

The Mab002 data product

Original number of samples	16,000
Number of samples (per 13.02.2026)	15,311
Number of unique participants	15,041
Biological sample type	Plasma
Participant type(s)	MoBa mothers, MoBa fathers
Collection timepoint	17-18 weeks' gestation
Selection criteria	Artificial reproductive technologies (ART)
Metabolite type(s)	Metabolic biomarkers
Original reference article	Not yet available
Analytical method(s)	Nightingale Health NMR biomarker platform
Related MoBaBIO product(s)	
FHI Project number(s)	PDB2535

The project that generated these data

Prenatal metabolic profile and IVF and the influence on pregnancy and perinatal outcomes

Project lead: Maria Christine Magnus

The purpose of this ongoing study is to determine whether artificial reproductive technologies (ART) have adverse outcomes during pregnancy and the perinatal period for mother and child. To investigate this, plasma samples from mothers and fathers will be analyzed for a large number of metabolic biomarkers, and machine learning will be used to predict adverse pregnancy outcomes.

Study population

The Mab002 metabolomics data source is based on **15,311 plasma samples** from **15,041 mothers and fathers** and comprises a case-control study design. In the original sample, a total of **750 cases** were selected based on pregnancies that were conceived through Assisted Reproductive Technology (ART), and **10,250 randomly selected controls** that were selected based on pregnancies that were conceived without ART treatment. In addition, a random selection of 5,000 of the fathers were included, bringing the total sample size of biological samples sent for analysis to 16,000. In the mab002 dataset that is available to use, there are currently data generated on samples from 4,720 fathers and 10,321 mothers. A number of participants (57 fathers and 1,034 mothers) have two or more samples in the dataset, some of which were collected during the same pregnancy (duplicates), and others that were collected during separate pregnancies. It is important to take note of this when handling, analyzing and interpreting these data. The pregnancy identifier (Preg_ID) which is delivered together with these data can be used to identify these instances, and can also be used to link mother-father pairs where samples were taken from both participant types during the same pregnancy.

Available metabolic measures (variable names in bold)

Abbreviations

HDL: high-density lipoproteins
LDL: low-density lipoproteins
VLDL: very low-density lipoproteins

Cholesterol

Total cholesterol (**Total_C**)

Total cholesterol minus HDL-C (**Non_HDL_C**)

Remnant cholesterol (non-HDL, non-LDL cholesterol) (**Remnant_C**)

VLDL cholesterol (**VLDL_C**)

Clinical LDL cholesterol (**Clinical LDL_C**)

LDL cholesterol (**LDL_C**)
HDL cholesterol (**HDL_C**)

Triglycerides

Total triglycerides (**Total_TG**)
Triglycerides in VLDL (**VLDL_TG**)
Triglycerides in LDL (**LDL_TG**)
Triglycerides in HDL (**HDL_TG**)

Phospholipids

Total phospholipids in lipoprotein particles (**Total_PL**)
Phospholipids in VLDL (**VLDL_PL**)
Phospholipids in LDL (**LDL_PL**)
Phospholipids in HDL (**HDL_PL**)

Cholesteryl esters

Total esterified cholesterol (**Total_CE**)
Cholesteryl esters in VLDL (**VLDL_CE**)
Cholesteryl esters in LDL (**LDL_CE**)
Cholesteryl esters in HDL (**HDL_CE**)

Free cholesterol

Total free cholesterol (**Total_FC**)
Free cholesterol in VLDL (**VLDL_FC**)
Free cholesterol in LDL (**LDL_FC**)
Free cholesterol in HDL (**HDL_FC**)

Total lipids

Total lipids in lipoprotein particles (**Total_L**)
Total lipids in VLDL (**VLDL_L**)
Total lipids in LDL (**LDL_L**)
Total lipids in HDL (**HDL_L**)

Lipoprotein particle concentrations

Total concentration of lipoprotein particles (**Total_P**)
Concentrations of VLDL particles (**VLDL_P**)
Concentrations of LDL particles (**LDL_P**)
Concentrations of HDL particles (**HDL_P**)

Lipoprotein particle sizes

Average diameter for VLDL particles (**VLDL_size**)
Average diameter for LDL particles (**LDL_size**)
Average diameter for HDL particles (**HDL_size**)

Other lipids

Phosphoglycerides (**Phosphoglyc**)
 Ratio of triglycerides to phosphoglycerides (**TG_PG**)
 Total cholines (**Cholines**)
 Phosphatidylcholines (**Phosphatidylc**)
 Sphingomyelins (**Sphingomyelins**)

