



Credits

This exhibition was organized by the *Designing Motherhood* curatorial team in collaboration with the Discovery Center at the Bill & Melinda Gates Foundation. Thank you to everyone who contributed to the design, development, and realization of this project.

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Collaborators

In Philadelphia, *Designing Motherhood's* thought partner was Maternity Care Coalition which ensures that families can birth with dignity, parent with autonomy, and raise babies who are healthy, growing, and thriving.

In Boston, *Designing Motherhood's* thought partner was Neighborhood Birth Center which will open as Boston's first independent and freestanding birth center in 2023 with the vision of improving birth experiences and outcomes, across communities, for generations.

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**Graham
Foundation**



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DESIGNING MOTHERHOOD

Things That Make and Break Our Births

The Bill & Melinda Gates Foundation Discovery Center
On view 2023

Birth is the way we all arrive in this world—and each of us will repeat, prevent, delay, or reject reproduction during our lives. As we do, we will interact with designs of all kinds: products, devices, programs, and policies. While being born is a universal human experience, the designs that shape that experience are not. Many remain taboo, rarely considered, or inaccessible to many millions of people.

Designs can make and break our experiences around reproduction, even if most of us are unaware of their development. *Designing Motherhood* invites us to consider why and how designs that facilitate reproductive health have been developed and to ponder their social, economic, and political implications. This exhibition highlights how birth and the culture that surrounds it affect every living person. These are not just women's issues; they are human issues and they matter to us all.

The Bill & Melinda Gates Foundation is hosting *Designing Motherhood* because maternal, child, and newborn health have been central to our broader work in global health equity and gender equality. The foundation-related innovations in the exhibition, which are highlighted in gray, reflect our commitment to reproductive health as a form of economic justice.

Now more than ever, as access to reproductive care has become more precarious and endangered, the movement for reproductive justice demands that such designs be reimagined for better outcomes here in the U.S. and around the globe.

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DISCOVERY CENTER

Introduction

- 1 Alison Croney Moses (American, b. 1983)**
My Belly, 2021
Cedar wood, milk paint
Commissioned for *Designing Motherhood*
by the Maternity Care Coalition Advisors
Courtesy of the artist

Alison Croney Moses studied furniture design at the Rhode Island School of Design and currently works at the Eliot School of Fine & Applied Arts in Boston. In her work, Croney Moses creates sculptures with wood—a material that, even after being cut down, still mimics life by changing with its environment. In the artist's words:

Pregnancy and motherhood are life changing and full of contradictory experiences of pain and pleasure, heartache and love, fear and hope, and sadness and joy. Our bodies are literally rearranged, torn apart, and drained while growing humans within our womb, birthing those humans, sustaining those lives, and nurturing those tiny people in the critical years of development. When we come out the other end, all mothers are fundamentally changed and it's often difficult to see and feel who we once were. We then begin the journey of bringing back together the different parts of who we were and who we are now and rebuilding ourselves to be something new.

For Black mothers, this transformation occurs while living through systemic racism and personal implicit bias, all made worse during the current health crisis due to COVID-19. Our physical survival of the birthing process and living is what we are tasked with as humans. The ability to care for ourselves, to celebrate, and to commune with each other is what we need to thrive.

- 2 Alison Croney Moses (American, b. 1983)**
Bintu Conté (Maninkan, b. 1985)
We Are Black Vessels, 2021
Video (4:18 mins)
Produced by One Productions
Music: Euphoria Instrumental and Summer Instrumental by Naz Alakai
Courtesy of the artists

A group of Boston-based Black mothers came together with Croney Moses to create a trusting, empowering community centered around the journey of Black motherhood. In June 2021, Bintu Conté—one of the mothers and an embodiment practitioner—guided the group in creating a sacred space to process lived experiences and cultivate self-care.



Audio tour stop #1

Narrated by Sarah Bloom with additional commentary by Michelle Millar Fisher and Juliana Rowen Barton, co-curators of *Designing Motherhood*.

Our bodies, ourselves

Like the pathbreaking book *Our Bodies, Ourselves*, this section speaks to experiences across the arc of reproduction that are both universal and personal, beginning with menstruation. By highlighting social and cultural norms (including stigmas) around human reproduction, as well as the designs that have emerged to challenge or change them, this section explores complex topics related to bodily autonomy.

- 3 Deborah Willis (American, b. 1948)**
***I Made Space for a Good Man*, 2009**
Lithograph, edition of 28
Printed at the Brandywine Workshop and
Archives in Philadelphia
Courtesy of the artist

“‘You took the space from a good man.’ These words do not belong to Willis, but to a male professor who, in 1975, challenged the artist’s position—her space—in a studio course at the Philadelphia College of Art. Thirty-four years later, the words resounded across the triptych of Willis’s body. ‘I decided to play with the words that haunted me,’ she told Harvard Art Museums fellow Hannah Chew in a recent interview. The words morph with her body across the 1976 contact print, a series of photographic negatives brought into pink relief by the lithograph. An indefinite phrase (‘A woman ...’) turns to citation (‘You took ...’) and ends, with a raising of arms and eyes, in declaration (‘I made ...’). From the multiplication of text and the transformation of print formats (photograph to lithograph), making space becomes a generative act. Willis makes space for herself; for her practice as an artist, historian, photographer, and writer; and for her ‘good man,’ her future son (and fellow artist) Hank Willis Thomas.”

Written by Alejandro Octavio Nodarse for the exhibition *Prints from the Brandywine Workshop and Archives: Creative Communities*, March 4–July 31, 2022, Harvard Art Museums, Cambridge, MA.

- 4 A young girl holds a placard during a 2020 fundraising marathon in Kyotera, Uganda. (Photo © Jjumba Martin)**

Period stigma affects the lives of many people. Despite accounting for a quarter of the world’s population, girls and women of reproductive age in some regions are considered untouchable when they are menstruating. They may be exiled to separate structures which, while designated for girls and women, are not designed or equipped for their care. Even areas without such strict social norms may not have separate toilet facilities, or the facilities may lack water supply or have no doors, walls, or roofs. Such stigma affects girls especially. After puberty, girls lose as many as 20 to 60 school days per year and as a result have higher dropout rates. In Uganda, up to 80% of girls drop out of school by age 13.

- 5 Leona Watson Chalmers (American, active 20th century)**
Robert P. Oreck (American, active 20th century)
Tassette, 1959
Rubber
- 6 Jane Hartman Adamé (American, b. 20th century)**
Andy Miller (American, b. 20th century)
FLEX Cup (originally Keela Cup), 2017
100% Medical grade silicone

Menstrual cups are more affordable and environmentally friendly than disposable alternatives and can last about 10 years. Their design dates back as far as the mid-19th century. In 1932, the midwifery group McGlasson and Perkins improved the menstrual cup by developing a bullet-shaped prototype out of rubber. In 1935, former Broadway actress Leona Watson Chalmers designed what would eventually become the first commercially available menstrual cup, and she later collaborated with businessman Robert Oreck to produce the Tassette. (*Tasse* means *cup* in French and, with the suffix *-ette*, indicates a little cup). Today, menstrual cups are more popular than ever, with everyone from global health advocates to large companies promoting their efficacy, comfort, affordability, and sustainability.



Audio tour stop #2

Narrated by Sarah Bloom with additional commentary by Angela Garbes, author of *Like a Mother and Essential Labor*.

- 7 Tampax, 1936**
- 8 Freedom Pads, late 20th century**

Many reproductive health products owe their development to wartime designs and technologies. During World War I, U.S. Army nurses repurposed a cotton substitute that was used to absorb blood, called Cellucotton, for their periods. After the war, businesses quickly commercialized Cellucotton to sell leftover products. This modest invention proved groundbreaking. By the early 1920s, Kimberly-Clark's Kotex brand was born. Since then, some "feminine hygiene" brands have become near-universal. The Tampax brand produced a compressed cotton tampon with a cardboard applicator. Invented by American doctor Earl Hass and patented in 1933, the applicator allowed insertion without touching the vagina. It was marketed as "hygienic and discreet." In 1969, Kotex introduced a new innovation—the Stayfree mini pad—that adhered to underwear and eliminated the need for safety pins and belts to keep the pad in place.

- 9 Herbert Bayer (American, born Austria, active Germany and U.S., 1900–1985)**
***The Menstrual Cycle Brochure*, 1939**
Schering AG, 1851
Herbert Bayer © 2022 Artists Rights Society (ARS), New York / VG Bild-Kunst, Bonn
Original: Offset lithograph on paper, mounted on black paper
Courtesy of Cooper Hewitt, Smithsonian Design Museum, and the Artists Rights Society

In 1939, Austrian-born designer Herbert Bayer was commissioned by the pharmaceutical company Schering AG to design illustrations for its new forms of estrogen, Progynon-B and Progynon-DH. Bayer loved splicing and reassembling photographs and illustrations into photomontages. This colorful brochure is full of anatomical detail and depicts the menstrual cycle with cosmic reverence. The black background evokes a night sky, and a uterus at the center appears to radiate out into the universe. Bordered by phases of the moon, an ovum circles the page, its satellite journey proceeding from ovary to fallopian tube to uterus and beyond. The uterus appears in perfect harmony with the cosmos—an idealized view that reflected Schering AG's goal of promoting estrogen to correct "menstrual disturbances."

**10 Suzanne Siemens (Canadian, b. 20th century)
Madeleine Shaw (Canadian, b. 1970)
Boxer Brief, 2020
Manufactured by Aisle (formerly Lunapads)
Body: Tencel/organic cotton/spandex
Lining: Recycled polyester/organic cotton/
polyester/TPU laminate**

11 Rael Reusable Pantiliner, 2021

In the past decade, new underwear products have emerged to free users from single-use sanitary pads or tampons through a patented combination of absorbent materials in the lining of the garment. Such products are antimicrobial, leak resistant, and designed to be inconspicuous yet stylish to meet the needs of a wider spectrum of people who menstruate.

12 Protest Buttons, c. 1960s–1990s

Since the pin-back button was invented at the turn of the 20th century, buttons have been a popular way to declare individual or collective demands, desires, and beliefs through words or images. Take, for example, the image of a wire coat hanger. In the 1960s and 1970s, supporters of abortion rights in the U.S. sometimes held hangers as an eloquent yet grisly reminder that desperate women used them for often-fatal self-induced abortions.

**13* “Right Method, Right Time, My Choice,”
2014–2021 (Indonesia)
Johns Hopkins Center for Communication
Programs
(Photo © Bill & Melinda Gates Foundation/
Prashant Panjiar)**

At the start of the 2010s, many Indonesian women reported being confused over how to choose a method of contraception. Among Indonesian girls ages 15 to 19, one-third experienced an adolescent pregnancy, and half of women ages 20 and older used short-term contraceptives despite not wanting more children. The Indonesian Health Ministry partnered with the Johns Hopkins Center for Communication Programs to develop a program called Right Method, Right Time, My Choice, which provided information about contraceptives on television and via a mobile app, a website, and social media. They engaged local organizations, midwives, and other health care providers to ensure that women and girls could find reliable information within their communities. The program also worked with supply chains to maintain a steady stock of all contraceptive options.

**14* Adolescent 360, 2016–ongoing
Ethiopia, Tanzania, and Nigeria**

According to the World Health Organization (WHO), pregnancy and childbirth complications are the leading cause of death among girls ages 15 to 19. To combat these trends, Adolescent 360 (A360) designed four youth-powered programs: Smart Start in Ethiopia, *Kuwa Mjanja* in Tanzania, *Matasa Matan Arewa* in northern Nigeria, and 9ja Girls in southern Nigeria. In each program, A360 partners with girls to create classes that combine one-on-one reproductive health counseling and life skills sessions. A360’s mission: “By protecting and improving girls’ sexual and reproductive health, we can mitigate some of the [economic, social, and contextual] barriers they face on their journeys, and empower them to work towards the futures they envision.”

15 *Jihua shengyu haochu duo/Family planning has many advantages, 1974*
Originally distributed in the People's Republic of China; reprinted for this exhibition courtesy of the International Institute of Social History, Amsterdam

16 *Two-child policy, 2007*
Produced by the India Ministry of Health and Family Welfare
Image courtesy of Alamy

17 *Would you be more careful if it was you that got pregnant?, 1969*
Photographed by Alan Brooking. Art directed by Bill Atherton. Copywritten by Jeremy Sinclair Cramer Saatchi Advertising Agency
Poster for the Health Education Council, issued by the Family Planning Association, UK

18 *The population bomb threatens the peace of the world, 1968*
Produced by the Campaign to Check the Population Explosion
Printed by *The New York Times*
Image courtesy of Special Collections, Princeton University Library

Policies designed to control population growth have long existed. India was the first country to launch a mass media campaign on family planning in 1952. Many nations followed suit. China's one-child policy is one of the most well-known family planning initiatives of the 20th century. In the U.S. and Europe, a popular movement that was inspired by the environmentalism of the late 1960s advocated for zero population growth. Today, concerns about family planning persist, and the impact of population on the environment and labor force have led many to monitor demographic booms and busts—though often without improving family leave policies, maternal and infant health, or compensation for caregiving.

19 *Boston Women's Health Book Collective Our Bodies, Ourselves, 2nd edition, 1974*
First published in Boston in 1970 as *Women and Their Bodies*

20 *Our Bodies, Ourselves, 9th edition, 2011*

Like many grassroots efforts, *Our Bodies, Ourselves* had humble origins. The original text was written by a group of white middle-class women for a course that ran only once in 1969. The book was handwritten, then photocopied for distribution. It cost readers 75 cents. First-person testimonials formed the core of the book, with chapters on basic anatomy, sexuality, sexually transmitted diseases, birth control (including abortion), pregnancy, childbirth, and postpartum care.

