Addressing Extreme Heat Events and Supportive Campus Resources Among California State University, Northridge Students

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For Real People

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Abstract

As climate change continues to be a lingering issue, so do intensified extreme heat events, such as wildfires, heat waves, and droughts. This reality is especially evident among the San Fernando Valley community, particularly among California University, Northridge (CSUN) undergraduate students. This research addresses how extreme heat events affect students and highlights any necessary resources available on campus and within the community. The study aims to evaluate the awareness and usage of resources available to CSUN students regarding the prevention of heat-related health conditions. The results analysis of a pilot cross-sectional online survey assessed the overall perceived susceptibility to heat-related issues and any benefits and barriers to using available campus resources. These findings aim to promote student well-being and help mitigate heat-related health risks among CSUN students through the development of campus recommendations and external resources.

Introduction

Extreme heat events are becoming an increasingly frequent environmental health issue due to climate change, especially among the students at California State University, Northridge (CSUN), posing significant risks to college students. Many students who regularly commute to campus often face the repercussions of inadequate cooling systems whether in their classrooms, in their vehicles, or even in outdoor areas. Prolonged exposure to urban heat can increase the risk of health conditions such as heat stroke and dehydration. With significant impacts coming from extreme heat, students may lack awareness and utilization of available resources to combat heat-related health issues.

Given that CSUN is the self-proclaimed heart of San Fernando Valley at 356 acres and one of the hottest regions in Los Angeles County, it is crucial to assess the effectiveness of resources that protect students against extreme heat conditions. These resources may include shaded rest areas, hydration stations, and air-conditioned facilities.While the campus currently does have sustainable resource initiatives, such as solar energy and recycling, further research is needed to discover the resources available to students regarding extreme heat.

With this, our research is designed to evaluate the awareness and usage students have towards CSUN resources aimed at preventing heat-related health conditions, as well as to evaluate the effectiveness of those resources. From these objectives, the research question that drives this proposal is: With extreme heat events resulting from climate change, how effective are awareness and usage of CSUN resources in preventing heat-related health conditions among students, and what recommendations or changes could be made upon further research?

Measuring student awareness provides relevant data on the accessibility to heat-related resources and promotes prevention strategies in the event of extreme heat temperatures. We hope

our findings could be a valuable contribution towards campus policies, and safety promotion on campus, and highlight effective practices to combat extreme heat events.

Literature Review

With the steady rise of global warming, extreme heat events are intensifying by the year. CSUN is known as the 'heart' of the SFV, highlighting how these extreme events significantly impact their students. This research aims to assess the gaps in knowledge about different resources and preventative measures used by the institution including available resources county-wide.

Heat related illness can manifest in several different ways, ranging from physical to mental health. Elevated heat can cause violent tendencies, cardiovascular issues, dementia, mood disorders and more (Vasilakopoulou & Santamouris 2025). This can impact students' academic performance vastly as it affects their physiological mechanism, disrupting their body temperature regulation, brain chemistry and more (Vasilakopoulou & Santamouris 2025).

CSUN aims to remain with prevention before it occurs, however, they also have set protocols for when any heat-related illnesses may occur, not only for the students but for the staff and whoever may be present on campus. They offer extensive procedures and training for employees to prepare them for any situation, including students, faculty, and staff. Some methods to support and protect the people of CSUN include emergency alert systems. The Blackboard Connect system is utilized by the Police Services as a warning system to alert all students and faculty about time-sensitive information including heat-related events using mass emails and text messages. Most, if not all, buildings on campus, including the dormitories at CSUN have heaters and air conditioning per California's Division of Occupational Safety and Health (Cal/OSHA). To ensure the safety of those inside the building, it must not reach above 82 degrees Fahrenheit

to prevent heat-related illnesses, primarily targeted at employees in a workplace environment. However, this standard is also honored in institutional places as well. In addition to proper temperature control, cooling centers specifically used for extreme heat-related events are not available on campus; however, the county of Los Angeles has multiple locations varying from city to city.

