PPL Institute
Psychology, Politics, Liberty

When the Temperature Rises: How Local Heat Exposure Relates to Public Opinions on Reproductive Rights in the United States

Alexis R. Grayon
Non-Resident Fellow

Liesl Co
Research Assistant

Paige Iino
Research Assistant

Ryan R. Rajpal
Director

Extreme heat, a product of climate change experienced across many regions of the United States, is associated with adverse birth outcomes, including stillbirth, miscarriage, preterm birth, and birth defects. Americans hold varying beliefs about climate change, but largely maintain that the effects are not yet timely nor domestic. Thus, the connection between climate and perinatal health is not understood to the same extent by the public as it is by professionals. Annual pregnancy heat-risk data and national survey data from the Cooperative Election Study reveal that individuals from states with greater pregnancy heat-risk days more strongly oppose state policies aimed at prohibiting abortion care services. It is therefore important that climate is integrated in educational efforts for and by healthcare providers to improve reproductive health literacy, behaviors, and outcomes.

Keywords: Climate Change, Reproductive Rights, Public Opinion, Public Health

Published: 13 April 2026

Introduction

Climate change has been an international policy issue since 1987, when scientists recognized the severity of ozone depletion, and nations sought to curb it (Houghton et al., 2001; United Nations Environment Programme, 1987). While scientists and civilians alike are aware of climate change, it is not universally accepted as an urgent issue. Still, extreme heat, a symptom of climate change, can lead to health risks such as heat-related fainting and heat stroke (Székely et al., 2025; Bouchama and Knochel, 2002). The public is generally aware of these specific risks (Xu et al., 2024; Sartin et al., 2023). However, differences in climate change belief stem from differences in experiences, trust in science, and risk processing (Egan and Mullin, 2017). Due to these differences in climate change opinion and experience, we theorized that people may be less aware of a connection between climate change and maternal health.

This issue of climate change falls along partisan fault lines, with Democrats finding climate change more pressing and timely than Republicans **(**Egan and Mullin, 2012; Egan and Mullin, 2017; Ballew et al., 2019**)**. Still, climate change events, like extreme heat, have adverse effects on health within the United States. In cases of pregnancy, extreme heat can negatively affect pregnant people and the fetus by altering the body's ability to thermoregulate during pregnancy, potentially resulting in stillbirth, miscarriage, congenital anomalies, and gestational diabetes (Cunningham et al., 2015; Lakhoo et al., 2025; Wesselink et al., 2024).

While many experts have described the connection between extreme heat and health, there is less information about how this shapes public opinion regarding reproductive healthcare policy. Given the growing body of evidence linking extreme heat and climate change to perinatal health (Kuehn and McCormick, 2017; Wesselink et al., 2024; Lakhoo et al., 2025), this study aims to understand how pregnancy heat-risk days — characterizing extreme heat, a side effect of

climate change — may be spatially correlated with opinions regarding reproductive health care in the United States. We hypothesized that states with more frequent annual pregnancy heat-risk days would show greater support for access to reproductive healthcare.

Literature Review

Extreme Heat and Fetal Death

Extreme heat days of over 95 degrees Fahrenheit are projected to become frequent across the United States, a product of climate change, according to the U.S. Environmental Protection Agency (2025). The effects of climate change on health, including pregnancy, are actively being studied as global climate conditions continue to shift. Recent findings have found that pregnant people face unique health risks due to extreme heat, such as the involuntary termination of a pregnancy (Kuehn and McCormick, 2017; Wesselink et al., 2024; Lakhoo et al., 2025).

Women's bodies undergo profound physiological changes during pregnancy, experiencing reduced systemic vascular resistance, increased heart rate, and a 40-50% increase in blood volume, affecting blood pressure (Cunningham et al., 2015; Auger et al., 2017). These changes to a woman's physiology support gestation but hinder the body's ability to regulate its temperature when exposed to extreme heat. One biological consequence of this heat intolerance is reduced placental blood flow, which can deprive the fetus of oxygen and essential nutrients necessary for development (Samuels et al., 2022). Adverse maternal health due to extreme heat can also affect fetal health through various mechanisms, with outcomes including the increased risk of stillbirth or miscarriage.

Stillbirth, defined as fetal death at 20 weeks of gestation or later, is associated with extreme heat exposure (Syed et al., 2022; Wilkins-Huag, 2020). Lakhoo et al. (2025) conducted a

systematic review and meta-analysis of previous studies, reporting increased odds of stillbirth for every degree Celsius increase in temperature. However, they found insufficient evidence to assert an association between spontaneous abortion (i.e., miscarriage), defined as fetal death before 20 weeks of gestation, and exposure to ambient extreme heat. Still, some find a link between exposure to ambient extreme heat and higher odds of spontaneous abortion (Qu et al., 2021; Wesselink et al., 2024). Regardless, it is clear that extreme heat has negative health effects for pregnant women and developing fetuses.

Public Opinion In the US

Climate Change Americans remain deeply divided over a number of factors related to climate change, including the appropriate policy response, the timeline of consequences, and whether it truly exists. The division is attributable to differences in scientific trust, risk processing, and personal experience (Egan and Mullin, 2017). Americans are largely unable to link their personal experience with environmental conditions to the effects of climate change, such as hotter temperatures, increased storms, or greater wildlife occurrences (U.S. Environmental Protection Agency, 2024). Nonetheless, personal experience with hotter temperatures among Americans, particularly among those with less strongly defined partisanship or lower educational attainment, can influence beliefs and opinions regarding climate change (Egan and Mullin, 2012). However, this change in opinion relies on recency bias and is altogether temporary.

Roughly half of Americans view climate change as a personal risk; most expect the negative effects of it to occur in distant locations or later in the future as many have not experienced the effects of global warming or are otherwise unable to connect their personal experiences to the effects (Ballew et al., 2019). Many view climate change as less problematic

for their own or their family's health, but more problematic for the health of others worldwide (Hathaway and Maibach, 2018). However, extreme heat is the leading cause of death among weather-related causes in the United States. While temperature is not the only indicator of climate change, many Americans are unaware of the threat climate change poses to their well-being, besides extreme heat (Howe et al., 2019). Risk perceptions and heat exposure are correlated; those who experienced extreme heat in California and Texas perceived the greatest threat levels from extreme heat (2019). Despite climate change across the United States, many people are unaware of their vulnerability to heat and the growing threat of it.

