Navigating Women's Health in a Post-Roe Era: The Sociotechnical Evolution of Wearable Technologies

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Time travel may belong to the realm of science fiction, but in the context of women's health and rights, it's unfolding right before our eyes. Recently, President Trump issued an executive order to roll back diversity, equity, and inclusion (DEI), using keywords such as women, disability, bias, and Black to identify research that includes DEI topics (Sharma, 2025). The executive order requires researchers to halt work that does not comply, effectively stalling progress in critical areas of study that address systemic inequities. One researcher noted that if she can't use the word women in her research then she can't discuss how an abortion ban will negatively affect women (Sharma, 2025). It was also recently in the news that NIH archived a policy that requires female animals in studies (López Lloreda, 2025). This is dangerous as it disregards the importance of gender-specific research and such actions risk reinforcing a one-size-fits-all approach to science, which historically has marginalized women's health. These research rollbacks resemble a journey back in time, undoing the progress toward representation in healthcare and research.

This regression is particularly troubling when juxtaposed with the rapid advancements in technology, such as wearable devices, which are transforming healthcare for millions. Today, one in three Americans use some type of wearable device for fitness tracking or health support (NHLBI, 2023). Furthermore, analysts valued the wearable technology market at 33 billion dollars in 2019 and expect it to grow at a rate of 15.9% each year (Brophy et al., 2021). Despite immense growth in this market of wearable technologies, technological advancements and government policies continue to overlook women's health.

I will delve into these issues by addressing the central question: "How does the lack of equity in wearable device development, driven by a reliance on male health statistics, impact the

advancement of technology for women's health?" For this analysis, I will use the feminist critique framework to discuss the historical and sociopolitical contexts that have shaped the current state of wearable technology development. I will reveal how this technological research has embedded gender and other biases and how these biases continue to shape the accessibility and effectiveness of health technologies for women. There are four main parts to this analysis. First, I will discuss the history of clinical health trials and the very present sex discrimination, then I will discuss the history of the wearable technology market, next an analysis of how political events are shaping the future of the female wearable technology landscape, and lastly, I will look into the future next steps.

History of Gender Bias in Clinical Trials

Throughout history, medicine has absorbed and enforced socially constructed gender divisions, often favoring men and subordinating women in politics, wealth, and education (Cleghorn, 2021). These divisions have shaped the foundation of modern scientific medicine, which even goes back to ancient Greece where even the philosopher Aristotle described the female body as an inverse of the male body, considering it faulty and deficient (Cleghorn, 2021). Healthcare professionals have also long overlooked women's health, often misdiagnosing them or overlooking their symptoms and pain. Elinor Cleghorn discusses how health-care systems fail women with chronic pain, offer women less strong pain medications, and see women's pain as something that is more emotional or psychological. This treatment is still something that women deal with in the modern era of healthcare. One recent example is the case of IUD insertions, where healthcare providers insert this form of birth control into a woman's uterus (Cleveland Clinic, 2022). Some women face pain levels so high that it causes them to puke or even pass out and many women are unaware of the pain that they will face. Due to an increase in women

sharing their experiences with IUD insertion on the internet and social media, the CDC updated their guidelines in 2024. These new guidelines require doctors to discuss pain management methods with their patients prior to IUD insertion (Rosenbluth, 2024).

Gender biases have also existed in medical research for decades. In 1977, the Food and Drug Administration (FDA) passed a policy that excluded reproductive women from Phase 1 and 2 of clinical trials due to a tragedy that occurred with a drug called thalidomide. Europe and Australia tested and approved this drug for its sedative effects, and it was used as a treatment for morning sickness in pregnant women, but it was found to cause birth defects and sometimes death. It was not until 1986 when Congress revisited this policy and passed a law in 1993 requiring clinical research trials to include women (Balch, 2024). Beyond this, clinical trials today underrepresent women and women of color even more so. A Harvard Medical article concluded after examining 1,433 trials with 302,664 participants, that on average, only 41.2 percent of participants are women. Amongst cancer patients 51 percent of them are women, but only 41 percent of clinical trial participants were women as well (Vadali, 2022). This raises concerns because clinical researchers underrepresent women in trials, preventing them from fully optimizing medical treatments and interventions for female patients. This lack of inclusion can lead to gaps in knowledge about how different genders respond to treatments, potentially resulting in less effective or even harmful medical care for women. To address this gender gap, Jules Murtha believes that physicians should actively promote gender balance in medical research and provide education on the differences between genders in medicine (Murtha, 2022).

