

Large Print and High Contrast  
Exhibit Labels

*Designing Motherhood:  
Things That Make and Break Our Births*

\*Please leave with the exhibition and return  
after use.



## Welcome

Welcome to *Designing Motherhood: Things that Make and Break our Births*. This large print (20 font) guide contains the text of the exhibition panels. The guide is designed to follow the natural path through the exhibition. To jump to a particular section, see the section headings on the next page.

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## Introduction Panel

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 reimaged for better outcomes here in the U.S. and around the globe.

## Content advisory

Reproduction and birth, despite their universality, are intensely personal. If you experience strong responses to this exhibition, our low-sensory room offers space for reflection and repose. If you're here with younger visitors, we're happy to guide you through suitable stops.

## Audio tour and booklet

For a guided experience, we encourage you to follow along with our audio tour featuring local Seattle voices and our in-depth booklet.



1

Alison Croney Moses (American, b. 1983)

*My Belly*, 2021

Cedar wood, milk paint

“Pregnancy and motherhood are life changing. Our bodies are literally rearranged, torn apart, and drained while growing humans within our womb. 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.”

—Alison Croney Moses



2

Alison Croney Moses (American, b. 1983)

Bintu Conté (Maninkan, b. 1985)

*We Are Black Vessels*, 2021

Video

“For Black mothers, the transformation to motherhood 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.”

—Alison Croney Moses



## 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

The artist poses pregnant as a narrative moves from “A woman taking space from a good man” to “I made a space for a good man.” In 2010, Deborah Willis recounted how an art professor once said, “All you’re going to do is get married, get pregnant, have a baby, and a good man could have been in your seat.” This piece reframes her response with poignancy as her son, Hank Willis Thomas, became an artist.

4

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

5

Tassette, 1959

6

FLEX Cup, 2017

[headphone icon] [QR code]



7

Tampax, 1936

8

Freedom Pads, late 20th century

9

The Menstrual Cycle Brochure, 1939

From the collection of Cooper Hewitt,

Smithsonian Design Museum

Herbert Bayer © 2022 Artists Rights Society

(ARS), New York / VG Bild-Kunst, Bonn

10

Aisle Boxer Brief, 2020

11

Rael Reusable Pantiliner, 2021

12

Protest Buttons, c. 1960s–1990s



## Survive and thrive

According to the World Health Organization (WHO), pregnancy and childbirth complications are the leading cause of death for girls ages 15 to 19. By co-creating new platforms with young adults, Adolescent 360 and the My Choice program draw on research in public health and human-centered design to increase young people’s agency around reproduction.

13

“Right Method, Right Time, My Choice,” 2014–2021

Photo © Bill & Melinda Gates Foundation/Prashant Panjiar

14

Adolescent 360, 2016–ongoing



## Population booms and busts

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. China's one-child policy is one of the most well-known family planning initiatives. In the U.S. and Europe, a popular movement advocated for zero population growth, inspired by environmentalism of the late 1960s. 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.



15

Jihua shengyu haochu duo/Family planning has many advantages, 1974 (China)

16

Two-child policy, 2007 (India)

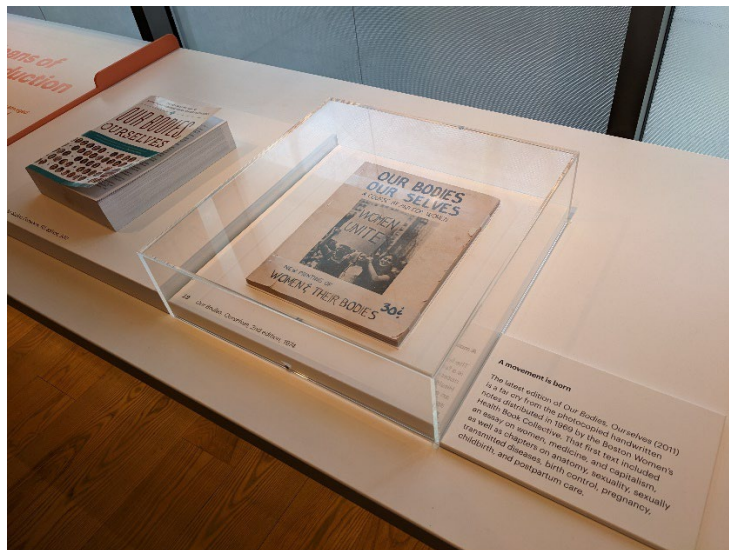
17

Would you be more careful if it was you that got pregnant?, 1969 (UK)

18

The population bomb threatens the peace of the world, 1968 (U.S.)

Courtesy of Special Collections, Princeton University Library



## A movement is born

The latest edition of *Our Bodies, Ourselves* (2011) is a far cry from the photocopied handwritten notes distributed in 1969 by the Boston Women's Health Book Collective. That first text included an essay on women, medicine, and capitalism, as well as chapters on anatomy, sexuality, sexually transmitted diseases, birth control, pregnancy, childbirth, and postpartum care.

19

*Our Bodies, Ourselves*, 2nd edition, 1974

20

Our Bodies, Ourselves, 9th edition, 2011



## 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.”



### **Small yet mighty**

Small, delicate, and usually made of polyethylene or copper, 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

Today, 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.

22a and 22b

Martha Poggioli (American, b. 1988)

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

2018–ongoing

Printed on fabric

“I often forget that one of these devices lives inside me. Over the years, as the pain quieted, I reconciled with the neutrality it afforded me. To neutralize is one of many functions these inventions offer. It could be said that

these ‘prosthetics of interiority’ all somehow correct deficiency, neglect, potential, or threat. Increasingly, though, I wonder: In hosting this device, why must my body bear this load? Through it, I am liberated, but I am also held captive. It’s a double-edged sword: the privilege and burden of one’s reproductive power.”

—Martha Poggioli

The devices in Martha Poggioli’s *Incomplete Patent Chronology* were designed to be inserted in the body, including intrauterine devices (IUDs). However, not all of these devices have been manufactured or distributed—just as some designs in this exhibition are not yet commercially available.

