

Supplementary Appendix

This appendix has been provided by the authors to give readers additional information about their work.

Supplement to: Abul-Husn NS, Cheng X, Li AH, et al. A protein-truncating *HSD17B13* variant and protection from chronic liver disease. *N Engl J Med* 2018;378:1096-106. DOI: 10.1056/NEJMoa1712191

SUPPLEMENTARY APPENDIX: A protein-truncating HSD17B13 variant and protection from chronic liver disease

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Additional information on the DiscovEHR study is available at <http://www.discovehrshare.com>

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Supplementary Methods

Study Participants

Human genetics studies were conducted as part of the DiscovEHR collaboration of the Regeneron Genetics Center and the Geisinger Health System (GHS). The study was approved by the GHS Institutional Review Board. The two DiscovEHR study populations (discovery cohort and bariatric surgery cohort) originated from the first 50,726 consented participants ≥ 18 years of age from the MyCode® Community Health Initiative of GHS¹. The GHS discovery cohort consisted of 46,544 European individuals recruited from outpatient primary care and specialty clinics between 2007 and 2016, excluding all those recruited to the bariatric surgery cohort. The GHS bariatric surgery cohort consisted of 2,644 European individuals who had been referred for bariatric surgery.

Replication studies of associations with liver transaminases included 1,357 European individuals from the Dallas Heart Study and 8,526 European individuals from the Penn Medicine Biobank. The Dallas Heart Study is a probability-based population cohort study of Dallas County residents aged 30 to 65 years². The Penn Medicine Biobank includes participants recruited from the University of Pennsylvania Health System and consented for biospecimen storage, access to EHR data, and permission to recontact.

Replication studies of the associations with chronic liver disease included 517 individuals from the Dallas Liver Study (DLS) and 447 individuals from the Dallas Pediatric Liver Study (DPLS). The DLS is a biobank of patients with liver disease of non-viral etiology. Recruitment began in January 2015 and is ongoing. Participants were recruited from liver clinics at UT Southwestern and Parkland Health and Hospital System, Dallas. The biobank was approved by the UT Southwestern Institutional Review Board. Participants provided written informed consent. Participants completed a questionnaire on ethnic/racial background, medical history, lifestyle factors, and family history of liver disease and other diseases. Additional clinical information was extracted from medical records by a trained technician. We included all African American, European American, and Hispanic American patients with DNA available at the time of the present study (n=517) with controls from the Dallas Heart Study. The DPLS is a biobank of

Hispanic children recruited from pediatric liver clinics at UT Southwestern and Parkland Health and Hospital System, Dallas, and from an obesity clinic at Children’s Medical Center, Dallas. The biobank was approved by the UT Southwestern Institutional Review Board. The legal guardians of the participants provided written informed consent. Clinical information was extracted from medical records by a trained technician. As more than 95% of the patients were Hispanic Americans, we only included Hispanic American patients and controls in the present study (n=205 patients and 234 controls).

Clinical Measurements and Chronic Liver Disease Definitions in the Discovery Cohort

Clinical laboratory measurements for ALT and AST were extracted from EHRs of participants from the GHS discovery cohort and bariatric surgery cohort. Median ALT and AST values were calculated for all participants with two or more measurements, and were \log_{10} -transformed to normalize the distribution prior to association analyses.

International Classification of Diseases, Ninth Revision (ICD-9) disease diagnosis codes were extracted from EHRs and collapsed into clinical disease categories for non-viral, nonalcoholic (ICD-9 571.40, 571.41, 571.49, 571.5, 571.8, 571.9) or alcoholic (ICD-9 571.0, 571.1, 571.2, 571.3) liver disease case definitions. Additional case definitions based on single diagnosis codes included: alcoholic cirrhosis (ICD-9 571.2), nonalcoholic cirrhosis (ICD-9 571.5), and HCC (ICD-9 155.0). For these case definitions, a common control group without liver disease (“no liver disease”) was defined as participants with no case criteria or single-encounter or problem-list diagnosis code indicating any type of liver disease.

Liver Histopathologic Phenotype Definitions in the Bariatric Surgery Cohort

The GHS bariatric surgery cohort consisted of 2,644 individuals of European descent. Wedge biopsies of the liver were obtained intraoperatively during bariatric surgery from 2,391 of these individuals. The biopsies were consistently obtained 10 cm to the left of falciform ligament prior to any liver retraction or surgery on the stomach. The biopsy was divided into sections, with the primary section delivered to the clinical pathologists for liver histology (fixed in 10% neutral buffered formalin and stained with hematoxylin and eosin for routine histology and Masson’s trichrome for assessment of fibrosis) and remaining sections stored within a research biobank

(frozen in RNAlater and/or liquid nitrogen). Liver histology was conducted by an experienced pathologist and subsequently re-reviewed by a second experienced pathologist using the NASH Clinical Research Network scoring system³ as follows: steatosis grade 0 (<5% parenchymal involvement), 1 (5 to <33 %), 2 (34 to <66 %), and 3 (>67 %); lobular inflammation grade 0 (no foci), grade 1 (mild, <2 foci per 200X field), grade 2 (moderate, 2-4 foci per 200X field), grade 3 (severe, >4 foci per 200X field); fibrosis Stage 0 (none), Stage 1 (perisinusoidal or periportal fibrosis), Stage 2 (perisinusoidal and periportal fibrosis), Stage 3 (bridging fibrosis), and Stage 4 (cirrhosis). These histologic diagnoses were used to defined the following phenotypes: 1) Normal: no evidence of steatosis, NASH, or fibrosis; 2) Simple steatosis: Steatosis (regardless of grade) with no evidence of NASH or fibrosis; 3) NASH: Any presence of lobular inflammation or hepatocyte ballooning (regardless of grade), or any presence of fibrosis (regardless of stage); 4) Fibrosis: Any presence of fibrosis (regardless of stage).

DNA Sample Preparation and Sequencing

In brief, exome capture was performed using NimbleGen probes according to the manufacturer's recommended protocol (Roche NimbleGen). The captured DNA was PCR amplified and quantified by qRT-PCR (Kapa Biosystems). The multiplexed samples were sequenced using 75 bp paired-end sequencing on an Illumina v4 HiSeq 2500 to a coverage depth sufficient to provide greater than 20x haploid read depth of over 85% of targeted bases in 96% of samples (approximately 80x mean haploid read depth of targeted bases). Raw sequence data from each Illumina HiSeq 2500 run were uploaded to the DNAnexus platform⁴ for sequence read alignment and variant identification. In brief, raw sequence data were converted from BCL files to sample-specific FASTQ-files, which were aligned to the human reference build GRCh37.p13 with BWA-mem⁵. Single nucleotide variants (SNV) and insertion/deletion (indel) sequence variants were identified using the Genome Analysis Toolkit⁶.

Exome-wide Association Analysis of Liver Enzymes

We tested 502,219 biallelic variants with missing data rate < 1%, Hardy-Weinberg equilibrium P-value > 1.0×10^{-6} , and minor allele frequency > 0.1% for association with transaminase levels. Log₁₀-transformed median ALT and AST were adjusted for age, age², sex, BMI, and the first four

principal components of ancestry. To account for relatedness among study participants, we also fit a genetic relatedness matrix as a random-effects covariate. Both principal components and the genetic relatedness matrix were constructed from 39,858 non-MHC markers in approximate linkage equilibrium and with minor allele frequency > 0.1%. We used linear mixed models as implemented in the GCTA package⁷ to test for association between trait residuals and single nucleotide variants. All P-values reported in the text correspond to the allelic model.

We attempted to replicate associations in the GHS discovery cohort in three separate European-ancestry cohorts: the GHS bariatric surgery cohort, the Dallas Heart Study, and the Penn Medicine Biobank (described above). ALT and AST measures from the GHS bariatric surgery cohort and from Penn Medicine Biobank were \log_{10} -transformed and adjusted for age, age², sex, BMI, and the first four principal components of ancestry. Genetic relatedness matrices were included as random-effects covariates, and analysis was performed using linear mixed models in GCTA. In the Dallas Heart study, \log_{10} -transformed ALT and AST measures were adjusted for age, age², sex, BMI, and the first ten principal components of ancestry, and analysis was performed using linear regression implemented in PLINK. Summary statistics for the three replication cohorts were meta-analyzed using METAL⁸ (replication meta-analysis). Summary statistics for the discovery cohort and the three replication cohorts were meta-analyzed similarly (joint meta-analysis).

Association Analysis with Chronic Liver Disease Phenotypes

We analyzed thirteen significant and replicated single nucleotide variants from the liver enzyme ExWAS for associations with chronic liver disease phenotypes defined from the GHS discovery cohort, as described above. We used a Bonferroni significance threshold of $P < 0.05/26$ ($P < 1.92 \times 10^{-3}$) to account for the thirteen variants and two broad chronic liver disease categories (alcoholic and nonalcoholic) tested. The *HSD17B13* rs72613567 variant was further tested for association with histopathologically defined liver phenotypes from the GHS bariatric surgery cohort, as described above. Odds ratios were estimated with the use of Firth's penalized likelihood method of logistic regression after adjustment for age, age², sex, BMI, and the first four principal components of ancestry. Genotypic odds ratios were estimated for *HSD17B13* rs72613567 using the same covariates.

Odds ratios for liver disease in the DLS were estimated by logistic regression, adjusted for age, age², sex, body mass index, and self-reported ethnicity. Participants from the Dallas Heart Study with available rs72613567 genotypes were used as normal controls (n=4,279). Odds ratios in the DPLS were estimated by logistic regression.

Analysis of Genetic Interaction between *PNPLA3* rs738409 (p.I148M) and *HSD17B13* rs72613567

To evaluate the combined effect of *PNPLA3* rs738409 and *HSD17B13* rs72613567 we conducted association analyses for quantitative (ALT and AST) and binary (nonalcoholic liver disease and alcoholic liver disease) traits using linear and logistic regression, respectively, modeling main effects for both genetic variants as well as an interaction term, assuming an additive genetic model. All models were adjusted for age, age², sex, BMI, and the first four principal components of ancestry. Statistical analyses were performed using the glm function in base R.

Phenome-Wide Association Study of *HSD17B13* rs72613567

We performed a phenome-wide study of associations of *HSD17B13* rs72613567 with 405 quantitative EHR-derived anthropometric, vital sign, laboratory, electrocardiographic, echocardiographic, and bone densitometry measurements, and also with 3,168 EHR-derived clinical diagnoses. Median laboratory values for individuals with serial outpatient measures were calculated following removal of likely spurious values that were > 3 standard deviations from the intra-individual median value; maximum and minimum values were also calculated. We then calculated trait residuals for all laboratory traits after adjustment for age, age², sex, and the first four principal components of ancestry, and applied appropriate transformations prior to association analysis. ICD-9 based diagnosis codes were collapsed to hierarchical clinical disease groups and corresponding controls using a modified version of the groupings proposed by Denny et al^{9,10}. ICD-9 based diagnoses required one or more of the following: a problem list entry of the diagnosis code or an encounter diagnosis code entered for two separate clinical encounters on separate calendar days.

Analyses of association with transformed quantitative clinical measurement residuals were performed using linear regression, and analyses of association with clinical diagnoses

were performed using logistic regression adjusted for age, age², sex, and the first four principal components. Alleles were coded using both additive (0 for reference allele homozygotes, 1 for heterozygotes, and 2 for alternative allele homozygotes) and recessive (0 for reference allele homozygotes and heterozygotes, 1 for alternative allele homozygotes) models.

Software

Genetic association analyses were performed using GCTA software, version 1.25.0⁷ and PLINK, version 1.9.0. Quantile-quantile and Manhattan plots were generated using R software, version 3.2.1 (R Project for Statistical Computing). Regional association plots were generated using LocusZoom¹¹.

RNA Sequencing Studies

RNA sequencing studies were performed in histologically normal liver samples from 22 T/T homozygous, 30 T/TA heterozygous, and 17 TA/TA homozygous carriers of the HSD17B13 rs72613567 splice variant. RNA quality and concentration was evaluated by running total RNA on an Agilent RNA Nano Bioanalyzer chip; all samples had an RNA integrity number (RIN) greater than 8. Polyadenylated RNA transcripts were isolated using two rounds of enrichment with oligo(dT)25 beads (Thermo Fisher Scientific). Samples were purified and concentrated with RNAClean XP beads (Beckman Coulter) and heat-fragmented to approximately 140 base pairs. First-strand synthesis was completed with SuperScript III reverse transcriptase (Thermo Fisher Scientific) using random hexamers; dTTP was replaced with dUTP during second-strand synthesis. Samples were processed according to our standard DNA library preparation method referenced above for exomes with the addition of a uracil DNA-glycosylase step to generate strand-specific sequencing libraries.

