



CLIMATE CHANGE RISK PORTFOLIO

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GPH301 Introduction to Quantitative Methods in Geography

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PURPOSE

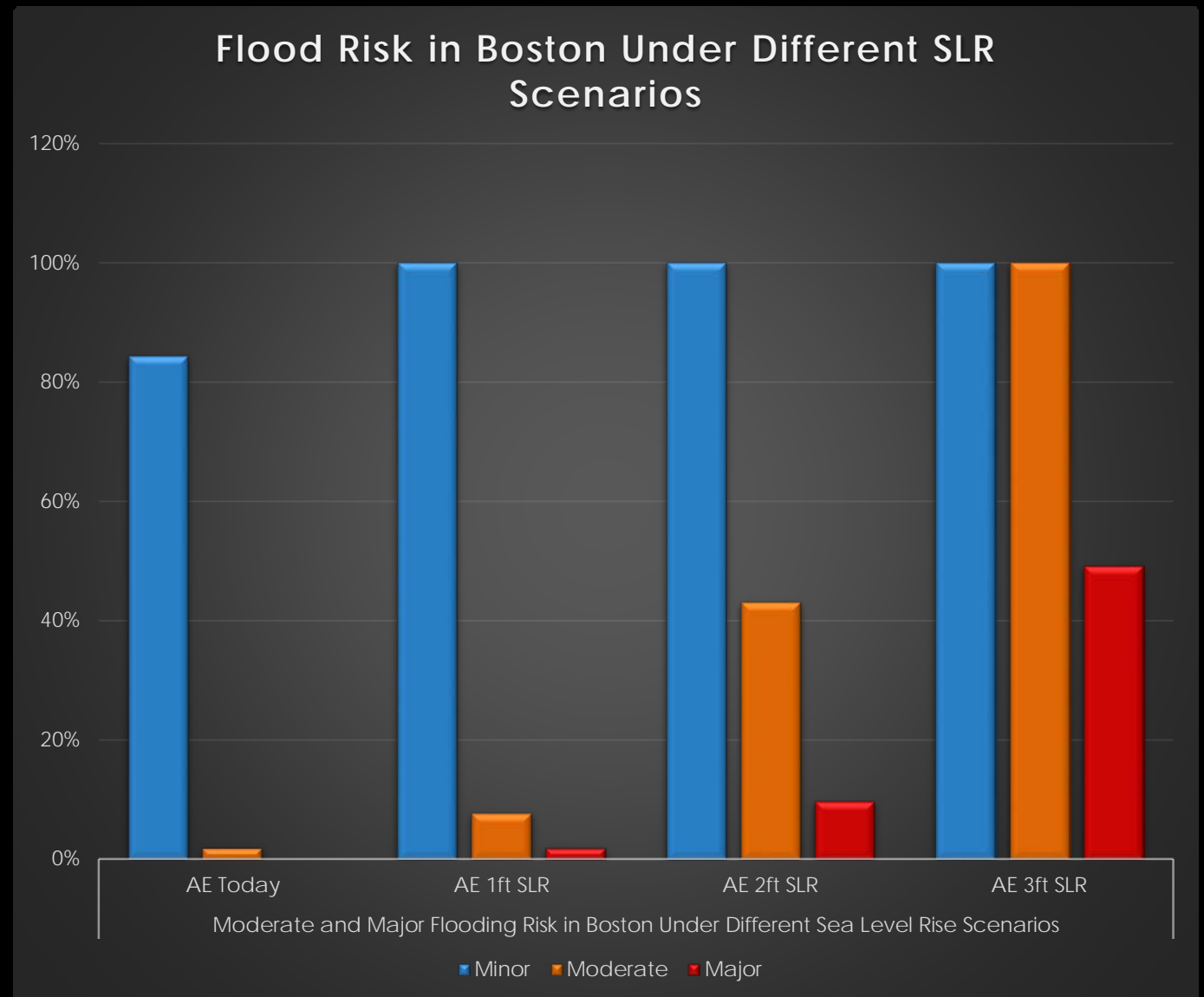
- This portfolio aims to present the risk of our current changing climate and to show what hazards may occur if we do not work to stop it.
- Some of the biggest most apparent risks that are increasing involve flooding, tropical storms, and heat related illnesses.
- We will be covering each of these and including scenarios to asses future damages.

COASTAL FLOODING

With rising temperatures comes rising sea levels. As ice caps melt the water expands and raises the sea level.

We covered the risk of flooding in Boston harbor at our current sea level and how the risk will change with the rising sea level in the future.

The chart to the right shows the risk of major, moderate and minor floods at our current sea level as well as 1, 2 and 3 foot sea level rise.

