

IN THE SUPREME COURT OF THE STATE OF MONTANA
Case No. DA 23-0575

RIKKI HELD, et al., Plaintiffs and Appellees

v.

STATE OF MONTANA, et al., Defendant and Appellants

**BRIEF OF *AMICI CURIAE* PUBLIC HEALTH EXPERTS AND DOCTORS
IN SUPPORT OF PLAINTIFFS-APPELLEES SEEKING AFFIRMANCE**

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TABLE OF CONTENTS

TABLE OF AUTHORITIES ii

STATEMENT OF INTEREST OF *AMICI CURIAE*1

STANDARD OF REVIEW4

SUMMARY OF KEY FINDINGS AND CORROBORATING PEER-
REVIEWED MEDICAL LITERATURE.....5

 I. Respiratory Issues.....5

 II. Extreme Heat Impacts.11

 III. Mental Health Harms.16

 IV. Additional Harm Buttressing the District Court’s Findings of Fact.....21

CONCLUSION23

CERTIFICATE OF COMPLIANCE.....24

APPENDIX A.....25

TABLE OF AUTHORITIES

Cases

<i>Clark Fork Coal. v. Mont. Dep’t of Nat. Res. & Conservation</i> , 2021 MT 44, 403 Mont. 225, 481 P.3d 198.....	4
<i>Cusenbary v. U.S. Fid. & Guar. Co.</i> , 2001 MT 261, 307 Mont. 238, 37 P.3d 67	4
<i>Holtz v. Diesz</i> , 2003 MT 132, 316 Mont. 77, 68 P.3d 828	4
<i>Park Cnty. Env’t Council v. Mont. Dep’t of Env’t Quality</i> , 2020 MT 303, 402 Mont. 168, 477 P.3d 288.....	4

Constitutional Provisions

Mont. Const. art. II, § 15.....	4
Mont. Const. art. II, § 3.....	4
Mont. Const. art. IX, § 1	4

Rules

Mont. R. Civ. P. 52	4
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Books

BRITT WRAY, <i>GENERATION DREAD: FINDING PURPOSE IN AN AGE OF CLIMATE ANXIETY</i> 31 (2023) (paperback edition).....	20
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Medical and Scientific Journals

Augustina Delaney et al., <i>Population-Based Surveillance of Birth Defects Potentially Related to Zika Virus Infection—15 States and U.S. Territories</i> , 67 MORBIDITY & MORTALITY WKLY. REP. 91 (2016).....	23
Ava Orr et al., <i>Sustained Efforts on Lung Function in Community Members Following Exposure to Hazardous PM_{2.5} Levels from Wildfire Smoke</i> , TOXICS, Aug. 5, 2020.....	10

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- Gennaro D’Amato et al., *Climate Change and Respiratory Diseases*. 23 EUR. RESPIRATORY REV. 161 (2014).....7

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- Heather L. Brumberg et al., *Ambient Air Pollution: Health Hazards to Children*, 6 PEDIATRICS 147 (2021), <https://doi.org/10.1542/peds.2021-051484>.....7
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- Joshua Graff Zivin & Jeffrey Shrader, *Temperature Extremes, Health, and Human Capital*, 26 FUTURE OF CHILD. 31 (2016), <https://eric.ed.gov/?id=EJ1101427>....16
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Patricia To et al., <i>The Impact of Wildfires on Mental Health: A Scoping Review</i> , BEHAV. SCIS., Sept. 2021	19
Paul J Edelson et al., <i>Climate Change and the Epidemiology of Infectious Diseases in the United States</i> , 76 CLINICAL INFECTIOUS DISEASES 950 (2023).....	23
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<i>Living with Allergies</i> , AM. COLL. ALLERGY, ASTHMA, & IMMUNOLOGY, https://acaai.org/allergies/management-treatment/living-with-allergies/ (last visited Mar. 18, 2024)	8
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STATEMENT OF INTEREST OF *AMICI CURIAE*¹

Amici curiae comprise a group of both Montana-based and nationally recognized experts in medicine, population health, and related fields who bring a broad spectrum of scientific insight into the public health benefits of climate solutions and the corollary health dangers of inaction. Their overarching assessment is that the District Court's findings are entirely in line with what has been documented in the scientific literature.

Amicus Susan Clayton is Professor and Chair of Psychology at the College of Wooster in Ohio. She has over one hundred publications on topics ranging from climate change, to the environment, to mental health. She served as a lead author for the Sixth Assessment Report from the Intergovernmental Panel on Climate Change and is a co-editor of the book, *PSYCHOLOGY AND CLIMATE CHANGE: HUMAN PERCEPTIONS, IMPACTS, AND RESPONSES*, published in 2018.

