TIME SERIES ANALYSIS OF ASSOCIATIONS BETWEEN CLIMATE CHANGE AND HEAT RELATED ILLNESSES; THE DEVELOPMENT OF A HEAT HEALTH WARNING SYSTEM FOR THAILAND

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Introduction

The Earth's climate is changing in ways that could cause serious consequences to public health. In Thailand, there is no system in place, especially with the increasing amount of heat - related illnesses (HRI) annually. Heat warning systems are in place in other countries but the relevant thresholds (e.g. for USA…) may not be appropriate for use in Thailand. As a result of this, the objective of this work is to develop a Heat Health Warning System for Thailand.

Methods

- A combination of quantitative and qualitative were used to complete all Heat Health Warning system components.
- Time series and GLM with Poisson regression were used to analyse the relationship between HRI and heat index (HI) controlling for day of the week and holiday indicator, for lag times of 1– 7 days.
- A e- Delphi technique was applied for consideration of threshold level in each region of Thailand by 16 experts. Lastly, to elaborate and verify the system from the Delphi phase, a focus group discussion with policy makers was planned.

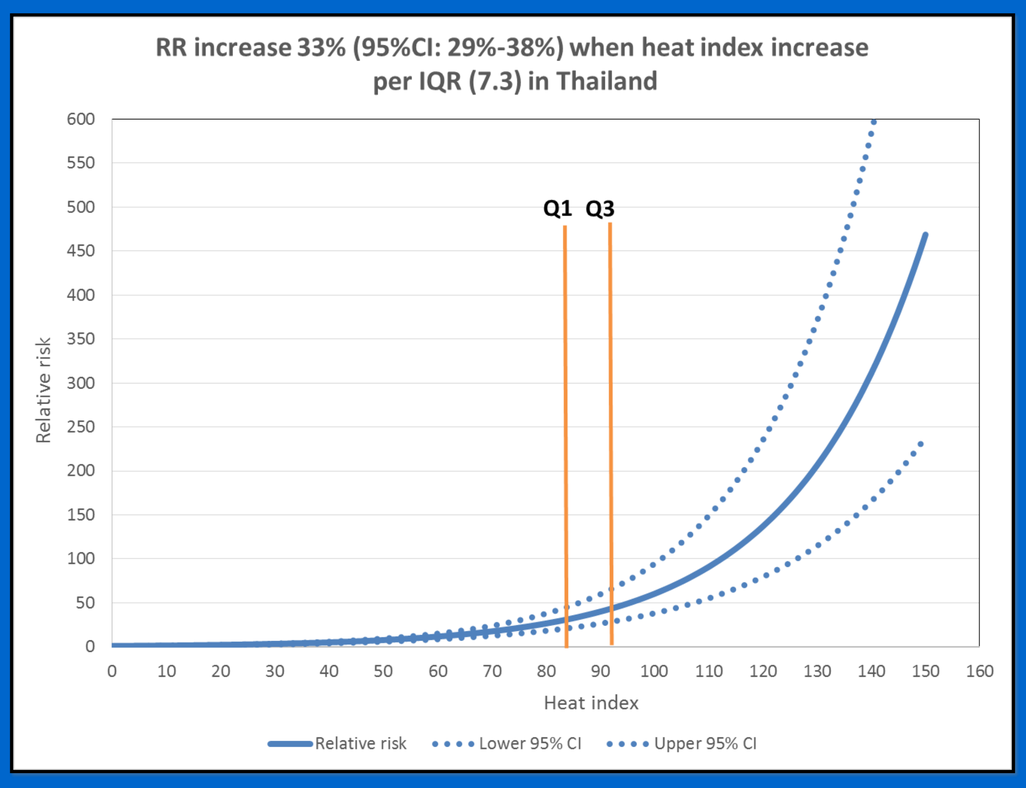
Quantitative results

GLM with Poisson regression model in each region of Thailand

	β	ε	P-value
Northeastern	0.040225	0.003383	< 0.001
Central	0.046376	0.004636	< 0.001
Southern	0.018950	0.006939	< 0.001
Northern	0.033885	0.003665	< 0.001
Whole country	0.041000	0.0023	< 0.001