Reproductive Healthcare The American people are deeply divided over issues of reproductive healthcare, specifically abortion. Conservative social and religious beliefs – that life begins at conception – have motivated moralistic and political opposition to abortion expansion (Kelley et al., 1993; Tamney et al., 1992). The political opposition to abortion has largely been considered by activists to be shrouded in misogyny; anti-abortionism supports traditional gender roles of subordination and homemaking (Banet-Weiser, 2018). Differences in social and religious beliefs have created political faultlines over which partisans are polarized. Regarding the perceived definition of abortions, VandeVusse et al. (2023) found that 66% of their sample found that "stillbirth, sick when pregnant, ectopic pregnancy, miscarriage" were not abortions. Personal understanding and experience with abortion and reproductive health, clinically and socially, are key in shaping how people consider what is classified as an abortion.

As a policy issue, abortion is often thought of dichotomously: support or oppose. However, there is a distinction between an elective abortion (abortion by choice) and a traumatic abortion (abortion by physiological or psychological necessity), and the public's support for either, including various circumstances within either abortion type. Overall, there tends to be

more support for traumatic abortions (82% support rate) than for elective abortions (49% support rate) (Osborne et al., 2022). As such, there is a difference in support between conditional supporters of abortion and unconditional supporters, including conditional and unconditional anti-abortionists. Taken together, 54% of Americans believe that abortion should be legal only under certain circumstances (Adamczyk et al., 2020). However, there are differences in opinion regarding the circumstances for a situational abortion (VandeVusse et al., 2023).

Hostile abortion legislation, following the overturning of Roe v. Wade, can restrict abortion education amongst physicians, leading to less training in abortion care (Kheyfets et al., 2023). Altogether, differences in abortion opinion can make access to abortions in traumatic situations difficult to obtain. Still, there is no consensus on what a traumatic situation could be.

Climate-Health Literacy

Given that public opinion on climate change and reproductive healthcare is divided, and in light of the risks of extreme heat, it is relevant to consider the extent of awareness among Americans of the connection between climate change and health. Though recent literature on the intersection of these topics is limited, there are similarities to perceptions of climate change in general. Relatively few Americans understand how climate change affects health, with the majority reporting they had not considered this aspect before; few were able to name at least one specific health problem linked to climate change (Leiserowitz et al., 2014; Akerlof et al., 2010). Only 4% mentioned health problems related to extreme temperatures, but over one-third (36%) believed that heat stroke would become a more common occurrence within their community within the next 10 years due to global warming (Leiserowitz et al., 2014).

Furthermore, Americans view developing nations as more susceptible to climate change-related health risks than the United States; 38% believe others around the world were

already being harmed by climate change, compared to 33% who believed Americans were currently being harmed (Akerlof et al., 2010). Perceived relevance is especially apparent when comparing responses from other countries: at least 50% of Canadians and Maltese believed climate change adversely impacts human health, while only one in three Americans agreed with this statement (Akerlof et al., 2010). Moreover, studies conducted in Asia and Africa found that people are more aware of health issues caused by climate change-related temperature changes and weather events (Hathaway and Maibach, 2018). American sentiments on climate change and health are also characterized by a lack of perceived urgency. Most Americans believe global warming will begin impacting health within the next 25 years, while only about one-third believe health is currently being impacted (Leiserowitz et al., 2014; Akerlof et al., 2010).

A lack of discourse highlighting the health aspect of climate change is likely a major contributor to limited public understanding. One recent review estimates that only 5-14% of climate change-related news coverage mentions impacts on health (Hathaway and Maibach, 2018). Many Americans report using news outlets, social media, and family and friends as sources of information on climate change, though with varying levels of trust. Interestingly, doctors are a highly-trusted yet seldom-utilized source of information on climate change-related health impacts (Leizerowitz et al., 2014; Boland and Temte, 2019). Thus, there is a great opportunity for doctors and other clinical professionals to drive public awareness of the impacts of climate change on health.

Within the clinical sphere, there appears to be greater awareness and understanding of the climate change-health connection compared to the general public (Sarfaty et al., 2015; Sarfaty et al., 2016; Kotcher et al., 2021; Hathaway and Maibach, 2018; Boland and Temte, 2019). The majority of health professionals report that they already see climate change affecting patient

health, and most view climate change as relevant to patient care (Sarfaty et al., 2015; Sarfaty et al., 2016; Hathaway and Maibach, 2018; Boland and Temte, 2019). When asked to identify health issues affected by climate change, allergies and lung disease were the most frequently named health conditions (Sarfaty et al., 2015; Sarfaty et al., 2016; Boland and Temte, 2019). However, over one-third of health professionals report that heat-related health issues are currently affecting their patient population, and nearly half of health professionals expect these to become more commonplace in the next 10-20 years (Sarfaty et al., 2015; Sarfaty et al., 2016).

Despite clinical expertise, heightened awareness of the health consequences of climate change, and frequent interactions with the American public, health professionals are unlikely to have conversations with their patients about the climate-health connection. Although clinicians have relatively heightened awareness, they often do not feel knowledgeable enough on the subject to educate their patients (Sarfaty et al., 2016; Kotcher et al., 2021; Hathaway and Maibach, 2018). Other noted barriers to public engagement include time constraints, a perceived lack of support from fellow health professionals, and stigma around the issue itself (i.e., climate change is deemed too controversial or risky to discuss) (Kotcher et al., 2021). Despite these challenges, though, the majority of clinical professionals do believe they should play an active role in responding to climate-related health issues (Sarfaty et al., 2015; Sarfaty et al., 2016; Kotcher et al., 2021). Clinicians seek more patient- and public-facing educational materials on this matter and are supportive of more climate-health education for trainees, policy statements from professional organizations, training on effective communication, guidance for engaging with policy makers, and continuing professional education for themselves (Kotcher et al., 2021). Such strategies would target multiple stakeholders across the healthcare system, and in turn cultivate collective climate-health literacy.