Biases in clinical data can significantly impact women's access to healthcare, as the exclusion of women from clinical trials has led to treatments developed and evaluated predominantly on men—potentially compromising their efficacy and safety for women. Feminist philosopher

Donna Haraway argues that all knowledge is shaped by the specific contexts, biases, and perspectives from which it is produced. This idea directly challenges the historical narratives of objective perspective in scientific research, which have often overlooked the experiences of women (Haraway, 1988). By failing to recognize the situated knowledge of medical research and clinical practices, systemic gender biases that harm women's healthcare will continue to exist. The underrepresentation of women in clinical trials exemplifies this issue. Researchers have predominantly conducted studies through a lens that assumes male physiology and experiences as the norm, sidelining the unique health needs of women. This skewed understanding has contributed to disparities in treatment efficacy and safety for women, as well as the tendency to trivialize women's pain and symptoms. Haraway's critique highlights that to achieve truly equitable healthcare, it is essential to value and integrate the lived experiences and perspectives of women, which the process of knowledge production historically has excluded.

Gender Bias in Wearables

In the 60s, Edward Thorp and Claude Shannon invented the first wearable device with malicious intent, using it as a method to cheat in roulette (Albright, 2022). The 2000s saw the introduction of the first Bluetooth headset and digital heartrate monitors, including popular devices like Fitbit and Jawbone. The launch of the Fitbit sparked a craze for smartwatches. Current trends of wearable devices include advancements in fitness wearables for ECG, blood oxygen, and sleep analysis sensors. Furthermore, the current drivers of the wearable market are wrist wearables with brands such as Apple, Samsung, and Garmin (TechInsights, n.d.). They also project that smart glasses and rings will grow as well as the market for virtual reality (TechInsights, n.d.). At CES 2025, an annual Consumer Electronics Show tech event, the second biggest theme was smart wearable devices. There were many smart rings at the showcase such as

the Ringconn that can detect sleep apnea, Stelo for monitoring glucose, as well as Ultrahuman and Aura displaying new features of their rings (Bajarin, 2025). CES also presented glasses such as Even Realities, Snapchat's Snap Spectacles, and Meta's Orion glasses. Google is also in the process of developing an Android XR OS, which would allow hardware companies such as Samsung and Sony to enter the glasses market (Bajarin, 2025).

These recent events and innovations highlight the rapid evolution and growing significance of wearable technology in today's market. These examples showcase the diversification of wearables and the potential for significant growth as many companies are heavily investing in this market. In many cases, researchers have designed and tested wearable devices predominantly on white male participants, which has led to gender biases in their functionality and effectiveness. Statistically speaking, men design more wearables than women do. This allows for certain biases to influence the design process, potentially leading to products that do not fully address the needs and preferences of women or other underrepresented groups (Romero-Perales, 2023). Designers have often overlooked women as a target group in the design and functionality of technology, leading to devices tailored to male needs and preferences. As the wearable technology sector continues to boom, it becomes increasingly critical to examine and address the biases that may be inherent in these technologies.

