



Research article

Parents' perspectives about discussing climate change during well-child visits

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ABSTRACT

Objectives: The American Academy of Pediatrics recommends discussing climate change with parents, particularly at well-child visits; however, parental opinions about receiving climate change information at their child's checkup are largely unknown. This exploratory study examines: (1) parents' perspectives on frequency of climate change discussions during well-child visits and if climate change should be incorporated into well-child visits; and (2) associations between parents' perspectives about climate change and if climate change should be incorporated into well-child visits.

Methods: We conducted cross-sectional surveys with parents of children 0–17; parents were recruited from the waiting rooms of two clinics and an online recruitment repository. The survey included investigator-developed questions about guidance around climate change during well-child visits and questions from the Climate Change in the American Mind survey. Descriptive statistics were used to examine frequencies, means, and standard deviations. Logistic regression was used to examine associations between perspectives about climate change and how climate change should be incorporated into well-child visits.

Results: A total of 371 parents (71% of those approached) completed the survey. Four percent of parents reported that global warming was discussed during their child's well visits over the past year. Eighty percent strongly agreed or agreed that the impact of global warming on their child's health should be discussed during their well visits. Fewer thought preparing for global warming (57%), reducing global warming (55%), or talking to decision makers about global warming (38%) should be covered. There were significant positive associations between parents' perceptions about global warming and their agreement that global warming should be incorporated into well-child visits.

Conclusion: Results of this exploratory study suggest parental interest in incorporating climate change into well-child visits. Further research should be conducted with a larger, more diverse population, consider perspectives of providers and children, and develop best practices for inclusion of climate change into the pediatric medical home.

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Climate change (also called global warming) is a public health crisis with detrimental effects on children's health including worsening allergies and asthma, heat-related illnesses, vector-borne infectious diseases, and physical and emotional trauma [1–3]. Climate change also disproportionately affects marginalized and minoritized communities; addressing it is critical to promoting health equity and social justice [4,5].

The American Academy of Pediatrics (AAP) encourages pediatric healthcare providers to engage on climate change. The AAP's climate change policy statement encourages the use of “existing anticipatory guidance as a framework for discussing climate change with families [1].” Several barriers to physicians adopting this guidance exist including: (1) limited time; (2) pediatric providers' lack of knowledge about climate change; and (3) concern about parents' perceptions of a politicized topic. Including parents in the development of anticipatory guidance and health education initiatives within the pediatric primary care space is a tenet of family-centered care [6,7]. However, little is known about parents' perspectives regarding the importance of climate change as a topic for well-child visits. Elucidating parents' perspectives is an important step toward incorporating climate change into routine pediatric practice.

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The goals of this study include examining: (1) parents' perspectives on the frequency of climate change discussions during well-child visits and if climate change should be incorporated into well-child visits; and (2) associations between parents' perspectives about climate change and if climate change should be incorporated into well-child visits.

Methods

Study design and setting

We utilized a cross-sectional, convenience sampling study design. Participants were intentionally recruited from three sites in the Pittsburgh, PA area: 1) an urban academic clinic; 2) a suburban practice; and 3) Pitt + Me, an online recruitment repository of 240,000 individuals interested in participating in research. The University of Pittsburgh Institutional Review Board deemed this study exempt.

Measures

Questions regarding climate change beliefs were taken from the Climate Change in the American Mind survey developed by the Yale Program on Climate Change Communication [8]. The survey included four domains. Importantly, although the Yale Program on Climate Change Communication uses the term "climate change" broadly on their website, their survey questions use the term "global warming" [8]. Therefore, we also used the term "global warming" throughout the survey.

Parents' overall perceptions about climate change: We queried parents' overall perceptions about climate change, taken from the Climate Change in the American Mind survey, which included three items: (1) whether global warming is happening (yes, no, never heard of global warming, not sure); (2) why it is happening (human activities, natural, not happening, not sure); (3) and how worried a participant is that it will impact their child's health (4-point Likert scale from strongly agree to strongly disagree).