23

Bioceptive Cervical Retractor and IUD Inserter, in development

Many potential users avoid IUDs for fear of painful insertion. New Orleans–based Bioceptive designed a device called a cervical retractor to replace the forceps used in IUD insertion. The retractor uses gentle suction to stabilize the opening to the uterus, called the cervix, so an IUD can be inserted with little or no pain or bleeding. The retractor can be used for a variety of procedures, and Bioceptive has a pipeline of products that includes this IUD inserter.

24

DialPak Contraceptive Dispenser, 2001

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.

25

Lyndra Therapeutics Monthly Oral Contraception (LYN-064), in development

Photo © Langer and Traverso Labs at MIT

26

The Baby Trap: A Devastating Attack on the Motherhood Myth, 1971

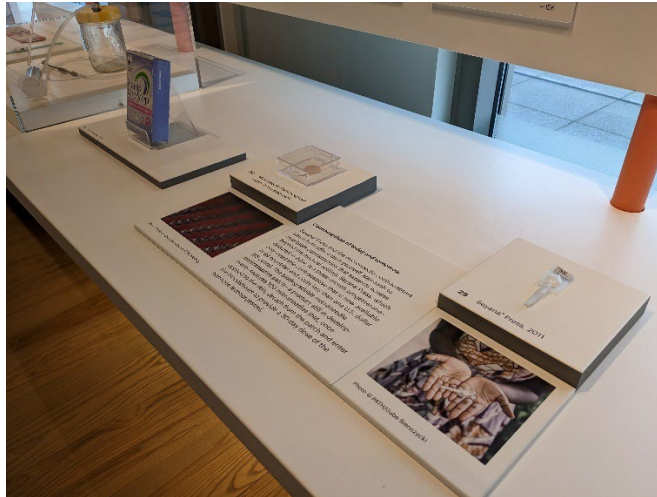
27

Mother's Day Is Over, 1973

28

Pronatalism: The Myth of Mom & Apple Pie, 1974





## Contraceptives of today and tomorrow

Sayana<sup>®</sup> Press and the microneedle contraceptive patch both offer a do-it-yourself approach to injectable contraception that expands access beyond the medical setting. Sayana Press, which debuted in 2014, is a three-month progesterone-only injectable contraceptive that is now available in 69 countries and costs less than one U.S. dollar (85 cents). The biodegradable microneedle contraceptive patch—a product still in development—features 100 microneedles that, once applied to the skin, detach from the patch and enter the bloodstream to provide a 30-day dose of the hormone levonorgestrel.

29

Sayana<sup>®</sup> Press, 2011

Photo © PATH/Gabe Biencycki

30

Microneedle Contraceptive Patch, in development

Photo © Wei Li, Georgia Institute of Technology

31

Plan B One Step, 2009

32

Del Em Device, 1971

33

JEB (Joan E. Biren) (American, b. 1944)

Darquita and her mother, Denyeta, 1979

Archival pigment print

34

JEB (Joan E. Biren) (American, b. 1944)

Mobilize for Women's Lives, a pro-choice march and rally  
in Washington, DC, 1989

Archival pigment print

35

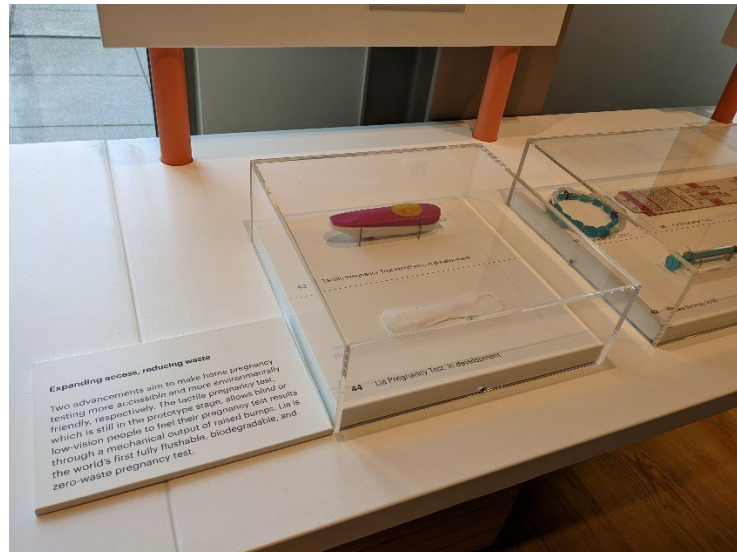
JEB (Joan E. Biren) (American, b. 1944)

Dessie Woods (later Rashida Muhammad Mustafa) at a  
Take Back the Night March in Washington, DC, 1981

Archival pigment print

“The photograph of Darquita and Denyeta is from my  
book *Eye to Eye: Portraits of Lesbians*. Lesbian parents  
should not need to adopt their own children.”

—JEB



## Expanding access, reducing waste

Two advancements aim to make home pregnancy testing more accessible and more environmentally friendly, respectively. The tactile pregnancy test, which is still in the prototype stage, allows blind or low-vision people to feel their pregnancy test results through a mechanical output of raised bumps. Lia is the world's first fully flushable, biodegradable, and zero-waste pregnancy test.

36

*The Predictor, 1971*

In 1967, New York–based graphic designer Margaret “Meg” Crane worked at a pharmaceutical company that performed pregnancy tests. The process involved adding a chemical mixture to a urine sample; after two hours, results would appear reflected in the mirror at the bottom of the tube. Crane made this technology widely available when she created the Predictor, the first home pregnancy test.

