pm were collected. The body temperature data after regular bath were collected in the time of 0600 pm. The paired t–test was used to compare the difference between body temperature means before and after daytime bath and ANOVA was used to compare the difference between body temperature means after daytime bath and regular bath.
Results There were 93 conscripts participating in this study with response rate of 100%. The results of the analyses showed that the body temperature after daytime bath is lower than before bath in statistically significant ($p<0.05$). But, the difference of body temperature between daytime bath and regular bath is not statistically significant. ($p>0.05$).
Discussion Both regular and daytime bath showed effectiveness in decreasing body temperature. Therefore, daytime bath can be used as additional method to reduce body temperature in the daytime period to prevent heat injury.

189 OCCUPATIONAL HEAT EXPOSURE OF TRAFFIC POLICE WORKERS IN AHMEDABAD, INDIA

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Introduction Climate change is causing rising levels of extreme heat. Traffic police workers form a vulnerable group exposed to high atmospheric temperature in temperate countries like India. A heat exposure assessment among traffic police has not been previously undertaken in an Indian city. Therefore, a pilot study was conducted with plans for an exhaustive study in future.
Methods This study was conducted over a six-week period during June and July 2015 at four Traffic junctions in Ahmedabad on 16 traffic policemen. Personal ambient temperature was measured by data loggers, Wet-bulb-globe temperature and ambient temperature measurements were also recorded. Ahmedabad city Temperature Measurement data corresponding to the monitoring period was collected from Indian Meteorological Department. A questionnaire was administered to all participants to collect demographic data and history of heat related symptoms. Follow up was done to capture prevalence of heat-related symptoms over the study period.
Result The average age of study participants was 35.1 years. 94% of participants reported that the summer is the most uncomfortable season to work. The dry bulb and globe bulb temperature ranged from 31.6°C±0.3°C to 36.8°C±1.6°C and 34.6°C±1.0°C to 49.1°C±3.0°C respectively. Area WBGT heat stress measurements for all four traffic junctions ranged from 28.2°C to 36.1°C during the study period. Participants experienced high heat exposures during the study period. Daily WBGT measurements exceeded the maximum recommended exposure at each of the four outdoor worksites.
Discussion This study offers one of the first data sets on ambient heat exposure of traffic police workers in an urban context. The occupational heat stress exposure resulting from outdoor work in traffic junctions is likely to have implications for health. Further, it is observed that the exposures of people who work near roadways is not well characterised by conventional temperature monitoring stations. Various strategies are recommended to protect traffic police from heat exposures.

387 THE EFFECTS OF AMBIENT TEMPERATURE ON WORK-RELATED INJURIES IN ADELAIDE, AUSTRALIA–WORKERS' COMPENSATION CLAIMS INCREASE WITH HIGH TEMPERATURES

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Introduction Ambient thermal stress may directly, or indirectly, increase the risk of work-related injuries, particular for outdoor workers. However, little is known about the overall injury burden contributed by ambient temperatures (both high and low). The objectives of this study were to examine the relationship between ambient temperatures and work-related injuries and illnesses as well as quantify the associated burden at both ends of the temperature spectrum.
Methods Daily numbers of worker's compensation claims for injuries and illnesses in the Adelaide metropolitan area from 2003–2013 (n=224, 631) were provided by the jurisdictional regulator. Daily weather data were obtained from the Australian Bureau of Meteorology. We used a time-stratified case-crossover regression model combined with distributed lag non-linear to quantify the cumulative effect of temperatures over the previous 7 days. The burden of low and high temperatures was computed and further separated into effects related to mild and extreme temperature ranges. Analyses were stratified by worker, work environment and injury characteristics.
Results As the daily maximum temperatures rose above 25°C, the risk of work-related injuries and illnesses also increased. Compared with the optimum temperature (minimum claim likelihood), extreme high temperatures (99th percentile) were associated with a 30% (95% CI: 18% to 44%) increase in overall claims whereas no statistically significant association was observed with cold temperatures (1 st percentile). Longer delayed effects were seen for cold temperatures, whereas acute effects were seen in hot conditions. Notably, moderate temperature ranges were associated with greater injury burden than extreme temperatures.
Conclusion The results suggest a J-shaped relationship between temperature and injury claims with the highest extreme temperatures having the greatest risk but the more common hot days having the greatest burden. Companies and supervisors should be aware that heat-related injuries can arise even in moderately hot conditions. Injury prevention interventions should therefore consider ambient temperature risks more broadly.

1326 HOT ENVIRONMENT: EFFECTS OF A POWER ASSISTED FILTERING DEVICE INCORPORATING A FULL FACE MASK ON NEWTON MANIKIN THERMOPHYSIOLOGICAL RESPONSE

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Introduction Respiratory protective devices are used to protect workers from inhalation of hazardous atmospheres. Beside the aspects related to adequacy of the device in protecting the worker, it is necessary to investigate also the aspects related to the suitability of the device such as ergonomic factors: one of the most common complain of the workers is related to the face thermal sensation perceived as hot.

