Small Dense LDL Cholesterol Measured by Homogeneous Assay in Japanese Healthy Controls, Metabolic Syndrome and Diabetes Patients with or without a Fatty Liver.

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## Abstract

BACKGROUND: Serum small dense LDL-cholesterol (sdLDL-C) levels in healthy controls and the cases with diabetes (T2DM) and metabolic syndrome (MetS) with or without a fatty liver in a large, typical Japanese population was determined.

METHODS: The plasma lipids and lipoproteins, including sdLDL-C by homogeneous assay, were determined in controls, MetS and T2DM patients (n=5255). The cases with MetS and preliminary MetS (pre-MetS) as well as T2DM and preliminary T2DM (pre-DM) were selected based on the Japanese criteria for MetS and T2DM. Fatty liver was diagnosed using the ultrasonography.

RESULTS: The 75th percentile values for sdLDL-C were 27.5mg/dL for men and 23.3mg/dL for women and increased with age. The concentrations of sdLDL-C and sdLDL-C/LDL-C were significantly higher in pre-MetS and pre-T2DM patients than healthy controls as well as in MetS and T2DM patients. Significantly higher sdLDL-C was found in cases with a fatty liver than without a fatty liver in all five groups.

CONCLUSIONS: Significantly elevated sdLDL-C levels were found in pre-MetS, MetS and pre-T2DM, T2DM patients compared to the healthy controls. Fatty liver significantly enhanced serum sdLDL-C levels and the multiple regression analyses ascertained that fatty liver was an independent determinant for sdLDL-C.

## Highlight

- **1.** The normal range of sdLDL-C in Japanese population was determined.
- 2. sdLDL-C was significantly higher in pre-MetS and pre-T2DM than in controls
- 3. sdLDL-C was highest in MetS and T2DM when associated with a fatty liver

#### Introduction

The atherogenic lipid profile in patients with metabolic syndrome or glucose intolerance is characterized by hypertriglyceridemia, elevated apolipoprotein B levels, reduced high-density lipoprotein cholesterol (HDL-C) concentrations and an increased proportion of small, dense low-density lipoprotein (sdLDL) particles [1, 2]. The sdLDL particles exhibit increased penetration of the arterial wall, lower affinity for the LDL receptor, longer half-life in plasma, greater susceptibility to glycation and lower resistance to oxidative stress, suggesting that sdLDL is highly atherogenic [3]. Indeed, patients with high levels of sdLDL particles were shown to have an approximately 3-fold increase in the risk of developing coronary heart disease compared with individuals with primarily large, buoyant LDL particles [4, 5]. In addition, the sdLDL-cholesterol (sdLDL-C) concentration has been suggested to be a better surrogate marker than the LDL-C concentration for the severity of coronary heart disease [6-8].

LDL particles are heterogeneous with respect to size and density. Compared to large, buoyant LDL, sdLDL particles are known to exhibit atherogenic properties [9, 10]. Therefore, sdLDL particles possess an elevated atherogenic potential and are linked to premature cardiovascular disease (CVD), and a growing body of evidence supports their role as a CVD biomarker [11-14] determined by gradient gel electrophoresis (GGE) method (15, 16) and Nuclear Magnetic Resonance (NMR) spectroscopy (17). Recently, a simpler method for the determination of cholesterol in sdLDL was developed by Hirano et al. [18]. In it, the lipoproteins at a density <1.044 g/ml are precipitated using heparin and MgCl2, and cholesterol is measured by a homogeneous method in the supernatant fluid on a routine chemical analyzer, or ApoB is measured by immunotubidometry. More recently, a fully automated homogeneous assay for sdLDL cholesterol (sdLDL-C) has been developed by Ito et al. [19]. Using this method, the sdLDL-C values obtained by this new assay are compared with those obtained by isolation of the d =1.044–1.063 g/ml plasma fraction by sequential ultracentrifugation showed excellent agreement [20] and predicted incident cardiovascular disease (21). Therefore, we used this homogeneous sdLDL-C assay to establish a normal range of for sdLDL-C levels in a healthy Japanese population in order to compare with metabolic syndrome (MetS) and type 2 diabetes (T2DM).

As a means to finding an early diagnosis of cardiovascular disease, we investigated the cases with preliminary MetS (pre-MetS) and preliminary T2DM (pre-T2DM) patients, the presence of a fatty liver and associated lipid disorders. Pre-MetS and pre-T2DM are known to be associated with the impaired glucose tolerance (IGT) and high risk group of CVD (1). Also, a fatty liver has been proposed to be an independent predictor of coronary heart disease (CHD) [22-25]. A fatty liver is also a manifestation of metabolic syndrome, and is associated with obesity, T2DM and hypertriglyceridemia [25, 26]. In patients with T2DM or MetS, the prevalence of a fatty liver is significantly high and may enhance atherogenesis by increasing the level of sdLDL particles [27]. It has been reported that there is an overproduction and secretion of VLDL in the insulin resistance with a fatty liver, independent of liver fat deposits [28, 29]. De Vries et al reported that both lipoprotein lipase activity and adiponectin are inversely correlated with sdLD-C [30]. The precise role of a fatty liver in the pathogenesis of sdLDL, however, is still unclear. In the present study, we performed a cross-sectional analysis of a cohort of more than 5000 men and women to examine the potential associations between a fatty liver and the serum sdLDL levels, in particular in pre-MetS and pre-T2DM patients as an early detection of cardiovascular risk assessment by sdLDL-C.

The aims of this study were to determine the normal range of the plasma sdLDL-C concentration in a strictly selected healthy Japanese population and compared with the sdLDL-C level in patients with T2DM and MetS, in particular an early stage of these diseases. Furthermore, the metabolic pathway of formation of sdLDL-C and the driving mechanism of the interaction (i.e. which is the causative or primary factor) between the presence of a fatty liver and an elevated sdLDL-C were discussed. Which factor comes first, fatty liver or elevated sdLDL-C, and how influenced to the other and deteriorate the cardiovascular diseases was also discussed in this large population study.

## **Materials and Methods**

#### Study subjects

The study subjects included 5,255 participants (3,199men and 2,056women) who underwent medical examination at Hidaka Hospital in Takasaki, Gunma prefecture, Japan. The subjects ranged in age from 28 to 83 in the men and from 27 to 75 in the women. The demographic data on age, height, weight, waist circumference, medications, systolic blood pressure, diastolic blood pressure, lipids and lipoproteins, including sdLDL-C, and other blood tests were collected at the time of the

examination after an overnight fast. Abdominal ultrasonography was performed at the same time. The body mass index [BMI] was calculated as the weight in kilograms divided by the square of the height in meters. However, no information available with regard to menstruation. **From whole 5,255 participants, we excluded cases with a lipid-lowering agent because of the possible** 

influence on the sdLDL-C levels. Total of 4,388 subjects (2,665 men and 1,723 women) were selected for this study.

Written informed consent was obtained from all subjects and study was approved by the ethics committee of Hidaka Hospital.

## Healthy control subjects

The healthy control subjects (712 men, 915 women) were selected strictly on the basis of medical records from among the total subjects. Healthy subjects were defined as having normal blood pressure (systolic blood pressure < 130 mmHg and diastolic blood pressure < 85 mmHg), without impaired glucose tolerance (fasting plasma glucose < 110 mg/dL and HbA1c(NGSP) < 6.0 %), without any lipid metabolism disorder (LDL-C < 140 mg/dL and triglycerides(TG) < 150 mg/dL and HDL-C  $\geq$  40 mg/dL), without any thyroid disorder(TSH  $\geq$  0.4µIU/mL and < 4.0µIU/mL, FreeT4  $\geq$  0.8ng/dL and < 1.9ng/dL) and not taking any medication. For the establishment of the reference range interval, the cases with fatty liver detected by ultrasonography were excluded from this healthy control group (604 men, 864 women).

## Metabolic syndrome (MetS)

MetS subjects were diagnosed according to the Japanese criteria [31], that is, visceral obesity (waist circumference  $\geq 85$  cm in men, 90 cm in women) plus two or more of the following components : (a)TG  $\geq 150$  mg/dL and/or HDL-C < 40 mg/dL, (b) systolic blood pressure  $\geq 130$  mmHg and/or diastolic blood pressure  $\geq 85$  mmHg, or the prescribed use of an antihypertensive agent and (c) a fasting plasma glucose  $\geq 110$ mg/dL or the prescribed use of an anti-diabetic agent. In addition, we defined pre-MetS subjects as those with visceral obesity and one of the components (hypertension, lipid metabolism disorder, or impaired glucose tolerance) used to define MetS mentioned above. The number of pre-MetS and MetS cases were 544 and 414 in men and 47 and 28 in women, respectively. Significantly larger number of pre-MetS and MetS cases were found in this study population followed by the definition of Japanese criteria.

## **Diabetes Mellitus (DM)**

DM subjects were defined according to the Japan Diabetes Society (JDS) criteria: HbA1c(NGSP)  $\geq 6.5\%$  and fasting plasma glucose  $\geq 126$ mg/dL or the use of a prescribed anti-diabetic agent. In addition, pre-DM subjects (mainly consisting of impaired fasting glucose (IFG)) were also defined according to the JDS criteria: HbA1c(NGSP) < 6.5%, fasting plasma glucose  $\geq 110$ mg/dL and < 126mg/dL, and without the use of any prescribed anti-diabetic agent. "Suspected DM", as defined by JDS criteria, was not included, since this cannot be determined in a single examination.

### **Fatty liver**

A fatty liver was diagnosed based on ultrasonographic findings (Japanese Society of Sonographers), as follows: (a) Bright liver (increased echo level); (b) Liver-kidney contrast (an increased liver echo level compared to the kidney); (c) Deep attenuation (attenuation of the echo level in deep regions) ; (d) Vascular blurring (blurring of the hepatic vein).

#### Laboratory measurements

Total cholesterol (TC) and TG were measured with an enzymatic assay (Denka Seiken, Tokyo). HDL-C and LDL-C were measured by means of a direct assay (Denka seiken, Tokyo). SdLDL-C was measured with a newly developed homogeneous assay [19]. Glucose was measured with a hexokinase assay (Sekisui Medical, Tokyo). TSH and FT4 were measured by the CLEIA method (ADVIA Centaur XP, Siemens Healthcare Diagnostics). AST was measured by malate dehydrogenase assay (Sekisui Medical, Tokyo). ALT was measured with a lactate dehydrogenase assay (Sekisui Medical, Tokyo).  $\gamma$  GT was measured by L- $\gamma$  -glutamyl-3-carboxy-4-nitroanilide substrate(Sekisui Medical, Tokyo). ALP was measured by p-nitrophenylphosphate substrate (Wako Pure Chemical,Osaka). ChE was measured with a p-hydroxybenzoylcholine substrate assay (Serotec, Sapporo, Japan). All of the items except TSH and freeT4 were determined using a TBA-c8000 (Toshiba, Tokyo). Ultrasonography was performed with a TUS-A300 (Toshiba, Tokyo)

#### Statistical analysis

Statistical analyses were conducted with the Microsoft Office Excel 2007, Dr. SPSS II for Windows (11.0.1 J standard version) and StatFlex ver. 6 (Artech, Osaka, Japan). All values are expressed as the median. Linear relations between TG, LDL-C, HDL-C, sdLDL-C and large LDL-C were evaluated by linear regression models and Spearman's correlation coefficients in all of the subjects participating in this study. All the data were classified and the groups established, and then tested for significant differences between groups of 2 with Mann-Whitney's U test, and groups of 3 with the Kruskal-Wallis method (the P-value was calculated with Bonferoni's correction). Multiple logistic regression analysis and multiple regression analysis were conducted by normalization with power transformation (StatFlex). A significant difference was defined as P< 0.05.

