The Great East Japan Earthquake (March 11th, 2011) seriously negatively impacted the mental health of residents living in the affected area. The effects were severe in the prefectures (Iwate, Miyagi, and Fukushima) hit hardest by the disaster. In order to remedy this problem, it is particularly important to address the key issue of depression. Indeed, recent reports have shown that more than 30% of individuals living in temporary housing have depressive symptoms (Kahoku-Shimpo, 2012) and 12% of Iwate, Miyagi and Fukushima residents are in poor mental health (Mura et al., 2013).

Insomnia has been cited as a major risk factor for depression (Cole et al., 2003). Five months after the earthquake, 40% of residents in the affected area were troubled by insomnia (Phizer, 2011). It is generally understood that insomnia can be traced not only to medical issues, but also to socioeconomic status. As the earthquake had an easily observable economic impact, it is important to clarify if this is in turn may compromise socioeconomic status.

Therefore, the aim of this study is to reveal the relationship between insomnia and socioeconomic conditions in the disaster area.

## Methods

### Subjects

2,100 residents of Sendai City aged ≥ 20 were surveyed by self-administered questionnaire in November and December 2012 (eight months after the earthquake). Sendai City consists of five wards (“ku” in Japanese, see Figure 1). As Wakabayashi-ku and Miyagino-ku face the Pacific Ocean, they suffered particularly serious tsunami damage.

The survey, entitled “Consciousness Survey on Disaster Prevention and Life,” was conducted by Rikkyo and Tohoku Universities. (Detailed data is accessible online at http://www2.rkkyo.ac.jp/web/ninurse21/). 1,532 answers were obtained (a 64% response rate), and 1,374 valid samples were analyzed.

### Variables

- **Insomnia:** Respondents were asked, “Have you not slept well?” I counted a “yes” answer as a positive report of insomnia.
- **Socioeconomic Status** - I assessed socioeconomic status from two perspectives: objective (equivalent income) and subjective (subjective social status). Equivalent income was calculated by dividing the median of household income by the square root of number of household members. Subjective social status (SSS) was categorised as high, middle, or low.

### Statistical Analysis

In order to control for respondents’ gender, age, and extent of damage experienced (for more information on types of damage, see Table 1), I used a generalised linear model (GLM: logistic) to test for an association between insomnia and socioeconomic status. I conducted a similar model to examine the effects by ward.

## Results & Discussion

Almost one-third of respondents had been troubled by insomnia. Compared to a report that cited 40% of residents experiencing insomnia five months after the earthquake, it appears the incidence of insomnia has decreased over time. However, compared to the general insomnia prevalence rate of 21% (Liu et al., 2000), the insomnia rate in the disaster area is still high.

The results showed that insomnia was associated with subjective social status in the disaster area. Subjective social status had a greater effect on insomnia than did objective social status. Previous research has linked insomnia to objective socioeconomic status factors, such as income, educational levels and employment status (Fitzgerald, 2010; Talari et al., 2012). In Japan, especially in disaster areas, the subjective assessment of socioeconomic status is crucial in addressing insomnia. These results suggest that 1) subjective social status might be a good predictor of mental health issues like insomnia, and 2) Japanese people might value relative social position more highly than absolute social position.

Additionally, the association between insomnia and socioeconomic status varied among wards. Insomnia in Aoba-ku residents was strongly related to socioeconomic status, suggesting that high income inequalities in this ward might affect the relationship between socioeconomic status and insomnia. On the other hand, in wards like Wakabayashi-ku, the magnitude of earthquake damage might affect insomnia more directly.

Thus, when examining the determinants of insomnia in a disaster area, we must consider not only the direct effects of the earthquake, but also pre-existing economic differences. Indeed, Misawa (2013) showed that economic disparities existing prior to the earthquake were associated with increased insomnia at the district level.

## References
