny or interfere with a woman's right to choose or obtain an abortion prior to viability of the fetus, or when the abortion is necessary to protect the life or health of the woman."

In 2007 the Supreme Court upheld the Partial Birth Abortion Act of 2003 (*Gonzales v Carhart*) which outlawed intact dilation and extraction, a very rare form of late abortion.

Most recently, on June 27, 2016 in *Whole Woman's Health v Hellerstedt* the court overturned state restrictions enacted in the name of patient safety on the way abortion clinics can function, such as requirements that clinics have the same facilities as hospitals, and that clinic doctors have local hospital admitting privileges. The court noted that many other procedures of similar risk are performed without such restrictions.

After quickening, state laws regulating abortion are highly variable in terms of defining, allowing, or prohibiting abortion at various later stages of pregnancy. Some use menstrual weeks, some use embryonic weeks (recall that menstrual weeks are standard, and are two weeks more than embryonic weeks. So, if a state allows abortion up to 20 embryonic weeks, that is really 22 menstrual weeks). Some states allow abortion up to the third trimester, even though this is well past viability. California permits abortion up to fetal viability.

How has abortion changed since Roe v Wade?

Advances in the diagnosis of pregnancy and determining the condition of the embryo and fetus.

For all of time until the mid 1970's, there was no way for a woman or her physician to be absolutely sure that she was pregnant with a viable fetus until quickening occurred at 18-20 weeks, or the fetal heart could be reliably be auscultated with a stethoscope at 20 weeks.

Pregnancy tests.

The diagnosis of even pregnancy was not certain until quickening until the advent of various pregnancy tests.

Pregnancy tests depend on the ability to detect the unique pregnancy hormone, HCG. There are a few really rare tumors of the ovary that produce HCG, but essentially, finding HCG (which is made by the placenta) in a woman's urine or blood is diagnostic of pregnancy, but does not tell us whether an embryo or fetus is present or not, nor whether, if present, it is viable or not.

One of the earliest was the well-known rabbit test described by Friedman in 1931. When a rabbit "comes into heat" (estrus), her ovaries contain mature egg-containing blisters (follicles), ready for immediate ovulation. If we inject HCG from the urine of a pregnant woman into the estrus rabbit for several days, she will ovulate the eggs. We then sacrifice the rabbit (the rabbit always died) and examine her ovaries for evidence of ovulation. Ovulation = pregnant patient.

In 1947 certain species of male frogs and male toads were found to release spermatozoa into their urine 2-4 hours after urine from a pregnant woman was injected into their lymph sac. This test was very rapid and simple to do. Many physicians kept a supply of these frogs in their offices, and office pregnancy testing was born.

These various animal bioassays were capable of detecting pregnancy at about 6-8 menstrual weeks (42-56 days).

In the 1960's slide immunoassays were developed, and the Gravindex test was the standard of the time when I was in my residency training from 1970-1973. This test would detect normal pregnancies reliably at about 6 weeks (42 days) from the LMP, or when the woman was two weeks late for her period.

The current blood test for pregnancy, the HCG ß-subunit assay was developed in 1972, and in 1974, my friend Tom Kosasa used it to detect a pregnancy at the 23rd day of the menstrual cycle in several patients (5 days before the first missed period, 8-9 days after ovulation and fertilization). The time of fertilization was known because the patients had sterile husbands and had received artificial donor insemination at a known time. This detection corresponds to the very beginning of pregnancy, the time that the embryo first implants in the uterine wall, and begins to release HCG into the mother's blood.

Thus, about the time of Roe v Wade, the diagnosis of early pregnancy was moved up from 42 days to 23 days, and became essentially 100% accurate.

Within a short time, home pregnancy tests, available to all at the drug store, were able to diagnose pregnancy in some women at day 29, but very reliably at day 35.

Pregnancy testing has had enormous implications for early abortion. For centuries women have viewed pregnancy before quickening as a menstrual disorder, and have used herbs and even instrumental methods to "restore menses to normal." The number of colloquial descriptive terms that have been used for this "restoration" defies cataloging. And who was to know for sure whether such restoration was actually aborting an early pregnancy or not—until pregnancy testing was available. Even then, pregnancy viability was still uncertain until quickening.

As an illustration, "menstrual extraction." was popular in the early 1970's and was done within the first week or two of the missed menses. This involved placing a sterile flexible tube into the

uterus through the undilated cervix and then applying suction via a large syringe while slowly rotating and withdrawing the tube. The uterine lining (along with any early implanted pregnancy) would be thus extracted before a diagnosis of pregnancy could be made with certainty one way or the other.