## Results

# 1. Diagnostic parameters among the control, pre-MetS and MetS cases and pre-T2DM and T2DM.

Relevant biochemical and anthropomorphic characteristics for the healthy subjects are presented in Table 1. The parameters that differed between men and women were BMI, blood pressure, serum glucose, triglycerides (TG), HDL-C, LDL-C, liver enzymes and thyroid hormones. The data are presented as the median with 75<sup>th</sup> percentile values, rather than as mean values with standard deviations, because almost none of the variables were normally distributed. The parameters in men and women with MetS and T2DM were divided into two groups, i.e. pre-MetS and MetS, as well as pre-T2DM and T2DM. The results show the stronger associations with BMI, blood pressure, lipoproteins (elevated TC, TG, LDL-C, sdLDL-C, low HDL-C), markers of glucose homeostasis (fasting glucose, HbA1c) significantly dependent on the waist circumference in MetS and pre-MetS, but not T2DM and pre-T2DM. A significantly increased sdLDL-C, sdLDL-C/LDL-C (%) level (P<0.001) was found in the pre-MetS, MetS and pre-DM, DM (both men and women) as compared to the control group. Significant differences in sdLDL-C, sdLDL-C/LDL (%) (P<0.001) were found between pre-MetS and MetS in men (P<0.001), but no significant differences were found between pre-DM and DM. Interestingly, no significant difference was found in LDL-C between pre-MetS and MetS and between pre-DM and DM in both men and women, although the

number of MetS and pre-MetS patients was too small in women for the performance of an adequate statistical analysis. These results indicated that sdLD-C and sdLDL-C/LDL (%) increased significantly in the early stage of diseases such as pre-MetS and pre-T2DM and can distinguish between the early stage and late stage. However, LDL-C can not distinguish between pre-MetS and Mets and between pre-T2DM and T2DM. Also, the greater waist circumference significantly impacted the increase in sdLDL-C and sdLDL-C/LDL (%).

## 2. A comparison of sdLDL-C and other diagnostic parameters in patients with or without a fatty liver in the control, MetS and T2DM cases.

All of the parameters in the five groups were further divided into those with or without a fatty liver (Table 2). The prevalence of fatty liver was in normal controls (15.2%), pre-MetS (59.4%), MetS (71.0%), pre-T2DM (52.0%) and T2DM (60.9%). Significantly higher prevalence of fatty liver was found in pre-MetS and pre-T2DM as well as in MetS and T2DM compared to the controls. The presence of fatty liver shows significantly stronger associations with lipoproteins in all five groups. A larger waist circumference was also significantly associated with a fatty liver than those without fatty liver. Significantly increased TG, LDL-C and sdlDL-C levels were found in all of the control, pre-MetS, MetS and pre-T2DM, T2DM cases with a fatty liver as compared to the groups without a fatty liver. Significantly decreased HDL-C was found in men in all five groups with a fatty liver (P<0.001). However, sdLDL-C/LDL-C (%) was not significantly increased in the control and MetS cases in men or women, but it was significantly increased in T2DM in men. The cases with a fatty liver mostly exhibited a trend towards higher levels of liver injury markers (ChE, ALT, AST,  $\gamma$ GT, ALP), although most of these levels were within the high normal range.

These results indicate that the presence of fatty liver significantly affected the increase of sdLDL-C in the controls, pre-MetS, MetS and pre-T2DM, T2DM cases, but the sdLDL-C/LDL-C (%) was only affected in T2DM in men.

#### 3. Reference range analysis for sdLDL-C

The sdLDL-C concentrations increased with age and the gender difference was evident throughout all age categories. The concentrations of sdLDL-C were considered to trend upward with age in both men and women based on 10-year intervals. (Table 3). In 604 healthy men and 864 healthy women without fatty liver as described previously, the mean and standard deviation of the sdLDL-C

concentration were  $23.5 \pm 7.8$ mg/dL (men),  $20.3 \pm 5.7$ mg/dL (women), respectively. The median was 22.6mg/dL in men and 19.6mg/dL in women. The 75<sup>th</sup> percentile values for sdLDL-C were 27.5mg/dL for men and 23.3mg/dL for women. From these distribution ranges, cutoff points were also calculated for low, normal and increased concentrations. The ranges determined for sdLDL-C in Japanese men and women were: low, (<18.3; <16.3 mg/dL), normal, (18.4-27.4; 16.4- 23.3 mg/dL) and increased, (>27.5; > 23.3 mg/dL).

#### 4. Univariate correlations among the lipid parameters.

Figure 1 shows the difference in the correlation with LDL-C between small and large buoyant LDL-C. The regression coefficient was determined for LDL-C vs sdLDL-C (0.314) and large LDL-C (0.686), and the correlation coefficient was 0.632 with sdLDL-C and 0.872 with large LDL-C, respectively.

Figure 2 shows the correlation with TG between small and large buoyant LDL-C. The regression coefficient was determined for TG vs sdLDL-C (0.142) and large LDL-C (-0.056), and the correlation coefficient was 0.703 with sdLDL-C and -0.176 with large LDL-C.

Figure 3 shows the correlation with HDL-C between small and large buoyant LDL-C. The regression coefficient was determined for HDL-C vs sdLDL-C (-0.285) and large LDL-C (-0.142) and the correlation coefficient was -0.303 with sdLDL-C and -0.095 with large LDL-C, respectively.

Those univariate correlation coefficient analysis among the parameters showed that sdLDL-C is significantly and positively correlated with total cholesterol, triglyceride, LDL-C and inversely correlated with HDL-C. Large LDL was inversely correlated with TG and weakly correlated with HDL-C. These data indicate there is a clear difference between large LDL-C and sdLDL-C within the LDL fraction.

# 4. Multiple logistic regression analysis to identify the variables in diagnosing fatty liver and waist circumference.

To identify variables which are effective in diagnosing fatty liver from among the cardiovascular markers in Table 1 (age, HDL-C, LDL-C, sdLDL-C, ALT, ChE, HbA1c, etc.), multiple logistic regression analysis was performed using a backward elimination procedure. sdLDL-C was not an independent determinant for fatty liver. However, the standard partial regression coefficient with three explanatory variables (age, fatty liver and waist circumference) exhibited a significant

correlation with sdLDL-C by multiple regression analysis; (age =0.048 (P<0.01) and the presence of a fatty liver =0.206 (P<0.001, waist circumference =0.225 (P<0.001).

Therefore, fatty liver was ascertained to be an independent determinant for sdLDL-C by multiple regression analyses.

#### Discussion

The normal range of serum sdLDL-C levels in the Japanese population using strict criteria has been determined using a novel homogeneous assay recently developed by Ito et al. [19] and the results compared with the serum sdLDL-C levels in patients with pre-MetS, MetS and/or pre-T2DM, T2DM. Significantly elevated sdLDL-C and sdLDL-C/LDL-C (%) levels were found in pre-MetS and pre-T2DM as well as in MetS and T2DM compared to normal controls. These results indicated that sdLD-C and sdLDL-C/LDL (%) increased significantly in the early stage of diseases such as pre-MetS and pre-T2DM and could distinguish the disease stage between preliminary and established phase. However, LDL-C could not distinguish the disease stage between pre-MetS and Mets and between pre-T2DM and T2DM. Further, the presence of fatty liver in the control, pre-Mets and pre-T2DM as well as MetS and T2DM cases was significantly associated with increased sdLDL-C and sdLDL-C/LDL-C (%) compared to the cases without a fatty liver. The different characteristics of small and large LDL-C was clearly evident, as sdLDL-C was positively correlated with TG, while large LDL-C was negatively correlated with TG.

The serum concentrations of sdLDL-C and total LDL-C were positively correlated and approximately 30% of LDL-C was comprised of sdLDL-C, as shown in Figure 1. The major portion of LDL-C in normal controls was comprised of large LDL-C. However, the correlation between sdLDL-C and TG (r=0.703) shown to be significantly higher than that of large LDL-C and TG (r=-0,176). This means that sdLDL-C is derived from TG-rich lipoproteins, but large LDL-C may not be directly derived from TG-rich lipoproteins. This metabolic pathway for the formation of sdLDL is still controversial, but lipoprotein lipase (LPL), hepatic triglyceride lipase (HTGL) and

cholesteryl ester transfer protein (CETP) activities are known to play roles in the formation of sdLDL-C [32]. Nakajima et al. reportedly demonstrated a significant inverse correlation between sdLDL-C and LPL activity, but no correlation was found between sdLDL-C and HTGL (33). Although the metabolic pathway to form sdLDL has been reported to be related to HTGL activity [34, 35], the mechanism has not been reportedly elucidated. One of the purposes of this study was to determine the mechanism of sdLDL-C formation under certain special circumstances, such as a fatty liver and/or a large waist circumference.

The analysis of sdLDL-C and fatty liver was conducted in a comparatively large Japanese population at Hidaka Hospital, which is located outside Tokyo, an urban area where the healthy control subjects comprise a typical Japanese population. Subjects who possessed a healthy medical profile without the ingestion of any medications or abnormal physiological markers were selected on the basis of strict criteria for the determination of 75<sup>th</sup> percentile normal range of sdLDL-C. These group excluded fatty liver and hyperlipidemia. The upper cut off value was 27.5mg/dL in men and 23.3mg/dL in women based on the 75<sup>th</sup> percentile method. The sdLDL-C/ LDL-C ratio was approximately 20 % in both men and women. Because sdLDL-C was correlated with both TG and LDL-C, it was increased in hypertriglyceridemia and hypercholesterolemia. As expected, sdLDL-C was markedly increased in combined hyperlipidemia, and the majority of LDL-C was recovered in the sdLDL-C fraction. Familial combined hyperlipidemia is characterized by high levels of LDL particles (hyper apoB) and a preponderance of small dense LDL, and it is a representative disease associated with a high incidence of CHD [36] Therefore, measurement of sdLDL-C may be useful when screening for familial combined hyperlipidemia [37]. However, the subjects with severe hypertriglyceridemia including chylomicronemic subjects, were found to have only slightly elevated sdLDL-C levels. It is likely that the subjects with a TG level >400 mg/dL had a low level of LPL activity, which impaired the conversion of TG-rich lipoproteins to LDL and thus also resulted in a disproportionately low sdLDL-C concentration relative to the TG level. Such a modest elevation of sdLDL-C in subjects with severe hypertriglyceridemia might explain why the incidence of CHD is reportedly not increased further by a massive increase in the TG level.

In this study, we found that the serum sdLDL-C and sdLD-C/LDL-C (%) were significantly increased in the early stage of both Mets and T2DM with impaired glucose tolerance. Both of the preliminary disease conditions were significantly associated with an increase in waist circumference and the prevalence of a fatty liver compared with normal controls. As waist circumference reflect the

amount of visceral fat, we compared the role of a fatty liver and visceral fat in the increase of sdLDL-C. Although a fatty liver and visceral fat often co-exist, the fatty liver is known to be more strongly associated with dyslipidemia and dysglycemia and to be independent of visceral fat [38]. sdLDL-C was additively increased in cases with a fatty liver in all five groups compared to the non-fatty liver cases (Table 2). This may mean that the presence of a fatty liver enhances the formation of serum sdLDL-C in controls cases as well as in the MetS and T2DM cases. We speculate that the development of a fatty liver comes first and this enhances the formation of sdLDL-C. Hosoyamada et al. [39] reported a relationship between a fatty liver and LDL particle size. They demonstrated an independent association between the presence of a fatty liver and the serum sdLDL-C levels by logistic regression analysis, after adjustment for such potential confounders as BMI and impaired fasting glucose levels. Toledo et al. [26] showed a positive relationship between a fatty liver and sdLDL particle size in patients with T2DM. Sugino et al. [27] suggested that a fatty liver synergistically interacts with metabolic syndrome so as to affect sdLDL-C levels. Based on these studies, a fatty liver appears to affect LDL particle size, an effect that may be independent of visceral obesity and/or systemic insulin resistance. However, Yatsuzuka et al [40] reported that sdLDL-C is not significantly associated with a fatty liver by multiple regression analysis in MetS. In our current study, multiple regression analyses ascertained that fatty liver is an independent determinant for sdLDL-C, but sdLDL-C was not an independent determinant of the presence of a fatty liver. Fatty liver may have more strongly associated variables than sdLDL-C. Therefore we have concluded from this large population study that fatty liver and sdLDL-C are independent of each other as Hosoyamada et al. reported [39].