This research will touch on the students' knowledge of resources available on campus with the inclusion of those outside the institution as well. Some challenges with this research include the students' frequency and knowledge about the campus overall. Csun's high percentage of commuter students may skew the results. Some gaps that this research will cover are the specificities of the location, city, and type of institute. Sources will conclude on locations not specific to the SFV, in addition to a corresponding institution (CSU campuses), therefore addressing the challenges and resources available differs and this research will cover that.

Methodology

The participants of the pilot test study included 60 California State University, Northridge Undergraduate students, freshman to senior, between the ages of 18 and 35. Participants lived more than 5 miles away from campus, in on-campus housing, or less than 5 miles away from campus. Participants were either male, female, non-binary, full-time, or part-time students. Most participants took at least one in-person class, with only two remote students.

Before the survey, participants completed an informed consent form (refer to Appendix A). Students were invited to participate through a QR code flyer posted in class Discord servers, social media accounts of student organizations, high-traffic areas across campus, and student organization events. Participants were self-selected and contributed voluntarily.

A sample size of 268 undergraduate students is ideal for a 90% confidence level and a ±5% margin of error. The pilot test sample size does not satisfy this requirement since only 60 undergraduate students have participated so far. Due to the sub-optimal sample size, data may not be reliable/valid with an approximate ±11% margin of error. In future research, recruiting volunteers to facilitate the survey across multiple high-traffic locations on campus at a consistent frequency prior to the final statistical analysis would ensure our ideal sample size is achieved. Our survey was limited to student organizations and Discord servers of our research team's knowledge. Moving forward, working with the CSUN Institutional Review Board to gain proper authorization to contact college students to participate in the survey would also ensure student commitment and yield a larger sample size if the entire student population was contacted.

The cross-sectional online survey was provided through Google Forms. The survey measured perceived susceptibility to heat-related health issues and extreme heat events, the severity of heat-related health issues/extreme heat, benefits of campus resources, barriers in using those resources, cues to action during extreme heat, and self-efficacy in preventing heat-related issues. The survey consisted of 22 multiple-choice questions and two optional short responses. Participants were either given a Likert scale, set responses, or the option of a short answer for most multiple-choice questions. For example "How effective do you think these resources are in preventing heat-related illnesses? (1 = Not effective → 5 = Very effective)." Short answer responses asked of student recommendations, comments, or concerns regarding extreme heat and campus resources (refer to Appendix B). To assess student awareness of campus resources in preventing heat-related health issues as a result of extreme heat events, data was analyzed through Excel with a focus on mean and percentage.

Results

At the end of the collection data, 60 participants participated in the survey as follows: 36.8% were between the ages of 25-35 and 63.2% were between the ages of 18-24 (refer to Appendix C). About half of the respondents reported that they had experienced heat-related health symptoms. A correlation analysis was conducted between the likelihood of experiencing heat-related health issues was measured from a 5-point Likert scale. The self-reported experience of heat-related issues was questioned as “How likely do you think you are to experience heat-related health issues during extreme heat events? (1 = Not likely and 5 = Very likely)” (refer to Appendix D). A scatterplot of likelihood of experiencing heat-related health issues and reported symptoms are shown in Figure 1 (refer to Appendix F). This analysis revealed a significant positive correlation $r(60) = .45$, $p = .003$, which indicates that the participants who reported a higher likelihood of experiencing heat-related issues were more likely to have experienced symptoms. Participants were also asked “Do you believe extreme heat can negatively impact academic performance? (1 = Disagree and 5 = Highly agree). A majority of 80% of participants indicated that extreme heat negatively impacts their academic performance (refer to Appendix E). Participants rated the extent to which climate change increases the risk of extreme heat events at CSUN, this includes a mean rating of 3.8 on a 5-point scale. Qualitative responses prove these findings to be that 65% of participants noted that limited availability of cooling spaces was a major barrier to utilizing heat-related resources.