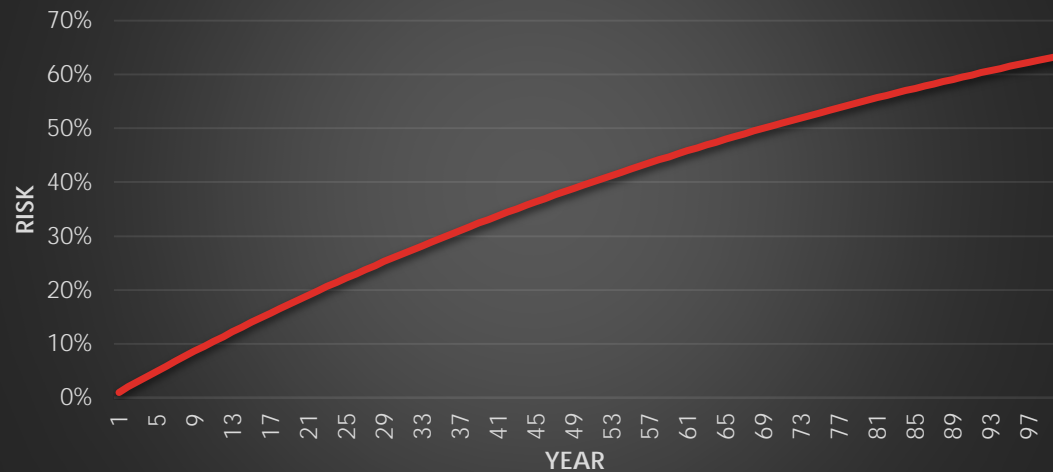


These charts show the risk of a major flood in Boston Harbor over 100 years as compared to a major flood over 100 years with a 3 foot sea level rise.

At our current sea level the probability of a major flood is 63% within 100 years.

With a 3 foot sea level rise there is a 100% probability of a major flood within just 15 years.

100 Year Flood Cumulative Probability



Risk of Major Flood with 3ft SLR over 30 Years

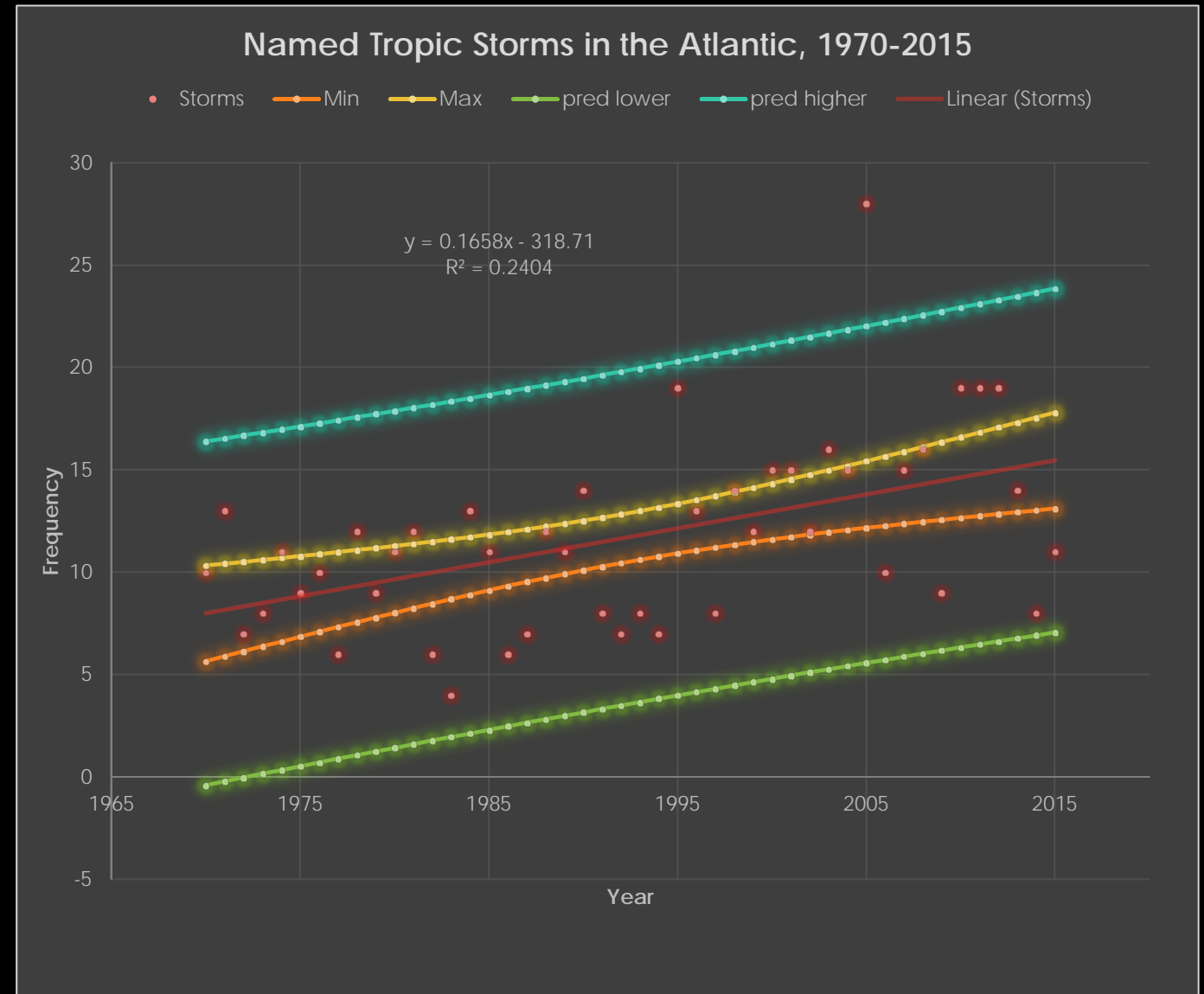


TROPICAL STORMS

Many climate scientists agree that there is a link between rising temperatures and increased tropical storms.