Identification and Validation of Novel *HSD17B13* Transcripts

Reads were mapped to the Human.B38 using ArrayStudio[®] software (OmicSoft[®], Cary, NC) allowing two mismatches. Two approaches were employed to identify novel *HSD17B13* transcripts. Novel exon junctions were discovered based on Gencode v24 using ArrayStudio. *De novo* transcript assembly was run using Trinity (v2.2.0) in default setting. Custom gene models

were built to incorporate novel transcripts of *HSD17B13*, and transcript quantification was estimated by read alignment to the custom gene model. Protein sequence alignment of all identified *HSD17B13* isoforms is shown in **Figure S8**. RT-PCR was performed on total RNA from human liver samples was performed using the SuperScript™ One-Step RT-PCR System with Platinum™ Taq DNA Polymerase (Thermofisher). Each 50 µL RT-PCR reaction contained 1X Reaction Mix, 500 nM each forward and reverse primers (PST516: ATGAACATCATCCTAGAAATCCTTC and PST517: ATCATGCATACATCTCTGGCTGGAG), 1 µL of RT/Platinum Taq, and 75 ng RNA. Cycling conditions were: one cycle of 45°C for 30 min; one cycle of 94°C for 2 min; 40 cycles of 94°C for 20 s, 53°C for 30 s, and 72°C for 90 s; one cycle of 72°C for 5 min; then a 10°C hold. Products were purified using the QIAquick PCR Purification Kit (Qiagen) and submitted for direct Sanger sequencing using the primer DE002 (ATCAGAACTTC AGGCCTTGG). To identify the B and C transcripts, the RT-PCR products were run out on a 2% agarose gel stained with SYBR GoldSYBR® Gold Nucleic Acid Gel Stain (Thermofisher), and bands of the expected molecular weight were excised and purified using the QIAquick Gel Extraction Kit (Qiagen), then subjected to cloning with the TOPO® TA Cloning Kit (Thermofisher). Sequencing of the TOPO clones was performed using M13F and M13R sequencing primers. Sequence analysis was performed using the Sequencher DNA analysis software (Gene Codes Corporation).

Full-length *HSD17B13* transcripts were amplified directly from 50ng of total RNA with the SuperScript III One-step RT-PCR System with Platinum Taq High Fidelity (Thermo Fisher Scientific) using gene-specific primers in the first (GCAAAGCCATGAACATCATCC) and last exons (TCTTGATGTAGTGGGAGTCGGATT) to generate an amplicon of ~2.2 kb (maximum predicted size transcript). Amplicons were verified on an Agilent Bioanalyzer. PacBio-compatible barcoded adapters were ligated to the amplicons and cleaned with PacBio PB beads (Pacific Biosciences). Libraries were pooled in equal amounts and sequenced on one SMRT cell for 180 min on the PacBio RSII platform. The data was demultiplexed using PacBio software smrtanalysis v2.3 tool labelmw and then analyzed with ConsensusTools AmpliconAnalysis. Resulting amplicons were compared to *HSD17B13* RefSeq genes to determine isoform and genotype status.

Subcellular Localization of HSD17B13 Isoforms

HepG2 cells were cultured in Eagle's Minimum Essential Medium supplemented with 10% fetal bovine serum. *HSD17B13* transcripts A and D were sub-cloned into Myc-DDK backbone lentivirus constructs, and lentivirus were generated. HepG2 cells were infected with lentivirus carrying the *HSD17B13* transcripts. Stable cell lines expressing each *HSD17B13* transcript were selected with 1-3 mg/ml Geneticin G-418 sulfate in complete culture medium for two weeks. Following fixation, HSD17B13 isoforms were detected with mouse anti-Myc antibody. Lipid droplets were labeled with BODIPY FL dye (Sigma). Secondary antibodies for immunofluorescence were Alexa Fluor 488 donkey anti-rabbit IgG and Alexa Fluor 594 donkey anti-mouse IgG (Jackson ImmunoResearch).

Quantification of HSD17B13 Protein Expression in Human Liver Biopsy Tissue and Stable Cell Lines

Human liver and cell pellet samples were homogenized in ice-cold 1x RIPA lysis buffer (EMD Millipore) in the presence of protease and phosphatase inhibitor mixtures (Thermo-Fisher). Supernatant was collected and used for protein concentration using BCA protein assay (Thermo-Fisher). Human tissue and cell lysates were loaded and separated on SDS/PAGE gels (Bio-Rad) and transferred to PVDF membranes (Bio-Rad). The membranes were blocked for 1 h with 5% (wt/vol) milk in 1x TBS supplemented with 0.1% Tween20 (Bio-Rad). Membranes were incubated with antibody at 4 °C overnight against HSD17B13 (1:200, Thermo-Fisher) and B-Actin (1:500, Cell Signaling Technology). Bound antibody was detected using HRP-conjugated anti-rabbit antibody (1:10,000, Jackson ImmunoResearch) and enhanced using chemiluminescence reagent (Thermo-Fisher). Band intensities were quantified using Image J software.

Real-Time Semi-Quantitative PCR

RNA was extracted from cell using TRIzol® (Invitrogen, Carlsbad, CA). First-strand cDNA was synthesized using Superscript III RT (Invitrogen) and utilized for Semi-Quantitative PCR based on intron-spanning primers. A QuantStudio 6 Flex Real-Time PCR System was used to measure the

expression level of transcripts. Primers of *HSD17B13* and *TBP* were ordered from IDT (Integrated DNA Technologies). Relative gene expression was analyzed with the $\Delta\Delta\text{Ct}$ method, providing a fold-change of expression normalized to the house-keeping gene *TBP* (ΔCt).

Lipid Droplet Isolation and Characterization by Western Blotting

Lipid droplets were prepared from HepG2 cells stably expressing HSD17B13 transcript A (IsoA) or transcript D (IsoD) as previously reported^{12,13}. In brief, HepG2 cells stably expressing HSD17B13 IsoA, IsoD, or the parental line were incubated overnight with 1 mM oleic acid. Following lipid loading, cells were scraped and resuspended in hypotonic lysis buffer (20 mM Tris, pH 7.5, 1 mM EDTA) supplemented with 1X HaltTM protease/phosphatase inhibitors (Thermo) and lysed by cavitation at 50 bar for 8 min. Lysates were spun at 1000g/4°C for 10 min, and the post-nuclear supernatant (PNS) was mixed with sucrose to a final volume of 2 mL and concentration of 20% in ultracentrifuge tubes. Then 1.5 mL of 5% sucrose and another 1.5 mL of hypotonic lysis buffer was layered on top of the lysate. Tubes were spun at 182,000g/4°C for 40 min, and the lipid droplet (LD) layers were transferred to new tubes. The remaining volume in the tube was aspirated, and the pelleted (total membrane, TM) was resuspended in 0.5 mL hypotonic lysis buffer. The PNS, LD, and TM fractions were mixed with 1x radioimmunoprecipitation (RIPA) buffer (EMD) + NuPAGETTM LDS Sample Buffer (Thermo) and β -mercaptoethanol and sonicated for 3 hrs at 37°C. The TM lysate was diluted 2.5-fold to normalize to the PNS. Lysates were run on 4-20% SDS-PAGE gels (Biorad), transferred using the Trans-Blot (Biorad) onto low fluorescence PVDF membranes, and blocked for 1 hr in Odyssey TBS Blocking Buffer. Membranes were incubated overnight with the following antibodies: α -HSD17B13 (Abgent, cat # AP5729a 1:500); LD marker: α -ADRP (Proteintech, 152-94-1-AP, 1:2500); LD marker: α -TIP47 (Proteintech, 10694 1:2000); lysosome marker: α -LAMP1 (Novus, NBP2-25183, 1:1000); cytosolic marker: α -GAPDH (Proteintech, 60004-1-Ig, 1:2000); endoplasmic reticulum marker: α -calreticulin (Abcam, ab92516, 1:1000); mitochondrial marker: α -COX IV (Abcam, ab33985, 1:500); cytoskeleton marker: α -actin (Sigma, A5441, 1:4000). The next day membranes were washed 4 times with Tris-buffered saline + 0.1% Tween, then incubated for 1 hr at room temperature with blocking buffer containing IRDye[®] α -rabbit

(800CW) and α -mouse (680RD) secondary antibodies (Li-Cor) at 1:5,000 and 1:10,000 dilutions, respectively. Gels were washed again with TBST and imaged using the Odyssey.

Quantification of Intracellular Triglyceride Content

The triglyceride (TG) content from the stable cells was determined using a TG quantification kit (Abcam). In the assay, TG are converted to free fatty acids and glycerol. The glycerol is then oxidized to generate a product which is quantified (spectrophotometry at $\lambda = 570$ nm).

Substrate Screening of Steroid and Bioactive Lipid Libraries Against Purified Recombinant HSD17B13

Reactions were performed in a final volume of 40 μ l of assay buffer (0.2 M Tris-HCl, pH 7.5) which contained 500 μ M NAD⁺, 5 μ M bioactive lipid or 50 μ M steroid (all in a final concentration of 5% DMSO), and 100 ng recombinant human HSD17B13. Reactions were incubated for 3 hr, at 23°C, after which an equal volume NADH-Glo Detection Reagent (Promega) was added. Following 1 hr incubation at 23°C the relative light units (RLUs) were measured on an Envision Plate Reader (Perkin Elmer). Raw RLU values were normalized as percent of control (50 μ M estradiol) following subtraction of negative control (5% DMSO) using the following formula: Percent of control (POC) = $100 \times (\text{Sample (RLU)} - \text{Negative CTRL}_{\text{average}}) / (\text{Positive CTRL}_{\text{average}} - \text{Negative CTRL}_{\text{average}})$.

***In vitro* and Cellular Characterization of HSD17B13 Enzymatic Activity**

Recombinant human HSD17B13 protein was purified from *E. coli* (Genscript) transformed with plasmid DNA harboring HSD17B13 transcript A or transcript D. The HSD17B13 variants contained a 10xHis tag at the C terminus and were purified from soluble fraction using a Ni²⁺ affinity purification. Enzymatic activity was determined through measurement of NADH production using the NAD(P)H-Glo Detection System (Promega). Reactions were performed for 3 hr at 25 °C in 0.2 M Tris-HCl, pH 7.5, 0.5mM NAD⁺, 75 μ M of substrate (Sigma) and 500 ng purified enzyme in a final volume of 100 μ L. After incubation, 20 μ L of the reaction was combined with 20 μ L luciferase reagent (Promega), incubated at room temperature for 1h and read on an Envision Plate Reader (Perkin Elmer).

HEK293 cells overexpressing HSD17B13 transcript A, transcript D or green fluorescent protein (GFP, control) were used to investigate the activity of HSD17B13 against estradiol in a cell-based assay. Estradiol (1 μ M) was fed to each cell type. After 48 hrs, the media was collected and the concentration of estradiol and its converted product estrone were identified and quantified by LC-MS.

Supplementary Tables**Table S1. Baseline Characteristics of Sequenced European-ancestry Individuals from the Discovery and Replication Cohorts.**

Characteristic	GHS Discovery Cohort (N = 46,544)	GHS Bariatric Surgery Cohort (N = 2,644)	Dallas Heart Study (N = 1,357)	Penn Medicine Biobank (N = 8,526)
Age (years) – median (IQR)	63 (50 - 74)	53 (44 - 61)	46 (38 - 54)	68 (60 - 76)
Female sex – number (%)	26,875 (58)	2,119 (80)	724 (53)	3,242 (38)
Body mass index – median (IQR)	30 (25 - 45)	47 (42 - 54)	28 (25 - 32)	30 (25 - 32)
Transaminase level (U/L) – median (IQR)				
Alanine aminotransferase (ALT)	22.0 (17.0 - 29.0)	23.0 (17.5 - 29.5)	20.0 (15.0 - 27.0)	22.0 (17.0 - 30.0)
Aspartate aminotransferase (AST)	23.0 (20.0 - 27.5)	23.0 (20.0 - 27.0)	21.0 (18.0 - 25.0)	24.0 (20.0 - 30.5)
Presence of liver disease – N (%)				
Alcoholic liver disease	197 (0.4)	7 (0.3)	-	-
Alcoholic cirrhosis	130 (0.3)	3 (0.1)	-	-
Nonalcoholic (non-viral) liver disease	1,938 (4.2)	1,543 (58.4)	-	-
Nonalcoholic cirrhosis	382 (0.8)	24 (0.9)	-	-
Hepatocellular carcinoma	76 (0.2)	1 (0.04)	-	-
No liver disease	30,628 (65.8)	1 (0.04)	-	-

Table S4. Association of Thirteen Exome-Wide Significant and Replicated Single Nucleotide Variants with Liver Disease Phenotypes in the Discovery Cohort.