Many participants included short responses advocating for more shaded areas on campus, improving air cooling systems in all campus facilities (especially older buildings), making mist fans more accessible in high traffic areas across campus. Most participants listed drinking water as the best practice to prevent heat-related health conditions and some mentioned the school

should provide free water bottles, increasing water stations across campus, and requiring that water is chilled and filtered. Students also mentioned that campus alerts through student email, social media, posters/flyers, and professor recommendations were ways to notify students of heat-related risks and resources.

Discussion

The results from our research provide important information regarding the awareness, perceptions, and utilization of heat-related resources among CSUN students. The apparent connection between the likelihood of experiencing heat-related issues and the reported symptoms highlights the significant impact of extreme heat on students' health. With over half of the participants experiencing symptoms like dizziness, nausea, or headaches, the need for practical and accessible campus resources is evident.

Participants agreed that heat negatively affects academic performance, which further emphasizes the negative effects of this issue. Heat-related discomfort, trouble focusing, and limited cool spaces for studying can disrupt learning. This finding aligns with already known research indicating that extreme heat events can impair cognitive function, and overall academic outcomes.

The data on resource awareness and usage revealed critical gaps. While many students were aware of resources on campus like air-conditioned buildings and emergency alert systems, a few students reported using them. Barriers such as lack of promotion, inconvenience, and limited space in cooling spaces prove that simply having the resources isn't enough. These resources need to be actively and outwardly promoted and made easily accessible.

Encouragingly, students did express interests in improvements, like more campaigns, and easier access to cooling spaces. These suggestions align with the best practices for heat

preparedness, which tells us that students are ready to engage with resources if they are properly informed and supported. Additionally, students' preferences for receiving important information via email, social media, or from in-class announcements helps us to provide clear channels of communication.

Overall, these findings do reveal a need for a practical approach to heat-related health prevention on CSUN campus. Enhancing resource awareness, addressing access barriers, and integrating student feedback into promotion adjustments can create a safer campus environment. We recommend the CSUN campus to prioritize updating campus facilities to ensure that students are receiving adequate cooling systems during peak temperatures. In addition, CSUN should improve cooling stations across the entirety of the campus through mist fans, shaded areas like increased foliage, and more accessible water stations to provide students with chilled and filtered water at any time. We recommend that CSUN monitor peak temperatures and to send alerts to students on what to do in the event of extreme heat and potential symptoms of heat-related illnesses. Future research with a larger sample size would strengthen these conclusions and protect student well being in the face of rising temperatures.

Conclusion

In conclusion, climate change continues to drive more frequent extreme heat events, posing significant risks to CSUN students. Because of this, it is imperative to assess the awareness and utilization of resources available to students in order to effectively mitigate heat-related health risks. This research aims to evaluate the effectiveness and accessibility of campus resources that currently strive to address and prevent heat-related health issues. Not only this, but through systematic surveys, this research highlights the importance of understanding students' perceived benefits and barriers towards accessing campus resources.

By identifying these gaps in awareness and student engagement, our research provides data-based insights to inform strategies towards enhancing resource accessibility and overall student well being. Specific initiatives could include upgrading outdated HVAC systems on campus to provide a wider range of air-conditioned facilities available. Additionally, the campus could expand shaded outdoor areas that could potentially be facilitated by the students themselves through gardening activities. Not to mention, the campus could implement a real-time heat safety alert system that would notify the students through an app, their email, or phone number. All in all, we recommend that CSUN take immediate steps to integrate heat-prevention measures to address current vulnerabilities for students in order to promote sustainable change.

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Appendix A: Informed Consent

Thank you for participating in For Real People's research study. Our study hopes to analyze the effectiveness of awareness of heat-related illnesses/conditions and the utilization of California State University, Northridge (CSUN) campus resources to prevent such health concerns. Through our research we hope to provide any recommendations or changes that will further support CSUN students. ***This survey takes approximately 6 minutes!***

Participation:

- Our only requirement is you must be enrolled as an **undergraduate** student at **CSUN**.
- The survey consists of **22** multiple choice questions & ***2*** *optional short responses.*
- Questions cover **demographic**, **awareness** of heat-related conditions, & **utilization** of campus resources for extreme heat events.
- There are **no direct risks or benefits** in choosing to participate in this study.
- Participation is **voluntary** and we value the time taken to complete this survey!