Visceral obesity (in MetS) and insulin resistance (in T2DM) have been recognized as major causes of increased levels of sdLDL particles, because these factors are major contributors to postprandial hypertriglyceridemia, in which one of the underlying mechanisms is an increased free fatty acid release from adipocytes that stimulates hepatic TG output in the form of VLDL. Additionally, if a fatty liver is present, upregulated de novo synthesis of fatty acids may increase hepatic TG production. Donnely et al. [41] reported that approximately 60% of the fat that accumulates in the liver and is incorporated into lipoprotein is derived from circulating free fatty acids, while approximately 25% results from de novo lipid synthesis in patients with nonalcoholic fatty liver disease. In addition to altered TG output, a fatty liver has been shown to be associated with an increased TG content in large VLDL [28, 29]. Large VLDL efficiently promotes the

modification of LDL particles via CETP. Recent studies showed that the liver X receptor (LXR)-sterol regulatory element-binding protein (SREBP)-1c pathway governs the size of the VLDL particles secreted by the liver [42, 43]. It is noteworthy that the LXR-SREBP-1c pathway is a major causative factor in the development of a fatty liver, because several genes involved in de novo fatty acid synthesis are expressed in response to up-regulated LXR-SREBP-1c signaling [44]. Thus, a fatty liver affects VLDL particles both quantitatively and qualitatively, resulting in both an increased amount of VLDL remnants and sdLDL formation.

The activities of CETP, LPL and HTGL are known to correlate with the serum LDL particle size [35, 45]. Lipoprotein lipase is responsible for a major step in TG clearance. Interestingly, Li et al. [46] reported that hepatic macrophage content is increased in a fatty liver and the plasma CETP levels significantly increased in correlation with the increase in hepatic macrophage content, not adipose tissue. This indicates that a fatty liver accumulates macrophages, which in turn enhances the expression of hepatic CETP levels. Lucero et al. [47] reported that plasma CETP levels are significantly increased in cases of a fatty liver. The major pathway in the formation of sdLDL-C is reported to be the combination of CETP and HTGL activity [34, 35]. The overproduction of VLDL, delayed clearance of VLDL remnants, a decrease in LPL and increased CETP as well as HTGL may individually or jointly increase the formation of sdLDL-C along with increased CETP. Therefore, treating a fatty liver enhances the formation of sdLDL-C along with increased CETP. Therefore, treating a fatty liver may be of primary importance in order to decrease the risk of atherogenesis, associated with a reduction in the sdLDL-C levels by statins or other drugs in patients with pe-MetS or pre-T2DM in order to prevent cardiovascular disease.

It should be noted that this study has certain limitations. First, the association between a fatty liver and sdLDL-C was examined with multivariate analysis using age, BMI, hypertension, hyperlipidemia, hyperglycemia and sdLDL-C levels as co-variables. It is possible that additional factors that were not analyzed may have affected the results. Second, the fatty liver diagnosis was made using abdominal ultrasonography to identify fatty steatosis. Ultrasonography may not detect a subset of advanced alcohol or nonalcoholic fatty liver diseases—referred to as "burnt-out steatohepatitis:—which are characterized by a less pronounced fatty steatosis. Furthermore, ultrasonography does not always detect a fatty liver parallel with computed tomography measurements, detecting a comparatively high rate of false positives from our preliminary observation (unpublished data).

In conclusion, this homogeneous sdLDL-C assay technology constitutes an important technological advance in determining a large number of clinical samples in the course of routine clinical practice. The measurement of sdLDL-C in conjunction with a routine lipid profile should prove useful for cardiovascular risk stratification and global risk assessment in select populations. The availability of a rapid and precise method also allows the determination of sdLDL-C in pre-MetS and pre-DM patient serum as a routine laboratory assay to prevent the CHD. The presence of a fatty liver associated with T2DM and/or MetS may enhance the formation of sdLDL-C through the up-regulation of CETP and HTGL activity and thus increase the risk of cardiovascular disease. Therefore, the treatment of a fatty liver should be the primary therapeutic target, followed by an inhibition of CETP, activation of LPL or statins to reduce the sdLDL-C levels in the patients with MetS or T2DM.

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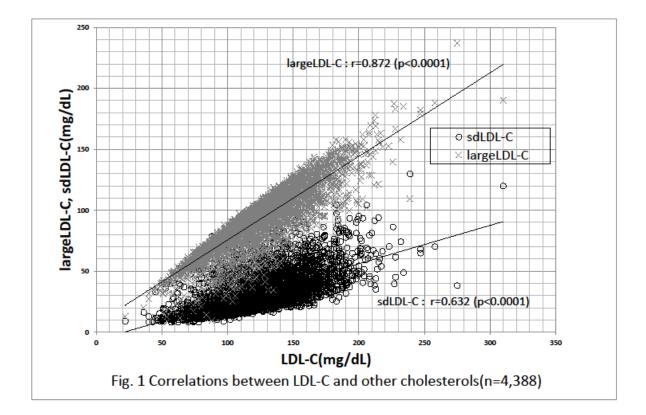
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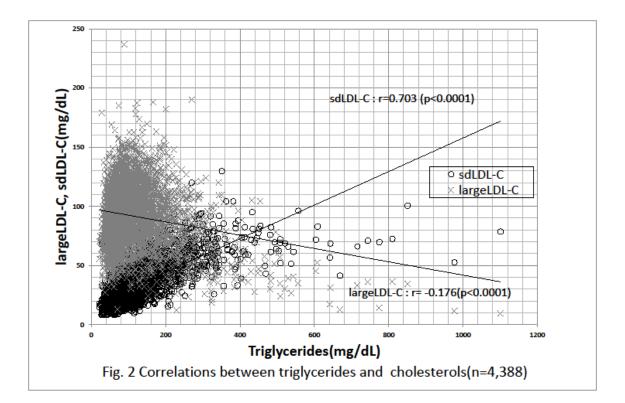
Figure 1.Correlations with LDL-C between large LDL-C and sdLDL-C. The 4388 plots with an open circle (sdLDL-C) and X (large LDL-C) reflects the total number of normal controls, MetS and

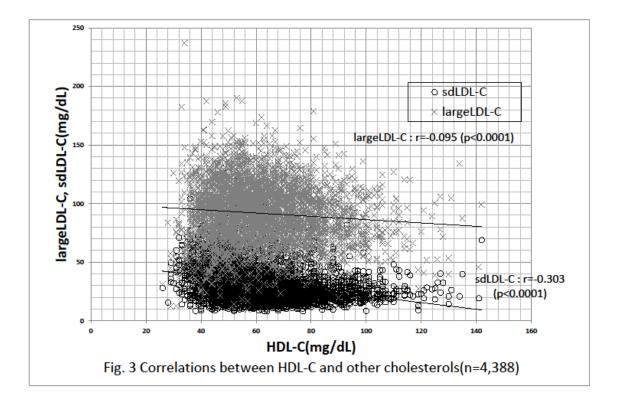
T2DM. The concentration of large LDL-C is more than 2 fold that of sdLD-C.

Figure 2. Correlations with TG between large LDL-C and sdLDL-C. The 4388 plots with open circle (sdLDL-C) and X (large LDL-C) reflects the total number of normal controls, MetS and T2DM. sdLDL-C is positively correlated with TG, but inversely correlated with large LDL-C.

Figure 3. Correlations with HDL between large LDL-C and sdLDL-C. The 4388 plots with open circle (sdLDL-C) and X (large LDL-C) reflects the total number of normal controls, MetS and T2DM. sdLDL-C, but not large LDL-C, is more potently and inversely correlated with HDL-C.







Parameter	Units	A:Contro	ol (n=712)	3:PreMet	S (n=544	C:MetS	(n=414)			P valu	е			D:PreDN	l (n=300)	E:DM (	n=156)			P valu	e		
		Median	75%tile	Median	75%tile	Median	75%tile	AvsB		AvsC		BvsC		Median	75%tile	Median	75%tile	AvsD		AvsE		DvsE	
Age		46	52	48	55	51	57	<0.001	*	<0.001	*	<0.001	*	51	57	54	59	<0.001	*	<0.001	*	0.006	*
Weight	kg	64.5	70.0	75.7	81.3	77.0	83.6	<0.001	*	<0.001	*	0.009	*	70.7	77.5	71.0	79.8	< 0.001	*	<0.001	*	0.734	
BMI	kg/cm <sup>2</sup>	22.1	23.7	25.5	27.5	26.1	28.4	<0.001	*	<0.001	*	<0.001	*	24.4	26.3	24.9	26.7	<0.001	*	<0.001	*	0.568	
waist circumference	cm	80	84.5	90	95	92	97	<0.001	*	<0.001	*	<0.001	*	87	93	88	94	<0.001	*	<0.001	*	0.513	
Systolic BP	mmHg	111	118	121	129	129	137	<0.001	*	<0.001	*	<0.001	*	124	133	123	132	<0.001	*	<0.001	*	0.684	
Diastolic BP	mmHg	71	77	80	87	87	93	<0.001	*	<0.001	*	<0.001	*	81	90	80	88	<0.001	*	<0.001	*	0.349	
FBG	mg/dL	96	100	101	106	112	122	<0.001	*	<0.001	*	<0.001	*	113	117	145	169	<0.001	*	<0.001	*	<0.001	*
HbA1c(NGSP)	%	5.5	5.6	5.6	5.8	5.8	6.3	<0.001	*	<0.001	*	<0.001	*	5.8	6.0	7.2	8.1	<0.001	*	<0.001	*	< 0.001	×
Total cholesterol	mg/dL	190	206	211	236	215	236	<0.001	*	<0.001	*	0.131		215	236	204.5	225.5	<0.001	*	<0.001	*	0.026	
Triglycerides	mg/dL	80.5	107	134	187	168	228.3	<0.001	*	<0.001	*	<0.001	*	127	176	128.5	174.3	<0.001	*	<0.001	*	0.704	
HDL-C	mg/dL	61	71	51	60	49	56	<0.001	*	<0.001	*	0.012		54	66	50.5	59	<0.001	*	<0.001	*	0.001	k
LDL-C	mg/dL	109	124	135	155	134	156.8	<0.001	*	<0.001	*	0.610		132	152	130	152	<0.001	*	<0.001	*	0.556	
sdLDL-C	mg/dL	23.0	28.0	39.0	49.8	46.0	60.0	<0.001	*	<0.001	*	<0.001	*	37.1	51.0	39.1	54.2	<0.001	*	<0.001	*	0.817	
	mg/dL	85.7	95.9	95.0	112.4	91.1	108.0	<0.001	*	<0.001	*	0.008		93.5	109.5	91.1	109.1	<0.001	*	0.002	*	0.416	
sdLDL-C / LDL-C	%	20.9	24.8	28.5	37.0	33.4	42.9	<0.001	*	<0.001	*	<0.001	*	28.5	36.9	29.9	39.9	<0.001	*	<0.001	*	0.539	
Smoking, Yes	%	31		33		33		NS		NS		NS		30		33	_	NS		NS		NS	
Alcohol, everyday	%	35		37		43	-	1						50		35	]						
	%	45		47		40		NS		NS		NS		36		40		- 0.001	*	NS		0.002	k
none	%	20		16		17								14		25							

Table 1. Characteristics of subjects with or without metabolic syndrome(MetS) and DM status