37

Fertility Awareness Method Chart from *Taking Charge of Your Fertility*, 1995

[headphone icon] [QR code]



38

Ava Bracelet, 2014

39

The Forecaster, 1948

40

Pregmate Ovulation Strips, 2021

41

CycleBeads®, 2002

42

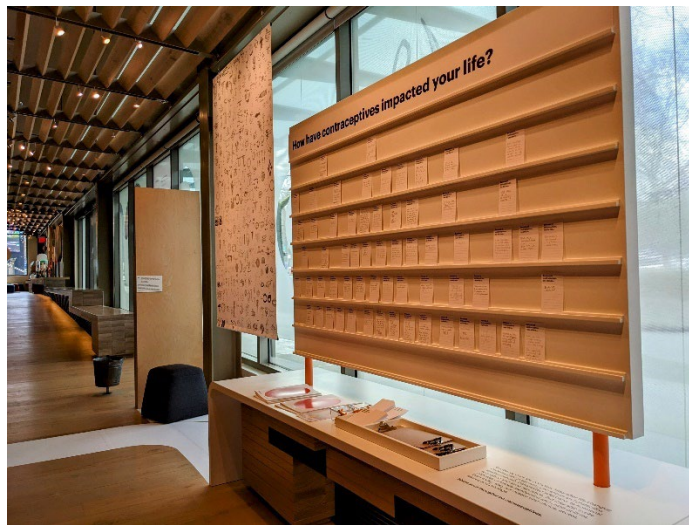
Mosie Syringe, 2016

43

Tactile Pregnancy Test Prototype, in development

44

Lia Pregnancy Test, in development



Contraceptives are complex. They offer life-changing benefits from pregnancy prevention and protection against sexually transmitted infections, to hormonal regulation and acne reduction. But they also evoke histories of forced sterilization and racist policies. Even today, they stir debate over choice, access, power and privilege.

**Share your thoughts on contraceptives.**





## Designing Motherhood

This exhibition was organized by the Designing Motherhood curatorial team in collaboration with the Discovery Center at the Bill & Melinda Gates Foundation.

In Seattle, the project's thought partners are the Designing Motherhood advisory committee: Amie Bishop, Senior Research Advisor for OutRight Action International; Angela Garbes, Seattle-based writer and

author of *Like A Mother* (2018) and *Essential Labor* (2022); Ari Robbins Greene, proud dad to two children; Dr. Cyril Engmann, Senior Director of Quality and Program Impact and Institutional Official at PATH; Dila Perera, Executive Director at Open Arms Perinatal Services; Mercedes Snyder, owner of Something Beautiful Midwifery; and Rebecca Mauldin, Director of Communications & Development at ChildStrive.

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

In Boston, the project's thought partner was the 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.

MassArt Art Museum, the Mütter Museum of The College of Physicians of Philadelphia, the Philadelphia Center for Architecture and Design, and the University of Pennsylvania School of Design were vital to the development of the *Designing Motherhood* exhibition.

Major support for Designing Motherhood has been provided by the Graham Foundation for Advanced Studies in the Fine Arts. Support for Designing Motherhood's initial presentation and publication was provided to Maternity Care Coalition by The Pew Center for Arts & Heritage.



## 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.



## History under exam

For centuries, the speculum was the only tool for internal examination of the uterus. Its use, combined with prevailing ideologies, influenced perceptions of female anatomy and female bodies as inferior.

Some of these ideologies included racism. American physician J. Marion Sims (1813–1883) invented a method to repair fistulas, a potentially life-threatening complication from prolonged or obstructed labor. But his success was built on experimentation on enslaved African American women, many of whom endured

multiple surgeries without anesthesia. In 2020, obstetrician Kameelah Phillips renamed the Sims speculum, an instrument that Sims developed, as “Lucy” in tribute to one of Sims’ patients.

45

Pompeii Quatra-Valve Speculum, 19th century reproduction of c. 79 CE design

46

Lucy (Sims) Speculum, c. mid-19th century

47

Yona Prototype Speculum, in development

48

Jess T. Dugan (American, b. 1986)

*Taan*, 2012

Archival pigment print

“I believe in the importance of representation; photographs can function as possibility models, depicting

and validating specific identities and life paths.  
Sometimes you need to see something represented to  
know that it is possible for you.”

—Jess T. Dugan

49

Nyssa VieVision Self-Check Mirror, 2021

50

Exam Table Stirrups, c. 1885

51

*Table Manners: A Guide to the Pelvic Examination for  
Disabled Women, 1982*

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

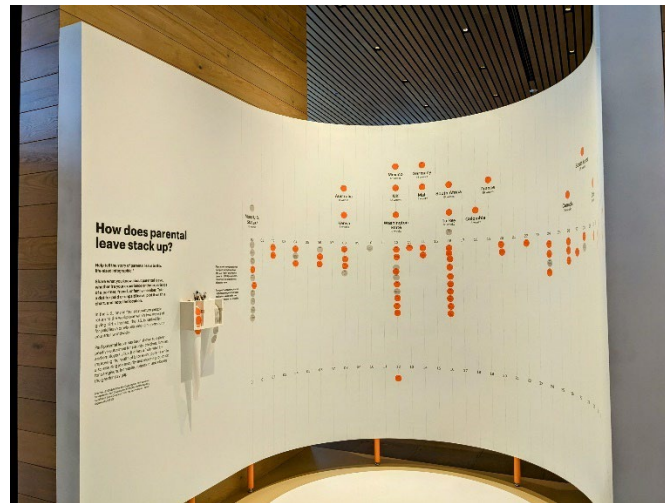
JEB (Joan E. Biren) (American, b. 1944)

Jan Dixon (later Jamilah Ali) and Barbara Lewis doing a cervical examination, 1979

Archival pigment print

“In the 1970s, we asked: Why should your doctor know what you look like and you have no idea? So we looked at our own and other women’s cervixes. To know what was once unknown made us feel that our bodies belonged to us, and we wanted to take back control of what happened to them.”

—JEB



## How Does Parental Leave Stack Up?

Help tell the story of parental leave in this life-sized infographic.\*

Share what you know about parental leave, whether it's your experience of a partner, friend, or family member. Take a dot for paid or unpaid leave, plot it on this chart, and note the location.

In the U.S., one in four postpartum people return to the workplace within two weeks of giving birth. Indeed, the



U.S. is ranked last for paid leave provisions among high-resource countries worldwide.

