

## **Pattern and determinants of hospitalization during heat waves: an ecologic study.**

BMC Public Health. 2007 Aug 9;7:200.

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**BACKGROUND:** Numerous studies have investigated mortality during a heatwave, while few have quantified heat associated morbidity. Our aim was to investigate the relationship between hospital admissions and intensity, duration and timing of heatwave across the summer months.

**METHODS:** The study area (Veneto Region, Italy) holds 4577408 inhabitants (on January 1st, 2003), and is subdivided in seven provinces with 60 hospitals and about 20000 beds for acute care. Five consecutive heatwaves (three or more consecutive days with Humidex above 40 degrees C) occurred during summer 2002 and 2003 in the region. From the regional computerized archive of hospital discharge records, we extracted the daily count of hospital admissions for people aged  $\geq 75$ , from June 1 through August 31 in 2002 and 2003. Among people aged over 74 years, daily hospital admissions for disorders of fluid and electrolyte balance, acute renal failure, and heat stroke (grouped in a single nosologic entity, heat diseases, HD), respiratory diseases (RD), circulatory diseases (CD), and a reference category chosen a priori (fractures of the femur, FF) were independently analyzed by Generalized Estimating Equations.

**RESULTS:** Heatwave duration, not intensity, increased the risk of hospital admissions for HD and RD by, respectively, 16% ( $p < .0001$ ) and 5% ( $p < .0001$ ) with each additional day of heatwave duration. At least four consecutive hot humid days were required to observe a major increase in hospital admissions, the excesses being more than twofold for HD ( $p < .0001$ ) and about 50% for RD ( $p < .0001$ ). Hospital admissions for HD peaked equally at the first heatwave (early June) and last heatwave (August) in 2004 as did RD. No correlation was found for FF or CD admissions.

**CONCLUSION:** The first four days of an heatwave had only minor effects, thus supporting heat health systems where alerts are based on duration of hot humid days. Although the finding is based on a single late summer heatwave, adaptations to extreme temperature in late summer seem to be unlikely.

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