Parameter	Units	A:Contro	ol (n=915)	B:PreMe	tS (n=47)	C:MetS	i (n=28)			P valu	е			D:PreD	A (n=58)	E:DM	(n=32)			P valu	e	
		Median	75%tile	Median	75%tile	Median	75%tile	AvsB		AvsC		BvsC		Median	75%tile	Median	75%tile	AvsD		AvsE		DvsE
Age		45	51	51	57	58	62	<0.001	*	<0.001	*	0.054		55	60	58	61	<0.001	*	<0.001	*	0.707
Weight	kg	51.9	56.6	72.3	77.3	67.4	72.9	<0.001	*	<0.001	*	0.121		57.6	63.3	59.8	63.2	<0.001	*	< 0.001	*	0.441
BMI	kg/cm <sup>2</sup>	20.5	22.4	28.9	30.2	27.1	29.8	<0.001	*	<0.001	*	0.120		24.1	26.2	24.9	26.2	<0.001	*	< 0.001	*	0.374
waist circumference	cm	75	80	95	99	94	97	<0.001	*	<0.001	*	0.869		82	89	86	89	<0.001	*	< 0.001	*	0.220
Systolic BP	mmHg	107	115	123	139	133	141	<0.001	*	<0.001	*	0.087		122	131	123	128	<0.001	*	< 0.001	*	0.820
Diastolic BP	mmHg	66	72	78	89	79	89	<0.001	*	<0.001	*	0.887		75	80	75	78	<0.001	*	< 0.001	*	0.752
FBG	mg/dL	92	97	98	103	115	127	<0.001	*	<0.001	*	<0.001	*	113	118	153	175	<0.001	*	< 0.001	*	<0.00
HbA1c(NGSP)	%	5.4	5.6	5.7	5.9	6.0	6.6	<0.001	*	<0.001	*	0.002	*	5.9	6.0	7.4	7.7	<0.001	*	< 0.001	*	<0.00
Total cholesterol	mg/dL	196	213	222	239	223.5	249.3	<0.001	*	<0.001	*	0.322		212	235.5	228.5	260	<0.001	*	<0.001	*	0.101
Triglycerides	mg/dL	64	82	121	143	172.5	253.3	<0.001	*	<0.001	*	0.002	*	98	122.5	116.5	152	<0.001	*	<0.001	*	0.092
HDL-C	mg/dL	71	81	59	65	52	61	<0.001	*	<0.001	*	0.116		59	72.5	58.5	66.3	<0.001	*	< 0.001	*	0.67
LDL-C	mg/dL	104	120	137	151	134	170.5	<0.001	*	<0.001	*	0.466		130	145	140.5	171.8	<0.001	*	<0.001	*	0.13
sdLDL-C	mg/dL	19.8	23.6	32.6	43.7	48.8	57.4	<0.001	*	<0.001	*	0.001	*	31.3	39.8	41.4	50.9	<0.001	*	<0.001	*	0.049
large LDL-C	mg/dL	83.9	96.3	102.4	115.6	94.0	120.5	<0.001	*	0.009	*	0.308		99.6	112.0	101.4	121.9	<0.001	*	< 0.001	*	0.164
sdLDL-C / LDL-C	%	19.2	21.8	23.0	28.0	28.7	40.4	<0.001	*	<0.001	*	0.004	*	22.5	28.5	26.0	32.6	<0.001	*	<0.001	*	0.217
Smoking, Yes	%	9		6		4		NS		NS		NS		9		6		NS		NS		NS
Alcohol, everyday	%	13		11		7	1							10		6	1					
	%	46		34		32		NS		NS		NS		45		31	ł	NS		NS		NS
none	%	41		55		61								45		63						

