Progress report 2024

Department of Prevention of Diabetes and Lifestyle-Related Diseases

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■ Introduction and Organization

The Department of Prevention of Diabetes and Lifestyle-Related Diseases is a Social Cooperation Program founded in April 2018, which is sponsored by Asahi Mutual Life Insurance Company and is cooperating with the Department of Nephrology and Endocrinology (Professor Masaomi Nangaku) and Department of Diabetes and Metabolic Diseases (Professor Toshimasa Yamauchi).

The objective of our department is to undertake research on preventing onset and progression of diabetes and other lifestyle-related diseases, through analyses of big data including medical databases and usage of information and communication technology (ICT), thereby making a contribution to improving health of people in Japan.

Lifestyle-related diseases including diabetes account for approximately 30% of medical expenses and 60% of deaths. Moreover, Japan is facing an unprecedented super aged society with aging rate of 28.1% in 2018, and an increasing number of people require long-term care due to conditions caused by lifestyle-related diseases. Analyzing factors associated with onset and progression of lifestyle-related diseases is expected to contribute to preventing lifestyle-related diseases and conditions caused by them, decreasing the number of people requiring long-term care, as well as optimizing medical expenses.

Our department intends to conduct multidirectional analyses of big data including medical databases and construct models predicting progression of lifestyle-related diseases.

We are receiving three collaborative researchers from Asahi Mutual Life Insurance Company.

■ Research activities

The members of our department are working on the following research topics.

1) Research on long-term care

An increasing number of people require long-term care in recent years, and as of 2018, 6.5 million people have been certified as being in need for long-term care in Japan. However, factors and diseases leading to conditions requiring long-term care remain largely unknown. We aim to identify factors that predict conditions requiring long-term care by using large-scale databases.

2) Research on discontinuation of physician visit in patients with diabetes, or failure to attend a follow-up visit for diabetes care

Discontinuation of diabetes care is associated with increased rate of complications and mortality. Also, failure to attend a follow-up visit after being diagnosed with diabetes may lead to serious consequences. In order to identify predictors of discontinuation in patients with diabetes in real-world data or to develop a machine-learning model to predict patients who fail to attend a follow-up visit for diabetes care after a screening program, we are analyzing the JMDC database in collaboration with the Department of Clinical Epidemiology and Health Economics (Professor Hideo Yasunaga).

3) Research on impact of COVID-19 pandemic

The global impact of the COVID-19 pandemic on healthcare services is enormous. In order to evaluate

the impact of the COVID-19 pandemic on healthcare service, we are analyzing large-scale, hospital based databases.

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In addition to moving these projects forward, we plan to take on new projects using databases in the future.

■ List of Publications

<Original Articles>

1. Okada A, Aso S, Kurakawa KI, Inoue R, Watanabe H, Sasabuchi Y, Yamauchi T, Yasunaga H, Kadowaki T, Yamaguchi S, Nangaku M (2024) Adding biomarker change information to the kidney failure risk equation improves predictive ability for dialysis dependency in eGFR <30 ml/min/1.73 m. *Clin Kidney J* 17 (11):sfae321. doi:10.1093/ckj/sfae321
2. Okada A, Yamana H, Watanabe H, Manaka K, Ono S, Kurakawa KI, Nishikawa M, Kurano M, Inoue R, Yasunaga H, Yamauchi T, Kadowaki T, Yamaguchi S, Nangaku M (2024) Diagnostic validity and solute-corrected prevalence for hyponatremia and hypernatremia among 1 813 356 admissions. *Clin Kidney J* 17 (12):sfae319. doi:10.1093/ckj/sfae319
3. Okada A, Yamaguchi S, Imaizumi T, Oba K, Kurakawa KI, Yamauchi T, Kadowaki T, Nangaku M (2024) Modification Effects of Albuminuria on the Association Between Kidney Function and Development of Anemia in Diabetes. *J Clin Endocrinol Metab* 109 (4):1012-1032. doi:10.1210/clinem/dgad660
4. Okada A, Oba K, Kimura T, Hagiwara Y, Ono S, Kurakawa KI, Michihata N, Yamauchi T, Nangaku M, Matsuyama Y, Kadowaki T, Yamaguchi S (2024) Steatotic liver index: An interpretable predictor of steatotic liver disease using machine learning with an enhanced shrinkage method. *Hepatology Research.* https://doi.org/10.1111/hepr.14156
5. Araie H, Seki T, Okada A, Yamauchi T, Nangaku M, Kadowaki T, Ohe K, Yamaguchi S (2025) Temporal trends in time toxicity of R-CHOP: a nationwide hospital-based database analysis in Japan. *Support Care Cancer* 33 (4):293. doi:10.1007/s00520-025-09335-7
6. Kurakawa KI, Okada A, Konishi T., Michihata N., Ishimaru M., Matsui H., Fushimi K., Yasunaga H., Yamauchi T., Nangaku M., Kadowaki T., Yamaguchi S. Children Comorbidity Score, a simple predictor for in-hospital mortality: A nationwide inpatient database study in Japan. *JMA Journal*, in press