THE HIGHSTAKES OFTRACKING MENSTRUATION

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FOREWORD

People routinely use applications to manage and track their menstrual health, but the frameworks governing these products and the data they collect are weak. Providers can do more to protect user privacy, ensure their safety, and earn their trust.

This report from Dr Stefanie Felsberger and the Minderoo Centre for Technology and Democracy represents a critical intervention into the governance of health tracking apps. Using a data justice framing, this report critiques society's poor understanding and treatment of menstruation and explores the risks women face when cycle tracking apps are not well governed.

This report highlights that the data extracted by the femtech industry is extremely valuable and shows how different actors abuse such data to the very real detriment of women, of all people, and of society.

There is a different possible future. Researchers could use this data to help answer questions about women's health. Care providers could use it to deliver more holistic patient care. App users could get more meaningful insights about their health and well-being. Instead, in its current form menstrual tracking data is treated as consumer data, not afforded the protections of health data, and not rigorously validated as medical data. Women deserve better.

For policymakers and civil society, this report will be useful in designing governance frameworks for femtech and other health applications. The report also makes specific recommendations to the UK Government to shore up trust in cycle tracking apps, by supporting the development of publicly-backed women's health trackers in order to improve the science and practice of women's health.

For industry, we make recommendations on how to better design health apps for transparency and user choice.

And for academic readers, this report is an extension of studies on how people use technology to manage their own health and wellbeing, and the questions of knowledge authority and rights tradeoffs that come with that.

Femtech has helped to sell a vision of the future that empowers people through digital data. Without fixing the problems and risks that today's femtech tools and data present, that vision will be one that is heavy on selling and light on empowerment for health.



Professor Gina Neff *Executive Director, Minderoo Centre for Technology and Democracy*



EXECUTIVE SUMMARY

Menstrual tracking applications turn personal health information into data points to be collected, analysed, and sold.

This poses risks and harms for users and society, as menstrual tracking data can be, and has been, used to control people's reproductive lives. This report presents pathways towards building safe menstrual technologies for all.

Cycle tracking applications (CTAs) have emerged as rapidly proliferating health technology within the femtech market, which is projected to reach over USD 60 billion by 2027. A 2024 study estimated global downloads for the three most popular apps to exceed 250 million.¹

Apps intervene in a context of limited access to menstrual health information, menstrual stigma, and a dearth of medical research on menstrual health. In the Global North, users often turn to CTAs after struggling to access relevant information, care, or diagnoses for menstruation-related conditions in conventional medical settings.

CTAs promise to address this critical knowledge gap. Yet, CTAs are not medical technologies in the traditional sense. Rather, they operate in the context of data capitalism: they transform personal health information into data points to be collected, analysed, and sold. This poses significant risks for users. Despite some concerns over data security and privacy, users often do not regard menstrual tracking data as personal or intimate. People vastly underestimate the commercial value of menstrual data and the extent to which it can provide insights into their political preferences, health issues, or reproductive choices.

Stakeholders in the areas of menstrual or reproductive health similarly lack understanding of the risks and harms CTA data collection engenders.

This report explains what cycle tracking apps are and why people use them, what data they collect, and who accesses it. Taking a data justice approach, this report maps out what is at stake for individuals and society in the Global North when menstrual data is collected and sold at scale. The aim is to inform both individuals using apps, along with stakeholders from civil society organisations, policymakers, and industry.



1. Francesca Rampazzo, Amy Raybould, Paolo Rampazzo, Rebecca Barker, and David Leasure, "UPDATE: I'm Pregnant!": Inferring Global Downloads and Reasons for Using Menstrual Tracking Apps', *Digital Health* 10 (2024), 1–14. https://doi.org/10.1177/20552076241298315

RECOMMENDATIONS

This report provides recommendations for individuals, civil society organisations, industry, and policymakers to mitigate the possible harms and risks of tracking menstrual cycles in the context of menstrual health struggles.

BETTER ACCESS TO MENSTRUAL KNOWLEDGE & CARE

- 1. Improve healthcare for and incentivise research on menstrual and reproductive health, including through menstrual data stewardship or collaborations between cycle tracking companies and research institutes.
- 2. Raise public awareness and digital literacy on menstrual tracking for all ages through civil society organisations and schools.

ALTERNATIVES TO MENSTRUAL TRACKING APPS

3. Develop alternative governance models for cycle tracking apps, including apps from public bodies such as the NHS, developed to be trustworthy and allow for the collection of data for research to fill the gender health gap in a responsible way.

BETTER & SAFER MENSTRUAL TRACKING APPS FOR ALL

- 4. Promote stricter regulation of menstrual tracking data as sensitive health information (US) or stricter enforcement of existing regulations (UK, EU).
- 5. Improve data governance and security of CTAs through meaningful consent options, clear and accessible privacy policies, and prioritisation of data privacy and security in app design.

6. Make CTAs more transparent and inclusive with clear information on how tracking data is used to make in-app predictions, with interface options for those who cannot or do not want to become pregnant.



INTRODUCTION: WHAT IS AT STAKE IN TRACKING MENSTRUAL CYCLES?

For most people in the Global North, learning about their periods is a process that neither delights nor captivates. Instead it is a frustrating and lonely process.

Accessing care for menstrual health or reproductive issues is at best fraught with frustration, and at worst impossible.

Women's health is a chronically underresearched area in medicine.² Period tracking apps, or **cycle tracking apps (CTAs)**,³ were developed to intervene in this context with a promise to provide users with urgently needed knowledge about their menstrual cycles. CTAs have become extremely popular. In 2024, the combined downloads for the three most popular apps were estimated to number more than 250 million globally.⁴

Cycle tracking apps provide users with a centralised place to track daily indicators related to their menstrual cycles, predictions on future periods (and fertile windows), and often access to a hub of information on all things related to menstrual health. They are part of a larger lucrative trend termed femtech: digital products, services, or technologies focused on promoting women's health and wellbeing. CTAs often present themselves as a solution to the challenges of the gender health gap. The market for so-called femtech was valued at USD 22 billion in 2020 and is expected to reach a market size of over USD 60 billion by 2027.⁵ CTAs make up 50 percent of this market.⁶

Cycle tracking apps are a lucrative business because they provide the companies behind the apps with access to extremely valuable and fine-grained user data. Data from CTAs can flow to a wide range of companies, including big tech firms like Google and Meta, and companies in the targeted advertising industries.⁷ CTA data is not only commercially valuable and shared with an inextricable net of third parties (thereby making intimate user information exploitable for targeted advertising) but it also poses severe security risks for users. In the UK, data from period trackers has been used to charge women for illegally accessing abortion services.8

2. Criado Perez, Caroline, Invisible Women: Data Bias in a World Designed for Men (New York: Abrams Press, 2019); Sally King, 'Premenstrual Syndrome (PMS) and the Myth of the Irrational Female', in *The Palgrave Handbook of Critical Menstruation Studies*, ed. by Chris Bobel, Inga T. Winkler, Breanne Fahs, Katie Ann Hasson, Elizabeth Arveda Kissling, and Tomi-Ann Roberts (Singapore: Palgrave MacMillan, 2020), pp. 287–302

3. These apps encourage users to not just track their periods but indicators related to all the different phases of their menstrual cycles, this report uses the term Cycle Tracking Apps (CTAs) throughout.

4. Rampazzo et al., 'UPDATE: I'm Pregnant!' (supra note 1).

5. Conor Stewart, 'Worldwide Femtech Market Size 2027', *Statista*, 14 September 2023. Accessed 1 December 2021. https://www.statista.com/statistics/1125599/femtech-market-size-worldwide/.

6. Preeti Zachariah, 'Why We Need Femtech', *Mint Lounge*, 5 October 2021. https://web.archive.org/web/20230901160532/ https://lifestyle.livemint.com/health/wellness/why-we-need-femtech-111620649640927.html.

7. Forbrukerrådet, 'Out Of Control: How Consumers are Exploited by the Online Advertising Industry', 14 January 2020. https://web.archive.org/web/20230724125253/https://fil.forbrukerradet.no/wp-content/uploads/2020/01/2020-01-14-out-of-control-final-version.pdf.

8. Phoebe Davis, 'British Police Testing Women for Abortion Drugs', *Tortoise Media*, 30 October 2023. https://www.tortoisemedia.com/2023/10/30/british-police-testing-women-for-abortion-drugs/ A 2024 survey of US women from states with differing abortion laws found widespread concern about third parties and law enforcement accessing period tracker data. This was compounded by feelings of powerlessness and a lack of awareness of real risks and how to mitigate them.⁹

Despite users voicing concerns over data security and the uncontrolled sharing of user data in the online advertising ecosystem, the use of CTAs remains popular.¹⁰ Often, users do not regard menstrual data as personal or intimate. A 2023 study found that CTA users in Austria believed their menstrual tracking data was not commercially valuable, nor used for consumer profiling.¹¹

Additionally, there is a lack of understanding—by users, health professionals promoting CTAs, those in the field of menstrual or reproductive health, and policymakers—of the stakes of the datafication of menstrual cycles. Self-tracking data has been used to police people's reproductive choices, to undermine a user's testimony in court, and it can lead to increased vulnerability in intimate relationships, partner violence, risks to job prospects via employer access to CTA data, workplace monitoring, or possible health insurance discrimination.