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Parameter	Units		troi (heal			P value	_	pre l		_	P value	_		<b>#</b> 5		P value	_	Dre			P value	_		M		P value
			atty liver	B.Fut				atty liver		ty liver	-		fatty liver		ty liver			atly liver	P.Pat				fatty liver		ly liver	
		(0**			108)	Avab		221)		025)	CVID		<120)		(204)	CvsD		144)		156)	EWF		-01)		95)	EVER
		Median		Median		6.510	Median	Tendle		TENDIA	<0.001	Mada	75%die	Median	703484	<0.001		TENDA	Median	TENDA	0.085	M4-241	75%die	Median	70%/84	4.881
Age Weight		40	62		75.9		72.9	17.7	47	80	40.001	72.7	77.1	78.0		<0.001	82	87 72.2	51	82.8	-10.001		62	82		<0.001
114	NO	21.0	23.5	24.2	25.0	-0.001	26.0	25.8	26.2	28.1	40.001	24.7	25.6	28.0	29.3	<0.001		24.5	28.0	22.4	-0.001	22.8		25.0	27.9	40.001
waist circumference	kgicm'	79	10	86	30	<0.001		81	91.5		40.001		92		100	<0.001	-	87	91	87	40.001		24.5	81	90	<0.001
Systolic BP	mmHg		110	114	120	0.000		130	120	129	0.823	121	140	- 120	126	0.227	123	122	124.5	124	0.700	119	122	125	122	0.002
Diastolic BP	mmHo	71	77	74	78	0.005			80	87	0.055	-		87	92	0.129	80		82	80	0.543	78	84	82		0.025
TEG	mgid.		100		101	-0.001		105	101	100				112	125	0.024		115	114	110	0.012	120	150	150	182	0.004
BA1c(NGSP)	5		5.0	5.5	5.6	0.250	5.5	6.7	5.0	5.0	-0.001			5.9	6.3	-0.001	6.7	5.9	5.9	6.0	-0.001		7.4	7.4	8.0	-1.001
fotal cholesterol	ngidL	181	207	100	289	0.307	208	226	213	227	0.220	207	230	219	226	0.065	214	230	218	228	0.520	292	222	200	234	0.206
Triglycerides	mgidL	79	100	20	117	-0.001	121	165	144	209	-0.001	150	194	170	240	-0.001	113	142	147	190	-0.001		129	152	214	-1.001
OL-C	moldL	62	71	54	81	-0.001		82	40	67	-0.001	- 54	64	47	54	<0.001		72	50	67	-0.001		60	48	64	<0.001
DL-C	mgidL	100	123	117	127	0.000	120	161	120	109	0.000	129	144	129	159	<0.001	127	145	135	158	0.002	124	141	122	155	0.026
d.DL-C	mgidL	22.6	27.5	25.4	31.0	0.002		48.2	40.1	50.7	0.005		62.7	48.8	61.5	<0.001		40.9	40.4	55.3	-0.001	28.7	44.2	42.8	61.5	-1.001
arge LDL-C	moldL	05.0	95.2	88.1	100.1	0.024	\$2.7	109.6	95.7	113.7	0.218	97.6	101.7	92.6	109.6	0.047	\$2.7	105.1	90.5	112.4	0.100	00.0	109.1	93.2	109.1	0.798
dLDL-C/LDL-C	16	20.8	24.6	22.5	25.7	0.142	27.5	35.3	29.1	27.0	0.092	22.7	40.4	22.9	44.5	0.099	27.5	34.0	29.8	38.4	0.004	24.8	22.9	92.2	44.3	<0.001
AST .	ILI.	21	26	22	26	0.044	22	28	25	21	<0.001	- 22	26	27	34	<0.001	22	28	24	21	<0.001	21	25	25	34	<0.001
ALT.	NUK.	20	26	24	34	<0.001	24	31	35	49	<0.001	· 25	30	27	63	<0.001	22	28	34	49	<0.001	21	29	26	67	<0.001
HOT	NUL.	25	36	26	34	6.010	35	59	41	80	0.010	40	60	63	90	<0.001	20	62	4.5	75	0.005	- 30	43	63	75	<0.001
ALP	RUR.	190	292	209	234	0.354	206	237	206	243	0.440	205	235	218	293	0.802 *	-	292	213	261	0.028		240	224	255	0.143
Chill	ALC:	992	375	264	297	<0.001	963	411	200	450	<0.001	. 260	405	393	464	<0.001	264	404	205	436	<0.001	543	291	209	445	<1.001
Record Frag																										
WOMEN																										
Parameter	Units	Cor	troi (heal	the suble	erfai)	P value		or wh	Aut S		P value		M	48		P value		0.00	CA.		P value		0	M		P value
Parameter	Units		troi (hea) atiy iyer	the public B.Pat		P value	Chion-	oreà atty liver		ty liver	P value		M fatty liver		ty iver	P value	Ellion4	orei atty ilver	DM F/Fat	y liver	P value	ENcer	D Attyliver		v liver	P valu
Parameter	Unita	AcNon-6		B.Pat		P value Avail			D:Pat	ty liver (28)	P value CvsD	Collion		C:Fat	tyliver #21)	P value CvsD			Ffat	y liver 423)	P value			P.Fat	ty litver +22)	P value
Parameter	Units	AcNon-6	atty liver (64#)	B.Pat	ty liver 41)			atty ilver r19)	D:Fall			C:Non (1	fatty liver	Cr#wt (ne			(0*	atly iver	Ffat	(23)		(17	fatty liver	P.Fat	22)	P value Eval
Age	Units	AtNon-A (n=0 Median 45	atty ilver 1648) 75%die 51	8:Pat (nr Median 46	ty liver 401) 75%die 53	AvaB 0.093	(ne Median 55	19) 70%die 81	D:Fat (nr Median 50	28) 79%81e 80	CvsD 0.168	C:Non (r Media 60	Alty liver =78) 75%die 60	D:Fat (n Median	#21) 75%tie 60	CvsD 0.898	Median 55	atty liver +35) 79%tile 81	F/Fatt (14 Median 53	23) 79%die 59	E-6F	(IN Median 60	nity itver +10) 75%tile 65	P:Fatt (n/ Median 68	122) 70%tile	Ever
la.	kg	A:Non-4 (n=0 Median 45 51.5	atty ilver 1948) 75%die 51 56.0	8:Fat (re Median 46 62.3	ty liver 41) 75%die 63 67,3	Avs8	(ne Median 55 65.0	19) 70%/16 61 69.3	D:Fat (ne Hedian 50 75.6	20) 79%5le	CvsD	C:Non (1	440y liver =78) 175%die 60 60.9	D:Fat (re Median 56 72.9	00 75%25	0.898	Median 55 54.4	100 Ilver 100) 70%tile	Fifut (n Median 53 63.3	23) 75%51+ 59 69.2	Ewr	60 62.2	65 60.0	F:Fat (re Median 55 60.3	422) 70%///ie 59 66.2	Ever 0.095 0.003
lge Neight	kg kgicm'	A:Non-6 (n=0 Median 45 51.5 20.4	811y liver 1948) 75%die 51 56.0 22.0	8:Fat (re Median 46 62.5 25.0	ty liver 41) 75%die 67.3 27.3	AvaB 6.005 <0.001 <0.001	(nv Median 55 65.0 25.3	12) 70%21e 61 69.3 27.4	D:Fat (n Median 50 75.6 29.5	20) 70%0ie 80 79.4 91.0	CvsD -0.001 -0.001	C:Non (r Media 65 61.1 24.7	440y ilver #79) 75%die 60.9 27.1	0:Fet (n Median 56 70.3 27.6	75%28e 60 76.5 29.0	CvsD 0.858 0.850 0.854	(n# Nedian 56 54.4 22.1	411y Ilver +25) 79%51e 81 59.4 24.1	F3fatt (14 Median 63.3 63.3 26.3	23) 75%Ele 59 60.2 28.0	0.089 <0.001	(n Median 60 62.2 21.7	401 10 10 10 10 10 10 10 10 10 10 10 10 1	F:Fat (19 Median 55 60.3 25.1	422) 70%///ie 50 06.2 27.2	Ever 0.095 0.003 0.027
Nge Neight Sall Kalist circumference	kg kgicm <sup>4</sup> cm	A:Non-6 (n=0 Median 45 51.5 20.4 74	8048) 75%die 51 56.0 222.0 79	8:Fat (n Median 46 62.3 25.0 56	ty liver 41) 75% tile 67.3 27.3 92	AvaB 40.001 40.001 40.001	(nv Median 65.0 26.3 92	12y ilver 13) 76%tile 61 69.3 27.4 95	D:Fat (n Nedian 50 75.6 29.5 90	20) 79%58e 50 79.4 91.0 101	CvsD -0.001 -0.001 0.001	C:Non (r Media 65 65 65 1 24.7 95	440 iver 179) 75%die 60.9 27.1 90	0:Fat (re Median 56 70.9 27.6 54	*21) 75%25+ 60 78.5 29.0 97	0.898 0.890 0.894 0.798	(0* Median 56,4 22,1 79	411y liver 425) 75%51e 61 59.4 24.1 15	F3fatt (14 Median 63 63,3 26,3 26,3 29	22) 75%5ie 69.2 28.0 90	0.009 <0.001 <0.001 <0.001	(n Medan 60 80.2 21.7 82	65 50.0 25.1 67	F:Fat (n Median 66.3 25.1 06	422) 76%158+ 68.8 27.2 91	Ever 0.095 0.003 0.027 0.050
Age Neighz Isla Islat circumference Systolic BP	kg kgicm cm mnHg	A:Non-6 (n=0 Median 45 51.5 20.4 74 107	atty liver 1948) 75%die 51 56.0 22.0 79 115	8:548 (n/ Median 40 62.3 25.0 86 111	ty liver 41) 75%5ie 67.3 27.3 92 120	AveB <0.001 <0.001 <0.001 <0.001 <0.001	(nr Hedian 55 65.0 25.3 82 123	419) 75%20e 61 69.9 27.4 95 143	0:Fet (nr Nedian 50 75.8 29.5 90 123	55 78%51e 85 78.4 91.0 101 127	CvsD -0.001 -0.001 0.001 0.001 0.460	C:Non () Media 65 62.1 24.7 95 161	440y 8ver +79) 75%die 60 65.9 27.1 90 157	0:Fat (n Median 56 70.9 27.6 94 122	#21) 76%25e 60 76.5 29.8 97 140	0.000 0.000 0.004 0.760 0.549	(0+ Median 55 54.4 22.1 79 119	435) 75%51e 61 59.4 24.1 85 121	F748 (14 Median 63 63.3 28.3 28.3 29 127	22) 79%5ie 59 60.2 25.0 90 120	0.009 <0.001 <0.001 <0.001 <0.001 0.509	(7 Median 60 602 21.7 82 124	65 65 65 25.1 125	F:Fat (n Median 55 60.9 25.1 96 122	622) 76%///ie 69 66.0 27.2 91 129	EveF 0.095 0.003 0.027 0.000 0.903
Nge Neight BMI salat circumference Systolic BP Diastolic BP	kg kgicm <sup>°</sup> cm mnHg mnHg	A:Non-4 (n+6) Median 45 51.5 20.4 74 107 65	atty liver 1948) 75%die 51 56.0 22.0 79 115 72	8:Fut (nr Median 40 62.3 25.0 86 111 70	y liver 61) 75%6ie 67.3 27.3 92 120 75	AveB =0.001 =0.001 =0.001 =0.001 =0.001	(ne Median 55 65.0 26.5 92 123 78	419) 75%21e 61 69.9 27.4 95 143 29	D:Fat (n= Hedian 50 75.6 29.5 90 123 79	21) 75%51e 55 79.4 21.0 101 137 29	CvsD <0.001 <0.001 0.001 0.001 0.460 0.579	C:Non () Media 65 62.1 24.7 95 141 26 141 26	fatty liver #79) 1 75%clin 60 65.9 27.1 90 157 101	0:948 (n Median 56 70.9 27.8 54 152 74	#21) 75%28# 60 76.5 25.0 57 540 54	CvsD 0.000 0.004 0.760 0.045 0.045	(19 Hedian 56 54.4 22.1 79 119 74	atty liver (55) 75%5le 61 59.4 24.1 85 121 79	F5fatt (19 Median 53 63.3 26.3 89 127 75	(23) 75% Sie 59 68.2 28.0 90 130 80	ExaF -0.001 - -0.001 - -0.001 - 0.001 - 0.001 - 0.001 - 0.009 -	(7 Median 60 62.2 21.7 62 121 124 74	fatty liver #10) 75%clie 65 68.0 25.1 67 129 76	F:Fut (n/ Median 56 60.9 25.1 66 122 77	622) 70%tile 68 96.0 27.2 91 129 90	EveF 0.095 0.003 0.027 0.000 0.903 0.427
Age Weight IME Maist circumference Systalic BP VBG	kg kgicm <sup>2</sup> cm mnHg mgidL	A:Non-4 (n40 Median 45 51.5 20.4 74 107 65 92	atty Iver 1948) 75%die 51 56.0 22.0 79 115 72 96	8:Fut (nr Median 40 02.5 25.0 00 111 70 56	y liver 61) 75%6ie 67.3 27.3 92 120 76 101	Ava8 40.001 40.001 40.001 40.001 40.001 40.001	(ne Median 55 65.0 29.3 82 123 78 78 96	429 Ilver 19) 75%21e 61 69.9 27.4 95 143 69 99	D:Fat (nº Neclan 50 75.6 29.5 90 123 79 102	28) 79%584 80 79,4 91,0 101 137 89 107	CvsD 0.168 -0.001 -0.001 0.001 0.460 0.579 0.005	C:Non () Media 66 62.1 24.7 56 141 141 107	4409 8Ver #79) 1 75%/58 65.9 27.1 90 157 101 112	0:948 (n Median 56 70.9 27.6 54 152 74 159	#21) 75%21# 60 76.5 29.0 97 140 54 130	CvsD 0.050 0.050 0.054 0.765 0.049 0.024 0.012	(n# Median 56 54,4 22,1 79 119 74 113	atty liver +35) 75%tile 61 58.4 24.1 05 121 79 117	Fflatt (19 Median 53 62.3 26.3 29 127 75 114	23) 75%5ix 59 68.2 28.0 90 130 80 130 80 130 80 119	Ex8F -0.001 -0.001 -0.001 -0.001 -0.001 -0.001 -0.009 -0.009 -0.009 -0.154	(7 Median 60 62.2 21.7 62 124 74 124 74	fatty liver #10) 55500 65 65.0 25.1 87 129 76 160	F:Fat (n) Median 56 60.9 25.1 86 122 77 153	622) 75%tile 69 66.0 27.2 91 129 60 175	Evel* 0.095 0.003 0.027 0.000 0.903 0.427 0.207
lon Neight Init Neid Circumference Systolic BP Disatolic BP ISG HDA1c(NGSP)	kg kgicm' cm mnHg mgidL %	A:Non-4 (n=0 Median 45 51.5 20.4 74 107 65 92 5.4	atty liver 1948) 75%clie 51 54.0 22.0 79 115 72 96 5.6	8.54t (ny Median 46 62.3 25.0 06 111 70 56 5.6	y Bver 41) 75%die 67.3 27.3 92 120 75 101 6.7	AveB 40.001 40.001 40.001 40.001 40.001 40.001 40.001	(ny Median 56 95.0 29.3 92 123 70 70 5.6	429 IVer 439 75%23e 81 89.9 27.4 95 143 89 99 5.0	D:Fut (19 Neclan 50 75.6 29.5 90 123 79 102 5.0	221) 75%51e 50 79.4 21.0 101 137 59 107 6.0	CvsD 0.168 -0.001 -0.001 0.001 0.460 0.579 0.005 0.045	Chion (1) Media 60.1 24.7 96 141 80 141 81 147 57	(atty liver #79) 1 75%/5/# 65.9 27.1 96 157 101 112 6.2	D:Fat (n Median 56 70.9 27.6 54 122 74 119 6.1	#21) 76%25e 76.5 29.0 97 140 94 130 6.6	CvsD 0.056 0.054 0.054 0.059 0.059 0.059 0.059 0.052	(n# Nedian 56 54,4 22,1 79 119 74 113 5,0	atty liver +35) 75%tile 61 58.4 24.1 35 121 79 117 6.0	Fflatt (19 Median 53 63.3 26.3 29 127 75 114 5.9	23) 75%5/4 59 68.2 28.0 90 130 80 130 80 119 6.0	Ex8F -0.001 -0.001 -0.001 -0.001 -0.001 -0.001 -0.000 -0.009 -0.154 -0.000	(7 Median 60 62.2 21.7 82 124 74 148 6.0	fatty liver #10) 75%21e 65 68.0 25.1 87 126 76 160 7.0	F:Fat (n Median 86 90.9 25.1 96 122 77 153 7.5	622) 75%tile 69 66.0 27.2 91 129 60 175 6.3	EveF 0.095 0.003 0.027 0.050 0.903 0.427 0.207 0.207
Age Neight BM Halit Circumference Systolic BP FBG HDA1c(MGSP) Total cholesterol	kg kgicn <sup>1</sup> cm mailg maid, % maid,	A:Non-4 (n=0 Median 45 51.5 20.4 74 107 65 92 5.4 110	atty liver 1948) 75%clie 51 54.0 22.0 79 115 72 96 5.6 213	8.54t (nr Median 46 62.3 25.0 66 111 70 96 5.6 119	y Bver 41) 75%die 67.3 27.3 92 120 75 101 6.7 211	Avs8 40.001 40.001 40.001 40.001 40.001 40.001 40.001 40.001 8.0001	(ny Nedian 56 65.0 29.3 82 123 78 96 5.6 228	419) 75%214 61 69.9 27.4 95 143 95 143 99 5.9 245	D:Fut (79 Nectian 50 75.6 29.5 90 123 79 102 5.0 217	21) 75%51e 85 78.4 21.0 101 137 89 107 6.0 228	CvaD 0.168 -0.001 -0.001 0.460 0.679 0.065 0.065 0.045	C:Non (1) Media 65 65,1 24,7 96 141 161 127 5,7 5,7 224	4879 IVer #79) 175%clie 66.9 27.1 36 157 101 112 6.2 296	D:Fat (ry Median 56 70.9 27.6 94 152 74 119 6.1 220	#21) 75%25# 90 76.5 29.0 97 140 84 130 6.8 246	CvsD 0.059 0.094 0.049 0.049 0.049 0.012 0.012 0.012 0.012	(14 Neclan 55 54.4 22.1 79 119 74 113 5.0 210	atty liver (55) 75%514 81 88.4 24.1 15 121 79 117 6.0 220	Fflatt (19 Median 83 83,3 26,3 29 127 75 114 5,9 221	(23) 79%(5)e 89 80.2 25.0 90 130 80 130 80 119 6.0 242	Ex8F -0.001 -0.001 -0.001 -0.001 0.509 0.154 0.259 0.154	(7 Median 60 21.7 82 124 74 148 6.9 217	(attyliver *10) 75%bie 65 58.0 25.1 87 129 76 160 7.0 222	F:Fat (n Median 66 00.9 25.1 06 122 77 155 7.5 257	422) 75%458e 66.0 27.2 91 129 90 175 0.3 259	EvsF 0.095 0.003 0.027 0.050 0.427 0.207 0.207 0.205 0.077