Although women are the most likely to utilize digital health technologies, only 3% of the venture capitalist funding for digital health has focused on women's health (Figueroa, 2021). This lack of investment results in fewer resources being allocated to research and development in this area. As a result, many wearable devices do not cater to the unique health needs of women. Venture capitalists also have shown a preference for investing in startups led by men, often due to implicit biases and existing networks that favor male entrepreneurs. This disparity in funding

opportunities has created barriers for women trying to enter and innovate in the wearable tech industry. Some businesses might argue that the femtech market is currently too niche and lacks sufficient research and development to create marketable products for women. They may consider topics like menstrual health, pregnancy, and PCOS to be taboo and prefer not to associate with or delve into them. Additionally, they might believe that designing femtech products would be a lengthy process and instead choose to invest in technologies that are currently popular. In response to these potential claims, the femtech market is brimming with untapped potential. Despite the challenges, investing in femtech can yield significant benefits such as advancements in technology where there has not been a lot of development, the growing demand for it as stated above (women are more likely than men to purchase wearables), and lastly, women make up 51% of the U.S. population, which is more than half of the wearable market (U.S. Census, n.d.).

In part, due to the lack of investment in femtech, many wearable devices lack features that are critical for diagnosing and monitoring women's health issues. For instance, wearable technology often neglects key aspects of women's health, such as hormonal fluctuations, menstrual cycles, and reproductive health. Without the capability to track and analyze these factors, wearables fail to provide comprehensive health insights for women. For example, current wearable technologies often fail to adequately address conditions like Polycystic Ovary Syndrome (PCOS), which affects many women, because researchers invest little effort into studying this hormonal disorder. Dr. Aarti Javeri-Mehta, Internal Medicine Specialist & Lifestyle Medicine Physician has said that wearables such as the Apple watch have the potential to incorporate advanced tracking mechanisms such as cervical mucus changes and temperature changes, which are all beneficial measurements of a woman’s overall health, such as bone

health, cardiovascular health, immune function, brain health, and of course PCOS (Narwani, 2023). This gap in the market not only limits the effectiveness of wearables for women's health monitoring but also perpetuates the gender bias in technology development.

Sandra Harding's standpoint theory offers a valuable lens through which to examine the development and design of wearable devices, particularly in the context of the gender biases that persist in this industry. Standpoint theory highlights how a person’s social position, experiences, and environment shape their perspectives, particularly in marginalized groups. It argues that those in higher positions often view issues from a narrower, more abstract standpoint due to privilege, while marginalized individuals perceive these issues more practically due to their realities and the challenges they face (Communication Theory, 2024). By incorporating the viewpoints of marginalized groups, such as women, this theory aims to create a more comprehensive understanding of societal issues. Applying Sandra Harding's standpoint theory to the development and design of wearable devices emphasizes the importance of addressing gender biases and creating technologies that are equitable. By integrating the lived experiences and practical perspectives of marginalized groups, such as women, developers can improve the functionality of wearable devices for a wider range of users. For instance, prioritizing women's health concerns like hormonal fluctuations, reproductive health, and conditions such as PCOS could lead to innovative features in wearables that provide more meaningful health insights for women.

Currently, though, there have been some advancements in this area. In 2022, Apple came out with the Series 8 apple watch that has the capability to track menstrual cycles. It does so by estimating when a user is ovulating by measuring wrist temperatures every five seconds during the night (Wetsman, 2022). Moreover, a popular health ring, the Oura Ring, can also track

menstrual cycles within a five-day window of a user's period. It achieves this by measuring body temperature through the ring, aligning these readings with established patterns found in research on women's body temperature variations throughout their cycle (Kryder, 2023). Despite this, major brands still don't account for such features, like the Garmin fitness watches. Garmin watches only offer manual menstrual cycle tracking where users must enter in their period information themselves (Garmin, n.d.). So, although there have been advancements in femtech, there is still a lot more space to grow.

Another way biases could be prevalent is through data bias. Data bias occurs when there is an imbalance in the representation of different demographic groups within the dataset used to train wearable technology algorithms. In the case of wearables, there is a potential for higher representation of men in the dataset, which can skew the performance of the algorithms. As discussed in the first section, clinical trials have traditionally skewed toward men because researchers have included fewer women participants. This disparity in clinical trial representation highlights a significant data bias that could extend into the realm of wearable technology. When people design and test wearable devices using datasets that predominantly feature male participants, the resulting algorithms and models are less accurate and effective for female users. Consequently, women may experience less accurate health tracking and monitoring, limiting the effectiveness of these devices in improving their health outcomes.

