# Extreme Weather Impact on Suicide in Total Population in HHS Region 7: A Time Series Analysis

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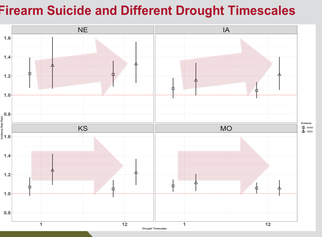
## INTRODUCTION

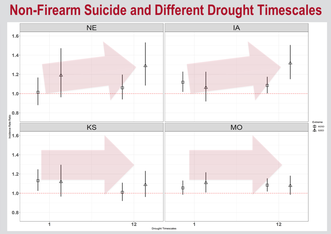
- Suicide has been on the rise for the past two decades
- Firearm are used in half of all suicide deaths
- The firearm suicide has increased 12.5% over the last decade
- Many factors in play such as social isolation, access to lethal means, mental and mood disorders, …
- Farming, fishing and forestry industry has one of the highest suicides rates
- Extreme weather is usually not discussed as a major risk
- Climate change is first and foremost a health crisis
- The frequency and severity of both extreme dry and extreme wet conditions are projected to increase in the Midwest region

## DATA & METHODS

- Suicide data (National Center for Health Statistics), Firearm and Non-Firearm mechanisms
- Extreme weather categories based on two drought indices of Evaporative Demand Drought Index (EDDI) and US Drought Monitor (USDM)
  - **Moderate to Severe Drought**
  - **Sever to Exceptional Drought**
  - **Moderate to Severe Wet**
  - **Sever to Exceptional Wet**
- Generalized Additive Model (GAM)
- State-wise Meta-analysis