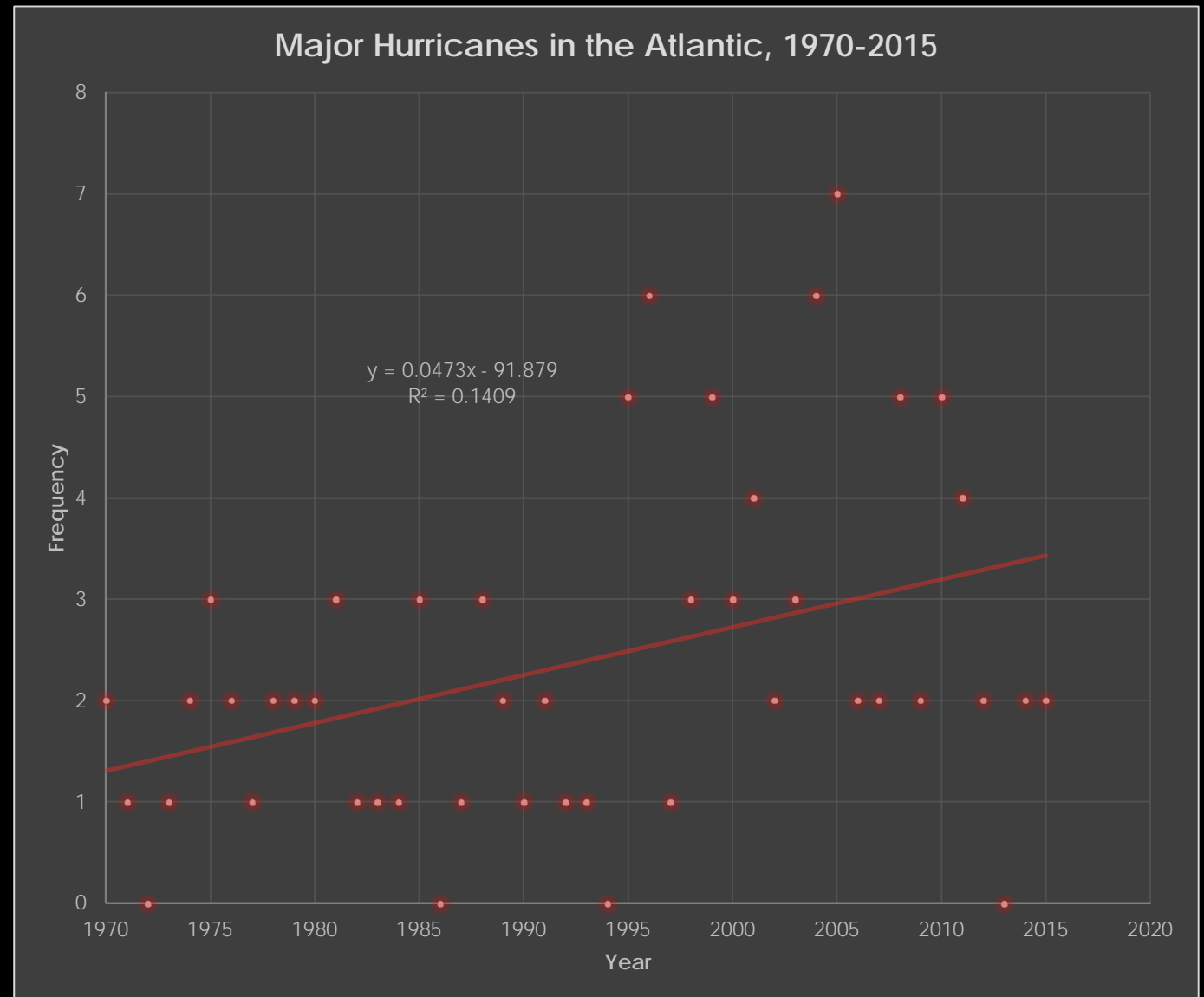
We created a visual to show the correlation between rising temperature and an increasing frequency and intensity of tropical storms.

The chart to the right has the frequency of storms each year plotted. While the data looks random, when we added a trend line it appears to be generally increasing. We created a conservative prediction in which most of the points fall between the min and max prediction.



MAJOR HURRICANES

This chart has the frequency of major storms each year in the Atlantic. While the points are mostly random the trend line suggests that between 1970 and 2015 the frequency of major storms has generally increased.