CHR:BP:Ref:Alt	Gene	rsID	Alcoholic liver disease		Alcoholic cirrhosis		Nonalcoholic liver disease		Nonalcoholic cirrhosis		Hepatocellular carcinoma	
			OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
4:88231392:T:TA	<i>HSD17B13</i>	rs72613567	0.62 (0.48-0.81)	1.82E-04	0.56 (0.41-0.78)	3.35E-04	0.84 (0.78-0.91)	1.31E-05	0.74 (0.62-0.88)	4.48E-04	0.67 (0.45-1.00)	4.66E-02
8:145730161:C:T	<i>GPT</i>	rs201815297	3.83 (1.05-13.94)	8.88E-02	6.33 (1.71-23.43)	2.88E-02	0.23 (0.04-1.14)	1.86E-02	1.25 (0.24-6.38)	7.98E-01	3.66 (0.70-19.01)	2.01E-01
8:145732114:G:C	<i>GPT</i>	rs141505249	0.77 (0.06-10.73)	8.43E-01	1.13 (0.08-15.39)	9.30E-01	1.02 (0.49-2.11)	9.70E-01	0.36 (0.02-5.37)	3.82E-01	1.84 (0.15-23.25)	6.88E-01
8:145732180:G:C	<i>GPT</i>	rs147998249	0.73 (0.05-11.76)	8.17E-01	1.07 (0.07-17.16)	9.60E-01	1.03 (0.49-2.17)	9.30E-01	0.34 (0.02-5.59)	3.67E-01	1.74 (0.11-27.05)	7.21E-01
10:18242311:A:G	<i>SLC39A12</i>	rs10764176	0.85 (0.68-1.07)	1.64E-01	0.92 (0.70-1.22)	5.80E-01	0.92 (0.86 (0.99)	3.43E-02	1.03 (0.88-1.21)	7.15E-01	1.29 (0.93-1.79)	1.37E-01
10:101157378:CGTT:C	<i>GOT1</i>		4.60 (0.25-86.41)	3.93E-01	7.11 (0.38-133.19)	3.00E-01	2.37 (0.61-9.27)	2.50E-01	8.27 (1.44-47.49)	5.92E-02	9.81 (0.52-183.54)	2.43E-01
10:101165533:G:C	<i>GOT1</i>	rs374966349	2.20 (0.13-37.68)	6.24E-01	3.47 (0.20 - 59.04)	4.70E-01	1.63 (0.53-4.96)	4.20E-01	1.17 (0.07-20.09)	9.13E-01	5.37 (0.32-91.12)	3.55E-01
10:101912064:T:C	<i>ERLIN1</i>	rs2862954	0.92 (0.75-1.12)	4.05E-01	1.05 (0.82-1.34)	7.13E-01	0.98 (0.91-1.04)	4.61E-01	1.13 (0.98-1.31)	9.90E-02	0.94 (0.69-1.28)	6.94E-01
14:94844947:C:T	<i>SERPINA1</i>	rs28929474	2.49 (1.49-4.17)	2.30E-03	3.35 (1.93-5.83)	3.01E-04	1.50 (1.21-1.87)	5.29E-04	2.99 (2.11-4.24)	9.08E-08	1.86 (0.74-4.67)	2.40E-01
19:19379549:C:T	<i>TM6SF2</i>	rs58542926	1.47 (1.06-2.04)	2.76E-02	1.35 (0.89-2.04)	1.80E-01	1.36 (1.21-1.52)	2.42E-07	1.64 (1.31-2.05)	6.04E-05	1.93 (1.22-3.04)	1.08E-02
22:44324727:C:G	<i>PNPLA3</i>	rs738409	1.76 (1.43-2.18)	4.98E-07	2.07 (1.60-2.67)	1.08E-07	1.65 (1.54-1.78)	1.31E-41	2.05 (1.76-2.38)	1.70E-19	2.20 (1.60-3.02)	5.59E-06
22:44324730:C:T	<i>PNPLA3</i>	rs738408	1.77 (1.43-2.18)	4.70E-07	2.07 (1.61-2.67)	1.03E-07	1.65 (1.54-1.78)	1.42E-41	2.05 (1.77-2.38)	1.45E-19	2.20 (1.60-3.03)	5.41E-06
22:44368122:A:G	<i>SAMM50</i>	rs3761472	1.90 (1.52-2.38)	1.36E-07	2.28 (1.75-2.98)	1.83E-08	1.52 (1.41-1.65)	7.33E-24	1.86 (1.58-2.19)	1.81E-12	1.66 (1.16-2.39)	1.05E-02

Gray shading indicates P-values meeting the Bonferroni significance threshold of $P < 1.92 \times 10^{-3}$

Table S5. Baseline Characteristics of Genotyped Multi-Ethnic Cases and Controls from the Dallas Liver and Pediatric Liver Studies.

Characteristic	Dallas Liver Study Cases (N = 517)	Dallas Liver Study Controls (N = 4,279)	Dallas Pediatric Liver Study Cases (N = 205)	Dallas Pediatric Liver Study Controls (N = 234)
Age (years) – median (IQR)	55 (48 - 60)	44 (36 - 53)	12 (10 - 15)	12 (11 - 14)
Female sex – number (%)	277 (54)	2,494 (58)	63 (31)	118 (50)
Body mass index – median (IQR)	30 (27 - 35)	30 (26 - 35)	30 (27 - 34)	31 (28 - 35)
Self-reported ethnicity				
African American	33 (6)	2,291 (54)	-	-
European American	158 (31)	1,266 (30)	-	-
Hispanic American	326 (63)	722 (17)	205 (100)	234 (100)
Presence of liver disease – N (%)				
Alcoholic liver disease	223 (43)	-	-	-
Alcoholic cirrhosis	215 (42)	-	-	-
Nonalcoholic (non-viral) liver disease	212 (20)	-	-	-
Nonalcoholic cirrhosis	100 (19)	-	-	-
Hepatocellular carcinoma	44 (9)	-	-	-
No liver disease	-	4,279 (100)	-	234 (100)

Table S6. Analysis of Genetic Interaction between *PNPLA3* rs738409 (p.I148M) and *HSD17B13* rs72613567

Phenotype/Subset	N	<i>HSD17B13</i> rs72613567 : <i>PNPLA3</i> rs738409		<i>HSD17B13</i> rs72613567			<i>PNPLA3</i> rs738409			
		[Interaction effect]		[Main effect]			[Main effect]			
log₁₀ (ALT)										
Subset	N	Effect (95% CI)	P	AAF	Effect (95% CI)	P	AAF	Effect (95% CI)	P	
All	43,309	-0.007 (-0.011,-0.002)	1.80E-03	26.36%	-0.006 (-0.009,-0.003)	1.88E-04	23.54%	0.026 (0.022,0.029)	1.97E-50	
Obese	23,051	-0.01 (-0.015,-0.004)	1.01E-03	26.48%	-0.009 (-0.013,-0.005)	6.53E-05	23.57%	0.037 (0.032,0.042)	3.13E-55	
Non-obese	20,258	-0.004 (-0.01,0.002)	1.49E-01	26.22%	-0.002 (-0.007,0.002)	3.53E-01	23.51%	0.013 (0.008,0.018)	1.56E-07	
log₁₀ (AST)										
Subset	N	Effect (95% CI)	P	AAF	Effect (95% CI)	P	AAF	Effect (95% CI)	P	
All	42,662	-0.004 (-0.007,-0.001)	4.53E-03	26.40%	-0.004 (-0.006,-0.002)	4.78E-04	23.47%	0.016 (0.014,0.018)	9.69E-46	
Obese	22,719	-0.006 (-0.01,-0.003)	1.04E-03	26.51%	-0.006 (-0.009,-0.003)	1.42E-04	23.53%	0.023 (0.02,0.027)	7.65E-49	
Non-obese	19,943	-0.001 (-0.005,0.003)	4.97E-01	26.26%	-0.001 (-0.004,0.002)	3.42E-01	23.41%	0.008 (0.005,0.011)	1.56E-06	
Nonalcoholic liver disease										
Subset	N Controls	N Cases	OR (95% CI)	P	AAF	OR (95% CI)	P	AAF	OR (95% CI)	P
All	29,928	1,857	0.919 (0.812,1.039)	1.78E-01	26.43%	0.88 (0.787,0.983)	2.40E-02	23.51%	1.764 (1.606,1.938)	1.76E-32
Obese	14,243	1,445	0.906 (0.786,1.044)	1.74E-01	26.36%	0.894 (0.788,1.012)	7.81E-02	23.65%	1.714 (1.537,1.91)	2.06E-22
Non-obese	15,685	412	0.964 (0.75,1.235)	7.71E-01	26.50%	0.845 (0.662,1.069)	1.67E-01	23.38%	1.887 (1.566,2.269)	1.96E-11
Alcoholic liver disease										
Subset	N Controls	N Cases	OR (95% CI)	P	AAF	OR (95% CI)	P	AAF	OR (95% CI)	P
All	29,928	190	1.112 (0.749,1.637)	5.94E-01	26.57%	0.578 (0.391,0.834)	4.56E-03	22.99%	1.689 (1.298,2.185)	7.80E-05
Obese	14,243	97	1.295 (0.741,2.224)	3.56E-01	26.59%	0.501 (0.283,0.839)	1.22E-02	22.83%	1.533 (1.052,2.201)	2.30E-02
Non-obese	15,685	93	0.956 (0.544,1.65)	8.72E-01	26.55%	0.666 (0.382,1.105)	1.33E-01	23.13%	1.853 (1.275,2.664)	1.00E-03

Table S7. Phenome-Wide Study of Associations of HSD17B13 rs72613567:TA with Quantitative Clinical Measurements