Of interest is the recent return of "menstrual extraction" as a way of facilitating early abortion for women in areas of the country where abortion access is severely limited. You can find out exactly how to do it yourself on the internet.

Obstetric ultrasound.

Ultrasound was described in 1958, but it wasn't until after 1973 that accurate, reliable, real-time ultrasound imaging of embryos and fetuses became practical.

Today most pregnant women will undergo at least two ultrasound examinations. The first will be at the time of the first prenatal visit, ideally before 8-10 weeks. This provides accurate information about the dating of the pregnancy by measuring the size of the embryo, and confirms embryonic viability, and intrauterine location.

The earliest time that a pregnancy can be determined to be viable today is at 42 days, when embryonic cardiac activity can be detected using transvaginal ultrasound. Once this event occurs, 90% of pregnancies will progress to viability. (but 10% will still abort spontaneously).

The second ultrasound is done at 18-20 weeks, and is used to screen for major fetal anomalies, discussed below.

Screening for fetal structural and chromosomal anomalies.

A woman is endowed with all her eggs before she is even born, a maximum of about 5 million of them when she is a fetus at 20 weeks gestation in her mother's womb. Beginning then, and continuing until they are essentially all gone at the time of menopause at age 50, eggs are lost continuously in exponential fashion. 1 million remain at birth, 300,000 at puberty, 100,000 at age 21, 30,000 at age 38.

(By contrast, men make sperm every day from puberty to death, about 200 each time your heart beats during most of that time.)

When a woman reaches 38 or so, her fertility decreases markedly, and after 42, pregnancy is decidedly rare. This appears to be due to aging of the eggs leading to errors as they divide and malfunctions as they are released and fertilized. Thus the risk of infertility, abnormal conceptions, failure of implantation, early pregnancy losses, and pregnancy complications all increase at an increasing rate in these later years of reproductive life.

The birth defects that are most likely to occur with age are aneuploidies (missing or extra chromosomes or parts thereof). Even though the risk of Down syndrome, the most common aneuploidy, is higher in older women, most of the Down syndrome babies are born to younger mothers, because younger mothers have more children.

Antenatal screening for Down syndrome was first performed in the 1970's using advanced maternal age or a previous history of aneuploidy as an indication for diagnostic amniocentesis at about 16 weeks with chromosome analysis for the trisomy 21 aneuploidy unique to Down syndrome. In the 1980's, the association of Down syndrome with abnormal levels of certain specific serum markers in the mother's blood was discovered, and maternal serum screening was developed, allowing screening to be routine for pregnant women of all ages who desire it.

Since the 2000's addition of ultrasound screening has further improved Down syndrome detection accuracy. Increased thickness of a translucent area in the fetal neck in the first

trimester is an independent screening tool. The accuracy of early ultrasound pregnancy dating facilitates precision of maternal serum screening, and second trimester scanning can reveal "soft markers" (certain ultrasound fetal findings) that are suggestive for Down syndrome, in addition to other major structural anomalies, such as neural tube defects (ranging from spina bifida to anencephaly) and cardiac defects.

Women who screen positive by these various tests are offered confirmatory testing with chorionic villus sampling or amniocentesis to obtain fetal genetic samples.

Women with positive confirmatory testing are offered abortion as an option to prevent the birth of a severely handicapped or non-viable baby. Perhaps 10% of abortions are done for these situations, but since accurate diagnosis is not possible until at least 10-12 weeks (and often closer to 20 weeks or even more), these abortions account for most of the later abortions, and are the most difficult both technically and emotionally.

In the last two or three years, cell-free embryonic DNA in the mother's blood is being used in the first trimester to screen for aneuploidy. When placental cells die spontaneously (apoptosis), they rupture, releasing fetal DNA into the mother's blood. This fetal DNA can be distinguished from mother's DNA and analyzed for chromosome errors. The available complexity of the DNA analysis is increasing all the time, and we are currently at a point where we are able to find genetic abnormalities whose significance is still unknown.

In-vitro Fertilization and other Advanced Reproductive Technologies.

In the IVF lab fertilization is attempted either by direct insemination of the oocyte in a dish, or by injection of a single sperm into the oocyte (ICSI). A human oocyte is the largest cell in the body, but it is still just barely visible to the naked eye, much smaller than a period on this page.