Participant sociodemographics. Participant sociodemographics included parent age, parent's race (white, Black, or Other), parent's education (graduated high school, some college, graduated college, masters or doctorate degree), and child's age for all children ages 0 to 17. For child's age, we asked parents with one child to report the age of their child in years. For parents with more than one child, we asked them to report the age of their eldest and youngest child only (age 0 to 17). We also asked parents if they have a child old enough to understand the meaning of global warming; for those who selected yes, we asked them to check the ages of their child(ren) who understand global warming.

Parents perceptions about climate change during well child visits. We asked if global warming was discussed during well-child visits in the past 12 months (yes/no). Next, we asked a question about whether parents thought their child's doctor would know the answers to their questions on global warming (4-point Likert scale, strongly agree to strongly disagree). Finally, we queried if five specific climate change related topics should be discussed during well-child visits: (1) how global warming affects child health; (2) how families should prepare for global warming; (3) how to reduce global warming; (4) how to talk with decision makers about global warming; and (5) how to address child stress around global warming (4-point Likert scale strongly agree to strongly disagree). We only presented the last question to parents who first reported that they have a child old enough to understand the meaning of climate change. All questions about climate change and well-child visits were developed by investigators.

Prior to data collection, we pilot tested the questions with six parents (ages 30–50; 4 women, 2 men), reviewed the survey with them in detail, and revised the questions based on their feedback. All questions were framed within the context of a well-child visit.

Participants and data collection

Eligible parents: 1) were \geq age 18; 2) had a child age 0–17; and 3) were comfortable taking the survey in English. Recruitment occurred from December 2019 to April 2020. For the two clinical sites, a research assistant recruited participants from the waiting room. Information about the study was posted on the Pitt + Me website; interested participants contacted the research team. Participants completed the 15-minute survey on the REDCap software program.

Data analysis

Surveys with more than 50% missing data were removed ($n = 11$); missing data were otherwise retained in the analysis. One parent was also removed as the ages of their children were not below 18. Another 8 participants reported that their eldest child was older than 18; however, because their younger child was less than 18 these participants met inclusion criteria and their data was retained. Descriptive statistics were used to examine frequencies, means, and standard deviations.

We built adjusted logistic regression models to test associations between parents' perspectives about whether global warming is happening and all 5 measures on if global warming should be incorporated into well-child visits. For these models, we created binary variables; for the question about whether global warming is happening, we grouped parents who said that it is happening as "yes" and those who either did not know or said it wasn't happening as "no." For all outcomes on incorporating global warming into well-child visits, we grouped strongly agree and agree as "agree" and strongly disagree and disagree as "disagree." We built similar multivariable models to examine associations between how worried parents are that global warming will affect their child's health and the 5 measures on incorporating global warming into well-child visits. We created a binary variable for how worried parents are about global warming affecting children's health: very worried or worried was labelled as "worried" and not very worried or not at all worried was labelled as "not worried." All models were adjusted for parents' race, age, gender, and education.

Results

A total of 524 parents were approached in the waiting room or reached out on Pitt + Me to express their interest in the study. Of these, 371 participated (71%). The majority (204: 55%) were recruited from Pitt + Me; 122 (33%) were recruited from the suburban practice; and 45 (12%) from the urban academic practice. Most identified as female (305; 82%), were ages 35–44 (155; 42%), non-Hispanic white (303; 82%), and college graduates (236; 63%). Three hundred and thirteen parents (84%) believed global warming is happening; 251 (68%) reported it is caused by human activities; and 263 (71%) worried about the impact of global warming on their children's health. A total of 158 parents (43%) thought their child (or children) was old enough to understand the meaning of global warming; the majority of these children were age 8 or older (Table 1). Only 14 parents (4%) reported that their pediatric provider had discussed global warming during their child's well-child visit in the past year (Table 2).