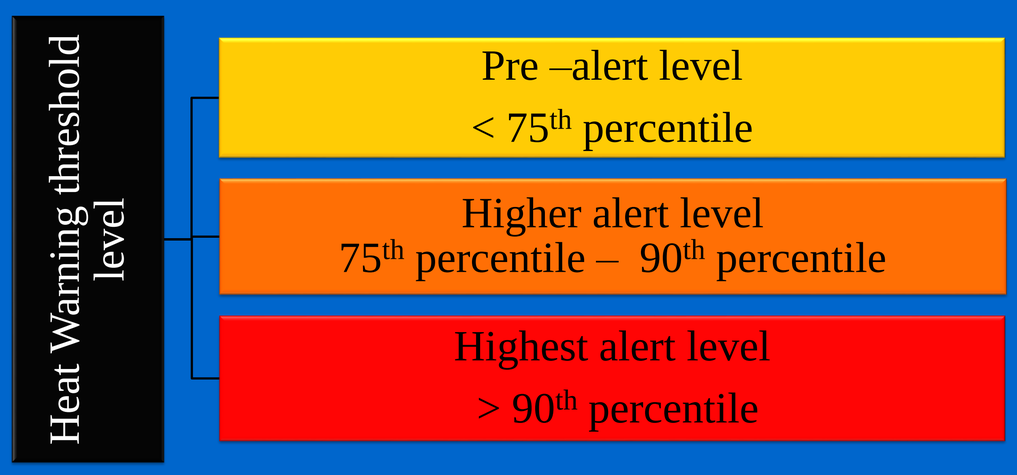
The risk of a person being exposed to some heat (x) having a specific illness is RR(x) times greater than someone who has not been exposed to heat.

$$RR(x) = e^{\beta x},$$

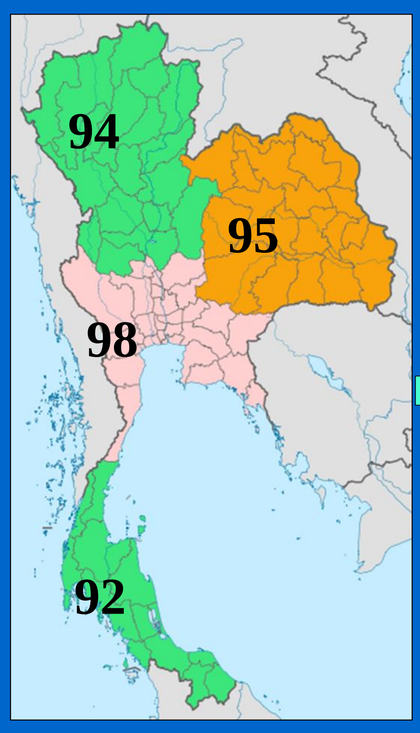


The relative risks of HRI visits in the country at 25th and 75th percentile of the mean of heat index at lag 0 were 31.44 and 42.53, respectively.

e-Delphi results



The e-Delphi consensus was achieved (>70% agreed or strongly agreed with the statement) that the pre- alert level is the level of HI below 75th percentile, the higher level is the level of HI from 75th percentile to 90th percentile and the highest level is starting from 90th percentile of HI.



Heat Watch and Heat Warning System in USA is divided to 4 levels , which the Excessive Heat Warning is when the maximum heat index temperature is expected to be 105 or higher for at least 2 days

The starting point of the heat index (° F) for the highest threshold level in each region of Thailand

Conclusion

- An increase of interquartile range (IQR) of daily mean of heat index, were associated with an increase in daily HRI visits on the same day, (lag 0) in each region of Thailand
- The suitable warning threshold level for the Heat Health Warning System for Thailand is different from United State of America

References

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