Soon to turn 60, the oral contraceptive pill still dominates histories of technology in the ‘sexual revolution’ and after.¹ The pill was revolutionary for many, though by no means all, women in the west, but there have always been alternatives, and looking globally yields a different picture.² The condom, intrauterine device (IUD), surgical sterilization (male and female) and abortion were all transformed in the twentieth century, some more than once. Today, female sterilization (tubal ligation) and IUDs are the world’s most commonly used technologies of contraception. The pill is in third place, followed closely by the condom. Long-acting hormonal injections are most frequently used in parts of Africa, male sterilization by vasectomy is unusually prevalent in Britain, and about one in five pregnancies worldwide ends in induced abortion. Though contraceptive use has generally increased in recent decades, the disparity between rich and poor countries is striking: the former tend to use condoms and pills, the latter sterilization and IUDs.³

Contraception, a term dating from the late nineteenth century and since then often conflated with abortion, has existed in many forms, and techniques have changed and proliferated over time. Diverse local cultures have embraced new technologies while maintaining older practices. Focusing on Britain and the United States, with excursions to India, China and France, this chapter shows how the patterns observed today were established and stabilized, often despite persistent criticism and reform efforts. By examining past innovation, and the distribution and use of a variety of tools and techniques, it reconsiders some widely held assumptions about what counts as revolutionary and for whom. Analytically, it takes up and reflects on one of the main issues raised by feminists and social historians: the agency of users as patients and consumers faced with choice and coercion.⁴ By examining practices of contraception alongside those of abortion, it revisits the knotty question of technology in

the sexual revolution and the related themes of medical, legal, religious and political forms of control.⁵

**Supply and Demand**

Respectable women in Victorian Britain projected a culture of modesty and sexual innocence,⁶ but techniques of self-discipline depended on reproductive knowledge and constituted technologies in their own right. Some called for domestic tools such as a calendar or thermometer, others for a visit to the herbalist or chemist.⁷ In the absence of pregnancy testing, the first trimester was an uncertain time for many women and their physicians.⁸ Though in past centuries women took emmenagogues more to promote conception than to remove an unwanted pregnancy, by the late nineteenth century many thousands of women every year were using widely advertised ‘female pills’ as abortifacients (Fig. 36.1).⁹ Other common methods of inducing miscarriage included falling down the stairs, drinking gin or pennyroyal tea, dilating the cervix with slippery elm bark, and ingesting lead, ergot or quinine; few had access to surgical abortions.¹⁰ Statistics do not exist for earlier decades, but estimates based on official inquiries from the 1930s range from 60,000 to 125,000 abortions a year for England and Wales even though the practice had been outlawed in the nineteenth century.¹¹

As birth control campaigners complained, many working-class women regulated fertility around menstruation more than intercourse and did not distinguish (illegal) abortion from (increasingly tolerated) contraception. Although in the interwar years networks of clinics on both sides of the Atlantic promoted prescription-only female

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Figure 36.1 Advertisement for Dr Patterson’s ‘famous’ pills, one of the more popular remedies for female ‘irregularities’. Mention of such well-known abortifacients as pennyroyal indicated the function. This advertisement was stuck after publication inside a copy of Married Love (first published in 1918), the bestselling manual by Marie Stopes, who publicly opposed abortion although she sometimes helped individual women. 19 × 13 cm. Nick Hopwood’s collection.
barrier methods (cervical caps, diaphragms and pessaries), women continued to view menstrual regulation as ‘natural’, but birth control as ‘artificial’ and sinful. Many couples in Britain rejected ‘modern’ appliances as expensive and impractical, embracing instead the unreliability of ‘being careful’ as a means of reducing the odds of pregnancy without cheating fate or God. Viewed by some as a pleasure-enhancing sexual skill, withdrawal (coitus interruptus) was familiar, socially acceptable, easy-to-understand and conformed to the gender norm of male responsibility. Along with abstinence and the rhythm method (‘Vatican roulette’), withdrawal could also be aligned with Catholicism’s vague injunction to self-control.