A multifaceted approach is crucial for climate-related reproductive health education as well. As previously mentioned, climate change-mediated phenomena such as extreme heat can pose significant health risks for pregnant people and their babies (Kuehn and McCormick, 2017; Wesselink et al., 2024; Lakhoo et al., 2025). Once again, there appears to be a discrepancy in awareness between health professionals and the public concerning this vulnerable subpopulation. Whereas many Americans are unaware that certain demographic groups are more at risk for global warming-associated health problems, health professionals largely agree that young children 0-4 years old are particularly vulnerable (Leiserowitz et al., 2014; Sarfaty et al., 2015; Sarfaty et al., 2016). A recent report issued by the American College of Obstetricians and Gynecologists also acknowledges climate change as a significant health issue for women in particular, especially during pregnancy. Clinicians are thus encouraged to factor environmental exposures (e.g., heat exposure, air pollution, chemical exposures, etc.) into pre-pregnancy and prenatal counseling (ACOG, 2021).

Although climate-relevant education is especially pertinent for pregnant people, as it stands, there is very little research on its impacts and efficacy (Adebayo et al., 2020; Atkin et al., 2024; Kaya et al., 2025). The few studies that do exist suggest that information on the maternal and fetal risks of climate change may be impactful for expecting parents. In one recent study, pregnant women in Turkey were given an educational brochure entitled “Pregnancy and Climate Change”. As one might expect, informational exposure was found to increase awareness, perceptions, knowledge, and behavior and policy expectations concerning climate change. Interestingly, receiving educational material was found to reduce feelings of anxiety but increase feelings of helplessness (Kaya et al., 2025). Another study conducted in the US compared two different formats of presentation: didactic (scientific, factual statements presented as a brochure)

versus narrative (story-driven, with the same statements shown as dialogue between illustrated characters). Strikingly, those who received information in a narrative format displayed significantly greater perceived knowledge, sense of risk, self-efficacy, and behavioral intentions, and were almost eight times more likely to seek further information after the session (Adebayo et al., 2020). Thus, there appears to be great untapped potential for climate-conscious educational interventions targeting pregnant individuals.

Climate change and reproductive healthcare are both heavily-debated subjects, yet climate-related educational resources for pregnant people are scarce. Our research focused on the intersection of these contentious issues to provide evidence of their relationship.

Research Question: What is the relationship between extreme heat (i.e., pregnancy heat-risk days) frequency and opinions on reproductive rights/abortion access?

Methods

Pregnancy Heat-risk Days

We acquired data on pregnancy heat-risk days – defined as days where temperature exceeded 95% of local temperatures from 1991-2020 – from Climate Central, using their Climate Shift Index tool (Climate Central, 2025). They quantified the annual number of heat-risk days and the number of days added due to climate change across 940 cities internationally, so we limited the data to cities within the United States. If there were multiple observations within a state, we selected the city with the highest average annual number of pregnancy heat-risk days and used that city's records for our analysis.

Public Opinions

The 2024 Cooperative Election Study was created by a team of sixty researcher teams to understand American political opinion and participation (Schaffner et al., 2025). Surveys were sent to Americans across all fifty states and Washington D.C. before and after the 2024 election. Various questions were asked related to sociodemographics, approval of government branches, opinions on current events, ideology, and more. We selected questions related to abortion and contraception (**Table 1**), state of residence, and political affiliation. Data were collected as counts, so responses were aggregated at the state-level and used as proportions in our analysis.

Table 1
Questions of interest from the 2024 Cooperative Election Study

Domain	Question item – all responses [Support/Oppose]
Abortion	● Always allow a woman the right to obtain an abortion as a matter of choice ● Permit abortion only in case of rape, incest or when the woman's life is in danger ● Make abortions illegal in all circumstances* ● Expand access to abortion, including making it more affordable, broadening the types of providers who can offer care, and protecting access to abortion clinics
Congress Bills	● Prohibit government restrictions on the provision of, and access to, contraceptives ● Prohibit government restrictions on the provision of, and access to, abortion services
State policies	● Prohibiting receiving abortion-inducing drugs through the mail.* ● Prohibiting women from traveling to another state to receive an abortion when such services are not legal in their state.*
Supreme Court decisions	● The United States Constitution does not protect a woman's right to have an abortion. Roe v. Wade is overruled, and individual states can make their own laws governing abortion, including outlawing abortion.*

**Reverse-coded item for composite score*

We created a composite pro-choice index for each state based on the rates of question responses that demonstrated more tolerant reproductive rights. This was calculated as the means of question items, with reverse-coded items indicated in **Table 1**.

Abortion Rates

Statewide annual number of abortions were also considered in our analysis, data of which was obtained from the Guttmacher Institute. The Monthly Abortion Provision Study provided data on the estimated number of abortions in 2024 in states without a total ban on abortions (DoCampo et al., 2023). Data was collected from medical providers and included procedural and medicational abortions at health facilities and telehealth/virtual prescriptions of abortion medication in the United States. Random clinics are chosen each month to complete the survey. Thirty-seven states have abortion data available based on the number of states with total abortion bans in 2024. Rates were determined by dividing the abortion counts by population estimates according to the U.S. Census Bureau (U.S. Census Bureau, n.d.).

Statistical Analysis

The analyses of the effect of extreme heat on opinions were linear regression models with significance set to the 95% confidence intervals. We adjusted for statewide political affiliation rates and conducted a sensitivity analysis additionally adjusting for statewide abortion rates among the 37 states with complete data. We also checked for differences in covariate and outcome-related data based on availability of abortion data and calculated Cohen's d statistics for effect sizes. All analyses were performed using R version 4.4.3 (R Core Team, 2024).

Results

There were 49,338 responses included in our analysis to ensure that all respondents completed the survey both pre- and post-election (**Table 2**). Respondents were majority non-Hispanic White (76%), female (53%), married or partnered (48%), registered to vote (94%), and voted in the November 2024 general election (93%). Party affiliation was evenly distributed among survey respondents, as Democrat-affiliated respondents were most represented with 38% of the analytic sample. After state-wide aggregation, 33 states were Democrat-leaning (including Washington, D.C.) and 18 were Republican-leaning.