## RESULTS



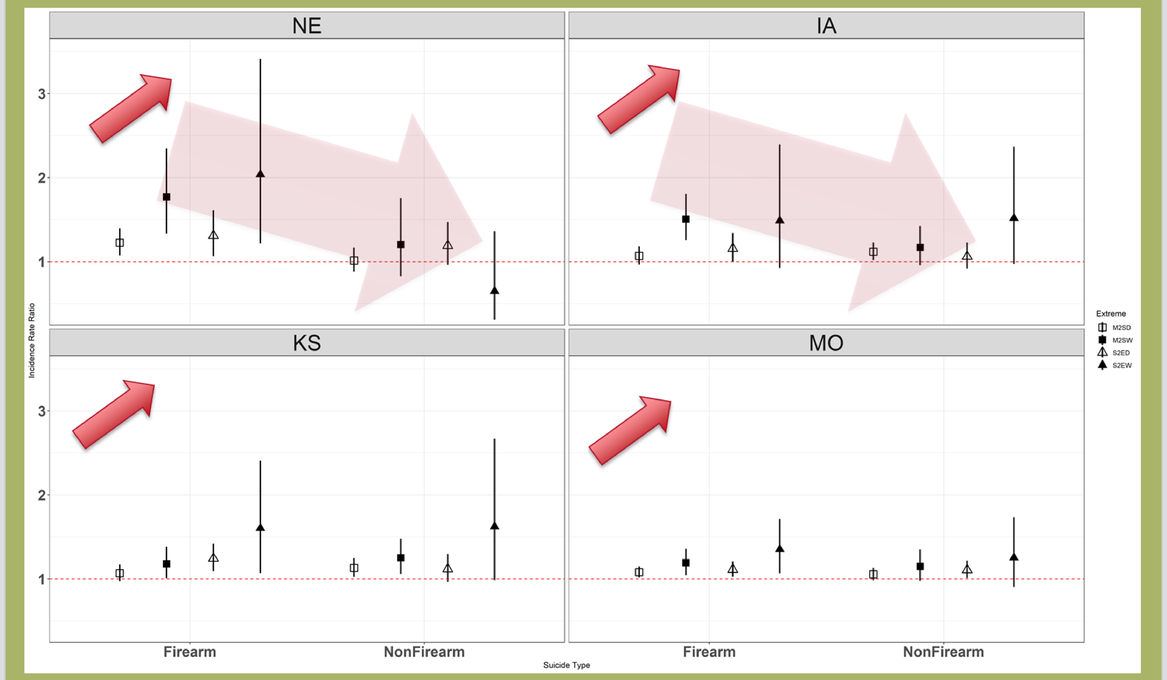



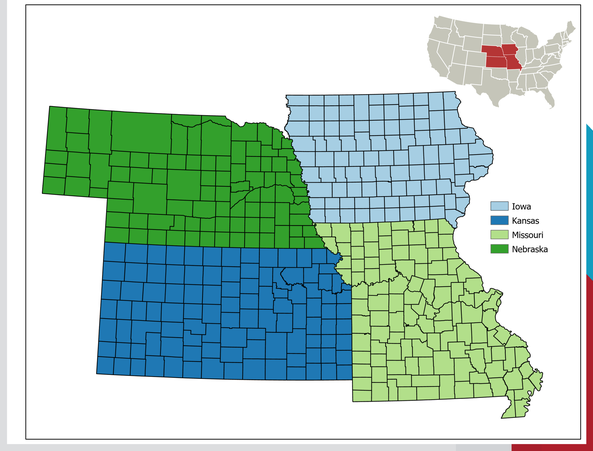

- The suicide incidence rates is on the rise in the HHS region 7
- The effect estimates' patterns for Nebraska and Iowa were similar. The same was true for Kansas and Missouri

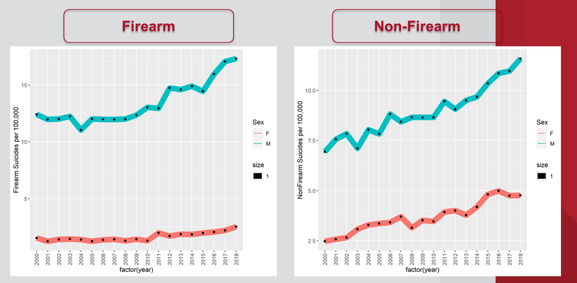
## DISCUSSION

- Climate change is one of the great challenges of our time
- The literature on extreme weather and mental health is expanding
- Firearm suicide is on the rise particularly in the rural areas
- Identifying the risk factors for firearm and non-firearm suicides can improve the prevention strategies and to eventually reducing those preventable deaths

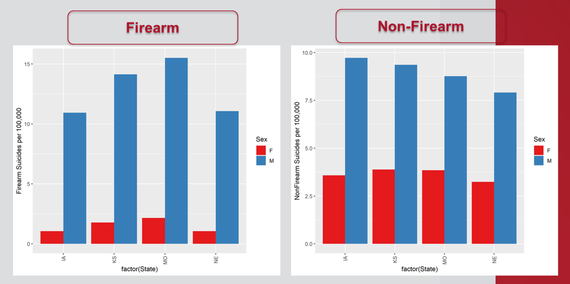
- ➢ The changes in the suicide rates associated with **extreme wet events were higher** compared to **drought events**, but with a lower confidence
- ➢ **Exacerbation of dry condition** from moderate to exceptional was **associated with higher Firearm suicide incidence rates in all four states**
- ➢ The changes in the **firearm suicide** were **higher** than changes in the **non-firearm suicide** for **all extreme dry and wet conditions**
- ➢ **Longer term droughts** were positively associated with higher suicide rate changes both for firearm and non-firearm in **Nebraska and Iowa**




| Urbanicity | Nebraska | | Iowa | |
|---|---|---|---|---|
| Metro | 1140 | 1250 | 1807 | 2353 |
| Non-Metro | 938 | 665 | 1618 | 1463 |
| | **Kansas** | | **Missouri** | |
| Metro | 2679 | 2480 | 6891 | 5578 |
| Non-Metro | 1556 | 1056 | 2973 | 1578 |




The GAM framework is based on an appealing and simple mental model: Relationships between the individual predictors and the dependent variable follow smooth patterns that can be linear or nonlinear.

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