Consequences of the Overturn of Roe v. Wade

While recent advancements in femtech, such as Apple Watches and the Oura Ring, have shown great promise in predicting menstrual cycles and improving women's health, policies like Roe v. Wade threaten the potential for further growth in this field. These policies can limit access to essential reproductive health data and services, hindering the development and effectiveness

of femtech solutions. Ensuring that femtech can continue to evolve and provide accurate, reliable health data is crucial for improving overall health outcomes. Additionally, the female consumer base is more hesitant to share their data with these tech companies, which limits the growth of the consumer base as women might not be purchasing these technologies as often. Therefore, it's essential to advocate for policies that support and protect the growth of femtech, rather than imposing policies that could limit innovation.

Roe v. Wade was a lawsuit filed in 1970 by Jane Roe against Dallas County, Texas. She wanted to challenge a law in Texas that made abortion illegal except to save a woman's life. She stated that this infringed on her right to privacy protected by the First, Fourth, Fifth, Ninth, and Fourteenth Amendments (Oyez, n.d.). The courts decided that the Texas law was unconstitutional and that during the first trimester, the state cannot pass laws that intervene in abortion decisions. In the second trimester, the state may pass abortion regulations if lawmakers determine they protect the mother's health. By the third trimester, the state can regulate or prohibit abortions, but states must make exceptions when the procedure is necessary to protect the life or health of the mother (Oyez, n.d.). Recently, in 2022, the Supreme Court overturned Roe v. Wade, which removed the constitutional right to abortion. As a result of that, many states have passed strict laws for anti-abortion with some states having laws designed to take effect immediately once Roe v. Wade is overturned (Totenberg et al., 2022). As of today, there are 12 states with a total ban on abortion and 4 states that ban abortion at just 6 weeks, which is before most people know that they are pregnant (Guttmacher, n.d.).

After the overturn of Roe v. Wade there were concerns over data privacy related to period tracking apps. Flo has 43 million active users and can tell when a period starts and ends and when a pregnancy starts and ends (Torchinsky, 2022). Some officials are concerned about how

third parties can potentially access and misuse this data, raising significant privacy issues, especially considering recent changes to abortion laws. Apps have also been known to sell or share user data. For example, researchers found in 2021 that Instagram collects around 79% of its user's personal information and sells it with third parties (Cuthbertson, 2021). Furthermore, law enforcement can request and access data to aid in criminal investigations. Experts say that there could be a potential that the same thing happens if states criminalize abortion (Torchinsky, 2022). A study done by researchers found that 87% of women's health apps shared their data with third parties (Cao et al., 2024). The Organization for the Review of Care and Health Apps found that 67% of menstrual apps on the market are willing to share data for legal obligations (Cao et al., 2024). As a result, many women have deleted their period-tracking apps, fearing that authorities could use the data to criminalize them for abortion or miscarriage. Opal Pandya is a 25-year-old from Philadelphia, and she deleted the Flo app after noticing that she got targeted ads on Instagram for products that help with period symptoms that she just recently put into Flo. From there, she discovered that Flo was sending her data to third parties. She also learned that her courts could access her data in the event the courts prosecuted her for an illegal abortion (Gross, 2024).

Recently in Virginia, Governor Youngkin's administration opposed a bill aimed at safeguarding women's private menstrual data from being used against them in court, a measure that could have provided greater security for women in the post-Roe v. Wade era (Moomaw, 2023). As a result of this, the proposal that passed the Democratic-controlled Senate failed in the state House of Delegates. This serves as a prime example of how states are already exerting control over women's health and safety in a way that undermines protections for women, leaving them vulnerable rather than empowering them. If states are already contemplating measures like

this, it is alarming to imagine what other intrusive policies they might consider in the future. From a feminist standpoint, this situation reflects systemic patriarchal control over women's autonomy, which is similar to Simone de Beauvoir's assertion that society often treats women as "the Other," whose bodies and lives are subject to external governance (Beauvoir, 2015). The reluctance to protect women's data further reinforces the devaluation of their agency and privacy.

