Is Healthcare access affected by Extreme Weather Events in Miami, Florida? An exploratory study of outpatient HIV clinics.

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#### Background

- The adverse health effects of climate change are a growing public health problem
- Urgency to address the directly and indirectly associated consequences of Extreme Weather Events (EWE)
- Transdisciplinary approaches are needed to address climate change, from agriculture to healthcare



Increasing co2 and Short-Lived Climate Pollutants, Rising Temperature, Rising Sea Levels, and Increasing Extreme Weather Events



#### HIV



#### Southern U.S. houses:

nearly 40% of all population approximately 45% of all PLWH

• Almost 50% of all new HIV diagnoses in 2019

Miami, Florida, has the highest HIV infection rate in the United States.





HIV



In MDC, the HIV/AIDS treatment cascade is as follows:

- 64% of diagnosed PLWH are in regular care
- **60%** of those in care were virologically suppressed—preventing transmission in the community

Understanding the influence of EWE on the healthcare for PLWH may increasingly become an important factor towards better control of the HIV epidemic.

### Previous study



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Samano, D., Saha, S., Kot, T. C., Potter, J. E., & Duthely, L. M. (2021). Impact of Extreme Weather on Healthcare Utilization by People with HIV in Metropolitan Miami. *International journal of environmental research and public health*, *18*(5), 2442. https://doi.org/10.3390/ijerph18052442

### Aims

Observational, descriptive, ecological study

- 1) To examine the relationship between EWE and PLWH accessing outpatient HIV clinics by race and ethnicity in Miami, Florida from 2015-2019
- 2) Document the study's methodology for reproducibility in different climatological regions, other out-patient settings, in the US or internationally
- 3) Present results to stakeholders to improve health outcomes for PLWH and to inform future health policy

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1. Weather Data (1990-2019)

Local Definition of Extreme Weather Events (EWE).

Retrospective analysis:

- a. **30 years of** *weather data* obtained from NOAA database at HIV-Clinics Zip Code
- b. Local EWE were defined as greater than or equal to **90<sup>th</sup> percentile** of daily values in 3 decades





Normal Distribution of Heat Index in Miami, FL (1990-2019)



90th = 101.5°F





Scheduled visits: **87,122** ~ **52%** Overall **attendance** M-F operating days

SB = Black, SBH= Black Haitian, SWHP= White Hispanic, SO= Others

#### 1. Weather Data (1990-2019)

#### 2. Outpatient HIV Clinics registry





### Precipitation

Among EPE subgroups, patient attendance displayed a decreasing trend as Daily precipitation increased

#### Relative Risk from Poisson Regression

% Decrease in Attendance during Precipitation and EP ( $\geq$  2 Inches)



### Heat Index



1. Weather Data (1990-2019) 2. Outpatient HIV Clinics registry 3. Association between EWE and Clinics (Poisson Regression) Heat Index



3. Association between EWE and Clinics (Poisson Regression)

### Heat Index

#### Relative Risk from Poisson Regression



% Decrease in Attendance during EHI (≥ 101.5 °F)



### Discussion

#### There is ~8% RR of decrease in Healthcare access by EHI (>101.5°F)

There is ~12-13% RR of decrease in Healthcare access by **average precipitation (1-2 in) and EP** in Black Haitian(>2 in)

- This study represents a novel approach to understand the (in)direct effects of Extreme Precipitation on outpatient healthcare utilization, specific to HIV clinics
- As EWE become more extreme, there seems to be an association with lower HIV-clinic attendance. However, further analysis and statistical modelling is required to assess significance of findings
- This research has the potential to improve HIVp's healthcare adherence in Miami through institutional, individual and collective resilience to climate change
- This novel research approach could be replicated at any geographic location, adjusting to other Extreme Weather Events, using publicly available weather-data and healthcare registries

#### EWE are an additional stressor that impact healthcare access

## Take Home Messages

This methodology can be reproduced in different climatological regions, other out-patient settings, in the US or internationally to improve health outcomes and inform future health policy

Exploratory research is much needed to identify equitable solutions for the challenges imposed by EWE

# **THANK YOU!** Daniel Samano, MD, MPH

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Please feel free to contact us to learn more about out research and collaboration options