In terms of parents' perspectives about including global warming during well-child visits, 295 (80%) strongly agreed or agreed that pediatric providers should discuss how global warming affects children's health. For parents who felt they have children old enough to understand the meaning of global warming, 133 (84%) wanted pediatric providers to talk about what to do if a child is feeling stressed about global warming. Two hundred and thirteen parents (57%) thought pediatric providers should discuss how to prepare for global warming and 201 (55%) strongly agreed or agreed with discussions about how families can help reduce global warming. Fewer (139;

Table 1
Participant sociodemographic characteristics and attitudes about climate change.

Sociodemographic characteristic	N (%)
Parent Age	
18–24	16 (4%)
25–34	121 (33%)
35–44	155 (42%)
45 or older	79 (21%)
Gender	
Male	65 (17%)
Female	305 (82%)
Non-binary	1 (0.3%)
Education	
High school degree or less	53 (14%)
Some college	80 (22%)
Graduated college	105 (28%)
Masters level or higher	131 (35%)
Missing	2 (0.5%)
Ages of children (0–17) in years	
Only child (for parents with 1 child)	6.7 (sd:6, range 0–17)
Eldest child (for parents with more than 1 child)	9.5 (sd: 5, range 1–24) ^a
Youngest child (for parents with more than 1 child)	4.8 (sd: 4; range 0–17)
Race and ethnicity	
Black or African American	40 (11%)
White	303 (82%)
Other ^b	28 (8%)
Has a child ages 0–17 who the parent believes understands the concept of climate change	
Yes	158 (43%)
No	212 (57%)
Missing	1 (0.3%)
Age of child(ren) who the parent believes understands the concept of climate change ^c	
Less than 1	3 (2%)
1–3 years old	5 (3%)
4–7 years old	30 (19%)
8–11 years old	63 (40%)
12–14 years old	51 (32%)
15 to 17 years old	63 (40%)
Attitudes about climate change	N (%)
Is global warming ^d happening	
Yes	313 (84%)
No	18 (5%)
Haven't heard	0 (0%)
I am not sure	38 (10%)
Missing	2 (0.5%)
What is causing global warming?	
Mostly human activities	251 (68%)
Mostly natural changes	60 (16%)
None, because global warming isn't happening	10 (3%)
I am not sure	50 (13%)
How worried are you that global warming will impact your children's health?	
Very worried	104 (28%)
Somewhat worried	159 (43%)
Not very worried	81 (22%)
Not at all worried	25 (7%)
Missing	2 (0.5%)

^a : The maximum age for “eldest child” is 24 as 8 individuals wrote the age of their eldest child who was older than 17. As their youngest child was 17 or younger, these participants were included in the data analysis.

^b : “Other” for participants’ racial and ethnic identification includes American Indian or Alaska Native, Asian, Hispanic/Latino, Native Hawaiian or Pacific Islander, or Multiracial.

^c : Total number is 215 as some participants selected having more than one child who they believed was old enough to understand what global warming means. The percentages here are calculated with a denominator of 158 as only parents who said they have a child old enough to understand what global warming means were asked this question.

^d : Global warming was defined for parents in the following way, adapted from the “Climate Changed in the American Mind” survey through the Yale Program in on Climate Change Communication: *Global warming refers to the idea that the world's average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world's climate may change as a result.*

Table 2
Perspectives about climate change discussions during well-child visits^a.