Today, *Our Bodies, Ourselves* is still one of the best-selling feminist books worldwide—and one of the most translated books. It's available in at least 34 languages, with translated versions addressing some culturally specific issues. For example, the version available in Egypt includes an entry for female circumcision, which explains the cultural context; some readers have objected that this has allowed for the continuation of the practice.

“Every woman should have the right to decide whether and when to have children.”

Mark Suzman
CEO, The Bill & Melinda Gates Foundation

Means of reproduction

Not all tools to monitor and control fertility have emerged from the realm of medicine; activists, designers, and entrepreneurs have also reimagined reproductive health, often alongside social movements. In the 1990s, 16 organizations led by women of color founded the nonprofit SisterSong, launching a movement that defines reproductive justice as “the human right to maintain personal bodily autonomy, have children, not have children, and parent the children we have in safe and sustainable communities.”

21 Intrauterine devices

Small, delicate, and usually made of polyethylene or copper, intrauterine devices (or IUDs) are inserted in the uterus by a medical professional to prevent pregnancy. IUDs are 99% effective over many years—and reversible, as fertility resumes shortly after removal. But access to IUDs is often limited due to the training required to perform the procedure, as well as the cost, which can range from US\$500 to US\$1,300.

21a Dalkon Shield IUD, 1971

On loan from the Mütter Museum of the College of Physicians of Philadelphia

IUDs are regulated in part because of side effects experienced by women who used the Dalkon Shield in the 1970s and 1980s. After the Dalkon Shield had been prescribed to 2.5 million women, it was found to have caused widespread pelvic inflammatory disease and infertility because its multifilament string allowed bacteria to enter the uterus. Loretta J. Ross, a pioneer of the reproductive justice movement, shared her story to prevent future generations from suffering as she did.

The design flaw was the wick [that] caused an infection and caused me to lapse into a coma. I underwent a total hysterectomy at the age of 23 that ended my fertility prematurely. By age 25, I was experiencing menopausal symptoms. I wasn't able to give permission for the hysterectomy; there was no informed consent. I did not wake up until the doctor who had performed my hysterectomy was standing by my bedside. He was the same doctor who for six months had been misdiagnosing my symptoms as a venereal disease, or what we call an STD [sexually transmitted disease] today. He didn't remove the Dalkon Shield until my fallopian tubes erupted.

21b Birnberg Bow IUD

21c Unidentified 375 Copper Coil IUD

21d Cushion Shaped Disc ICD (Intracervical Device) in 14 Karat Gold

21e Margulies Spiral IUD

21f Hall-Stone Type Ring IUD: Uterine Shaped

21g Lippes Loop IUD

21h Unidentified Silver IUD

21i Majzlin Spring IUD

21j Paragard Copper IUD

21k Saf-T-Coil IUD

21l Mirena IUD

On loan from the Mütter Museum of the College of Physicians of Philadelphia

22a Martha Poggioli (American, b. 1988)

23b *Incomplete Patent Chronology, 1867–2021, Scheme A61F 6/00, 6/06, 6/08, 6/14 & 6/20, 2018–ongoing*

Printed on fabric

Courtesy of the artist

This timeline shows an evolution of reproductive tools and devices. Each object depicts a unique patent claim related to IUDs, pessaries, and other insertable devices. The drawings are proposed inventions within the category “A61F” in the Cooperative Patent Category classification system. Patents on this map are from the U.S., China, Russia, Japan, Denmark, France, South Korea, Spain, Switzerland, and the UK. As online databases containing these kinds of patents continue to expand, so too will this chronology, which will likely never be complete.

**23* Cervical Retractor and IUD Inserter, in development
Bioceptive, Inc.**

While IUDs are exceptionally effective, many people opt out of them due to fears about insertion. The pain or bleeding that some experience with IUD insertion is due to the tenaculum forceps, a device originally designed to remove bullets from Civil War soldiers. The tenaculum clamps tissue to stabilize the cervix so a physician can position the IUD within the uterus.

New Orleans-based Bioceptive has designed a gentler alternative. A retractor uses suction to stabilize the cervix and create a pathway into the uterus. Then an IUD inserter is used to position the IUD. Bioceptive's design will allow IUD procedures to be performed by trained providers other than doctors. The patented system will also pair the cervical retractor with future devices to support a variety of uses, including biopsies and fertility-related procedures.

**24 David P. Wagner (American, b. 20th century)
DialPak Contraceptive Dispenser, 2001
Plastic**

Illinois engineer David P. Wagner invented the DialPak in 1962 when he and his wife had difficulty remembering whether she had taken her daily contraceptive pill. The principle is similar to many such packs used today: four sets of seven-day weeks. By moving away from a jar of pills to this round dial, the design offered greater precision and control over contraception.

“Contraceptives are one of the greatest antipoverty innovations in history.”

**Melinda French Gates
Co-chair, The Bill & Melinda Gates Foundation**

**25* Lyndra Therapeutics Monthly Oral Contraception (LYN-064), in development
(Photo © Langer and Traverso Labs at MIT)**

Lyndra Therapeutics has developed a drug delivery system to transform “the pill” into a single capsule taken monthly instead of 28 pills taken over 28 days. Enabled by more than 50 patents, the LYNX™ system ensures steady drug release over time. The capsule has a coating that maintains its integrity until it reaches the stomach. Once there, stomach acid dissolves the coating, and the drug-containing elements unfold in a star formation to begin releasing medication. The star shape keeps the medicine in the stomach until the timed release is complete. The component then disintegrates and safely passes through the body.

The LYNX system will have broad applicability. Because the medication itself is independently approved, the LYNX system could very soon begin saving patients from complex regimens to simplify their care. The Gates Foundation has invested in the system's use for contraception and malaria eradication.

**26 Ellen Peck (American, 1942–1995)
William Granzig (American, b. 1939)
*The Baby Trap: A Devastating Attack on the Motherhood Myth, 1971***

**27 Shirley Radl (American, 20th century)
*Mother's Day Is Over, 1973***

**28 Ellen Peck (American, 1942–1995)
Judith Senderowitz (American, 20th century)
*Pronatalism: The Myth of Mom & Apple Pie, 1974***

“Obituary: Motherhood” was the provocative title of Ellen Peck's 1972 op-ed in *The New York Times* about the trappings of motherhood. She pointed to rising environmental awareness and challenges to patriarchal social attitudes as reasons to remain, using a term she coined, childfree. A year earlier, with sexologist William Granzig, Peck wrote *The Baby Trap*, one of the first books about the emerging childfree movement. She also founded an advocacy organization for people who choose not to have children. Her partner in this venture was Shirley Radl, a writer and mother whose book *Mother's Day Is Over* (1973) featured a diaper pin bent beyond repair on its cover. These books launched the childfree movement, but made no historical reference to enslaved people whose children had been considered not their own but the property of others, nor to generations of women, predominantly women of color, who were sterilized without their consent.

29* Sayana® Press, 2011
PATH

The Sayana® Press is an easy-to-use injectable contraceptive that can be self-administered to prevent pregnancy for three months. The device features a small plastic bubble that comes prefilled with a hormone, depot medroxyprogesterone acetate. The injection system is simple. You shake the device for 30 seconds until its contents become evenly white, then you push down on the needle shield to activate the injector. After removing the needle shield, you pinch an area on your stomach or thigh and push the needle in, holding the container until the liquid has been fully injected.

To support equity, a consortium of partners, donors and aid organizations have ensured that the Sayana Press is available for 85 cents per dose in 69 low- and middle-income countries, so women in those countries have access to contraception at little or no cost.

30* Microneedle Contraceptive Patch, in development
FHI 360, Georgia Institute of Technology

The microneedle contraceptive patch offers a spin on injectable contraception. Although scientists refer to the spikes on this patch as “needles,” the microneedles are less than one millimeter tall and are made of a biodegradable polymer that is much softer than steel. After “injection,” when the patch is pressed into the skin for one minute, the microneedles separate from the patch as fluids in the skin trigger a “fizzing” reaction that weakens their connection to the backing. Once in the skin, the microneedles dissolve slowly, releasing a hormone (levonorgestrel) into the bloodstream for 30 days. Conveniently, the patch generates no biohazardous needle waste.

31 Plan B One Step, 2009

Medications that are referred to as “emergency contraception” contain hormones that prevent ovulation. They’re taken up to 72 hours after intercourse to prevent pregnancy. Their use began in the 1960s when doctors would prescribe estrogen off-label (for a use other than what was intended) for victims of rape. From the 1970s to 1990s, different formulations were used, and many organizations (including PATH and the University of Washington) advocated for “prescriptive delegation,” so pharmacists could dispense emergency contraception by working on behalf of a patient’s doctor or nurse.

In 1999, the emergency contraceptive pill Plan B was approved by the U.S. Food and Drug Administration (FDA). While this ended off-label use of such drugs to prevent pregnancy, it ushered in a new era of struggle over access until 2006 when the FDA approved Plan B for over-the-counter purchase by people 18 years and older. It became available at retail pharmacies across the U.S. in 2009 and it later became available without age restrictions in 2011.

32 Los Angeles Self-Help Clinic
Del Em Device, 1971
Glass jar, valved syringe, plastic cannula

The Del Em device was used to perform abortions in the early weeks of pregnancy. This design, made from easy-to-find parts, emerged from a consciousness-raising meeting of the Los Angeles-based Self-Help Clinic in 1971. Once the tube was fed through the cervix and into the uterus, the syringe plunger was extended to create a vacuum, which extracted the contents of the uterus through the tube into the jar. Lorraine Rothman, a teacher and mother of four, made a lifesaving addition of a one-way valve that prevented air from being pushed back into the uterus, where it could enter the bloodstream and cause a fatal embolism.

Earlier, in 1966—and unbeknownst to the Self-Help Clinic—British obstetrician and gynecologist Dorothea Kerslake produced a teaching film on vacuum aspiration. Reproductive scientist Malcolm Potts dates the first manual vacuum aspiration from the uterus to the Scottish gynecologist James Young Simpson (1811–1870), who was Queen Victoria’s physician. As Potts remarked, “Only in a field as controversial as abortion would the same idea need to be discovered three times, each independently.”

- 33 JEB (Joan E. Biren) (American, b. 1944)**
Darquita and her mother, Denyeta, 1979
- 34 Mobilize for Women's Lives, a pro-choice march and rally in Washington, DC, 1989**
- 35 Dessie Woods (later Rashida Muhammad Mustafa) at a Take Back the Night March in Washington, DC, 1981**

Archival pigment prints
Courtesy of the artist

JEB (Joan E. Biren) is an internationally known photographer and documentary filmmaker who has chronicled social justice movements and the lives of lesbians for more than four decades. JEB came out in the 1960s and realized the need for affirming images of lesbian culture. In the 1970s, JEB toured the U.S., photographing lesbians at events such as the Michigan Womyn's Music Festival, anti-Ku Klux Klan demonstrations, and gay and lesbian pride marches. Her groundbreaking images are intimate portraits of daily life that also document the emerging women's health movement.

- 36 Margaret M. Crane (American, b. 1941)**
The Predictor, 1971
Image courtesy of Brendan McCabe

In 1967, while working at the pharmaceutical company Organon, graphic designer Margaret "Meg" Crane observed how the company processed pregnancy tests. A chemical mixture was added to a urine sample in a test tube; after two hours, the result would appear reflected in the mirror at the bottom of the tube. Crane thought this technology could be placed in the hands of end users. She pressed Organon to manufacture home tests and even created a prototype. While Organon's executives worried that their customer base of mostly male doctors would see home pregnancy tests as undermining their authority, Organon's parent company earmarked funds for a market test. Organon hired an advertising agency to develop prototypes. Having caught wind of this, Crane turned up at a meeting uninvited and placed her own prototype next to the agency's prototypes. The ad agency representative hired by Organon to oversee marketing bypassed prototypes with "feminine" bows and tassels in favor of Crane's sleek kit. The Predictor became the first patented home pregnancy test.

- 37 Toni Weschler (American, b. 1955)**
Fertility Awareness Method Chart from *Taking Charge of Your Fertility*, originally published 1995
Photocopy of chart, 2012
Courtesy of Amber Winick

In 1996, Toni Weschler published *Taking Charge of Your Fertility*, popularizing the Fertility Awareness Method and ushering in a more nuanced model of body literacy. In the book, Weschler explains the phases of fertility and identifies three indicators of fertility: waking (basal body) temperature, cervical fluid, and cervical positioning. Her account helps readers track their fertility with ready-made templates that link temperature changes with one's unique fertility phases.



Audio tour stop #3

Narrated by Sarah Bloom with additional commentary by Amie Bishop, Senior Research Advisor at OutRight Action International.

- 38 Pascal Koenig (Swiss, active 21st century)**
Philipp Tholen (Swiss, active 21st century)
Peter Stein (Swiss, active 21st century)
Lea von Bidder (Swiss, active 21st century)
Ava Bracelet, 2014
Wearable technology in biocompatible silicone
Courtesy of Ava

While many period-tracking apps help identify peak fertility, the Ava Bracelet is the first wearable fertility tracker that monitors nine indicators of fertility. Data collected from the bracelet is displayed on an app to pinpoint the most fertile days of a wearer's cycle. The Ava bracelet also helps people track their general health during pregnancy.