¹ *Amici curiae* certify that no counsel for any party authored this brief in whole or in part, and no person or entity other than *amici curiae* and their counsel made a monetary contribution intended to fund its preparation or submission. Shevani Mehta, University of Virginia School of Law '25, and Hana Verwilt, University of Virginia School of Law '24, are students in the Environmental Law and Community Engagement Clinic and contributed substantially to the research, writing, and editing of this brief.

Amicus Mariela Herrera is a child psychiatrist in Billings, Montana, where she serves as Associate Program Director of the Billings Clinic Psychiatry Residency. Her areas of expertise include trauma-informed care for youth exposed to neglect and abuse, and expansion of psychiatric services to underserved rural populations.

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Amicus Frederica Perera is Professor of Public Health and the Founding Director of the Columbia University Center for Children's Environmental Health in New York. She is internationally recognized for her research and is the author of CHILDREN'S HEALTH AND THE PERIL OF CLIMATE CHANGE, published by Oxford University Press.

Amicus Gregory Wellenius is Professor of Environmental Health and the founding Director of the Center for Climate and Health at Boston University. He is a leading epidemiologist who heads a group of researchers studying the adverse health impacts of extreme weather events, air pollution, and other climate-relevant hazards.

Amicus Caren Solomon is Associate Professor of Medicine at Harvard Medical School and a physician at Brigham and Women’s Hospital. She is a Deputy Editor of the NEW ENGLAND JOURNAL OF MEDICINE, where she oversees articles related to fossil-fuel pollution, climate change, and health.

Amicus Allison Young is a practicing pediatrician in Missoula, Montana at the Western Montana Clinic. She serves on the Executive Board for the Montana Chapter of the American Academy of Pediatrics (“AAP”) and is the chair of the Montana AAP’s Climate Committee.

In total, 113 public health experts and doctors and 17 accredited organizations join this brief. All signatories are listed in Appendix A.

Amici curiae affirm that the medical literature on public health strongly supports the District Court’s factual findings that climate change is creating serious respiratory, extreme heat, and mental health harms which are being realized by Appellees today. The harm is acute and immediate. Further, the District Court’s findings represent just a fraction of the public health risks that Appellees face—the proverbial tip of the iceberg.

STANDARD OF REVIEW

The District Court’s findings of fact on the public-health harms suffered by Appellees are entitled to deference under the “clearly erroneous” standard. Mont. R. Civ. P. 52; *see also Holtz v. Diesz*, 2003 MT 132, ¶ 15, 316 Mont. 77, 68 P.3d 828. These findings include, but are not limited to, the District Court’s determination that climate change “specifically” and “already” harms Appellees. *See* District Court’s Findings of Fact, Conclusions of Law, and Order (Doc. 405), at 26-34; 46-64 (entered Aug. 14, 2023). Pure questions of law are reviewed *de novo*. *See Cusenbary v. U.S. Fid. & Guar. Co.*, 2001 MT 261, ¶ 9, 307 Mont. 238, 37 P.3d 67.

The District Court’s factual and legal conclusions were properly premised on its appreciation that Montana’s Constitution guarantees “certain inalienable rights” including the “right to a clean and healthful environment.” Mont. Const. art. II, § 3; *see also id.* § 15; *id.* art. IX § 1. Thus, “[t]he right to a clean and healthful environment is a fundamental right which government action may not infringe except as permissible under strict constitutional scrutiny.” *Clark Fork Coal. v. Mont. Dep’t of Nat. Res. & Conservation*, 2021 MT 44, ¶ 47, 403 Mont. 225, 481 P.3d 198 (citations omitted); *Park Cnty. Env’t Council v. Mont. Dep’t of Env’t Quality*, 2020 MT 303, ¶ 86, 402 Mont. 168, 477 P.3d 288 (holding laws are unconstitutional when

“they substantially burden a fundamental right and are not narrowly tailored to further a compelling government interest.”).

SUMMARY OF KEY FINDINGS AND CORROBORATING PEER-REVIEWED MEDICAL LITERATURE

I. Respiratory Issues.

The most acute harms that the District Court found are associated with Appellees’ respiratory health and are supported by decades of scientific research. Indeed, the smog and soot pollution attributable to fossil-fuel development has long been understood to represent an immediate threat to public health.² Scientific research—again and again—has documented the role that air pollutants associated with fossil-fuel combustion play in leading to increased incidences of asthma, cardiovascular disease, reduced lung function, and respiratory hospitalization. And these harms are explicitly tied to a worsening climate crisis: the United States Environmental Protection Agency (“EPA”) has projected that 6,240 additional asthma-related emergency room visits and an additional 34,500 cases of asthma will be diagnosed *each year* with 2 degrees Celsius (°C) of global warming.³

² See *State of the Air*, AM. LUNG ASS’N, <https://www.lung.org/research/sota> (last visited Mar. 6, 2024).

