The Media Lab “Make the Breast Pump Not Suck” Hackathon

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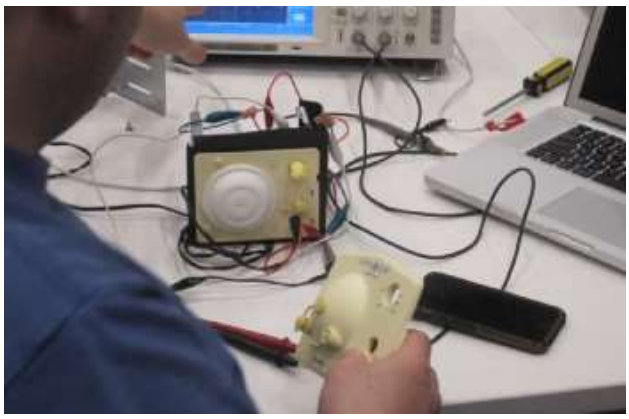
On Wednesday, May 21, about twenty people convened at the Media Lab for the first ever “Make the Breast Pump Not Suck” Hackathon. Those of us who organized the event had been meeting as a small working group that coalesced after the publication of the article Shouldn’t the Breast Pump Be as Elegant as an iPhone and as Quiet as a Prius by Now? on *The New York Times’* Motherlode blog. Our own stakes in the matter are personal (we are parents and parents-to-be) and professional (we have designed medical devices, created open source hardware, and organized communities to change the world). Our organizing group includes Tal Achituv, Catherine D’Ignazio, Alexis Hope, Taylor Levy, Alexandra Metral, and Che-Wei Wang.

The goals for the hackathon were to educate ourselves and our colleagues about the mechanics of breast pumping, discuss design challenges posed by current technologies and societal norms, and generate ideas for how we could change our machines and our society to make breastfeeding and breast pumping a normal, painless, and not-degrading experience for moms. We want to bring the breast pump out of the lactation closet, so to speak. Our larger goal is to help fuel a culture of innovation in the space of maternal and neonatal health, a space that typically lags behind other fields in technological innovation.

The Basics of Breast Pumping



So what *is* a breast pump? Breast pumps may seem like sci-fi technology to the uninitiated. They are machines that help moms extract breast milk when they are not with their baby (as in the case of a working mom) and can be life-saving when a baby cannot nurse for some reason (preemies, babies in the NICU, babies that cannot latch well). Breast pumps typically use vacuum and compression to trigger the mother’s letdown mechanism, which makes the milk flow from the breast. Breast milk is collected in a bottle and can be fed to baby through a bottle, dropper, tube, or cup.

The benefits of breast milk to individual and public health are huge. The World Health Organization recommends breastfeeding for at least the first two years of a child’s life. And yet, breastfeeding is *hard:* it’s hard to initiate the breastfeeding relationship and it’s also hard to maintain it, particularly for families who live in one of the four countries considered “Maternal Health Backwaters”: Liberia, Papua New Guinea, Swaziland, and the United States of America (yup, the USA is in this group). These are the only countries in the world who do not grant paid parental leave on the birth of a new child. Mothers often return to a workplace that may not be supportive of breastfeeding, may not grant time to pump, may not have a space other than a bathroom or closet to pump, may not have a place to refrigerate pumped milk, and may not have colleagues that understand or appreciate what is going on.

Design Challenges with the Breast Pump

> *“With buying a breast pump, you make a lot of commitments that aren’t easy to go back on. It’s 50x more complicated than buying a car. The entire matching the person-to-thing experience, it all needs to change.” — Tal Achituv, research affiliate, Fluid Interfaces group*

The breast pump is a key technology in extending the nursing relationship and providing babies with breast milk for longer. But most women will tell you that the experience of using the breast pump

SUCKS, literally and figuratively. Here are some of the reasons pumping sucks:

- *Education*: Proper latch, suction level, and positioning are critical to the ability to pump effectively and comfortably. The size, shape, and adjustment of flange funnels is particularly important, but limited options come with each pump model. Women don’t receive proper instruction on the importance of flanges and they don’t know how or where to go about ordering different sizes or trying different things.
- *Difficulty*: Milk let-down is difficult: babies are really cute and knead breasts while they nurse, which encourages let-down; let-down and oxytocin also respond to sounds and sights of babies cooing and crying. Pumping is an inorganic, medicalized, generally unpleasant process, often taking place in a stressful, time-crunched environment that does not encourage let-down.
- *Too many parts / not enough parts*: The pumps come with a lot of little parts that require sanitation and care, and it’s difficult for the nursing mother to keep track of and transport them all. They do not, however, come with many of the accessories and amenities that make pumping convenient for mothers, such as long cords, battery packs, extra bottles, extra flanges and other parts, and hands-free nursing bras.
- *Degrading*: Pumping is loud and mechanical, and has a generally medical and degrading feel; the mother is in a closed-off room, plugged into the wall, struggling to adjust and multitask, all while feeling rather like a cow being milked.
- *Social norms*: Breast pumping is treated like a hidden and embarrassing medical condition. Pumped breast milk is seen as a waste product rather than as a food product.