Apolipoproteins

Apolipoprotein B (**ApoB**)
 Apolipoprotein A1 (**ApoA1**)
 Ratio of apolipoprotein B to apolipoprotein A1 (**ApoB_ApoA1**)

Fatty acids

Total fatty acids (**Total_FA**)
 Degree of unsaturation (**Unsaturation**)
 Omega-3 fatty acids (**Omega_3**)
 Omega-6 fatty acids (**Omega_6**)
 Polyunsaturated fatty acids (**PUFA**)
 Monounsaturated fatty acids (**MUFA**)
 Saturated fatty acids (**SFA**)
 Linoleic acid (**LA**)
 Docosahexaenoic acid (**DHA**)

Fatty acid ratios

Ratio of omega-3 fatty acids to total fatty acids (**Omega_3_Perc**)
 Ratio of omega-6 fatty acids to total fatty acids (**Omega_6_Perc**)
 Ratio of polyunsaturated fatty acids to total fatty acids (**PUFA_Perc**)
 Ratio of monounsaturated fatty acids to total fatty acids (**MUFA_Perc**)
 Ratio of saturated fatty acids to total fatty acids (**SFA_Perc**)
 Ratio of linoleic acid to total fatty acids (**LA_Perc**)
 Ratio of docosahexaenoic acid to total fatty acids (**DHA_Perc**)
 Ratio of polyunsaturated fatty acids to monounsaturated fatty acids (**PUFA_MUFA**)
 Ratio of omega-6 fatty acids to omega-3 fatty acids (**Omega_6_Omega_3**)

Amino acids

Alanine (**Ala**)
 Glutamine (**Gln**)
 Glycine (**Gly**)
 Histidine (**His**)

Branched-chain amino acids

Total concentration of branched-chain amino acids (leucine + isoleucine + valine)
(Total_BCAA)
 Isoleucine (**Ile**)

Leucine (**Leu**)
 Valine (**Val**)
Aromatic amino acids
 Phenylalanine (**Phe**)
 Tyrosine (**Tyr**)

Glycolysis related metabolites

Glucose (**Glucose**)
 Lactate (**Lactate**)
 Pyruvate (**Pyruvate**)
 Citrate (**Citrate**)

Ketone bodies

3-Hydroxybutyrate (**bOHbutyrate**)
 Acetate (**Acetate**)
 Acetoacetate (**Acetoacetate**)
 Acetone (**Acetone**)

Fluid balance

Creatinine (**Creatinine**)
 Albumin (**Albumin**)

Inflammation

Glycoprotein acetyls (**GlycA**)

Lipoprotein subclasses

*Chylomicrons and extremely large **Very-low-density lipoproteins (VLDL)** (particle diameters from 75 nm upwards)*

Concentration of chylomicrons and extremely large VLDL particles (**XXX_VLDL_P**)
 Total lipids in chylomicrons and extremely large VLDL (**XXL_VLDL_L**)
 Phospholipids in chylomicrons and extremely large VLDL (**XXL_VLDL_PL**)
 Cholesterol in chylomicrons and extremely large VLDL (**XXL_VLDL_C**)
 Cholesteryl esters in chylomicrons and extremely large VLDL (**XXL_VLDL_CE**)
 Free cholesterol in chylomicrons and extremely large VLDL (**XXL_VLDL_FC**)
 Triglycerides in chylomicrons and extremely large VLDL (**XXL_VLDL_TG**)

Very large VLDL (average diameter 64 nm)

Concentration of very large VLDL particles (**XL_VLDL_P**)
 Total lipids in very large VLDL (**XL_VLDL_L**)
 Phospholipids in very large VLDL (**XL_VLDL_PL**)
 Cholesterol in very large VLDL (**XL_VLDL_C**)
 Cholesteryl esters in very large VLDL (**XL_VLDL_CE**)
 Free cholesterol in very large VLDL (**XL_VLDL_FC**)
 Triglycerides in very large VLDL (**XL_VLDL_TG**)

Large VLDL (average diameter 53.6 nm)

Concentration of large VLDL particles (**L_VLDL_P**)
 Total lipids in large VLDL (**L_VLDL_L**)
 Phospholipids in large VLDL (**L_VLDL_PL**)
 Cholesterol in large VLDL (**L_VLDL_C**)
 Cholesteryl esters in large VLDL (**L_VLDL_CE**)
 Free cholesterol in large VLDL (**L_VLDL_FC**)
 Triglycerides in large VLDL (**L_VLDL_TG**)