Phenotype	Effect	SE	P	AAF	N			
					Total	T/T	T/TA	TA/TA
Alanine Aminotransferase median:Adjusted(Residual Log)	-0.009	0.001	1.74E-12	0.264	44038	23868	17115	3055
Aspartate Aminotransferase median:Adjusted(Residual Log)	-0.006	0.001	2.75E-11	0.264	43370	23493	16851	3026
Alanine Aminotransferase max:Adjusted(Residual Log)	-0.013	0.002	1.39E-09	0.264	43905	23797	17065	3043
Aspartate Aminotransferase max:Adjusted(Residual Log)	-0.010	0.002	8.73E-09	0.264	42733	23145	16609	2979
Platelets median:Adjusted(Residual Log)	0.004	0.001	1.44E-08	0.264	46182	25020	17944	3218
Alanine Aminotransferase min:Adjusted(Residual Log)	-0.008	0.002	2.47E-07	0.264	44029	23864	17111	3054
Platelets min:Adjusted(Residual)	1.919	0.443	1.47E-05	0.264	46181	25020	17943	3218
Platelets max:Adjusted(Residual Log)	0.004	0.001	3.03E-05	0.264	46165	25014	17936	3215
Aspartate Aminotransferase min:Adjusted(Residual Log)	-0.004	0.001	5.00E-05	0.264	43327	23471	16831	3025
Total Bilirubin max:Adjusted(Residual Log)	-0.005	0.002	1.34E-03	0.264	42538	23072	16512	2954
White Blood Cell Count median:Adjusted(Residual Log)	0.003	0.001	1.38E-03	0.264	46346	25122	18001	3223
White Blood Cell Count min:Adjusted(Residual)	0.043	0.014	2.24E-03	0.264	46308	25100	17986	3222
Absolute Neutrophils median:Adjusted(Residual Log)	0.003	0.001	3.57E-03	0.264	40229	21816	15612	2801
Left Ventricular Mass :Adjusted(Residual Log)	-0.005	0.002	6.52E-03	0.267	12471	6691	4900	880
Triglyceride max:Adjusted(Residual BMI Log)	0.005	0.002	8.88E-03	0.263	37587	20405	14586	2596
Mean Platelet Volume max:Adjusted(Residual Log)	-0.001	0.000	9.33E-03	0.264	46348	25110	18009	3229
Albumin max:Adjusted(Residual)	-0.006	0.002	9.95E-03	0.264	43054	23351	16715	2988
Gamma Glutamyl Transferase median:Adjusted(Residual Log)	-0.028	0.011	1.03E-02	0.251	3425	1943	1247	235
Triglyceride median:Adjusted(Residual BMI Log Rx Corrected)	0.004	0.002	1.04E-02	0.263	37613	20423	14594	2596
Iron max:Adjusted(Residual Log)	-0.005	0.002	1.61E-02	0.261	18030	9857	6938	1235
Iron median:Adjusted(Residual Log)	-0.005	0.002	1.61E-02	0.261	18031	9857	6939	1235
Gamma Glutamyl Transferase max:Adjusted(Residual Log)	-0.028	0.012	1.96E-02	0.251	3425	1943	1247	235
Absolute Monocytes min:Adjusted(Residual)	0.004	0.002	2.02E-02	0.264	40083	21719	15576	2788
Iron min:Adjusted(Residual Log)	-0.007	0.003	2.09E-02	0.261	18031	9857	6939	1235
Hemoglobin max:Adjusted(Residual)	-0.019	0.008	2.23E-02	0.264	46430	25161	18034	3235
Absolute Monocytes median:Adjusted(Residual Log)	0.002	0.001	2.33E-02	0.264	40092	21722	15580	2790
Mean Platelet Volume median:Adjusted(Residual)	-0.019	0.008	2.39E-02	0.264	46356	25113	18014	3229
Gamma Glutamyl Transferase min:Adjusted(Residual Log)	-0.024	0.011	2.57E-02	0.251	3425	1943	1247	235
Cubed End Systolic Volume :Adjusted(Residual Log)	-0.010	0.005	2.61E-02	0.267	11710	6278	4601	831
Mean Corpuscular Hemoglobin Concentration median:Adjusted(Residual)	-0.012	0.006	2.62E-02	0.264	46227	25060	17953	3214
gM min:Adjusted(Residual Log)	-0.024	0.011	2.64E-02	0.263	2726	1491	1038	197
Mean Platelet Volume min:Adjusted(Residual)	-0.022	0.010	2.74E-02	0.264	46356	25113	18014	3229
Prothrombin Time max:Adjusted(Residual)	-0.027	0.012	2.75E-02	0.263	15899	8640	6168	1091
International Normalized Ratio of Prothrombin Time min:Adjusted(Residual)	-0.002	0.001	2.90E-02	0.263	23320	12677	9012	1631
Post-Bronchodilator % of Predicted Forced Expiratory Volume in 1 second :Adjusted(Residual)	0.827	0.380	2.96E-02	0.269	6579	3550	2512	517
Intraventricular Septal End Diastole normalized to Body Surface Area :Adjusted(Residual)	-0.004	0.002	3.03E-02	0.268	11844	6347	4656	841
gM median:Adjusted(Residual Log)	-0.021	0.010	3.61E-02	0.263	2726	1491	1038	197
Triglyceride min:Adjusted(Residual BMI Log)	0.003	0.002	3.62E-02	0.263	37612	20423	14593	2596
Anion Gap max:Adjusted(Residual)	-0.042	0.021	4.19E-02	0.264	45440	24640	17627	3173
% Neutrophils median:Adjusted(Residual)	0.130	0.065	4.50E-02	0.264	40570	22009	15741	2820
Red Blood Cell Count max:Adjusted(Residual)	-0.006	0.003	4.63E-02	0.264	46287	25079	17980	3228
Post-Bronchodilator % of Predicted Forced Vital Capacity :Adjusted(Residual)	0.621	0.314	4.82E-02	0.269	6579	3550	2512	517
Prothrombin Time min:Adjusted(Residual)	-0.020	0.010	5.17E-02	0.264	23084	12529	8937	1618
Intraventricular Septal End Diastole :Adjusted(Residual)	-0.006	0.003	5.98E-02	0.267	12871	6900	5062	909
Total Bilirubin median:Adjusted(Residual Log)	-0.002	0.001	5.99E-02	0.264	42810	23215	16623	2972
Absolute Neutrophils min:Adjusted(Residual)	0.023	0.012	6.17E-02	0.263	40088	21751	15554	2783
Z Score forBMD Hip from most recent DEXA:Adjusted(Residual):Subset(Males)	-0.079	0.042	6.30E-02	0.285	469	236	199	34
Total Vitamin D and Metabolites median:Adjusted(Residual Log)	-0.003	0.002	6.91E-02	0.265	22872	12340	8938	1594
Post-Bronchodilator Forced Expiratory Volume in 1 second :Adjusted(Residual)	0.020	0.011	6.91E-02	0.269	6580	3551	2512	517
Intraventricular Septal End Diastole normalized to Height :Adjusted(Residual)	0.000	0.000	6.98E-02	0.267	12869	6898	5062	909
Absolute Neutrophils max:Adjusted(Residual Log)	0.003	0.002	7.04E-02	0.264	40215	21810	15605	2800
Seruloplasmin max:Adjusted(Residual)	-0.516	0.286	7.11E-02	0.241	1370	796	487	87
Arterial Blood Oxygen min:Adjusted(Residual)	-1.004	0.559	7.23E-02	0.266	2304	1254	875	175
Cubed Ejection Fraction :Adjusted(Residual Squared)	49.030	27.965	7.96E-02	0.267	11690	6268	4593	829
Zinc max:Adjusted(Residual)	0.665	0.379	7.96E-02	0.265	2959	1614	1119	226
Absolute Eosinophils min:Adjusted(Residual Log)	0.005	0.003	8.00E-02	0.264	35514	19235	13836	2443
Absolute Myelocytes median:Adjusted(Residual Log)	0.021	0.012	8.29E-02	0.263	1835	990	725	120
Post-Bronchodilator Forced Vital Capacity :Adjusted(Residual)	0.020	0.012	8.76E-02	0.269	6580	3551	2512	517
Hematocrit max:Adjusted(Residual)	-0.040	0.023	8.78E-02	0.264	46381	25132	18018	3231
Free Testosterone median:Adjusted(Residual Log):Subset(Females)	0.026	0.016	8.98E-02	0.267	1200	642	476	82
QRS complex duration ECG:Adjusted(Residual Log)	-0.001	0.001	9.16E-02	0.264	34789	18866	13493	2430
Mean Corpuscular Hemoglobin Concentration max:Adjusted(Residual)	-0.011	0.006	9.34E-02	0.264	46213	25054	17946	3213

HSD17B13 and liver disease

Total wall thickness (LVPW + IVS):Adjusted(Residual)	-0.009	0.006	9.40E-02	0.267	12815	6868	5043	904
Seruloplasmin median:Adjusted(Residual)	-0.471	0.282	9.43E-02	0.242	1374	798	488	88
Albumin median:Adjusted(Residual)	-0.003	0.002	9.64E-02	0.263	43111	23382	16741	2988
gM max:Adjusted(Residual Log)	-0.016	0.010	1.00E-01	0.263	2720	1487	1036	197
Left ventricular mass (LVM):Adjusted(Residual)	-1.370	0.841	1.03E-01	0.267	12767	6841	5023	903
Free Testosterone median:Adjusted(Residual Log):Subset(Males)	0.027	0.017	1.04E-01	0.262	2411	1291	976	144
Left ventricular mass (LVM) normalized:Adjusted(Residual)	0.000	0.000	1.05E-01	0.267	12762	6841	5018	903
Prolactin min:Adjusted(Residual Log)	0.009	0.006	1.11E-01	0.267	4171	2227	1660	284
Pre-Bronchodilator % of Predicted Forced Vital Capacity :Adjusted(Residual)	0.411	0.260	1.14E-01	0.267	10985	5938	4221	826
T Score forBMD Hip from most recent DEXA:Adjusted(Residual):Subset(Males)	-0.088	0.056	1.18E-01	0.285	599	304	248	47
LDL max:Adjusted(Residual BMI Log)	0.001	0.001	1.19E-01	0.263	37633	20431	14604	2598
Z Score forBMD Spine from most recent DEXA:Adjusted(Residual):Subset(Males)	-0.150	0.096	1.21E-01	0.277	488	249	208	31
Mean Corpuscular Hemoglobin Concentration min:Adjusted(Residual)	-0.014	0.009	1.21E-01	0.264	46117	25002	17909	3206
LDL by Friedewald Equation median:Adjusted(Residual BMI Rx Corrected)	-0.464	0.300	1.22E-01	0.263	37253	20210	14478	2565
Ejection Fraction from most recent echocardiography estimated by Teicholtz formula:Adjusted(Residual)	0.247	0.159	1.22E-01	0.263	23590	12799	9152	1639
C-Peptide max:Adjusted(Residual Log)	-0.025	0.016	1.22E-01	0.274	936	488	383	65
T Score forBMD Spine from most recent DEXA:Adjusted(Residual):Subset(Males)	-0.131	0.085	1.24E-01	0.279	600	309	247	44
Activated Partial Thromboplastin Time median:Adjusted(Residual)	-0.080	0.052	1.27E-01	0.264	17207	9331	6682	1194
Free Testosterone max:Adjusted(Residual Log):Subset(Females)	0.025	0.016	1.28E-01	0.267	1200	642	476	82
Cortisol min:Adjusted(Residual Log)	0.016	0.011	1.33E-01	0.255	2535	1417	945	173
White Blood Cell Count max:Adjusted(Residual)	0.044	0.029	1.34E-01	0.263	44501	24150	17255	3096
C-Peptide median:Adjusted(Residual Log)	-0.024	0.016	1.37E-01	0.273	940	491	384	65
Fibrinogen median:Adjusted(Residual)	10.130	6.820	1.38E-01	0.248	958	540	361	57
Folate median:Adjusted(Residual)	0.088	0.060	1.40E-01	0.266	8083	4363	3141	579
Fibrinogen max:Adjusted(Residual)	10.500	7.141	1.42E-01	0.248	956	539	360	57
Pre-Bronchodilator % of Predicted Forced Expiratory Volume in 1 second :Adjusted(Residual)	0.459	0.313	1.42E-01	0.267	10988	5941	4221	826
Cubed End Diastolic Volume :Adjusted(Residual Log)	-0.004	0.003	1.45E-01	0.267	12836	6880	5056	900
Left Ventricular Posterior Wall End Diastole normalized to Body Surface Area :Adjusted(Residual)	-0.002	0.002	1.47E-01	0.267	11842	6346	4658	838
gG max:Adjusted(Residual Log)	-0.006	0.004	1.48E-01	0.264	3153	1715	1209	229
T Value forBMD Hip from most recent DEXA:Adjusted(Residual):Subset(Males)	-0.011	0.007	1.48E-01	0.286	593	301	245	47
Average Intraocular Pressure value of left and right Intraocular Pressure value :Adjusted(Residual Log)	0.003	0.002	1.48E-01	0.262	8119	4404	3176	539
Free Testosterone min:Adjusted(Residual Log):Subset(Males)	0.026	0.018	1.48E-01	0.262	2411	1291	976	144
Arterial Blood HCO3 median:Adjusted(Residual)	-0.114	0.079	1.48E-01	0.259	2898	1598	1099	201
Left Ventricular Internal Diameter End Diastole :Adjusted(Residual)	-0.014	0.010	1.50E-01	0.267	12921	6926	5087	908
Arterial Blood HCO3 max:Adjusted(Residual)	-0.131	0.091	1.51E-01	0.260	2980	1642	1129	209
Absolute Myelocytes max:Adjusted(Residual Log)	0.024	0.017	1.51E-01	0.262	1827	987	721	119
Lactate Dehydrogenase median:Adjusted(Residual Log)	-0.002	0.002	1.54E-01	0.262	7938	4298	3127	513
Absolute Monocytes max:Adjusted(Residual Log)	0.002	0.001	1.60E-01	0.264	40023	21690	15548	2785
C-Peptide min:Adjusted(Residual Log)	-0.022	0.016	1.61E-01	0.267	643	341	261	41
Ejection Fraction from most recent echocardiography estimated by Cubed formula:Adjusted(Residual)	0.220	0.157	1.61E-01	0.264	23572	12787	9146	1639
Fibrinogen min:Adjusted(Residual)	9.846	7.049	1.63E-01	0.248	958	540	361	57
International Normalized Ratio of Prothrombin Time max:Adjusted(Residual)	-0.002	0.001	1.63E-01	0.262	15570	8462	6055	1053
LDL min:Adjusted(Residual BMI Log)	0.001	0.001	1.63E-01	0.263	37598	20414	14587	2597
Pre-Bronchodilator Forced Vital Capacity :Adjusted(Residual)	0.013	0.010	1.69E-01	0.267	10987	5940	4221	826
International Normalized Ratio of Prothrombin Time median:Adjusted(Residual)	-0.002	0.001	1.70E-01	0.262	16957	9218	6589	1150
Left Ventricular Internal Diameter End Diastole normalized to Height :Adjusted(Residual)	0.000	0.000	1.71E-01	0.267	12918	6923	5087	908
Total Vitamin D and Metabolites min:Adjusted(Residual Log)	-0.003	0.002	1.74E-01	0.265	22872	12340	8938	1594
Arterial Blood pH max:Adjusted(Residual)	-0.002	0.001	1.76E-01	0.262	3146	1723	1195	228
PR interval ECG:Adjusted(Residual)	-0.255	0.189	1.77E-01	0.264	34469	18690	13379	2400
Tricuspid maximum lifetime Pressure Gradient from outpatient echocardiography:Adjusted(Residual Log)	-0.004	0.003	1.80E-01	0.267	7917	4230	3139	548
Pre-Bronchodilator Forced Expiratory Volume in 1 second :Adjusted(Residual)	0.012	0.009	1.82E-01	0.267	10990	5943	4221	826
Seruloplasmin min:Adjusted(Residual)	-0.379	0.284	1.83E-01	0.242	1374	798	488	88
High-Sensitivity C Reactive Protein median:Adjusted(Residual Log)	0.018	0.014	1.89E-01	0.269	3900	2092	1521	287
Parathyroid Hormone max:Adjusted(Residual Log)	-0.005	0.004	1.96E-01	0.263	12114	6571	4707	836
Maximum Intraocular Pressure value of left and right Intraocular Pressure value :Adjusted(Residual Log)	0.003	0.002	1.97E-01	0.262	8119	4404	3176	539
Average RR interval ECG:Adjusted(Residual)	-1.250	0.968	1.97E-01	0.264	34700	18817	13458	2425
Calcium median:Adjusted(Residual)	0.003	0.002	2.02E-01	0.264	46321	25106	17986	3229
Mean Corpuscular Hemoglobin min:Adjusted(Residual)	-0.021	0.017	2.09E-01	0.264	45748	24796	17764	3188
Lactate Dehydrogenase min:Adjusted(Residual Log)	-0.002	0.002	2.10E-01	0.262	7932	4295	3124	513
Total Protein max:Adjusted(Residual)	-0.005	0.004	2.10E-01	0.264	42626	23118	16545	2963
Ventricular Rate ECG:Adjusted(Residual)	0.115	0.092	2.12E-01	0.264	34972	18962	13568	2442
% Reticulocytes median:Adjusted(Residual Log)	-0.007	0.006	2.15E-01	0.263	3009	1633	1168	208
Predicted Forced Expiratory Volume in 1 second to Forced Vital Capacity Ratio :Adjusted(Residual)	-0.019	0.015	2.20E-01	0.267	10990	5943	4221	826
Activated Partial Thromboplastin Time min:Adjusted(Residual)	-0.056	0.047	2.26E-01	0.264	17105	9274	6642	1189
Free Testosterone min:Adjusted(Residual Log):Subset(Females)	0.020	0.016	2.28E-01	0.267	1200	642	476	82
Prothrombin Time median:Adjusted(Residual)	-0.015	0.012	2.28E-01	0.264	17547	9511	6822	1214
% Neutrophils max:Adjusted(Residual)	0.107	0.089	2.32E-01	0.264	40570	22009	15741	2820
Calcidiol max:Adjusted(Residual)	0.341	0.287	2.36E-01	0.260	5833	3225	2181	427
Creatine Kinase min:Adjusted(Residual Log)	-0.004	0.004	2.43E-01	0.262	14789	8067	5708	1014