Paid parental leave has been shown to deliver positive outcomes for parents, children, families, and employers alike. It offers a “win-win” by improving the health of babies and parents while also ensuring job security and income protection for caregivers, increasing retention, and closing the gender pay gap.

Sources: 2020 data from the Organization for Economic Co-operation and Development (OECD); and the Working Conditions Laws Database from the International Labour Organization (ILO).

†Eight states have passed their own paid family leave laws. The U.S. Family and Medical Leave Act (FMLA) covers 60% of workers for up to 12 weeks of unpaid leave.

\*To support comparison, this list captures averages of full wage equivalent weeks under paid leave policies that are available to mothers.



## 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

Twilight Sleep Advertisement, c. 1914

54

Dilation Chart, c. 2021



## Labor pains

No single approach to addressing labor pain is best, and no approach to pain management is universally available to all laboring people. Today, an estimated 60% to 70% of births in the U.S. involve an epidural, an injection that blocks pain signals from a region of the body to the brain during labor and birth.

55

PERIFIX Filter Continuous Epidural Set, 21st century

56

The Lamaze Method: Techniques for Childbirth  
Preparation, 1983

57

*Natural Childbirth: A Documentary Record Of The Birth Of  
A Baby, 1957*

58

*Creative Childbirth: The Leclaire Method of Easy Birthing  
Through Hypnosis, 1991*

59

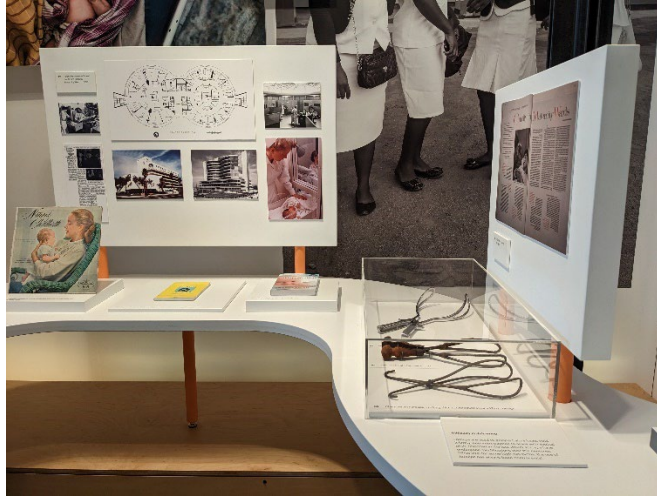
HypnoBirthing: The Mongan Method with CD, 1992

60

Kaiser Permanente Sunset Boulevard Hospital Maternity  
Ward, c. 1950

61

Ladies Home Journal, May 1958



## Difficulty in delivering

Forceps are used to grasp a baby's head, hold it firmly, and exert traction to assist with vaginal birth. Invented in the late 1600s, forceps have undergone modifications over the centuries. While vital for some high-risk births, the use of forceps has always been controversial.

62

Chamberlen Forceps, Locking, 19th c. reproduction of a 17th c. design

63

Smellie Straight Forceps, c. 1752

64

DeLee Forceps, c. 1913

65

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 creates a need to deliver quickly. The BD Odon Device™ is only the third tool created to assist with vaginal birth. It was designed by Argentinian car mechanic Jorge Odón, who watched a video about how to get a cork out of an empty wine bottle and wondered if the technique could support birth. He developed a prototype that quickly attracted the attention of the global health community. While obstetricians may try to improve upon tools, Odón came at the problem based on the mechanics of birth.

66a

Small Perineal Repair Simulator, 2018

66b

Medium Perineal Repair Simulator, 2018

66c

Large Perineal Repair Simulator, 2018

Cesarean section is the most commonly performed surgery around the world. This drape was developed by nurses in Virginia to allow a newborn to be passed through and laid directly on the birthing parent's chest for skin-to-skin contact—which is calming to the newborn and promotes healthy development, among other benefits—while maintaining a sterile surgical site.



### **Advisory**

Even surgical models can make some of us squeamish. This video about perineal repair may be especially sensitive for people who have had an episiotomy.



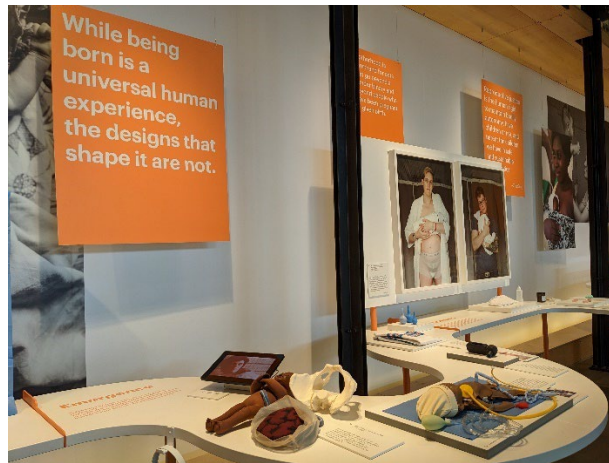
67

ProxSIMity Perineal Repair Simulator Video, 2021

68

Immediate Skin-to-Skin C-Section Drape, 2015

Photo © Clever Medical/Hefferilt Photography



## 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*

Simulation tools have been used for centuries to support training of midwives, birth attendants, and doctors. Early models were made from wood, clay, or glass. Later, wax, leather, and cloth provided moveable parts. This kit shows how the pelvis moves and how the fetus may be positioned during birth.

70

Deluxe Flexible Pelvis Model Set, c. 21st century

71

NeoNatalie, 2010

Photo © Bill & Melinda Gates Foundation/Prashant Panjiar

Globally, about 1 million newborns die each year within 24 hours of birth—and 80% of those deaths are due to preventable causes. NeoNatalie is a simulator that supports training in resuscitation during the first 10 minutes of life. 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. Since 2010, the simulator kit has been rolled out to 80 countries, training more than 1 million health care workers.