The Group

For the hackathon, we invited the Media Lab community which includes talented designers, engineers, and scientists. Students from numerous Media Lab

groups–Civic Media, Playful Systems, Mediated Matter, Changing Places, Viral Systems, Object-Based Media, and Fluid Interfaces. We also invited local professionals who have a stake in helping families with new babies: Nancy Holtzman, a renowned lactation consultant; Robyn Churchill, a midwife and researcher at the Harvard School of Public Health; Susan Thompson, a MassChallenge Finalist who invented a new breast pump prototype; Kara Schamell, a Cambridge-based doula; Tina Cassidy, author of *Birth: A History*; and Stephen Gerrard, whose company develops novel breastfeeding technologies for preventing HIV transmission.

The Work

Nancy kicked us off with an amazing session about how pumps work and the challenges that moms face in breastfeeding and pumping. After some Q&A, we divided into small groups to generate ideas for improvements that we could imagine to the breast pump.

> *“I have worked with pump manufacturers, innovators, and R&D groups before but this session went in completely different directions, kind of “wouldn’t it be cool if…” We talked about creating a breast pump as an intelligent object, maybe a “smarter” breast pump, breast pumps with sensors that would adapt their function based on individual physiologic responses, new thoughts about power sources and portability, the ability to add social sharing or even “gamification” aspects to the pumping process. Some really interesting ideas!”— Nancy Holtzman, lactation consultant*

Groups came up with a range of ideas that we grouped into categories:

- *Smarter interfaces and guided experiences:* Pumps that can interface with your phone; pumps that can inform mom and also reinforce her commitment to her baby.

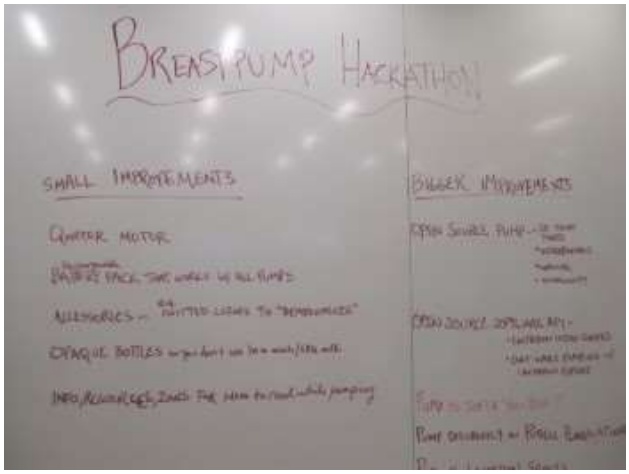
- *Data collection:* Could pumps anonymize and transmit data about the milk collected? This could serve to set a research agenda for breastfeeding research, which is often neglected due to lack of data.

> *“At first I thought it would be hard to get away from basic ideas like simply making the motor more silent, which is very important, but you won’t get that from the type of creativity that we love at the Lab. It was great to see how we all went pretty quickly to more exciting ideas with farther reaching consequences.” —Santiago Alfaro, Object-Based Media group*

- *Education and distribution:* A “Tupperware party”-style system whereby women could try out breast pumps and flanges prior to giving birth; comic books instead of medical instruction manuals; a website with free expert advice and real-time help.
- *Adjustable parts:* Flanges that can “dial” larger and smaller; flanges made of new materials like jamSheets with adjustable stiffness for customizable fit.
- *Interoperable parts:* A universal battery pack that would make any pump portable and not have to plug into the wall; an open source breast pump.
- *Demedicalizing:* Making knitted cozies for the breast pump; softer and warmer materials to put on mom’s body.

For the last hour of the hackathon people worked in small groups to discuss these ideas further and hack on breast pump motors. One group got a quieter motor up and running with existing plastic pump parts.

Conclusions and Next Steps



The engineers, public health professionals, designers, lactation consultants, entrepreneurs, and parents in the room all agreed that this is a space that is ripe for further innovation. We plan to hold a larger hackathon this fall and build towards hosting a summit on maternal and neonatal health innovation (which maybe we should just call “Family Health Innovation” given that the dudes and partners are really important in this equation).

“There were many Media Lab-affiliated new parents and parents-to-be present, and I was happy to see the networking and connections made,” Nancy Holtzman said afterwards. “I am glad there will be a follow-up meeting planned. I hope to remain involved and have no doubt that some interesting pumps or modifications will come out of this group!”

Want to join forces? Join our Facebook group, or sign up for our mailing list (send an email to the breastpump-request@media.mit.edu with the subject line “Subscribe”) to be notified of upcoming events.

Do you have ideas for how to make the breast pump not suck? Drop us a line at breastpump-organizers@media.mit.edu.

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