In the past 12 months, has your child's doctor talked with you about global warming ^b during a well-child visit?	
Yes	14 (4%)
No	356 (96%)
Missing	1 (0.3%)
If I had a question about how global warming affects my child's health, my child's doctor would know the answer.	
Strongly agree	62 (17%)
Agree	172 (46%)
Disagree	104 (28%)
Strongly disagree	31 (8%)
Missing	2 (0.5%)
My child's doctor should talk with me about how global warming could affect my child's health.	
Strongly agree	107 (29%)
Agree	188 (51%)
Disagree	53 (14%)
Strongly disagree	21 (6%)
Missing	2 (0.5%)
My child's doctor should talk with me about how my family should prepare for global warming.	
Strongly agree	45 (12%)
Agree	168 (45%)
Disagree	113 (30%)
Strongly disagree	43 (12%)
Missing	2 (0.5%)
My child's doctor should talk with me about how I can help reduce global warming.	
Strongly agree	58 (16%)
Agree	143 (39%)
Disagree	123 (33%)
Strongly disagree	45 (12%)
Missing	2 (0.5%)
My child's doctor should talk with me about how I can talk to decision makers (politicians, school principals, community leaders) about reducing global warming.	
Strongly agree	36 (10%)
Agree	103 (28%)
Disagree	172 (46%)
Strongly disagree	58 (16%)
Missing	2 (0.5%)
My child's doctor should talk with me about what to do if my child is feeling stressed about global warming. ^c	
Strongly agree	49 (31%)
Agree	84 (53%)
Disagree	13 (8%)
Strongly disagree	9 (6%)
Missing	3 (2%)

^a : Well-child visits were defined for participants in the following way: *When you are answering these questions, please think about your child's well-child visits (also called a physical exam or routine visit).*

^b : Global warming was defined for parents in the following way, adapted from the “Climate Changed in the American Mind” survey through the Yale Program in on Climate Change Communication: *Global warming refers to the idea that the world's average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world's climate may change as a result.*

^c : Total n = 158, because only parents who stated they had a child old enough to understand the meaning of global warming were asked this question.

38%) reported pediatric providers should review how to talk to decision makers about global warming. Two hundred and thirty-four participants (63%) strongly agreed or agreed that pediatric providers would know the answer to their questions about how global warming affects children's health (Table 2).

Adjusted logistic regressions showed that parents who believed global warming is happening and were strongly worried or worried that their children's health could be impacted by global warming had significantly higher odds of strongly agreeing or agreeing that climate change should be incorporated into well-child visits for all five measures (Table 3).

Table 3

Adjusted odds ratios of parents' perspectives about incorporating climate change into well-child visits based on whether they believe climate change is happening and if they are worried about how climate change will impact their child's health^a.

	Global warming ^b is happening	Am worried about how global warming will impact my child's health
My child's doctor should talk with me about how global warming could affect my child's health.	5.9 (3.1, 11)***	13.6 (7.3, 25.2)***
My child's doctor should talk with me about how my family should prepare for global warming.	2.6 (1.4, 4.7)**	5.5 (3.3, 9.2)***
My child's doctor should talk with me about how I can help reduce global warming.	3.2 (1.7, 6.2)***	6.2 (3.6, 10.7)***
My child's doctor should talk with me about how I can talk to decision makers (politicians, school principals, community leaders) about reducing global warming.	2.1 (1.1, 4.2)*	5.6 (3.0, 10.4)***
My child's doctor should talk with me about what to do if my child is feeling stressed about global warming. ^c	7.1 (2.2, 23.4)**	7.6 (2.6, 22.2)***

* $P < 0.05$.

** $P < 0.01$.

*** $P < 0.001$.

^a : Adjusted for parent's race, gender, age, and education.

^b : Global warming was defined for parents in the following way, adapted from the "Climate Changed in the American Mind" survey through the Yale Program in on Climate Change Communication: *Global warming refers to the idea that the world's average temperature has been increasing over the past 150 years, may be increasing more in the future, and that the world's climate may change as a result.*

^c : Only parents who stated they have a child old enough to understand the meaning of global warming ($n = 158$) were asked this question.

Discussion

This study is the first to our knowledge to examine parents' perspectives about discussing climate change during well-child visits. While most parents believed pediatric providers should discuss the impact of climate change on children's health, only 4% reported receiving this type of guidance during well-child visits. This gap suggests a discrepancy between climate change related anticipatory guidance delivered by pediatric providers with what is desired by parents. Such a mismatch is similar to results from a study on adult patients, which showed that patients have high trust in their health-care providers' knowledge about global warming; however, few reported speaking about climate change during medical visits [9]. Our findings suggest that parent buy-in to discussing climate change during pediatric visits—in alignment with AAP recommendations—may already exist.