³ EPA, CLIMATE CHANGE AND CHILDREN’S HEALTH AND WELL-BEING IN THE UNITED STATES 36, 39 (2023), https://www.epa.gov/system/files/documents/2023-04/CLiME_Final%20Report.pdf.

Even before crossing a perilous, 2°C threshold, physicians and health experts like *amici curiae* are already seeing pediatric respiratory health harms correlated with fossil-fuel use and resulting climate change.⁴ Children exposed to high levels of air pollution suffer higher rates of oxidative stress, inflammation, and endothelial dysfunction.⁵ The cellular damage caused by air pollution contributes to diseases like asthma and cancer.⁶ These same pollutants have also been tied to harms occurring *in utero*, potentially leading to adverse birth outcomes.⁷

The peer-reviewed, scientific conclusions are echoed in the District Court's findings below. Specifically, the court found that Appellees with pre-existing respiratory

⁴ Jill A. Poole, MD, et al., *Impact of Weather and Climate Change with Indoor and Outdoor Air Quality in Asthma: A Work Group Report of the AAAAI Environmental Exposure and Respiratory Health Committee*, 143 J. ALLERGY & CLINICAL IMMUNOLOGY 1702 (2019), <https://www.jacionline.org/action/showPdf?pii=S0091-6749%2819%2930281-7>.

⁵ Caroline J. Smith, *Pediatric Thermoregulation: Considerations in the Face of Global Climate Change*, 11 NUTRIENTS, Aug. 2019, at 1, 12, <https://www.mdpi.com/2072-6643/11/9/2010>.

⁶ See Philip J. Landrigan et al., *The Lancet Commission on Pollution and Health*, 391 LANCET 462, 465 (2018), [https://doi.org/10.1016/S0140-6736\(17\)32345-0](https://doi.org/10.1016/S0140-6736(17)32345-0); see also Heather L. Brumberg et al., *Ambient Air Pollution: Health Hazards to Children*, 6 PEDIATRICS 147 (2021), <https://doi.org/10.1542/peds.2021-051484>.

⁷ Bruce Bekkar et al., *Association of Air Pollution and Heat Exposure with Preterm Birth, Low Birth Weight, and Stillbirth in the US: A Systematic Review*, JAMA NETWORK OPEN, June 18, 2020, at 1.

conditions such as asthma are especially vulnerable to climate change impacts—and that these harms have been corroborated by national medical literature.⁸ Several Appellees have pre-existing respiratory conditions and are experiencing the effects of this increased vulnerability firsthand. *See* Doc. 405, at Findings of Fact ¶¶ 128, 206a [hereinafter Findings] (“Wildfire smoke has harmed the health of Plaintiffs Olivia, Jeffrey, and Nate, all who have pre-existing health conditions.”).

The District Court also found that childhood exposure to air pollution may disrupt physical and cognitive development and worsen conditions such as leukemia and asthma. *See* Findings at ¶ 124. Moreover, expert testimony conclusively demonstrated that anthropogenic climate change is extending the length of allergy season and causing harm to Appellees. *See id.* ¶ 126. The trial court’s findings are buttressed by scientific research confirming that plants produce more pollen when exposed to warmer temperatures and higher levels of carbon dioxide.⁹

⁸ *See* Gennaro D’Amato et al., *Climate Change and Respiratory Diseases*, 23 EUR. RESPIRATORY REV. 161 (2014); Hannah H. Covert et al., *Climate Change Impacts on Respiratory Health: Exposure, Vulnerability, and Risk*, 103 AM. PHYSIOLOGICAL REV. 2507 (2023); Findings at ¶ 128.

⁹ *See* Yong Zhang et al., *Allergenic Pollen Season Variations in the Past Two Decades Under Changing Climate in the United States*, 21 GLOB. CHANGE BIOLOGY 1581 (2015); Lewis H. Ziska & Paul J. Beggs, *Anthropogenic Climate Change and Allergen Exposure: The Role of Plant Biology*, 129 J. ALLERGY & CLINICAL IMMUNOLOGY 27 (2012).