Confidentiality:

- We ensure that *no personal information is required* to participate in this study. Therefore, no personal identifiers (other than general demographic questions) will be collected, and data will be stored securely.
- Responses will remain anonymous and will strictly be used for research purposes only.

Study Title: California State University, Northridge (CSUN) Student Survey on Extreme Heat/Climate Change, Awareness, and Resource Usage

Purpose of the Study
This study aims to understand how CSUN students perceive the risks of extreme heat, their awareness and usage of available university resources, and how these resources can be improved to prevent heat-related health conditions.

Procedures:
If you agree to participate, you will:

- Complete a **survey** that includes:
- Demographic information
- Multiple-choice questions
- Likert-scale questions
- Short answers

Your participation is entirely **voluntary**!

Risks:
The survey ensures that this survey poses no risks to participants. However, Students may experience discomfort or distress in providing the following information:

- Personal health experiences
- Awareness of climate change
- The risks of extreme heat events

If you feel these apply to you, you may opt out of the survey at any time and your responses will not be recorded.

Benefits:
While you may not receive direct benefits, your participation will contribute to:

- Identifying the gaps in awareness and accessibility of CSUN resources for heat-related conditions.
- Improving policy in the events of extreme heat.
- Enhancing the knowledge of CSUN students heavily impacted by extreme heat.

Confidentiality & Data Protection

- Your responses will be **confidential** and stored securely.
- Any published findings will **not** include identifying information.
- Only the research team will have access to the data.
- The only personal information we require is your first and last name and signature **ONLY** on this form (Consent Form) for legality assurance.

Voluntary Participation & Withdrawal

- Your participation is **entirely voluntary**.
- You may **withdraw at any time** without any consequences.
- If you choose to withdraw, any data you have provided will be **removed from the study**.

Consent Statement

Verify the following:
You have read and understand this consent form.
You voluntarily agree to participate in this study.
You understand that you may withdraw at any time.

By selecting "I agree," you confirm the above statements.

- ☐ I agree (Continue to Survey)
- ☐ I do not agree (Exit Survey)

Appendix B: Survey

Demographic:

1. What age group do you belong in?
   - ☐ 18 - 24 years old
   - ☐ 25-35 years old
   - ☐ 35-44 years old
   - ☐ 45-54 years old
   - ☐ 55-64 years old
   - ☐ 65+ years old
2. How do you identify?
   - ☐ Female
   - ☐ Male
   - ☐ Non-binary
   - ☐ Prefer not to answer.
3. What class year are you in?
   - ☐ Freshman
   - ☐ Sophomore
   - ☐ Junior
   - ☐ Senior
4. Are you a full-time or part-time student?
   - ☐ full-time
   - ☐ part-time
5. Do you take at least one in-person class?
   - ☐ yes
   - ☐ no
6. Do you live on or near campus?
   - ☐ On-campus housing
   - ☐ Within 5 miles of CSUN
   - ☐ More than 5 miles away from campus

Section 1:

7. How likely do you think you are to experience heat-related health issues during extreme heat events? (1 = Very unlikely → 5 = Very likely)

8. Have you ever experienced symptoms of any heat-related illnesses while at CSUN? (e.g. dizziness, nausea, headaches)
   - ☐ Yes
   - ☐ No
9. How concerned are you about the impact of extreme heat on your health and well-being?
   - ☐ Not concerned at all
   - ☐ Slightly concerned
   - ☐ Moderately concerned
   - ☐ Very concerned

Section 2:

10. How serious do you think heat-related illnesses are for college students? (1 = Not at all serious → 5 = Very serious)
11. Do you believe extreme heat can negatively impact academic performance? (1 = Strongly disagree → 5 = Strongly agree)
12. If you agree, in what ways might extreme heat negatively affect academic performance? (Check all that apply)
    - ☐ Trouble focusing
    - ☐ Discomfort
    - ☐ Limited "cool spaces" for studying
    - ☐ It does not affect my academic performance
    - ☐ Other…
13. How much do you think climate change has or will increase the risk of extreme heat events at CSUN? (1 = Not at all → 5 = Significantly)