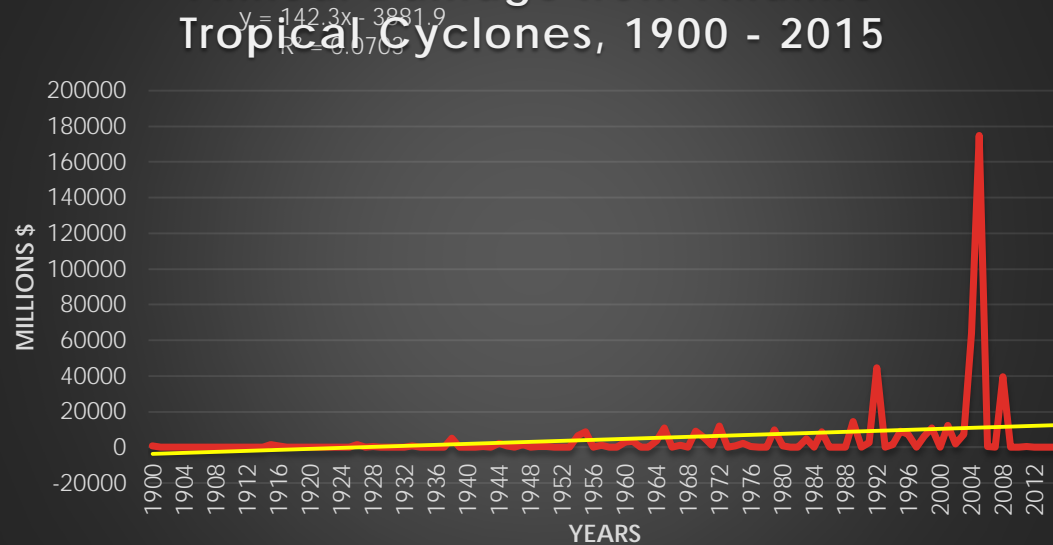


ANNUAL STORM DAMAGE

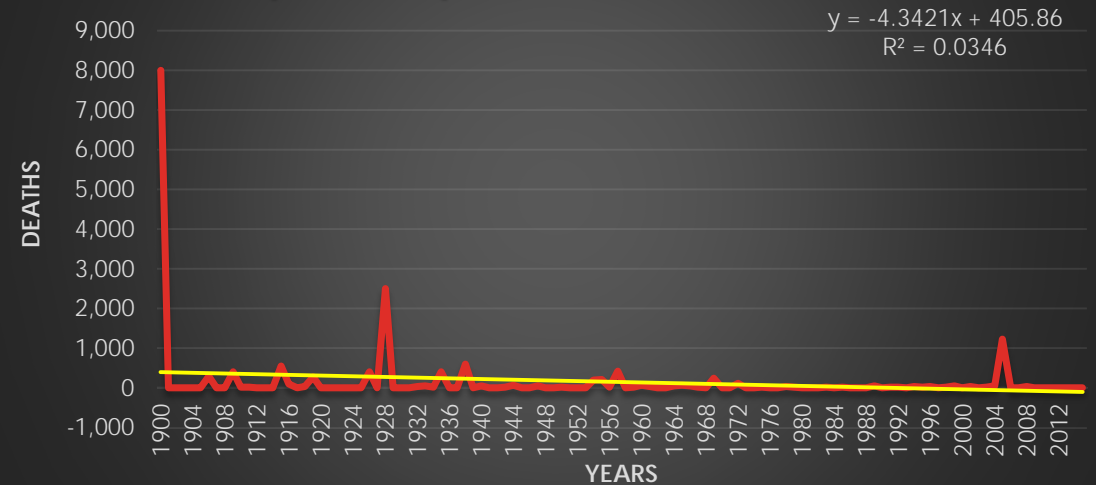
Our study suggests that with increased frequency and intensity of storms over the years, the amount of damage has increased as well.

While damage has increased it appears that less people deaths are being caused per year by hurricanes.