Medium VLDL (average diameter 44.5 nm)

Concentration of medium VLDL particles (**M_VLDL_P**)
 Total lipids in medium VLDL (**M_VLDL_L**)
 Phospholipids in medium VLDL (**M_VLDL_PL**)
 Cholesterol in medium VLDL (**M_VLDL_C**)
 Cholesteryl esters in medium VLDL (**M_VLDL_CE**)
 Free cholesterol in medium VLDL (**M_VLDL_FC**)
 Triglycerides in medium VLDL (**M_VLDL_TG**)

Small VLDL (average diameter 36.8 nm)

Concentration of small VLDL particles (**S_VLDL_P**)
 Total lipids in small VLDL (**S_VLDL_L**)
 Phospholipids in small VLDL (**S_VLDL_PL**)
 Cholesterol in small VLDL (**S_VLDL_C**)
 Cholesteryl esters in small VLDL (**S_VLDL_CE**)
 Free cholesterol in small VLDL (**S_VLDL_FC**)
 Triglycerides in small VLDL (**S_VLDL_TG**)

Very small VLDL (average diameter 31.3 nm)

Concentration of very small VLDL particles (**XS_VLDL_P**)
 Total lipids in very small VLDL (**XS_VLDL_L**)
 Phospholipids in very small VLDL (**XS_VLDL_PL**)
 Cholesterol in very small VLDL (**XS_VLDL_C**)
 Cholesteryl esters in very small VLDL (**XS_VLDL_CE**)
 Free cholesterol in very small VLDL (**XS_VLDL_FC**)
 Triglycerides in very small VLDL (**XS_VLDL_TG**)

Intermediate-density lipoproteins (IDL) (average diameter 28.6 nm)

Concentration of IDL particles (**IDL_P**)
 Total lipids in IDL (**IDL_L**)
 Phospholipids in IDL (**IDL_PL**)
 Cholesterol in IDL (**IDL_C**)
 Cholesteryl esters in IDL (**IDL_CE**)
 Free cholesterol in IDL (**IDL_FC**)
 Triglycerides in IDL (**IDL_TG**)

*Large **Low-density lipoproteins** (LDL) (average diameter 25.5 nm)*Concentration of large LDL particles (**L_LDL_P**)Total lipids in large LDL (**L_LDL_L**)Phospholipids in large LDL (**L_LDL_PL**)Cholesterol in large LDL (**L_LDL_C**)Cholesteryl esters in large LDL (**L_LDL_CE**)Free cholesterol in large LDL (**L_LDL_FC**)Triglycerides in large LDL (**L_LDL_TG**)*Medium LDL (average diameter 23 nm)*Concentration of medium LDL particles (**M_LDL_P**)Total lipids in medium LDL (**M_LDL_L**)Phospholipids in medium LDL (**M_LDL_PL**)Cholesterol in medium LDL (**M_LDL_C**)Cholesteryl esters in medium LDL (**M_LDL_CE**)Free cholesterol in medium LDL (**M_LDL_FC**)Triglycerides in medium LDL (**M_LDL_TG**)*Small LDL (average diameter 18.7 nm)*Concentration of small LDL particles (**S_LDL_P**)Total lipids in small LDL (**S_LDL_L**)Phospholipids in small LDL (**S_LDL_PL**)Cholesterol in small LDL (**S_LDL_C**)Cholesteryl esters in small LDL (**S_LDL_CE**)Free cholesterol in small LDL (**S_LDL_FC**)Triglycerides in small LDL (**S_LDL_TG**)*Very large **High-density lipoproteins** (HDL) (average diameter 14.3 nm)*Concentration of very large HDL particles (**XL_HDL_P**)Total lipids in very large HDL (**XL_HDL_L**)Phospholipids in very large HDL (**XL_HDL_PL**)Cholesterol in very large HDL (**XL_HDL_C**)Cholesteryl esters in very large HDL (**XL_HDL_CE**)Free cholesterol in very large HDL (**XL_HDL_FC**)Triglycerides in very large HDL (**XL_HDL_TG**)*Large HDL (average diameter 12.1 nm)*Concentration of large HDL particles (**L_HDL_P**)Total lipids in large HDL (**L_HDL_L**)Phospholipids in large HDL (**L_HDL_PL**)Cholesterol in large HDL (**L_HDL_C**)Cholesteryl esters in large HDL (**L_HDL_CE**)Free cholesterol in large HDL (**L_HDL_FC**)Triglycerides in large HDL (**L_HDL_TG**)