72

Augmented Infant Resuscitator (AIR), in development

The Augmented Infant Resuscitator (AIR) provides real-time feedback while using a bag-valve mask to resuscitate a newborn. Its design started as a collaboration between two doctors (one Ugandan, one American) with an automotive engineer and an electrical engineer who met at a 2012 MIT H@cking Medicine event.

73

Wireless Skin Sensors, in development

Photo © Northwestern University

74

Kuddle-Up Blanket, c. 1950s

The iconic Kuddle-Up receiving blanket is used around the world. In 1910, a group of nurse-nuns approached A.L. Mills, a company that produced aprons for Chicago's meatpacking industry, to create hospital garments. As a result, the medical garment and textile supply business was born. The Kuddle-Up is now manufactured in Pakistan.

75

BoogieBulb Eco-Friendly Nasal Aspirator, 2008



## 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

“There is a significant lack of representations of queer families and queer parenting, and especially of butch or transmasculine parenting. I want to begin to fill that gap by photographing my own family and telling my own story. Parenting is one of the most amazing, and most challenging, things I have ever done. My daughter calls me ‘Pari.’ As a nonbinary person, I had to create and redefine much of the language around parenting to make it work for me and my family.”

—Jess T. Dugan

77

Generic Postpartum Mesh Underwear, 21st century

78

Perineal Irrigation Bottle, 21st century

79

Encapsulated Placenta, 2021

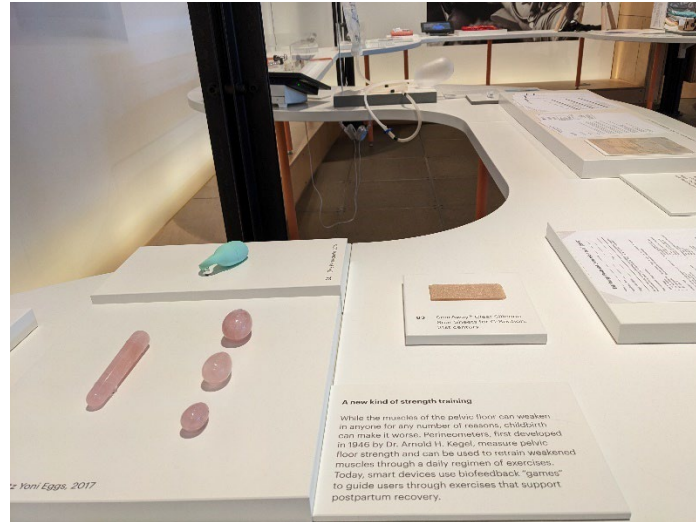
80

After Birth Perineal Healing Herbs (Herbal Sitz Bath),  
2022

81

Elvie Perineometer, 2015





## A new kind of strength training

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. Today, smart devices use biofeedback “games” to guide users through exercises that support postpartum recovery.

82

Rose Quartz Yoni Eggs, 2017

83

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

84

The Edinburgh Postnatal Depression Scale, 1987

85

Medical Bills for a Birth in the 1940s, a Home Birth (2013), 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.

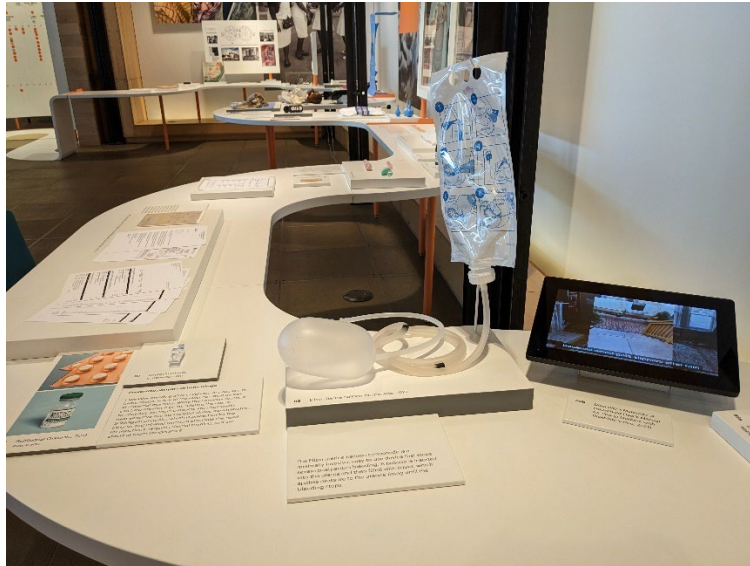
86

Sublingual Oxytocin, 2014

Photo © PATH

87

Oxytocin Inhaler, in development



## Preventing postpartum hemorrhage

Excessive bleeding after childbirth, or postpartum hemorrhage, is one of the most common causes of maternal mortality. While the hormone oxytocin can help prevent it by stimulating the uterus to contract, oxytocin products are traditionally heat-sensitive and also require skilled administration. Sublingual oxytocin, which is placed under the tongue, and inhaled oxytocin eliminate the need for injections, require minimal training, and are stable at room temperature.

88

Ellavi Uterine Balloon Tamponade, 2019

The Ellavi uterine balloon tamponade is a minimally invasive, easy-to-use device that stops severe postpartum bleeding. A balloon is inserted into the uterus and then filled with liquid, which applies pressure to the uterine lining until the bleeding stops.

89a

*Disability x Maternity, A Household User's Manual for Young Mothers with Disability Manual, 2020*

89b

*Disability x Maternity, A Household User's Manual for Young Mothers with Disability Video, 2020*



## Curiosities for a common condition

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. In the past, pessaries have included pomegranates and balls of wool—or have been made from wood, metal, or glass.

90a

Reia Pessary Prototype (Frankenstein 1)

90b

Reia Pessary Prototype (Frankenstein 2)

90c

Reia Pessary Prototype (V8)

90d

Reia 4 (Final Prototype)



## 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

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

Umbilical clamps have been used by midwives since the 19th century to stop bleeding from the blood vessels in the umbilical cord once delivery has occurred. To avoid corrosion, the scissors are typically made of silver plate or sterling silver.