Age Weight BME salat circumference Systolic BP VBAG Ubatolic BP VBAG (Sala cholesteroi Irigiycerides	kg kgicm <sup>1</sup> cm mmilg mgidL % mgidL mgidL	A:Non-4 (n=0 Median 45 51.5 20.4 74 107 65 92 5.4 110 62	atty liver 1948) 75%die 81 84.0 22.0 79 115 72 36 5.5 213 30	8:Fat (nv 46 62.3 25.0 86 111 70 96 5.5 109 56	y Ilver 41) 75%5ie 63 67.3 27.3 92 120 75 101 6.7 211 111	Avs8 40.001 40.001 40.001 40.001 40.001 40.001 40.001 8.000 8.0001	(ny Nedian 55 65.0 29.3 92 125 78 96 5.6 228 129	419) 75%214 61 69.9 27.4 95 143 95 143 99 5.9 245 146	D:Flat (nº Neclan 50 75.8 29.5 90 125 79 102 5.5 217 112	201) 78%.51e 85 79.4 21.0 101 137 89 107 6.0 225 136	CvaD 0.168 -0.001 -0.001 0.460 0.079 0.065 0.065 0.065 0.065 0.005	C:Non () Media 65 62.1 24.7 95 141 107 5.7 5.7 224 160	4879 IVer #79) 175%clie 65.9 27.1 36 157 101 112 6.2 290 290	D:/fat (ry Median 56 70.9 27.8 94 102 74 119 6.1 220 179	#21) 75%25# 60 76.5 25.0 97 140 64 130 6.6 246 245	CvsD 0.058 0.059 0.054 0.054 0.052 0.052 0.052 0.052 0.052 0.052 0.052 0.052	(19 Neclan 55 54.4 22.1 79 119 74 113 5.0 210 80	atty liver (55) 75%514 81 88,4 24,1 15 121 79 117 6,0 2200 111	FFlat (19 Median 53 61.3 26.3 29 127 75 114 5.3 221 115	(23) 78%,51e 89 80.2 28.0 90 130 80 130 80 119 6.0 242 145	Exe# +0.001 +0.001 +0.001 -0.001 0.509 0.154 0.509 0.154 0.509 0.259 0.017	(7 Median 60 62.2 21.7 82 124 74 146 6.0 217 73	(attyliver #10) 75%bie 65 58.0 25.1 87 129 76 160 7.0 222 100	F:Fat (19 Median 56 00.9 25.1 96 122 77 153 7.5 257 151	422) 75%458 66.0 27.2 91 129 90 175 0.3 269 191	Ever 0.096 0.003 0.027 0.000 0.903 0.427 0.207 0.207 0.005 0.077 0.005
Nge Neight Bill waldt (incumfwrence tystolic BP Diastolic BP TBG High (MGBP) fotal cholwsterol Inglycertdes MSL-C	kg kgicm cm mmilg mgidL NgidL mgidL mgidL mgidL	AcNon-4 (n=6) Median 45 51.5 20.4 74 107 65 92 5.4 106 92 5.4 106 92 71	atty liver 1948) 75%clie 51 540 2220 79 115 72 36 5.6 213 30 82	8.Fat (ry Median 46 62.3 25.0 66 111 70 96 5.5 119 56 63	y liver 61) 75%51= 53 67.3 27.3 82 120 75 121 6.7 211 111 72	AveB 6.091 40.091 40.091 40.091 40.091 40.091 40.091 40.091 40.091 40.091 40.091 40.091	(ny Hedian 55 65.0 25.5 82 123 78 56 6.6 228 129 60	419) 75%214 61 69.9 277.4 95 143 69 99 5.0 245 146 76	D:Fut (19 Neclan 50 75.6 29.5 90 122 79 102 5.8 217 112 55	01) 75%51e 50 79,4 31,0 101 137 09 107 6,0 220 136 60	CvsD -0.001 -0.001 0.450 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005	C:Non () Media 65 62.1 24.7 95 141 107 5.7 5.7 224 57	(atty liver #78) 1 75%(5)# 60 65.9 277.1 90 157 101 112 6.2 296 206 62	D:Pat (re Median 56 70.9 27.6 54 152 74 152 74 159 6.1 220 179 62	#21) 75%28# 60 78.5 29.0 97 140 94 130 6.6 240 240 245 59	CvsD 0.000 0.004 0.049 0.049 0.049 0.049 0.042 0.042 0.042 0.042 0.042 0.042 0.042 0.042 0.042 0.042 0.040	(19 Neclan 55 54.4 22.1 79 119 74 113 6.0 210 80 80	atty liver (55) 75%51e 61 59.4 24.1 15 121 79 117 6.0 250 111 77	FFat (19 Median 83 60.3 20.3 20.3 20.3 20.3 20.3 20.3 20.3 2	23) 75%5ie 59 68.2 28.0 80 130 83 130 83 130 83 130 83 130 83 148 6.0 242 146 60	ExaF -0.001 -0.001 -0.001 0.509 0.509 0.154 0.500 0.259 0.017 0.009	(7 Median 60 62.2 21.7 62 124 74 146 6.8 217 72 71	Anty liver +10) 175%25+ 65 56.0 25.1 67 126 76 165 7.0 222 100 77	F:Fat (19 Median 55 00.9 25.1 96 122 77 150 7.5 257 151 56	422) 75%45ie 68 66.8 27.2 91 129 90 175 6.3 269 191 63	Evel* 0.098 0.003 0.027 0.000 0.427 0.005 0.427 0.005 0.005 0.005
Age Weight Bill Systolic BP Systolic BP BG HDA1c(MKBP) Total cholastrol Inglycerides HDA-C LD-C	kg kgicm cm mmiłg mgidL S mgidL mgidL mgidL mgidL	A:Non-A (n=0 Median 45 51.5 20.4 74 107 65 92 5.4 190 63 71 194	atty liver (948) 75%clin 51 510 22:0 79 115 72 56 8.6 8.6 213 60 62 119	8.Fat (nv Median 46 62.3 25.0 56 111 70 56 5.5 129 65 63 111	y liver 61) 75%ds+ 85 67.3 82 120 75 121 8.7 211 111 72 121	Ave8 6.001 -0.001 -	(ny Neclan 55 65.0 25.3 92 123 78 56 5.6 220 129 60 135	kty liver ris) 75%tile 61 69.3 27.4 95 143 99 8.0 245 146 76 154	D:Flat (nv Nectian 50 75.6 29.5 90 122 79 102 5.0 217 112 55 130	00) 75%00 85 78.4 21.0 101 137 89 107 8.0 228 107 8.0 228 107 8.0 228 107 8.0 148	CvsD 0.168 -0.001 0.001 0.005 0.005 0.045 0.045 0.045 0.045 0.056 0.045 0.058	C:Non 65 65 65,11 34,7 36 141 167 57 124 57 121	4253 (Juer #78) 175% (Juer 60 66.9 27.1 161 157 101 112 6.2 296 296 62 171	0:748 (re Median 88 70.8 27.8 54 122 74 119 8.1 220 179 8.1 220 179 82 125	#21) 75%21# 60 76.5 25.0 57 140 54 120 6.6 246 245 68 199	CvsD 0.090 0.094 0.760 0.049 0.049 0.049 0.049 0.049 0.042 0.042 0.042 0.042 0.042 0.042 0.042 0.042 0.042	(n= N=clan 55 54.4 22.1 79 119 74 119 74 119 74 119 74 210 210 210 210 210 210 210 210 210 210	atty liver +35) 75% tile 88.4 24.1 85 121 79 117 6.0 2200 1111 77 129	FFat (nr Median 53 62.3 28.3 19 127 75 114 5.9 221 115 55 142	023) 75%584 59 08.2 28.0 80 130 80 119 8.0 242 148 80 150	Exe# -0.001 -0.001 -0.001 -0.001 -0.001 0.509 0.154 0.500 0.259 0.017 0.009 0.055	(7 Median 60 62.2 124 146 6.0 217 74 140 6.0 217 71 71 120	fatty liver +10) 175%21e 65 50.0 25.1 87 126 76 165 7.5 292 100 77 127	F/Fat (19 Median 85 00.3 25.1 85 122 77 153 7.5 257 151 85 154	422) 75%£5ie 59 66.8 27.2 91 129 90 175 8.3 269 191 60 191 193	Evel <sup>#</sup> 0.096 0.000 0.000 0.400 0.400 0.407 0.207 0.207 0.207 0.207 0.207 0.207
Age Weight BME exist circumference systalic BP PaG (Matchick BP) faG (Matchicke Matchicke (Matchicke Match	kg kg/cm cm mailg mgidL mgidL mgidL mgidL mgidL	A:Non-6 (n40) Median 45 81.5 20.4 74 107 65 82 5.4 196 62 5.4 196 62 71 194 19.6	8549 (Iver 1944) 75%(clie 56.0 22.0 79 115 72 26 5.6 213 20 82 119 22.3	8.745 (nv Median 46 62.3 25.0 56 111 70 56 5.5 129 65 5.5 129 65 5.5 111 22.2	y liver d1) 75%die 67.3 27.3 82 120 78 121 5.7 211 111 72 121 27.3	Ava8 6.895 40.01 40.01 40.01 40.01 40.01 40.01 6.962 40.01 6.962 40.01 6.962 40.01 6.962 40.01 6.962 6.961 6.962 6.964 6.962 6.962 6.965 6.9555 6.9555 6.9555 6.9555 6.9555 6.95555 6.955555 6.955555555555555555555555555555555	(n9 Hedian 85 95.0 28.3 78 123 78 56 5.6 2229 125 60 135 50.6	kty liver ris) 75%tile 69.3 27.4 95 143 99 5.0 245 146 145 146 146 146 146	D:Fut (nv Median 50 75.6 29.5 90 122 79 102 5.0 217 112 55 130 25.0	220) 79%20e 80 78.4 21.0 101 107 80 107 6.0 220 106 107 6.0 106 146 45.1	CvsD 6.168 -0.001 -0.001 0.001 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.005 0	C:Non (0) 56 65 65 141 157 57 57 57 57 57 57 57 57 57 57	Anty liver +79) 1 75% Clie 60.9 60.9 60.9 60.9 60.9 107 101 112 6.2 256 250 60 250 107 101 112 50 250 107 107 107 107 107 107 107 10	D:Fat (m Median 56 71.5 54 122 74 54 122 74 54 122 74 119 6.1 220 179 52 125 48.3	*21) 76%21e 60 76.5 29.0 97 140 94 120 6.6 246 246 246 246 246 246 246 246 246 24	CvsD 0.056 0.056 0.054 0.059 0.052 0.052 0.052 0.052 0.052 0.052 0.052 0.052 0.052	(19 Hedian 85 54.4 22.1 79 119 74 113 5.0 210 85 210 85 210 85 210 85 220 29.2	atty liver +35) 75%(1)= 81 84 24.1 85 121 121 129 129 26.5	FFat (n Median 03.3 28.3 09 127 75 114 5.9 221 115 55 142 25.9	23) 79%51+ 59 68.2 28.0 130 130 130 119 6.0 242 145 60 150 48.9	ExeF -0.001 -0.001 -0.001 -0.001 -0.001 0.009 0.154 0.009 0.015 0.017 0.009 0.017 0.009 0.019 0.001	(7 Median 60 62.2 124 146 6.0 217 71 120 27.2	fatty liver *10) 170%clie 65 66.0 25.1 67 126 7.6 222 100 77 127 20.1	P:Fut (n) Median 66.9 25.1 66 122 77 155 155 155 156 154 44.8	22) 70%///iiii 89 66.0 27.2 91 129 90 175 6.3 299 191 193 66.3	Ever 0.088 0.005 0.027 0.080 0.207 0.205 0.207 0.005 0.077 0.005 0.002 0.002
lge Weight Bill exist circumference hystolic BP Weig Weight BP Weight BP Wei	kg kgicn nniłg ngid, s ngid, ngid, ngid, ngid, ngid, ngid,	A:Nor-6 (n=0) Median 45 51.5 20.4 74 107 65 20.4 74 107 65 52 5.4 196 63 71 196 63 71 196 63 71 196 63 71	8547 (Iver 1944) 75%(Sie 51 560 2220 79 115 72 96 8.8 213 80 82 119 223,3 96,0	8.Fat (nv Median 46 62.3 25.0 56 111 70 56 5.5 119 56 63 119 56 63 111 22.2 20.4	y liver 41) 75%die 67.3 927.3 92 120 76 121 27.1 121 27.3 98.1	AvaB 6.093 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.00	(19 Hedian 85 85,0 28,3 123 78 8,6 229 129 80 129 105 105,4 102,4	419) Toer 419) 78%20+ 81 80.3 27.4 95 143 29 99 5.0 245 146 76 164 76 167.4	D:Fat (n= Nectian 50 75.6 29.5 90 123 79 102 5.0 217 112 55 126 217 112 55 126 126 127 112 55 126 126 127 112 127 127 127 127 127 127 127 127	23) 79%55 85 79%55 91,0 101 127 89 107 6,0 220 126 6,0 220 126 6,0 126 6,0 126 146 45,1 116,6	CvsD 0.168 -0.001 -0.001 0.460 0.460 0.079 0.065 0.095 0.0274 0.077 0.601 0.0274 0.077 0.501 0.481 0.482	C:Non () Media 85 92.1 98 141 127 5.7 224 196 57 121 121 51.1 122.6	fatty liver #79) 1 75%clie 68 96.9 27.1 96 101 112 62 290 62 290 62 171 87.2 46.5	D:Fat (re Median 96.3 27.6 94 119 6.1 119 6.1 119 6.2 120 179 62 126.8 95.8	*21) 76%28+ 60 76.5 25.9 97 140 54 120 54 240 243 245 245 245 245 169 169 169 169	CvsD 0.000 0.094 0.049 0.049 0.049 0.049 0.049 0.049 0.049 0.049 0.049 0.049 0.049 0.049 0.049 0.049 0.049 0.049 0.050	(19 Hedian 85 54.4 22.1 79 113 74 113 5.0 210 82 60 128 29.2 97.2	atty liver +25) 79%25e 81 58.4 24.1 151 79 117 6.0 220 111 77 129 36.6 107.6	FFat (n Median 53 62,3 29 127 75 114 5,9 221 115 55 142 55 115 55 142 20,9 104,3	23) 75%51+ 89 80,210 90 120 80 120 80 120 80 146 80 150 40,9 117,8	Ex8F 0.009 -0.001 -0.001 0.509 0.154 0.009 0.017 0.009 0.017 0.009 0.017 0.009 0.012	(7) Median 60 62.2 21.7 124 146 6.9 217 73 71 120 27.2 69.0	fatty liver =10) 175%ztle 66 68 28.1 87 126 160 7.6 160 7.6 120 77 120 190 77 123.1 104.0	P:Fut (n) Maclan 66, 90, 90 25, 1 06 122 77 150 7, 5 257 151 86 194, 8 44, 8 115, 0	22) 79%25# 89 66.5 27.2 91 129 80 175 6.3 259 191 65 195 66.3 124.7	Ever 0.098 0.003 0.027 0.080 0.427 0.085 0.427 0.085 0.427 0.085 0.077 0.085 0.077 0.085 0.071 0.081
tge Height Bill salat circumference systalic BP Distalic BP RSG Unaclose BSG USAC (MSP) (cala consense USAC USAC USAC USAC USAC USAC USAC USAC	kg cn nniig ngid. Ngid. ngid. ngid. ngid. ngid. Ngid. Ngid.	A:Non-6 (net) Median 45 51.5 20.4 74 165 92 5.4 196 65 92 5.4 196 65 92 5.4 196 65 92 5.4 196 65 92 5.4 196 93 71	8549 (Iver 1648) 75%(Iie 56.0 22.0 79 115 72 96 8.6 213 20 119 22.3 96.0 21.7 96.0 21.7	8.Fat (n/ 46 62.3 25.0 66 5.5 109 66 63 111 22.2 00.4 18.5	y Ilver etit) 75%die 63 67.3 27.3 82 120 121 121 121 121 27.3 98.1 25.2	Avail 6.091 -0.001	(19 Hedian 55 65.0 26.3 82 123 78 56 5.0 25.3 82 123 78 56 5.0 125 123 125 125 125 125 125 125 125 125	htty liver ris) 75%zile 61 69.3 27.4 95 143 29 8.3 245 146 76 154 41.4 107.4 27.8	0:Fat (nr Neclan 29.5 90 102 5.9 10 102 5.9 102 5.9 102 5.9 102 5.9 102 5.9 102 5.9 102 5.9 102 5.9 102 5.9 102 5.9 10 102 5.9 10 102 5.9 10 102 5.9 10 102 5.9 10 102 5.9 10 102 5.9 10 10 10 10 10 10 10 10 10 10 10 10 10	23) 79%51# 85 78.4 91.8 101 137 89 107 6.0 229 136 65 146 65 146 116.5 20.4	CvsD 0.168 <0.001 0.001 0.460 0.015 0.065 0.065 0.065 0.065 0.065 0.065 0.065 0.065 0.065 0.061 0.065 0.055 0.055 0.055 0.055 0.055 0.055 0.055 0.055 0.055 0.055 0.055 0.057 0.055 0.	C:Non () Media 65 62.1 95 141 157 57 1214 106 57 1215 1122,4 102,2 28,7 29,7 29,7 20	Anty liver #79) 1 75%clie 66.9 66.9 66.9 66.9 66.9 66.9 157 157 157 157 152 296 296 296 296 296 296 296 29	D:Fet (re Median 70.8 27.8 54 112 74 119 6.1 220 179 62 126 62 126 62 126 52 27.9	*21) 76%28+ 60 76.5 29.0 97 160 64 130 68 246 246 246 246 246 246 246 246 246 246	CvsD 0.050 0.094 0.044 0.049 0.049 0.042 0.042 0.042 0.176 0.242 0.176 0.242 0.176 0.242 0.176 0.242 0.176 0.242 0.576	(0* Niedian 55 54.4 22.1 79 119 74 113 5.0 210 82 82 82 82 82 82 82 82 82 82	atty liver (35) 79%516 81 89.4 28.1 85 121 79 117 6.0 220 111 77 129 26.6 107.6 26.3	FFat (n Median 83 80.3 20.3 89 127 75 114 8.9 221 115 85 142 26.3 104.3 20.3 104.3 20.5 104.3 104.3 104.3 104.3 104.3 105.3	23) 75%51+ 59 68.2 28.8 85 130 85 130 85 130 85 148 60 150 148 60 150 148 92.4	Ever 6.009 -0.001 -0.001 -0.001 -0.001 0.009 0.154 0.009 0.154 0.009 0.159 0.017 0.009 0.015 0.005	(7) Median 60 52.2 124 74 146 6.2 124 74 146 6.2 217 72 71 120 25.2 62 217 72 73 71 120 22.7	fatty liver #10) 1 75%ztie 65 65 65 25.1 67 165 76 165 7.6 252 160 77 127 25.1 104.0 25.5	P:Fet (n/ Median 60.3 25.1 06 122.1 150 7.5 257 150 7.5 257 151 58 154 44.6 115.0 22.5	22) 70%25# 88 66.5 27.2 81 125 65 175 63 195 191 65 191 65 191 56.5 124.7 54.4	Evel <sup>#</sup> 0.095 0.003 0.027 0.000 0.407 0.207 0.207 0.207 0.207 0.202 0.002 0.002 0.002 0.001 0.002