This report takes a 'data justice' approach to address the knowledge gap on menstrual tracking in the Global North. Data justice asks how datafication—the collection, analysis, and selling of data on human behaviours—interacts with ongoing systems of oppression and emancipation.¹² Often, conversations in the field of reproductive or menstrual health remain removed from discussions and debates on how to build private, safe, responsible technologies for all. The data justice framework is well suited to bridge this gap. This means that the policing of people's reproductive lives, the demand to conceal menstruation, and the lack of research on menstrual health all matter for the technologies that people use. The data justice approach also draws our attention to collective problems and solutions to the increasing collection, sharing, and use of digital data about intimate health information.

This report:

- Explains what cycle tracking apps are, what context they intervene in, why people use them, and what data they collect;
- Demonstrates why menstrual tracking data is valuable for medical research, widely used in the online advertising industry, and weaponised by those seeking to police people's reproductive choices;
- Outlines the existing and future harms of the datafication of menstrual cycles by private companies for both individuals and society;
- Provides recommendations for individuals, civil society organisations, and policymakers to mitigate the possible harms and risks of CTAs by situating these recommendations in the wider context of menstrual and reproductive health struggles.

^{9.} Cao Jiaxun, Hiba Laabadli, Chase H. Mathis, Rebecca D. Stern, and Pardis Emami-Naeni, "I Deleted It After the Overturn of Roe v. Wade": Understanding Women's Privacy Concerns Toward Period-Tracking Apps in the Post Roe v. Wade Era', in *Proceedings of the CHI Conference on Human Factors in Computing Systems (Honolulu, HI, May 11–16, 2024)*, 22, https://doi.org/10.1145/3613904.3642042.

^{10.} Information Commissioner's Office (ICO), 'ICO to Review Period and Fertility Tracking Apps as Poll Shows more than Half of Women are Concerned over Data Security," September 2023, https://ico.org.uk/about-the-ico/media-centre/ news-and-blogs/2023/09/ico-to-review-period-and-fertility-tracking-apps/.

^{11.} Stefanie Felsberger, 'Data Flows: How Users of Period Trackers Navigate the Datafication & Commodification of Their Menstrual Cycles' (unpublished PhD dissertation, University of Cambridge 2023).

^{12.} Lina Dencik, Arne Hitz, Joanna Redden, and Emilio Treré, Data Justice (Los Angeles: Sage, 2022).

A Note on Language

Language on menstruation is not neutral. Not all women menstruate, not everyone with menstrual cycles is a woman. Children and teenagers have periods. Trans men can menstruate and trans women can experience symptoms similar to premenstrual syndrome (PMS). Some cis women cannot menstruate due to menopause, hysterectomy, or amenorrhea.¹³ This report uses both gendered and gender-neutral language depending on the time and purpose of the argument. When describing the present, terms are used that reflect the range of gender identities that experience menstruation and that use CTAs. Nevertheless, the term woman or cis woman is used to discuss discourses around reproduction or menstruation that seek to frame and define the category woman.¹⁴



1: THE USE & COLLECTION OF MENSTRUAL DATA

This section explains what cycle tracking apps are, the context they intervene in and why users find them valuable. This section then asks what data CTAs collect, and who can access this data besides users and the cycle tracking applications themselves. Finally, this section looks at what kinds of insights can be garnered from menstrual data.

What Are CTAs and Why Do People Use Them?

In the Global North, menstruation has been a stigmatised and concealed experience. In medical research, menstruation has been primarily associated with women's reproductive capabilities. This has left a gap in understanding how menstrual cycles impact people's everyday lives, making it extremely difficult for people to learn about their menstrual cycles.

People with periods—especially those with irregular cycles or conditions like poly-cystic ovary syndrome (PCOS), endometriosis, or Premenstrual Dysphoric Disorder (PPMD), which can go undiagnosed for years—often turn to cycle tracking apps to make sense of their experiences. CTAs aim to fill exactly these gaps with access to information through self tracking, data science, and Al. A great variety of apps exist. Most focus on fertility—either promising to help users conceive or to prevent conception. Others simply encourage the tracking of a wide range of indicators to gain insights into users' menstrual health.

Apps provide users with predictions on their future periods, ovulation, and PMS, and provide a centralised place for users to access their menstrual tracking data. People of various age groups use CTAs. One online survey of 375 period-tracking app users in the UK found a median age of 26 years old.¹⁵

For many users, CTAs provide an easy way for users to track any and all details about their emotions and bodily functions throughout the fluctuations of their menstrual cycle. Research has identified two main approaches to using cycle trackers: on one hand, people use apps to track and to plan with or around their cycles. On the other hand, users seek to understand specific issues related to their bodies or health.¹⁶

CTAs are situated as the tool for users to live with their cycles by making menstrual cycles trackable, 'predictable', and knowable. The apps' detailed tracking features often provide users with their first insights into the intricate relationship between menstrual cycles and other hormonal or physiological processes in their bodies.

16. Marion Coville, Olivier Rampnoux, and Bruno Vétel, 'Le numérique au service de la valorisation des compétences des jeunes adultes', *Interfaces numériques* 11.3 (2022). https://doi.org/10.25965/interfaces-numeriques.4974.

^{15.} Anna Broad, Rina Biswakarma, and Joyce Harper, 'A Survey of Women's Experiences of Using Period Tracker Applications: Attitudes, Ovulation Prediction and How the Accuracy of the App in Predicting Period Start Dates Affects Their Feelings and Behaviours,' *Women's Health* 18 (April 25, 2022): 17455057221095246, https://doi.org/10.1177/17455057221095246.

Users who just started tracking, or those with disorderly cycles, often track a large set of indicators to gain a deeper understanding of how their cycle impacts them. CTAs collect a wide range of data on users (see below). In return for the data, CTAs provide users with visualisations of their tracked data and predictions on their next period, ovulation window, and PMS windows.

Users consistently state they find CTAs extremely useful to record their data and to help them manage (ir)regularities or plan around their cycles.¹⁷ This is because apps offer people a space to manage their menstrual cycles and related phenomena in their daily lives. CTAs can help users understand themselves and their bodies, often after years of frustration from struggling with health problems or just not understanding what their cycle is doing.

Yet many medical studies have demonstrated that apps fail to accurately calculate cycle length or ovulation windows.¹⁸ This is because predictions are mostly calculated as averages from past cycle or period data.¹⁹ Additional data users input is often not used to improve predictions for users, but predominantly a source of value for CTA companies.²⁰ With most apps providing no or very little information on how predictions are made, a 2023 study found that some users were encouraged to track more data to fine-tune their predictions and train an imagined algorithm.²¹

The insights CTAs provide also remain limited as most are designed for straight cis women interested in pregnancy.²² This focus can be difficult for teenagers using apps to learn about their cycles, for trans men or non-binary people, and for queer women, or women who have decided to stay child-free.²³

Although some apps have sought to 'improve' user experiences, more diverse user interface options need to be made available so people can access pertinent information.

17. Josie Hamper, "Catching Ovulation": Exploring Women's Use of Fertility Tracking Apps as a Reproductive Technology', *Body & Society* 26.3 (2020), 3–30, https://doi.org/10.1177/1357034X19898259.; Felsberger, 'Data Flows' (*supra* note 11); Johanna Levy and Nuria Romo-Avilés, "A Good Little Tool to Get to Know Yourself a Bit Better": A Qualitative Study on Users' Experiences of App-Supported Menstrual Tracking in Europe', *BMC Public Health* 19.1213 (2019). https://doi.org/10.1186/s12889-019-7549-8.

18. Marguerite Duane, Alison Contreras, and Elizabeth T. Jensen, 'The Performance of Fertility Awareness-Based Method Apps Marketed to Avoid Pregnancy', *Journal of the American Board of Family Medicine* 29.4 (2016), 508–51, doi: 10.3122/jabfm.2016.04.160022.; Alexander Freis et al., 'Plausibility of Menstrual Cycle Apps Claiming to Support Conception', *Frontiers in Public Health* 6.98 (2018), 1–9, https://doi.org/10.3389/fpubh.2018.00098.; Michael D. Manhart et al., 'Fertility Awareness-Based Methods of Family Planning: A Review of Effectiveness for Avoiding Pregnancy Using SORT', *Osteopathic Family Physician* 5.1 (2013), 2–8, https://doi.org/10.1016/j.osfp.2012.09.002.; Michelle L. Moglia et. al., 'Evaluation of Smartphone Menstrual Cycle Tracking Applications', *Obstetrics & Gynecology* 127.6 (2016), 1153–1160. https://doi.org/10.1097/AOG.00000000001444.; Lauren Worsfold, Lorrae Marriott, Sarah Johnson, and Joyce C. Harper, 'Period Tracker Applications: What Menstrual Cycle Information Are They Giving Women?', *Women's Health* 17 (2021): 1–8, https://doi.org/10.1177/17455065211049905.