93

The Birth Book, 1972

94

Janma Clean Birth Kit, 2011

95a

Rebozo, 2022

95b

Trailer for "Asynclitism" (Fetal Disengaging and Engaging with a Rebozo) from Rebozando for Birth, 2021

Courtesy of Naoli Vinaver, [www.naolivinaver.com](http://www.naolivinaver.com)

A rebozo is a long, hand-woven garment used in pregnancy and the postpartum period. Drawing on centuries of knowledge, Mexican midwives wrap and move the rebozo against the body to ease ligament, muscle, and back pain. Midwives and doulas can also use it to reposition the fetus, including using a technique commonly known as “sifting.”

96

Birth Stool, 2020



97

MyAnchor Birthing Pool Straps, 2005



## Birthing beyond the bed

Birthing furniture and objects such as chairs and backless stools have supported laboring people for centuries across cultures, ethnicities, and geographic regions. The conceptual furniture by UK-based designer Stiliyana Minkovska envisions a way to adjust for transitions during the journey through labor and delivery.

98

Stiliyana Minkovska's Ultima Thule, 2020

99

## Electronic Helping Babies Breathe (eHBB) Virtual Reality Simulation, 2019

The first minute of life—often called “the golden minute”—can require quick critical care, particularly if a newborn fails to start breathing. This immersive training course, designed by a neonatologist at Seattle Children’s Hospital, uses a virtual reality game format to build skills in resuscitation in low-resource settings.



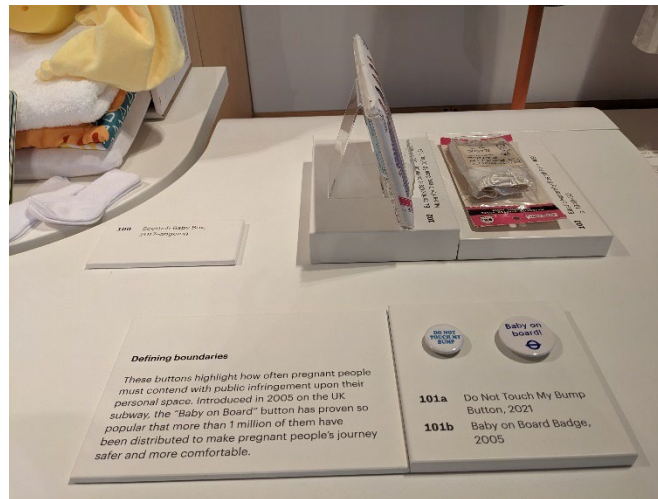
100

## Scottish Baby Box, 2017–ongoing



## 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.



## Defining boundaries

These buttons highlight how often pregnant people must contend with public infringement upon their personal space. Introduced in 2005 on the UK subway, the “Baby on Board” button has proven so popular that more than 1 million of them have been distributed to make pregnant people’s journey safer and more comfortable.

101a

Do Not Touch My Bump Button, 2021

101b

Baby on Board Badge, 2005

102

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

103

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

104

Tie-Waist Skirt, c. 1960

In the early 20th century, the prevailing norm in the U.S. was to use clothing to hide pregnancy. Tie-waist skirts masked what was still often unutterable in “polite society.” As the wearer’s hip and rib circumferences expanded, the tie around the waist was adjusted—all while maintaining an even hemline.

104b

Patent for Page Boy Tie-Waist Skirt, 1939



105

Wei Hung Chen (Taiwanese, b. 1993)

Modular Dress 2.0, 2017

Cotton blend with a silk cotton blend lining

“The Modular Dress 2.0 is designed to accompany a woman’s journey pre-, during, and post-pregnancy. The dress employs a hook-and-bar system to enable size alteration. It allows the wearer to modify sizing on various parts of the body (bust, waist, and hips), depending on how their body changes throughout pregnancy.”

—Wei Hung Chen

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 not only changes 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

108

Petit Pli, 2017

Children typically grow seven sizes in their first two years. Aeronautical engineer Ryan Mario Yasin designed Petit Pli to stretch and grow “bidirectionally,” snugly fitting a range of sizes from four months to three years. Petit Pli garments gesture toward a new paradigm for reducing waste in fashion.



## Try a baby carrier

Try different baby carrier designs on the stand to your right. You can use the mirror (behind this panel) to wrap the baby carrier around NeoNatalie.

Designs for baby carrying have precedents in every corner of the globe—from indigenous cradleboards and rebozos in the Americas, to tied textiles of the African continent and ring slings in parts of Asia.

Side carrier

Front carrier

Back carrier

Consider which designs may be suitable for the different activities a caregiver might need to perform throughout the day.

Return the baby carriers to the rack after use.

109

B-01 “Umbrella” Baby Stroller, 1966

110

Cradleboard, contemporary

In Indigenous traditions both past and present, cradleboards support caregiving, securing an infant (typically within its first year) while caregivers travel or work. Materials and designs vary considerably. The Coast Salish peoples of the Pacific Northwest often use cedar bark and wood fibers to create cradleboards and cradle baskets. Cradleboards can be worn by the caregiver or leaned against a nearby structure to give the infant full view of the surroundings. The tight swaddling gives the infant a feeling of warmth and safety.

111

Snugli, 1971

[headphone icon] [QR code]



112

Kangaroo Mother Care Game, 2018

Photo ©Bill &amp; Melinda Gates Foundation/Barbara Kinney

Kangaroo mother care supports newborn development by promoting skin-to-skin contact and breastfeeding. In 1978, Colombian pediatricians Edgar Rey and Héctor Martínez proposed this new approach to infant care by first drawing inspiration from nature's low birthweight baby—the kangaroo. Born the size of a lima bean, baby kangaroos continue to feed and develop in the warmth of their mother's pouch. Studies have proven that kangaroo mother care is as effective (or more) than other interventions, as it helps regulate temperature, reduce infections, and accelerate weight gain.