*Medium HDL (average diameter 10.9 nm)*Concentration of medium HDL particles (**M_HDL_P**)Total lipids in medium HDL (**M_HDL_L**)Phospholipids in medium HDL (**M_HDL_PL**)Cholesterol in medium HDL (**M_HDL_C**)Cholesteryl esters in medium HDL (**M_HDL_CE**)Free cholesterol in medium HDL (**M_HDL_FC**)Triglycerides in medium HDL (**M_HDL_TG**)*Small HDL (average diameter 8.7 nm)*Concentration of small HDL particles (**S_HDL_P**)Total lipids in small HDL (**S_HDL_L**)Phospholipids in small HDL (**S_HDL_PL**)Cholesterol in small HDL (**S_HDL_C**)Cholesteryl esters in small HDL (**S_HDL_CE**)Free cholesterol in small HDL (**S_HDL_FC**)Triglycerides in small HDL (**S_HDL_TG**)***Relative lipoprotein lipid concentrations****Chylomicrons and extremely large VLDL ratios*Phospholipids to total lipids ratio in chylomicrons and extremely large VLDL (**XXL_VLDL_PL_Perc**)Cholesterol to total lipids ratio in chylomicrons and extremely large VLDL (**XXL_VLDL_C_Perc**)Cholesteryl esters to total lipids ratio in chylomicrons and extremely large VLDL (**XXL_VLDL_CE_Perc**)Free cholesterol to total lipids ratio in chylomicrons and extremely large VLDL (**XXL_VLDL_FC_Perc**)Triglycerides to total lipids ratio in chylomicrons and extremely large VLDL (**XXL_VLDL_TG_Perc**)*Very large VLDL ratios*Phospholipids to total lipids ratio in very large VLDL (**XL_VLDL_PL_Perc**)Cholesterol to total lipids ratio in very large VLDL (**XL_VLDL_C_Perc**)Cholesteryl esters to total lipids ratio in very large VLDL (**XL_VLDL_CE_Perc**)Free cholesterol to total lipids ratio in very large VLDL (**XL_VLDL_FC_Perc**)Triglycerides to total lipids ratio in very large VLDL (**XL_VLDL_TG_Perc**)*Large VLDL ratios*Phospholipids to total lipids ratio in large VLDL (**L_VLDL_PL_Perc**)Cholesterol to total lipids ratio in large VLDL (**L_VLDL_C_Perc**)Cholesteryl esters to total lipids ratio in large VLDL (**L_VLDL_CE_Perc**)Free cholesterol to total lipids ratio in large VLDL (**L_VLDL_FC_Perc**)Triglycerides to total lipids ratio in large VLDL (**L_VLDL_TG_Perc**)

Medium VLDL ratios

Phospholipids to total lipids ratio in medium VLDL (**M_VLDL_PL_Perc**)
 Cholesterol to total lipids ratio in medium VLDL (**M_VLDL_C_Perc**)
 Cholesteryl esters to total lipids ratio in medium VLDL (**M_VLDL_CE_Perc**)
 Free cholesterol to total lipids ratio in medium VLDL (**M_VLDL_FC_Perc**)
 Triglycerides to total lipids ratio in medium VLDL (**M_VLDL_TG_Perc**)

Small VLDL ratios

Phospholipids to total lipids ratio in small VLDL (**S_VLDL_PL_Perc**)
 Cholesterol to total lipids ratio in small VLDL (**S_VLDL_C_Perc**)
 Cholesteryl esters to total lipids ratio in small VLDL (**S_VLDL_CE_Perc**)
 Free cholesterol to total lipids ratio in small VLDL (**S_VLDL_FC_Perc**)
 Triglycerides to total lipids ratio in small VLDL (**S_VLDL_TG_Perc**)

Very small VLDL ratios

Phospholipids to total lipids ratio in very small VLDL (**XS_VLDL_PL_Perc**)
 Cholesterol to total lipids ratio in very small VLDL (**XS_VLDL_C_Perc**)
 Cholesteryl esters to total lipids ratio in very small VLDL (**XS_VLDL_CE_Perc**)
 Free cholesterol to total lipids ratio in very small VLDL (**XS_VLDL_FC_Perc**)
 Triglycerides to total lipids ratio in very small VLDL (**XS_VLDL_TG_Perc**)