Annual Damage from Atlantic Tropical Cyclones, 1900 - 2015



Annual US deaths from Atlantic Tropical Cyclones, 1900 - 2015

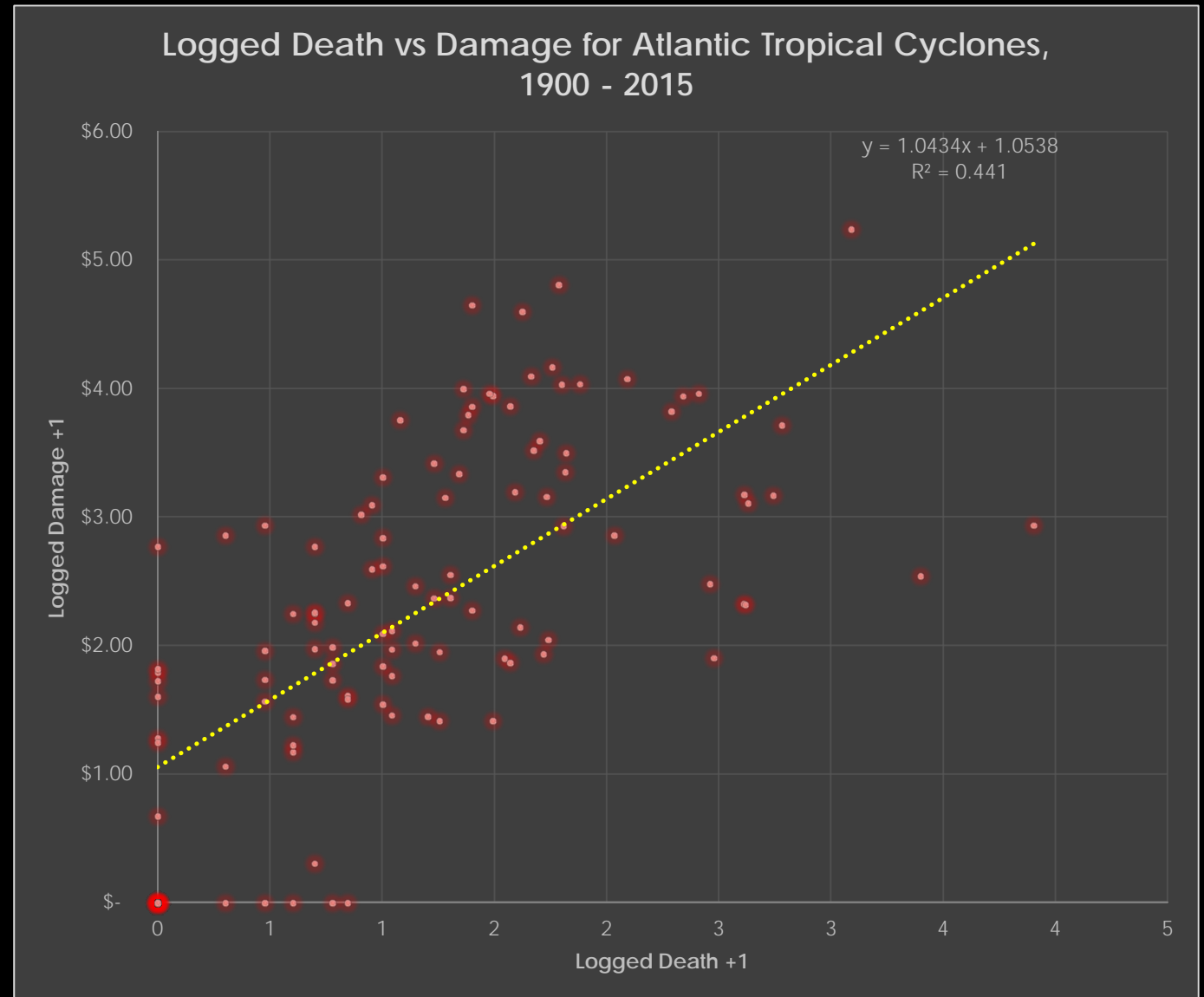


DEATH VS DAMAGE

What does it mean if damage has increased but death has decreased?

New technology and better preparedness for major storms may have contributed to this statistic as well as more accurate record keeping.

Although these two seem contradictory when charted together there is actually a strong correlation between amount of deaths and amount of damage caused by tropical storms.



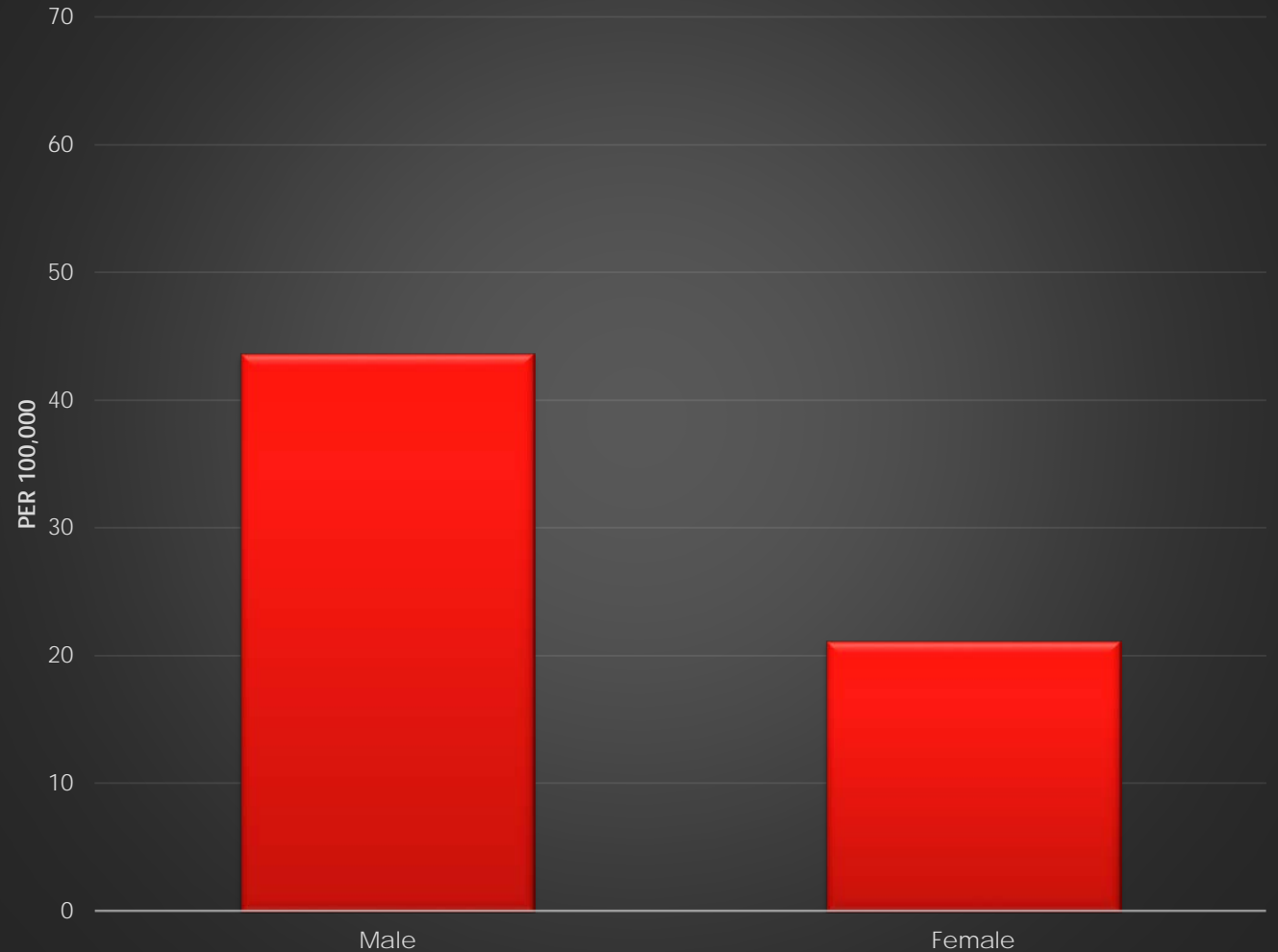
HEAT SICKNESS

With increasing temperature more people are expected to die from heat related sickness.