Section 3:

14. Are you aware of any CSUN resources that help students prevent heat-related health conditions? (Click all that apply)
    - ☐ Environmental Health & Safety Team - Health and Safety: Heat Illness Prevention Program
    - ☐ Campus buildings/facilities with maintained air conditioning
    - ☐ Department of Police Services - Emergency Procedures for Students, Faculty, and Staff: Personal Care During Extreme Heat
    - ☐ CSUN Safety & Security teams
    - ☐ Establishments/Areas providing free water
    - ☐ Shaded/Covered outdoor areas
    - ☐ I am not aware of any resources
    - ☐ Other…
15. How effective do you think these resources are in preventing heat-related illnesses? (1 = Not effective → 5 = Very effective)
16. Have you ever used any of the CSUN resources listed above?
    - ☐ Yes
    - ☐ No
    - ☐

Section 4:

17. If you have NOT used CSUN's heat-related resources, what are the reasons? (Click all that apply)
    - ☐ I didn't know they existed
    - ☐ They are inconvenient to access
    - ☐ They are not well-promoted
    - ☐ I don't think I need them
18. If you HAVE used CSUN's heat-related resources, what challenges did you face? (Click all that apply)
    - ☐ Limited availability of cooling spaces
    - ☐ Difficulty finding a place with free water
    - ☐ Lack of awareness about when/where to access them
    - ☐ No challenges faced
    - ☐ Other…

Section 5:

19. What would encourage you to use CSUN's heat-related resources? (Click all that apply)
    - ☐ More information and awareness campaigns
    - ☐ Easier access to cooling spaces
    - ☐ Text or email heat alerts from CSUN
    - ☐ Peer recommendations
    - ☐ None of the above
    - ☐ Other…
20. Where would you prefer to receive information about heat-related health risks and resources? (Check all that apply)
    - ☐ CSUN email
    - ☐ Social media
    - ☐ Posters/flyers on campus
    - ☐ Professors/instructors mentioning it in class
    - ☐ None of the above
    - ☐ Other…

Section 6:

21. Do you feel confident in your ability to protect yourself from heat-related illnesses? (1 = Not confident at all → 5 = Very confident)
22. What personal strategies do you currently use to stay safe during extreme heat? (Check all that apply)
    - ☐ Drinking more water
    - ☐ Staying in shaded or air-conditioned areas
    - ☐ Wearing lightweight clothing
    - ☐ Avoiding outdoor activities during peak heat hours
    - ☐ I don't take any precautions
    - ☐ Other…

Section 7: *(Optional short response)*

23. What additional resources or improvements would you suggest to help CSUN students stay safe during extreme heat?
24. Do you have any other comments or concerns about extreme heat and student health at CSUN?

(Form is Submitted)

Thank you for your participation!

We value the time you have taken to contribute to For Real People's research study. Your responses have been recorded and will remain anonymous. Please ensure all responses have been recorded and hit submit.

If you have any questions or would like more information about this study in the future visit us at www.forrealpeople.org

https://forms.gle/UgdhTXGuGxo7BXiSA

Appendix C: Table 1 - Age

Age Group	n	%
18-24 years old	38	63.20%
25-35 years old	22	36.80%

Appendix D: Table 2 - Experienced Symptoms

Experienced Symptoms	n	%
Yes	30	50.00%
No	30	50.00%

Appendix E: Table 3 - Academic and Climate Change Impact

Perception of Academic Impact	High Climate Change Impact (n)	Low Climate Change Impact (n)	Total (n)
Significant Impact on Academic Performance	32	8	40
Non-Significant Impact on Academic Performance	16	4	20

Appendix F: Scatterplot

Figure 1. Scatterplot of Likelihood of Experiencing Heat-Related Health Issues and Reported Symptoms.