IDL ratios

Phospholipids to total lipids ratio in IDL (**IDL_PL_Perc**)
 Cholesterol to total lipids ratio in IDL (**IDL_C_Perc**)
 Cholesteryl esters to total lipids ratio in IDL (**IDL_CE_Perc**)
 Free cholesterol to total lipids ratio in IDL (**IDL_FC_Perc**)
 Triglycerides to total lipids ratio in IDL (**IDL_TG_Perc**)

Large LDL ratios

Phospholipids to total lipids ratio in large LDL (**L_LDL_PL_Perc**)
 Cholesterol to total lipids ratio in large LDL (**L_LDL_C_Perc**)
 Cholesteryl esters to total lipids ratio in large LDL (**L_LDL_CE_Perc**)
 Free cholesterol to total lipids ratio in large LDL (**L_LDL_FC_Perc**)
 Triglycerides to total lipids ratio in large LDL (**L_LDL_TG_Perc**)

Medium LDL ratios

Phospholipids to total lipids ratio in medium LDL (**M_LDL_PL_Perc**)
 Cholesterol to total lipids ratio in medium LDL (**M_LDL_C_Perc**)
 Cholesteryl esters to total lipids ratio in medium LDL (**M_LDL_CE_Perc**)
 Free cholesterol to total lipids ratio in medium LDL (**M_LDL_FC_Perc**)
 Triglycerides to total lipids ratio in medium LDL (**M_LDL_TG_Perc**)

Small LDL ratios

Phospholipids to total lipids ratio in small LDL (**S_LDL_PL_Perc**)

Cholesterol to total lipids ratio in small LDL (**S_LDL_C_Perc**)

Cholesteryl esters to total lipids ratio in small LDL (**S_LDL_CE_Perc**)

Free cholesterol to total lipids ratio in small LDL (**S_LDL_FC_Perc**)

Triglycerides to total lipids ratio in small LDL (**S_LDL_TG_Perc**)

Very large HDL ratios

Phospholipids to total lipids ratio in very large HDL (**XL_HDL_PL_Perc**)

Cholesterol to total lipids ratio in very large HDL (**XL_HDL_C_Perc**)

Cholesteryl esters to total lipids ratio in very large HDL (**XL_HDL_CE_Perc**)

Free cholesterol to total lipids ratio in very large HDL (**XL_HDL_FC_Perc**)

Triglycerides to total lipids ratio in very large HDL (**XL_HDL_TG_Perc**)

Large HDL ratios

Phospholipids to total lipids ratio in large HDL (**L_HDL_PL_Perc**)

Cholesterol to total lipids ratio in large HDL (**L_HDL_C_Perc**)

Cholesteryl esters to total lipids ratio in large HDL (**L_HDL_CE_Perc**)

Free cholesterol to total lipids ratio in large HDL (**L_HDL_FC_Perc**)

Triglycerides to total lipids ratio in large HDL (**L_HDL_TG_Perc**)

Medium HDL ratios

Phospholipids to total lipids ratio in medium HDL (**M_HDL_PL_Perc**)

Cholesterol to total lipids ratio in medium HDL (**M_HDL_C_Perc**)

Cholesteryl esters to total lipids ratio in medium HDL (**M_HDL_CE_Perc**)

Free cholesterol to total lipids ratio in medium HDL (**M_HDL_FC_Perc**)

Triglycerides to total lipids ratio in medium HDL (**M_HDL_TG_Perc**)

Small HDL ratios

Phospholipids to total lipids ratio in small HDL (**S_HDL_PL_Perc**)

Cholesterol to total lipids ratio in small HDL (**S_HDL_C_Perc**)

Cholesteryl esters to total lipids ratio in small HDL (**S_HDL_CE_Perc**)

Free cholesterol to total lipids ratio in small HDL (**S_HDL_FC_Perc**)

Triglycerides to total lipids ratio in small HDL (**S_HDL_TG_Perc**)

Quality control tags and notes

The original data generated using the Nightingale NMR platform were returned to NIPH in accompaniment of quality control information for tagged samples and biomarkers. This supplementary information is included in the Mab002 data product (dataset) made available for use in research projects, and is briefly described below (Table 1). In addition, some samples were returned with annotations for one or more tags that were linked to a given biomarker. These are also briefly described.