We examined how expensive this risk is, who is most at risk and what the future holds if we don't do something to stop climate change.

The chart to the right shows that men are actually considerably more at risk than women are for heat related illnesses.

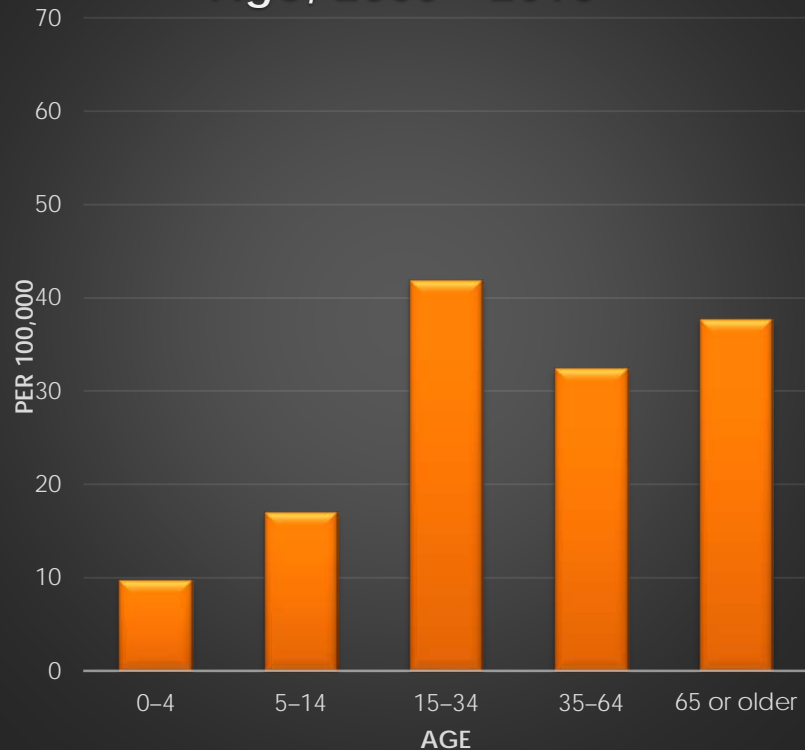
Crude Incidents Rates of Heat-Related Morbidity by Sex, 2005 - 2010



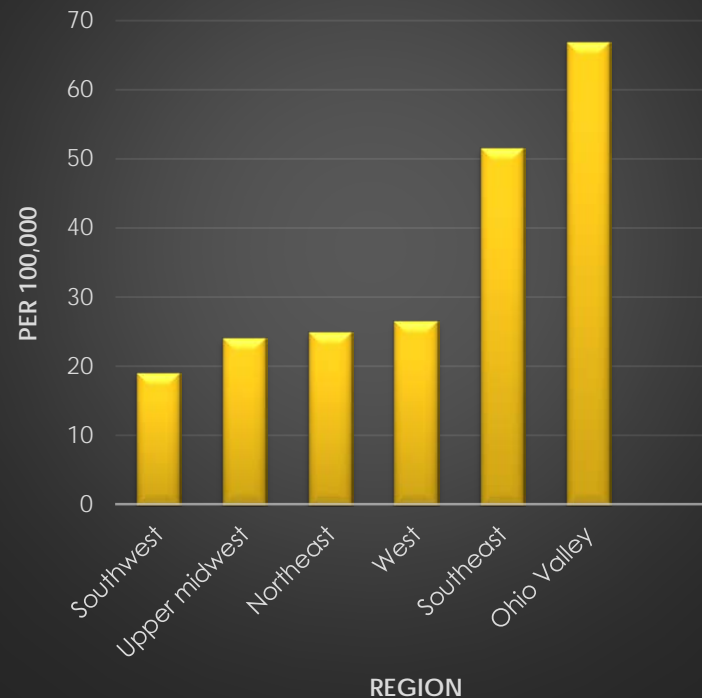
While many different factors may put you at risk of heat related illness, the factor that puts the most people at risk is being in the Ohio Valley. Hot humid temperatures make the heat almost unescapable.

WHO IS MOST AT RISK?