39 The Forecaster, 1948
Manufactured by Forecaster Co.

40 Ovulation Strips, 2021
Pregmate LLC (est. 2014, U.S.)
Plastic

While designers began to explore ways to detect ovulation in the 1960s, it wasn't until the mid-1980s that over-the-counter ovulation monitors became widely available. Ovulation monitoring requires routine measurement of luteinizing hormone (LH) that can be traced in urine. Produced by the pituitary gland, LH is secreted at very low levels throughout the menstrual cycle but surges once a developing egg follicle reaches a certain size, triggering ovulation about 24 to 48 hours later. A positive result on an ovulation strip indicates high levels of LH and the beginning of ovulation.

41 Dr. Maria Hengstberger (Austrian, b. 1941)
CycleBeads®, 2002
Cycle Technologies (est. 2002, Austria)
Rubber and plastic

The Austrian gynecologist Dr. Maria Hengstberger developed the Baby Necklace in 1989 as part of her work in Ethiopia. After establishing a local health clinic, Hengstberger worked closely with women to design many tools, including a necklace of color-coded beads based a standard 28-day cycle. Hengstberger's necklace was instrumental in the development of CycleBeads, which help people identify their potentially fertile windows.

42 Maureen Brown (American, active 21st century)
Marc Brown (American, active 21st century)
Mosie Syringe, 2016
Mosie LLC (est. 2014, U.S.)

Fertility challenges affect about one out of eight people. The best-known (and often wildly expensive) option to address infertility is in vitro fertilization, in which eggs are retrieved in a medical procedure, fertilized in a lab, and implanted in the uterus. A less expensive option, intrauterine insemination inserts sperm past the cervix and into the uterus just before ovulation. A third option, intravaginal insemination can be performed at home using a syringe or even a turkey baster. Most syringes, however, have a tip that can be painful to the user and can also trap sperm. As part of their own fertility journey, Maureen and Marc Brown developed a new syringe with a rounded nub to ease at-home insemination. They launched a company, Mosie, and their son Francis (Frank) became the first Mosie baby. This patented design has helped single, surrogate, straight, and LGBTQ+ parents successfully conceive.

43 Josh Wasserman (British, active 21st century)
Royal National Institute of Blind People, UK
Tactile Pregnancy Test Prototype,
in development
Courtesy of the designer

People who are blind or visually impaired often have to rely on others—partners, friends, health care workers, even strangers—to learn the results of a pregnancy test. This prototype of a tactile pregnancy test, developed by the UK Royal National Institute of Blind People, aims to remove this barrier. The prototype features bright yellow and pink panels so people with low vision can differentiate the top from the bottom. It works with the same kind of sensors as other pregnancy tests, but it relays that information through tactile bumps. A small bump on the underside of the stick confirms that the urine has been absorbed. Bumps on the top become raised to indicate a positive result. In its accessibility to all users, not just those with sight loss, this test is an example of universal design.

44 Bethany Edwards (American, active 21st century)
Anna Couturier Simpson (American, active 21st century)
Lia Pregnancy Test Prototype, in development
Courtesy of the designers

Many young designers are taking on industry norms that have gone unchallenged, as seen in the first plastic-free and biodegradable home pregnancy test designed by Lia Diagnostics. The company name plays on the scientific term lateral immunoassay, a fiber test strip that's part of a pregnancy test. For this design, Lia developed biodegradable paper that remains durable in contact with urine yet breaks down when flushed, reducing the environmental impact of pregnancy testing.

Exam

Design is never neutral. Some methods of examining bodies and monitoring pregnancy and birth have been developed and used in ways that are at best uncomfortable—and at worst violate consent. Other newer tools and practices, however, have been designed from the patient’s perspective, enabling exams that prioritize comfort while providing culturally appropriate, gender-affirming, and trauma-informed care.

**45 Pompeii Quatra-Valve Speculum, 19th century reproduction of c. 79 CE design
On loan from the Mütter Museum of the College of Physicians of Philadelphia**

For centuries, the speculum was the only tool available for internal examination of the uterus. It has three or four prongs that are inserted into the vagina. As outward pressure is applied, the prongs separate and stretch the surrounding tissue to enlarge the opening. Use of the speculum fed into prevailing perceptions of female anatomy and women generally as inferior. Even at the beginning of the 20th century, physicians believed that disturbances to the uterus changed women’s behavior. Drawing on the Greek and Latin words for uterus, *hysteria* became a common pseudo-scientific diagnosis that attributed women’s issues to their uteruses, not their subjugation in society.

**46 J. Marion Sims (American, 1813–1883)
Lucy (Sims) Speculum, c. mid-19th century
On loan from the Mütter Museum of the College of Physicians of Philadelphia**

Physician J. Marion Sims specialized in a field that later became known as gynecology. Among his contributions was a method to repair fistula, a potentially life-threatening complication of prolonged or obstructed labor. The method involved using a speculum fashioned from a bent pewter spoon and repairing the damage using silver sutures. His speculum design is still in use today.

Although Sim’s work has improved women’s health, his major success was built on experimentation on enslaved African American women—some of whose names are known, including Betsey, Anarcha, and Lucy. The enslaved patients endured multiple surgeries without anesthesia even after it became available. In 2020, obstetrician Kameelah Phillips decided to rename the Sims speculum “Lucy” as a tribute to one of Sim’s patients. Phillips said, “I wasn’t going to give honor to a man who operated on the backs and developed instruments on the backs of women who looked like me.”

**47 Fran Wang (American, b. 1990)
Rachel Hobart (American, b. 1991)
Yona Speculum Prototype, in development
frog design (est. 1969, Germany;
headquartered in the U.S.)
Aluminum and silicone
Courtesy of Yona Care**

More than 60 million pelvic exams using the speculum are conducted each year in the U.S. For too long, people with vaginas had little voice in the design of these tools. Women designers at *frog*, a San Francisco-based design consultancy, have created a redesigned speculum “for people with vaginas by people with vaginas.” The designers interviewed patients and medical professionals and created and evaluated prototypes for efficiency of use, ergonomics, and even auditory effects. Their device, called the Yona (from the Hindu *yonis*, or the life force symbolized by the vulva), features surgical-grade silicone to eliminate the feel of cold steel and diminish the metallic sounds many associate with a speculum. The redesign also modifies the angle of the handle to improve comfort. The designers hope that when the Yona is used, it will alleviate stress and ultimately shorten pelvic exams.

**48 Jess T. Dugan (American, b. 1986)
Taan, 2012
Archival pigment print
Courtesy of the artist**

Jess Dugan is an American-born artist whose creative practice centers around an exploration of identity—particularly gender and sexuality—through photography, video, and writing. As a queer, non-binary person, Dugan is motivated by an existential need to understand and express themselves and connect with others. Their intention is to create work that facilitates intimacy and encourages empathy, understanding, and critical conversations about identity and contemporary social life.

- 49 Eden Laurin (American, b. 1983)**
Nyssa VieVision Self-Check Mirror, 2021
Nyssa Care (est. 2018, U.S.)
Plastic
Courtesy of Nyssa

Founded by three new mothers, the company Nyssa launched with a focus on postpartum recovery. This hands-free mirror is shaped so it can sit between the thighs while the user is in a seated or standing position. True to its tagline—“Get to know your vulva in a whole new light”—an LED light illuminates the vulva and vagina. Nyssa’s founders suggest using the VieVision mirror for routine checks, for self-grooming, for guiding the insertion of a tampon, menstrual cup, or contraceptive device, or during birth.

- 50 Exam Table Stirrups, c. 1885**
Canton Surgical and Dental Co., U.S.
On loan from the Mütter Museum of the College of Physicians of Philadelphia

The lithotomy position—in which a person lies on their back with legs raised and bent at the knees, often with their feet in stirrups—is commonly used for pelvic exams and surgical procedures. This posture is also common in hospital births. An increasing number of providers are now working with patients to address the discomfort that many associate with this position. As Chicago-based midwife Stephanie Tillman says, “Many providers see stirrups or foot pedals as making their day easier because they keep everyone in the same position and facilitate getting to the cervix easily. But we can get to the cervix easily from many different positions. Having people find their most comfortable position and working around that ultimately takes less time.”

- 51 Susan Ferreyra (American, b. 20th century)**
Katrine Hughes (American, b. 20th century)
Anne Walzer (American, b. 20th century)
Planned Parenthood of San Francisco
Table Manners: A Guide to the Pelvic Examination for Disabled Women, 1982
Courtesy of Planned Parenthood

Download *Table Manners*
bit.ly/table-manners-guide



Table Manners provides an important corrective to health care norms and is based on “the assumptions that disabled women are sexual, and that they deserve quality health care services which are accessible and sensitive to their needs.” Illustrations by Anne Walzer show how patients and providers can collaborate to make a pelvic examination as comfortable and empowering as possible for every person.

- 52 JEB (Joan E. Biren) (American, b. 1944)**
Jan Dixon (later Jamilah Ali) and Barbara Lewis doing a cervical examination, 1979
Archival pigment print
Courtesy of the artist

JEB (Joan E. Biren) is an internationally known photographer and documentary filmmaker who has chronicled social justice movements and the lives of lesbians for more than four decades. JEB came out in the 1960s and realized the need for self-expression and affirming images of lesbian culture. In the 1970s, JEB toured the U.S., photographing lesbians at women’s events such as the Michigan Womyn’s Music Festival, anti-Ku Klux Klan demonstrations, and gay and lesbian pride marches. Her groundbreaking images are intimate portraits of daily life that also document the emerging women’s health movement.

Labor

During labor, the fetus and placenta are delivered from the uterus to the outside world. Whether this process is vaginal, by cesarean section, at home, in a hospital, in a pool, or with an analgesic, it involves designs that vary depending on cultural, political, and economic factors. The designs in this section are related to the birthing experience, which is increasingly centered on the needs and choices of the birthing people rather than just their survival.

**53 Dr. Bernhardt Kronig (German, active 1850s)
Dr. Karl Gauss (German, active 1850s)
Twilight Sleep Advertisement, c. 1914**

In 1906, obstetricians Bernhardt Kronig and Karl Gauss presented research at the Berlin National Obstetrics Conference on a birthing method they called Twilight Sleep. Touted as a “painless labor” alternative, the method involved injecting the laboring person with morphine at the start of birth pains, and then administering doses of scopolamine, an amnesiac with hallucinogenic side effects. As the baby’s head emerged, chloroform could also be administered. The drug combination was designed to erase the memory of labor pains, but it was not always effective.

Dr. Elizabeth Taylor Ransom promoted Twilight Sleep in her newly founded maternity hospital in Boston. In 1915, a patient who had been an advocate of Twilight Sleep (Frances Carmody) died during its use while she was in labor with her third child. Although the national news coverage lessened the method’s popularity, Twilight Sleep was used well into the late 1960s.

**54 Dilation Chart, c. 2021
Wood**

Cervical dilation charts demonstrate how the cervix effaces (thins and stretches) and dilates (opens) in the days and weeks before childbirth so a baby can fit through the vaginal canal. Once the cervix opens to ten centimeters, the person is ready to birth their baby. Such standards for measurement, however, are not always useful. While cervical dilation checks have become routine with medicalized childbirth, many midwives, doulas, and forward-thinking obstetricians insist that cervical dilation does not predict the timeline, speed, or cadence of birth.

**55 First Epidural Designed by James Leonard Corning (American, 1855–1923)
PERIFIX Filter Continuous Epidural Set,
21st century
Manufactured by B. Braun Medical Inc.
(est. 1839, Germany)**

The epidural, a procedure to provide local pain relief, was developed in the late 19th century when American neurologist James Leonard Corning injected cocaine into the spine of a male volunteer. The technique was explored again in the early 20th century by Spanish military surgeon Fidel Pagés, who used it when treating wounded soldiers. Today, 60% to 70% of births in the U.S. reportedly involve an epidural. Applied by an anesthesiologist, a needle is used to introduce an infinitesimally thin plastic catheter into the spine, through which medication is delivered. An epidural blocks the nerves that send pain messages to the brain. Many people receiving an epidural describe a significant decrease in pain and a numbness in the legs, which prevents lower movement and necessitates using a catheter for urination.

**56 *The Lamaze Method: Techniques for
Childbirth Preparation*, 1983
Produced by Embassy Home Entertainment, 1982**

French obstetrician Dr. Fernand Lamaze introduced the Lamaze method in 1951, which was heavily informed by a trip to what was then the Soviet Union, where he studied the medical findings of Ukrainian psychotherapist Dr. I. Z. Velvovskii. The Lamaze method consists of relaxation strategies, breathing techniques, childbirth education, and emotional support from a specialized nurse. The familiar “hee, hee, hoo!” seen in Hollywood portrayals of childbirth was popularized in part through Marjorie Karmel’s 1959 book *Thank You, Dr. Lamaze*, which promoted the Lamaze method with U.S. audiences.

- 57 **Grantly Dick-Read (British, 1890–1959)**
Natural Childbirth: A Documentary Record Of The Birth Of A Baby, 1957
- 58 **Michelle LeClaire O’Neill, PhD, RN (American, active 20th and 21st century)**
Creative Childbirth: The LeClaire Method of Easy Birthing Through Hypnosis, 1991
- 59 **Marie “Mickey” Mongan (American, 1933–2019)**
HypnoBirthing: The Mongan Method, 1992

In his books *Natural Childbirth* and *Childbirth Without Fear*, British obstetrician Grantly Dick-Read claimed that “healthy childbirth was never intended by the natural law to be painful.” Hypnosis, he argued, would assist birthing people in interrupting the “fear-tension-pain syndrome,” a vicious cycle in which fear of pain contributes to pain and affects the circulation of blood by directing it away from reproductive organs to larger muscle groups in the ligaments.