Amici curiae, including organizations like the American Academy of Pediatrics, public health experts, and practicing physicians, can attest to the severity of harms associated with climate-driven allergens. Allergies are unequivocally exacerbated by greenhouse gas pollutants and are the sixth-leading cause of chronic illness in the United States, costing more than \$18 billion annually.¹⁰ At least one Appellee, OLIVIA VESOVICH, suffers from allergies that have grown progressively worse, causing her eyes to swell shut and leading to eye pain that has lasted weeks at a time. *See Findings at ¶ 201b.*

Even more significant—especially in fire-prone states like Montana—is the intense harm associated with exposure to wildfire smoke. A thorough review of the evidence led the District Court to find that Appellee BADGE BUSSE experienced difficulty breathing as a result of wildfire smoke in Kalispell. *See Findings at ¶ 196g.* And the court found that Appellees MICA K. and OLIVIA VESOVICH were diagnosed with exercise-induced asthma, increasing their chances of respiratory harms. *See Findings at ¶¶ 201a, 205f.* Similarly, Appellee CLAIRE VLASES testified that her cross-country practices have been cancelled due to “dangerously smoky air quality conditions,” which limit her ability to train and compete. *Id.* ¶ 202d. These

¹⁰ *Living With Allergies*, AM. COLL. ALLERGY, ASTHMA, & IMMUNOLOGY, <https://acaai.org/allergies/management-treatment/living-with-allergies/> (last visited Mar. 18, 2024).

respiratory effects have impeded Appellees’ ability to live their lives normally, exemplified by OLIVIA’s forced relocation for the summer to avoid the smoke-filled air.¹¹

Peer-reviewed data backs up the District Court’s conclusions about the severe impacts of climate-driven wildfires.¹² Indeed, a 2023 meta-analysis concluded that exposure to wildfire smoke was associated with heightened risks of adverse health outcomes—and especially adverse respiratory health outcomes in adolescents.¹³ Another study compared two Montana communities, Seeley Lake and Thompson Falls, over a three-year period after significant exposure to wildfire smoke at Seeley Lake.¹⁴ The study found the residents of Seeley Lake had decreased lung function when compared to residents of the “similarly sized town of Thompson Falls, MT whose smoke exposure during the same time period was five-fold less” for fine

¹¹ Findings at ¶ 201a (“Olivia feels she is suffocating if she spends more than thirty minutes outdoors.”); *see also, e.g., id.* ¶ 205e (“Mica’s family now avoids camping and other outdoor activities.”).

¹² Wayne E. Cascio, *Wildland Fire Smoke and Human Health*, 624 SCI. TOTAL ENV’T 586, 586 (2018).

¹³ Yiwen Zhang et al., *Health Impacts of Wildfire Smoke on Children and Adolescents: A Systematic Review and Meta-analysis*, 11 CURRENT ENV’T HEALTH REPS. 46 (2023).

¹⁴ Ava Orr et al., *Sustained Efforts on Lung Function in Community Members Following Exposure to Hazardous PM_{2.5} Levels from Wildfire Smoke*, TOXICS, Aug. 5, 2020, at 1.

particulate matter (“PM_{2.5}”).¹⁵ The study confirmed that harms to Seeley Lake residents were “maintained up to two years post smoke exposure.”¹⁶

Amici curiae emphasize that the urgency of the crisis is growing, and that the threat in Montana is escalating. Per a report from the Western Fire Chiefs Association, “In the last 10 years, an average of 61,376 wildfires have occurred per year with an average of 7.2 million acres burned.”¹⁷ The public health harms associated with these wildfires can be tragic. Based on health data from 2018 to 2020, it was estimated that as many as 180 excess deaths occur each year in Montana due to PM_{2.5} air pollution from wildland fire smoke.¹⁸

The human health impact from fires such as these has been robustly documented. Wildfire smoke increases air pollution levels to extremely harmful levels.¹⁹ For

¹⁵ *Id.* at 2.

¹⁶ *Id.* at 10.

¹⁷ *Montana Fire Season: In-Depth Guide*, W. FIRE CHIEFS ASS’N (Feb. 26, 2024), <https://wfca.com/wildfire-articles/montana-fire-season-in-depth-guide>.

¹⁸ Kevin Cromar et al., *Adverse Health Impacts of Outdoor Air Pollution, Including from Wildland Fires, in the United States*, 21 ANNALS THE AM. THORACIC SOC’Y 76, 84 (2024) (citing Di Qian et al., *Air Pollution and Mortality in the Medicine Population*, 376 NEW ENG. J. MED. 2513 (2017)).

¹⁹ Yisi Liu et al., *Health Impact Assessment of the 2020 Washington State Wildfire Smoke Episode: Excess Health Burden Attributable to Increased PM_{2.5} Exposures and Potential Exposure Reductions*, GEOHEALTH, May 1, 2021, at 1, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8101535/>.

youth and young adults like Appellees, worsening air quality is unquestionably detrimental. A study conducted on the West Coast demonstrated a 25% higher rate of asthma-related hospitalizations in five- to nineteen-year-olds when exposed to wildfire smoke, and a 56% higher rate persisting after the fires were extinguished.²⁰ More data collected during the 2011 Pains Bay wildfire in eastern North Carolina retells the same story: elevated levels of air pollution were associated with higher rates of emergency room visits for respiratory diseases in children under age eighteen.²¹

Simply put, the District Court correctly found that extended allergy seasons, wildfire smoke, and other climate-driven factors have coalesced to cause severe, respiratory harm to Appellees.

