Nightingale Health Quantification Library 2020

We are proud to introduce an updated quantification library that aligns Nightingale's biomarker service even better with diagnostics use. This introduces clinically validated biomarker concentrations and an overall more accurate quantification across Nightingale's biomarker panel.

Why was this done?

Nightingale aims for clinical use of our biomarker service. To achieve this, we are obtaining regulatory approval for our biomarkers. This also brings benefits for our research customers, as every Nightingale project delivered after December 2019 will contain the CE-marked biomarkers.

The "2020 update" also brings improved consistency between different sample volumes and more coherent results across different NMR instruments. This is required when measuring large projects, such as UK Biobank, and for local clinical implementation.

Advantages

1. Better match with clinical chemistry and other platforms.

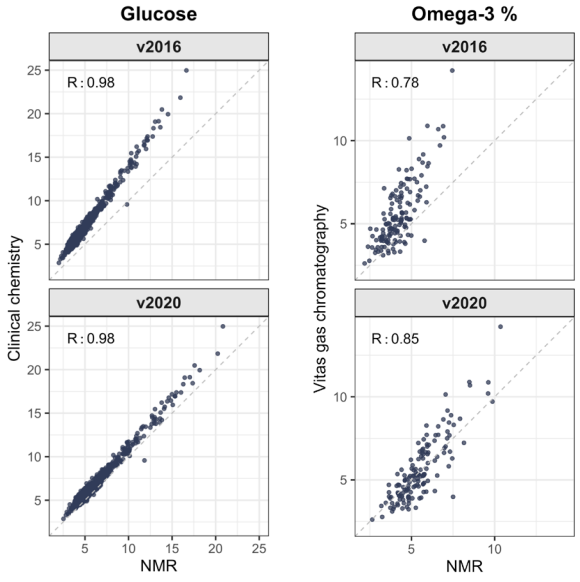

Figure 1. Comparison of glucose and omega-3% using Nightingale's nuclear magnetic resonance (NMR) and other assays. For glucose, v2020 model corrected the bias in absolute biomarker values. For omega-3%, v2020 corrected absolute values and improved the correlation with Vitas gas chromatography (Data courtesy: Prof Kirsten Holven, University of Oslo).

2. Improved traceability and detection range for very low and very high concentrations.
3. Improved consistency between different sample volumes (100 µL and 350 µL).
4. More coherent results across different NMR instruments.
5. New biomarkers:
   a) Our LDL-cholesterol has been renamed to "pure-LDL-C", reflecting more narrow particle-size definition[1]. In addition, we provide Clinical LDL-cholesterol that includes also IDL-cholesterol and thus matches better with general clinical chemistry LDL-cholesterol.
   b) We provide more complete measures of lipoprotein subfractions, such as non-HDL cholesterol, total HDL-phospholipids and total LDL particle concentration.
   c) We have improved our quantification of acetoacetate and also included acetone to our panel.

Effects on scientific analyses

1. No major changes expected for most biomarker associations.

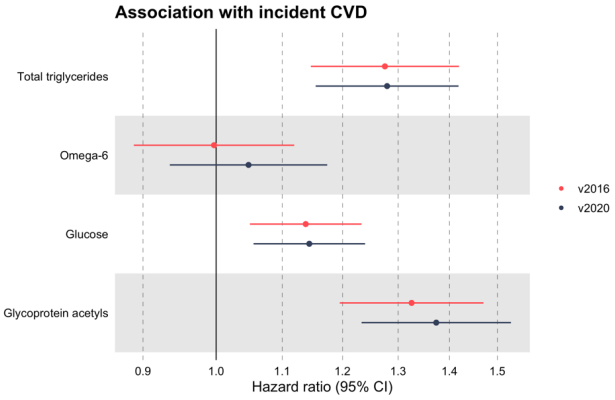

Figure 2. Associations between selected biomarkers with incident CVD in general Finnish population.

