

Final Paper of
The Relationship between air conditioning
and Heat Stress

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Introduction

There is a critical link between air conditioning and heat stress, especially in areas with extremely high temperatures. I chose this topic because I think right now this issue is very important. We are seeing severe weather change for last few decades. So That's why the hospitalization because of heat is growing, people needs to use more and more air conditioning in their households and office. By creating a regulated interior environment with lower temperatures, air conditioning systems are essential in reducing heat stress. Air conditioning helps maintain a safe and comfortable interior atmosphere during extreme heat waves, which lowers the risk of heat-related illnesses including heat exhaustion and heatstroke. This is particularly important for vulnerable groups that are more sensitive to the negative impacts of excessive heat, such as the elderly, children, and those with pre-existing medical disorders. In addition to enhancing comfort, well-operating air conditioning systems also provide a substantial contribution to public health and safety by reducing the harmful effects of heat stress during hot weather. For all this information I had to gather data. To access data I had to collect these from NYC Health and Environment data portal.

An important component of urban health, especially in highly populated locations like New York City, is the connection between air conditioning and heat stress. The importance of air conditioning in reducing heat stress grows when temperatures rise as a result of climate change. Data from the New York City Environment and Health Data Portal was examined in order to show this association. The percentage of people who experience heat stress is shown in the table below according to whether or not their homes have air conditioning.

that the relationship between heat stress and air conditioning is critical to people's health in hot areas. Air conditioning is vital for decreasing heat stress because it generates a controlled interior environment with lower temperatures and lower humidity. When exposed to high heat, heat-related diseases such as heat exhaustion and heatstroke can be deadly. People may seek relief from the oppressive heat by fleeing indoors through the use of air conditioning. It also promotes better sleep, maintains physiological comfort, and increases overall productivity. However, excessive usage of air conditioning can have a severe impact on the environment, including increased energy prices and greenhouse gas emissions. To address heat stress, a balance must be struck between the benefits of air conditioning and ecologically beneficial practices.

Here I have added the data table I used from NYC Health and Data portal website.

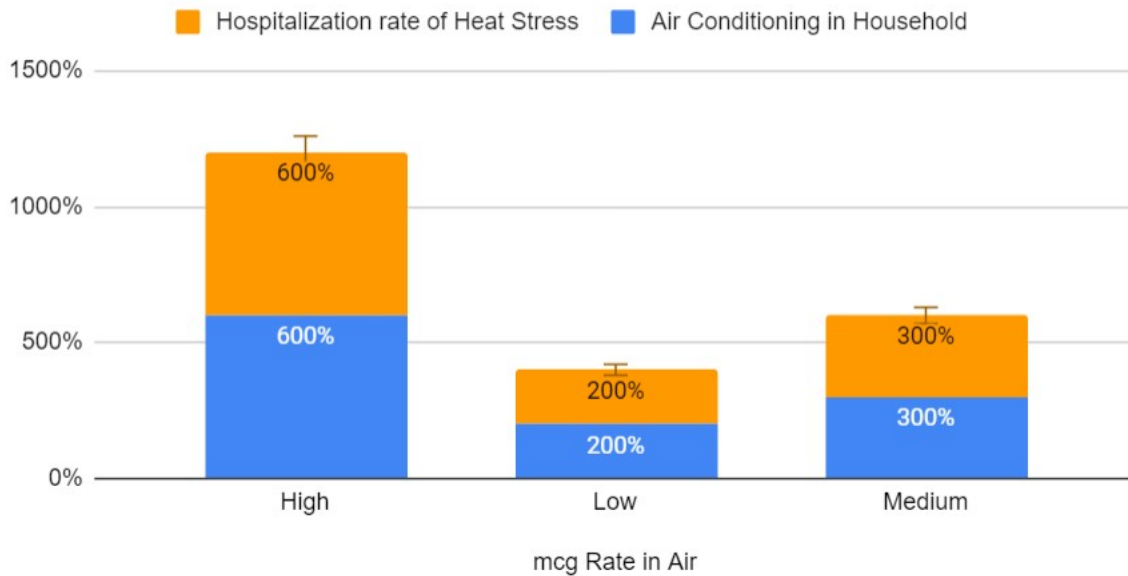
Annual Average 2022	GeoTypeDesc	GeoID	GeoRank	Geography	90th percentile mcg in Air Quality	Heat stress hospitalizations per 100,000 residents	mcg Rate in Air	Heat Stress Rate
Annual Average 2022	UHF 42	101	4	Kingsbridge - Riverdale	630.00%	190.00%	High	High
Annual Average 2022	UHF 42	102	4	Northeast Bronx	620.00%	200.00%	High	High
Annual Average 2022	UHF 42	103	4	Fordham - Bronx Pk	630.00%	230.00%	High	High
Annual Average 2022	UHF 42	104	4	Pelham - Throgs Neck	650.00%	260.00%	High	High
Annual Average 2022	UHF 42	105	4	Crotona - Tremont	650.00%	260.00%	High	High
Annual Average 2022	UHF 42	106	4	High Bridge - Morrisania	630.00%	240.00%	High	High
Annual Average 2022	UHF 42	107	4	Hunts Point - Mott Haven	670.00%	100.00%	High	Medium
Annual Average 2022	UHF 42	201	4	Greenpoint	680.00%	180.00%	High	High
Annual Average 2022	UHF 42	202	4	Downtown - Heights - Slope	680.00%	250.00%	High	High
Annual Average 2022	UHF 42	203	4	Bedford Stuyvesant - Crown Heights	630.00%	240.00%	High	High
Annual Average 2022	UHF 42	204	4	East New York	600.00%	180.00%	High	Medium