II. Extreme Heat Impacts.

Extreme heat has negatively impacted Appellees' ability to live their lives normally.

As the District Court found, Appellee RIKKI HELD has experienced climate-change

²⁰ R.J. Delfino, *The Relationship of Respiratory and Cardiovascular Hospital Admissions to the Southern California Wildfires of 2003*, 66 OCCUPATIONAL ENV'T MED. 189, 192 (2009).

²¹ Melissa A. Tinling, *Repeating Cardiopulmonary Health Effects in Rural North Carolina Population During a Second Large Peat Wildfire*, 15 ENV'T HEALTH 12 (2016).

related harms to herself and her family ranch, including problems related to severe flooding, wildfires, and drought. *See* Findings at ¶ 195a. The evidence presented confirmed that RIKKI HELD was needed to work on her family’s ranch regardless of temperature and air quality—at great personal risk. *Id.* ¶ 195g. Similarly, the District Court was persuaded by evidence of a 2018 wildfire, which caused Appellees LANDER and BADGE BUSSE to prepare to evacuate their home. *Id.* ¶ 196h. Lingering smoke, along with extreme heat, forced many Appellees to seek refuge inside. *See id.* ¶¶ 198g, 203a, 207j. The District Court also heard that extreme heat has led to drought and melting glaciers in Montana, causing Appellee CLAIRE VLASES to suffer from water scarcity at her home. *See id.* ¶ 202f.

Appellees have a deep kinship with Montana, in no small part because of their love for outdoor recreation. *Id.* ¶ 201a, 205b. Extreme heat has taken away many of the opportunities for Appellees to enjoy Montana’s unique and threatened environment. Climate-driven heat has forced the cancellation of KIAN TANNER’S soccer practices—an activity that is “foundational to his family.” *See id.* ¶ 198f. Similarly, extreme temperatures have made skiing, fishing, and hunting “unbearable and impossible” for Appellees BADGE and LANDER BUSSE. *Id.* ¶ 196.

Given these documented harms, it is no surprise that Appellees have had to forego athletic training because of extreme heat-related weather. *See id.* ¶¶ 123, 131, 198f, 199d, 200c, 202c, 202d. The District Court was persuaded by the testimony of Appellee GEORGIANNA FISCHER, who explained how her summer Nordic skiing practices have been curtailed and that extreme heat has caused her to feel “dizzy, nauseous, generally unwell, and has caused persistent nosebleeds that led [her] to seek medical attention.” *Id.* ¶ 199d.

Amici curiae, including Montana-based practitioners and nationally renowned experts, are sobered by the District Court’s findings of fact. And these findings are amply backed up by the scientific and medical literature.²² Indeed, scientific research suggests that greenhouse gas pollution is linked to longer, more intense, and geographically broader droughts, especially in the West.²³ Simply stated, extreme heat and rising temperatures associated with climate change have disproportionately negative effects on children.²⁴

²² *See, e.g.*, U.S. Global Change Research Program, THE IMPACTS OF CLIMATE CHANGE ON HUMAN HEALTH IN THE UNITED STATES: A SCIENTIFIC ASSESSMENT (2016), <https://health2016.globalchange.gov/> (describing the varied and significant ways in which climate change is already harming human health around the globe).

²³ *See id.*; Diffenbaugh et al., *Anthropogenic Warming has Increased Drought Risk in California*, 112 PROC. NAT’L ACAD. SCI. 3931 (2015).

²⁴ *See* MARGARETHA BARKHOF ET AL., UNICEF & DATA FOR CHILDREN’S COLLABORATIVE, THE COLDEST YEAR OF THE REST OF THEIR LIVES: PROTECTING

Children are uniquely susceptible to heat-related illnesses, which include heat stroke, heat exhaustion, respiratory disease exacerbations, and renal dysfunction.²⁵ Pregnancy complications are also a concern, as vulnerability begins before birth. Thus, maternal heat exposure has been associated with preterm birth and low birth weight, which may lead to long-term health consequences for the child.²⁶ Extreme heat may also impair learning, as exposure to higher temperatures has been associated with reduced cognitive function and loss of educational achievement.²⁷

CHILDREN FROM THE ESCALATING IMPACTS OF HEATWAVES (2022), <https://www.unicef.org/media/129506/file/UNICEF-coldest-year-heatwaves-and-children-EN.pdf>.