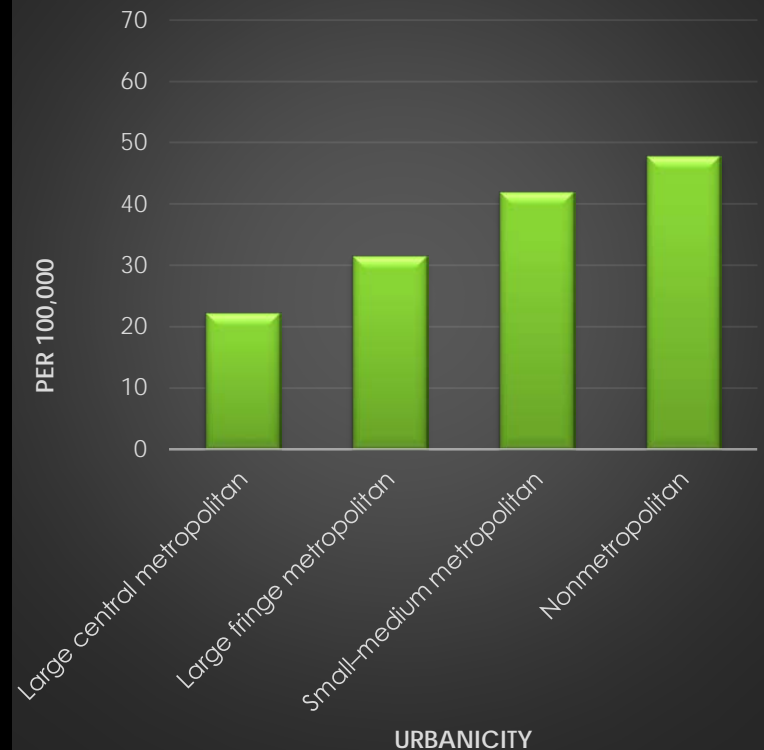
Crude Incidents Rates of Heat-Related Morbidity by Age, 2005 - 2010



Crude Incidents Rates of Heat-Related Morbidity by Climate Region, 2005 - 2010



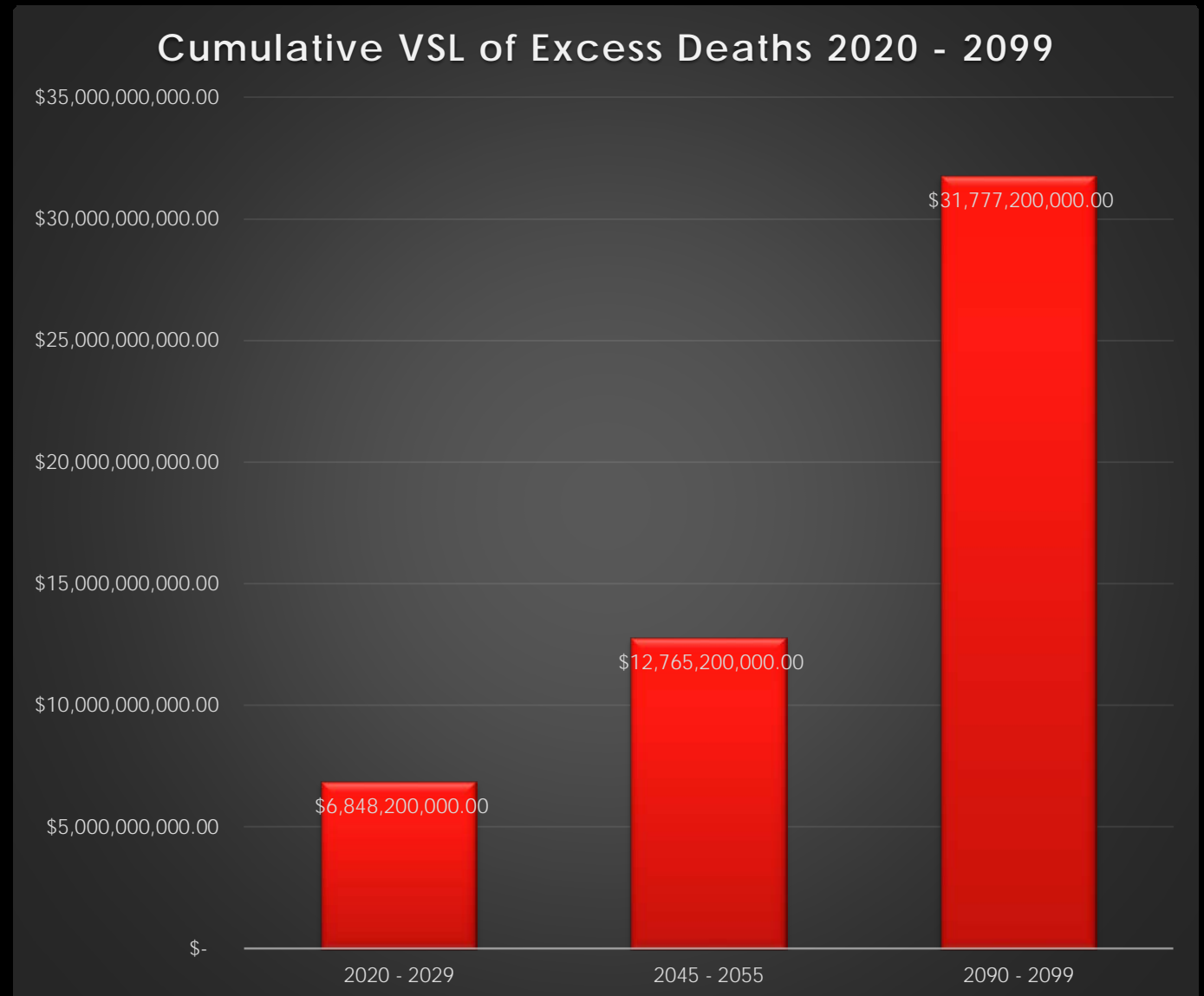
Crude Incidents Rates of Heat-Related Morbidity by Urbanicity, 2005 - 2010



CUMULATIVE VSL

VSL stands for Value per Statistical Life.