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Annual Average 2022	UHF 42	205	4	Sunset Park	680.00%	110.00%	High	Medium
Annual Average 2022	UHF 42	206	4	Borough Park	580.00%	240.00%	Medium	High
Annual Average 2022	UHF 42	207	4	East Flatbush - Flatbush	590.00%	110.00%	Medium	Medium
Annual Average 2022	UHF 42	208	4	Canarsie - Flatlands	580.00%	150.00%	Medium	High
Annual Average 2022	UHF 42	209	4	Bensonhurst - Bay Ridge	600.00%	130.00%	High	Medium
Annual Average 2022	UHF 42	210	4	Coney Island - Sheepshead Bay	560.00%	240.00%	Medium	High
Annual Average 2022	UHF 42	211	4	Williamsburg - Bushwick	690.00%	110.00%	High	Medium
Annual Average 2022	UHF 42	301	4	Washington Heights	650.00%	140.00%	High	Medium
Annual Average 2022	UHF 42	302	4	Central Harlem - Morningside Heights	640.00%	230.00%	High	High
Annual Average 2022	UHF 42	303	4	East Harlem	630.00%	120.00%	High	Medium
Annual Average 2022	UHF 42	304	4	Upper West Side	630.00%	50.00%	High	Low
Annual Average 2022	UHF 42	305	4	Upper East Side	680.00%	120.00%	High	Medium
Annual	UHF 42	306	4	Chelsea -	960.00%	80.00%	High	Low

Average 2022				Clinton				
Annual Average 2022	UHF 42	307	4	Gramercy Park - Murray Hill	920.00%	80.00%	High	Low
Annual Average 2022	UHF 42	308	4	Greenwich Village - SoHo	880.00%	80.00%	High	Low
Annual Average 2022	UHF 42	309	4	Union Square - Lower East Side	920.00%	60.00%	High	Low
Annual Average 2022	UHF 42	310	4	Lower Manhattan	760.00%	100.00%	High	Medium
Annual Average 2022	UHF 42	401	4	Long Island City - Astoria	670.00%	110.00%	High	Medium
Annual Average 2022	UHF 42	402	4	West Queens	670.00%	40.00%	High	Low
Annual Average 2022	UHF 42	403	4	Flushing - Clearview	640.00%	140.00%	High	Medium
Annual Average 2022	UHF 42	404	4	Bayside - Little Neck	580.00%	100.00%	medium	Low
Annual Average 2022	UHF 42	405	4	Ridgewood - Forest Hills	610.00%	70.00%	High	Low
Annual Average 2022	UHF 42	406	4	Fresh Meadows	560.00%	110.00%	Medium	Low
Annual Average 2022	UHF 42	407	4	Southwest Queens	580.00%	170.00%	Medium	Medium
Annual Average 2022	UHF 42	408	4	Jamaica	410.00%	80.00%	Low	Low
Annual Average 2022	UHF 42	409	4	Southeast	456.00%	90.00%	Low	Low