This new approach launched a movement in the U.S. during the 1970s. By the 1980s, two birth educators were promoting the importance of focusing inward, reframing labor sensations as positive and productive, and feeling safe and relaxed. Marie “Mickey” Mongan and Michelle LeClaire O’Neill both used the term “HypnoBirthing” to describe their technique without either holding a trademark. A decade later, Mongan filed a lawsuit against LeClaire O’Neill for common law trademark infringement. The case was dismissed, and today both educational programs lay claim to HypnoBirthing in their birth training.

- 60 **George Melville Wolff (American, 1898–1977)**
Wolff and Phillips Architects, Portland, OR
Kaiser Permanente Sunset Boulevard Hospital Maternity Ward, c. 1950
Courtesy of Kaiser Permanente Heritage Resources

Kaiser Permanente’s “dream hospitals” promised deliberate, thoughtful maternity care to a postwar generation. This unique hospital design was based on concentric “circles of service” that separated sterile staff spaces from patients and separated both staff and patients from visitors. Beside each birthing person’s bed in the maternity ward was a large metal drawer that transferred a baby’s bassinet from the communal nursery to the privacy of their room. The baby drawer was one of many designs that were intended to offer a more efficient and humane environment.

The first Kaiser Permanente hospital was built on Los Angeles’ Sunset Boulevard in 1952. Its design was the brainchild of Dr. Sidney R. Garfield, a pediatrician and right-hand man of Henry J. Kaiser, the industrialist who founded Kaiser Health Plan for his workers. Garfield had been influenced by Dr. Edith Jackson’s projects at Grace-New Haven Community Hospital. Piloted between 1946 and 1952, Jackson’s hospital designs encouraged bonding and breastfeeding by keeping infants and birthing parents together through “rooming-in.” The practice was welcomed as an alternative to sedated deliveries and separated care.

“Our reproductive arcs are central to the preservation and extension of humanity. Uteruses give life and welcome people onto the planet.”

Erica Chidi from *Designing Motherhood*

**61 *Ladies Home Journal*, May 1958
First published by Condé Nast in 1883**

In the May 1958 issue of *Ladies Home Journal*, a letter from an anonymous labor and delivery nurse touched a nerve.

When I first started in my profession, I thought it would be wonderful to help bring new life into this world. I was and am still shocked at the manner in which a mother-to-be is rushed into the delivery room and strapped down with cuffs around her arms and legs and steel clamps over her shoulders and chest. It is common practice to take the mother right into the delivery room as soon as she is "prepared." [This preparation would have meant shaved pubic hair and an enema.] Often she is strapped in the lithotomy position, legs in stirrups with knees pulled far apart, for as long as eight hours. On one occasion, an obstetrician informed the nurses on duty that he was going to a dinner and that they should slow up things. The young mother was taken into the delivery room and strapped down hand and foot with her legs tied together.

After this letter, women across the country shared their own stories of abuse and lack of consent, including being drugged in an effort to keep them still, quiet, and passive during labor.

**62 Chamberlen Forceps, Locking, 19th c.
reproduction of a 17th c. design
Designed by the Chamberlen Family, England**

**63 Smellie Straight Forceps, c. 1752
Designed by Dr. William Smellie, England**

**64 DeLee Forceps, c. 1913
Manufactured by Lawton, Germany
On loan from the Mütter Museum of the College
of Physicians of Philadelphia**

Forceps are used to grasp a baby's head, hold it firmly, and exert traction to assist with vaginal birth. Their use has always been controversial. Forceps were invented in the late 1600s by the Chamberlen (or Chamberlain) family in England. They promoted midwifery based in part on their invention, which they kept a family secret. After more than a century, they sold the design—and over subsequent centuries medical providers introduced modifications. Scottish obstetrician William Smellie (1697–1763) separated the blades for more comfortable insertion and, in some cases, to conceal the forceps from his patients, which meant that consent may not have been provided. He also wrapped leather around the blades, believing this adaptation would reduce the temperature difference between the steel and the body. However, the absorbent leather could not be properly sanitized between uses and thus posed an infection risk.

**65* Jorge Odón (Argentinian, b. 1954)
OdonAssist™, in development
For demonstration purposes only;
not available for sale in the U.S.**

In 10% to 15% of births, prolonged or obstructed labor can create an urgent need to deliver the baby quickly. Vaginal birth has historically employed two tools: forceps and the ventouse, which uses a suction cup. Both are often unavailable in low-resource settings and in untrained hands can cause serious complications.

The OdonAssist™ was designed by Argentinian car mechanic Jorge Odón. After watching a YouTube video on how to get a cork out of an empty wine bottle, Odón wondered if the technique could facilitate childbirth. After demonstrating his idea to an obstetrician, he set to work on a prototype. At a 2008 medical conference, a friend scheduled him to meet with WHO physician Dr. Mario Meriardi. The WHO quickly expressed interest in the device's development.

The OdonAssist is presently an investigational device. It is made of a polyethylene sleeve with a cuff-like fold and applicator. The sleeve is introduced into the vagina using flexible spatulas. Atmospheric air is pumped into the sleeve through the applicator to introduce just enough pressure to create traction. After the spatulas are removed, the sleeve can be gently pulled to move the baby's head down the birth canal.



Audio tour stop #4
Narrated by Sarah Bloom
with additional commentary
by Dila Perera, Executive
Director at Open Arms
Perinatal Services.

**66a Adam Dubrowski (Canadian, b. 1972)
66b Christine Goudie (Canadian, b. 1980)
66c Artur Arutiunian (Canadian, b. 1999)
Perineal Repair Simulators, 2018
(open-source design)
Developed by MUN MED 3D, Memorial University,
Newfoundland, Canada, and maxSIMhealth,
Ontario Tech University, Ontario, Canada
Manufactured by proxSIMity, Ontario, Canada
Polylactide, silicone**

**67 ProxSIMity Perineal Repair Simulator Video, 2021
Video (7:04 mins)**

The perineum is the area between the vulva and the anus. During birth, it can tear or be intentionally cut to hasten birth, a procedure called an episiotomy. About one-third of all postpartum people in the UK and U.S. require stitches for a torn or cut perineum. Skilled repair is critical.

Dr. Adam Dubrowski, a scientist at Ontario Tech University, is part of a team that creates inexpensive, open-source medical training models, including 3D-printed silicone models for training in perineal repair. Anyone can 3D-print models with perineal tears of different depths and severity. The design team chose a hot pink color to avoid racial or ethnic bias.

**68 Kim Jarrelle, BS, RNC-OB (American, active
21st century)
Debbie Burbic, RN (American, active 21st century)
Jessamine O. Niccoli, RN (American, active
21st century)
Immediate Skin-to-Skin C-Section Drape, 2015
Clever Medical (est. 2015, U.S.)
Non-woven synthetics
Courtesy of Clever Medical**

An ancient surgical procedure (documented in 100 BCE as the way Julius Caesar was born), cesarean section births are now the most commonly performed surgery worldwide. In 2015, this C-section drape was developed by three nurses in Virginia to allow the obstetrician to pass the infant immediately after surgery to the birthing parent through a portal in the drape. The newborn can lay directly on the parent's chest for skin-to-skin contact, which promotes infant development and mediates the neonatal stress response, while ensuring a sterile medical environment.

Emergence

Birth is a journey that moves on the breath: exhaled, inhaled, held, and eventually dissipated. A baby emerges, and so too does a new identity for the parent. Birth can be happy but also stressful—and dangerous. This section explores designs related to the birthing experience.

**69 *Birth: A Film about Feelings and Experiences, 1986*
Directed by Sheila Kitzinger. Photography by
Ivan Strasburg, Diane Tammes, and Mike Fox.
Sound by Mike McDuffie. Edited by Franco Rosso.
A National Childbirth Trust Film produced by
Julian Aston Productions**

This film contains testimonials from women who have recently given birth, talking candidly about how they felt physically and emotionally leading up to and after delivery. The first-person accounts are interlaced with scenes of a woman who is giving birth at home, accompanied by a midwife, a doctor, and her husband. Birth advocate Sheila Kitzinger is seen hosting a National Childbirth Trust class, and Dr. Frédérick Leboyer (author of *Birth Without Violence*) talks about the benefits of birth in water.

**70 *Deluxe Flexible Pelvis Model Set, c. 21st century*
Health Edco**

Simulation tools have been used for centuries to train midwives, birth attendants, and doctors. Early models were made from wood, clay, or glass. Anatomist Marie Catherine Bihéron used wax to create movable parts. Because the French academy didn't admit women, Bihéron made a living by exhibiting and selling her models before moving to England where she taught a generation of doctors. The first life-size mannequin was designed by Angélique Marguerite Le Boursier du Coudray. Born to a medical family, du Coudray made models out of fabric, leather, and stuffing—and human bones. She achieved her own prominence when King Louis XV asked her to teach midwifery throughout France.

This Deluxe Flexible Pelvis Model demonstrates how the pelvis moves during labor. A fetal model can be used to show any presentation or positioning. The kit also includes models of the perineum and placenta so trainees can practice and master a range of birth-related skills.

**71* *NeoNatalie, 2010*
Laerdal Global Health**

In 2007, the American Academy of Pediatrics invited Laerdal (later Laerdal Global Health) to design training in newborn resuscitation for low-resource settings. Laerdal created a course that became known as Helping Babies Breathe (HBB) and a low-cost simulator for hands-on learning.

The simulator NeoNatalie can be inflated with air or water. A pump can be attached to simulate a pulse or breathing. The chest rises with chest compressions, which produce a “click” when done correctly. NeoNatalie can also cry. Although a newer version comes with mobile app-supported features, the basic NeoNatalie performs all functions without electricity. More than 1 million health care workers in 80 countries have used NeoNatalie as part of their training. In recognition of its impact, in 2013 Laerdal Global Health received an Index Award, often referred to as the “Nobel Prize of design.”

**72* Augmented Infant Resuscitator (AIR), in development
CAMTech, Massachusetts General Hospital
Global Health**

Failure to establish and maintain breathing at birth can damage a baby's vital organs, most notably the brain. To resuscitate a newborn, bodily stimulation and warming help. A bag-valve mask is often used, but it requires training to be effective and to avoid damaging the airways.

The Augmented Infant Resuscitator device can be added to any bag-valve mask to provide real-time, actionable feedback. Its design started as a collaboration at an MIT H@cking Medicine event in 2012, hosted by the Consortium for Affordable Medical Technologies (CAMTech). While working as a birth trainer in Uganda, Dr. Data Santorino noted a lack of quantitative methods to test skills in newborn resuscitation. Santorino pitched this challenge at the event and worked with CAMTech's Dr. Kristian Olson and two engineers, one automotive and one electrical, to build a prototype. The device they designed measures ventilation flow and pressure and identifies issues such as leaks, obstructions, or inappropriate breathing rates.

**73* Wireless Skin Sensors, in development
Sibel Health, Northwestern University**

In the U.S., preterm babies born between 30 and 32 weeks have a 99% survival rate. In low-resource settings, however, their outlook is often bleak. Only half will survive. To address these disparities, biomedical researchers at Northwestern University have designed soft, flexible, wireless skin sensors to monitor vulnerable newborns.

Dr. John A. Rogers, who leads the research team, says the sensors bring newborn care one step closer to achieving a "NICU of the future"—a neonatal intensive care unit that can be made available anywhere. To support use in settings with rolling blackouts or spotty internet coverage, the sensors have a rechargeable battery that also improves operating range. The sensors use radio frequencies to transmit biometric data to a nurses' station, mobile phone, or tablet. The data collected includes not only vital signs but also data on crying, movement, body orientation, and heart sounds. The team is looking to incorporate algorithms that will alert caregivers in low-resource settings to early warning signs of conditions that require clinical-grade care. Because the sensors are wireless, they allow for skin-to-skin contact between babies and parents, which is critical for newborn development.

**74 A.L. Mills (American, active 20th century)
Kuddle-Up Blanket, first produced in the 1950s
Manufactured by Medline Industries, Inc.,
est. 1966 (formerly Mills Hospital Supplies, Inc.
est. 1910)
Cotton**

A simple white cotton blanket with alternating stripes of pink and blue, the iconic Kuddle-Up blanket is used around the world. In 1910, a group of nurse-nuns approached A.L. Mills, a garment maker who produced aprons for Chicago's meatpacking industry, to create hospital garments. As a result, the medical garment and textile supply business was born, and Mills Hospital Supplies would later become Medline, the world's largest privately held manufacturer and distributor of medical supplies.

**75 Linda Foss (American, active 21st century)
BoogieBulb Eco-Friendly Nasal Aspirator, 2008
Phthalate, biodegradable materials**

The blue bulb syringe is commonly found in discharge packs for new parents or in a seasoned midwife's birthing kit. It is used during delivery if babies have meconium (stool) in their mouth or nose—or nasal obstructions in the early weeks of life. The suction tip is often slightly larger than the opening of a newborn's nostrils to protect against injuring the nasal passages.

**While being born
is a universal human
experience, the
designs that shape
it are not.**

Postpartum

After a baby has entered the world and after the placenta has emerged, the uterus that held them continues to bleed for days or weeks. Nearly every person who has given birth feels stinging when peeing, winces when sitting down, and is reminded of the aftereffects of birth with each glance downward. The designs in this section reflect various phases and experiences after childbirth, called the postpartum period.