QC Tags (variable names in bold)

Sample excluded (**Tag_Sample_excluded**)
 Sample notes (**Tag_Sample_notes**)
 Low ethanol (**Tag_Low_ethanol**)
 Medium ethanol (**Tag_Medium_ethanol**)
 High ethanol (**Tag_High_ethanol**)
 Isopropyl alcohol (**Tag_Isopropyl_alcohol**)
 1_methyl_2_pyrrolidone (**Tag_1_methyl_2_pyrrolid**)
 Polysaccharides (**Tag_Polysaccharides**)
 Aminocaproic acid (**Tag_Aminocaproic_acid**)
 Low glucose (**Tag_Low_glucose**)
 High lactate (**Tag_High_lactate**)
 High pyruvate (**Tag_High_pyruvate**)
 Low glutamine/high glutamate (**Tag_Low_glut_high_glut**)
 Gluconolactone (**Tag_Gluconolactone**)
 Low protein (**Tag_Low_protein**)
 Unexpected amino acid signals (**Tag_Unexpect_AA_signals**)
 Unidentified macromolecules (**Tag_Unident_macromol**)
 Unidentified small molecule A (**Tag_Unident_small_mol_A**)
 Unidentified small molecule B (**Tag_Unident_small_mol_B**)
 Unidentified small molecule C (**Tag_Unident_small_mol_C**)
 Below limit of quantification (**Tag_Below_LOQ**)

Tags per biomarker

There are 249 variables in the dataset that describe quality control tags (notes) per biomarker. These have the exact same variable names as the biomarkers themselves (listed above under the section **Available metabolic measures**), but with the designation "**Tag_**" in front of each biomarker label. As an example, the variable that provides QC tags for the variable "Clinical_LDL_C" is called "**Tag_Clinical_LCL_C**".

Tag annotations

Quality control tag	variable name	Tag description
Low ethanol	Tag_Low_ethanol	This arises potentially due to disinfectant contaminations in the blood donation/collection process and/or contamination in air from lab handling, such as cleaning of well-plates. In higher concentrations, ethanol prohibits the quantification of glycerol, and therefore the sample has been flagged with a "TAG", and no concentration has been provided for the sample. In lower concentrations, it may interfere with the reliable quantification of glycerol and result in artificially distorted glycerol levels. We recommend caution when interpreting absolute glycerol concentrations. It is also good to note that high alcohol in the sample might artificially increase the acetate concentration.
Medium ethanol	Tag_Medium_ethanol	This arises potentially due to disinfectant contaminations in the blood donation/collection process and/or contamination in air from lab handling, such as cleaning of well-plates. In higher concentrations, ethanol prohibits the quantification of glycerol and 3-hydroxybutyrate, and therefore the sample has been flagged with a "TAG", and no concentration has been provided for the sample. In lower concentrations, it may interfere with the reliable quantification of glycerol and 3-hydroxybutyrate and result in artificially distorted glycerol and 3-hydroxybutyrate levels. We recommend caution when interpreting absolute glycerol and 3-hydroxybutyrate