19. Exceptions to this are more established CTAs like Flo, which uses a neural network to predict future periods for those with irregular cycles. See Felsberger, 'Data Flows' (*supra* note 11).

20. Michele E. Gilman, 'Periods for Profit and the Rise of Menstrual Surveillance', *Columbia Journal of Gender & Law* 41.1 (2021), 100–113. https://doi.org/10.52214/cjgl.v41i1.8824

21. Felsberger, 'Data Flows' (supra note 11).

22. Sarah Fox and Daniel A. Epstein, 'Monitoring Menses: Design-Based Investigations of Menstrual Tracking Applications', in *The Palgrave Handbook of Critical Menstruation Studies*, ed. by Chris Bobel, Inga T. Winkler, Breanne Fahs, Katie Ann Hasson, Elizabeth Arveda Kissling, and Tomi-Ann Roberts (Singapore, Palgrave MacMillan, 2020), pp. 733–750. https://doi.org/10.1007/978-981-15-0614-7_23.

23. Maggie Delano, 'I Tried Tracking My Period and It Was Even Worse Than I Could Have Imagined', *Medium*, 21 February 2015, https://medium.com/@maggied/i-tried-tracking-my-period-and-it-was-even-worse-than-i-could-have-imagined-bb46f869f45.

Despite these drawbacks, users often show high levels of trust in CTAs, assuming the developers are committed to menstrual health and stigma reduction, because for many the existence of an app for their period demonstrates that the companies behind the app 'care'. In this sense, apps provide an individual solution to a societal structural problem surrounding the place of menstrual cycles in society, research, medicine, and life.

But CTAs are better understood through the lens of **data capitalism**. CTAs are developed and run by for-profit private companies. They are part of the wider context of self-tracking applications which rely on user data for profit, and therefore come under pressure from funders to find ways of making a profit.

Data Capitalism refers to the central role of data in how companies generate value. This includes both tech companies, such as Meta or Alphabet and CTAs, but also most companies with an online presence. The most widely used apps operate on subscription or 'freemium' (free to download, but 'premium' features are unlocked for a fee), and generate money through advertising. As legal scholar Michele Gilman has argued, the profit motive of menstrual tracking tech redirects femtech companies' incentives away from users' needs.²⁴

Investigations by Privacy International have shown that CTAs have shared, and continue to share, user data with third parties and advertisers.²⁵ CTAs' privacy policies are opaque and hard to understand.²⁶ They often do not clearly identify the legal basis for data collection.

Too often, CTAs do not provide users with full information about their data practices (data sharing, use, or security).²⁷ They often rely on 'all or nothing' consent options for users, and thus arguably fail to obtain meaningful consent.²⁸

24. Gilman, 'Periods for Profit and the Rise of Menstrual Surveillance' (supra note 20).

25. Privacy International, 'How Apps on Android Share Data with Facebook (Even If You Don't Have a Facebook Account)', December 2018, https://web.archive.org/web/20190808222222/https://privacyinternational.org/sites/default/files/2018-12/How%20Apps%20on%20Android%20Share%20Data%20with%20Facebook%20-%20Privacy%20 International%202018.pdf.; Privacy International, 'No Body's Business But Mine: Vol 2," May 2025, https://privacyinternational.org/sites/default/files/2025-05/period%20tracking%20with%20recs.pdf.

26. Leah R. Fowler, Charlotte Gillard, and Stephanie R. Morain, 'Readability and Accessibility of Terms of Service and Privacy Policies for Menstruation-Tracking Smartphone Applications: Health Promotion Practice', *Health Promotion Practice* 21.5 (2020), 679–83, https://doi.org/10.1177/1524839919899924.

27. Najd Alfawzan, Markus Christen, Giovanni Spitale, and Nikola Biller-Andorno, 'Privacy, Data Sharing, and Data Security Policies of Women's mHealth Apps: Scoping Review and Content Analysis', *JMIR mHealth and uHealth* 10.5 (2022), e33735, https://doi.org/10.2196/33735.

28. Laura Shipp and Jorge Blasco, 'How Private is Your Period?: A Systematic Analysis of Menstrual App Privacy Policies', *Proceedings on Privacy Enhancing Technologies* 2020.4 (2020), 491–510. https://doi.org/10.2478/popets-2020-0083.'; Natasha Felizi and Joana Varon, 'Menstruapps – How to Turn Your Period into Money (for Others)', *Chupadados*, accessed 23 August 2024, https://web.archive.org/web/20200403023225/https://chupadados.codingrights.org/en/menstruapps-como-transformar-sua-menstruacao-em-dinheiro-para-os-outros/.

CTAs collect some of the most intimate health information about people, but users are often not afforded the same protections as with medical information.²⁹ Exempting user data about menstruation from the strict legal protections for other medical data makes it ripe for extraction and commodification.³⁰

In the US, CTAs are regulated as general wellness devices.³¹ In the UK and EU, menstrual tracking data falls into special category data, which requires explicit consent and more safeguarding.³²

CTAs are often marketed to users as a 'medical' technology, yet most fail to meet medical standards.³³ Apps are not regulated as medical technologies and generally do not undergo official testing or certification of accuracy.³⁴ For example, reporter Kashmir Hill contrasts the medical symbols and health alerts for dangerous symptoms displayed by a fertility tracker with an all-caps warning in the app's Terms & Conditions: 'THIS IS FUNDAMENTALLY IMPORTANT', followed by a clarification that the app 'does not provide medical advice'.³⁵

Who has Access to Users' Menstrual Tracking Data?

An excessive amount of CTA user data has seeped into the wider system of data capitalism.³⁶ In a recent investigation into the safety of CTAs, the UK Information Commissioner's Office (ICO) called on app developers to increase transparency, obtain meaningful consent, establish a lawful basis for data collection, and ensure accountability.³⁷ The ICO found 'systemic issues' regarding data processing, consent, transparency, and accountability of CTA's data processes.³⁸

But the ICO also stated that they found 'no evidence' that the CTAs in question misused 'users' sensitive personal data relating to menstruation and fertility in a way which causes harm'.³⁹

29. Nandini R. Chami, Vaishno Bharati, Anushka Mittal, and Ankita Aggarwal. *Data Subjects in the Femtech Matrix: A Feminist Political Economy Analysis of the Global Menstruapps Market*. IT for Change, December 2021. https://dawnnet.org/wp-content/uploads/2021/12/FDJ-Issue-Paper-6-Data-Subjects-In-the-Femtech-Matrix-IT-for-Change.pdf.

30. Maryam Mehrnezhad and Teresa Almeida, 'Caring for Intimate Data in Fertility Technologies', in *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* 409 (May 2021), (New York: Association for Computing Machinery, 2021), pp. 1–11, https://doi.org/10.1145/3411764.3445132.

31. Food and Drug Administration, 'General Wellness: Policy for Low Risk Devices. Guidance for Industry and Food and Drug Administration Staff', July 29, 2016. https://www.fda.gov/regulatory-information/search-fda-guidance-documents/general-wellness-policy-low-risk-devices?source=govdelivery&utm_medium=email&utm_source=govdelivery.

32. Information Commissioner's Office, 'PACE Project: Fertility & Menstruation Apps – Internal Report [redacted]', 2023. https://ico.org.uk/media/about-the-ico/disclosure-log/4030017/femtech-report_redacted.pdf, p. 7.

33. Moglia et al., 'Evaluation of Smartphone Menstrual Cycle Tracking Applications Using an Adapted APPLICATIONS Scoring System' (*supra* note 18).

34. Gina Neff and Dawn Nafus, Self-Tracking (Cambridge, MA: MIT Press, 2016).

35. Cited in Kashmir Hill, 'What Happens When You Tell the Internet You're Pregnant', *Jezebel*, July 27, 2017. https://jezebel.com/what-happens-when-you-tell-the-internet-youre-pregnant-1794398989.

36. Anastasia Siapka and Elisabetta Biasin, 'Bleeding Data: The Case of Fertility and Menstruation Tracking Apps', *Internet Policy Review* 10.4 (2021), 1–32. https://doi.org/10.14763/2021.4.1599.

37. Information Commissioner's Office (ICO), 'ICO Urges All App Developers to Prioritise Privacy', *ICO — News and Blog*, 8 February 2024, https://ico.org.uk/about-the-ico/media-centre/news-and-blogs/2024/02/ ico-urges-all-app-developers-to-prioritise-privacy/.

Information Commissioner's Office, 'PACE Project: Fertility & Menstruation Apps', (*supra* note 32). p. 14.
 Ibid., p. 34.