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bsolute Lymphocytes median:Adjusted(Residual Log)	0.001	0.001	2.43E-01	0.264	40155	21767	15591	2797
.eft Ventricular Internal Diameter End Diastole normalized to Body Surface Area :Adjusted(Residual)	-0.006	0.005	2.45E-01	0.268	11893	6372	4679	842
alcium min:Adjusted(Residual)	0.004	0.004	2.46E-01	0.264	45998	24925	17863	3210
/alue forBMD Hip from most recent DEXA:Adjusted(Residual)	-0.003	0.003	2.49E-01	0.261	5217	2865	1977	375
rogesterone max:Adjusted(Residual Log):Subset(Females)	-0.039	0.034	2.49E-01	0.258	1060	575	424	61
rythrocyte Sedimentation Rate min:Adjusted(Residual Log)	-0.005	0.004	2.59E-01	0.265	22843	12350	8898	1595
olate max:Adjusted(Residual)	0.074	0.066	2.63E-01	0.265	6618	3584	2564	470
otal Carbon Dioxide min:Adjusted(Residual)	0.023	0.021	2.71E-01	0.264	46125	25018	17893	3214
emoglobin median:Adjusted(Residual)	-0.009	0.009	2.72E-01	0.264	46441	25167	18038	3236
% Reticulocytes max:Adjusted(Residual Log)	-0.007	0.007	2.72E-01	0.263	3006	1632	1166	208
hloride max:Adjusted(Residual)	-0.022	0.021	2.76E-01	0.264	46350	25146	17979	3225
bsolute Reticulocytes median:Adjusted(Residual Log)	-0.006	0.006	2.81E-01	0.263	3000	1630	1162	208
lucose median:Adjusted(Residual BMI Log):Subset(No Related Dx)	0.000	0.000	2.85E-01	0.263	23134	12546	8997	1591
alcidiol median:Adjusted(Residual)	0.245	0.230	2.86E-01	0.260	5861	3241	2188	432
/alue forBMD Spine from most recent DEXA:Adjusted(Residual):Subset(Males)	-0.010	0.009	2.91E-01	0.278	598	309	245	44
.eft Ventricular Posterior Wall End Diastole normalized to Height :Adjusted(Residual)	0.000	0.000	2.97E-01	0.267	12859	6890	5064	905
hloride median:Adjusted(Residual)	-0.015	0.015	2.98E-01	0.264	46409	25181	17996	3232
4 min:Adjusted(Residual)	0.003	0.003	3.01E-01	0.261	16705	9124	6448	1133
reatine Kinase MB Isoenzyme max:Adjusted(Residual Log)	-0.010	0.010	3.07E-01	0.259	6592	3620	2524	448
omocysteine min:Adjusted(Residual Log)	0.005	0.004	3.09E-01	0.249	2582	1483	914	185
.eft Atrial dimension :Adjusted(Residual)	-0.010	0.010	3.09E-01	0.267	11765	6322	4612	831
ree T3 min:Adjusted(Residual)	0.010	0.010	3.09E-01	0.265	8212	4420	3238	554
% Eosinophils max:Adjusted(Residual Log)	-0.002	0.002	3.13E-01	0.264	40098	21726	15583	2789
igh-Sensitivity C Reactive Protein min:Adjusted(Residual Log)	0.014	0.014	3.13E-01	0.269	3899	2091	1521	287
.eft Intraocular Pressure value :Adjusted(Residual Log)	0.003	0.003	3.16E-01	0.261	8022	4355	3143	524
Score forBMD Spine from most recent DEXA:Adjusted(Residual):Subset(Females)	0.035	0.036	3.23E-01	0.257	4596	2555	1720	321
.eft Ventricular Posterior Wall End Diastole :Adjusted(Residual)	-0.003	0.003	3.28E-01	0.267	12858	6889	5064	905
olate min:Adjusted(Residual)	0.061	0.062	3.28E-01	0.265	8608	4658	3337	613
rolactin max:Adjusted(Residual Log)	-0.007	0.007	3.29E-01	0.267	4159	2223	1651	285
Arterial Blood Oxygen max:Adjusted(Residual)	-0.523	0.536	3.30E-01	0.270	1688	907	651	130
bsolute Myelocytes min:Adjusted(Residual Log)	0.013	0.013	3.31E-01	0.264	1820	979	722	119
arathyroid Hormone median:Adjusted(Residual Log)	-0.003	0.003	3.36E-01	0.263	12139	6581	4719	839
otal Iron Binding Capacity median:Adjusted(Residual)	-0.651	0.678	3.37E-01	0.262	16491	8999	6340	1152
reatine Kinase max:Adjusted(Residual Log)	-0.005	0.005	3.40E-01	0.262	14695	8012	5674	1009
reatine Kinase median:Adjusted(Residual Log)	-0.003	0.004	3.41E-01	0.262	14789	8067	5708	1014
% Eosinophils median:Adjusted(Residual Log)	-0.002	0.002	3.41E-01	0.264	40107	21731	15586	2790
rain Natriuretic Peptide max:Adjusted(Residual Log)	-0.015	0.016	3.41E-01	0.264	3693	2004	1430	259
/itamin B12 median:Adjusted(Residual Log)	0.002	0.002	3.44E-01	0.265	17069	9229	6632	1208
/itamin B12 min:Adjusted(Residual Log)	0.002	0.003	3.44E-01	0.265	17103	9246	6645	1212
/alue forBMD Spine from most recent DEXA:Adjusted(Residual):Subset(Females)	0.004	0.004	3.49E-01	0.257	4595	2552	1721	322
ollicle Stimulating Hormone min:Adjusted(Residual Log):Subset(Males)	-0.022	0.024	3.54E-01	0.261	664	359	263	42
Cortisol median:Adjusted(Residual Log)	0.007	0.008	3.56E-01	0.254	2570	1440	955	175
ollicle Stimulating Hormone median:Adjusted(Residual Log):Subset(Females)	0.008	0.009	3.58E-01	0.260	5477	3016	2075	386
QT interval ECG:Adjusted(Residual)	-0.251	0.274	3.60E-01	0.264	34920	18929	13557	2434
erritin min:Adjusted(Residual Log)	0.006	0.007	3.64E-01	0.263	16854	9174	6489	1191
hosphate max:Adjusted(Residual Log)	-0.001	0.001	3.64E-01	0.265	13191	7107	5170	914
alcidiol min:Adjusted(Residual)	0.215	0.238	3.65E-01	0.260	5851	3236	2184	431
.eft Cup Disc Ratio from most recent funduscopy:Adjusted(Residual Log)	0.003	0.004	3.67E-01	0.263	9258	5036	3572	650
ed Blood Cell Count median:Adjusted(Residual)	-0.003	0.003	3.67E-01	0.264	46313	25093	17989	3231
gG min:Adjusted(Residual)	-7.979	8.853	3.68E-01	0.265	3154	1713	1212	229
Vitral Valve E Point :Adjusted(Residual Log)	-0.002	0.002	3.68E-01	0.268	12609	6735	4985	889
bsolute Reticulocytes max:Adjusted(Residual Log)	-0.005	0.006	3.71E-01	0.263	3000	1630	1162	208
Axis ECG:Adjusted(Residual)	0.256	0.287	3.73E-01	0.264	34591	18742	13432	2417
rogesterone median:Adjusted(Residual Log):Subset(Females)	-0.028	0.032	3.76E-01	0.258	1060	575	424	61
% Neutrophils min:Adjusted(Residual)	0.074	0.083	3.76E-01	0.264	40313	21875	15631	2807
erritin max:Adjusted(Residual Log)	0.005	0.006	3.78E-01	0.263	16854	9174	6489	1191
reatinine max:Adjusted(Residual Log)	-0.001	0.001	3.82E-01	0.264	45697	24792	17715	3190
lkaline Phosphatase median:Adjusted(Residual Log)	0.001	0.001	3.84E-01	0.263	42962	23327	16656	2979
h thyroid Stimulating Hormone max:Adjusted(Residual Log)	-0.002	0.003	3.88E-01	0.265	40200	21737	15652	2811
ean Corpuscular Hemoglobin max:Adjusted(Residual)	-0.011	0.013	3.88E-01	0.264	45972	24903	17857	3212
DL median:Adjusted(Residual BMI Log Rx Corrected)	0.001	0.001	3.92E-01	0.263	37634	20432	14604	2598
Maximum Cup Disc Ratio:Adjusted(Residual Log)	0.003	0.004	3.94E-01	0.262	9599	5235	3692	672
omocysteine median:Adjusted(Residual Log)	0.004	0.004	3.95E-01	0.249	2582	1483	914	185
rain Natriuretic Peptide median:Adjusted(Residual Log)	-0.013	0.015	3.97E-01	0.264	3693	2004	1430	259
ollicle Stimulating Hormone max:Adjusted(Residual Log):Subset(Males)	-0.018	0.021	4.00E-01	0.261	667	361	264	42
emoglobin A1C median:Adjusted(Residual BMI):Subset(Related Dx)	-0.011	0.014	4.16E-01	0.262	13919	7579	5387	953
ctivated Partial Thromboplastin Time max:Adjusted(Residual Log)	-0.001	0.001	4.21E-01	0.264	15609	8436	6100	1073
otal Iron Binding Capacity max:Adjusted(Residual)	-0.614	0.763	4.21E-01	0.262	16480	8992	6337	1151
bsolute Eosinophils median:Adjusted(Residual Log)	0.002	0.002	4.24E-01	0.264	39617	21473	15390	2754