2. More prominent role of small LDL due to slightly different inter-relation between lipoprotein subclasses.

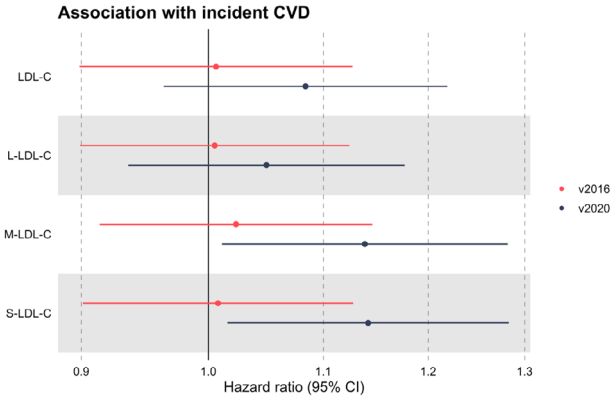

Figure 3. Associations between LDL cholesterol and subclasses with incident CVD in general Finnish population.

3. Less lipid signal in some of the biomarkers could result in changes in associations.

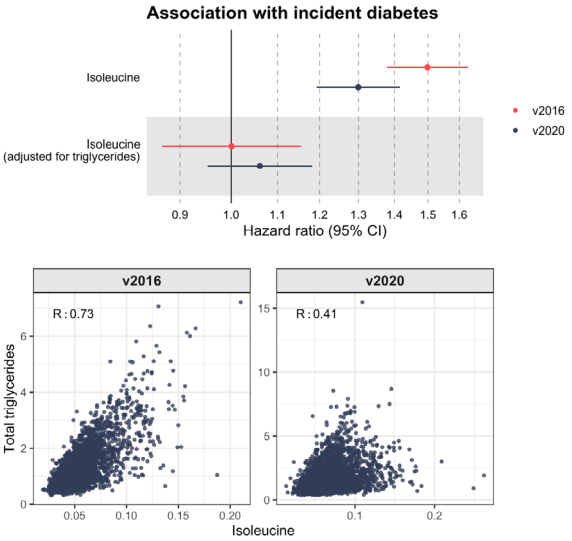

Figure 4. Top: Associations between isoleucine with incident type 2 diabetes in general Finnish population.
Bottom: Correlation between isoleucine and total triglycerides in general Finnish population.

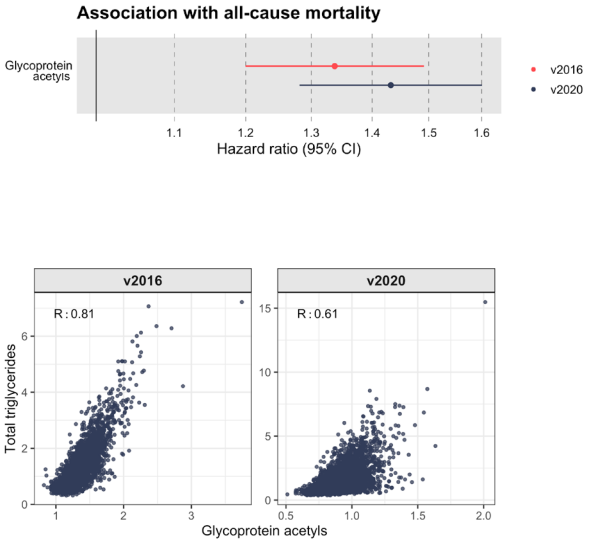

Figure 5. Top: Associations between glycoprotein acetyls with all-cause mortality in general Finnish population.
Bottom: Correlation between glycoprotein acetyls and total triglycerides in general Finnish population.

How does this affect my studies using the Nightingale biomarker platform?

- All future Nightingale research projects will be done using the 2020 quantification library.
- There are no restrictions to meta-analyse results from old and new quantification versions.
- We provide an opportunity to have previously measured samples updated to the new 2020 version. We recommend this update if:
  - You intend to pool the data from old cohorts with the new ones.
  - The data is used for clinical decision making.

REFERENCES 1. Holmes and Ala-Korpela, Nature Reviews Cardiology (2019). What is “LDL-cholesterol”?