Table 2
Description of all analyzed survey respondents (N = 49,338)

Individual characteristic	Count (%)
Census region	
Northeast	9,014 (18%)
Midwest	11,449 (23%)
South	18,661 (38%)
West	10,214 (21%)
Race/ethnicity	
Non-Hispanic White	36,425 (74%)
Non-Hispanic Black	4,773 (9.6%)
Hispanic	3,975 (8.1%)
Asian	1,451 (2.9%)
Middle Eastern	1,390 (2.8%)
Native American	422 (0.9%)
Multiple races or other	956 (1.9%)
Gender	
Man	22,949 (47%)
Woman	26,070 (53%)
Non-binary	250 (0.5%)

Other	69 (0.1%)
Highest level of education	
No high school	1,109 (2.2%)
High school graduate	12,160 (25%)
Some college	11,463 (23%)
Associate degree	5,809 (12%)
Bachelor's degree	11,605 (24%)
Advanced degree	7,192 (15%)
Marital status	
Married or domestic/civil partnership	26,403 (53.2%)
Separated or divorced	7,562 (15.8%)
Widowed	3,669 (7.4%)
Never married	11,693 (24%)
Unknown	11
Party affiliation	
Democrat	18,530 (38%)
Republican	13,875 (28%)
Independent	13,584 (28%)
Other	2,009 (4.1%)
Registered to vote	
Yes	46,279 (94%)
No	2,663 (5.4%)
Don't know	396 (0.8%)
Voted in the November 2024 General Election	
Did not vote in the election	2,701 (5.7%)
Attempted to vote but did not or could not	496 (1.1%)
Voted in the General Election	43,741 (93%)
Unknown	2,400

The mean (SD) number of state average pregnancy heat-risk days was 28.9 (6.8) days annually. Of the top ten states with the greatest number of heat-risk days, seven were also in the

top states with the greatest number of heat-risk days due to climate change (**Table 3**). The total number of heat-risk days due to climate change ranged from 7 to 34 days, while the percent contribution ranged from 28% to 100%. Full details on state heat-risk days can be found in **Supplemental Table 1**.

Table 3
Top states across different heat-risk day categories

Number of heat-risk days		**Number of heat-risk days due to climate change**		**Contribution of climate change to heat-risk days**	
California	52	Florida	34	Hawaii	100%
Texas	43	Texas	26	Florida	81%
Florida	42	Utah	26	North Carolina	76%
Louisiana	38	California	25	Utah	74%
Nevada	38	Colorado	25	Georgia	71%
Colorado	36	Hawaii	22	South Carolina	70%
Washington	36	Nevada	21	Colorado	69%
Utah	35	New Mexico	21	Arizona	65%
North Dakota	35	Arizona	20	New Jersey	64%
Oregon	34	Louisiana	18	New Mexico	62%

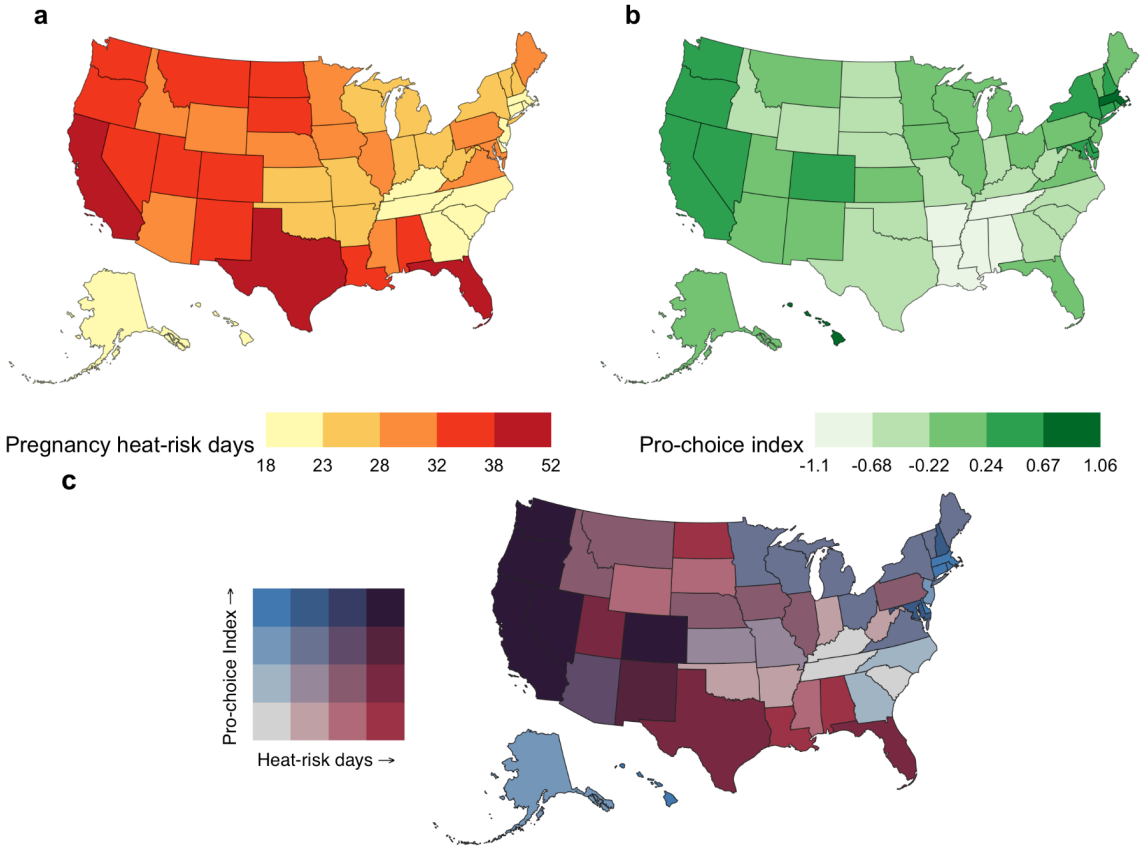
Of the questions related to reproductive rights, respondents most agreed that government restrictions on the provision of, and access to, contraceptives should be prohibited with 75.5% supporting that statement (**Table 4**). Respondents most strongly opposed making abortion illegal in all circumstances with only 10.0% supporting the idea. The pro-choice index (i.e., mean of all item z-scores for each state) was normally distributed.

