

ความสัมพันธ์ระหว่างการเปลี่ยนแปลงอุณหภูมิต่อผลลัพธ์สุขภาพของประชากรในประเทศไทย
ASSOCIATION BETWEEN TEMPERATURE AND HEALTH OUTCOMES OF
POPULATION IN THAILAND

วิระวรรณ ถิ่นยืนยง
สำนักคณะกรรมการผู้ทรงคุณวุฒิ กรมอนามัย
เบญจวรรณ จิวสุภา
กรวิภา ปุณนศิริ
อำพร บุศรีงษ์
กองประเมินผลกระทบต่อสุขภาพ กรมอนามัย
สร้อยญา สุจริตพงษ์
สถาบันวิจัยประชากรและสังคม มหาวิทยาลัยมหิดล

Background and objectives: The impacts from climate change have become one of the important health threats in the 21st century worldwide, including Thailand. One of the most imperative impacts is associated with the trend in rising temperatures and as such may have negative consequences on mortality and morbidity of the Thai population. Only a few studies on the relationships between temperature and health outcomes have been conducted in Thailand. Therefore, addition studies are still needed. The main **objective** of this research is to identify the temperature effect on mortality in Thailand. Specific objectives were set to identify specific causes of deaths associated with temperature in Thailand and to indicate populations at risk in terms of age, region and seasonality.

Methods: Daily mortality of 242,963 deaths classified according to the International Statistical Classification of Diseases version 10 (ICD-10) for cardio-circulatory (I00-I99) and respiratory systems (J00-J99) from 20 provinces in Thailand during the period of 1999-2015 was used. The mortality data was linked with daily mean temperatures at lag 0-13 by using statistical analysis based on Poisson regression models.

Findings: There was a significant relationship between the sum of mortality for the two disease categories of interest and temperature in Thailand. The pattern of the relationship was similar to the shape of hockey stick or inverse J-shape in that a relative risk of 1.40 at the lowest daily mean temperature (16.7 degree Celsius) was greater than a relative risk of 1.22 at the highest daily mean temperature (34.8 degree Celsius). When an analysis was undertaken for each disease category, it was found that the mortality for both disease categories was significantly associated with temperature in Thailand. The association patterns for both disease categories were similar in which the relative risks on mortality due to exposure to the low temperature

range were higher than those in the high temperature range. When the mortality data was stratified and analyzed by age, it was found that the age group above 60 years was at the highest risk for both disease categories. The associations between mortality caused by both the cardio-circulatory and respiratory disease categories were different by region of Thailand. The northern and northeastern parts were the areas where populations were at the highest risk with regard to temperature changes. Results from this study indicate the differences of the relationship between mortality and temperature in Thailand by season. In winter, it was found that relative risks on mortality at low temperatures were greater than those in the other seasons. In summer, whereas, relative risks on mortality were constant at the low temperature range and then when the temperature reached 30 degrees Celsius, mortality gradually increased along with higher temperatures.

Conclusions: Results from this study show that there was an association between temperature and mortality for cardio-circulatory and respiratory systems in Thailand. The association found was different by age, region and seasonality. Findings from this research can be used as baseline for monitoring long-term impacts of temperature on health as well as for future projections of changes in temperature-related mortality due to climate change. Furthermore, an implication of the study findings can be to monitor an achievement of goals set in health adaptation plans of Thailand and to update these plans on a regular basis. Future studies should be conducted to assess health impacts related to temperature by using morbidity data. In addition, an association between temperature and other potential health outcomes should also be explored

Keywords: Climate Change, temperature, mortality, Thailand