Average 2022				Queens				
Annual Average 2022	UHF 42	410	4	Rockaways	320.00%	300.00%	Low	High
Annual Average 2022	UHF 42	501	4	Port Richmond	470.00%	290.00%	Low	High
Annual Average 2022	UHF 42	502	4	Stapleton - St. George	250.00%	130.00%	low	Medium
Annual Average 2022	UHF 42	503	4	Willowbrook	140.00%	180.00%	Low	Medium
Annual Average 2022	UHF 42	504	4	South Beach - Tottenville	0.00%	120.00%	Low	Medium

Percentage of Air Conditioning In Households and Heat Stress Hospitalization



Here I have added my pivot table below

Air Conditioning o Heat stress hosp		Air Conditioning in Households	Heat Stress Hospitalization
High	High	600%	600%
	Low	1000%	1000%
	Medium	1200%	1200%
Low	High	200%	200%
	Low	200%	200%
	Medium	300%	300%
Medium	High	300%	300%
	Low	200%	200%
	Medium	200%	200%

So, here you can see the full data and graph of my research. In the graph you can see where, when and which county ranks air quality. The ranking is geographic ranking. As example we can see in NYC Bronx has 7.2% of air quality damage in every year. Also we can see Queens stand in number 4 with 6.5% of air quality damage. This data is taken from NYC department of health.

Conclusion

So at the end we can say that the connection between heat stress and air conditioning is crucial to people's health in hot environments. Because air conditioning creates a regulated interior environment with lower temperatures and reduced humidity, it is essential for reducing heat stress. Heat-related disorders, including heat exhaustion and heatstroke, can be fatal when exposed to extreme heat. People might get refuge from the unbearable heat by escaping inside temperatures with the aid of air conditioning. Additionally, it supports improved sleep, preserves physiological comfort, and boosts general productivity. Overuse of air conditioning, however, can have negative effects on the environment, including higher energy costs and greenhouse gas emissions. Addressing heat stress requires striking a balance between the advantages of air conditioning and environmentally friendly behaviors.

Citation

For Citation I have used this website

https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_formatting_and_style_guide/general_format.html

Pavanello, F., De Cian, E., Davide, M., Mistry, M., Cruz, T., Bezerra, P., Jagu, D., Renner, S., Schaeffer, R., & Lucena, A. F. P. (2021, November 9). *Air-conditioning and the adaptation cooling deficit in emerging economies*. Nature News.
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Lundgren-Kownacki, K., Hornyanszky, E. D., Chu, T. A., Olsson, J. A., & Becker, P. (2017, December 30). *Challenges of using air conditioning in an increasingly hot climate - International Journal of Biometeorology*. SpringerLink.
<https://link.springer.com/article/10.1007/s00484-017-1493-z>

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Zander1, K. K., Cadag3, J. R., Escarcha1, J., Garnett4, S. T., & <https://orcid.org/0000-0002-2237-1801>, K. K. Z. (2018a, July 27). *IOPscience*. Environmental Research Letters. <https://iopscience.iop.org/article/10.1088/1748-9326/aad2e5>

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Also we have used NYC Environment and Health Data Portal to gather all our data which we have used to create pivot table and the graph.

<https://a816-dohbsp.nyc.gov/IndicatorPublic/>