Table 4
National average responses for each survey item

Domain	Item	% Support
Abortion	Always allow	62.84%
	Case-dependent	47.68%
	Make illegal*	9.99%
	Expand access	61.96%
Congress Bills	Prohibit government restrictions on contraceptives	75.46%
	Prohibit government restrictions on abortions	65.83%
State policies	Prohibit mailing of abortion-inducing drugs*	38.34%
	Prohibit interstate travel for abortions*	15.73%
Supreme Court decisions	Constitution does not protect abortion rights, states can decide	50.37%

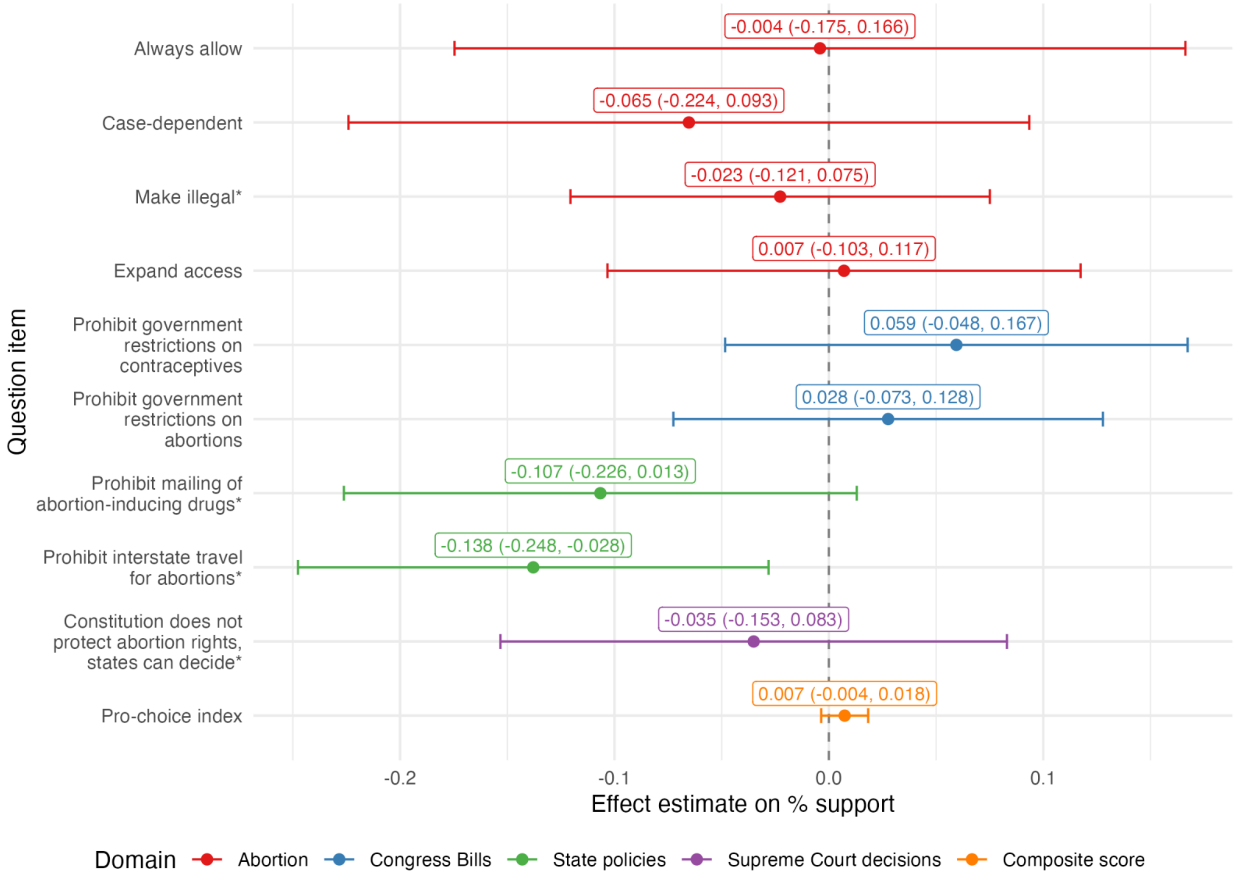
Individual state-level patterns of our variables of interest are in **Figure 1**. States in the West and Southwest tended to have more heat-risk days and pro-choice opinions. In the Northeast, there were greater pro-choice opinions but less heat-risk days. Some states in the South (Kentucky, Mississippi, North Carolina, and South Carolina) showed low pro-choice indices and low heat-risk days.

Figure 1
State map of (a) average annual number of pregnancy heat-risk days, (b) pro-choice index, and (c) their spatial relationship



In our adjusted models, we detected one significant association between heat-risk days and reproductive rights opinion (**Figure 2**). For every day increase in average annual heat-risk days, there was a 13.8% decrease in support for the prohibition of interstate travel for abortion services (95% CI: -0.248, -0.028). All other relationships varied in directionality, and the association between number of heat-risk days and overall pro-choice index was null.

Figure 2
Relationships between heat-risk days and reproductive rights opinions



There were 37 states that also had abortion data for 2024 (**Figure 3**). Nine of the fourteen states missing abortion data were located in the South. Of the regions without total abortion bans, Washington, D.C., New Mexico, and Kansas had the highest abortion rates per 10,000 people. States that had abortion data available (i.e., without total abortion bans) had significantly higher percentages of respondents who were Democrat and significantly lower percentages of respondents who were Republican (**Table 5**). Additionally adjusting for abortion rates in our sensitivity analysis, we detected negative relationships between heat-risk days with both state policy items ($\beta_{mailing}$ = -0.132, 95% CI: -0.247, -0.017; β_{travel} = -0.136, 95% CI: -0.224, -0.047).