It was not the medically approved devices pushed by campaigners but those pedalled by entrepreneurial vendors that found the largest share of the market. Men of all classes used ‘skins’ made from animal guts and, from the 1840s, sheaths of vulcanized rubber. The industrial mass production of thinner, more comfortable and disposable latex condoms was a major innovation of the 1920s; by the 1930s, large rubber companies around Britain produced millions every year. Previously mainly imported from Germany, these sold openly from pubs, barbers, cinemas, dance halls, arcades, tobacconists and vending machines. Wartime campaigns against venereal disease and military contracts helped position the London Rubber Company as Britain’s dominant manufacturer. The company supplied Durex to thousands of chemists in the 1940s and made 95 per cent of the hundred million condoms sold in that country alone in 1968.

The United States was also a ‘nation of condoms’. Despite the federal Comstock Act passed in 1873 to prohibit the mailing or transport of contraceptive products and information, Americans had access to a lively underground trade. Avoiding the expense and inconvenience of a doctor’s visit, consumers purchased vaginal jellies, foam tablets, suppositories, douches (most notoriously, the household cleaning product Lysol) and especially condoms directly from drug stores, mail-order catalogues and travelling pedlars. Following Margaret Sanger’s arrest for opening the nation’s first birth control

14 Claire L. Jones, ‘Under the covers? Commerce, contraceptives and consumers in England and Wales, 1880–1960’, Social History of Medicine 29 (2016), 734–56; James M. Edmonson, ‘Condoms’, Exhibit 28, this book; Fig. 32.4 depicts a vending machine.
15 Andrea Tone, ‘Making room for rubbers: Gender, technology, and birth control before the pill’, History and Technology 18 (2002), 51–76, on 60.
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In 1916, a New York judge ruled in favour of contraceptive use to prevent venereal disease (prophylaxis) only. The condom business boomed in the 1920s. Standards imposed by the Food and Drug Administration (FDA) pushed small-timers out of business, effectively centralizing production in the late 1930s. In 1950, two companies controlled half the $100 million market. By 1958, sales had risen to $150 million, compared with $20 million for female contraceptives.¹⁶ This situation changed abruptly with the advent of the prescription-only pill in 1960.

Medicalization and Population Control

Sanger’s medical solution to overpopulation was developed in the mid-1950s with the support of wealthy philanthropist Katharine Dexter McCormick. The first commercial oral contraceptive, the pharmaceutical company Searle’s Enovid, combined mestranol, an oestrogen, and norethynodrel, a progestin, to inhibit female fertility. It was tested in Massachusetts and then on a much larger scale in the US territory of Puerto Rico.¹⁷ Though abandoned by population controllers as too expensive and excessively reliant on patient compliance, ‘the pill’ proved unexpectedly popular with affluent consumers, who were used to going to the doctor (Fig. 36.2). In 1955, about half of the American women who used contraception reported relying on either condoms (27 per cent) or a diaphragm (25 per cent). Ten years later, 27 per cent used the pill, 18 per cent condoms and just 10 per cent a diaphragm.¹⁸

The first decade of medicalized contraception coincided with the liberalization of laws and policies. Though the Comstock Act was overturned in 1936, thirty states still had statutes prohibiting or limiting the advertisement and sale of contraceptives in 1960. Five years later, the Supreme Court ruled in Griswold v. Connecticut that married couples had a right to privacy and, by extension, the right to purchase and use birth control. This judgement superseded most proscriptive state laws, but Massachusetts continued to ban the distribution of contraceptives to unmarried individuals. In 1972, the Supreme Court extended the right of privacy in matters of birth control to the unmarried in the Eisenstadt v. Baird decision and reversed the last of the state laws against contraception.¹⁹

