## Smoking and drinking habits among childhood survivors of the atomic bombings

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**Background :** Exposure to stressful life events, particularly during childhood, has been associated with subsequent increased tobacco and alcohol consumption.

**Objective:** We examined the association between location at the time of the atomic bombings (ATB) in Hiroshima and Nagasaki (i.e. distance from the hypocenter), a surrogate measure of psychological trauma, and smoking/drinking habits among childhood a-bomb survivors in the Life Span Study (LSS) cohort.

**Methods :** The individuals were LSS members ≤16 years ATB who reported information on cigarette smoking/alcohol drinking in mail surveys and clinical interviews. Sex-specific associations between distance from the hypocenter within each city (inner proximal [0-2 km], outer proximal [2-2.5 km], distal [2.5-10 km]) and smoking/drinking habits were estimated using regression models adjusted for age ATB, age at last questionnaire and education.

**Results :** Analyses included 25,626 individuals (12,027 males, 13,599 females). Among males, there was no difference in age at smoking initiation by distance. Females exposed in inner-proximal Hiroshima and outer-proximal Nagasaki were more likely to ever smoke and initiate smoking earlier (all $p<0.01$), and females exposed in proximal Hiroshima consumed more cigarettes than females exposed in distal areas of each city (both $p<0.02$). These associations were more pronounced among females 6-11 years ATB. The likelihood of alcohol drinking was increased among Nagasaki males exposed in proximal areas (both $p=0.01$) and among females exposed in inner-proximal area ($p=0.008$).

**Conclusion :** Females aged 6-11 years ATB who were exposed proximal area had higher risk of smoking initiation and cigarette consumption. Increase in alcohol intake was observed among some proximal survivors, although these associations varied by sex and city. Whether our findings are related to psychological trauma directly or through other factors require careful consideration.

## Estimated COVID-19 infection avoidance rates in Iwate, Saitama, Tokyo, and Okinawa prefectures

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**Introduction** : The infection trends can be estimated based on the existing infection rate, the infection avoidance rate (the population rate of the socially avoided infection group), and the reinfection rate. This report analyzes data from January 2022 to December 2024 for four regions: Iwate (I), Saitama (S), Tokyo(T), and Okinawa(O) Prefecture, as well as nationwide (J) data.

**Methods** : The calculation method is as follows:

Infection protection rate = infection immunity rate (the rate obtained by subtracting the reinfection rate from the infection rate) + vaccine immunity rate + infection avoidance rate

Infection rate (referred to as IR) = 1 - infection protection rate

IR viral reproduction number = IR*viral reproduction number = 4 day growth rate

Infection avoidance rate = 1 - infection immunity - vaccine immunity rate – 4 day growth rate / viral reproduction number

Setting each data point: (1) Estimated number of infections: If N rate is blood donation N antibody positivity rate / reported infection rate, then estimated infection rate is reported infection rate * N rate. The national N rate is 1.58 for period of Category 2 and 1.74 for period of Category 5. (2) the virus reproduction number: Mutant strains are set by multiplying the increase rate compared to the previous strain. Corrections are made using an adjustment rate of 0.4. (3) Reinfection occurs within 5 years based on our hospital data, with a maximum reinfection rate of 0.12 based on the cumulative reinfection rate in Saitama Prefecture

**Results** : As of December 2024, the infection immunity rate in Japan was 0.71 (I: 0.65 - O: 0.81).The vaccine immunity rate was 0.003.The infection avoidance rate was 0.14 (I: 0.20, O: 0.04).The cumulative reinfection rate 0.05 (I:0.04,O:0.07).The infection probability rate was 0.15 ± 0.003.

**Discussion** : If the infection avoidance rate reaches zero, it is believed that new infections will cease.

# Differential Effects of Community Participation on Long-term Care Needs by Chronic Disease Status

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**Background :** Community gathering places (Kayoi-no-ba) have shown protective effects against long-term care (LTC) certification among older adults. However, the underlying pathways remain unclear. This study examined whether the effects of Kayoi-no-ba participation vary by chronic disease status to explore potential mechanisms.

**Methods :** Using data from the National Health Insurance Database of Japan, 9,382 residents aged $\geq 65$ years without LTC certification in 2019 were analyzed through 2022. Participants were stratified by presence of diabetes mellitus (n=3,129 present; n=6,253 absent) and hypertension (n=6,019 present; n=3,363 absent). Kayoi-no-ba participation involving exercise programs was categorized as none, 1-49 times, 50-99 times, and $\geq 100$ times over three years. Multivariate logistic regression analyzed the association between participation frequency and new LTC certification, adjusting for age, sex, baseline medical conditions, and medical costs.