Figure 3
State map of abortion rates per 10,000 people in population

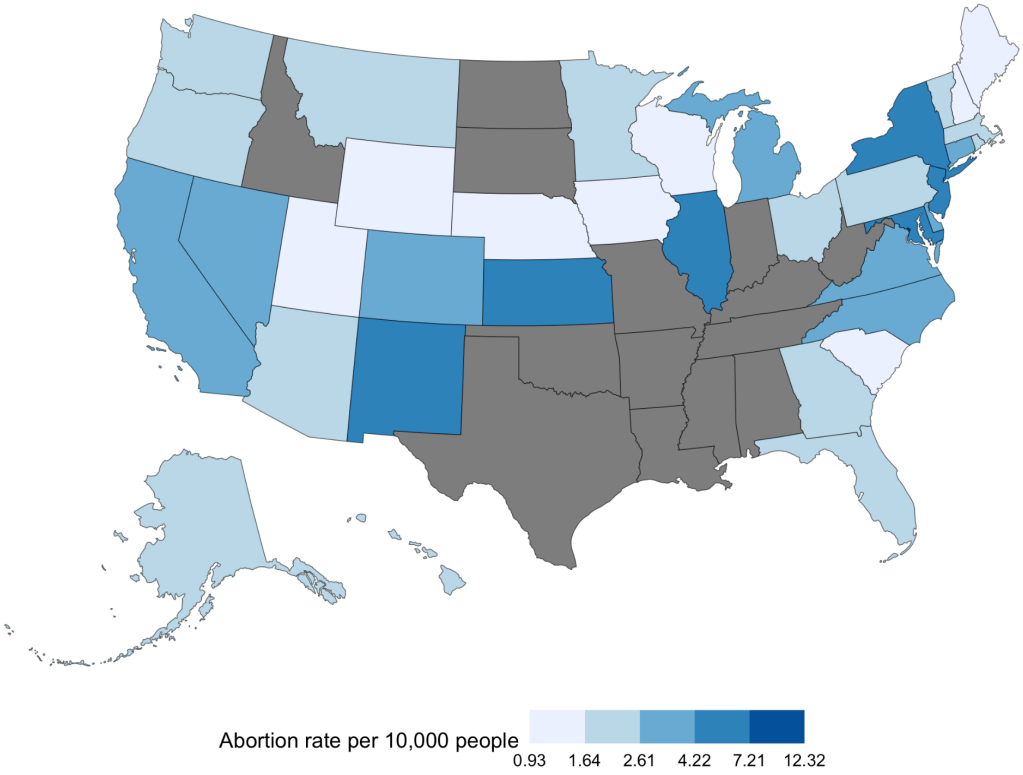


Table 5
Differences in states by availability of abortion data

Variable	t	df	p-value	Effect size (95% CI)
Political affiliations				
Percent Democrat	-4.03	44.82	<0.001	0.97 (0.33, 1.61)
Percent Republican	7.62	48.56	<0.001	-1.74 (-2.44, -1.03)
Percent Independent	-2.26	35.58	0.03	0.6 (-0.03, 1.23)
Percent other	0.21	46.04	0.84	-0.05 (-0.66, 0.57)
Annual heat-risk days				
Number	0.67	25.97	0.51	-0.2 (-0.82, 0.41)
Added due to climate change	-0.91	30.74	0.37	0.26 (-0.36, 0.87)
Contribution of climate change	-2.23	44.10	0.03	0.54 (-0.08, 1.16)

Discussion

Amidst increasing extreme heat days within the US, and a lack of public awareness about its effects on pregnancy health, this study sought to understand how pregnancy heat-risk days influence opinions regarding abortion restrictions. We found that extreme heat was negatively associated with support for restrictive healthcare policy. While the sample leaned slightly pro-choice, the findings remained even when adjusting for partisanship.

This study analyzed the nuances between two distinctions in the effect of climate change on extreme heat: the number of pregnancy heat-risk days due to climate change and the contribution of pregnancy heat-risk days due to climate change. The analysis of heat-risk days due to climate change indicated that the South, already predisposed to greater heat, was the most affected region. However, analysis of the contribution of heat-related days due to climate change illustrates that several non-southern states experienced an increase in heat-risk days from climate change. While Florida had 34 heat-risk days due to climate change, and Hawaii had 22 days, all of which were due to climate change. Our findings suggest that people in regions experiencing artificially induced extreme-heat risk due to climate change may face greater risk of adverse maternal health. As such, it may be wise for states experiencing the greatest contribution of heat risk days to push climate health materials in clinical and medical education settings.

Two states, Utah and Colorado, were among the top ten states to have the most risk days, heat risk days due to climate change, and the proportion attributable to climate change. Utah, historically a red state, was comparatively more pro-choice than other red states that experienced similar heat, such as Texas, Louisiana, and Alabama. Thus, this study is limited because it does not measure direct opinions on heat and healthcare; a case study in Utah would provide a unique understanding of this relationship. Given that the other conservative states were not on the list, it

may be that the experience of extreme heat as driven by climate change and educational accommodation has led to opinion development.

The sample held slight but favorable pro-choice opinions with the majority supporting abortion in all cases and expansion of abortion accessibility. We saw support in prohibiting congressional restrictions on contraceptive and abortion access. Further, roughly half of respondents held that the Constitution did not protect abortion rights, but rather, abortion policy was a State issue, as was decided by the Supreme Court (*Dobbs v. Jackson Women's Health Organization*, 2022). While the sample was 38% Democrat, 28% Republican, and 28% Independent, this finding indicates a mass, textualist understanding of the Constitution. At the state level, about 40% of the sample supported state bans on the mailing of abortion drugs, maintaining the integrity of state law against abortions. However, only 16% of the sample supported laws banning interstate travel for abortions, indicating that the sample supported personal agency over state law concerning lifestyle. Extreme heat was negatively associated with banning interstate travel for abortion services and the mailing of abortion-inducing drugs when additionally adjusting for state abortion rates, indicating that external health factors such as heat may influence healthcare opinions. It is currently legal to travel to another state for abortions, but some states do not allow such drugs to be mailed, like Texas. As such, it may be important for healthcare providers to explicitly make the connection clear to patients and provide healthcare options for individuals according to state and constitutional jurisdiction.

Overall, providing educational resources may spark a ripple effect on public health and climate policy. Beyond simply demonstrating the relevance of climate change to pregnancy, the emotional and psychological impacts of receiving this information are worthy of further exploration. For example, after receiving a “Pregnancy and Climate Change” brochure, pregnant

women reported increased feelings of helplessness (Kaya et al., 2025). However, presenting narratively-framed information on the subject had a greater positive impact on pregnant women's sense of self-efficacy, which is essential for motivating self-protective action (Adebayo et al., 2020). A pregnant person's sense of awareness, helplessness, self-efficacy, and other aspects of their mental health can all inform the questions they ask their doctors, and ultimately influence their prenatal and childcare decisions. Increased dialogue between patients and doctors can serve to lessen the knowledge gap, and in turn, public opinion on climate change may gradually shift.