²⁵ Daniel Helldén et al., *Climate Change and Child Health: A Scoping Review and an Expanded Conceptual Framework*, 5 LANCET PLANETARY HEALTH 164, 166 (2021), [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(20\)30274-6/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30274-6/fulltext); Courtney W. Mangus & Therese L. Canares, *Heat-Related Illness in Children in an Era of Extreme Temperatures*, 409 PEDIATRICS REV. 97, 98 (2019), <https://doi.org/10.1542/pir.2017-0322>; Zhiwei Xu et al., *The Impact of Heat Waves on Children's Health: A Systematic Review*, 58 INT'L J. BIOMETEOROLOGY 239, 244 (2013).

²⁶ Matthew F. Chersich et al., *Associations Between High Temperatures in Pregnancy and Risk of Preterm Birth, Low Birth Weight, and Stillbirths: Systematic Review and Meta-Analysis*, BJM, Nov. 4, 2020, <https://doi.org/10.1136/bmj.m3811>; see also Elizabeth O'Nions et al., *Preterm Birth: Educational and Mental Health Outcomes*, 26 CLINICAL CHILD PSYCH. & PSYCHIATRY 750, 750 (2021) (“Findings consistently indicate that on average, children born preterm experience poorer mental health and educational outcomes compared to their term-born peers.”).

²⁷ R. Jisung Park et al., *Learning Is Inhibited by Heat Exposure, Both Internationally and Within the United States*, 5 NATURE HUM. BEHAV. 19, 19 (2021), <https://doi.org/10.1038/s41562-020-00959-9>.

These harms should not be discounted, as some evidence suggests that “heatwaves kill more people [in the United States] than any other weather-related disaster,” with children and infants having an elevated risk of mortality.^{28, 29}

As the District Court correctly found, children lack the developmental capabilities to respond to extreme heatwaves.³⁰ Moreover, high temperatures not only play a critical role in increasing toxicity, but also increase the uptake of pollutants in the atmosphere.³¹ These issues are especially pertinent for student-athletes.³²

An important takeaway here is that when it comes to tolerating extreme heat, children are not merely small adults; they are more susceptible to harm than the population at large.³³

²⁸ BARKHOF ET AL., *supra* note 24, at 14.

²⁹ Joshua Graff Zivin & Jeffrey Shrader, *Temperature Extremes, Health, and Human Capital*, 26 FUTURE OF CHILD. 31, 35 (2016), <https://eric.ed.gov/?id=EJ1101427>.

³⁰ *Id.* at 34-35; Findings at ¶ 121, 123.

³¹ Smith, *supra* note 5, at 11.

³² Zivin & Shrader, *supra* note 29, at 35.

³³ *Id.* (reviewing public health literature on increased mortality risk and rising temperatures).

III. Mental Health Harms.

The District Court understood that climate change and extreme weather can cause severe and wide-ranging mental health harms, including increased levels of harmful stress,³⁴ spikes in psychiatric emergency room visits for depression and suicidal thoughts and behavior,³⁵ and diminished academic performance, with the potential for lifelong impairments.³⁶

These harms affect some of the most elemental aspects of a child's upbringing. Children attending school in areas affected by extreme weather events exhibit diminished performance in reading and numeracy, and adolescents exposed to rising average temperatures experience increased delinquency and aggression.³⁷ One study found that during drought events, emergency room "visits for suicide and mood

³⁴ Caroline Hickman et al., *Climate Anxiety in Children and Young People and Their Beliefs About Government Responses to Climate Change: A Global Survey*, 5 LANCET PLANETARY HEALTH 863, 864 (2021), <https://www.thelancet.com/action/showPdf?pii=S2542-5196%2821%2900278-3>.

³⁵ Kelly Sewell et al., *Impacts of Compounding Drought and Heatwave Events on Child Mental Health: Insights from a Spatial Clustering Analysis*, DISCOVER MENTAL HEALTH, Jan. 2, 2024, at 8.

³⁶ Bradley Patrick White et al., *Mental Health Impacts of Climate Change Among Vulnerable Populations Globally: An Integrative Review*, ANNALS OF GLOB. HEALTH, Oct. 6, 2023, at 1, 8.

³⁷ Jennifer L. Barkin et al., *Effects of Extreme Weather Events on Child Mood and Behavior*, 63 DEVELOPMENTAL MED. & CHILD NEUROLOGY 785, 785-86 (2021).

disorders in youth were 4.48 and 6.32 times higher, respectively, compared to non-drought periods.”³⁸

The District Court reviewed evidence—subject to cross examination—which confirmed that Appellees have suffered and are continuing to suffer significant mental health harms such as these. Worry and dread over climate change and greenhouse gas pollution are harming Appellees’ mental health. Thus, the court found that Appellees feel “distressed,” “anxious,” “stressed,” “helpless[],” and “depressed” due to climate change. *See, e.g.*, Findings at ¶¶ 200f, 202h, 205i. The District Court further found that “[a]s climate disruption transforms communities, some Plaintiffs are experiencing feelings that they are losing a place that is important to them.” *Id.* ¶ 115.³⁹

Abundant research confirms that climate-driven distress alters how children and young adults like Appellees envision their future.⁴⁰ Indeed, mental distress can be so severe that they even question whether they can bring children into an uncertain

³⁸ Sewell et al., *supra* note 35, at 18.

