

Innovative Research Program on Suicide Countermeasures in FY2021: Report on Commissioned Research Results

Field 2: Improving support tools for local governments

Topic number : 2-1

Research topic:

Research on Promotion of Utilization of Statistical Data in Public Administration

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Summary:

Research on the formation of an on-site data analysis environment to accelerate the policy use of official statistical microdata:

Takabe, Yamauchi, Okamoto, and Tsubaki have been preparing for the establishment of on-site data analysis centers for advanced analysis of microdata in official statistics and expanding the data analysis environment at existing centers. On-site microdata centers for official statistics will be established at the Faculty of Data Science and the Graduate School of Health Management at Keio University. Through this, exploratory data analysis contributing to policy-making, such as suicide prevention, will be possible at the two universities. Arai, Kubota, Tsubaki, and Watanabe have been studying data analysis methods that can be used for large-scale data analysis at the on-site center, and have implemented an environment that enables analysis of latent class models at the on-site center of the Research Organization of Information and Systems.

1) **Research and development of publishable data creation and anonymization tools to accelerate the utilization of on-site data analysis environments:**

Based on the idea of Synthetic Data, Takabe analyzed and examined how to create pseudo microdata of official

statistics using actual data. As a result of the analysis, it was found that the created pseudo micro data preserves the structure of the original data to some extent. Minami has developed a k-anonymization algorithm that enables the disclosure of detailed regional information, mainly targeting cancer registration information in Japan, and empirically evaluated its safety. As a pre-processing for anonymization, we match the municipal information (e.g., machi, city) in the regional information with the GPS coordinates published by the Ministry of Land, Infrastructure, Transport, and Tourism, so that we can perform regional division based on the GPS reference values recursively. He considers age, gender, and regional information as quasi-identifier attributes that an attacker can know age, and evaluates record identification risks with varying values of k.

2) **Research on the Utilization of Micro Data for Comprehensive Suicide Prevention:**

Suicide in Japan, which had been declining for more than a decade, began to increase in 2020 and has been pointed out to be related to the COVID-19 pandemic. Oka, Yamauchi, Kubota, and Tsubaki attempted to understand how changes such as unemployment, economic deprivation, decreased social activity, and isolation affected the increase in suicide.

Referring to previous studies on the suicide problem, they organized the classification of target areas, selection of indicators, and analytical methods. In particular, we examined the use of public micro data that contributes to comprehensive suicide countermeasures. They created an indicator, "degree of increase in the suicide rate," to estimate changes in the suicide rate around 2020 based on suicide statistics from 1,735 municipalities nationwide, and analyzed regional and gender differences in the increase in the suicide rate and its background factors.

It became clear that the rise in Japan's suicide rate due to the Corona disaster did not occur uniformly across the country, but rather that disparities emerged between regions where the rate rose more and those where it did not. Differences in industrial structure and differences in the working patterns of men and women may have caused the gender difference in the rise in the suicide rate.

In light of the results of this study, they believe it is important to set priorities in the implementation of countermeasures and to formulate different support contents according to background factors. To conduct a

more effective analysis of background factors, it is desirable to develop an environment for public micro-data analysis using an on-site center and to use this information in the evaluation of countermeasures in the future.

As an analytical technique for promoting the use of microdata from official statistics surveys, the method of latent class analysis, which is a technique for exploring statistical causal structure models for observational record data, especially relatively large-scale, so-called real-world data, was taken up for quantitative studies on visualization of several latent heterogeneous lifestyle behavioral patterns of carers based on anonymous microdata from the Official Survey of Social Life Time. Watanabe, Yamauchi, and Tanoue indicate the issues of social isolation as latent factors in the caregiving lifestyle behavior of single elder males. The percentage of suicides in Japan caused by "nursing care tiredness" is on the rise every year. In Japan, where the population is aging, this rate is expected to increase further. Arai, Yamauchi, and Watanabe also visualized the various problems faced by caregivers through the analysis of information on caregivers' time spent in daily activities using anonymous data on Time Use and Leisure Activities from the Official Survey of Social Life Time

Takebayashi planned a web-based survey to examine the factors that promote or hinder the utilization of mental health services. This year, survey items were selected and developed based on a review of previous studies. The review of previous studies revealed the existence of numerous psychological barriers based on the stigma of mental illness and demographic factors such as gender, age, socioeconomic status, etc., as factors that inhibit the utilization of mental health services. On the other hand, mental health literacy and acceptance of diversity may promote the use of mental health services. A survey will be conducted in the next fiscal year to examine the complex relationships among these factors.