The next day, the egg is examined to see if fertilization was successful, and if so, the embryo is cultured for 5-6 days before it is placed inside the uterus. It is now standard procedure to remove 4-5 cells from the embryo on day 5 and perform next generation DNA sequencing on these cells. (Details of next generation sequencing are beyond the scope of this paper.) In this way, genetic abnormalities in the embryo can be detected, and only normal embryos are placed in the patient's uterus. The embryos are usually all frozen on day 5 after the biopsy, because the NGS requires about 2 days to complete, and embryos cannot be transferred after day 6.

The patient decides the fate of the frozen embryos that are normal and not used, and those that are abnormal. The embryos can be used for a future pregnancy, thawed and destroyed, kept frozen indefinitely, donated for research, or given to another woman for adoption. An embryo frozen for a young woman would allow her to become pregnant at any future age, should she desire. We discourage pregnancy after age 55 because of the high risk of maternal complications of pregnancy.

At Loma Linda University Center for Fertility we currently have about 2300 frozen embryos in our tanks of liquid nitrogen. Embryos at this stage are 0.1-0.2 mm in diameter (a period on this page is about 0.3 mm) and contain from 8 to about 200 cells, mostly placental cells. About 15% of these embryos are "orphaned." (embryo owners have stopped paying the modest storage fees and we are unable to contact them.) We have some that have been frozen for 20 years.
None of these lost embryos are counted in abortion statistics, and their true number is really not known, but it is quite large.

Methods of abortion.

Abortion has been practiced essentially for all of recorded history. Most societies have disapproved the practice after quickening. The methods used prior to the late 19th century were mostly herbal and chemical. It was not until after the implementation of aseptic surgery

in the 1890's that surgical abortion became relatively safe if performed by professionals under sterile conditions, and so abortion during the 20th century prior to *Roe v Wade* was largely surgical, using dilation of the cervix and sharp or suction curettage of the uterus. When used by unskilled operators and/or in unsterile conditions, even this technique as well as some of the other more toxic chemical methods as exemplified by Leuenbach's paste, were responsible for many of the deaths that occurred as a result of abortion.

Currently the risk of death from abortion in the US ranges from about 0.3 for every 100,000 abortions done at or before eight weeks to 6.7 per 100,000 at 18 weeks or later. This figures out to less than 10 deaths per year. This is compared to 1000-2000 per year in the 1940's and 1950's and perhaps 10,000 or more per year in the pre-antibiotic era. Abortion is now about as safe as tonsillectomy, 10 times safer than vaginal delivery at term, 50 times safer than a C-section, and about 100 times safer than a hysterectomy.

The invention of the suction curette was a significant advance because it simplified the procedure and greatly reduced the main complications of abortion—hemorrhage, uterine perforation, incomplete abortion, and sepsis. Even though the suction method was described in China in 1958, it was not widely used in the US until the late 1960's.

Mifepristone, a competitive progesterone receptor antagonist, was developed in 1980 (it was called RU-486 during its experimental phase), came into use in France in 1987, and was approved for use in the US in 2000 for abortion up to 50 days when combined with a prostaglandin, misoprostol. Progesterone produced by the ovary and then the placenta is required to maintain pregnancy. Prostaglandins cause uterine contraction and can initiate labor pains at any stage of pregnancy.

Mifepristone and misoprostol have subsequently been shown to be 90-95% effective in producing abortion at any gestational age. Mifepristone is expensive, and tightly regulated—available only through licensed abortion providers. Misoprostol (Cytotec), on the other hand, is cheap and ubiquitously available, even on-line without prescription, because it has other

legitimate uses, such as prevention of gastric ulcers in elderly patients on aspirin or NSAIDs (like ibuprofen). By itself, it will accomplish abortion 80-90% of the time quite safely.

Medication abortion accounted for 23% of all nonhospital abortions in 2011, and for 36% of abortions before nine weeks' gestation. In March 2016, the Food and Drug Administration updated the mifepristone label to allow lower doses and use of medication abortion up to 10 weeks' gestation. The proportion of abortions accomplished by medication continues to increase rapidly.

In Minnesota and Iowa, states where abortion access is limited by distance, creative methods such as telemedicine are being used to reduce barriers. In 2015 the Iowa Supreme Court unanimously struck down a restriction that would have prevented physicians from administering a medication abortion remotely through video teleconferencing. Today telemedicine abortion is available only in Iowa and Minnesota; 18 states have adopted bans on it.

Abortion and contraception trends.