**Results :** Kayoi-no-ba participation effects varied by chronic disease status. Frequent participation ($\geq 100$ times) significantly reduced LTC certification risk among participants without diabetes (adjusted OR: 0.16, 95% CI: 0.05-0.51, p=0.002) and those with hypertension (adjusted OR: 0.30, 95% CI: 0.13-0.69, p=0.005), but showed no significant effects among those with diabetes or without hypertension.

**Conclusions :** The protective effects were significantly more pronounced among individuals without diabetes and those with hypertension. For hypertension, exercise-induced blood pressure reduction may have prevented cardiovascular events. For diabetes, insulin resistance may have limited muscle mass improvement, and preventing diabetes-related cognitive decline and frailty may have been more difficult with this approach. These findings may provide insights into the mechanisms underlying the preventive effects of Kayoi-no-ba, and further research is needed to elucidate these pathways.

## Does PTSD and depression modify the association between obesity and all-cause mortality?

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**Objective :** Post-traumatic stress disorder (PTSD), depression, and obesity share common risk factors for cardiovascular diseases, such as metabolic disorders. However, the modifying effects of PTSD and depression on the association between obesity and mortality have not been fully evaluated.

**Methods :** We analyzed 23,288 men and 38,337 women (aged 20-89 years) who participated in the Tohoku Medical Megabank Project Community-Based Cohort Study from 2013 to 2016. During follow-up until 2021, 1,250 men and 665 women died. Cox proportional-hazards regression analysis was used to estimate hazard ratios (HRs) and 95% confidence intervals (CIs) of all-cause mortality, adjusted for covariates, according to the measured body mass index (BMI) categories (<18.5, 18.5-<22, 22-<25, 25-<27.5, 27.5-<30.0, and ≥30.0 kg/m²), cross-classified into presence or absence of PTSD or depression. PTSD or depression was defined as a self-reported history of PTSD or depression, the presence of post-traumatic stress reaction, or the Center for Epidemiologic Studies Depression Scale score ≥16. Missing information was handled using multiple imputation (20 imputed datasets).

**Results :** Compared with participants without PTSD and depression, and with BMI 22-<25 kg/m², the multivariable-adjusted HRs (95 %CIs) for those without PTSD and depression, and with BMI ≥30.0 kg/m², were 1.14 (0.78–1.67) in men and 1.13 (0.70–1.84) in women. The corresponding HRs for those with PTSD or depression and BMI 22-<25 kg/m² were 1.01 (0.82–1.26) in men and 1.29 (0.96–1.74) in women. For those with PTSD or depression and BMI ≥30.0 kg/m², the HRs were 1.28 (0.71–2.28) in men and 1.89 (1.16–3.10) in women.

**Conclusion :** Obesity accompanied by PTSD or depression was associated with a higher risk of all-cause mortality compared with obesity alone. These findings suggest that obese victims with PTSD or depression may require more intensive support and careful long-term follow-up for recovery.

# Framework for Assessing Heat Resilience by Urban Resistance, Vulnerability, and Adaptive Behaviors

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**Background :** Extreme urban heat has become a serious health threat. Traditional temperature-based assessments fail to capture actual heat-related harm. Although the "Adaptation–Resistance–Response" model improves on the "Exposure–Hazard–Vulnerability" framework, it is complex and omits human adaptive behaviors. A practical framework integrating human adaptive behaviors is therefore needed.

**Objective :** To develop a simple urban heat resilience framework integrating urban resistance, vulnerable populations, and adaptive behaviors, linked to heat injury, to rapidly identify low-resilience areas and provide a basis for targeted strengthening measures.

**Methods :** Data on urban resistance and vulnerable populations came from Taiwan's Statistical Indicator Database, and residents' adaptation behaviors were surveyed. Heat injury data were obtained from Taiwan's Ministry of Health and Welfare. Partial least squares structural equation modeling built the urban heat resilience framework, and geographically weighted regression identified resilience factors significantly linked to heat injury.

**Results :** Heat resilience was significantly negatively associated with heat injury ($\beta = -0.644$) and explained 41.5% of the variance in heat injury. The model's standardized root mean square residual was 0.063. Under this urban heat resilience framework, Hualien and Taitung counties in eastern Taiwan exhibited lower heat resilience (score: −6.71 and −3.27, respectively), driven by lower urban heat resistance (score < −0.73) and higher urban vulnerability (score > 0.52), with Hualien residents also showing poorer heat adaptation behaviors (score: −3.22).

**Conclusion :** This study developed a simple urban heat resilience framework that incorporates human heat adaptation behaviors in addition to commonly used urban factors. The framework was significantly negatively associated with heat injury, highlighting its value for identifying high-risk areas and guiding interventions.