**Abstract**

Aim

The present study aims to establish an informative interval testing for cholesterol for dyslipidemia screening, in response to different patient backgrounds, from real-world data.

Methods

This was a retrospective cohort study, using electronic medical record data between January 2005 and December 2016 from the Center for Preventive Medicine, St's International Hospital in Tokyo, Japan. We adopted an established statistical method, linear random effect model for analysis to delineate an informative interval for testing cholesterol. The minimal informative cholesterol measurement interval is defined as the time when the signal exceeds noise. In addition, we also stratified the population by dyslipidemia, body mass index (BMI), Framingham risk score (FRS) and age for analysis. Among the lipid panel tests, we used direct low density lipid cholesterol (LDL-c) and indirect LDL-c for analysis.

Results

Of the 128,902 subjects with cholesterol measurements at the Center for Preventive Medicine, St. Luke's International Hospital, after dropping missing and excluded data, 76,843 eligible subjects were included in this study for research analysis. Generally,

there was no difference of signal-noise ratio results between direct LDL-c and indirect LDL-c. The estimated minimal informative LDL-c measurement interval was six years and three months. The estimated minimal informative LDL-c measurement interval of dyslipidemia patients in this study population was approximate six to seven years, while the estimated minimal informative LDL-c measurement among the subjects without dyslipidemia was longer (approximately seven and one-half years). After stratifying the study population by age, FRS and BMI. We confirmed that subjects with middle and high-risk scores had a shorter estimated informative interval for LDL-c measurement, and a shorter estimated informative interval was confirmed in 30 to 44 year-old obese subjects. Therefore, age, BMI and FRS affect LDL-c changes according the analysis of this stratified study population. These findings suggest that age, FRS and BMI be included when planning lipid management strategies.

Conclusion

The meaningful LDL-c measurement intervals for dyslipidemia screening were approximately six years. If the lipid status is manageable in dyslipidemia patients, approximate six to seven years per LDL-c measurement is considered plausible. In addition, FRS, age and BMI can shorter or longer the estimated LDL-c measurement intervals. Overall, these data suggest that the yearly lipid measurement in Japan may

have limited meaning, which strongly recommend the health policy makers to consider decreasing the unnecessary yearly lipid measurement to decrease the healthcare burden.

## Introduction

Dyslipidemia is a condition in which lipid metabolism, such as triglycerides and cholesterol in the blood, is abnormal. There are several types of dyslipidemia (high / boundary region high low density lipids (LDL) cholesterolemia, high triglyceridemia, and low HDL cholesterolemia), which are differentiated by the types of lipids that are evaluated in the blood. Most dyslipidemia is the result of secondary causes resulting from disturbances of lifestyle habits such as eating habits, lack of exercise, and smoking, but can also be partially the result of genetic abnormality. According to a 2017 survey conducted by the Ministry of Health, Labor and Welfare (Survey and statistics of dyslipidemia in Japan), the estimated total number of dyslipidemia patients with drug treatment was 2, 205, 000 in Japan. The estimated number of people without drug intervention, with potential risks of dyslipidemia, was more than 2, 205, 000 people in Japan. The disproportion of triglycerides and cholesterol can induce the blood fat to accumulate in the walls of blood vessels, which is associated with an increased risk of atherosclerotic cardiovascular disease (ASCVD) (Mach et al., 2020). Moreover, dyslipidemia is a disease that needs long-term serum lipid control with appropriate diet,