- 76 Jess T. Dugan (American, b. 1986)**
Self-portrait with Vanessa and Elinor (2 days old), 2018
Archival pigment print
Courtesy of the artist and Turner Carroll Gallery

Jess Dugan is an American-born artist whose creative practice centers around an exploration of identity—particularly gender and sexuality—through photography, video, and writing. As a queer, non-binary person, Dugan’s work is motivated by an existential need to understand and express themselves and connect with others. Their intention is to create work that facilitates intimacy and encourages empathy, understanding, and critical conversations about identity and contemporary social life.

- 77 Generic Postpartum Mesh Underwear, 21st century**

Designed for postpartum care, these stretchy panties made of an expandable synthetic mesh hold liners that absorb uterine discharge or ice packs and other treatments for localized pain relief and healing. They are encountered by most postpartum people, regardless of whether the birth took place in a hospital, at a birthing center, or at home.

- 78 Perineal Irrigation Bottle, 21st century**
Medline Industries, Inc., est. 1966 (formerly Mills Hospital Supplies, Inc. est. 1910)
Polyethylene

After a vaginal delivery, a perineal irrigation bottle provides self-care for the postpartum person, who can squirt pH-balancing water against their urine flow to temper the sting on stretched or stitched skin.

- 79 Encapsulated Placenta, 2022**
Glass bottle containing dried and encapsulated placenta
Prepared by Erin Gamet
Courtesy of Powerful Placenta

One of history’s most celebrated practitioners of traditional Chinese medicine, Li Shizhen was the first to write about using the placenta—*zi he che*—in his 1578 compilation *Materia Medica*. The practice of consuming the placenta, most often in pill or capsule form, was introduced in the U.S. through Raven Lang, an American midwife who studied traditional Chinese medicine and promoted it in the 1980s. Encapsulation involves steaming and dehydrating the placenta, grounding it into a fine powder, and sometimes combining it with herbs and spices. Within traditional Chinese medicine, postpartum is considered a cold period after the body has lost immense heat, and placenta pills are believed to restore balance, energy, and vitality. Today, placentas are consumed by some as a balm for depression, anemia, and other common postpartum conditions. For Erin Gamet of Seattle-based Powerful Placenta, encapsulating placentas is a way to honor “the portal of the postpartum period.”

- 80 After Birth Perineal Healing Herbs (Herbal Sitz Bath), 2022**
Contains lavender flowers, red raspberry leaf, comfrey leaf, plantain leaf, calendula flowers, uva ursi leaf, shepherd’s purse, rose petals

Postpartum relief sometimes comes in the form of age-old cross-cultural or folk remedies. In a perineal sitz bath (from the German *sitzen*, “to sit”), the postpartum person sits in a shallow bath of warm water, baking soda or salt, and aromatherapy or healing herbs.

81 Elvie Perineometer, 2015
Manufactured by Elvie (est. 2013, England)

82 Rose Quartz Yoni Eggs, 2017
Manufactured by Nerissa Nefeteri
Rose quartz
Courtesy of Gabriella A. Nelson

While the muscles of the pelvic floor can weaken in anyone for any number of reasons, childbirth can make it worse. Perineometers, first developed in 1946 by Dr. Arnold H. Kegel, measure pelvic floor strength and can be used to retrain weakened muscles through a daily regimen of exercises. Since their invention, perineometers have shifted medical practice from a reliance on surgery toward rehabilitation. Today, smart devices use biofeedback “games” to guide users through exercises that support postpartum recovery, while other products are decidedly unplugged such as weighted vaginal balls or yoni eggs.

83 ScarAway® Clear Silicone Scar Sheets for C-Section, 21st century

Silicone scar strips like ScarAway are often used to reduce the itchiness and discomfort of a healing incision after a cesarean birth.

84 John L. Cox (Scottish, active 20th century)
Jenifer Holden (Scottish, active 20th century)
Ruth Sagovsky (Scottish, active 20th century)
The Edinburgh Postnatal Depression Scale, 1987

An estimated one in seven postpartum people in the U.S. suffers from postpartum depression. Ranging from “baby blues” to severe psychosis, postpartum mental distress is common yet often undiagnosed or underdiagnosed due to both stigma around mental illness and stereotypes of maternal joy. The Edinburgh Postnatal Depression Scale was designed to set a threshold for clinical intervention. While its 10-question format provides a means to assess mood, its designers insisted that it be considered holistically in relation to a patient’s wider social support system.

85 Medical Bills for a Birth in the 1940s, a Home Birth (2013), and a Cesarean (2019), all in the U.S.

In countries without universal health coverage, after the miracle of birth can come the nightmare of bills. Childbirth in the U.S. costs more per capita than in any other high-income country. Of those births, 99% take place in hospitals. More hospital stays in the U.S. are for pregnancy, childbirth, and newborn care than for any other reason. In 2017, the average cost for hospital fees alone was US\$11,200 for a vaginal birth and US\$15,000 for a cesarean birth when covered by private insurance. Costs can be even higher for the uninsured or underinsured. Home birth is not universally covered by health insurance, but many midwives accept Medicaid and have the ability to customize bills for their patients.

86* Sublingual Oxytocin, 2014
PATH

Excessive bleeding after childbirth, or postpartum hemorrhage, is a common cause of maternal mortality. After a baby is born, post-birth contractions put pressure on the vessels that attach the placenta to the uterus, which helps push out the placenta. If the contractions are too weak, the vessels bleed more. The loss of blood causes a drop in blood pressure that, if left untreated, can lead to shock (because the body’s organs don’t get enough blood) or death.

To prevent and treat postpartum hemorrhage, the WHO recommends uterine massage or drugs that stimulate contractions. While the hormone oxytocin is effective, until recently the synthetic form has required refrigeration and administration by a skilled provider via IV or injection. Because of these challenges, 94% of deaths from postpartum hemorrhage worldwide have occurred in low-resource settings across sub-Saharan Africa and Southern Asia.

To get oxytocin to postpartum people no matter where they live, PATH has developed a freeze-dried, fast-dissolving oxytocin tablet that is placed under the tongue. The freeze-dried oxytocin remains stable at high temperatures, so the pills can be used in any setting. And because the tissue under the tongue is highly permeable and rich in blood supply, the pill offers a quick way to deliver the lifesaving drug into the bloodstream.

**87* Oxytocin Inhaler, in development
Monash University**

Researchers at Monash University in Australia have developed an inhalable form of oxytocin for the treatment of postpartum hemorrhage. The team created a spray-dried, ultrafine formulation of oxytocin that can be delivered as an aerosol using a traditional inhaler. Not only will this heat-stable and easy-to-administer oxytocin work in low-resource settings, but it will yield a quicker response than injectable oxytocin. The inhalable oxytocin has advanced through clinical trials, and Monash University has partnered with GSK and Iconovo to coordinate its distribution as a dry powder inhaler.

**88* Ellavi Uterine Balloon Tamponade, 2019
PATH, Sinapi Biomedical**

When uterine massage and oxytocin don't resolve postpartum hemorrhage, a uterine balloon tamponade (UBT) offers a next step in urgent care. The device works through a balloon that is inserted into the uterus and then filled with water to put pressure on the uterine walls, simulating contractions until the bleeding stops. UBTs have been used in wealthy countries for years, but they're scarce in lower-income countries due to their high cost.

South African biomedical manufacturer Sinapi and PATH designed a UBT specifically for low- and middle-income countries. The Ellavi UBT comes fully assembled. Its design features a uterus-shaped balloon that fills with water or saline in less than one minute. The bag uses gravity to control the pressure between the balloon and the uterus, and water can flow between the balloon and the bag as the uterus regains strength. Seeing the water move back and forth provides proof that contractions have resumed and the UBT can be removed. Ellavi is available between US\$5 to US\$15, a fraction of the price of a traditional UBT, which costs around US\$600 for one-time use.

89a Frani O'Toole (America, b. 1997)

89b Liyan Zhao (American, b. 1990)

Vaidehi Tikekar (Indian, b. 1996)
Disability x Maternity, A Household User's Manual for Young Mothers with Disability, 2020
Manual and Video (3:32 mins)
Courtesy of the designer

In *Maternity x Disability Household User's Manual*, Frani O'Toole offers tactical design tips for newly disabled young mothers. The manual was conceived as a resource to be included in the

folder that patients receive upon discharge from a rehabilitation center. O'Toole's manual draws on personal experience—her mother had a stroke when O'Toole was eight months old. Her account offers home-based design and accessibility strategies for people who might receive some training on changes to their environment to support independent living, but who find themselves responsible for multiple types of care: self-care and care of others, such as child care and elder care.

90 Pessaries

A pessary is a device inserted into the vagina to treat prolapse, a condition where organs in the pelvic area descend due to weakened pelvic floor muscles. While not life-threatening, prolapse can be life-altering for as many as 50% of people with vaginas over the age of 50 who will experience prolapse. Despite the prevalence of prolapse, most people don't hear about it for reasons that range from a lack of investment in women's health to shame and embarrassment about reproductive health.

90a Reia Pessary Prototype (Frankenstein 1)

90b Reia Pessary Prototype (Frankenstein 2)

90c Reia Pessary Prototype (V8)

90d Reia 4 (Final Prototype)

Courtesy of Reia

In the past, pessaries have included pomegranates and balls of wool—or have been made from wood, metal, or glass. An all-female design team redesigned the pessary to provide greater dignity to users. Made of silicone, the Reia pessary collapses to half its diameter, making it easier to insert and remove.

90e Jackson Stem Pessary

90f Gum Rubber Ring Pessary with Brass Springs

90g Glass Globe Pessary

90h Double Concave Glass Disc Pessary

90i Thomas Vulcanite Prolapsus Pessary

90j Self-Retaining Cutter's Retroversion Pessary

90k Curved Brass Pessary

90l Hollow Plastic Ring Pessary

90m Self-Retaining Cutter's Retroversion Pessary

On loan from the Mütter Museum of the College of Physicians of Philadelphia

Midwives

The WHO defines midwifery as “skilled, knowledgeable, and compassionate care” for childbearing people and their infants and families. Until a few centuries ago, many aspects of reproductive health took place at home, largely attended by midwives. Today, around 10% of U.S. births are attended by a midwife, compared to more than 50% in other high-resource countries. Global health experts recommend that a simple way to improve maternal and newborn outcomes, avoid unnecessary interventions, and create cost savings is to support pathways to becoming a midwife.

**91 Pinard’s Ear Fetal Stethoscope, mid-20th century
Manufactured by Miltex Germany
On loan from the Mütter Museum of the College
of Physicians of Philadelphia**

Part stethoscope, part ear trumpet, the Pinard is a simple horn-shaped object made of wood or metal for listening to a fetus’s heart. Designed in 1895 by French obstetrician Adolphe Pinard, it revolutionized medicine. The Pinard is uncomplicated, inexpensive, and unquestionably safe. Unlike the ultrasound, it doesn’t require batteries or external power, and it is intuitive to learn to use. Although the Pinard is all but obsolete in the U.S., its simple design is a favorite of midwives, and it’s still used everywhere from Mali to Denmark.

**92 Stork Umbilical Clamps, c. early 20th century
Manufacturer unknown, Italy
On loan from the Mütter Museum of the College
of Physicians of Philadelphia**

Used primarily by midwives since the 19th century, umbilical clamps stop bleeding from blood vessels in the umbilical cord after delivery. These clamps, made of plate or sterling silver to avoid corrosion, feature a stylized stork decoration to indicate their tie to birthing. Sewing scissors later embraced the stork motif—a crossover that is believed to have occurred when midwives brought their sewing work to pass the time while waiting on labor and delivery.

**93 Raven Lang (American, b. 1943)
Birth Book, 1972**

Knowledge from birth workers has often been passed down orally. In the early 1970s, self-trained midwife Raven Lang opened a birth center in Santa Cruz, California, and wrote the *Birth Book*. She found a potential publisher but was told that she would have to remove all pictures of female genitalia. She chose instead to self-publish.

**94 Zubaida Bai (Indian, b. 20th century)
Janma Clean Birth Kit, 2011
Courtesy of ayzh Ltd.**

According to the WHO, more than 800 people die every day in pregnancy and childbirth from preventable causes such as sepsis and other severe infections. After encountering a midwife in rural India who did not have access to sterile tools, mechanical engineer Zubaida Bai created an improvised clean birth kit for less than US\$2 that she calls Janma, which means “birth” in Sanskrit. Each kit contains off-the-shelf products to support sterile birth conditions: an apron, a sheet, antiseptic soap, a cord clip, and a surgical blade. In 2010, Bai founded the health-care company *ayzh*, which has distributed more than 250,000 kits in India, Afghanistan, Gambia, Ghana, Malawi, Nigeria, Zambia, Haiti, and Laos.

95a Rebozo, 2022

**95b Trailer for “Asynclitism” (Fetal Disengaging
and Engaging with Rebozo) from *Rebozando
for Birth*, 2021**

Courtesy of Naoli Vinaver, www.naolivinaver.com

A rebozo is a long, hand-woven garment used in pregnancy and the postpartum period. Usually 4 to 7 feet long, the material reflects Mexico’s long history of weaving alongside centuries of midwifery. Mexican midwives wrap and move the rebozo against the body to ease ligament, muscle, and back pain as the fetus grows and the pregnant body changes. Midwives and doulas can also use it to reposition the fetus, including using a technique commonly known as “sifting.” In the weeks after delivery, the rebozo can be used to massage the postpartum person—or it can be wrapped around the body to support baby wearing and baby carrying.