We are seeing a definite turn (probably we should say return) to use of medical methods of abortion instead of surgical ones. These medical methods will be easily and safely adapted to home use and personal procurement without physician or professional assistance. Do a Google search for "how do I abort myself" to see what I mean. The small fraction of incomplete abortions that result are managed by physicians. An inquisitive state could perhaps investigate these, but it would be hard to be sure about what really happened, since spontaneous abortions and intrauterine deaths also occur all during pregnancy.

The number of recorded abortions in the US is decreasing and the current abortion rate is the lowest since abortion became legal in 1973. This is mostly due to a reduction in unplanned

pregnancies due to use of the new Long Acting Reversible Contraceptive (LARC) methods available today, but is also partly due to decreased abortion access in some areas.

LARC's include IUD's, hormone implants, and injectable long-acting hormones. One of the current controversies about IUD's is their mechanism of action. It seems pretty clear that, for the most part, IUD's prevent pregnancy by preventing fertilization, likely through hostile action on sperm. However, we cannot say for sure that they don't prevent implantation of the fertilized embryo in a very small fraction of cases. The same is true for progestin-only oral contraceptives. (The so-called "mini-pill", not the standard, common, combination OC's). This has led to the passage of so-called "conscience laws" that allow pharmacists to decline filling prescriptions for OC's, or for employers to avoid providing insurance that covers contraception or abortion.

Planned Parenthood (founded by Margaret Sanger in 1916) provides a huge fraction of contraception used by the poor, but also provides abortion. It will continue to be a lightning rod in the abortion wars--defunded by conservative administrations, funded by liberal ones, and serving as a "poison pill" in various legislative bills that have other primary purposes.

Whether or not *Roe v Wade* is overturned, we are seeing a great effort by some states to severely limit access to legal abortion. There is also the specter of threat to and intimidation of abortion clinics and abortion providers, both of whose numbers are decreasing significantly.

Summary of how abortion has changed since Roe v Wade.

We now have much more sophisticated means to evaluate and monitor the contents of the womb. This has led to better management of pregnancy complications, but also would provide better tools for enforcement of abortion ban(s).

We have developed new technologies in genetics, infertility, and contraception. These allow much better means for women to plan, conceive, and assure the birth of a normal child, but also have created serious ethical dilemmas for those who believe that life begins at conception, and that all life should be preserved and protected.

There are now new non-surgical methods to accomplish abortion which are much safer and require less involvement by professionals, but which would be much more difficult to police, even with the new means that are available to allow the state to follow pregnancy outcomes closely.

Abortion has long been practiced by humans. It has become safer and easier to accomplish, and its uses have expanded. Better contraception has and will continue to reduce, but not eliminate, demand for it. Its history is intertwined with herbs, pharmaceuticals, medicine, surgery, nursing, religion, ethics, politics, women's rights, law, eugenics, misogyny, social class, poverty, immigration, and probably others that I forgot or am not aware of.

As a pragmatist who was exposed to ob-gyn and abortion before Roe v Wade, I fear the results of going down the difficult road of illegality again. I do believe that abortion-legal or illegal-is unlikely to go away. It is as ingrained in human history as the consumption of alcohol.

A ***pluralistic society*** is a diverse one, where the people in it believe all kinds of different things and tolerate each other's beliefs even when they don't match their own.

References.

Books:

Speert, Harold: *Obstertrics and Gynecology in America—A History*. Baltimore, Waverly Press, Inc., 1980.

Reagan, Leslie J.: *When Abortion Was a Crime*. Berkley and Los Angeles, University of California Press, 1997.

Himes, Norman E.: *Practical Birth Control Methods.* New York, Modern Age Books, 1938

Riddle, John, M.: Eve's Herbs. Cambridge, MA, Harvard University Press, 1997.

Pollitt, K.: Pro—Reclaiming Abortion Rights. New York, Picador, 2014.

Williams, J.W.: Obstetrics, First Edition. New York, D. Appleton, and Co., 1903.

Cunningham, F. G, Leveno, K., Bloom, S., Spong, C., Dashe, J., Hoffman, B., Casey, B., and Sheffield, J.: Williams Obstetrics, 24th Edition. New York, McGraw-Hill, 2014.

Chamberlain, G.: From Witchcraft to Wisdom—A History of Obstetrics and Gynaecology in the British Isles. London, RCOG Press, 2007.

Articles.