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Follicle Stimulating Hormone max:Adjusted(Residual Log):Subset(Females)	0.007	0.009	4.27E-01	0.260	5477	3016	2075	386
Glucose min:Adjusted(Residual BMI Log):Subset(No Related Dx)	0.000	0.000	4.32E-01	0.263	23103	12527	8986	1590
Total Protein median:Adjusted(Residual)	-0.002	0.003	4.33E-01	0.264	42715	23161	16586	2968
Mitral Valve A Point :Adjusted(Residual)	-0.260	0.334	4.36E-01	0.270	11613	6165	4614	834
Predicted Forced Vital Capacity :Adjusted(Residual)	0.002	0.003	4.38E-01	0.267	10990	5942	4222	826
Serum Ferritin median:Adjusted(Residual Log)	0.004	0.006	4.39E-01	0.263	16854	9174	6489	1191
Absolute Basophils median:Adjusted(Residual Log)	-0.001	0.002	4.43E-01	0.263	38777	21057	15031	2689
Sodium min:Adjusted(Residual)	0.018	0.023	4.49E-01	0.264	45893	24890	17806	3197
Total Vitamin D and Metabolites max:Adjusted(Residual)	-0.105	0.138	4.49E-01	0.265	22797	12297	8909	1591
Mean Corpuscular Volume max:Adjusted(Residual)	-0.027	0.036	4.55E-01	0.264	46065	24956	17898	3211
C Reactive Protein median:Adjusted(Residual Log)	0.008	0.010	4.59E-01	0.271	6731	3588	2632	511
Urea Nitrogen median:Adjusted(Residual Log)	-0.021	0.028	4.61E-01	0.260	1445	790	560	95
Arterial Blood Oxygen median:Adjusted(Residual)	-0.394	0.534	4.61E-01	0.271	1853	996	710	147
Mean Corpuscular Hemoglobin median:Adjusted(Residual)	-0.008	0.012	4.62E-01	0.264	46101	24978	17908	3215
Creatine Kinase MB Isoenzyme min:Adjusted(Residual Log)	0.005	0.006	4.63E-01	0.259	6676	3669	2557	450
Magnesium min:Adjusted(Residual)	0.004	0.006	4.63E-01	0.263	7566	4091	2963	512
Arterial Blood HCO3 min:Adjusted(Residual)	-0.078	0.107	4.64E-01	0.260	2994	1649	1135	210
Alkaline Phosphatase min:Adjusted(Residual)	0.104	0.142	4.66E-01	0.263	42847	23259	16614	2974
Calcium max:Adjusted(Residual)	0.002	0.003	4.66E-01	0.264	46188	25026	17941	3221
Aortic Root Diameter End Diastole :Adjusted(Residual)	0.004	0.005	4.67E-01	0.267	12766	6840	5035	891
Average Cup Disc Ratio:Adjusted(Residual Log)	0.003	0.003	4.67E-01	0.262	9599	5235	3692	672
Magnesium median:Adjusted(Residual)	0.003	0.005	4.67E-01	0.263	7570	4094	2964	512
Diastolic Blood Pressure max:Adjusted(Residual)	0.052	0.072	4.68E-01	0.264	48921	26499	19006	3416
Urea Nitrogen median:Adjusted(Residual Log)	-0.003	0.004	4.70E-01	0.265	3172	1722	1220	230
Glucose max:Adjusted(Residual BMI Log):Subset(No Related Dx)	0.000	0.001	4.71E-01	0.263	23147	12552	9003	1592
Human Chorionic Gonadotropin min:Adjusted(Residual Log):Subset(Females)	-0.009	0.013	4.72E-01	0.267	3170	1711	1225	234
Urea Nitrogen min:Adjusted(Residual)	0.019	0.026	4.75E-01	0.264	46120	25017	17887	3216
D-Dimer max:Adjusted(Residual Log)	-0.008	0.011	4.76E-01	0.264	2856	1556	1093	207
Urea Nitrogen min:Adjusted(Residual)	-0.831	1.166	4.76E-01	0.257	1872	1020	740	112
Systolic Blood Pressure min:Adjusted(Residual)	-0.053	0.076	4.83E-01	0.264	48912	26485	19010	3417
Absolute Reticulocytes min:Adjusted(Residual Log)	-0.004	0.006	4.88E-01	0.263	2980	1619	1155	206
Gamma Globulin median:Adjusted(Residual Log)	0.001	0.001	4.88E-01	0.261	16713	9130	6450	1133
Estradiol median:Adjusted(Residual Log):Subset(Females)	0.014	0.020	4.89E-01	0.250	1336	748	507	81
Total Bilirubin min:Adjusted(Residual Log)	-0.001	0.002	4.90E-01	0.264	42789	23204	16615	2970
Post-Bronchodilator Forced Expiratory Volume in 1 second to Forced Vital Capacity Ratio:Adjusted(Residual)	0.149	0.216	4.91E-01	0.269	6561	3541	2505	515
Total Cholesterol min:Adjusted(Residual BMI)	0.188	0.273	4.91E-01	0.263	37521	20359	14564	2598
Aldosterone median:Adjusted(Residual Log)	0.020	0.029	4.94E-01	0.251	980	539	390	51
Total Cholesterol max:Adjusted(Residual BMI)	0.257	0.378	4.96E-01	0.263	37425	20302	14529	2594
Zinc median:Adjusted(Residual)	0.213	0.314	4.98E-01	0.265	3202	1750	1208	244
Follicle Stimulating Hormone median:Adjusted(Residual Log):Subset(Males)	-0.014	0.021	5.06E-01	0.261	667	361	264	42
Follicle Stimulating Hormone median:Adjusted(Residual Log)	0.005	0.008	5.10E-01	0.260	6144	3377	2339	428
Total Iron Binding Capacity min:Adjusted(Residual)	-0.489	0.745	5.12E-01	0.262	16491	8999	6340	1152
Parathyroid Hormone min:Adjusted(Residual Log)	-0.002	0.003	5.15E-01	0.263	12130	6579	4712	839
Albumin min:Adjusted(Residual Log)	0.000	0.001	5.16E-01	0.264	48879	26473	18994	3412
Urea Nitrogen min:Adjusted(Residual Log)	-0.018	0.028	5.17E-01	0.260	1445	790	560	95
Aldosterone max:Adjusted(Residual Log)	0.019	0.030	5.19E-01	0.251	980	539	390	51
Immunoglobulin A min:Adjusted(Residual Log)	-0.004	0.006	5.25E-01	0.260	4975	2713	1941	321
Prostate Specific Antigen min:Adjusted(Residual Log):Subset(Males)	0.005	0.007	5.35E-01	0.262	13449	7321	5219	909
Homocysteine max:Adjusted(Residual Log)	0.003	0.005	5.35E-01	0.249	2582	1483	914	185
Right Intraocular Pressure value :Adjusted(Residual Log)	0.002	0.003	5.40E-01	0.260	8020	4375	3125	520
C Reactive Protein min:Adjusted(Residual Log)	0.006	0.010	5.41E-01	0.271	6728	3586	2631	511
Diastolic Blood Pressure median:Adjusted(Residual Rx Corrected)	0.036	0.060	5.45E-01	0.264	48022	26026	18651	3345
% Reticulocytes min:Adjusted(Residual Log)	-0.004	0.006	5.48E-01	0.263	3005	1631	1167	207
Alpha 1 Antitrypsin median:Adjusted(Residual)	-0.712	1.188	5.49E-01	0.237	1360	801	474	85
% Eosinophils min:Adjusted(Residual)	-0.006	0.011	5.54E-01	0.264	40028	21683	15561	2784
High-Sensitivity C Reactive Protein max:Adjusted(Residual Log)	0.009	0.015	5.57E-01	0.269	3900	2092	1521	287
% Lymphocytes min:Adjusted(Residual)	-0.043	0.075	5.65E-01	0.264	40426	21931	15682	2813
Total Cholesterol median:Adjusted(Residual BMI Rx Corrected)	0.186	0.324	5.67E-01	0.263	37521	20359	14564	2598
Urea Nitrogen max:Adjusted(Residual)	0.191	0.334	5.67E-01	0.257	1922	1056	746	120
Anion Gap median:Adjusted(Residual)	0.007	0.012	5.68E-01	0.264	45488	24659	17656	3173
Follicle Stimulating Hormone max:Adjusted(Residual Log)	0.005	0.009	5.72E-01	0.260	6144	3377	2339	428
Sodium median:Adjusted(Residual)	-0.007	0.012	5.74E-01	0.264	46221	25072	17930	3219
Glucose Mean Value estimated from Hemoglobin A1C median:Adjusted(Residual Log)	-0.001	0.001	5.76E-01	0.265	22830	12357	8855	1618
Post-Bronchodilator % of Predicted Forced Expiratory Volume in 1 second to Forced Vital Capacity Ratio:Adjusted(Residual)	0.155	0.280	5.80E-01	0.270	6537	3527	2495	515
Albumin max:Adjusted(Residual Log)	0.000	0.001	5.83E-01	0.264	48879	26472	18995	3412
Absolute Eosinophils max:Adjusted(Residual Log)	0.001	0.002	5.85E-01	0.264	39602	21468	15382	2752
Arterial Blood pH median:Adjusted(Residual)	-0.001	0.001	5.88E-01	0.262	3147	1724	1195	228
Arterial Blood CO2 min:Adjusted(Residual)	-0.103	0.191	5.91E-01	0.262	3127	1715	1185	227
Brain Natriuretic Peptide min:Adjusted(Residual Log)	-0.008	0.015	5.92E-01	0.264	3693	2004	1430	259

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sodium max:Adjusted(Residual)	-0.009	0.018	5.93E-01	0.264	46188	25051	17921	3216
Glucose Mean Value estimated from Hemoglobin A1C max:Adjusted(Residual Log)	-0.001	0.001	5.95E-01	0.265	22830	12357	8855	1618
γolactin median:Adjusted(Residual Log)	0.003	0.006	5.96E-01	0.267	4186	2237	1664	285
γalue forBMD Hip from most recent DEXA:Adjusted(Residual):Subset(Females)	-0.002	0.003	6.01E-01	0.258	4623	2564	1731	328
γemoglobin min:Adjusted(Residual)	-0.008	0.015	6.07E-01	0.264	46441	25167	18038	3236
γnion Gap min:Adjusted(Residual)	0.008	0.017	6.18E-01	0.264	45166	24496	17523	3147
γrterial Blood CO2 median:Adjusted(Residual)	-0.083	0.168	6.20E-01	0.262	3127	1715	1185	227
γnsulin median:Adjusted(Residual BMI Log):Subset(No Related Dx)	-0.004	0.008	6.20E-01	0.268	2569	1377	1005	187
γematocrit median:Adjusted(Residual)	-0.011	0.023	6.24E-01	0.264	46397	25143	18023	3231
γ Axis ECG:Adjusted(Residual)	0.162	0.331	6.24E-01	0.264	34852	18900	13519	2433
γbsolute Lymphocytes max:Adjusted(Residual)	0.003	0.006	6.25E-01	0.264	39727	21555	15400	2772
γreatinine median:Adjusted(Residual)	-0.001	0.001	6.30E-01	0.264	45692	24794	17703	3195
γree T3 max:Adjusted(Residual Log)	-0.001	0.002	6.34E-01	0.265	7937	4264	3135	538
γeum Lipase median:Adjusted(Residual Log)	0.002	0.003	6.37E-01	0.262	10411	5664	4033	714
γotassium max:Adjusted(Residual)	0.002	0.003	6.40E-01	0.264	46181	25049	17916	3216
γollicle Stimulating Hormone min:Adjusted(Residual Log)	-0.004	0.009	6.46E-01	0.260	6144	3377	2339	428
γed Cell Distribution Width max:Adjusted(Residual Log)	0.000	0.000	6.48E-01	0.264	45286	24552	17574	3160
γortic maximum lifetime Pressure Gradient from outpatient echocardiography:Adjusted(Residual Log)	-0.002	0.004	6.52E-01	0.268	12869	6885	5073	911
γDL by Friedewald Equation min:Adjusted(Residual BMI)	-0.105	0.235	6.57E-01	0.263	37281	20228	14486	2567
γlpha 1 Antitrypsin min:Adjusted(Residual)	-0.529	1.201	6.60E-01	0.237	1360	801	474	85
γhosphate median:Adjusted(Residual Log)	0.000	0.001	6.64E-01	0.265	13277	7149	5208	920
γrea median:Adjusted(Residual Log)	0.000	0.001	6.69E-01	0.264	46490	25212	18036	3242
γbsolute Lymphocytes min:Adjusted(Residual)	0.002	0.005	6.70E-01	0.264	40143	21763	15583	2797
γemoglobin A1C max:Adjusted(Residual BMI):Subset(Related Dx)	-0.012	0.030	6.80E-01	0.262	13914	7579	5382	953
γh thyroid Stimulating Hormone median:Adjusted(Residual Log)	-0.001	0.002	6.84E-01	0.265	40760	22046	15865	2849
γ Score forBMD Hip from most recent DEXA:Adjusted(Residual)	-0.011	0.026	6.86E-01	0.261	5243	2879	1989	375
γDL by Direct Assay median:Adjusted(Residual BMI Log Rx Corrected)	-0.001	0.003	6.91E-01	0.260	5275	2876	2051	348
γactate Dehydrogenase max:Adjusted(Residual Log)	-0.001	0.002	6.95E-01	0.261	7864	4262	3093	509
γ Lymphocytes median:Adjusted(Residual)	-0.022	0.057	6.96E-01	0.264	40426	21931	15682	2813
γstimated Glomerular Filtration Rate Calculated by CKD-EPI median:Adjusted(Residual)	0.042	0.110	7.00E-01	0.264	46371	25155	17979	3237
γemoglobin A1C min:Adjusted(Residual BMI):Subset(Related Dx)	0.004	0.011	7.02E-01	0.262	13857	7551	5355	951
γed Cell Distribution Width median:Adjusted(Residual Log)	0.000	0.000	7.06E-01	0.264	46053	24952	17891	3210
γrelative wall thickness (IVSd / LVPWd) / LVIdD:Adjusted(Residual)	-0.001	0.002	7.07E-01	0.267	12772	6845	5027	900
γ Score forBMD Spine from most recent DEXA:Adjusted(Residual):Subset(Females)	0.017	0.046	7.08E-01	0.262	3603	1984	1351	268
γematocrit min:Adjusted(Residual)	-0.016	0.042	7.08E-01	0.264	46397	25143	18023	3231
γree Testosterone max:Adjusted(Residual Log):Subset(Males)	0.007	0.018	7.11E-01	0.262	2409	1291	974	144
γlpha 1 Antitrypsin max:Adjusted(Residual)	-0.446	1.208	7.12E-01	0.237	1361	801	475	85
γotassium min:Adjusted(Residual)	0.001	0.003	7.13E-01	0.263	46381	25171	17979	3231
γ Axis ECG:Adjusted(Residual)	0.069	0.188	7.14E-01	0.263	34311	18622	13297	2392
γrate min:Adjusted(Residual Log)	-0.001	0.002	7.20E-01	0.261	11617	6321	4535	761
γitral Valve E/A ratio :Adjusted(Residual Log)	0.001	0.002	7.24E-01	0.271	11505	6101	4576	828
γ Score forBMD Hip from most recent DEXA:Adjusted(Residual):Subset(Females)	0.011	0.032	7.32E-01	0.263	3606	1977	1360	269
γotal Cholesterol to HDL Ratio max:Adjusted(Residual Log)	0.000	0.001	7.36E-01	0.263	38137	20699	14790	2648
γrythrocyte Sedimentation Rate median:Adjusted(Residual Log)	-0.001	0.004	7.38E-01	0.265	22944	12404	8935	1605
γotal Carbon Dioxide max:Adjusted(Residual)	0.007	0.020	7.41E-01	0.264	46126	25011	17899	3216
γight Cup Disc Ratio from most recent funduscopy:Adjusted(Residual Log)	0.001	0.004	7.42E-01	0.263	9200	5015	3534	651
γogesterone min:Adjusted(Residual Log):Subset(Females)	-0.011	0.033	7.47E-01	0.258	1060	575	424	61
γmylase max:Adjusted(Residual Log)	0.001	0.003	7.50E-01	0.263	8988	4880	3484	624
γtradiol min:Adjusted(Residual Log):Subset(Males)	0.001	0.004	7.51E-01	0.282	117	59	50	8
γeum Lipase min:Adjusted(Residual Log)	0.001	0.003	7.55E-01	0.262	10409	5663	4032	714
γDL by Direct Assay max:Adjusted(Residual BMI Log)	-0.001	0.003	7.55E-01	0.260	5275	2876	2051	348
γiastolic Blood Pressure min:Adjusted(Residual)	0.017	0.054	7.56E-01	0.264	48625	26340	18892	3393
γlucose Mean Value estimated from Hemoglobin A1C min:Adjusted(Residual)	0.071	0.231	7.59E-01	0.264	22532	12214	8717	1601
γinc min:Adjusted(Residual)	0.108	0.353	7.59E-01	0.265	3339	1828	1254	257
γldosterone min:Adjusted(Residual Log)	0.009	0.029	7.60E-01	0.251	980	539	390	51
γean Corpuscular Volume min:Adjusted(Residual)	-0.012	0.040	7.63E-01	0.264	45974	24922	17848	3204
γorrected QT interval ECG:Adjusted(Residual)	-0.073	0.249	7.69E-01	0.264	34881	18918	13531	2432
γmmunoglobulin A max:Adjusted(Residual Log)	0.002	0.005	7.72E-01	0.259	4996	2727	1949	320
γDL by Friedewald Equation max:Adjusted(Residual BMI)	-0.091	0.319	7.76E-01	0.263	37253	20214	14472	2567
γlkaline Phosphatase max:Adjusted(Residual Log)	0.000	0.001	7.80E-01	0.263	42704	23183	16563	2958
γ4 median:Adjusted(Residual)	0.090	0.328	7.84E-01	0.257	1922	1056	746	120
γ-Dimer median:Adjusted(Residual Log)	-0.003	0.010	7.85E-01	0.264	2856	1556	1093	207
γree T3 median:Adjusted(Residual)	0.002	0.009	7.85E-01	0.265	8212	4420	3238	554
γlpha Fetoprotein max:Adjusted(Residual Log)	0.004	0.017	7.85E-01	0.228	1212	723	425	64
γholecalciferol min:Adjusted(Residual Log)	-0.002	0.006	7.86E-01	0.260	6028	3339	2247	442
γtradiol max:Adjusted(Residual Log):Subset(Females)	0.007	0.027	7.92E-01	0.250	1336	748	507	81
γortic Valve Area :Adjusted(Residual)	0.003	0.011	7.92E-01	0.269	11221	5982	4441	798
γrterial Blood pH min:Adjusted(Residual)	0.000	0.002	8.03E-01	0.263	3119	1706	1187	226
γhloride min:Adjusted(Residual)	0.007	0.027	8.03E-01	0.264	45928	24924	17799	3205