The ICO report argued that special category data—in this case, data related to menstrual cycles or health—was 'only shared for purposes relating to storage, security, cycle prediction functionality, and customer support', but 'other personal data, including IP address, device data, usage data, and advertising ID, [was] shared by some apps for advertising and marketing purposes'.⁴⁰ The insights of the report are limited because it relied on CTAs self-reporting and did not take into account the use of tracking data for law enforcement.

Investigations by journalists, non-profits, and consumer groups into the data practices of CTAs have revealed that CTAs have shared user data with so-called third parties: Facebook, Google, advertisers and data brokers, and research institutions.⁴¹

The data shared has also included extremely intimate information. Cycle tracking company Flo, for example, has come under legal scrutiny by the Federal Trade Commission (FTC) in the United States over their data practices. The FTC alleged Flo Health lied to users and passed intimate health information pregnancy plans and dates of periods to marketing and analytics companies.⁴² Flo has since stated that they have changed their data sharing practices. In investigations from 2018 and 2019, Privacy International found that many apps shared intimate health information and data input by users about their cycles or intention to become pregnant with Facebook and advertisers.⁴³ It found that 61% of 36 apps tested automatically transferred data to Facebook when users opened an app. This occurred for users with and without a Facebook account, regardless of whether they were logged in. One app shared users' intention to become pregnant, cycle length, duration of periods, and the date of their last period with Facebook.⁴⁴

In May 2025, Privacy International published its most recent investigation on CTAs' data sharing practices. While they found that apps investigated had ceased sharing menstrual data input by users directly with Facebook and other third parties, Privacy International cautioned that other data, such as device information, was actively being shared by some of the apps with a variety of parties.

Device data in particular can be used to identify users due to the unique device identifiers associated with it. Privacy International also found that data is automatically collected with only brief mentions in privacy policies and no meaningful consent from users.⁴⁵

40. Ibid.

41. Privacy International, 'How Apps on Android Share Data with Facebook' (*supra* note 25); Privacy International, 'No Body''s Business But Mine: How Menstruation Apps Are Sharing Your Data', 9 September 2019. https://web.archive.org/web/20200227161014/https://www.privacyinternational.org/long-read/3196/no-bodysbusiness-mine-how-menstruation-apps-are-sharing-your-data.; Sam Schechner and Marc Secada, 'You Give Apps Sensitive Personal Information. Then They Tell Facebook', *Wall Street Journal*, 22 February 2019. https://web.archive. org/web/20230804171910/https://www.wsj.com/articles/you-give-apps-sensitive-personal-information-then-they-tellfacebook-11550851636.; Cooper Quintin, 'The Pregnancy Panopticon', *Electronic Frontier Foundation*, July 2017. https://www.eff.org/files/2017/07/27/the_pregnancy_panopticon.pdf.; Forbrukerrådet, 'Out Of Control' (*supra* note 7); Shannon Palus, 'There's One Good Reason to Share Period App Data: Medical Research', *Slate*, 17 September 2019. https://web.archive.org/web/20230422134905/https://slate.com/technology/2019/09/period-apps-privacy-researchersmenstrual-pain.html.

42. Zoe Schiffer, 'Period Tracking App Settles Charges It Lied to Users About Privacy', *The Verge*, 13 January 2021. https://web.archive.org/web/20221230033059/https://www.theverge.com/2021/1/13/22229303/ flo-period-tracking-app-privacy-health-data-facebook-google.

43. Privacy International, 'How Apps on Android Share Data with Facebook' (*supra* note 25); Privacy International, 'No Body's Business But Mine' (*supra* note 41).

44. Privacy International, 'No Body's Business But Mine' (supra note 41).

45. Privacy International, 'No Body's Business But Mine: Vol 2' (supra note 25).

Overall, Privacy International's report describes an even more complicated picture of a wide range of third parties integrated into app web traffic or outsourced app functionalities. These included:

Software development kits (SDK),

a collection of software tools, libraries, documentation, and code samples accessible to developers for building applications for specific platforms: SDKs for advertising, such as Google Ads or Facebook Ads or analytics, for example, AppsFlyer, were detected.

Cloud-based content delivery networks

(CDNs), networks of servers that deliver web content, and seem to deliver user data from apps to third parties, and from apps to app Application Programming Interfaces (APIs). CDNs often went unmentioned or unspecified in privacy policies.

Outsourced app functionalities,

many apps outsourced aspects of app functionality or development to third parties. For example, Stardust outsourced onboarding and authenticating to Rownd and push notifications to OneSignal. WomanLog outsourced health integration to Google Fit and its app AI function was supported by OpenAI.⁴⁶

The report 'raised alarm bells' because of the high number of entities that could potentially access CTA user data, and in particular device data. ⁴⁷ Additionally, menstrual tracking data can and has been requested as evidence in police investigations or court cases. In the UK, Flo's privacy notice explicitly stated that personal data may be shared 'in response to court orders or legal processes'.⁴⁸ Other apps also had references to this in their privacy policies.⁴⁹

46. Privacy International, 'No Body's Business But Mine: Vol 2 (supra note 25)'.

47. lbid.

48. Lauren McFarlane, 'Period Tracking Apps — A Presumption Against Privacy?', *BTO Solicitors* (blog), 24 October 2023. https://www.bto.co.uk/blog/period-tracking-apps-a-presumption-against-privacy.aspx.html.

49. Zikan Dong, Liu Wang, Hao Xie, et al., 'Privacy Analysis of Period Tracking Mobile Apps in the Post-Roe v. Wade Era', in *37th IEEE/ACM International Conference on Automated Software Engineering*, (New York: Association for Computing Machinery, 2022). 1–6. https://doi.org/10.1145/3551349.3561343.



2: THE COMMERCIAL USES OF MENSTRUAL TRACKING DATA

This section maps out what insights can be gained from menstrual tracking data and its commercial uses.

Many CTA users assume that tracking their menstrual cycle is private and regard their app as a diary in which they can save information about their menstrual cycles and health.⁵⁰ User attitudes are similar when it comes to other self-tracking technologies (e.g., fitness apps, sleep monitoring apps, etc.), where users either trust companies to handle their data, consider themselves not important enough for their data to reveal harmful or valuable information, or express frustration over their lack of control or alternatives.⁵¹

This is even more pronounced in the case of CTAs. Most users are unaware of the extent of data processing and sharing CTAs engage in.⁵² Often, privacy concerns do not impact users' tracking habits or practices.⁵³ A 2023 study found that users assumed that tracking the date of one's menstrual cycle, period cramps, or heaviness of blood flow, could not reveal more than that a (cis) woman had their period—hardly a surprise.⁵⁴

What Insights Can be Gained from Menstrual Tracking Data?

Menstrual tracking data can give insights into possible health issues, such as illnesses associated with irregular cycles like PCOS—information many users might want to keep private. Even the simple fact that someone has downloaded a CTA is valuable information for advertisers. As Privacy International's investigation from 2019 demonstrated, information has been shared with advertisers and Facebook.⁵⁵ Often this information is correlated with users' increased interest in fertility and is highly sought after by online advertisers.

Most users of CTAs do not just track the date of their menstrual cycles. Most commonly, when users download a period tracker they track a wide range of different indicators. While for many the initial excitement subsides, many users especially those with health concerns or interest in pregnancy whose data can reveal more vulnerabilities—continue to track a wide range of indicators over the long term.

50. Felsberger, 'Data Flows' (supra note 11).

51. Btihaj Ajana, 'Personal Metrics: Users' Experiences and Perceptions of Self-Tracking Practices and Data', *Social Science Information* 59.4 (2020): 654–678. https://doi.org/10.1177/0539018420959522.

52. Katie Gambier-Ross, David J. McLernon, and Heather M. Morgan, 'A Mixed Methods Exploratory Study of Women's Relationships with and Uses of Fertility Tracking Apps', *Digital Health* 4 (2018): 1–15. https://doi.org/10.1177/2055207618785077.

53. Amanda Karlsson, 'A Room of One's Own?: Using Period Trackers to Escape Menstrual Stigma', *Nordicom Review* 40.s1 (2019), 111–123. https://doi.org/10.2478/nor-2019-0017.

54. Felsberger, 'Data Flows' (supra note 11).

55. Privacy International, 'How Apps on Android Share Data with Facebook' (*supra* note 25); Privacy International, 'No Body's Business But Mine' (*supra* note 41).

Below is the information CTAs have access to through users' active tracking, or the collection of background data:

MENSTRUAL TRACKING DATA

menstruation | cycle length | heaviness of flow | cramps & pain | period products used | PMS symptoms | discharge | basal body temperature | **reproductive choices** | protection used | pill | IUD | pulling out | ovulation tests | pregnancy tests | emergency contraceptives | IUD insertion dates | birth control implant | birth control patch or ring | **sexual activity** | no/ orgasms | fantasies | sex toys | contraceptive used | masturbation habits | sex drive | painful intercourse | **wellbeing** | feelings | energy levels | mind | sleep | nutrition | cravings | social life | skin | hair | weight | digestion | mental health | exercise | leisure activities | partying | **health** | doctor appointments | ailments and illnesses | breast check ups | urine | hot flushes | **medication intake** | birth control pill | pain killers | antibiotics | oestrogen | progesterone | testosterone | supplements | **pregnancy experiences** | foetal movements | **menopause** | **perimenopause**

BACKGROUND DATA TRACKED

age | gender | IP addresses | locations | app behaviour⁵⁶

Aside from users, there are a range of institutions which can gain access to users' menstrual tracking data: CTA companies themselves, so-called third parties, advertising companies, medical research institutions, insurance companies, employers, the police, and governments.