Apa Nalght Ibli Statistic BP Statistic BP 1956 (Satcheller) (Satchelle	kg kgicn <sup>1</sup> cn mmiłg mgidi mgidi mgidi mgidi mgidi S LUL	A:Non-6 (net) Median 45 51.5 20.4 74 107 65 92 5.4 196 62 71 194 19.6 19.2 19	8547 Ever 1594(5) 1594(5) 15 105 115 115 115 115 115 213 20 213 213 213 213 213 213 213 213	8.Fat (nr Median 46 62.3 25.0 56 5.5 109 55 63 111 22.2 90.4 13.5 19	y liver dt) 75%die 85 67.3 27.3 92 120 78 120 78 120 78 120 78 121 121 27.3 92.1 27.3 92.1 27.3 92.1 27.3 92.1 27.3 92.1 27.3 92.1 27.3 92.2 25 25 25 27.3 92 25 25 25 25 25 25 25 25 25 2	Avail 6.091 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001	(19 Madian 86 86,0 24,3 82 123 86 8,6 225 129 80 135 20,6 125 105,4 22,5 105,4 105,4 105,4 105,4 105,4 105,5 19	419) Tonr 419) 78%216 61 69.3 27.4 95 142 89 99 99 8.0 245 146 78 41.4 107.4 215 140 215 215 215 215 215 215 215 215	D:Fat (nr Neclan 75.6 29.5 90 102 5.8 217 112 55 126 25.8 126 25.8 107.2 25.8 107.2 25.2 24	220) 79%(1)+ 80 91,0 101 107 6,0 220 107 6,0 220 107 6,0 220 146 45,1 116,6 20,4 20	CvsD 6.168 -0.001 0.001 0.480 0.001 0.480 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.001 0.005 0.	CtNon (2) Media 65 65 65 141 51 157 57 124 196 57 121 1026 57 121 1026 57 224 7 225 7 20	(atty liver +79) 1770(45) 66 65.9 27.1 96 157 161 112 296 290 62 290 62 290 62 290 67.2 46.3 122.1 57.2 46.3 122.1	D:Fat (re Median 56 70.9 27.6 1122 74 1122 74 1125 6.1 125 125 40.0 91.9 92.9 25	*21) 76%28+ 60 76.5 29.8 97 140 98 130 6.6 245 246 245 246 245 246 245 246 245 58 159 87.1 112.3 25.6 54	CvsD 0.898 0.990 0.994 0.994 0.912 0.912 0.912 0.912 0.912 0.912 0.910 0.911 0.907 0.911 0.991 0.911	(m Median 56 54,4 22,1 75 119 74 113 5,0 210 50 129 29,2 97,2 22,2 97,2 22,2 97,2 22,2 97,2 22,2 97,2 22,2 97,2 22,2 97,2 22,2 97,2 9	atty liver (25) 79%28 81 84 84 84 84 85 121 79 111 79 129 286 107,6 129 286 107,6 129 286,8 107,6 129 286,8 107,6 129 286,8 129 129 286,8 129 129 296,8 129 129 296,8 120 129 206,8 120 129 206,8 120 129 129 206,8 120 129 206,8 120 129 206,8 120 129 206,8 129 129 206,8 129 129 206,8 129 129 206,8 127 207 207 207 207 207 207 207 2	FFat (ne Median 00.3 20.3 20.3 20.3 20.3 20.3 20.3 20.3	23) 75%5/= 80 80 150 80 150 80 150 80 150 80 150 40.9 150 40.9 117.6 232	Ex8F -0.001 -0.001 -0.001 0.000 0.000 0.000 0.000 0.000 0.001 0.000 0.001 0.000 0.001 0.000 0.000 0.001 0.0000 0.00000 0.00000 0.000	(7) Median 60 50.2 124 74 146 6.2 124 74 146 6.2 77 71 120 27.2 98.0 22.7 29	fatty liver #10) 170%tile 65 68.0 25.1 87 125 76 160 7.0 222 160 77 127 127 127 127 127 127 127	P:Fet (n) 86 90.3 25.1 06 1222 77 153 7.5 7.5 7.5 7.5 151 151 154 44.8 115.0 20.5 22	22) 79%10+ 86.8 97.2 91 129 90 175 8.3 299 191 193 88.3 194.7 54.4 20	Ever 0.098 0.003 0.027 0.000 0.427 0.207 0.207 0.005 0.002 0.002 0.061 0.002 0.061 0.002 0.061 0.002
Apa Neight Statistic Countreence agat chroumference agat chroumference Page Nation (Statistics) Total cholestarool Total choles	kg kgicm cm mmilg mgidL mgidL mgidL mgidL mgidL MgidL LiLL LiLL	A:Non-6 (net) Median 45 51.5 20.4 74 107 65 92 5.4 106 106 106 106 106 106 105 105 105 105 105 105 105 105 105 105	8547 Ever 19545 1757405 115 115 122.0 75 115 122 255 200 22.3 96.0 21.7 223 960.0 21.7 223 960.0 21.7 21.7 22 10	8.Fat (nv Median 46 62.3 25.0 86 111 70 96 5.6 5.6 119 06 63 111 111 22.2 00.4 13.5 19 21	y liver dt) 75%de 80 67.3 27.3 120 78 121 123 27.3 120 78 121 27.3 98,1 27.3 99,1 27.3 27.3 27.3 120 78 121 27.3 27.3 120 78 121 27.3 27.3 27.3 120 78 121 27.3 27.1 27.3 27.1 27.3 27.1 27.1 27.1 27.3 27.1 27.3 27.1 27.3 27.1 27.3 27.1 27.3 27.3 27.3 27.1 27.3 27.5 27	AveB 6.091 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <	(19 Hedian 85 85 92 123 98 5.6 229 129 125 129 125 125 125 125 125 125 125 125	htty liver rts) 78%21+ 81 82.3 27.4 95 143 99 5.3 245 146 76 154 41.4 107.4 27.5 21 21	D:Fat Neclan 50 75.6 29.5 90 122 79 102 55 102 217 112 55 128 217 112 55 129 20.9	23) 79%184 53 79,4 51,0 101 137 89 107 6,0 220 136 65 148 45,1 116,6 20,4 20,4 20,4 20,4 20,4 20,4 20,4 20,4	CvsD 0.185 <0.001 0.001 0.460 0.065 0.045 0.045 0.024 0.077 0.501 0.501 0.442 0.017 <0.001 	C:Non (1) Media 66.1 24.7 98 147 98 147 157 5.7 5.7 5.7 5.7 5.7 121 81.1 152.6 57 121 81.1 152.6 7 20 7 20	6400 y liver = 199 =	D:Fat ()7 Median 56 70.3 27.8 54 152 74 119 6.1 179 6.2 105 48.8 92.8 92.8 92.8 27.9 25 20	*21) 76%25# 90%25# 29%3 54 54 120 64 120 64 245 245 245 245 245 58 58 54 48	CvsD 0.050 0.750 0.760 0.760 0.750 0.242 0.242 0.242 0.242 0.242 0.250 0.240 0.250 0.250 0.250 0.250 0.250 0.250 0.250 0.250	(m Median 56 54,4 22,1 79 119 74 113 5,0 210 50 50 50 50 50 50 50 50 210 50 50 210 50 50 50 50 50 50 50 50 50 5	atty liver (456) 79%(518) 61 58,4 24,1 85 121 117 6,0 220 111 77 129 6,0 256,5 107,6 26,5 26,5 26,5 26	FFat (n) Wedian 53 62.3 26.3 26.3 26.3 127 75 114 55 142 25.3 104.3 24.3 104.3 24.3 25 25 25	23) 79%81+ 59 6822 28.0 85 150 85 150 85 150 150 148 60 150 4629 117.6 254 254 47	Ever 0.009 -0.001 -0.001 -0.001 -0.001 0.509 0.309 0.001 0.009 0.017 0.009 0.017 0.009 0.017 0.009 0.017 0.009 0.001 0.001 0.100 0.1001 0.0001 0.1001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0000 0.0001 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000000	(7) Median 60 62 21.7 62 124 74 146 6.8 217 72 71 120 27.2 65.8 22.7 20 17 17	fatty liver +10) 175%atte 65 86.0 25.1 87 128 7.6 252 252 100 100 100 25.5 21 20	P:Fet (n) 86 90.3 25.1 152 77 153 7.5 257 151 56 154 44.6 115.0 20.5 225 251	22) 70%25+ 66.3 27.2 91 125 80 175 83,3 191 63 191 193 194,3 194,4 56,3 194,4 56,4 195 194,4 195 194,4 195 194,4 195 194,4 195 195 195 195 195 195 195 195	Ever 0.095 0.002 0.002 0.427 0.207 0
Apa Nalght Bill Sustain: DP Stastolic DP 1956 (Satchic)KGBP (Satchic)KGB	kg kg/cm cm mmilg mgidL mgidL mgidL mgidL mgidL S LUL LUL LUL	A.Non-6 (net) 45 51.5 2004 107 65 92 5.4 106 62 5.4 106 62 5.4 106 62 104 104 104 114	15 y liver 1648) 15%(5) 51 54,0 22,0 115 72 36 5,5 213 30 52 119 22,13 30 21,7 22,13 30 21,7 21,19 119 21,3 30 21,19 119 21,5 1	8.Fat (nr) 46 62.5 25.0 56 111 70 56 5.5 109 60 61 111 202 60.4 19.5 19 21	y liver dt) 79%die 82 120 76 121 120 76 121 120 76 121 121 121 125 225 25 25 25 25 25 25 27 27 27 27 27 27 27 27 27 27	AveB 6.091 <0.001 <0.001 <0.001 <0.001 <0.001 0.001	(19 Median 55 55 55 52 52 52 52 52 52 52	htty liver rts) 78%zile 81 89.3 27.4 143 29 39 5.0 245 143 29 245 144 143 29 245 154 41.4 107.4 27.5 21 21	0.7447 109 100 100 100 100 100 100 100	20) 79%10+ 85 79,4 21,0 101 137 6,0 229 107 6,0 229 107 6,0 229 107 6,0 229 107 6,0 229 107 6,0 229 107 6,0 229 45 45 42 45	CvsD 0.168 <0.001 0.001 0.460 0.065 0.065 0.065 0.065 0.077 0.580 0.077 0.580 0.077 0.580 0.077 0.580 0.077 0.580 0.077 0.580 0.077 0.580 0.077 0.580 0.077 0.580 0.077 0.580 0.077 0.580 0.077 0.580 0.077 0.081 0.075 0.045 0.077 0.085 0.077 0.085 0.077 0.085 0.077 0.085 0.077 0.085 0.077 0.085 0.077 0.085 0.077 0.085 0.077 0.085 0.077 0.085 0.077 0.080 0.077 0.080 0.077 0.080 0.077 0.080 0.077 0.080 0.077 0.080 0.077 0.080 0.081 0.077 0.580 0.077 0.080 0.045 0.077 0.080 0.077 0.080 0.077 0.080 0.045 0.077 0.080 0.077 0.080 0.077 0.080 0.041 0.077 0.080 0.041 0.077 0.080 0.041 0.041 0.077 0.080 0.041 0.	C:Non (1) 66 62.1 141 141 141 147 157 157 151 160 57 151 162.6 25.7 20 20	Cathy liver #19) 1 75% Cite 66 66.9 27.1 96 157 101 112 206 206 206 206 206 206 206 206 206 20	Drifet (nr Median 56 70.8 54 122 74 122 74 6.1 220 176 52 126 52 126 52 125 40.0 52 125 40.0 52 125 40.0 52 125 54 40 27.8 54 40 27.8 55 40 27.8 55 54 55 54 55 55 55 55 55 55 55 55 55	+21) 70%25+ 60 76.5 76.5 76.5 76.5 76.5 64 120 64 120 64 120 64 120 64 120 64 120 64 120 54 55 54 56 54 54 54 55	CV&D 0.856 - 0.954 - 0.996 - 0.924 - 0.976 - 0.924 - 0.976 - 0.9776 -	(n# Median 56 54,4 22,1 79 113 5,0 210 20 20,2 20,2 22,1 22,1 22,2 120 20,2 22,1 120 120 120 120 120 120 120 12	atty liver (d5) 79%(tik 81 84 28.1 28 121 79 117 6.0 220 1117 6.0 220 1117 129 20.5 210 210 220 210 220 210 220 220 220 220	FFat (19) Minclain 53 62.3 28.3 127 75 114 5.9 221 155 142 255 255 255 142 255 255 255 255 255 255 255 2	23) 79%51+ 59 68.2 28.0 85 130 85 130 85 130 85 148 90 156 40.9 117,8 53,4 242 47 48	EV8F 0.009 -0.001 - -0.001 - -0.001 - -0.001 - 0.009 0.154 0.009 0.017 - 0.009 0.012 - 0.042 - 0.042 - 0.045 0.041 - 0.045 - 0.041 - 0.001	(7) Median 60 62,2 21,7 62 124 146 6,3 24,7 175 71 120 27,2 26,2 27,2 20,7 15 22,7 20,7 16 21,7 15 22,7 20 21,7 15 22,7 20 21,7 15 22,7 20 21,7 15 22,7 20 21,7 15 22,7 20 21,7 15 22,7 20 21,7 15 22,7 20 21,7 15 22,7 20 21,7 15 21,7 15 21,7 15 21,7 15 21,7 15 21,7 15 21,7 15 21,7 15 21,7 15 21,7 15 21,7 20 21,7 20 21,7 20 21,7 20 21,7 20 21,7 20 21,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20 20,7 20,7 20,7 20 20,7 20	fatty liver #10) 175%atte 66 68.0 25.1 07 125 7.6 125 7.6 222 120 77 127 25.1 104.0 25.5 21 20 23	P:Fat (n) Median 88 90.3 25.1 96 122 77 151 257 151 164 44.6 115.0 28.5 22 29	22) 79%25+ 64.8 27.2 91 125 60 175 6.3 269 175 6.3 165 161 163 164 165 164 165 164 165 164 165 164 165 164 165 164 165 165 165 165 165 165 165 165 165 165	EveF 0.296 0.003 0.207 0.200 0.403 0.407 0.205 0.207 0.205 0.207 0.205 0.005 0.005 0.001 0.0115 0.015
	kg kgicm cm mmilg mgidL mgidL mgidL mgidL mgidL MgidL LiLL LiLL	A:Non-6 (net) Median 45 51.5 20.4 74 107 65 92 5.4 106 106 106 106 106 106 105 105 105 105 105 105 105 105 105 105	8547 Ever 19545 1757405 115 115 122.0 75 115 122 255 200 22.3 96.0 21.7 223 960.0 21.7 223 960.0 21.7 21.7 21.0 21.7 21.0 21.7 21.0 21.0 21.0 21.0 21.0 21.0 21.0 21.0	8.Fat (nv Median 46 62.3 25.0 86 111 70 96 5.6 5.6 119 86 63 111 111 22.2 00.4 13.5 19 21	y liver dt) 75%de 80 67.3 27.3 120 78 121 123 27.3 120 78 121 27.3 98,1 27.3 99,1 27.3 27.3 27.3 120 78 121 27.3 27.3 120 78 121 27.3 27.3 27.3 120 78 121 27.3 27.1 27.3 27.1 27.3 27.1 27.1 27.1 27.3 27.1 27.3 27.1 27.3 27.1 27.3 27.1 27.3 27.3 27.3 27.1 27.3 27.5 27	AveB 6.091 <0.001 <0.001 <0.001 <0.001 <0.001 0.001	(19 Maclan 85 85,0 28,3 82 123 78 86 5,6 229 80 135 102,4 22,5 19 19 10 201	htty liver rts) 78%21+ 81 82.3 27.4 95 143 99 5.3 245 146 76 154 41.4 107.4 27.5 21 21	D:Fat Heclan 50 75.6 29.5 90 122 79 102 55 102 217 112 55 128 217 112 55 129 20.9	23) 79%184 53 79,4 51,0 101 137 89 107 6,0 220 136 65 148 45,1 116,6 20,4 20,4 20,4 20,4 20,4 20,4 20,4 20,4	CvsD 0.185 <0.001 0.001 0.460 0.065 0.045 0.045 0.024 0.077 0.501 0.501 0.442 0.017 <0.001 	C:Non (1) Media 66.1 24.7 98 147 98 147 157 5.7 5.7 5.7 5.7 5.7 121 81.1 152.6 57 121 81.1 152.6 7 20 7 20	6400 y liver = 199 =	D:Fat ()7 Median 56 70.3 27.8 54 152 74 119 6.1 179 6.2 105 48.8 92.8 92.8 92.8 27.9 25 20	*21) 76%25# 90%25# 29%3 54 54 120 64 120 64 245 245 245 245 245 58 58 54 48	CvsD 0.050 0.750 0.760 0.760 0.750 0.242 0.242 0.242 0.242 0.242 0.250 0.240 0.250 0.250 0.250 0.250 0.250 0.250 0.250 0.250	(m Median 56 54,4 22,1 79 119 74 113 5,0 210 50 50 50 50 50 50 50 50 210 50 50 210 50 50 50 50 50 50 50 50 50 5	atty liver (456) 79%(518) 61 58,4 24,1 85 121 117 6,0 220 111 77 129 6,0 256,5 107,6 26,5 26,5 26,5 26	FFat (n) Wedian 53 62.3 26.3 26.3 26.3 127 75 114 55 142 25.3 104.3 24.3 104.3 24.3 25 25 25	23) 79%81+ 59 6822 28.0 85 150 85 150 85 150 150 148 60 150 4629 117.6 52.4 22.4 7	Ever 0.009 -0.001 -0.001 -0.001 -0.001 0.509 0.309 0.001 0.009 0.017 0.009 0.017 0.009 0.017 0.009 0.017 0.009 0.001 0.001 0.100 0.1001 0.0001 0.1001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0001 0.0000 0.0001 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000000	(7) Median 60 62 21.7 62 124 74 146 6.8 217 72 71 120 27.2 65.8 22.7 20 17 17	fatty liver +10) 175%atte 65 86.0 25.1 87 128 7.6 252 252 100 100 100 25.5 21 20	P:Fet (n) 86 90.3 25.1 96 122 77 153 7.5 227 151 86 154 44.6 115.0 21.5 225 225 23	22) 70%25+ 66.3 27.2 91 125 80 175 83,3 191 63 191 193 194,3 194,4 56,3 194,4 56,4 195 194,4 195 194,4 195 194,4 195 194,4 195 195 195 195 195 195 195 195	EveF 0.098 0.003 0.003 0.403 0.427 0.207 0