The chart to the right measures the how much money deaths related to heat sickness will cost now and in the future if temperatures continue to rise.

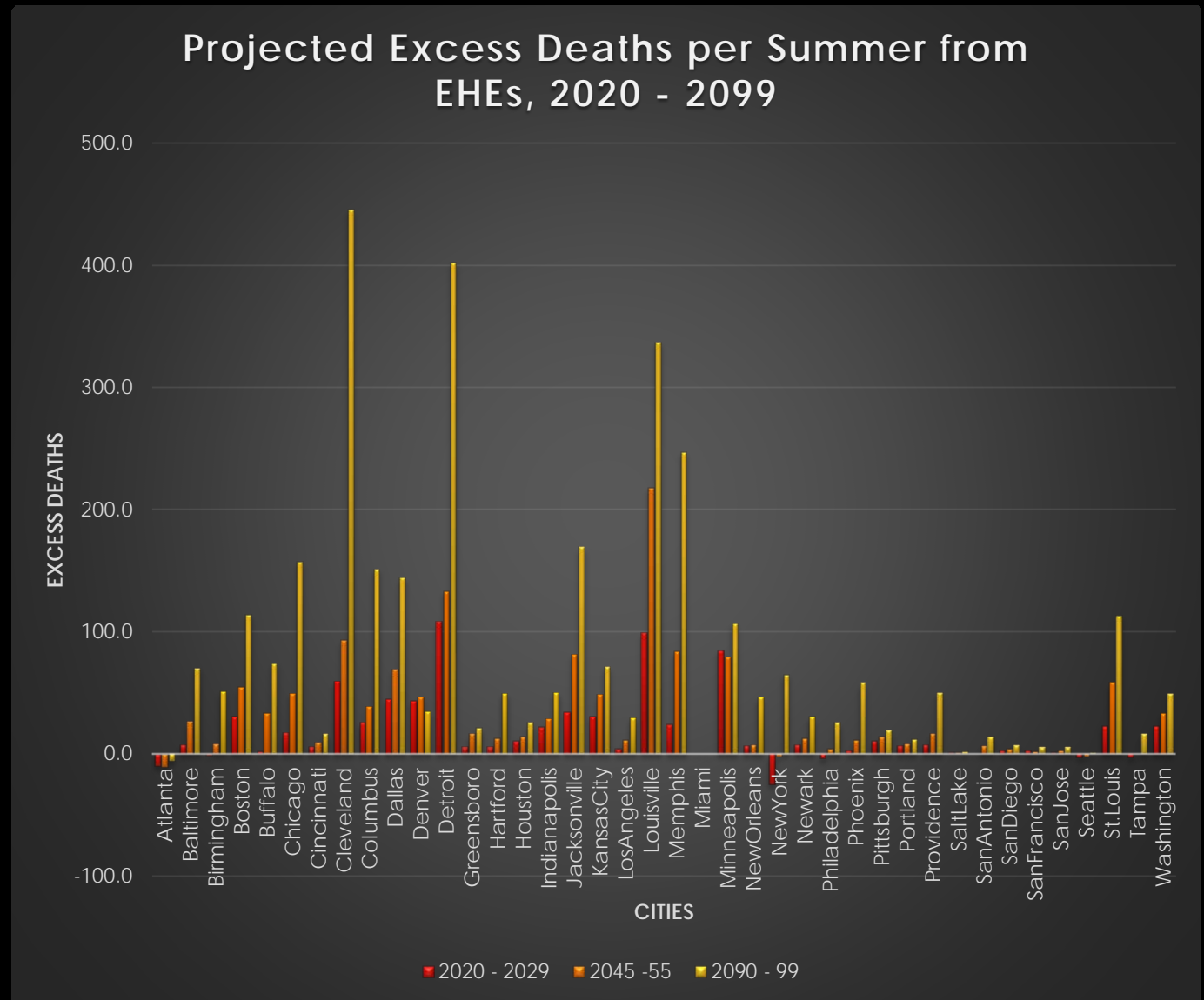


FUTURE MORTALITY

We projected the amount of excess deaths will be caused in major cities due to rising temperatures.

In the future most major cities, especially in the Ohio Valley, are expected to have a high increase in excess deaths per summer.

Cleveland and Detroit are the two most at risk with over 400 excess deaths predicted in each city.





CONCLUSION

- Many serious hazards will increase with rising temperatures due to climate change.
- I learned there are clear correlations between increasingly hazardous conditions and climate change.
- I have also learned how to create visual charts, graphs and tables to be able to easily see and understand these relationships.
- If we do not take steps to stop our role in climate change now we will pay for it later in money, deaths and damage.
- I really enjoyed this class, I would keep it the same because I am a hands on learner and it helped to be doing the assignments along with learning them.

SOURCES

- Assignments by Marcos Luna
- <http://www.smithsonianchannel.com/shows/perfect-storms/the-great-galveston-hurricane/1003407/3409138>
- <https://weather.com/safety/hurricane/news/hurricanes-tropical-storms-us-deaths-surge-flooding>