These concerns extend beyond period apps and into wearable devices as well. Wearables collect about 2 to 5 GB of data every day, and in today's age of big data, a user's personal data is very valuable (Anthony, 2020). After the overturn of Roe v. Wade, a Tennessee doctor stopped using the Oura Ring's Cycle Insights feature after realizing she didn't know where this information was going (Gross, 2024). A woman also stopped using her Apple Watch's cycle tracking feature and stopped wearing her watch to sleep since it tracks ovulation using sleep body temperature. Beyond just tracking menstrual cycles, there are also fears over the tracking of location data and communication data, which these wearables and apps can do. Jake Lapperruque, deputy director of the Center for Democracy and Technology's Security and Surveillance Project, stated that "Data collected by apps, wearables, could potentially now be used by law enforcement or even private individuals, seeking to sue or target people for exercising reproductive choice and seeking out information or care around abortion." As of right now, users must take responsibility for protecting their data. This could mean reading the pages and pages of a company's privacy policy, which most people already do not do. Apple has come forward and stated that they encrypt user's data end to end and only the user has access to the decryption key, meaning they cannot access the data (Gross, 2024).

There are major consequences of the changing landscape of women's health. Users' apprehension about sharing their health and personal data can lead to a decline in the adoption of

these technologies. If users do not trust that companies will handle their data securely, they may opt to stop using certain features or even abandon wearable devices altogether. This mistrust can hinder the industry's growth and innovation. If women users are hesitant to provide their health data, it limits the dataset available for analysis, leading to less effective and innovative solutions. This can result in a slowdown in technological advancements in the field of femtech, potentially affecting economic growth and investments in this sector. Furthermore, if court cases against women use menstrual data, this could generate negative publicity surrounding wearable devices. Cases of data misuse can cause widespread fear and reluctance among potential users. Ultimately, this can lead to a decline in the overall market for wearable devices designed for women, furthering the health disparity between men and women. Instead of celebrating advancements in wearable technology for women's health, many women now fear using these innovations.

Future Steps

So, what are the next steps? For one, an increase in data transparency and user control over their personal data is imperative. In a research study, participants “called for app companies to enhance data transparency, user control, and protections from law enforcement” (Cao et al., 2024). Prior research has shown that many period tracking apps were missing privacy policies, so ensuring that these apps have clear privacy policies is also important (Cao et al., 2024). This research study also suggested allowing users to have control over the usage and sharing of data where apps could add user control settings. Many people are also hoping that the federal government will pass regulations related to the requirement for companies to be transparent about the usage of consumer data. Congress proposed The American Privacy Rights Act, and it would give users more control over their data as well as eliminate the ability for companies to

share consumer data without clear consent (Gross, 2024). The U.S. could take a good look at how the EU handles data privacy as their General Data Protection Regulation (GDPR) is one of the strictest in the world in terms of privacy and data transparency and enforces severe penalties and those who violate them (Lee, 2022). Still, though, the GDPR allows criminal investigations to use data and it still allows the buying and selling of user's data.

Beyond gaining user trust in terms of data privacy, there should be some sort of checks and balances with these companies such as a system of external audits. For example, Flo was only found out after the Wall Street Journal performed an investigation and found that Flo notified Facebook when a user was having their period or if they intended to get pregnant (Torchinsky, 2022). Regulatory authorities should also keep major companies in check by enforcing privacy regulations. Many people are unaware of privacy policies and the potential implications of the Roe v. Wade overturn on the use of menstrual and personal data (Cao et al., 2024). Therefore, it is crucial for news outlets to inform and educate the public, particularly women, about the risks of sharing their menstrual data. Advocacy from and for those affected is essential to push for and uphold regulations on companies to protect this data. This involves working with policymakers to develop comprehensive data privacy laws, such as the American Privacy Rights Act. Strong enforcement and penalties for non-compliance are necessary to hold companies accountable and ensure that companies protect user data.