Gender	Age	n	5th	10th	25th	50th	75th	90th	95th
Men	<30	4	15.7	16.9	20.2	23.2	24.8	26.0	26.3
	30-39	127	12.2	13.9	17.1	20.3	25.4	30.9	33.0
	40-49	274	13.1	14.4	18.5	22.6	27.2	32.0	37.2
	50-59	163	13.3	15.3	19.1	23.3	28.4	35.3	41.6
	60-69	35	15.8	16.7	19.7	25.7	32.1	38.2	44.8
	70≦	1							
	All	604	13.0	14.5	18.3	22.6	27.5	32.9	38.3
Women	<30	4	14.1	15.1	18.0	19.9	20.5	21.3	21.5
	30-39	197	10.8	11.9	14.6	18.0	21.0	25.1	27.3
	40-49	421	12.5	13.6	16.2	19.1	22.3	26.6	29.6
	50-59	201	14.3	15.6	18.5	22.0	25.7	28.8	31.8
	60-69	37	16	17.6	21.8	25.3	28.4	29.7	31.1
	70≦	4	18.2	18.8	20.5	24.6	27.6	27.6	27.6
	All	864	12.2	13.5	16.3	19.6	23.3	27.6	29.9

Ible 3. Selected percentiles for sdLDL-C distribution of healthy subjects without fatty liver (mg/i