The potential information that can be garnered from menstrual data can only be fully understood by considering the data in relation to other data sets on consumer behaviour and social media data.

Analysing multiple datasets together might not directly reveal the identity of individual users, but may help sharpen the online advertising profiles that companies sort people into.

Overlaid with other data that data brokers and online advertisers have on consumers, CTA data can indicate:

 Political preferences: for example, the choice of CTA can indicate progressive or conservative values, as some apps have more inclusive tracking options for people with different gender expressions than others, while others are developed with expressly conservative values;

- Possible mental health problems, from depression to premenstrual dysphoric disorder;
- Physical illness such as PCOS or endometriosis;
- Sexual and gender identities, sexual habits and practices, which, depending on where users live, can put users at risk;
- Social habits and consumer choices;
- Reproductive choices: the desire to have children, pregnancy status, the wish to prevent pregnancy, the choice of contraceptive, access to emergency contraceptive pills, access to abortion services;
- Miscarriages, disorderly menstrual cycles, or imperfect tracking habits might be mischaracterised as abortion access.⁵⁷

56. Forbrukerrådet, 'Out Of Control' (supra note 7).

^{57.} Bridget G. Kelly and Maniza Habib, 'Missed Period? The Significance of Period-Tracking Applications in a Post-Roe America', *Sex Reproductive Health Matters* 31.4 (2023), 2238940. https://doi.org/10.1080/26410397.2023.2238940.

Menstrual tracking data is sensitive personal data in itself, and it can reveal much more complex insights into individuals groups. Menstruation is seen as something to be concealed and hidden, not information that is sought after and highly valuable. Users often underestimate the significance and commercial value of menstrual data and assume there is little interest in data on menstruation. Yet menstrual data has several commercial uses.

Consumer Profiling

The information CTAs gather is a veritable gold mine for consumer profiling. Health data is extremely valuable both in legal markets and black markets, where personal medical data can sell for fifty times higher than credit card information due to its comprehensive insights.⁵⁸ Data about menstruation is even more valuable.

First, menstrual tracking data can point to users who are trying to become pregnant. According to the advertising industry, pregnancy is one of the two life events that drastically changes people's shopping behaviour.⁵⁹ A Financial Times investigation found that while information about a person's gender, age, or location is worth \$0.0005 per person, information about someone being in the third trimester of their pregnancy increases the value of that record 220 times to \$0.11.⁶⁰

Data on who is pregnant, and who wants to be, has therefore emerged as some of the most sought-after information in digital advertising for over a decade.⁶¹ CTAs have shared data on people's intention to become pregnant with big online advertisers, such as Google/ Alphabet, Meta/Facebook, DoubleClick, Crashlytics, and AppsFlyer.⁶²

Janet Vertesi, a sociologist, was aware of the existing hyperfocus on pregnancy in the advertising industry and attempted to hide her pregnancy from advertisers, which resulted in her bank flagging her for suspicious activity.⁶³

Second, cycle-based advertising, developed by Kristina Durante and colleagues, seeks to tailor ads to people based on their menstrual cycle phases.⁶⁴ The approach suggests that hormonal fluctuations during the cycle can influence susceptibility to different products and allow for more targeted marketing.⁶⁵

60. Emily Steel, 'Financial Worth of Data Comes in at under a Penny a Piece', *Financial Times*, 12 June 2013. https://www.ft.com/content/3cb056c6-d343-11e2-b3ff-00144feab7de.

61. Target, a large supermarket chain in the United States, has a long history of targeting pregnant women in their ads (also in offline brochures) and of trying to identify pregnancy through analysis of what products people purchase. See Kashmir Hill, 'How Target Figured Out a Teen Girl Was Pregnant Before Her Father Did', *Forbes*, 16 February 2012. https://www.forbes.com/sites/kashmirhill/2012/02/16/how-target-figured-out-a-teen-girl-was-pregnant-before-her-father-did/.

62. Privacy International, 'How Apps on Android Share Data with Facebook' (*supra* note 25); Privacy International, 'No Body's Business But Mine' (*supra* note 41); K. Hill, 'What Happens When You Tell the Internet You're Pregnant' (*supra* note 35).; Jessica Morgan, 'Using a Period Tracking App? This Is Where All Your Personal Info Goes', *Refinery29*, 11 December 2019, https://www.refinery29.com/en-gb/period-tracking-apps-personal-data.

63. Kashmir Hill, 'You Can Hide Your Pregnancy Online, But You'll Feel Like a Criminal', *Forbes*, 21 April 2014. https://www.forbes.com/sites/kashmirhill/2014/04/29/you-can-hide-your-pregnancy-online-but-youll-feel-like-a-criminal/.

64. Kristina Durante, Vladas Griskevicius, Sarah E. Hill, Carin Perilloux, and Norman P. Li, 'Ovulation, Female Competition, and Product Choice: Hormonal Influences on Consumer Behavior', *Journal of Consumer Research* 37 (2011), 921–934. https://doi.org/10.1086/656575.

65. Leah Green, Shay Notelovitz, Simon Roberts, Joseph Pierce, Ben Kape, and Paul Boyd, 'How Your Period Is Making Other People Rich – Video'. *The Guardian*, 20 June 2019. https://www.theguardian.com/society/video/2019/jun/20/ how-your-period-making-other-people-rich-video.

^{58.} Lori Andrews, 'A New Privacy Paradigm in the Age of Apps', Wake Forest Law Review 53.3 (2018), 421–478; Gilman, 'Periods for Profit and the Rise of Menstrual Surveillance' (*supra* note 20).

^{59.} Charles Duhigg, 'How Companies Learn Your Secrets', *New York Times*, 16 February 2012.

 $https://www.nytimes.com/2012/02/19/magazine/shopping-habits.html?_r=1\&hp=\&pagewanted=all.$

In cycle-based advertising, the first half of the cycle, dominated by oestrogen, is referred to as the 'mating phase' and advertisements may advertise products like revealing clothing and cosmetics.

The second half, influenced by progesterone, is called 'nesting' and ads shift to home goods or plants. Cycle-based advertising also makes it harder to spot ads influenced by menstrual tracking data for users who might expect period underwear or chocolate, when instead ads seek to exploit perceived hormonal weaknesses.⁶⁶

Finally, menstrual tracking data can help sharpen the online profiles for political influence campaigns.

Although no case studies have yet managed to trace menstrual tracking data to political influence campaigns, the data is shared with advertisers and data brokers involved in targeted advertising which includes political advertisements. Users' reproductive choices may reveal their political preferences.

The use of menstrual data in advertising can have negative consequences for users. The use of fertility or pregnancy trackers especially can lead to increased fertility related ads. Baby or pregnancyrelated ads are very pervasive and persistent. Users tagged as 'expecting parent' and 'female' continue to be targeted by these ads, even after a miscarriage, causing distress at an already painful time, as Rachel Moss reports.⁶⁷

66. Felsberger, 'Data Flows' (supra note 11).

^{67.} Rachel Moss, 'This Is What It's Like to Be Targeted by Baby Ads After Miscarriage or IVF Struggles', *HuffPost*, 29 September 2019. https://www.huffingtonpost.co.uk/entry/women-affected-by-miscarriage-and-infertility-are-being-targeted-with-baby-ads-on-facebook_uk_5d7f7c42e4b00d69059bd88a.; ICO, 'PACE Project: Fertility & Menstruation Apps' (*supra* note 32).



3: RISKS & HARMS OF MENSTRUAL TRACKING

The pervasive online tracking of menstrual cycles presents a multifaceted set of risks and potential harms.

These risks can directly impact individuals. Collective harms such as the enclosure of menstrual tracking data in the private sector must not be overlooked. This section brings together previous findings on menstrual data, its commercial uses, and applications to delineate risks associated with the datafication of menstrual cycles.