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Estrodiol min:Adjusted(Residual Log):Subset(Females)	0.005	0.019	8.04E-01	0.250	1297	725	495	77
MI median:Adjusted(Residual Log)	0.000	0.001	8.05E-01	0.264	47893	25928	18634	3331
Total Carbon Dioxide median:Adjusted(Residual)	0.003	0.013	8.07E-01	0.264	46178	25044	17915	3219
rostate Specific Antigen max:Adjusted(Residual Log):Subset(Males)	0.001	0.006	8.10E-01	0.262	13466	7330	5229	907
gE max:Adjusted(Residual Log)	-0.007	0.030	8.11E-01	0.258	1478	810	573	95
Erythrocyte Sedimentation Rate max:Adjusted(Residual Log)	0.001	0.004	8.12E-01	0.265	22943	12404	8934	1605
Albumin min:Adjusted(Residual Squared)	-0.006	0.026	8.18E-01	0.263	43111	23382	16741	2988
Z Score forBMD Spine from most recent DEXA:Adjusted(Residual)	-0.010	0.043	8.24E-01	0.264	4092	2234	1559	299
Cholecalciferol max:Adjusted(Residual Log)	0.001	0.004	8.25E-01	0.260	6028	3339	2247	442
Potassium median:Adjusted(Residual)	0.000	0.002	8.29E-01	0.264	46480	25219	18023	3238
Total Protein min:Adjusted(Residual)	0.001	0.004	8.30E-01	0.264	42606	23095	16547	2964
T Score forBMD Hip from most recent DEXA:Adjusted(Residual):Subset(Females)	0.006	0.028	8.32E-01	0.258	4644	2575	1741	328
Alpha Fetoprotein min:Adjusted(Residual Log)	0.003	0.014	8.33E-01	0.228	1253	746	442	65
Creatinine min:Adjusted(Residual)	0.000	0.001	8.33E-01	0.264	46249	25093	17929	3227
Value forBMD Spine from most recent DEXA:Adjusted(Residual)	0.001	0.004	8.35E-01	0.260	5193	2861	1966	366
Vitamin B12 max:Adjusted(Residual Log)	0.001	0.003	8.36E-01	0.265	16324	8816	6351	1157
Estrodiol max:Adjusted(Residual Log):Subset(Males)	0.001	0.004	8.39E-01	0.282	117	59	50	8
C3 median:Adjusted(Residual)	-0.215	1.072	8.41E-01	0.257	1872	1020	740	112
Follicle Stimulating Hormone min:Adjusted(Residual Log):Subset(Females)	-0.002	0.010	8.43E-01	0.260	5477	3016	2075	386
C Reactive Protein max:Adjusted(Residual Log)	-0.002	0.012	8.46E-01	0.271	6731	3588	2632	511
Total Cholesterol to HDL Ratio min:Adjusted(Residual Log)	0.000	0.001	8.50E-01	0.263	38153	20706	14797	2650
Z Score forBMD Hip from most recent DEXA:Adjusted(Residual)	-0.006	0.030	8.50E-01	0.266	4075	2213	1559	303
Magnesium max:Adjusted(Residual)	0.001	0.005	8.59E-01	0.263	7552	4086	2957	509
Pre-Bronchodilator % of Predicted Forced Expiratory Volume in 1 second to Forced Vital Capacity Ratio:Adjusted(Residual)	0.039	0.220	8.60E-01	0.267	10926	5906	4199	821
Phosphate min:Adjusted(Residual)	0.002	0.009	8.62E-01	0.265	13277	7149	5208	920
Cholecalciferol median:Adjusted(Residual Log)	0.001	0.005	8.65E-01	0.260	6028	3339	2247	442
Uterinizing Hormone median:Adjusted(Residual Log):Subset(Females)	-0.002	0.011	8.65E-01	0.267	3170	1711	1225	234
Amylase min:Adjusted(Residual Log)	-0.001	0.003	8.69E-01	0.264	9064	4919	3510	635
% Monocytes median:Adjusted(Residual)	-0.002	0.015	8.69E-01	0.264	40618	22026	15760	2832
Left Ventricular Outflow Maximum Velocity :Adjusted(Residual)	0.047	0.291	8.72E-01	0.268	12763	6820	5051	892
Urate max:Adjusted(Residual Log)	0.000	0.002	8.75E-01	0.261	11627	6329	4536	762
Predicted Forced Expiratory Volume in 1 second :Adjusted(Residual)	0.000	0.003	8.78E-01	0.267	10990	5942	4222	826
Systolic Blood Pressure median:Adjusted(Residual Rx Corrected)	0.014	0.094	8.79E-01	0.264	48093	26046	18700	3347
Immunoglobulin A median:Adjusted(Residual Log)	0.001	0.006	8.80E-01	0.259	5001	2728	1952	321
Estrodiol median:Adjusted(Residual Log):Subset(Males)	0.001	0.004	8.81E-01	0.282	117	59	50	8
Red Cell Distribution Width min:Adjusted(Residual Log)	0.000	0.000	8.86E-01	0.264	46031	24937	17885	3209
Systolic Blood Pressure max:Adjusted(Residual)	0.020	0.142	8.91E-01	0.264	48945	26509	19020	3416
Leum Lipase max:Adjusted(Residual Log)	0.001	0.004	8.94E-01	0.262	10257	5576	3983	698
Insulin max:Adjusted(Residual BMI Log):Subset(No Related Dx)	-0.001	0.008	9.03E-01	0.268	2569	1377	1005	187
Red Blood Cell Count min:Adjusted(Residual)	-0.001	0.005	9.04E-01	0.264	46313	25093	17989	3231
Total Cholesterol to HDL Ratio median:Adjusted(Residual Log)	0.000	0.001	9.10E-01	0.263	38159	20710	14799	2650
C3 max:Adjusted(Residual)	0.118	1.065	9.12E-01	0.257	1863	1016	736	111
T Score forBMD Spine from most recent DEXA:Adjusted(Residual)	0.004	0.034	9.12E-01	0.260	5196	2864	1967	365
D-Dimer min:Adjusted(Residual Log)	-0.001	0.010	9.13E-01	0.264	2856	1556	1093	207
Amylase median:Adjusted(Residual Log)	0.000	0.003	9.14E-01	0.264	9065	4920	3510	635
T4 max:Adjusted(Residual Log)	0.000	0.001	9.19E-01	0.261	16530	9028	6379	1123
rostate Specific Antigen median:Adjusted(Residual Log):Subset(Males)	0.001	0.005	9.21E-01	0.262	13489	7342	5238	909
Cortisol max:Adjusted(Residual Log)	-0.001	0.008	9.23E-01	0.254	2570	1440	955	175
Body surface area calculation at time of echocardiography:Adjusted(Residual)	0.000	0.003	9.25E-01	0.268	12963	6940	5106	917
% Lymphocytes max:Adjusted(Residual)	-0.007	0.074	9.29E-01	0.263	40243	21839	15600	2804
Pre-Bronchodilator Forced Expiratory Volume in 1 second to Forced Vital Capacity Ratio:Adjusted(Residual)	0.015	0.168	9.31E-01	0.267	10940	5913	4206	821
Urea max:Adjusted(Residual Log)	0.000	0.001	9.34E-01	0.264	46474	25205	18028	3241
Alpha Fetoprotein median:Adjusted(Residual Log)	-0.001	0.014	9.40E-01	0.228	1253	746	442	65
Absolute Basophils min:Adjusted(Residual Log)	0.000	0.003	9.42E-01	0.263	26933	14661	10403	1869
Cubed Stroke Volume :Adjusted(Residual)	0.030	0.489	9.51E-01	0.267	11670	6256	4588	826
Uterinizing Hormone max:Adjusted(Residual Log):Subset(Females)	0.001	0.011	9.56E-01	0.267	3170	1711	1225	234
Thyroid Stimulating Hormone min:Adjusted(Residual Log)	0.000	0.003	9.59E-01	0.265	38400	20744	14953	2703
Urate median:Adjusted(Residual Log)	0.000	0.002	9.62E-01	0.261	11628	6329	4537	762
% Monocytes min:Adjusted(Residual)	0.001	0.020	9.62E-01	0.264	40665	22050	15781	2834
DL by Direct Assay min:Adjusted(Residual BMI Log)	0.000	0.004	9.63E-01	0.260	5265	2872	2045	348
Absolute Basophils max:Adjusted(Residual Log)	0.000	0.002	9.68E-01	0.263	38764	21052	15024	2688
Arterial Blood CO2 max:Adjusted(Residual)	-0.008	0.205	9.69E-01	0.263	3089	1688	1175	226
Mean Corpuscular Volume median:Adjusted(Residual)	0.001	0.030	9.76E-01	0.264	46193	25032	17943	3218
% Monocytes max:Adjusted(Residual Log)	0.000	0.001	9.86E-01	0.264	40649	22038	15777	2834
C4 min:Adjusted(Residual)	-0.003	0.340	9.92E-01	0.256	1913	1051	743	119
Insulin min:Adjusted(Residual BMI Log):Subset(No Related Dx)	0.000	0.009	9.98E-01	0.268	2567	1376	1004	187
Creatine Kinase MB Isoenzyme median:Adjusted(Residual Log)	0.000	0.007	9.99E-01	0.259	6680	3671	2559	450

Gray shading indicates P-values meeting the Bonferroni significance threshold of $P < 1.23E-04$.