¹⁶ Ibid., 72.
¹⁹ John W. Johnson, Griswold v. Connecticut: Birth Control and the Constitutional Right to Privacy (Lawrence, KA, 2005); David J. Garrow, Liberty and Sexuality: The Right to Privacy and the Making of Roe v. Wade (Berkeley, CA, 1994); Johnson and Hopwood, ‘Modern Law and Regulation’.
Figure 36.2 Article in the Sunday edition of a popular British tabloid (the predecessor of the Sunday Mirror) warning that ‘frightening’ X-pills had been ‘allowed to sneak into the country’. Three years before Enovid was marketed as a contraceptive, the FDA had approved it for the treatment of menstrual disorders. Tom Riley, ‘X-pills in the shops’, Sunday Pictorial, 19 Oct. 1958, back page. Mirrorpix.
The optimism that greeted the pill faded as medical concerns mounted over potentially fatal side-effects, including thrombosis and cancer. Books such as Barbara Seaman’s *The Doctors’ Case Against the Pill* (1969) and Wisconsin Senator Gaylord Nelson’s congressional hearings on its safety (1970) galvanized public debate in the United States, while the UK government restricted higher dosages. And yet, even as its safety came into question, the pill encouraged women to become more active patients and empowered them to challenge medical authority. Frequent claims notwithstanding, no single technology launched a ‘sexual revolution’, but oral contraception, in concert with a host of social, cultural and political changes, did help to make women’s lives in the 1980s very different from those of their mothers in the 1950s.

Far from sweeping alternatives away, the pill emboldened researchers to develop new technologies, including the modern IUD. Though devices such as Gräfenberg’s ring, made from silkworm gut and silver wire, were available from the early twentieth century, few doctors were willing to fit them. After Israeli and Japanese clinicians reported positive results with new materials in 1959, the Population Council, an NGO created in the United States in 1952 to focus on world population growth, funded numerous projects to bring these devices to market. As with the pill, IUDs were intended as cheap, effective contraception for poor, uneducated women in ‘developing’ countries, where coercive family planners inserted them routinely after childbirth and abortion. In ‘the west’, in contrast, middle-class, educated white women, including many of those coming off the pill, increasingly opted for the copper and plastic devices as a non-hormonal alternative (Fig. 36.3).

In the early 1970s, however, the ‘Dalkon Shield scandal’ severely damaged the reputation of IUDs in the United States. First marketed there and in Puerto Rico in 1971, the Dalkon Shield featured prongs, which prevented expulsion from the uterus but increased the chance of perforating the uterine wall, and a multifilament tail string, which extended into the vagina to aid removal but purportedly allowed bacteria to travel, or ‘wick’, into the uterus. It was withdrawn from the US market in 1974 amidst allegations of pelvic infections and other potentially fatal complications as well as hundreds

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of thousands of lawsuits against the manufacturer, A. H. Robins. Not until the early 2000s did Mirena, a Finnish innovation and the first widely available hormone-releasing IUD, reinvigorate the US market. Though the proportion of female contraceptors choosing long-acting reversible methods (mainly Mirena and subsequent variants) more than tripled in the United States between 2002 (2.4 per cent) and 2009 (8.5 per cent), it remained lower than in Britain (11 per cent), France (23 per cent), Norway (27 per cent) and China (41 per cent), where copper devices continued to dominate.

Reproductive technologists had high hopes not only for IUDs, but also for long-acting hormonal injections (Depo-Provera), implants (Norplant), vaginal rings

26 Takeshita, Global Biopolitics of the IUD, pp. 138–9, 141.
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and patches. Clinical trials began in 1969 in Chile; Finland was the first country to approve and market Norplant for general use in 1983. Like Mirena later, it came out of a collaboration between the Population Council and the Finnish pharmaceutical company Leiras Oy. The United States became the seventeenth nation to sanction sale and use in 1990, and almost immediately the implants became embroiled in controversy over the potential coercion of poor, black women. Although no more than 2 per cent of American women of reproductive age (about a million) ever used it as their method of choice, by 1996 some 50,000 individuals had joined class-action lawsuits against the manufacturer claiming restitution for pain and suffering. Norplant sales were discontinued in the United States in 2002, but Bayer and the Bill & Melinda Gates Foundation have made its WHO-approved successor product, Jadelle, available to millions of women worldwide through the recently launched Implant Access Program. In Brazil, personalized implants tailor-made in specialized pharmacies are today an increasingly popular upper-class contraceptive choice.