Once we can overcome data privacy concerns, it is important for companies to invest in femtech so that more innovation can thrive in this sector. Investment in femtech can lead to the development of advanced solutions for women's health, including improved diagnostic tools, personalized healthcare, and innovative products that address women's unique health needs. By prioritizing data privacy, companies can build trust with their users, encouraging more women to

engage with femtech innovations. Ultimately, this will lead to better health outcomes and a more inclusive approach to healthcare technology in the wearables sector.

Conclusion

For centuries, researchers and developers have overlooked women's health, creating significant gaps and biases in clinical research and healthcare. These biases continue to be prevalent in medical technology and wearable devices that exist today. There have been steps made towards femtech and the inclusivity of women's health, but there exist barriers for investments in femtech to truly flourish. Barriers such as the overturn of Roe v. Wade and data privacy issues limit the potential for innovation and widespread adoption of these technologies. To bridge these gaps, there must be a collaborative effort from researchers, policymakers, and healthcare professionals to challenge systemic biases, prioritize women's health in clinical research, and ensure equitable access to medical innovation. Only by addressing these deep-rooted disparities can we create a future where women's health is no longer an afterthought but a priority in medical research and technology.

Bibliography

Albright, J. (2022, November 15). *The history of wearable electronics*. Brewer Science. https://www.brewerscience.com/the-history-of-wearable-electronics/

Bajarin, T. (2025, January 9). *CES 2025: AI, Health Wearables, and Smart Glasses Take Center Stage*. Forbes. https://www.forbes.com/sites/timbajarin/2025/01/09/ces-2025-ai-health-wearables-and-smart-glasses-take-center-stage/

Balch, B. (2024a, March 26). *Why we know so little about women's health*. AAMC. https://www.aamc.org/news/why-we-know-so-little-about-women-s-health

Beauvoir, S. de. (2015). *The Second sex*. Vintage Classic.

Brophy, K., Davies, S., Olenik, S., Çotur, Y., Ming, D., Van Zalk, N., O'hare, D., Güder, F., & Yetisen, A. (2021). The future of wearable technologies. *The Future of Wearable Technologies, Briefing Paper No 6*. https://doi.org/10.25561/88893

Cao, J., Laabadli, H., Mathis, C., Stern, R., & Emami-Naeini, P. (2024). *"I Deleted It Afer the Overturn of Roe v. Wade": Understanding Women's Privacy Concerns Toward Period-Tracking Apps in the Post Roe v. Wade Era Pardis Emami-Naeini*. https://doi.org/10.1145/3613904.3642042

Cleghorn, E. (2021, June 17). The long history of gender bias in medicine. Time. https://time.com/6074224/gender-medicine-history/

Cleveland Clinic Medical. (2025a, February 7). *Intrauterine device (IUD): Birth Control, use & side effects*. Cleveland Clinic. https://my.clevelandclinic.org/health/treatments/24441-intrauterine-device-iud

Communication Theory. (2024, April 23). The standpoint theory. https://www.communicationtheory.org/the-standpoint-theory/

Cuthbertson, A. (2021, March 18). Instagram is “most invasive app”, New Study Shows. The Independent. https://www.the-independent.com/tech/instagram-invasive-app-privacy-facebook-b1818453.html

Figueroa, C., Luo, T., Aguilera, A., & Lyles, C. (2021). *The need for feminist intersectionality in digital health*. Lancet Digit Health. https://www.thelancet.com/pdfs/journals/landig/PIIS2589-7500(21)00118-7.pdf

Garmin. (n.d.). Using the menstrual cycle tracking feature: Garmin Customer Support. Using the Menstrual Cycle Tracking Feature | Garmin Customer Support. https://support.garmin.com/en-US/?faq=lGQFo7XRv18a5M7MevCEx9

Gross, P. (2024, July 26). Data Privacy after Dobbs: Is period tracking safe? Stateline. https://stateline.org/2024/07/26/data-privacy-after-dobbs-is-period-tracking-safe/

Guttmacher. (2025, January 2). *State bans on abortion throughout pregnancy*. Guttmacher Institute. https://www.guttmacher.org/state-policy/explore/state-policies-abortion-bans