96 Birthing Stool, 2020
Manufactured in the U.S.
Poplar wood

Birthing furniture and other objects, such as backless stools, have balanced and supported laboring people for centuries across cultures, ethnicities, and geographic regions. An Egyptian wall relief, dating to 1450 BCE, depicts the stool that held Queen Mutemwia during the birth of her son Amenhotep III. The body's position on the stool uses gravity as the newborn emerges from the womb, while the structure engages the birthing person's abdominal, back, stomach, legs, arm, and vaginal muscles.



Audio tour stop #5

Narrated by Sarah Bloom with additional commentary by Mercedes Snyder, licensed midwife and owner of Something Beautiful Midwifery.

97 MyAnchor Birthing Pool Straps, 2005
Manufactured by Birth Pool in a Box Eco
(est. 2003, U.S.)
Foam and woven plastic

An ancient practice, water birth allows freer movement during labor. Popular media representations of home water births typically portray a bright blue inflatable pool with three tubular chambers, but children's inflatable pools or even bathtubs work. This H-shaped birthing strap attaches to the handles of a tub or pool to help its user comfortably shift and strain.

98 Stiliyana Minkovska (active 21st century)
Ultima Thule, 2020
Image courtesy of the artist

This conceptual furniture, designed by Bulgarian-born, UK-based artist Stiliyana Minkovska, offers an other-worldly, sanctuary-like birth environment. Made of three flexible, sculptural pieces of open-ended shapes, the furniture supports a variety of postures: sitting, kneeling, squatting, and resting. In Minkovska's words: "It is a gradual element, where the mother takes the journey on her own, or can be supported by a partner, doula, or a midwife."

99* Electronic Helping Babies Breathe (eHBB)
Virtual Reality Simulation, 2019
Seattle Children's Hospital, the University of Oxford

The first minute after birth—often called "the golden minute"—can require quick action, particularly if a newborn fails to start breathing on its own. Seattle-based neonatologist Dr. Rachel Umoren turned to virtual reality (VR) to create a fully immersive simulator for training midwives, doctors, health professionals, and anyone else who may need to resuscitate a newborn.

Developed with the University of Oxford's Life-saving Instruction For Emergencies (LIFE) program, electronic Helping Babies Breathe (eHBB) gives users "hands-on" practice in resuscitating a newborn in low-resource settings. Once downloaded, the app requires no internet connection, and low-cost VR viewers like Google Cardboard can turn any smartphone into a simulator. The app randomizes scenarios to familiarize and test users in a range of real-life possibilities. The app then gives users a summary of what was done well and where improvement is needed. Research has shown that the app helps health workers not only build skills but also retain them—and at higher rates than in-person or online instruction.

Temporary bodies

The notion of a “temporary body” applies to most humans. We all change due to aging, illness, diet, and exercise, to name only a few factors. The designs in this section respond to the ways the body moves through temporary shapes and sizes along the reproductive arc.

100 Scottish Baby Box, 2017–ongoing Courtesy of the Scottish Government

Between the two world wars, a new generation of community-minded officials and organizers in Finland worked together to address urgent social and economic concerns. In 1938, the Finnish Social Welfare Committee introduced the *äitiyspakkaus*, a box packed with baby clothes and baby-care items for low-income parents. By 1949 and continuing to today, the benefit was available to all expectant Finnish citizens, including adoptive parents.

Inspired by the Finnish precedent, the Scottish Baby Box was designed to give every child in Scotland an equal start in life. The box contains everything from baby clothes and a blanket to a thermometer and nursing pads. The box itself can also be used as a crib, and its exterior can be colored in by family members.

101a Do Not Touch My Bump Button, 2021

101b Baby on Board Badge, 2005

Developed by the in-house design team at Transport for London, the Baby on Board button—or *badge* to use the British term—was introduced in 2005. The badge evokes the bespoke typeface and bullseye symbol for the London Underground that were designed by the calligrapher Edward Johnston in the late 1910s. The badge has proven popular, and more than 1 million of them have been distributed to help make pregnant people’s journeys safer and more comfortable. The badge and the homemade *Don’t Touch My Bump* button highlight how often pregnant people must contend with public infringement upon their personal space.

102 Butterick Classics Pattern, 5784 Misses’ Maternity Dress, Scarf & Collar, 1987

103 Staylastic Elastic Maternity Stretch Panel #696, c. 1940–50

Abandoning the idea that pregnant people should maintain dangerously waisted silhouettes that were in vogue in the early 20th century, maternity fashions began to adopt looser silhouettes by mid-century. Stretch fabrics were increasingly available in ready-to-wear garments, although one tried-and-true way to make maternity fashion meet one’s own personal style was to sew at home or get something tailor-made.

104 Page Boy Tie-Waist Skirt, c. 1960 Synthetic material

104b Patent for the Page Boy Tie-Waist Skirt, 1939

In the early 20th century, the prevailing norm in the U.S. was to use clothing to hide pregnancy, masking what was still often “unutterable” in polite society. Maternity corsets and dress types that could downplay a pregnant person’s changing shape were favored. The Page Boy tie-waist skirt introduced a norm-defying twist to this trend. Run by sisters, the maternity line Page Boy opened their first boutique in 1938 in Dallas, Texas, next to an obstetrician’s office—where they launched the tie-waist skirt. The skirt could be conveniently let out as pregnancy progressed and as the wearer’s hip and rib circumferences expanded. Snaps on the waistband adjusted the fit while maintaining an even hemline. The tie-waist skirt remained popular until 1959, when stretchy Lycra fabric was invented.

105 Wei Hung Chen (Taiwanese, b. 1993)***Modular Dress 2.0, 2017***

**Cotton blend with a silk cotton blend lining
Courtesy of the designer**

Wei Hung Chen strives to make his work sustainable and avoid generating waste by creating and constructing garments that are modular and interchangeable. Through his approach to design, the Taiwanese creative has developed unique shapes that allow people to construct and deconstruct their outfits according to their needs and desires.

106 Sari, 2022

Made of three parts—a long, wide garment, a fitted bodice, and a petticoat—the sari is a functional dress worn by women. In cultures where it is common, the sari evokes memories of mothers and grandmothers using their draped fabric for everything from cooking and cleaning to cradling and caregiving. During pregnancy, people rethink their draping technique, as a pregnant belly changes not only the waistline but also how the drapes fall. A belly band is sometimes used to provide soft elastic for tucking in the fabric and to support the back.

107 Nursing Bra Advertisement, c. 1970

Before 1866, nursing attire in the U.S. was repurposed from existing garments until Samuel M. Perry, an inventor in Plainfield, New York, applied for a patent for a nursing corset with a hinged flap over the bust. In the early 20th century, the U.S. Patent and Trademark Office began issuing patents for nursing bras that built on this design. Mainstream companies such as Maidenform began marketing nursing bras with support cups that featured leak protection through rubberized linings and pockets for absorbent pads. Designers aimed to balance form and function with bras that reflected the era's preferred breast shape without sacrificing the nursing bra's objectives. Advertising from this time reflects this tension.

108 Ryan Mario Yasin (British, active 21st century)***Petit Pli, 2017***

Courtesy of the designer

Children typically grow seven sizes in their first two years. Aeronautical engineer Ryan Mario Yasin was shocked to see his young niece and nephew quickly outgrow clothes, which inspired him to design versatile garments that grow with the child who wears them. Clothes in the Petit Pli line are pleated to stretch and grow bidirectionally, snugly fitting a range of sizes from four months to three years. The proprietary textile is windproof, waterproof, and resists tearing and staining. Because it's made of a recycled mono-fiber, it doesn't have to be separated into component fibers for recycling. Petit Pli garments gesture toward a new paradigm of reducing waste in fashion.

109 Owen F. Maclaren (English, active 20th century)***Andrew Maclaren Ltd., England******B-01 "Umbrella" Baby Stroller, 1966***

Aluminum alloy tubing and saran polythene fabric

Aeronautical designer Owen Finlay Maclaren applied his experience in designing fighter planes to the problem of his granddaughter's baby carriage when he created the first collapsible stroller. His design pared the product to its essential components. With a lightweight aluminum frame, the stroller weighed just six pounds—less than many newborns. Its handles mimicked the classic umbrella shape, and its fabric chair made a perfect canvas for eye-catching patterns. Maclaren took his prototype to Silver Cross, a British manufacturer of strollers, which said there would be little market interest and rejected the concept. In response, Maclaren formed his own company to mass produce the umbrella stroller. A decade after the stroller's debut, more than 600,000 were being produced annually.

**110 Sue Rigdon (Yakama, 1942–2017)
Cradleboard, 1995**

In Indigenous traditions, cradleboards provide a supportive design for infant care. After lacing a baby into the cradle, a caregiver can wear the cradleboard on his or her back while moving around, or the cradleboard can be leaned against a wall to give the infant full view while caregivers take on other tasks. Cradleboards are also used for sleep time, as the tight swaddling gives the infant a feeling of warmth and safety. These practices are alive in many tribal communities today. This cradleboard was created by Sue Rigdon for her daughter Polly Rigdon-Olsen when Polly gave birth to her son Tucker Olsen. The care reflected in its design imbues the cradleboard with love, protection, and legacy.

**111 Ann Moore (American, b. 1934)
Lucille Aukerman (American, 1909–1983)
Snugli, 1971
Manufactured by Snugli, Inc.**

Known by many names—including the American Indian and Alaska Native cradleboard, the pan-Asian *mei tai*, the Korean *podaegi*, and the Mexican and Colombian *rebozo*—the baby carrier is one of the oldest worn accessories. Positioned on the front, back, or side of the caregiver, baby carriers have become increasingly popular worldwide.

One of the first mass-produced baby carriers, the Snugli is a popular choice, yet few know of its connection to the first generation of Peace Corps volunteers in the 1960s. Trained as a pediatric nurse, Ann Moore and her husband Mike volunteered to live and work in Togo, West Africa. They were fascinated by the cloth used to bind newborn infants and toddlers to their caregivers. When the Moores returned to the U.S. and had their own daughter Mandela, Ann asked her mother to help her fashion something similar. After several iterations, the Snugli was “born.” It was patented in 1969.



Audio tour stop #6

Narrated by Sarah Bloom with additional commentary by Michelle Millar Fisher and Juliana Rowena Barton, co-curators of *Designing Motherhood*.

**112* Kangaroo Mother Care Game, 2018
Catapult Designs**

Kangaroo Mother Care (KMC) is a practice that supports newborn development by promoting skin-to-skin contact and breastfeeding. The science is sound: KMC has been proven to regulate temperature, accelerate weight gain, reduce infections, and stimulate bonding. This game by Catapult Design aims to increase the use of KMC among caregivers and health professionals.

KMC was first proposed in 1978 by two Colombian pediatricians, Dr. Edgar Rey and Dr. Héctor Martínez of Bogota’s *Instituto Materno Infantil*, where 11,000 babies were delivered annually, many in high-risk births. As the hospital’s maternity ward and nursery became overcrowded, complications escalated. To solve the problem, Rey and Martínez drew inspiration from nature’s low-birthweight baby—the kangaroo. Baby kangaroos are born the size of a lima bean (about one inch long) and continue to develop in the warmth of their mother’s pouch. Kangaroos offered the doctors a new approach. In their early research, the doctors found a significant reduction in newborn mortality.

KMC now includes a range of practices, and studies continue to confirm its benefits, including that it also works with nonbirthing parents. KMC may seem counterintuitive in an era that overmedicalizes birth, and where many neonatal intensive care units offer little or no space for parents to lie with a baby on their chest. But it also comes as no surprise that keeping small and sick infants with their parents improves the wellbeing of newborns and parents alike.

**113 Prefold Cloth Diaper and Snappi Fastener, 2017
Unbleached birdseye cotton and polyurethane**

Until the mid-20th century, diapering involved folding and pinning cloth towels in place and then tugging rubber pants over the diaper to minimize leaks. It wasn’t until the 1960s that disposable diapers were introduced. More than 80 years later, disposable diapers account for more than 90% of all diaper changes in the U.S., with about 18 million diapers ending up in landfills each year. The environmental impact has prompted a search for alternatives, with some turning back to washable, reusable cloth diapers.

Milk

Milk can be consumed at the breast, pumped, donated, or created in a lab. For some, feeding babies is a deeply enjoyable act, while for others it can be a complex or distressing experience. While the designs here may appear to ease feeding, what they don't show is the labor involved—or the social and economic conditions that can make “best practices” difficult to achieve.

114 Make the Breast Pump Not Suck Team, 2018
MIT Media Lab, Cambridge, Massachusetts
www.makethebreastpumpnotsuck2018.com
Courtesy of the designers

The breast pump is often praised as a timesaving device that makes extracting breastmilk look effortless. Yet the effort required to use the pump has not been matched by efforts to improve its design.

A multidisciplinary group of more than 100 designers, technologists, and community partners met in 2014 at the Massachusetts Institute of Technology's Media Lab to reimagine the future of breastfeeding. Called “Make the Breast Pump Not Suck,” the project centers the experiences of breastfeeding people, embraces the perspectives of marginalized people, and breaks taboos related to bodies and bodily fluids. A second gathering in 2018 widened the focus to policies surrounding paid leave, breastfeeding in public, and health care innovation. Through its “hackathon” format, the project has played an interventionist role by using the breast pump to expose the need for family leave policies.