Individual Harms: Tracking Data used against Users

In response to increasing economic constraints on healthcare systems, there is a growing trend towards integrating digital health solutions, including web-based and mobile applications, into traditional service delivery models.⁶⁸ This also makes CTAs and other digital health 'solutions' more appealing to those seeking access to care and support for reproductive and menstrual health issues. Simultaneously, users become more vulnerable to exploitation due to lacking or weak legal protection and inadequate enforcement mechanisms for this intimate data.⁶⁹ There are also data security concerns in CTAs.⁷⁰

These factors cause a range of *potential* harms for *individual* users, including:

- Increased vulnerability in intimate relationships and intimate partner violence, with, for instance, the possible use of CTAs in cyberstalking;⁷¹
- Risk to job prospects: access to menstrual tracking data by employers could indicate desire for pregnancy which can lead to discriminatory hiring decisions;⁷²
- Workplace monitoring;73
- Health insurance discrimination, as menstrual tracking data can reveal underlying health conditions;⁷⁴
- Restriction and policing of abortion access (see Case Study 2);

69. Gilman, 'Periods for Profit and the Rise of Menstrual Surveillance' (supra note 20).

71. Celia Rosas, 'The Future is Femtech: Privacy and Data Security Issues Surrounding Femtech Applications', *Hastings Business Law Journal* 15.2 (2019), 319–342. https://repository.uchastings.edu/cgi/viewcontent. cgi?article=1193&context=hastings_business_law_journal. For example, the 'share-your-cycle' function provides opportunities for partners or ex-partners to track a user's reproductive and sexual lives. Mehrnezhad and colleagues point to the possibility of cycle trackers being used in cyberstalking. Maryam Mehrnezhad et al., 'Vision: Too Little Too Late? Do the Risks of FemTech Already Outweigh the Benefits?', in *Proceedings of the 2022 European Symposium on Usable Security (EuroUSEC 2022)* (Karlsruhe: ACM, 2022), pp. 145–50. https://doi.org/10.1145/3549015.3554204.

72. Mehrnezhad and Almeida, 'Caring for Intimate Data in Fertility Technologies' (supra note 30).

73. Elizabeth Brown, 'The Femtech Paradox: How Workplace Monitoring Threatens Women's Equity', *Jurimetrics* 61.3 (2021): 289–329.; Mehrnezhad and Almeida, 'Caring for Intimate Data in Fertility Technologies' (*supra* note 30).

74. Mary Crossley, 'Discrimination Against the Unhealthy in Health Insurance," *Kansas Law Review* 54 (2005), 73. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1167043.; Allysan Scatterday, 'This is No Ovary-Action: Femtech Apps Need Stronger Regulations to Protect Data and Advance Public Health Goals', *North Carolina Journal of Law & Technology* 23.3 (2022), 636-690. https://scholarship.law.unc.edu/ncjolt/vol23/iss3/6.

^{68.} Caroline Free et al., 'The Effectiveness of Mobile-Health Technology-Based Health Behaviour Change or Disease Management Interventions for Health Care Consumers: A Systematic Review', *PLoS Medicine* 10 (2013). https://doi.org/10.1371/journal.pmed.1001362.; Alain B. Labrique, Lavanya Vasudevan, Erica Kochi, Robert Fabricant, and Garrett Mehl, 'Health Innovations as Health System Strengthening Tools: 12 Common Applications and a Visual Framework', *Global Health: Science and Practice* 1.2 (2013), 160–171. https://doi.org/10.9745/GHSP-D-13-00031.

^{70.} Lisa M. Malki et al., 'Exploring Privacy Practices of Female mHealth Apps in a Post-Roe World', in ACM Conference on Human Factors in Computing Systems (CHI) (2024). https://doi.org/10.1145/3613904.3642521.

- Use of tracking data in court to undermine testimony (see below);
- Use of menstrual tracking data to out trans people in dangerous environments;⁷⁵
- Piracy or data theft.

With marginalised groups such as refugees, queer people, or racialised people already under increased surveillance, the way these harms will impact and affect people can also exacerbate existing inequalities. It is important to reiterate that from the above listed risks, only the use of menstrual data in policing abortion access in the UK and the use of self-tracking data in court cases have been documented.

Nevertheless, concern about the materialisation of future risks remains, and the severity of risk can be difficult to evaluate in contexts where decisionmaking remains opaque.

Case Study 1: Tracking Data as Court Evidence in the US

In 2015, Jeannine Risley reported being sexually assaulted at her boss' home, where the police found a knife, overturned furniture, and a bottle of vodka. She informed police that she lost her FitBit in the struggle with the assailant.

When her FitBit was recovered and its data downloaded, the tracker's movement and heart rate data was taken as contradictory evidence to Risley's testimony. Risley was charged with making a false report to the police and fabricating evidence.⁷⁶

The above case revolved around FitBit data suggesting Risley was walking at a time she claimed to be sleeping. FitBit data cannot reliably determine exactly whether and when Risley was actually 'walking'.⁷⁷ The company even faced a fraud suit for not providing accurate



medical data, asserting that while their devices were better than 'cardio machines at the gym', they were 'not intended to be scientific or medical devices'.⁷⁸ This case study and the one below illustrate how readily tracking data can be used against users.

^{75.} Lindsey Darwin, David Schultz, and Tia Spagnuolo, 'Analysis: Why Compelling Student Athletes to Share Menstrual Data May Violate Federal Laws', *PBS NewsHour*, 23 February 2023. https://www.pbs.org/newshour/health/analysis-why-compelling-student-athletes-to-share-menstrual-data-may-violate-federal-laws.

^{76.} Jacqueline Wernimont, Numbered Lives: Life and Death in Quantum Media (Cambridge, MA: MIT Press, 2018).

^{77.} Nicole Chauriye, 'Wearable Devices as Admissible Evidence: Technology is Killing Our Opportunity to Lie', *Catholic University Journal of Law and Technology* 24.2 (2016). https://scholarship.law.edu/jlt/vol24/iss2/9.

^{78.} Jason Cipriani, 'Lawsuit Says Fitbit Fitness Trackers Are Inaccurate', *Fortune*, 6 January, 2016. http://fortune.com/2016/01/06/Fitbit-heart-rate-accuracy-lawsuit.

Case Study 2: Mandatory Tracking of Menstrual Cycles for School Athletes

In February 2023, the Florida High School Athletic Association debated making it mandatory for all student athletes to track and digitally store their menstrual cycle information. The idea was ultimately dismissed after parents strongly advocated against it.⁷⁹

In the context of Florida passing anti-LGBTQIA+ legislation, advocates raised concerns that this could out trans students, put them at risk, and severely affect student welfare.



As Jacquline Wernimont argues, what 'begins as self-tracking can quickly be leveraged by others to know those who aren't trusted to know themselves'.⁸⁰ This holds especially true for women, queer and racialised groups, and those who live in poverty. It is no coincidence that many examples, including the two case studies above, concern women or trans people. People living in poverty are already under increased surveillance. Accessing welfare also necessitates a loss of privacy.⁸¹ As far as the author of this report is aware, in the US, the only documented examples of using digital evidence to prosecute people for illegal abortion access are cases of women of colour, who already face additional structural challenges in accessing reproductive services.⁸²

79. Chauriye, 'Wearable Devices as Admissible Evidence' (supra note 77).

80. Wernimont, Numbered Lives, (supra note 76), p. 157.

81. Michele Gilman and Rebecca Green, 'The Surveillance Gap: The Harms of Extreme Privacy and Data Marginalization', *N.Y.U. Review of Law & Social Change* 42.2 (2018)m 253-307. https://socialchangenyu.com/review/ the-surveillance-gap-the-harms-of-extreme-privacy-and-data-marginalization/.

82. Cynthia Conti-Cook, 'Surveilling the Digital Abortion Diary', *University of Baltimore Law Review* 50.1 (2020), 1–76. https://scholarworks.law.ubalt.edu/cgi/viewcontent.cgi?article=2078&context=ublr.

Case Study 3: Preventing Abortion Access in the United States

Two cases in the US have demonstrated the continuing use of menstrual data against those with periods. In Missouri, the state's health department kept track of the menstrual cycles of patients in an attempt to investigate failed abortions. Officials also tracked medical ID numbers, gestational age of foetuses, and dates of medical procedures.⁸³ The investigation led to the withholding of St. Louis' Planned Parenthood license and a state hearing.⁸⁴

During President Trump's first administration, the Office of Refugee Resettlement tracked and monitored the menstrual cycles of unaccompanied minors seeking asylum as part of efforts to prevent them from accessing abortions, even in cases of rape.⁸⁵

The spreadsheet containing dates of menstrual cycles, how long people had been pregnant, whether sex had been consensual, and if they had requested abortion access was made available to the public through a freedom of information request and published by MSNBC.⁸⁶



83. Katie Reilly, 'Missouri's State Health Department Kept Spreadsheet Tracking Menstrual Periods of Planned Parenthood Patients', *Time*, 31 October 2019. https://time.com/5713804/missouri-health-official-planned-parenthood-periods/.
84. Chrystal Thomas, 'Missouri Health Director kept Spreadsheet of Planned Parenthood Patients' Periods', *The Kansas*

City Star, 30 October 2019. https://www.kansascity.com/news/politics-government/article236773058.html.

85. Devon Cone, 'Newsweek: The U.S. Is Failing to Protect Pregnant Asylum Seekers', *Refugees International*, 16 June 2021. https://www.refugeesinternational.org/newsweek-the-u-s-is-failing-to-protect-pregnant-asylum-seekers/#:~:text= The%20Trump%20administration's%200ffice%20of,the%20rights%20of%20unaccompanied%20minors.