³⁹ Further examples include: RIKKI HELD, who is worried about the effects of climate change on her family ranch, *id.* ¶ 195n; BADGE BUSSE, who feels a sense of loss after a wildfire destroyed and degraded his namesake, Badger Two-Medicine, *id.* ¶ 196k; and KIAN TANNER and MICA K. who are both distressed by the receding glaciers in Glacier National Park, *id.* ¶¶ 198d, 205h.

⁴⁰ Hickman et al., *supra* note 34, at 868.

world. *See, e.g., id.* ¶ 200g (“Even though Grace would like to raise children in Montana, she questions whether she can morally bring children into the world, because of her knowledge and fear of the world that her children would grow up in if climate change is not ameliorated.”); *id.* ¶ 201c (“Olivia would like to have children of her own, but she questions whether this is an option in a world devastated by the effects of climate change.”).

Again, the medical literature backs up the District Court’s findings. *Amici curiae*’s own professional observations confirm that in the wake of climate-related disasters, children may develop post-traumatic stress, obsessive-compulsive disorder, depression, and suicidal thoughts.⁴¹ Research highlights the damaging ways in

⁴¹ SUSAN CLAYTON ET AL., MENTAL HEALTH AND OUR CHANGING CLIMATE: IMPACTS, IMPLICATIONS, AND GUIDANCE 36 (2017), <https://www.apa.org/news/press/releases/2017/03/mental-health-climate.pdf>; *see also* HOESUNG LEE ET AL., CLIMATE CHANGE 2023 SYNTHESIS REPORT: SUMMARY FOR POLICYMAKERS 6 (2023), https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf (“In assessed regions, some mental health challenges are associated with increasing temperatures (*high confidence*), [and] trauma from extreme events (*very high confidence*)...”); Patricia To et al., *The Impact of Wildfires on Mental Health: A Scoping Review*, BEHAV. SCIS., Sept. 2021, at 1, 9 (“In the sub-acute phase post-wildfire, the number of children with significant PTSD symptoms can be as high as 92%.”); Findings at ¶ 116 (“The IPCC has found, with *very high confidence*, that climate change has ‘detrimental impacts’ on mental health and the harms to mental health are expected to get worse.”); *Id.* ¶ 117 (“The 2021 report, Climate Change

which acute harms (*e.g.*, displacement from flooding) can augment the fear and dread about a future out of Appellees' control. It also illustrates how the consequences of climate change may include not just the short-term emotional shock and trauma, but also deleterious lifelong impacts.

Dr. Britt Wray, Ph.D., an instructor in Psychiatry and Behavioral Sciences at Stanford University, has described this phenomenon in stark terms: “Disasters that affect people directly exacerbate mental health disorders; droughts, hurricanes, heatwaves, floods, and wildfires have been shown, time and again, to spike post-traumatic stress disorder, anxiety, depression, suicidality, substance abuse, and other mental problems.”⁴²

The District Court's findings are wholly in accord with medical literature documenting how climate change combines with government inaction to create

and Human Health in Montana, found that ‘[t]he mental health impacts of climate change are profound and varied.’ Extreme weather events, prolonged heat and smoke, and environmental change can all impact mental health and increase feelings of disconnectedness and despair.”) (citations omitted).

⁴² BRITT WRAY, *GENERATION DREAD: FINDING PURPOSE IN AN AGE OF CLIMATE ANXIETY* 31 (2023) (paperback edition).

chronic stress for children and adolescents.⁴³ A recent review of nearly a quarter-century worth of literature on climate change and children’s health confirmed an important research consensus: fear of climate change is leading to serious symptoms of anxiety and depression in younger populations.⁴⁴ Mental health professionals find that stress over the present and future impacts of climate change can cause changes in “behavior, development, memory, executive function, decision-making, and scholastic achievement.”⁴⁵ Children and adolescents become more vulnerable to “increased worry” when they “believ[e] that the governmental responses are unsatisfactory.”⁴⁶ While these mental health harms burden all communities, children living in socially and economically disadvantaged communities are affected first and worst.⁴⁷

⁴³ Tara J. Crandon, *A Social-Ecological Perspective on Climate Anxiety in Children in Adolescents*, 12 NATURE CLIMATE CHANGE 123, 123–24 (2022), <https://doi.org/10.1038/s41558-021-01251-y>; Hickman et al., *supra* note 34, at 864.