		concentrations. It is also good to note that high alcohol in the sample might artificially increase the acetate concentration.
High ethanol	Tag_High_ethanol	This arises potentially due to disinfectant contaminations in the blood donation/collection process and/or contamination in air from lab handling, such as cleaning of well-plates. In higher concentrations, ethanol prohibits the quantification of glycerol, 3-hydroxybutyrate and valine, and therefore the sample has been flagged with a "TAG", and no concentration has been provided for the sample. In lower concentrations, it may interfere with the reliable quantification of glycerol, 3-hydroxybutyrate and valine and result in artificially distorted glycerol, 3-hydroxybutyrate and valine levels. We recommend caution when interpreting absolute glycerol, 3-hydroxybutyrate and valine concentrations. It is also good to note that high alcohol in the sample might artificially increase the acetate concentration.
Isopropyl alcohol	Tag_Isopropyl_alcohol	Isopropyl alcohol signals detected. In higher concentrations, this compound prohibits the quantification of creatinine, and therefore the sample has been flagged with a "TAG", and no concentration has been provided for the sample. In lower concentrations, it may interfere with the reliable quantification of creatinine and result in artificially distorted creatinine levels. We recommend caution when interpreting absolute creatinine concentrations.
1-methyl-2-pyrrolidone	Tag_1_methyl_2_pyrrolid	A compound that can be used in sample collection processes. In higher concentrations, it prohibits the quantification of glutamine, and therefore the sample has been flagged with a "TAG", and no concentration has been provided for the sample. In lower concentrations, it may interfere with the reliable quantification of glutamine and result in artificially distorted glutamine levels. We recommend caution with interpreting absolute glutamine concentrations.
Polysaccharides	Tag_Polysaccharides	Polysaccharide or some other type of carbohydrate signals detected. Most commonly observed along with other signs of suboptimal sample quality, but may also indicate presence of heparin. In higher concentrations, this compound prohibits the quantification of creatinine, and therefore the sample has been flagged with a "TAG" and no concentration has been provided for the sample. In lower concentrations, it may interfere with the reliable quantification of creatinine and result in artificially distorted creatinine levels. We recommend caution when interpreting absolute creatinine concentrations.
Aminocaproic acid	Tag_Aminocaproic_acid	Aminocaproic acid detected in the sample; this compound is an antifibrinolytic agent. In higher concentrations, it prohibits the quantification of acetone, and therefore the sample has been flagged with a "TAG", and no concentration has been provided for the sample.
Low glucose	Tag_Low_glucose	Low glucose is tagged since the physiological concentration is commonly well controlled, particularly in the low concentration end. However, glucose is metabolized to pyruvate and lactate if the blood sample is kept with the cells during the sample collection process, in particular at room temperature but also to some extent at fridge temperature. The low glucose tag thus commonly reflects extended time periods prior to preparation to serum/plasma. As a result of the glycolysis, high lactate and/or high pyruvate is commonly observed with low glucose levels.
High lactate	Tag_High_lactate	Low glucose is tagged since the physiological concentration is commonly well controlled, particularly in the low concentration end. However, glucose is metabolized to pyruvate and lactate if the blood sample is kept for the cells during the sample collection process, in particular at room temperature but also to some extent at fridge temperature. The low glucose tag thus commonly reflects extended time periods prior to preparation to serum/plasma. As a result of the glycolysis, high lactate and/or high pyruvate is commonly observed along with low glucose levels.
High pyruvate	Tag_High_pyruvate	Low glucose is tagged since the physiological concentration is commonly well controlled, particularly in the low concentration end. However, glucose is metabolized to pyruvate and lactate if the blood sample is kept for the cells during the sample collection process, in particular at room temperature but also to some extent at fridge temperature. The low glucose tag thus commonly reflects extended time periods prior to preparation to serum/plasma. As a result of the glycolysis, high lactate and/or high pyruvate is commonly observed along with low glucose levels
Low glutamine/high glutamate	Tag_Low_glut_high_glut	In these samples most of the glutamine appears to have degraded into glutamate. This can take place, e.g. during the sample collection process, if the sample is kept at room temperature for a prolonged period of time, there are multiple freeze-thaw cycles, or there are oxidative conditions/oxidation occurs in the sample. In these samples glutamine is not quantified. In higher concentrations, glutamate prohibits the quantification of pyruvate, and therefore the sample has been flagged with a "TAG", and no concentration has been provided for the sample. In lower concentrations, glutamate may interfere with the reliable quantification of pyruvate and result in artificially

		distorted pyruvate levels. We recommend caution when interpreting absolute pyruvate concentrations.
Gluconolactone	Tag_Gluconolactone	Gluconolactone is an oxidation product of glucose and is not normally detected in samples. Interferes with the quantification of creatinine.
Low protein	Tag_Low_protein	Unexpected protein features have been identified during the analysis. This quality observation is related to unexpectedly low total protein concentration in the sample and may be an indication of potential sample dilution. Sample dilution may occur due to water contamination, or prolonged storage in freezer in combination with loosely closed tube caps, which exposes the sample to collect ice and increases the chances of dilution. In case there is reason to assume sample dilution, we recommend caution when analyzing absolute concentrations.
Unexpected amino acid signals	Tag_Unexpect_AA_signals	These are signals that we do not typically observe in normal samples. It is likely that they relate to protein breakage due to non optimal storage. Interferes with the reliable quantification of citrate and glycerol, and may result in artificially distorted metabolite concentrations.
Unidentified macromolecules	Tag_Unident_macromol	Signals from abnormal macromolecule(s)/protein(s). Interferes with the quantification of phenylalanine, acetate, acetone, glutamine and pyruvate.
Unidentified small molecule (a)	Tag_Unident_small_mol_A	Untypical signals from unknown small molecule(s); potentially xenobiotics.
Unidentified small molecule (b)	Tag_Unident_small_mol_B	Untypical signals from unknown small molecule(s); potentially xenobiotics. Interferes with the reliable quantification of albumin, creatinine, glycerol, glycine and acetone.
Unidentified small molecule (c)	Tag_Unident_small_mol_C	Unidentified signals at 2.27 ppm and various other spectral areas. Interferes with the reliable quantification of albumin, creatinine, glycerol, glycine and acetone.
Below limit of quantification	Tag_Below_LOQ	Below Limit-Of-Quantification (LOQ) means that the concentration of the given biomarker is smaller than the range where the Nightingale platform offers highly accurate quantification. For instance, the LOQ for lipoprotein lipid measures is <0.01 mmol/L. The estimated biomarker concentration is reported for use in certain epidemiological analyses, but it may be advisable to conduct sensitivity analyses with all values below LOQ excluded.