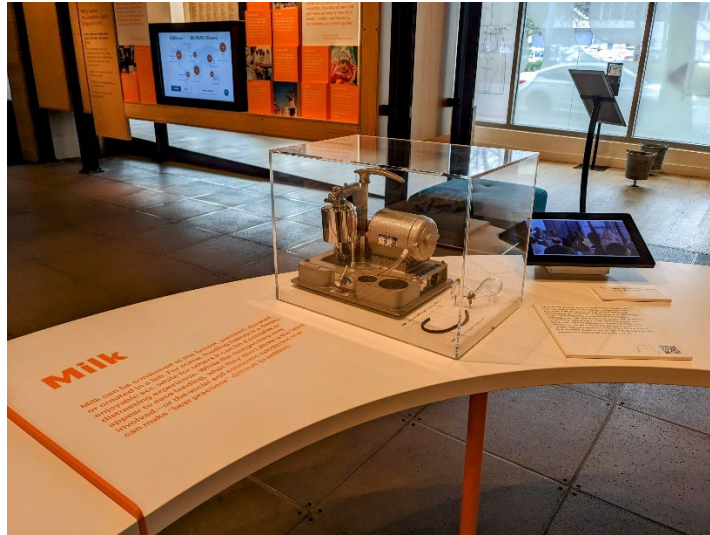
113

Sorbit Biodesigned Diaper, in development

Any diaper uses material resources, and introducing waste to landfills or sewers inevitably has an impact. Enter Sorbit, a prototype for a biodegradable, compostable diaper made with cellulose grown on agricultural waste. Sorbit premiered at the 2018 Biodesign Challenge, a global student competition for designs that envision a future that incorporates biotechnology.

113

Prefold Cloth Diaper and Snappi Fastener, 2017



## 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

115

Phenix Breast Pump, c. 1879



116

Egnell SMB Breast Pump, c. 1956

Early breast pumps were cumbersome, loud, and fairly painful to use. Einar Egnell, a Swedish civil engineer, designed one of the first mechanical breast pumps in the mid-1950s, after a gynecologist friend challenged him to improve on existing technologies. He specifically observed the anatomy of humans, rather than cows, and the result was the Egnell SMB breast pump. Breast pumps were initially confined to medical settings—and thus largely unavailable—until later in the 20th century. The at-home electric pump was not developed and widely marketed until the early 1990s.



117

Haakaa Breast Pump, 21st century

118

Willow Wireless Breast Pump, 2021

The Willow breast pump offers mobile technology in both senses of the word. Users can track the amount of milk expressed on a mobile app. And with no tubes or electrical cords, the pump frees lactating parents to pump on the go.

119

Various Baby Bottles, 20th–21st century

120

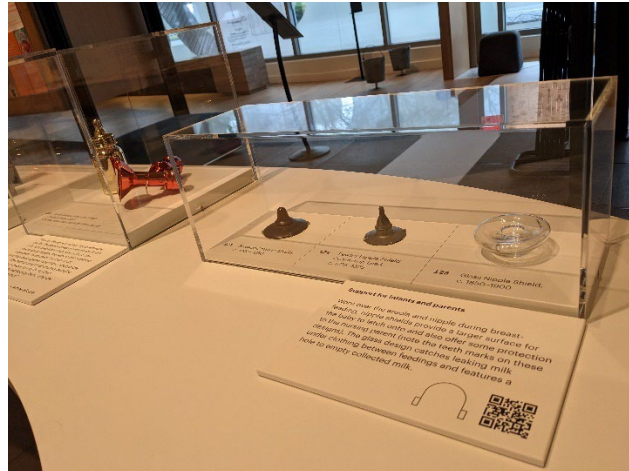
Aimee Gilmore (American, b.1982)

*Pushed & Pulled*, 2017

Chrome-plated baby bottle and breast pump

“Time is different as a mother. I try to reimagine the first few days or weeks or even months in this role, but it feels almost dreamlike. I cling to the now-discarded objects, the relics of their smallness. I save them, I honor them, I cut them apart, I put them back together, I coat them, I encapsulate them. I line them up proudly like trophies, awarding myself the permission to long for the times that I once prayed would go by faster. These are monuments to motherhood.”

—Aimee Gilmore



## Support for infants and parents

Worn over the areola and nipple during breastfeeding, nipple shields provide a larger surface for the baby to latch onto and also offer some protection to the nursing parent (note the teeth marks on these designs). The glass design catches leaking milk under clothing between feedings and features a hole to empty collected milk.



121

Boxwood Nipple Shield, c. 1800–1850

122

Pewter Nipple Shield Containing Lead, c. 1775–1825

123

Glass Nipple Shield, c. 1850–1900

124

JustMilk Nipple Shield, in development

Every year, more than 4.8 million infants worldwide die from conditions such as pneumonia, malaria, diarrhea, and HIV. The JustMilk nipple delivery system will offer a way to deliver antibiotics, antimalarials, antiretrovirals, vitamins, nutrients, and probiotics to infants, thereby helping to ensure equitable access to life-saving treatments.

125

### NIFTY™ Cup, 2014

Preterm babies often struggle to breastfeed and are at high risk for malnourishment, infection, and death. The NIFTY™ Cup allows mothers to directly express milk, eliminating cross-contamination from other containers, while the spout's small reservoir holds just enough milk to allow the infant to pace their own feeding.