115 Phenix Breast Pump, c. 1879
Manufactured by Whitall Tatum & Co., USA
On loan from the Mütter Museum of the College of Physicians of Philadelphia

116 Einar Egnell (Swedish, 1880–1976)
Sister Maja Kindberg (Swedish, 20th century)
Egnell SMB Breast Pump, c. 1956

Einar Egnell, a Swedish civil engineer, was one of the first mechanical breast pump designers. In the mid-1950s, after a gynecologist friend challenged him to improve upon existing technologies, Egnell started with human anatomy rather than that of cows, on which previous mechanical pumps had been based. His breast pump was named for “Sister Maja” Kindberg, the nurse who collaborated on its testing with new mothers in Stockholm's maternity hospital.

Breast pumps were initially restricted to medical spaces until the early 1990s, when the home electric pump became widely available. In 2010, the breast pump experienced its biggest public boost in the U.S. when the Affordable Care Act mandated that health insurance cover its cost.



Audio tour stop #7

Narrated by Sarah Bloom with additional commentary by Cyril Engmann, a neonatologist at the University of Washington, Seattle Children's Hospital, and Providence Hospital and Senior Director at PATH.

117 Haakaa Breast Pump, 21st century**118 Willow Wireless Breast Pump, 2021
First generation released in 2017**

The market for breast pumps has reached up to US\$7 million with room to grow, according to a 2017 article in *The New Yorker* by Jessica Winter, who wrote about the amount of money Silicon Valley kingmakers were “leaving on the table by shunning women and mothers and babies.” Newer designs are finally reaching the market. The Haakaa pump attaches to the breast with suction and can work mechanically or manually. The Willow pump has no tubes or electrical cords and tracks the amount of milk pumped on a mobile app.

119 Various Baby Bottles, 20th–21st century

Before the modern nursing bottle, infants were fed milk out of any container with a spout or narrowed end. In the 1840s, the American inventor Elijah Pratt patented his design for a rubber nipple, and further developments came through the invention of heat-resistant glass and plastic. By the 1940s, the U.S. Patent Office had issued more than 200 patents for baby bottle designs. As bottle shapes have evolved, design goals such as improving milk flow and mimicking the nipple’s shape have remained the same.

**120 Aimee Koran (American, b. 1982)
Pushed & Pulled, 2017
Chrome-plated baby bottle and breast pump
Courtesy of the artist**

Artist Aimee Koran explores care work that is often heavily gendered, socially devalued, and unpaid. By adding a chrome veneer to everyday objects, her work brings focus to their designs and makes permanent a moment in parenting that can seem both fleeting and interminable. Koran writes, “*Pushed and Pulled* are made by the vacuum metalizing process that more commonly makes trophies. This chrome series highlights the tension that arises between the technologies that exist to assist us but that also impel or compel care workers and mothers to, in turn, work more.”

121 Boxwood Nipple Shield, c. 1800–1850**122 Pewter Nipple Shield Containing Lead,
c. 1775–1825****123 Glass Nipple Shield, c. 1850–1900
Manufacturers unknown
On loan from the Mütter Museum of the
College of Physicians of Philadelphia**

A nipple shield is worn over the areola and nipple during breastfeeding to provide a larger surface for the baby to latch onto and also offer some protection to the nursing parent. Modern nipple shields are made of soft, thin, flexible silicone and have holes to allow the breast milk to pass through, much like these 18th and 19th century examples. The glass design caught milk under clothing between feedings, with a hole to empty collected milk.

**Audio tour stop #8**

Narrated by Sarah Bloom with additional commentary by Rebecca Mauldin, Director of Communications and Development at ChildStrive.

124* JustMilk Nipple Shield, in development
FHI 360, JustMilk, Inc.

Breastfeeding accounts for nearly half of all mother-to-child HIV transmission. At an International Development Design Summit at MIT in 2008, researchers from Malawi, the U.S., and the UK were challenged to develop a wearable device that could deactivate the virus in breast milk. While heating works, methods to heat milk are not available in all settings. Liquid medications also work, but they have a limited shelf life and require refrigeration. Powdered or dry milk formulations may solve some of these problems, but potable water is needed to reconstitute the milk.

After discovering the existence of a wearable device—the nipple shield—and a compound (sodium dodecyl sulfate) that had been shown in studies to deactivate the HIV virus quickly, the team combined the two to create a nipple shield delivery system. The system could be designed thin enough to maximize skin-to-skin contact with a feeding infant, and it could be developed to be preloaded or self-loaded, disposable or reusable. Beyond compounds for HIV that inspired its design, the JustMilk device could offer a way to administer antibiotics, antimalarials, antiretrovirals, vitamins, nutrients, probiotics or a range of active pharmaceutical ingredients to infants, ensuring more equitable access to lifesaving treatments.

125* NIFTY™ Cup, 2014
PATH, Seattle Children's Hospital, University of Washington School of Dentistry

Babies born prematurely or with cleft palates struggle to breastfeed and are at high risk for malnourishment, infection, and death. Dr. Michael Cunningham, medical director of Seattle Children's Craniofacial Center, witnessed these challenges on a 2007 visit to Ghana as part of a cleft training program he co-founded. Determined to address the problem, Dr. Cunningham brought hundreds of small plastic feeding cups called Foley Cup Feeders—and he saw firsthand how cup feeding provided an intuitive solution. He met with UW School of Dentistry researcher Dr. Christy McKinney, a former Peace Corps volunteer whose research focused on craniofacial problems. The two approached PATH, and a new collaboration was formed. Through extensive prototyping, they developed the Neonatal Intuitive Feeding Technology (NIFTY) cup which is made of silicone, a material durable enough to be repeatedly boiled and sterilized. The cup's base allows mothers to directly express milk, eliminating potential cross-contamination from other containers, while the cup's spout has a small reservoir that holds just enough milk to allow infants to pace their own feeding.

**Care work is a kind
of expertise that
is part of the design
of everyday life.**

Monitoring

What we choose to observe and monitor can reveal our greatest aspirations and deepest fears. In reproduction and caregiving, monitors can be designed to empower individuals, families, and larger communities, but they can also affect the way we perceive and react, magnify our anxieties, or compromise bodily autonomy and more intimate ways of knowing.

126 Photograph of the First Dasonograph, c. 1964
Built at Kelvin & Hughes, Hillington, Glasgow,
c. 1964

127 Dugald Cameron (Scottish, b. 1939)
Technical Drawing of Ultrasonic Unit, 1963
Courtesy of the Glasgow School of Art Archives,
Scotland

Ultrasound machines were invented to spot submarines during World War I. In the 1950s, Ian Donald, a professor of obstetrics and gynecology at the University of Glasgow, reasoned that there was not much difference “between a fetus in utero and a submarine at sea.” Donald, together with obstetrician John MacVicar and industrial engineer Tom Brown, built prototypes of obstetric ultrasound scanners. An industrial designer, Dugald Cameron was recruited in 1961 to streamline the apparatus, which had a menacing appearance.

Oral histories of the first obstetric ultrasounds capture the wonder and delight of staff and patients alike. Pat Anusas, a midwife at Queen Mother’s Hospital, recalled: “I still to this day can’t believe what I saw.... [B]oth the mother and I were so excited—she couldn’t believe she could see her baby.”

128 ECG Toco Fetal Chart Paper, 2012
Vivid Medical Source
6” x 47’ Corometrics Model 120 170 Monitor

An electronic fetal monitor (EFM) records a fetal heartbeat in utero to ensure that fetal oxygen supply is adequate. The EFM was first introduced in the 1960s without much evidence of its efficacy, yet the technology was swiftly embraced. Today EFM is used during labor about 90% of the time, according to the American College of Obstetricians and Gynecologists.

Observed changes in fetal heart rate can escalate the use of interventions, from limiting the movement of a birthing person to increasing the use of forceps and cesarean birth. These interventions often increase rather than reduce the risk of complications. In 2015, *The New Republic* called EFM machines “unnecessary and dangerous.” The WHO confirms that “continuous cardiotocography is not recommended for assessment of fetal well-being in healthy pregnant women undergoing spontaneous labor.” The view that EFM has no positive effect on infant or maternal outcomes has been clearly articulated in scientific and medical literature, yet EFM machines still crowd labor and delivery wards.



Audio tour stop #9
Narrated by Sarah Bloom
with additional commentary
by Ari Robbins Greene,
plaintiff attorney and
proud dad.

**129* Mobile Midwives Ultrasound, 2011†
University of Washington undergraduate
students and faculty advisors
Ruth Anderson, Gaetano Borriello,
Waylon Brunette, Matthew Hicks,
Alexis Hope, Nicole Goldsmith, Beth Kolko,
Robert Nathan, and Pratik Prasad**

The cost of ultrasound devices ranges from US\$15,000 to US\$60,000, placing standard prenatal care out of reach in lower-income countries. Dr. Beth Kolko, a professor of human-centered design and engineering at the University of Washington (UW), was approached in 2009 by UW radiologist Dr. Rob Nathan about a pilot project to create a portable, affordable ultrasound for use in Uganda. The request fit Kolko's curriculum, so she had her students team up with students from a computer science course called Designing Technologies for Resource-Constrained Environments, taught by Ruth Anderson.

The students set out to design a low-cost ultrasound for use in low-resource settings. The device they designed was portable, durable and easy to use—with a cost close to US\$3,500. It consisted of a probe that could connect via USB to a netbook. To simplify usability, they paired a touch screen with five slider bars for adjusting image settings and buttons for common functions. The device also included learning software to help midwives stay up to date on best practices.

† This device is no longer in development.

**130* Dahabo Adi Galgallo (Kenyan, active 21st century)
Solar-Powered GPS Bracelet, 2017**

In 2013, Kenya started investing in free maternity care in an effort to eliminate preventable maternal deaths. While the country saw modest progress, areas with large pastoralist communities—groups traveling with livestock, often far from health facilities—continued to have high mortality rates.

Born to a pastoralist family, epidemiologist Dahabo Adi Galgallo was familiar with the challenges of reaching expectant mothers in these communities. She designed solar-powered GPS bracelets that could be worn by pregnant people so health workers could routinely meet with them. The bracelets reflect the style favored by pastoralist communities, with beads in an array of colors. Those who opt into the program pick their favorite design. Galgallo and her team schedule visits based on the location of each mother. To help prepare communities for their visits, Galgallo and her team composed songs in the local language about the importance of prenatal and postpartum care.

The bracelets worked. In pastoralist communities the team has reached, 73% of expectant mothers received more than four prenatal visits and all have had successful deliveries, with their newborns also receiving lifesaving immunizations.

**131 Isamu Noguchi (American, 1904–1988)
Zenith Radio Nurse Advertisement, 1938
Zenith Electronics LLC (est. 1918)**

On February 27, 1932, Charles Lindbergh Jr., the 20-month-old son of aviators Anne Morrow Lindbergh and Charles Lindbergh, was taken from his crib and carried out an upstairs window while his parents sat, unaware, by the living room fire.

In the wake of this kidnapping, Eugene McDonald, president of the Zenith Radio Corporation, crafted a prototype that would help ease the anxieties of his own growing family. Using a microphone, speaker, and radio, McDonald fashioned a monitoring device that transported the sounds of the room where his newborn daughter slept to a portable speaker, enabling caregivers to listen in from any room. In 1937, McDonald commissioned Japanese American sculptor Isamu Noguchi to design the device's casing. The resulting Zenith Radio Nurse had a sculptural, abstract form that was reminiscent of a human head.

132 Fisher-Price Nursery Monitor, 1983
Fisher-Price (est. 1930, U.S.)
Electronics with plastic casing, 1983

Considered a luxury item well into the 1970s, the baby monitor was a major shift in the way adults care for babies. It not only bridged rooms, but it also revolutionized the way we interpret babies' cries. Baby monitors helped further the notion that a baby's cry is a signal that must be noticed immediately and responded to promptly.

133 Safety 1st Child View Monitor and Television, 2002
Electronics with plastic casing

In the 1990s, several television news stations ran stories of caregiver misconduct caught on video monitors, paving the way for so-called nanny-cams. Today, most video monitors are used in connection with a child's sleep routines. Infrared LEDs have made it possible to see video images at night, and Wi-Fi allows parents to stream a camera's video feed on smartphones and computers.

134 Owlet Smart Sock, 2nd Generation, 2018
Owlet Baby Care (est. 2013, U.S.)
Wearable synthetic sock with monitoring sensor
Courtesy of Rachel Swartz Robinson

Today's wearable, connected devices can gather data on everything from a baby's sleeping patterns and position (on the stomach or back) to breathing rates, skin temperature, room temperature, and even blood-oxygen levels and heart rates. The "internet of toddlers" now also includes smart onesies, diapers that detect urinary tract infections, and pacifiers that warn of elevated temperatures. Information can be continuously tracked via smartphone app.

135 Dr. Emmi Pikler (Hungarian, 1902–84)
***Unfolding of Infants' Natural Gross Motor Development*, 2006**

136 *On Their Own/With Our Help*, 1978
Directed by Penny Wright, Magda Gerber, and Thomas Forrest
See *How They Play*, 2013
Directed by Jonny Solomon, written by Ruth Anne Hammond, Elizabeth Memel, and Carol Pinto
Courtesy of Resources for Infant Educators® (RIE®)

In 1948, Hungarian pediatrician Dr. Emmi Pikler established a facility to care for war orphans in Budapest. There, she developed principles that elevated caregiving, promoted children's self-initiated play, and emphasized the benefits of sensitive observation for caregivers and children alike.