Definition of cases and controls in the dataset

The Mab002 data product is provided for use with the variable **CaseControl**, which defines cases (pregnancies that were conceived through ART) by "**Case**" and controls (randomly selected pregnancies that were conceived without ART treatment) by "**Control**".

Biological sampling and processing

Non-fasting plasma from blood samples were collected from expecting mothers and fathers at 17-18 weeks' gestation. These samples were collected into ethylenediaminetetraacetic acid (EDTA) tubes, centrifuged within 30 minutes, and temporarily placed in a refrigerator at 4 °C. They were shipped from the collecting hospital overnight to MoBa's biobank at the Norwegian Institute of Public Health (NIPH). The samples most often arrived at the biobank within 1–2 days of blood donation, where EDTA plasma were aliquoted onto polypropylene microtiter plates (96-well format, 300 µL per well), sealed with the use of heat-sealing foil sheets, and placed in long-term storage at –80 °C.

For more information on biological sampling, processing and storage, please refer to the original reference articles for NIPH's biobank by [Rønningen et al. 2006](#) and [Paltiel et al. 2014](#).

Analytical methodology

The metabolites measured in this study were measured using the **Nightingale Platform** for Nuclear Magnetic Resonance (NMR) Analysis of Lipoproteins and Metabolites ([Würtz et al. 2017](#)). The plasma samples sent from NIPH were analyzed in three batches (2021, 2023 and 2024). The 2021 and 2023 batches were analyzed at the University of Bristol in the United Kingdom, while the 2024 batch was analyzed at Nightingale Health in Finland. Samples can be grouped accordingly in the Mab002 dataset through the variable **batch**.

Measurement units:

Cholesterol, Triglycerides, Phospholipids, Cholesteryl esters, Free cholesterol, Total lipids, Lipoprotein particle concentrations, other lipids, Fatty acids, Amino acids, Glycolysis related metabolites, Ketone bodies, Inflammation (glycoprotein acetyls), Lipoprotein subclasses: **mmol/L**

Fluid balance (creatinine): **μmol/L**

Apolipoproteins, Fluid balance (Albumin): **g/L**

Lipoprotein particle sizes: **nm**

Limit of detection (LOD):

In general, the limit of quantification (LOQ) using this NMR technology is approximately 10μmol/L. By classical definition, the limit of detection (LOD) is roughly one third of the LOQ. Due to different molecular characteristics, the detection limit is slightly different for each biomarker. However, within the biomarkers that Nightingale Health measures, LOD has not been a limiting factor for providing high quality quantified biomarker data with absolute concentrations. This means that all of the biomarkers in this panel are in the range of detection. If there for some reason are individual metabolite measures with such low values that they cannot be quantified, the measure will be marked as zero in the data sheet. Along the Nightingale Quantification Library 2020, the manufacturer has introduced a new informative quality control tag, "Below limit of quantification", which tags all metabolites that have too low concentration and are thus not quantified.

There is no hard limit of detection, since it is holistic assessment relating to the whole spectrum. In practice, lowest observed nonzero value corresponds well to the analytical limits of detection. Due to this reason, the manufacturer does not provide cut-offs for individual biomarkers. For statistical analyses, it is therefore possible to set the zero-values at (or slightly below) the lowest observed value.

Published articles using Mab002

This section also includes articles related to study design, sampling, and data collection.

❖ None yet available

Restrictions for use

None currently known.

Acknowledgements recommended for use

We recommend that any use of these data in analyses that are presented in peer-review publications acknowledges the original article describing sampling and data collection:

Reference article not currently available.

Disclaimer

The data in Mab002 that are available for use are provided on an *as is* basis, and FHI does not provide any guarantees related to data quality and assurance of the original dataset. MoBa participants can retract their consent to participate in the MoBa study at any time, and results generated using biological samples will be removed from MoBa datasets accordingly. The descriptive information regarding sample sizes and data content in this product sheet is correct and up-to-date as of **13.02.2026**.