Surgical Solutions

Though even more controversial than implants and injections, sterilization and abortion are amongst the most common methods of avoiding pregnancy and childbirth in the world today. How did such divisive operations become so widespread? Used coercively in the first half of the twentieth century in the service of eugenics, to prevent the ‘unfit’ from reproducing, sterilization retained legitimacy to become the most popular form of contraception for married couples in the United States by 1975. Not only women but men too chose sterilization as concerns about oral contraception reframed vasectomy as a manly operation (Fig. 36.4). Developed in China in 1974 and introduced to the United States in 1986, ‘no-scalpel’ vasectomy was praised by Men’s Health magazine in 1996 as a painless procedure that spilled ‘not even a single drop of blood’.

Laparoscopy – a form of minimally invasive (‘keyhole’) surgery performed through a small incision in the female abdomen – made tubal ligation less expensive

29 Emilia Sanabria, Plastic Bodies: Sex Hormones and Menstrual Suppression in Brazil (Durham, NC, 2016).
Figure 36.4 Cover of *Esquire* (June 1972), the then iconic American men’s magazine, promoting a piece about vasectomies by showing a woman in surgical gear as she brandishes a scalpel and scissors. During the shoot with photographer Carl Fischer and designer George Lois, the model exclaimed: ‘I’d like to do this to my ex-boyfriend!’ (Lois to author, 20 Oct. 2015). Reprinted with permission from Hearst Corporation and George Lois.
and less risky, but still more invasive and traumatic than vasectomy, by avoiding general anaesthesia and hospitalization. In the early 1970s, the US Agency for International Development (USAID) funded the development of portable outpatient technologies of female sterilization for use in makeshift ‘camps’. Specialized equipment that fitted in a suitcase was deployed on a massive scale in rural India, where one enthusiastic surgeon claimed to have sterilized over 250,000 women between 1979 and 1989 (Fig. 36.5). Despite continual disclosures of coercion and even deaths, population
control programmes have stabilized female sterilization as the world’s commonest method of preventing pregnancy. In India and Puerto Rico, for example, tubal ligation is known simply as ‘the operation’.32

Today, surgeons not only control fertility by operating on male and female bodies, but also routinely remove the contents of women’s wombs. Of an estimated 205 million pregnancies worldwide in 2003, 20 per cent ended in induced abortion. The ratio of terminations to live births stands at 31 to 100 globally, but varies regionally; it is 1 to 5 in North America and 105 to 100 in eastern Europe, a legacy of Soviet-era policies that limited access to contraception but made abortion widely available.33 From the mid-nineteenth century, licensed physicians increasingly used cervical dilators, curettes (hooked scraping tools) and other surgical instruments to perform abortions. By the early twentieth century, dilation and curettage (D&C), which involves opening the cervix and scraping out the uterine contents, combined with asepsis, anaesthesia, analgesia and later antibiotics, had become the standard medical practice for first-trimester terminations. D&C remained dominant in the west until the early 1970s, when it was supplanted by vacuum aspiration, another Chinese innovation.

China was one of few countries in the 1950s with an active, state-sponsored ‘planned birth’ programme (jihua shengyu) for researching new techniques of fertility control.34 Designed in 1958 for use in rural China, the ‘negative pressure’ technique involved heating a glass bottle with a match to create a vacuum in the absence of electric power. Physicians in Japan, the Soviet Union and eastern Europe were early adopters as abortion technology travelled east to west.35 A Los Angeles gynaecologist recalled his enthusiasm on hearing about vacuum aspiration in the mid-1960s, when the profession was still dominated by men. At a national conference in Chicago, a colleague told of completing a miscarriage for a Soviet diplomat’s wife in Washington, DC. As he ‘began inserting the instruments to remove the last of the pregnancy, a Soviet doctor, who had accompanied the patient to the operating theatre for reasons of protocol, asked: “How come you don’t vacuum her?” None of us had ever heard of this vacuum machine before. I couldn’t wait to get my hands on one.’36

Before long, Americans constructed their own devices for domestic and overseas use. Harvey Karman, a controversial lay abortionist in Santa Monica, patented a narrow, flexible, plastic tube that removed the need for cervical dilation and electricity. In nearby Los Angeles, feminist Lorraine Rothman assembled parts purchased at grocery, hardware and pet stores into the patented Del-em for do-it-yourself ‘menstrual extraction’. Cheap plastic technologies made abortion affordable for the network of outpatient clinics that activists established around the country (Fig. 36.6). Meanwhile, various states had relaxed their abortion laws, and USAID contracted the mass production of thousands of disposable kits, based on Karman’s patent, for export. In 1973, the landmark ruling, *Roe v. Wade*, decriminalized abortion nationwide, but the 1973 Helms amendment prohibited federal