86. Rachel Maddow, 'Trump Admin Tracked Individual Migrant Girls' Pregnancies', *MSNBC*, 16 March 2019. https://www.msnbc.com/rachel-maddow/watch/trump-admin-tracked-individual-migrant-girls-pregnancies-1459294787849?fbclid=lwAR3LVaAi6SisXo_ISkkhnBcqKaf5sKE0r4T9W4Nc6X-_b7Vqdh7maWhiL14. While neither example given in Case Study 3 used data from menstrual trackers, instead data regarding people's menstrual cycles was compiled manually, the examples illustrate how central menstrual tracking data is in efforts to prevent access to abortion services.

Policing Abortion Access in the UK

When the United States Supreme Court struck down Roe v. Wade, the precedent recognising privacy protections for the right to abortion, the conversation around surveillance and reproductive rights centred around CTAs.⁸⁷ At time of writing, data from CTAs has not yet been used to charge women seeking abortion in the US, but Google search content and Facebook Messenger information have.⁸⁸ On the other hand, in the UK there are examples where data from CTAs has been used in this context.

In the UK, abortion is still a criminal offence under the 1861 Offences Against the Person Act and is only allowed with permission from two doctors and within a 24-week gestational period.⁸⁹ In recent years, there has been a concerning uptick in police investigations of illegal abortions following unexplained pregnancy losses. According to the British Pregnancy Advisory Service (BPAS), from 1967 to 2002 only three women were convicted of having an illegal abortion in England and Wales, but since then the number has increased drastically.⁹⁰ Abortion provider MSI reports almost '60 criminal inquiries in England and Wales since 2018, compared with almost zero before'.⁹¹

The increased prosecution seems motivated by an increased uptake of medical abortions, which can be taken at home. This option has become more widespread in the wake of the COVID-19 pandemic,⁹² but a study found that many women also feel pressured to opt for medical abortions at home due to the funding strain on abortion service providers.⁹³

The increased number of investigations does not mean more illegal abortions are taking place, but indicates an increased police focus on miscarriages and unexplained cases of pregnancy loss, leaving judges 'flabbergasted' as to why some cases reached court.⁹⁴ Following hospital procedures, women suspected of illegal abortions are pushed into tests without legal representation.⁹⁵

88. Conti-Cook, 'Surveilling the Digital Abortion Diary' (supra note 82).

89. British Pregnancy Advisory Service (BPAS), 'Britain's Abortion Law' (2012),

https://www.bpas.org/get-involved/campaigns/briefings/abortion-law/.

90. Maya Oppenheim and Lydia Patrick, 'UK Faces Sharp Rise in Abortion Convictions', *The Independent*, 28 February 2024. https://www.independent.co.uk/news/uk/home-news/abortions-women-investigations-prosecutions-rise-b2496958.html.

91. Eleanor Layhe, Anna Meisel, and Divya Talwar, 'More Women Investigated for Illegal Terminations, Says Abortion Provider', *BBC News*, 20 February 2024. https://www.bbc.co.uk/news/uk-68305991.

92. Mollie Malone, 'I Felt Like a Criminal': Record Number of Women Facing Illegal Abortion Investigations', *SkyNews*, 17 June 2024. https://news.sky.com/story/i-felt-like-a-criminal-record-number-of-women-facing-illegal-abortion-investigations-13153079.

93. Rachel Hall, 'Women in England and Wales "Feel Pressured to Opt for Medical Abortions"' *The Guardian*, 10 April 2023. https://www.theguardian.com/world/2023/apr/10/women-england-wales-abortion-pill.

94. Zoe Williams, 'The Women Being Prosecuted in Great Britain for Abortions: "Her Confidentiality Was Completely Destroyed", *The Guardian*, 10 November 2023. https://www.theguardian.com/world/2023/nov/10/ the-women-being-prosecuted-in-great-britain-for-abortions-her-confidentiality-was-completely-destroyed.

95. Maya Oppenheim, "Deeply Sinister": Police Testing Women Who Have Miscarriages for Abortion Drugs', *The Independent*, 2 November 2023. https://www.independent.co.uk/news/uk/home-news/police-testing-abortion-drugs-miscarriage-b2439733.html.

^{87.} David Cox, 'How Overturning Roe v. Wade Has Eroded Privacy of Personal Data', BMJ 378 (2022), o2075. https://doi.org/10.1136/bmj.o2075.; Stefanie Felsberger, 'Cycles of Control: Private Companies and the Surveillance of Reproductive Health', *Tactical Tech*, March 2023. https://tacticaltech.org/news/cycles-of-control/.

The practice has been pervasive enough for the Royal College of Obstetricians and Gynaecologists (RCOG), alongside the Faculty of Sexual and Reproductive Healthcare (FSRH), British Society of Abortion Care Providers and the Faculty of Public Health to issue guidance for health workers advising them that they are under no legal obligation to contact police after abortion, pregnancy loss, or unattended delivery.⁹⁶

Police have also repeatedly requested data from abortion providers on people who have been turned away from a BPAS clinic because they were over the legal limit for an abortion—something the BPAS has refused to provide.⁹⁷ Those under investigation routinely have their phones and other electronic devices confiscated.⁹⁸ Police have also made requests for data from menstrual tracking applications in the course of police investigation.⁹⁹

Abortion civil rights organisations have raised concerns over the use of CTA data in investigations.¹⁰⁰ It is not only data from CTAs, but also text messages and search history that have been used in investigations.¹⁰¹ Nonetheless, the threat of CTA data being used in police investigations in the UK is of great concern to users.¹⁰² This is taking place in a context where the UK government has put pressure on tech companies—specifically Signal and Apple¹⁰³—to develop inbuilt backdoors into the encrypted services they offer.

Menstrual tracking data puts users at risk of significant harm: the risk of having one's tracking data used in a police investigation into illegal pregnancy termination is very real. Given the complexity and the current context of increasing efforts to undermine encryption, solutions to ensure the safe tracking of menstruation must go beyond technical solutions such as stronger encryption.

Collective Harms: Tracking Data Used Against Others

Given the high risk that user data can be used to police people's reproductive choices, users have been urged to delete their cycle tracking apps before they become digital evidence. Yet users consistently stress the usefulness and value of cycle tracking apps in their lives. This is especially so because many users feel disillusioned by their experiences of accessing reproductive healthcare in a context where health services are under financial strain.

96. Royal College of Obstetricians and Gynaecologists (RCOG), Faculty of Sexual and Reproductive Healthcare (FSRH), British Society of Abortion Care Providers, and Faculty of Public Health, 'Involvement of the Police and External Agencies Following Abortion, Pregnancy Loss and Unexpected Delivery: Guidance for Healthcare Staff' (2024). https://www.rcog.org.uk/media/s3rf2brg/liaison-with-police-guideline-for-nhs-staff-in-womens-health-2.pdf.

97. Williams, 'The Women Being Prosecuted in Great Britain for Abortions' (*supra* note 94).

98. Oppenheim, 'Deeply Sinister' (*supra* note 95).

99. Davis, 'British Police Testing Women for Abortion Drugs' (supra note 8).

100. Alisa Berry Ryan, 'Press Release: Abortion Rights Raises Concerns Over British Police Testing for Abortion Drugs and Menstrual App Data Use', *Abortion Rights*, 31 October 2023. https://abortionrights.org.uk/press-release-abortion-rights-raises-concerns-over-british-police-testing-for-abortion-drugs-and-menstrual-app-data-use/.

101. Davis, 'British Police Testing Women for Abortion Drugs' (supra note 8).

102. ICO, 'ICO to Review Period and Fertility Tracking Apps' (supra note 10).

103. Apple has conceded to the UK government's demand, see Zoe Kleinman, 'Apple Pulls Data Protection Tool after UK Government Security Row', *BBC News*, 21 February 2025, https://www.bbc.com/news/articles/cgj54eq4vejo. Signal has communicated it would rather cease functioning in the UK than remove its encryption under governmental pressure, see Chiara Castro, "We Will Not Walk Back" – Signal Would Rather Leave the UK and Sweden than Remove Encryption Protections', *TechRadar*, 27 February 2025. https://www.techradar.com/computing/cyber-security/ we-will-not-walk-back-signal-would-rather-leave-the-uk-and-sweden-than-remove-encryption-protections. While it is crucial to raise user awareness of safer app choices, personal choices about menstrual tracking are limited in addressing collective harms and downstream effects of the widespread collection of reproductive data.¹⁰⁴ This also shifts responsibility to users, rather than to companies.

A data justice lens moves focus beyond the privacy rights of individuals and shows that opting out of menstrual tracking might not be enough to protect individuals from profiling, if others also share their data. Based on FitBit user data, Google can already predict health outcomes and advertising opportunities for people who don't use Fitbit.¹⁰⁵ Data shared by one group of people can also be used to develop technologies used to harm or disadvantage a different group of people. Marginalised groups are often at more risk when it comes to surveillance and the policing of their reproductive choices.