Haraway, D. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. Feminist Studies, 14(3), 575. https://doi.org/10.2307/3178066

Kryder, C. (2023, April 25). *How oura data can help you understand your menstrual cycle*. The Pulse Blog. https://ouraring.com/blog/menstrual-cycle-variation

Lee, M. (2022, October 24). *With reproductive rights under fire, we might look to the EU for ...* Fast Company. https://www.fastcompany.com/90798695/with-reproductive-rights-under-fire-we-can-look-to-the-eu-for-inspiration-on-keeping-data-private

López Lloreda, C. (2025, February 28). *Exclusive: NIH appears to archive policy requiring female animals in studies*. The Transmitter: Neuroscience News and Perspectives. https://www.thetransmitter.org/policy/exclusive-nih-appears-to-archive-policy-requiring-

female-animals-in-studies/

Moomaw, G. (2023, February 14). *Youngkin administration opposes shielding menstrual app data from search warrants • Virginia Mercury*. Virginia Mercury. https://virginiamercury.com/2023/02/14/youngkin-administration-opposes-shielding-menstrual-app-data-from-search-warrants/

Murtha, J. (2022, November 7). *Women have historically been excluded from research. Where are we now?* MDLinx. https://www.mdlinx.com/article/women-have-historically-been-excluded-from-research-where-are-we-now/1Vw4Ax8ug3dZxsdYwULcCl

Narwani, D. (2023, June 12). *How wearables can bridge the current gaps in women's health*. Omnia Health Insights. https://insights.omnia-health.com/technology/how-wearables-can-bridge-current-gaps-womens-health

NHLBI. (2023, June 15). *Study reveals wearable device trends among U.S. adults | NHLBI, NIH*. www.nhlbi.nih.gov. https://www.nhlbi.nih.gov/news/2023/study-reveals-wearable-device-trends-among-us-adults

Roe v. Wade. (n.d.). *Oyez*. Retrieved February 11, 2025, from https://www.oyez.org/cases/1971/70-18

Romero-Perales, E., Sainz-de-Baranda Andujar, C., & López-Ongil, C. (2023). Electronic Design for Wearables Devices Addressed from a Gender Perspective: Cross-Influences and a Methodological Proposal. Sensors (Basel, Switzerland), 23(12), 5483. https://doi.org/10.3390/s23125483

Rosenbluth, T. (2024, August 7). *Health officials urge doctors to address IUD insertion pain*. The New York Times. https://www.nytimes.com/2024/08/07/health/iud-insertion-pain.html

Sharma, A. (2025, February 10). *Federal list of Forbidden Words may jeopardize research at UCSD*. KPBS Public Media. https://www.kpbs.org/news/economy/2025/02/07/federal-list-of-forbidden-words-may-jeopardize-research-at-ucsd

TechInsights. (n.d.). *Five key trends for wearables in 2025*. TechInsights. https://www.techinsights.com/blog/five-key-trends-wearables-2025

Torchinsky, R. (2022, June 24). *How period tracking apps and data privacy fit into a post-Roe v. wade climate*. NPR. https://www.npr.org/2022/05/10/1097482967/roe-v-wade-supreme-court-abortion-period-apps

Totenberg, N., & McCammon, S. (2022, June 24). Supreme Court overturns Roe v. Wade, ending right to abortion upheld for decades. NPR. https://www.npr.org/2022/06/24/1102305878/supreme-court-abortion-roe-v-wade-decision-overturn

U.S. Census. (n.d.). U.S. Census Bureau quickfacts: United States. https://www.census.gov/quickfacts/fact/table/US/LFE046223

Vadali, M. (2022, June 29). Study shows females underrepresented in key disease clinical trials. More Data Needed. https://hms.harvard.edu/news/more-data-needed

Wetsman, N. (2022, September 7). *Apple adds souped-up period and ovulation tracking to Apple Watch Series 8*. The Verge. https://www.theverge.com/2022/9/7/23341259/apple-watch-series-8-ovulation-period-tracking-temperature-sensor