In this study, the effect of a power assisted filtering device incorporating a full face mask on the thermophysiological response of a thermal manikin is investigated.

Methods The experimental protocol schedules tests on a standing sweating thermal manikin (Newton) in the climatic chamber, where hot conditions were simulated (air temperature at 34°C, relative humidity at 32%). Two conditions were tested: manikin with the respirator powered on (CR) and manikin without the respirator (CC). Two different levels of metabolic rate were set (1 MET and 3 METs).

Results Results show:

- at 1 MET the manikin is in thermal balance with the external environment with or without respirator.
- at 3 MET, although the thermoregulation system is very stressed (the rectal temperature increases continuously with or without respirator), the effect of the respirator produces a small decrease of the local and global temperatures and also of the amount of sweat generated by active thermoregulation that reaches its maximum value of 30 g/min in CC). The body reaches sensation between 'hot' (CC) and 'warm' (CR) while the face sensation increases rapidly reaching the value correspondent to 'very hot' both for CC and CR.

Discussion At M=1 MET and M=3 MET the effect of the hot environment is weakened by the action of the respirator which allows a continuous heat exchange removing and renovating the air layer around the face without providing an additional thermal load.

1568 SEASONAL CHANGES OF PHYSIOLOGICAL RESPONSES ASSOCIATED WITH HEAT ACCLIMATISATION

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Introduction It is known that heat stroke is likely to occur when workers are not acclimatised to heat. The purpose of this study is to clarify if the physiological responses of heat acclimatisation are different by the seasonal difference of the temperature in living environment.

Methods Four healthy males in twenties repeated a 20 minutes-exercise on an ergometer at 40% VO_2max for three times in three different thermal environments in the artificial climate room controlled at 28°C, then elevated to 34°C and finally to 40°C where relative humidity was fixed at 50%. Each exercise was followed by 20 minutes-rest period kept seated in the adjunct room at 24°C. They were asked to exercise consecutively for five days. This series of intervention was repeated during summer and winter seasons. We continuously measured their auditory canal temperature (t_{ac}) and heart rate (HR). We also examined their sweat Na^+ and K^+ concentration and estimated their sweat volume from the body weight loss.

Result The observed t_{ac} and HR at the end of the exercise were generally higher in winter compared to summer. The sweat volume gradually increased for five days and the volume during the first exercise period at 28°C was larger in summer; however, the amount of increase was larger in winter. The sweat Na^+ concentration positively correlated with sweat volume and we observed smaller elevation of Na^+ concentration along with the increase of sweat volume in summer.

Discussion The lower t_{ac} and HR, earlier sweating, and smaller elevation of Na^+ concentration during heat acclimatisation in summer seem to be caused by the different thermal condition of living environment

841 PEOPLE AT ELEVATED RISK OF DEVELOPING HEAT-RELATED ILLNESS AT WORKPLACE: A CASE-CONTROL STUDY

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Introduction Primary causes of heat-related illness (HRI) at work are:

- extreme heat and humidity,
- heavy work load,
- continuous exertion and infrequent rest,
- clothes with poor vapor–permeability, and
- personal health condition.

Empirical research has not been performed to investigate the effect of underlying health problems to HRI.

Methods A case-control study was performed by asking occupational health staffs to report all HRI cases occurred at their workplaces in 2015 and 2016. One co-worker control of the same gender at the closest in age was also reported for each case. Target population included:

- 26 large manufacturing factories,
- 15 major construction companies,
- all traffic guard companies in Japan, and
- a fire stations in Kitakyushu city.

Their results of the periodic health examination were collected to evaluate the underlying health problems of obesity (BMI >25), impaired glucose tolerance, IGT (HbA1c≥6.5%, fast blood sugar ≥126 mg/dL, and/or casual blood sugar ≥200 mg/dL), high blood pressure, HBP (≥140/90 mmHg), and dyslipidemia (LDL-C ≥140 mg/dL, HDL-C <40 mg/dL, or TG ≥150 mg/dL). Data were statistically compared between the case and the control using JMP Pro 13.

Results Overall incidence rate of HRI at the examined workplaces was 0.065% (114 cases/1 76 094 person-year). A total of 102 pairs (n=204) could be compared. Cases showed higher BMI (p=0.046) and visceral circumference (p=0.045). Cases and controls included 12 and 2 persons with IGT, respectively (p=0.005). Multiple logistic regression analysis revealed increase of HbA1c elevated the risk of developing HRI (OR 16.76 [95% CI: 2.44 to 165.5], p=0.0014), whereas LDL-cholesterol showed protective effect (OR 0.97 [0.95–0.99], p<0.001).

Conclusion Significantly elevated risk of developing heat-related illness was observed among workers with IGT.