In the face of climate change, extreme heat exposure is of growing concern for pregnant people. Raising collective awareness of how climate change affects health is an important first step in mitigating risk. However, effectively addressing climate change involves going beyond educational initiatives alone. More research is needed to determine what systemic approaches would best support educational efforts in order to enact lasting protective change.

Conclusion

We found that frequency of statewide pregnancy heat-risk days were associated with opposition to restrictive abortion-related state policies. While the American people hold different opinions regarding climate change, there are established connections between extreme heat and a multitude of adverse health outcomes especially during pregnancy. People are largely aware of the connection between extreme heat and heat stroke, but less aware about its role in shaping maternal and fetal health. As climate change continues to evolve, clinicians play an integral role in educating the public about climate-induced health effects. By increasing awareness of how climate change and health are related, the popular American opinion on climate change may shift, potentially mitigating the prevalence of climate-related health outcomes.

References

Adebayo, A. L., Mhonde, R. D., DeNicola, N., & Maibach, E. (2020). The effectiveness of narrative versus didactic information formats on pregnant women's knowledge, risk perception, self-efficacy, and information seeking related to climate change health risks. *International Journal of Environmental Research and Public Health*, 17(19), 6969. https://doi.org/10.3390/ijerph17196969

Adamczyk, A., Kim, C., & Dillon, L. (2020). Examining public opinion about abortion: A mixed-methods systematic review of research over the last 15 years. *Sociological Inquiry*, 90(4), 920–954. https://doi.org/10.1111/soin.12351

Akerlof, K., DeBono, R., Berry, P., Leiserowitz, A., Roser-Renouf, C., Clarke, K.-L., Rogaeva, A., Nisbet, M. C., Weathers, M. R., & Maibach, E. W. (2010). Public perceptions of climate change as a human health risk: Surveys of the United States, Canada, and Malta. *International Journal of Environmental Research and Public Health*, 7(6), 2559–2606. https://doi.org/10.3390/ijerph7062559

American College of Obstetricians and Gynecologists. (2021). Reducing prenatal exposure to toxic environmental agents (Committee Opinion No. 832). *Obstetrics & Gynecology*, 138(1), e40–e54. https://doi.org/10.1097/AOG.0000000000004449

Atkin, K., Christopulos, G., Turk, R., Bernhardt, J. M., & Simmonds, K. (2024). Educating pregnant women about the dangers of extreme heat and air pollution. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 53(4), 438–446. https://doi.org/10.1016/j.jogn.2024.01.007

Auger, N., Fraser, W. D., Smargiassi, A., Bilodeau–Bertrand, M., Kosatasky, T. (2017). Elevated outdoor temperatures and risk of stillbirth. *International Journal of Epidemiology*, 46(1), 200-208. https://doi.org/10.1093/ije/dyw077

Ballew, M. T., Leiserowitz, A., Roser-Renouf, C., Rosenthal, S. A., Kotcher, J. E., Marlon, J. R., Lyon, E., Goldberg, M. H., & Maibach, E. W. (2019). Climate change in the American mind: Data, tools, and trends. *Environment: Science and Policy for Sustainable Development*, 61(3), 4–18. https://doi.org/10.1080/00139157.2019.1589300

Banet-Weiser, S. (2018). *Empowered: Popular feminism and popular misogyny*. Duke University Press.

Boland, T. M., & Temte, J. L. (2019). Family medicine patient and physician attitudes toward climate change and health in Wisconsin. *Wilderness & Environmental Medicine*, 30(4), 386–393. https://doi.org/10.1016/j.wem.2019.08.005

Bouchama, A., & Knochel, J. P. (2002). Heat stroke. *New England Journal of Medicine*, 346(25), 1978–1988. https://doi.org/10.1056/NEJMra011089

Climate Central. (2025). Climate change increasing pregnancy risks around the world due to extreme heat. https://www.climatecentral.org/report/pregnancy-heat-risks

Cunningham, F. G., Leveno, K. J., Bloom, S. L., et al. (2015). Williams Obstetrics (24th ed.). McGraw-Hill.

Dobbs v. Jackson Women's Health Organization, 597 U.S. 215 (2022).

DoCampo, I., Philbin, J., Osias, P., Maddow-Zimet, I., Aisiri Murulidhar, Mitchell, L., Menanno, M., & Jones, R. (2023). *Monthly abortion provision study*. https://doi.org/10.17605/OSF.IO/K4X7T

Egan, P. J., & Mullin, M. (2012). Turning personal experience into political attitudes: The effect of local weather on Americans' perceptions about global warming. *The Journal of Politics*, 74(3), 796–809. https://doi.org/10.1017/S0022381612000448

Egan, P. J., & Mullin, M. (2017). Climate change: US public opinion. *Annual Review of Political Science*, 20, 209–227. https://doi.org/10.1146/annurev-polisci-051215-022857

Hathaway, J., & Maibach, E. W. (2018). Health implications of climate change: A review of the literature about the perception of the public and health professionals. *Current Environmental Health Reports*, 5(1), 197–204. https://doi.org/10.1007/s40572-018-0180-3

Houghton, J. T., Ding, Y., Griggs, D. J., Noguer, M., van der Linden, P. J., Dai, X., & Johnson, C. A. (Eds.). (2001). Climate change 2001: The scientific basis. Cambridge University Press.