In 1978, Magda Gerber, a child development specialist and Hungarian-American émigré, honed Pikler's work into a methodology. Called Resources for Infant Educators (RIE), the method teaches caregivers to connect meaningfully with children during caregiving acts (such as feeding or diapering) and to trust in children's self-initiated playful explorations. According to the RIE-Pikler method, observation is a mutually beneficial form of monitoring. Adults observe as children are given the freedom to explore, play, learn, and solve problems on their own with adult intervention as needed. Through observation, caregivers can also better understand children's needs, abilities, and ways of communicating. Such moments demonstrate the value of caregivers—and how crucial it is to support and compensate them fairly.

*In collaboration with the *Designing Motherhood* team, the Gates Foundation Discovery Center has added objects to this exhibition that reflect investments in maternal, newborn, and child health, family planning, and gender equality. Objects that have been funded by the foundation, often in partnership with other key funders, appear with an asterisk (*) by their number.

Additional artwork

137 Aimee Koran (American, b. 1982)
Milksapes (series), 2016–ongoing
Breast milk on mylar as inkjet print fabric
Courtesy of the artist

Aimee Koran began studying for her MFA when her daughter was three months old. Koran recalls the time when her professor, glancing at her desk during a studio visit, mistook her breast pump for an air horn. In her practice, Koran trains her attention on the materials that are part of her care work, including her breast milk. When she accidentally spilled milk onto mylar, she was intrigued by the patterns of the residue. She saw them as “the material trace of my transition into my new role as mother.”



Audio tour stop #10
Narrated by Sarah Bloom with additional commentary by Michelle Millar Fisher and Juliana Rowen Barton, co-curators of *Designing Motherhood*.

Ani Liu (American, b. 1986)
Untitled (pregnancy menswear), 2020
Silk organza, suiting boning
On loan in celebration of the
***Designing Motherhood* exhibition**

Ani Liu is a research-based artist working at the intersection of art and technoscience who exhibits internationally. Integrating emerging technologies with cultural reflection and social change, Liu’s work examines the biopolitics of reproduction, labor, and care work. This suit is “a sketch of an idea,” an ongoing project informed by a series of conversations between the artist and trans and nonbinary persons regarding fertility.

Jite Agbro (Nigerian American, b. 1982)
To Whom the Future Belongs, 2020
Paper, fabric, ink, beeswax, graphite, and thread
Courtesy of the artist

Jite Agbro is a Nigerian American print artist who grew up in Seattle, Washington. Her colorful figurative work integrates layered patterns, sharp contrasts, and fabric-like textures. Her work examines rules and invisible structures and explores how old and oppressive systems endure by replicating through collective practices and rituals.

Holly Ballard Martz (American, b. 1965)
Whether and When, 2020
Laboratory glass (separatory funnel, evaporator flasks, stopcock), PVC tubing, steel, paint
Courtesy of the artist

Holly Ballard Martz (American, b. 1965)
Dangers of Nostalgia in Wallpaper Form (in utero), 2018
Powder-coated steel, brass nails, paint
Courtesy of the artist

Holly Ballard Martz is a Seattle-based multidisciplinary artist who uses language and found objects to create iconic, mixed-media works about deeply felt social, political, and personal issues, including mental illness, gun violence, and reproductive rights. Her two-dimensional, sculptural, and installation-based practice includes casting, sewing, metalwork, and encaustic.

In the theater

George C. Stoney (American, 1916–2012)
Mary Francis Hill Coley (American, 1900–1966)
Georgia Department of Public Health
***All My Babies: A Midwife's Own Story*, 1953**
16mm film converted to video (55 mins)
Added to the Library of Congress National Film Registry, 2002
Courtesy of the Library of Congress

All My Babies: A Midwife's Own Story was released as a training aid for midwives and health professionals at a time when birth was moving from the home to the hospital. The film paints a rare portrait of how a model of care among Black midwives coexisted alongside a growing medical-industrial complex.

Commissioned by the Georgia Department of Public Health, filmmaker George C. Stoney shadowed midwife Mary Francis Hill Coley for four months in Albany, Georgia. While the film included some acting, actual homes, streetscapes, and medical offices were used as backdrops. The film shows in detail two births attended by Coley with skill and high standards of care, and it captures the uncomfortable and enforced deference of Black midwives to white doctors and nurses at the county clinic. It even shows Coley questioning her own seasoned practices after a group lecture by a white doctor.

Filmed during the Jim Crow era, *All My Babies* captures the fading lifeline of Black midwives, who provided critical care for pregnant women of all races throughout the American South. Across slavery, segregation, and institutional racism, Black midwives inherited and passed down generations of knowledge, and their presence at home births was a constant—even as the turn to hospital births denied Black women hospital care during segregation.

Kyuri Jeon (South Korean, b. 1990)
다신, 태어나, 다시 *Born, Unborn and Born Again*, 2020
Video (12:37 mins)
Proofreading by Em Rea, Min Baek
Sound by Michael Bailey
Supported by The Sachs Program for Arts Innovation
Distribution by Cinema Dal
Courtesy of the artist

Kyuri Jeon is an interdisciplinary artist who lives and works in Philadelphia. Her work explores transnational systems of control, where they converge and where they divide. Jeon's video *Born, Unborn and Born Again* explores the transnational nature of governmental control over reproductive systems, switching between Korean and English as a way to signal ruptures and repetitions of time.

Fumi Amano (Japanese, b. 1986)
***Worries of a 30 year old single woman -Hysteria-*, 2016**
Video (5:30 mins)
Courtesy of the artist

Fumi Amano is a Japanese artist living and working in Seattle, Washington. Amano strives to break through ideals of Asian womanhood and beauty influenced by Western culture. Through her art, she challenges the stereotype of the "silent Asian woman" to reveal the complexities underneath.

Gates Foundation videos are also on rotation in the theater. For questions, please ask our staff.

Useful terms

Some terms or phrases in this exhibition may be new to you. We offer these descriptions to help clarify their use.

Birthing, pregnant, or postpartum person

The language of reproductive health is often gendered in ways that do not reflect the full spectrum of human experience. In this exhibition, we generally use *person* to describe someone experiencing pregnancy, birth, or the postpartum period. The word embraces transgender, intersex, genderqueer, and nonbinary people. We also use *women* for consistency with certain moments in time when discussing more historical designs, and we use *women and girls* for people in cultures around the world and across time where norms related to sex or gender limit opportunities for education, employment, self-determination, and fulfillment in life.

Body literacy, bodily autonomy

Body literacy is the accumulation of knowledge about the human body that counters a more common knowledge deficit about bodies. Body literacy is often developed within communities—in scientific and medical fields, in groups that share kinship (such as families of birth or of choice), and in social and cultural movements. The drive to develop body literacy has been instrumental to consciousness raising, for example among women, people of color, members of the LGBTQIA+ community, and those who live at the intersections of these identities. Wherever the right to make decisions about one's body—referred to as *bodily autonomy*—has been contested or denied, body literacy has offered a means to assert agency over one's own health.

Childfree

Childfree is a more neutral term than *childless*. Rather than implying a thwarted desire to procreate, *childfree* conveys personal choice related to a desire to not parent or to preexisting conditions that may harm one's health in the case of pregnancy or childbirth. While the term was coined by second-wave feminists amid increasing access to contraception, it was refined by women-of-color feminists who pointed to the many social and cultural factors that determine who gets to procreate and parent, as well as how freely their choices are made, upheld, and recognized.

Culturally appropriate care

Culturally appropriate care is deeply felt. The experience of it often goes unnoticed except when the care that is offered misses the mark. We often know care as rituals and remedies passed down through generations, and our understanding of care evolves across our lifetime as we give and receive care in a range of human encounters. Within health care contexts, each person deserves care that centers on them—their needs, their innate knowledge of themselves, their dignity, and the practices that reflect care within the cultures or communities that sustain them.

Low-resource settings

Low-resource settings can be found anywhere—from regions with limited or no electricity, to health facilities that can't afford expensive tools to support standards of care. While terms such as *high-income countries* or *low- to middle-income countries* capture the uneven distribution of wealth that can make or break experiences such as birth, those terms can also imply, incorrectly, that developed or industrialized economies always deliver on a promise of health. Low-resource settings exist wherever health systems lack resources—either formally through bad policies and poor governance or informally through systemic inequality.

Maternity care deserts

Maternity care deserts are areas with no hospitals that offer obstetric care, no birth centers, and no obstetrics providers, where people who are (or are seeking to become) pregnant must travel a considerable distance to receive care. While the reasons that maternity care deserts emerge may vary across rural, suburban, and urban settings, they ultimately represent a failure to adequately address the needs of communities.

Medical racism

Medical racism is discrimination against people of color within the medical system. In the U.S., medical racism has denied bodily autonomy and agency to certain groups of people, particularly Black Americans, with many reporting that their feelings of pain or self-knowledge about their bodies are routinely dismissed. Medical racism encompasses not only biases held by health care workers, whether conscious or unconscious, but also systematic disparities that have made race an underlying condition for worsening health outcomes. After the COVID-19 pandemic starkly exposed these disparities, the U.S. Centers for Disease Control and Prevention declared racism to be an epidemic and public health threat.

Midwife, doula, birth companion

A midwife is a trained professional who cares for pregnant, birthing, and postpartum people, guiding them through childbirth. A doula (or birth attendant) provides support during the reproductive journey that may include contraception, conception, birth, miscarriage, medical termination, stillbirth, surrogacy, or adoption. A birth companion is a trusted person who advocates for a laboring person.

Motherhood

Motherhood is shorthand for acts that go beyond a gender binary and beyond being pregnant or giving birth. It is something that can be embodied, deferred, refused, taken on as a duty or expectation, or otherwise engaged with in all its knotty contours. Motherhood is myriad.

Pregnancy loss

Pregnancy loss covers both miscarriage before the 20th week of gestation and stillbirth after that. While every experience is unique, pregnancy loss can come with searing physical or emotional pain, disappointment, guilt, shame, or relief. The difficulty of this loss is compounded by the fact that it is often treated as a taboo subject, keeping in silence those who experience such loss.

Reproductive justice

Reproductive justice is the human right to maintain personal bodily autonomy, have children, not have children, and parent children in safe and sustainable communities. The term was coined in 1994 by a group called Women of African Descent for Reproductive Justice, which built on the work of Indigenous women, other women of color, and trans* people.

Trauma-informed care

Trauma-informed care encompasses practices that promote a culture of safety, empowerment, and healing. This approach aims to avoid circumstances that embarrass, insult, or harm patients who may otherwise avoid medical care due to past negative experiences.

For further reading

***Designing Motherhood: Things that Make and Break Our Births*
by Michelle Millar Fisher and Amber Winick (2021)**

Select books from the exhibition

Reproductive Justice: An Introduction
by Loretta Ross and Rickie Solinger (2017)

Our Bodies, Ourselves, 9th edition, by the Boston Women's Health Book Collective (2011)

Trans Bodies, Trans Selves: A Resource by and for the Transgender Community, 2nd edition, edited by Laura Erickson-Schroth (2022)

Mother's Day Is Over by Shirley Radl (revised 1987)

Birth Book by Raven Lang (reprinted 2010)

Local voices

The Moment of Lift: How Empowering Women Changes the World by Melinda French Gates (2019)

Essential Labor: Mothering as Social Change by Angela Garbes (2022)

Taking Charge of Your Fertility: The Definitive Guide to Natural Birth Control, Pregnancy Achievement, and Reproductive Health, 20th anniversary edition, by Toni Weschler (2015)

The Birth Partner: A Complete Guide to Childbirth for Dads, Partners, Doulas, and Other Labor Companions, 5th edition, by Penny Simkin (2018)

Critical accounts

Mother Is a Verb: An Unconventional History by Sarah Knott (2019)

Things That Helped: On Postpartum Depression by Jessica Friedmann (2017)

Forget "Having It All": How America Messed Up Motherhood—and How to Fix It by Amy Westervelt (2018)

Pushed: The Painful Truth about Childbirth and Modern Maternity Care by Jennifer Block (2007)

Reproductive Injustice: Racism, Pregnancy, and Premature Birth by Dána-Ain Davis (2019)

Medical Bondage: Race, Gender, and the Origins of American Gynecology by Deirdre Cooper Owens (2017)

Young readers

Before You Were Born by Jennifer Davis, illustrated by Laura Cornell (1998)

Is Your Mama a Llama? by Deborah Guarino, illustrated by Steven Kellogg (1997)

And Tango Makes Three by Justin Richardson and Peter Parnell, illustrated by Henry Cole (2015)

Heather Has Two Mommies by Leslea Newman, illustrated by Laura Cornell (2016)

Love Makes a Family, written and illustrated by Sophie Beer (2018)

Good Night Stories for Rebel Girls by Elena Favilli and Francesca Cavallo (2016)

Let's Talk About Body Boundaries, Consent and Respect by Jayneen Sanders, illustrated by Sarah Jennings (2017)

Inspiring titles

Nurture: A Modern Guide to Pregnancy, Birth, Early Motherhood—and Trusting Yourself and Your Body by Erica Chidi Cohen (2017)

Spiritual Midwifery, 4th edition, by Ida May Gaskin (2002)

Period Power: A Manifesto for the Menstrual Movement by Nadya Okamoto (2018)

Revolution at Point Zero: Housework, Reproduction, and Feminist Struggle by Silvia Federici (2020)

Revolutionary Mothering: Love on the Front Lines, edited by Alexis Pauline Gumbs, China Martens, and Mai'a Williams (2016)

We Live for the We: The Political Power of Black Motherhood by Dani McClain (2019)