37 Murphy, *Seizing the Means*, pp. 150–76.
foreign aid from subsidizing abortion.\textsuperscript{38} NGOs continued to distribute the kits, including in the new country of Bangladesh, where the government had temporarily legalized abortion for women who had been raped during the Liberation War.\textsuperscript{39}

Under the Reagan presidency, religious conservatives in the Republican Party successfully restricted abortion access at the state and federal levels while ‘pro-life’ activists picketed clinics and ‘rescued’ unborn ‘babies’. Militants turned violent in the 1990s, bombing clinics and assassinating physicians. For ‘pro-choice’ activists, this state of siege made access to pharmaceutical alternatives more pressing than ever.\textsuperscript{40} But research had slowed down, especially in the United States, where the threat of class-action lawsuits, increasing government regulation, a seemingly saturated market and greater public scrutiny dampened enthusiasm.

As the number of US companies actively researching contraception fell from nine in 1980 to just one, Ortho Pharmaceutical, in 1990,\textsuperscript{41} the World Health Organization (WHO) took the lead. Beginning in the 1970s, the WHO had built an international network of laboratories to develop new forms of contraception and abortion, including controversial anti-fertility ‘vaccines’ and male methods involving synthetic hormones.\textsuperscript{42} Clinical trials on men were stymied, however, by the absence of an existing infrastructure for testing male contraceptives, low acceptance of any risk by either clinicians or study participants, and the ethical dilemma that failures would impregnate women, not the men enrolled in the trials.\textsuperscript{43} No male pill materialized, but a new generation of female pills expanded women’s choices and rekindled old debates about the boundary between contraception and abortion.

**‘Emergency’ Contraception and Pharmaceutical Abortion**

Heralded in the *New York Times* back in 1966 as a ‘second revolution in birth control’, the ‘morning-after’ pill was promoted by ‘fathers’ of ‘the pill’ Gregory Pincus and Min Chueh Chang as a convenient back-up, but condemned by their former collaborator,


\textsuperscript{39} Murphy, *Seizing the Means*, p. 168.


\textsuperscript{43} Oudshoorn, *Male Pill*, p. 80.
the Catholic gynaecologist John Rock, as an abortifacient. Less expensive than a daily regime, especially for the uninsured, the morning-after pill promised to reduce health risks at a time when the safety of oral contraception was increasingly scrutinized. In 1968, Chang predicted that a variety of ‘morning-after’, ‘week later’, ‘second-thought’, ‘abortion’ and ‘night before’ pills ‘would be a boon for couples who wanted 100 per cent effectiveness in preventing pregnancy’. But FDA approval proved elusive, and pharmaceutical companies had little incentive to market a potentially controversial drug intended for infrequent, ‘emergency’ use.

College physicians who provided the synthetic oestrogen diethylstilbestrol (DES) off-label to ‘girls unprepared for the night before’ were forced to look elsewhere when longer-term use for other indications was linked to a rare form of vaginal cancer in daughters of women who had taken the drug during pregnancy. Canadian gynaecologist Albert Yuzpe’s method of punching out four tablets of oral contraception was authorized in the early 1980s in Britain and West Germany, but not Canada or the United States, where feminists took matters into their own hands by distributing Yuzpe regimen dosages at rape crisis and student health centres. In the late 1990s, the FDA approved the Yuzpe method; a small New Jersey-based company marketed Preven, a combined oestrogen and progestin pill, as ‘emergency contraception’; and feminists founded their own corporation to market Plan B (two progestin-only pills taken twelve hours apart). In 2010, the FDA approved ellaOne (ulipristal acetate), which extended the window of use from seventy-two hours to five days, and, in 2013, the Obama administration announced it would allow over-the-counter sales of emergency contraception to girls and women of all ages.