Howe, P. D., Marlon, J. R., Wang, X., & Leiserowitz, A. (2019). Public perceptions of the health risks of extreme heat across U.S. states, counties, and neighborhoods. P*roceedings of the National Academy of Sciences*, 116(14), 6743–6748. https://doi.org/10.1073/pnas.1813145116

Kaya, L., Keles, E., Baydili, K. N., Kaya, Z., & Kumru, P. (2025). Impact of climate change education on pregnant women's anxiety and awareness. *Public Health Nursing*, 42, 54–60. https://doi.org/10.1111/phn.13455

Kelley, J. Evans, M. D. R., Headey, B. (1993). Moral Reasoning and Political Conflict: The Abortion Controversy. *The British Journal of Sociology*, 44(4), 589-612. https://www.jstor.org/stable/591412

Kheyfets, A., Dhaurali, S., Feyock, P. Khan, F. Lockley, A., Miller, B., Cohen, L., Anwar, E., Amutah-Onukagha, N. (2023). The impact of hostile abortion legislation on the United States Maternal Mortality crisis: a call for increased abortion education. *Frontiers in Public Health*, 11,

https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2023.1291668/full

Kotcher, J., Maibach, E., Miller, J., Campbell, E., Alqodmani, L., Maiero, M., & Wyns, A. (2021). Views of health professionals on climate change and health: A multinational survey study. *The Lancet Planetary Health*, 5(5), e316–e323. https://doi.org/10.1016/S2542-5196(21)00053-X

Lakhoo, D. P., Brink, N., Radebe, L., Craig, M. H., Pham, M. D., Haghighi, M. M., Wise, A., Solarin, I., Luchters, S., Maimela, G., & Chersich, M. F. (2025). A systematic review and meta-analysis of heat exposure impacts on maternal, fetal, and neonatal health. *Nature Medicine*, 31(2), 684–694. https://doi.org/10.1038/s41591-024-03395-8

Leiserowitz, A., Maibach, E., Roser-Renouf, C., Feinberg, G., Rosenthal, S., & Marlon, J. (2014). Public perceptions of the health consequences of global warming. Yale University.

Narayanan, A. & Keellings, D. (2025). Rise in heat related morality in the United States. *PLOS Climate*, 4(8). https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000610

R Core Team. (2024). R: A language and environment for statistical computing (Version 4.4.3) [Computer software]. R Foundation for Statistical Computing.

Samuels, L., Nakstad, B., Roos, N., Bonell, A., Chersich, M., Havenith, G., Lutchers, S., Day, L., Hirst. J. E., Singh, T., Elliot-Sale, K., Hetem, R., Part, C., Sawry, S., Le Roux, J., Kovats, S. (2022). Physiological mechanisms of the impact of heat during pregnancy and the clinical implications: review of the evidence from an expert group meeting. *International Journal of Biometeorology*, 66(8), 1505-1513, https://doi.org/10.1007/s00484-022-02301-6

Sarfaty, M., Bloodhart, B., Ewart, G., Thurston, G. D., Balmes, J. R., Guidotti, T. L., & Maibach, E. W. (2015). American Thoracic Society member survey on climate change and health. *Annals of the American Thoracic Society*, 12(2), 274–278. https://doi.org/10.1513/AnnalsATS.201410-460BC

Sarfaty, M., Kreslake, J. M., Casale, T. B., & Maibach, E. W. (2016). Views of AAAAI members on climate change and health. *The Journal of Allergy and Clinical Immunology: In Practice*, 4(2), 333–335. https://doi.org/10.1016/j.jaip.2015.10.019

Sartin, E., Metzger, K. B., & Maheshwari, J. (2023). U.S. caregivers' attitudes and risk perceptions toward pediatric vehicular heatstroke: A national survey. *Accident Analysis & Prevention*, 190, 107147. https://doi.org/10.1016/j.aap.2023.107147

Schaffner, B., Shih, M., Ansolabehere, S., & Pope, J. (2025). Cooperative Election Study Common Content, 2024 (Version V9) [Dataset]. Harvard Dataverse. https://doi.org/10.7910/DVN/X11EP6

Sommer, L. (2021, October 3). Heat waves are dangerous during pregnancy, but doctors don't often mention it. NPR. https://www.npr.org/2021/10/03/1041992916/pregnant-risk-heat-wave-climate-change

Syed, S., O'Sullivan, T. L., Phillips, K. P. (2022). Extreme Heat and Pregnancy Outcomes: A Scoping Review of the Epidemiological Evidence. *International Journal of Environmental Research and Public Health*, 19(4), 2412, https://www.mdpi.com/1660-4601/19/4/2412

Székely, M., Carletto, L., & Garami, A. (2015). The pathophysiology of heat exposure. *Temperature*, 2(4), 452–464. https://doi.org/10.1080/23328940.2015.1051207

Tamney, J. B., Johnson, S. D., Burton, R. (1992). The Abortion Controversy: Conflict Beliefs and Values in American Society. *Journal for the Scientific Study of Religion*, 31(1), 32-46, https://www.jstor.org/stable/1386830

United Nations Environment Programme. (1987). Montreal Protocol on Substances that Deplete the Ozone Layer (1522 U.N.T.S. 3). https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-2-a&chapter=27&clang=_en

U.S. Census Bureau. (n.d.). Annual Estimates of the Resident Population for the United States, Regions, States, District of Columbia and Puerto Rico: April 1, 2020 to July 1, 2024 (NST-EST2024-POP), Vintage 2024 [Dataset]. State Population Totals: 2020-2025. Retrieved March 8, 2026, from https://www.census.gov/data/tables/time-series/demo/popest/2020s-state-total.html

U.S. Environmental Protection Agency. (2024). Climate change indicators in the United States (5th ed., EPA 430-R-24-003). https://www.epa.gov/climate-indicators

U.S. Environmental Protection Agency. (2025, August 22). *Extreme heat*. https://www.epa.gov/climatechange-science/extreme-heat

Wesselink, A. K., Gausem, E. L., Spangker, K. R., Hystad, P., Kirwa, K., Willis, M. D., Wellenius, G. A., & Wise, L. A. (2024). Exposure to ambient heat and risk of spontaneous abortion: A case–crossover study. *Epidemiology*, 35(6), 864–873. https://doi.org/10.1097/EDE.0000000000001774

Wilkins-Huag, L. (2020). Genetic innovations and our understanding of stillbirth. *Human Genetics*, 139(9), 1161-1172. https://doi.org/10.1007/s00439-020-02146-2

Xu, Y., Chen, J., Du, J., & Jin, Y. (2024). Knowledge, attitudes, and practices among the general community population toward heatstroke. *Frontiers in Public Health,* 12. https://doi.org/10.3389/fpubh.2024.1373025