⁴⁴ Terra Leger-Goodes et al., *Eco-Anxiety in Children: A Scoping Review of the Mental Health Impacts of the Awareness of Climate Change*, 13 FRONTIERS PSYCH., July 2022, at 1, 3, 7, <https://doi.org/10.3389/fpsyg.2022.872544>; *see also* Hickman et al., *supra* note 34, at 871.

⁴⁵ CLAYTON ET AL., *supra* note 41, at 6.

⁴⁶ Leger-Goodes et al., *supra* note 44, at 7.

⁴⁷ Sewell et al., *supra* note 35, at 13 (“While all children are at risk, ... a higher physical hazard-health burden is shouldered by those in socially and economically overburdened communities and non-English-speaking households.”).

Finally, the District Court's findings underscore a cruel irony: strong attachments to place and community provide many benefits to children like Appellees, such as stability, social connectivity, and crucial networks of support. Yet climate disruptions to Appellees' environment now risk degrading these very same community and familial relationships, harming their physical health and undermining mental acuity. Potential impacts may persist throughout their lifespans.⁴⁸

IV. Additional Harm Buttressing the District Court's Findings of Fact.

As detailed above, the District Court recognized multiple respiratory, extreme heat, and mental health harms associated with climate change. Yet Appellees' injuries only begin to scratch the surface of what the scientific and medical literature confirms: the impacts of climate change on public health are significant and far-reaching. For example, the threat of insect and water borne infectious diseases has increased due to climate change and the risk is projected to compound as temperatures rise.

Greenhouse gas pollution is augmenting the burden of infectious disease on youths, with evidence suggesting that children are particularly vulnerable to zoonotic,

⁴⁸ CLAYTON ET AL., *supra* note 41, at 24-25.

vector-borne, water-borne, and respiratory viruses linked to climate change.⁴⁹ Extreme weather events attributed to climate change can disrupt and contaminate water systems, directly impacting infectious diseases by dispersing pathogens such as waterborne bacteria.⁵⁰ Climate change also alters the ecology, geographic range, and number of disease-carrying mosquitoes and other insects in the United States.⁵¹ In fact, “[c]limate-sensitive vector-borne illnesses transmitted by mosquitoes, ticks, and fleas, including Lyme disease and West Nile virus, tripled [domestically] between 2004-2016.”⁵²

In sum, climate change is accelerating Appellees’ vulnerability to injuries far beyond those confirmed in the courtroom. Among the harms on the horizon for Appellees is increased exposure to insect-borne and water-borne infectious diseases. As *amici curiae* stated at the outset of this brief, the District Court’s findings of fact represent only the tip of the iceberg.

⁴⁹ S.D. Chitre et al., *The Impact of Anthropogenic Climate Change on Pediatric Viral Diseases*, 95 PEDIATRIC RSCH. 496, 497-498, 500 (2024).

⁵⁰ Paul J Edelson et al., *Climate Change and the Epidemiology of Infectious Diseases in the United States*, 76 CLINICAL INFECTIOUS DISEASES 950, 956 (2023); K.F. Cann et al., *Extreme Water-Related Weather Events and Waterborne Disease*, 141 EPIDEMIOLOGY & INFECTION 671 (2013).

⁵¹ RENEE N. SALAS ET AL., 2018 LANCET COUNTDOWN ON HEALTH AND CLIMATE CHANGE BRIEF FOR THE UNITED STATES OF AMERICA 15 (2018); Augustina Delaney et al., *Population-Based Surveillance of Birth Defects Potentially Related to Zika Virus Infection—15 States and U.S. Territories*, 67 MORBIDITY & MORTALITY WKLY. REP. 91, 92 (2016).

⁵² SALAS ET AL., *supra* note 51, at 1.

CONCLUSION

Amici curiae, Public Health Experts and Doctors, are deeply familiar with the peer-reviewed medical and scientific literature on climate change and children's health. The data confirms that the District Court's findings are robustly supported. Based on both national and Montana-specific expertise in public health and medicine, *amici curiae* respectfully ask this Court to AFFIRM the Findings of Fact and Conclusions of Law of the District Court.

Respectfully submitted March 21, 2024.

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CERTIFICATE OF COMPLIANCE

Pursuant to Montana Rule of Appellate Procedure 11(4)(a), I certify that this brief is double spaced, except for those parts allowed by rule to be single spaced, uses a proportionally spaced Times New Roman 14 point font, and contains 4,837 words, excluding those parts not counted by rule.

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- Climate Psychiatry Alliance
- Confluence Public Health Alliance
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⁵³ Titles and organizational affiliations of individual signatories are included for identification purposes only.

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