Less ambiguous and more controversial than emergency contraception, the ‘abortion pill’ was first marketed in France in 1988 by Roussel-Uclaf, a company jointly owned by the French government and Hoechst, a major West German firm. Intended for use in early pregnancy (typically up to seven weeks) in combination with a prostaglandin, currently misoprostol, that causes uterine contractions, mifepristone or RU486, as it was then called, is an antiprogestin that alters the uterine lining to disrupt the attachment of a fertilized egg. Not as simple as popping a pill, ‘medical abortion’ initially required three or four clinical visits: for confirmation of pregnancy, usually by ultrasound; for abortion counselling and to swallow three tablets of RU486 under medical supervision; for an injection or suppository of misoprostol and to wait in the clinic to abort; and finally for a post-abortion check-up, usually also by ultrasound. It was rapidly caught in America’s abortion wars.

44 Prescott, Morning After, p. 7.  45 Quoted in ibid., p. 19.
Threatened with international boycotts by US anti-abortion groups, Roussel initially suspended distribution, but then resumed under orders from the French health minister who declared that RU486 was ‘the moral property of women’. When George H. W. Bush’s administration banned importation in 1989, American abortion-rights groups campaigned for access. On the twentieth anniversary of Roe v. Wade in 1993, the newly elected President Bill Clinton lifted the ban, by which time Britain, China and Sweden had also passed the drug. Roussel transferred the US patent to the Population Council and the FDA granted tentative approval in 1996, but no major pharmaceutical company dared claim the commercial rights for fear of reprisals. Finally Danco, a small New York company with an unlisted phone number and address, was established with the sole purpose of marketing RU486 in the United States, where it debuted in September 2000 as Mifeprex.

FDA authorization did not end the controversy, which continued when China announced that a Shanghai-based company would supply the raw compound to Danco. By then RU486 had been approved in over a dozen countries; hundreds of thousands of women in Europe and millions more in China had used it. In the United States, non-surgical providers were allowed to offer the drug as long as they could ‘assess the duration of pregnancy accurately’ and had made back-up arrangements for a surgical provider. Unusually for a drug of which the safety was not in question, physicians were obliged to sign a ‘provider’s agreement’ stating that they had met the above requirements and would report all adverse events to Danco. Patients too were required to sign a detailed agreement. Today, its use internationally remains subject to a host of restrictions that are not grounded in clinical need.

Conclusion

The pill was a highly successful, even revolutionary drug. By 1989, it had been taken by over 75 per cent of women born in Britain between 1945 and 1959. Yet many of them surely also used other methods and stayed on the pill for variable durations. When the pill was first marketed in the 1960s, men and women had long controlled their fertility. New hormonal and surgical methods increased women’s share of responsibility

48 Quoted in Prescott, Morning After, p. 79.
50 Ibid.
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and control, but male methods persisted. Health concerns about the pill inspired ‘vasectomania’ in the 1970s, condoms made a comeback with the global AIDS crisis of the 1980s, and withdrawal was still ‘a major, widespread method’ in the 1990s.\(^5^4\) Despite the failure of the pharmaceutical industry to produce a ‘male pill’, men and women collaborated in homes and clinics, variously combining male and female methods, contraception and abortion, new and old technologies. Though the sexual revolution did not see the sharp break in behaviours that is sometimes imagined, heated public debates around the pill, sterilization, abortion, women’s health and population control engendered a mainstream culture that featured contraceptive technologies more prominently than ever.\(^5^5\)

Though contraceptive use has generally risen, the resulting pattern has left few commentators satisfied. Today, critics complain of over-reliance on sterilization in Asia, but underuse of IUDs in the United States, where half of all pregnancies are ‘unplanned’. Some feminists champion oral contraception as liberatory, while others criticize doctors for pushing women to go on the pill. Vasectomy, though cheaper and safer than female sterilization, is uncommon in most countries. Self-abortion persists where legal access is limited; in the United States, prominent arrests involving the off-label use of misoprostol, available as an ulcer drug, have reignited old debates.\(^5^6\)

Corporations, states and NGOs have created and met demand for technologies of contraception and abortion from doctors, patients and consumers. This chapter has charted some of the major trajectories. While there is still much to discover, focusing on ‘the pill’ has clearly obscured a richer story in which not only American innovators and industrialists but also their state-supported counterparts in China and in France played leading roles in producing today’s strikingly various cultures of fertility control.