Gatter, M., Kimport, K., Foster, D., Weitz, T., and Upadhyay, U. Relationship Between Ultrasound Viewing and Proceeding to Abortion. Obstet Gynecol 123: 81 (2014)

Jost, T. Religious Freedom and Women's Health—The Litigation on Contraception. N Engl J Med 368:4 (2013)

Yang, T., and Kazhimannil, K. Medication Abortion Through Telemedicine. Obstet Gynecol 127: 313 (2016)

Finer, L, and Zolna, M. Declines in Unintended Pregnancy in the United States, 2008-2011. N Engl J Med 374:9 (2016)

Wright, A., and Katz, I.: Roe versus Reality—Abortion and Women's Health. N Engl J Med 355: 1 (2006)

Kessler, J.: The Demographics of Abortion. Third Way Issue Brief, August 30, 2005.

Gostin, L.: Abortion Politics—Clinical Freedom, Trust in the Judiciary, and the Autonomy of Women. JAMA 298: 1562 (2007)

Minkoff, H. and Paltrow, L.: Melissa Rowland and the Rights of Pregnant Women. Obstet Gynec 104: 1234 (2004)

Kosasa, T., Levesque, L., Goldstein, D., and Taymor, M.: Early detection of implantation using a radioimmunoassay specific for human chorionic gonadotropin. J Clin Endocrinol Metab 36: 622 (1973)

Hertig, A., Rock, J., and Adams, E.: A description of 34 human ova within the first 17 days of development. Am J Anat 98: 435 (1956)

Bruehl, F.: The Development of Pregnancy Tests. Am J Nurs 52: x (1952)

Joder, G., Ascheim zondek reaction in the early diagnosis of pregnancy. University of Nebraska Medical Center MD Thesis. (1932)

Brown, B., Hasselbacher L., and Chor, J. Whose Choice? Developing a Unifying Ethical Framework for Conscience Laws in Health Care. Obstet Gynecol 128:391 (2016)

Campbell, S. A Short History of Sonography in Obstetrics and Gynaecology. Facts, Views, and Visions in ObGyn. 5 (3): 213 (2013)

Abortion and Leunbach's Paste. Editorial. JAMA 111: 535 (1938)

Corselli, J. Embryologist, Loma Linda Center for Fertility. Personal communication. (2016)

Long-Acting Reversible Contraception: Implants and Intrauterine Devices. ACOG Practice Bulletin #121 (2011)

Rivera, R., Yacobson, I., and Grimes, D. The mechanism of action of hormonal contraceptives and intrauterine contraceptive devices. Am J Obstet Gynecol 181:1263 (1999)

Medical Management of First-Trimester Abortion. ACOG Practice Bulletin #143 (2014)

Neural Tube Defects. ACOG Practice Bulletin #44 (2003)

Prenatal Diagnostic Testing for Genetic Disorders. ACOG Practice Bulletin #162 (2016)

Khalil, A., and Pandya, P. Screening for Down syndrome. J Obstet Gynecol India 56: 205 (2006)

Screening for Fetal Aneuploidy. ACOG Practice Bulletin #163 (2016)

Second Trimester Abortion. ACOG Practice Bulletin #135 (2013)

Sanger, C. "The Birth of Death": Stillborn Birth Certificates and the Problem for Law. *CALIFORNIA LAW REVIEW* 100:269 (2012)

Reproductive Life Planning to Reduce Unintended Pregnancy. ACOG Committee Opinion #654 (2016)

Reingold, R., and Gostin, L. Women's Health and Abortion Rights--
WholeWoman's Health v Hellerstedt. JAMA 316: 925 (2016)

Internet.

Google

Google Images

Wikipedia

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Bio information for Fortnightly Club meeting #1897

Abortion, A New Look at an Old Practice

Grew up in central Nebraska in a town of 350, graduating from high school in 1961.

B.A. in Chemistry from Union College, Lincoln, Nebraska, 1965.

M.D. from Loma Linda University School of Medicine, 1969. Alpha Omega Alpha.

Internship in Internal Medicine and residency in Ob/Gyn, both at Loma Linda University, 1969 to 1973.

Fellowship in Reproductive Endocrinology and Infertility at Peter Bent Brigham Hospital, Harvard Medical School, Boston, 1973 to 1975.

Faculty member at Loma Linda University School of Medicine since 1973. Current rank Professor of Ob/Gyn.

Served as Chief of Reproductive Endocrinology and Director of IVF for 15 years and Chairman of the department of Ob/Gyn for 6 years.

Dual Board Certified in Ob/Gyn and Reproductive Endocrinology.

Over 50 peer-reviewed publications.

Retired from practice in 2010. Continue to teach voluntarily one to two days a week.