Parents were most interested in discussing the implications of climate change on child health and well-being, with fewer agreeing on discussing carbon mitigation or talking with decision makers. This could be because climate change is heavily politicized [8], and parents may not feel comfortable discussing climate change advocacy during visits. Connecting the health implications of climate change back to an individual child's health could enable focused conversations around climate change during well-child visits and engage parents in the connection between climate change advocacy and their family's well-being.

The majority of parents wanted information from pediatric providers about supporting children feeling stressed by the climate crisis. Eco-anxiety, defined as anxiety related to the global climate crisis, disproportionately affects young people and can cause a range of mental health symptoms [10,11]. Results from our study suggest that pediatric providers have a responsibility to support parents in discussing climate change with their children, especially in the context of children experiencing eco-anxiety.

We found that parents who believe that climate change exists or were worried it could impact their children's health were significantly more likely to want climate change discussions incorporated into well-child visits. While not surprising, it does suggest that different strategies may be needed for parents depending on their opinions about climate change. One potential solution is to integrate discussion on the health implications of climate change within routine health promotion and screening topics (e.g., mental health, healthy diets, heat and sun protection, disaster preparedness) and within relevant disease management topics (e.g., asthma and allergic diseases, climate-sensitive infectious illnesses, etc.; [12])

We recognize limitations to this study. We used the term "global warming" in the survey to remain in alignment with the Climate Change in the American Mind survey, while much of the academic literature (including the AAP Policy Statement) uses the term "climate change." We recognize that participants may interpret the terms "global warming" and "climate change" differently. The results may lack generalizability, since surveys were conducted in one region in the US with limited racial and ethnic diversity (although consistent with the overall sociodemographics of Allegheny County [13]). The predominance of parents identifying as female and non-Hispanic white is important as opinions about climate change vary across demographic groups. For example, according to the Yale Climate Change Communication Program [8], women are slightly more likely than men and non-Hispanic white individuals slightly less likely than minoritized individuals to believe climate change is happening. This study used a convenience sampling approach; thus, those who participated may be more likely to be interested in this topic. Further, we recognize there may be differences in opinions between participants recruited from the two clinics versus the online recruitment repository although this exploratory study was underpowered to examine these differences.

Limitations notwithstanding, results from this exploratory study set the stage for future studies in multiple US regions with diverse groups of parents to elucidate the climate and child health topics most likely to resonate with parents experiencing different climate-driven health threats. More in-depth studies examining the perspectives of parents who do not believe in climate change is critical to determine what strategies may work for them. Studies are also needed to explore pediatric providers' perceptions about if and how they are addressing climate change now and recommendations for incorporating climate change during well-child visits. Studies may consider asking about other opportunities in the pediatric medical home to incorporate climate change (e.g., asthma follow up visits, sports physicals, mental and behavioral health care), as we recognize well-child visits already are full of many demands. Future research should build upon parent perspectives by examining the opinions of children and adolescents, as children may inspire their parents' climate change advocacy [14].

These results also suggest the need for innovations within the pediatric medical home to include climate change. Future efforts to enhance pediatricians' skills and behaviors include incorporating the topic of climate change in Bright Futures guidelines, developing patient-centered education and resources sheets, and creating EMR templates for conversations about climate change during well-child visits. Climate change is increasingly understood as a social

determinant of health [15] that leads to both worsening child health inequities and increased healthcare costs. This broader context may serve to further build consensus around and justify inclusion of climate change in routine pediatric practice. Climate change content should also be incorporated into medical education and evaluated in standardized exams, including the American Board of Pediatric exams.

Conclusion

Climate change is one of the greatest health threats of our time, posing disproportionate harm to children. Our exploratory study suggests parental interest in learning about climate change during well-child visits, particularly how the changing climate impacts child health. Results set the stage for developing best practices to intentionally incorporate climate change into the pediatric medical home.

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Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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