Data is also more valuable in its aggregated form. Menstrual tracking data specifically is immensely valuable in the area of medical research. Menstrual cycles, menstrual health, and reproductive health are extremely underresearched areas.¹⁰⁶ CTAs collect vast data sets, which could become crucial to improving research on menstrual and reproductive health. More research is urgently needed, but available data on menstrual cycles is still limited and tied up in the private sector.

Users face the risks of sharing their menstrual data even as benefits from health insights are neither developed nor delivered. Companies control extensive menstrual tracking data sets, yet only a few have established research relationships with academia. For example, Clue collaborates with Columbia, Oxford, Stanford, and the Kinsey Institute.

Stanford researchers are exploring possible connections between menstrual pain patterns and disease prediction. Researchers at Columbia are studying connections between menstrual cycles and risks for breast-cancer.¹⁰⁷ Natural Cycles has also shared data with researchers, generating important insights that questioned the normative model of 28-day menstrual cycles.

Without the broader involvement of public institutions, medical professionals, and people with periods coming from a wide range of ages, ethnicities, genders, sexualities, and reproductive lives in the collection of menstrual cycle data, CTA developers get to own and define knowledge about menstrual cycles.

104. On raising awareness of safer app choices: Stefanie Felsberger, 'None of Their Business: How to Choose a Private Cycle Tracking App", Data Detox Kit, *Tactical Tech*, October 2022, https://www.datadetoxkit.org/en/health/none-of-their-business/.

105. Marc Bourreau et al., 'Google/Fitbit Will Monetise Health Data and Harm Consumers', *VoxEU.org*, 30 September 2020. https://voxeu.org/article/googlefitbit-will-monetise-health-data-and-harm-consumers.

106. Criado Perez, *Invisible Women* (*supra* note 2); King, 'Premenstrual Syndrome (PMS) and the Myth of the Irrational Female' (*supra* note 2).

107. Marina Khidekel, 'The Race to Hack Your Period Is On', *Elle*, 25 June 2018. https://www.elle.com/beauty/health-fitness/a21272099/clue-period-app/.



CONCLUSION & RECOMMENDATIONS

The use of CTAs is at an all-time high. There are reports and fears of companies sharing intimate data with advertisers and CTA data being used to police abortion access.

This report has mapped out what is at stake in the datafication of menstrual cycles, both for individuals and collectively, and taking a data justice framing has situated the use of CTAs in the wider context of people's struggle to access knowledge and care for their menstrual and reproductive health, illustrating why users continue to use CTAs despite news of their concerning data practices. CTAs fulfil an important need for people with periods, and form an important piece of health access.

Menstrual tracking data is not necessarily protected as medical information, but can reveal some of the most intimate information about users: their reproductive choices, mental health issues, health struggles, and a plethora of consumer and political information. In the US, cycle tracking devices are regulated as general wellness devices and the data is not afforded special protections. While in the EU and UK the data is protected as special category data the required protections, consent options, or legal basis for collection are not thoroughly enforced or implemented.

Because companies' business models rest on selling user data itself, or selling insights into the data, users are encouraged to track an extensive range of indicators, far beyond basic cycle information. Contrary to user assumptions, menstrual tracking data is extremely valuable and has several commercial applications. The datafication of menstrual cycles poses significant risks and harms to users and other menstruators. Menstrual tracking data can and has been used against individuals. It could be used to harm people in the case of intimate partner violence and workplace or insurance rate discrimination. It has been used to police and restrict abortion access and control reproduction. These risks disproportionately impact marginalised groups.

Crucially, cycle tracking apps propose an individual solution to societal problems such as a lack of healthcare services and research gaps in menstrual and reproductive health. Their usefulness in some ways rests on the continuation of these structural problems faced by people with periods. In moving forwards it is crucial to remember that changing individual tracking habits will not make users of CTAs safer, even if they use a secure app. It also will do nothing to alter the urgent need users have for tracking apps, or make menstrual tracking data more accessible for medical research. In light of these facts, this report puts forward the following recommendations:

BETTER ACCESS TO MENSTRUAL KNOWLEDGE & CARE

1. Improve healthcare for and incentivise research on menstrual and reproductive health, including through menstrual data stewardship or collaborations between cycle tracking companies and research institutes

More research on reproductive and menstrual healthcare needs to be fostered in order to decrease people's reliance on cycle tracking apps and to improve health outcomes for women. This could be realised through more funding opportunities targeted at reproductive and menstrual health questions or interdisciplinary research collaborations.

An important precondition for research is access to data on menstruation. The question of who has access to menstrual data collected by private companies is a question of public concern and should not be left in the hands of the same private companies. Instead, collaborations between CTA companies and research institutes should be fostered, or a menstrual data stewardship established. This needs to happen in collaboration with medical experts, CTA companies, civil society in the area of menstrual and reproductive health, and representatives of the public.

2. Raise public awareness and digital literacy on menstrual tracking for all ages through civil society organisations and schools

Opportunities need to be created for teenagers, young adults, and adults to access information or educational materials on the risks of sharing menstrual tracking data, since CTA users range from adolescents to older adults.

Civil society organisations working on menstrual health, reproductive rights, sexual health, and abortion access need to include the risks and harms from CTA use in their materials.

Schools are well positioned to educate students on the importance of menstrual health as well as its connection to privacy. Helping students learn about how to understand their individual cycles (beyond key information about average length, menstrual products, and basic implications for mental and physical health) can make them less vulnerable to health hoaxes and less dependent on technological solutions that expose their data.

In the UK, the school subjects Personal, Social, Health and Economic education (PSHE) and Sex and Relationships Education (SRE) could be further integrated to address not just questions around health data for all students, but to include skills on how to find reliable health information online, how to do so safely and privately, and the risks of menstrual and health data being shared and used by third parties.

ALTERNATIVES TO MENSTRUAL TRACKING APPS

3. Develop alternative governance models for cycle tracking apps, including apps from public bodies such as the NHS, developed to be trustworthy and allow for the collection of data for research to fill the gender health gap in a responsible way

New business models should be explored for CTAs and other femtech and health tech solutions that do not hinge on selling user data or anonymised data sets, such as freemium models, subscription-based models, or marketplace models. Developing apps owned and operated by public health bodies is one way to address questions of data commodification. For example, in the US, Planned Parenthood has developed its own version of a cycle tracking app.

The UK is ideally positioned to solve the question of access to menstrual data for researchers as well as privacy and data commodification concerns of those with periods by developing an NHS app to track menstrual cycles. Since users sincerely want their data to help improve others' menstrual experience, the app is likely to be popular and also engender more trust among users. The app could also allow researchers to have input on what kind of tracking data would be helpful for research and could provide users with the opportunity to actively decide how they want to participate in research.

BETTER & SAFER MENSTRUAL TRACKING APPS FOR ALL

4. Promote stricter regulation of menstrual tracking data as sensitive health information (US) and stricter enforcement of existing regulations (UK, EU)

Policymakers should work towards better protection for self-tracking data from period tracking apps, fertility apps, and pregnancy tracking apps, as well as other apps targeted at reproductive, menstrual or sexual health. Menstrual tracking data could be afforded similar protection to medical data.

Where menstrual tracking data is already protected as special category data, focus needs to be placed on enforcement of existing regulations.

However, as long as abortion remains frequently criminalised, protecting menstrual tracking data can only ever be a limited measure towards reducing the risks and harms of menstrual tracking.

5. Improve data governance and security of CTAs through meaningful consent options, clear and accessible privacy policies, and prioritisation of data privacy and security in app design

Current CTA privacy policies are vague and confusing, apps must enable users to access information about CTA's data sharing practices in an accessible and understandable privacy notice or in the app interface.

App developers must prioritise data privacy and security in their app design and infrastructure, for example by using encryption. Apps could include delete buttons for safety, which would allow users to erase their data not only from the app but also from the company servers. This would help protect users in contexts, including legal proceedings, where their data could be used against them.

To safeguard user privacy and mitigate potential risks, app developers should adopt data minimisation principles in their app design, collecting and retaining only data necessary for core functionality.

CTAs should cease presenting users with all-or-nothing consent options for data collection, and instead provide users with consent options inbuilt into the interface of the app, allowing users to decide which parts of their data they are willing to share for research or other purposes. The purposes of data sharing should also be explained in a clear and understandable manner.

6. Make CTAs more transparent and inclusive with clear information on how tracking data is used to make in-app predictions, with interface options for those who cannot or do not want to become pregnant

CTAs should provide clear information in the app interface on how predictions are calculated and how user data is used to calculate predictions.

App developers should include options for those who are not interested in or cannot become pregnant, such as children (this means excluding ovulation from the tracking options) and interfaces for people with periods who are not cis women: for example, by using gender-neutral language and design, or offering options to track different indicators, such as hormone therapy for those going through transitions. Co-designing workshops with people from diverse backgrounds could help determine exactly what options need to be included.



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