Photo © Laerdal Global Health



## 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



127

Technical Drawing of Ultrasonic Unit, 1963

128

ECG Toco Fetal Chart Paper, 2012

129

Mobile Midwives Ultrasound, 2011

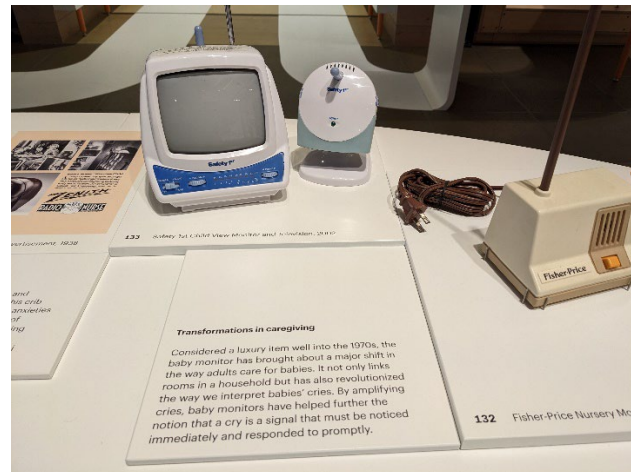


130

Solar-Powered GPS Bracelet, 2017

Photo © Dahabo Adi Galgallo

Women who receive no prenatal care are five times more likely to die due to pregnancy-related causes. To connect nomadic women in Kenya to free maternity and postpartum care from traveling health workers, Dahabo Adi Galgallo designed culturally appropriate, solar-powered GPS bracelets.



## Transformations in caregiving

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

131

### Zenith Radio Nurse Advertisement, 1938

In 1932, the infant son of aviators Anne and Charles Lindbergh was kidnapped from his crib while his parents were home. To ease the anxieties of families everywhere, Eugene McDonald of Zenith Radio Corporation devised a monitoring device that used a microphone, speaker, and radio. He then enlisted sculptor Isamu Noguchi to design the device's casing.

132

### Fisher-Price Nursery Monitor, 1983

133

### Safety 1st Child View Monitor and Television, 2002

134

Owlet Smart Sock, 2nd Generation, 2018

Today's wearable, connected devices 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. Information can be continuously tracked via a smartphone app.

135

Unfolding of Infants' Natural Gross Motor Development, 2006

136

On Their Own/With Our Help, 1978

See How They Play, 2013



137

Aimee Gilmore (American, b. 1982)

*Milkscapes* (series), 2016–ongoing

Breast milk on mylar as inkjet print fabric

“Milkscapes is a series made by pouring a small amount of my breast milk onto a sheet of glass. (The first instance of this stemmed from an accidental spill after laborious pumping.) The milk dries in abstract shapes, highlighting an otherwise invisible labor. The glass is then photographed, and the image is printed large-scale by a company that fabricates billboards. Scale is crucial here. An intimate yet highly labored and nuanced exchange transforms into a sublime moment of viewing, suggesting how personal space becomes blurred or even nonexistent for a mother. By exposing the process of

lactation, Milkscapes illuminates one way in which the female body is called on to perform and to produce.”

—Aimee Gilmore



## Additional Artwork



Ani Liu (American, b. 1986)

Untitled (pregnancy menswear), 2020

Silk organza, suiting boning

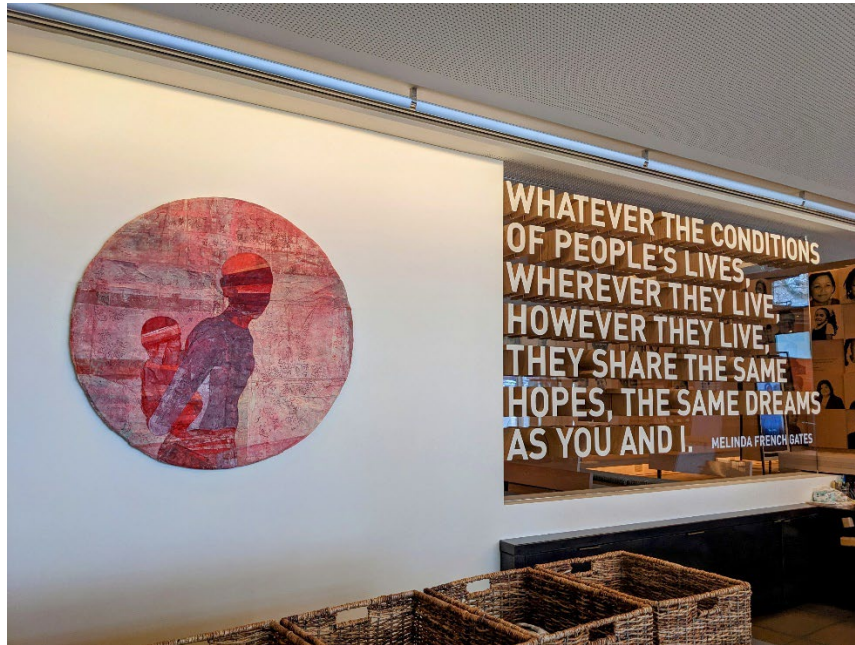
On loan in celebration of the Designing Motherhood exhibition

“This garment explores non-female and transgender pregnancy through suiting and the ways design can normalize and remake stigmatizing assumptions about gender, sex, fertility, and parenthood. Blurring boundaries between gender, sex, fertility, and vulnerability, the garment is designed to appear as a sketch of an idea and is created in silk and rigid boning.

“The design was informed by a series of conversations with trans and nonbinary persons regarding fertility. It is an ongoing project.”

—Ani Liu





Jite Agbro (American Nigerian, b. 1982)

*To Whom the Future Belongs*, 2020

Paper, fabric, ink, beeswax, graphite, and thread

"How might communities develop if we removed the social and economic barriers facing women and girls?"

—Jite Agbro



Holly Ballard Martz (American, b. 1965)

*Whether and When*, 2020

Laboratory glass (separatory funnel, evaporator flasks, stopcock), PVC tubing, steel, paint

"The ability for women to decide whether and when to have children is crucial to their physical and mental health, as well as their economic and educational opportunities. The power to decide is empowering."

—Holly Ballard Martz

## Back Wall Quotes

“Our reproductive arcs are central to the preservation and extension of humanity.

Uteruses give life and welcome people onto the planet.”

—Erica Chidi

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

Motherhood is shorthand for acts that go beyond a gender binary and beyond people who have been pregnant or given birth.

“Reproductive justice is the human right to maintain bodily autonomy, have children or not, and parent the children we have in safe and sustainable communities.”

—SisterSong

Roughly 75% of medical devices won't function beyond industrialized countries.

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

The world is lacking 1/3 of the midwives it needs.