Abbreviations: AAF, alternate allele frequency; SE, standard error.

Table S8. Phenome-Wide Study of Associations of HSD17B13 rs72613567:TA with Clinical Diagnoses

Phenotype	OR [95% CI]	P	AAF	N Cases				N Controls			
				Total	T/T	T/TA	TA/TA	Total	T/T	T/TA	TA/TA
Chronic liver disease and cirrhosis	0.88 [0.84-0.93]	9.14E-06	0.263	4031	2331	1449	251	35701	19238	13984	2479
Non-specific abnormal results of function study of liver	0.87 [0.82-0.93]	4.94E-05	0.263	2901	1698	1019	184	23353	12524	9221	1608
Cirrhosis of liver without mention of alcohol	0.78 [0.68-0.88]	1.33E-04	0.265	686	416	239	31	36425	19621	14260	2544
Alcoholic cirrhosis of liver	0.61 [0.47-0.79]	1.76E-04	0.265	198	131	62	5	36490	19651	14287	2552
Other abnormal blood chemistry	0.92 [0.88-0.96]	2.98E-04	0.262	7771	4380	2896	495	20562	11047	8090	1425
Esophageal varices without mention of bleeding	0.66 [0.53-0.83]	3.35E-04	0.265	246	160	77	9	38480	20804	14942	2734
Malignant neoplasm of kidney and other and unspecified urinary organs	0.74 [0.63-0.88]	3.42E-04	0.264	452	284	145	23	45874	24796	17888	3190
Cervical spondylosis without myelopathy	1.15 [1.06-1.24]	4.51E-04	0.266	1666	857	651	158	33442	18088	13010	2344
Non-specific elevation of levels of transaminase or lactic acid dehydrogenase [LDH]	0.81 [0.72-0.92]	6.36E-04	0.265	813	484	287	42	23637	12670	9336	1631
Other chronic nonalcoholic liver disease	0.91 [0.85-0.96]	9.53E-04	0.264	3337	1906	1218	213	35854	19310	14052	2492
Shoulder and upper arm injury	0.51 [0.34-0.76]	1.10E-03	0.264	90	65	22	3	46878	25358	18227	3293
Hemorrhage of rectum and anus	0.89 [0.82-0.96]	1.50E-03	0.265	2004	1141	749	114	31721	17115	12333	2273
Postmenopausal atrophic vaginitis:Subset(Females)	0.89 [0.82-0.96]	2.26E-03	0.264	2116	1225	752	139	15060	8075	5927	1058
Arachnoid neuritis or radiculitis NOS	1.14 [1.05-1.24]	2.32E-03	0.266	1390	703	569	118	33578	18162	13062	2354
Portal hypertension	0.72 [0.58-0.89]	2.46E-03	0.265	257	163	82	12	36477	19644	14282	2551
Malignant neoplasm of kidney	0.77 [0.65-0.91]	2.52E-03	0.264	409	252	136	21	45878	24796	17891	3191
Chromosomal anomalies	1.8 [1.23-2.63]	2.56E-03	0.264	56	20	28	8	43421	23524	16862	3035
Fracture of one or more phalanges of hand	0.76 [0.63-0.91]	2.72E-03	0.265	342	210	117	15	46382	25061	18070	3251
Non-specific findings on examination of blood	0.95 [0.91-0.98]	2.82E-03	0.262	15640	8637	5986	1017	18656	10004	7347	1305
Closed Fracture Of One Or More Phalanges Of Hand	0.74 [0.61-0.9]	2.99E-03	0.265	306	190	102	14	46428	25087	18087	3254
Cellulitis and abscess of unspecified sites	1.11 [1.04-1.19]	3.25E-03	0.264	2138	1101	862	175	38769	21026	15088	2655
Absence of menstruation:Subset(Females)	0.89 [0.82-0.96]	3.36E-03	0.265	2451	1377	918	156	14837	7964	5829	1044
Antepartum hemorrhage abruptio placentae and placenta previa:Subset(Females)	0.74 [0.6-0.91]	3.70E-03	0.264	285	174	100	11	25399	13781	9811	1807
Varicose veins of other sites	0.79 [0.67-0.93]	3.89E-03	0.265	428	260	146	22	38315	20723	14872	2720
Other Malignant Lymphomas	1.25 [1.07-1.46]	4.41E-03	0.264	384	180	171	33	48060	26064	18641	3355
Family history of other condition	0.72 [0.57-0.91]	5.15E-03	0.263	227	137	86	4	29674	16102	11492	2080
Unspecified Disorder Of Eye And Adnexa	1.23 [1.06-1.43]	5.36E-03	0.264	428	211	172	45	29305	15914	11343	2048
Liver abscess and sequelae of chronic liver disease	0.79 [0.67-0.93]	5.78E-03	0.265	407	246	141	20	36444	19632	14265	2547
Hypertension complicating pregnancy childbirth and the puerperium:Subset(Females)	0.8 [0.69-0.94]	6.25E-03	0.264	479	281	176	22	25319	13729	9788	1802
Thrombocytopenia	0.88 [0.8-0.96]	6.55E-03	0.265	1238	710	457	71	35812	19292	13975	2545
Anal Warts	1.1 [1.03-1.18]	8.04E-03	0.265	2110	1089	851	170	41070	22251	15981	2838
Other specified disorders of liver	0.83 [0.73-0.95]	8.10E-03	0.265	605	365	201	39	36120	19448	14143	2529
Diffuse cystic mastopathy:Subset(Females)	1.13 [1.03-1.24]	9.01E-03	0.264	1173	602	470	101	23573	12853	9068	1652
Chalasia and cardiospasm	0.46 [0.26-0.83]	1.03E-02	0.264	46	35	9	2	39393	21333	15320	2740
Candidiasis of mouth	1.13 [1.03-1.23]	1.06E-02	0.265	1181	590	500	91	38195	20678	14847	2670
Fall On Stairs Or Steps	0.76 [0.61-0.94]	1.14E-02	0.264	249	157	78	14	45488	24650	17667	3171
Other Diseases Of Trachea And Bronchus	0.85 [0.74-0.96]	1.16E-02	0.264	655	385	235	35	42859	23177	16697	2985
Unspecified internal derangement of knee	0.87 [0.78-0.97]	1.22E-02	0.263	878	517	307	54	29105	15753	11339	2013
Acute posthemorrhagic anemia	0.91 [0.85-0.98]	1.25E-02	0.266	2138	1201	806	131	34358	18485	13418	2455
Other known or suspected fetal and placental problems affecting management of mother:Subset(Females)	0.86 [0.76-0.97]	1.30E-02	0.264	845	472	335	38	25861	14037	9978	1846
Contact with or exposure to tuberculosis	0.56 [0.35-0.89]	1.31E-02	0.263	66	46	18	2	33808	18338	13129	2341
Hepatitis	0.81 [0.69-0.96]	1.35E-02	0.265	418	250	146	22	36359	19576	14239	2544
Other diseases due to viruses and chlamydiae	1.09 [1.02-1.16]	1.38E-02	0.264	2281	1181	921	179	40874	22149	15901	2824
Purpura and other hemorrhagic conditions	0.91 [0.84-0.98]	1.39E-02	0.265	1744	983	658	103	35499	19119	13854	2526
Other diseases of spinal cord	1.22 [1.04-1.43]	1.40E-02	0.263	366	181	148	37	43565	23675	16865	3025
Abnormality of organs and soft tissues of pelvis:Subset(Females)	0.86 [0.76-0.97]	1.40E-02	0.264	818	467	307	44	25875	14042	9978	1855
Issue of repeat prescriptions	0.83 [0.72-0.96]	1.41E-02	0.264	503	299	176	28	36186	19578	14073	2535
Personal History Of Malignant Neoplasm Of Urinary Organs	0.8 [0.67-0.96]	1.47E-02	0.263	357	210	132	15	29650	16087	11493	2070
Other and unspecified coagulation defects	0.84 [0.74-0.97]	1.57E-02	0.266	575	341	198	36	35894	19336	14002	2556
Salivary glanditis	0.81 [0.68-0.96]	1.61E-02	0.265	369	217	138	14	42023	22722	16331	2970
Other myelopathy	1.29 [1.05-1.58]	1.66E-02	0.263	211	101	87	23	43693	23745	16919	3029
Internal derangement of knee	0.9 [0.83-0.98]	1.71E-02	0.263	1559	900	559	100	28693	15537	11171	1985
Vertebral osteoarthritis	0.64 [0.44-0.92]	1.71E-02	0.263	94	61	31	2	29864	16237	11548	2079
Other And Unspecified Disorders Of Bone And Cartilage	1.1 [1.02-1.19]	1.76E-02	0.264	1705	893	673	139	38164	20693	14838	2633
Sprains and strains of wrist and hand	1.2 [1.03-1.41]	1.82E-02	0.264	391	193	161	37	41655	22591	16192	2872
Cyphoscoliosis And Scoliosis	1.15 [1.02-1.3]	1.89E-02	0.264	695	346	292	57	39291	21275	15297	2719
Postpartum care and examination	0.87 [0.78-0.98]	1.99E-02	0.263	1359	761	532	66	41742	22610	16234	2898
Mononeuropathy of lower limb	1.31 [1.04-1.64]	2.02E-02	0.264	175	81	77	17	38336	20781	14913	2642
Other malignant neoplasms of lymphoid and histiocytic tissue	1.19 [1.03-1.39]	2.02E-02	0.264	421	204	183	34	48041	26052	18636	3353
Acquired deformity of nose	0.75 [0.59-0.96]	2.08E-02	0.264	194	120	66	8	39565	21420	15409	2736
Congenital anomalies of eye	0.77 [0.62-0.96]	2.09E-02	0.264	230	145	70	15	43108	23342	16751	3015

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Other postablative hypothyroidism	0.81 [0.67-0.97]	2.17E-02	0.265	340	208	112	20	42590	23010	16597	2983
Benign neoplasm of lip oral cavity and pharynx	1.32 [1.04-1.67]	2.18E-02	0.265	160	72	73	15	40073	21703	15554	2816
Chronic migraine without aura	0.81 [0.67-0.97]	2.19E-02	0.263	331	195	123	13	40076	21769	15523	2784
Death Inj Caused By Animal	0.79 [0.65-0.97]	2.29E-02	0.264	286	173	99	14	47287	25576	18422	3289
Malignant neoplasm of uterus	1.34 [1.04-1.73]	2.29E-02	0.263	136	64	56	16	26022	14148	10052	1822
Previous Cesarean Section Complicating Pregnancy	0.85 [0.75-0.98]	2.29E-02	0.264	647	363	255	29	25990	14101	10027	1862
Chronic lymphocytic thyroiditis	0.85 [0.74-0.98]	2.35E-02	0.265	547	322	196	29	42560	22989	16590	2981
Pure hyperglyceridemia	1.09 [1.01-1.17]	2.39E-02	0.263	1910	989	779	142	28902	15772	11123	2007
Mononeuritis of lower limb and unspecified site	1.09 [1.01-1.17]	2.41E-02	0.264	1897	981	773	143	37268	20190	14513	2565
Postinflammatory pulmonary fibrosis	1.19 [1.02-1.38]	2.53E-02	0.265	426	213	171	42	43516	23534	16957	3025
Intrinsic Asthma	0.76 [0.6-0.97]	2.69E-02	0.264	200	123	68	9	41392	22417	16082	2893
Facial Redness And Flushing	1.22 [1.02-1.46]	2.70E-02	0.260	303	147	131	25	10105	5551	3877	677
Open wound of buttock	0.48 [0.25-0.92]	2.70E-02	0.264	37	28	7	2	46567	25212	18112	3243
Psoriasis and similar disorders	1.09 [1.01-1.18]	2.79E-02	0.265	1679	865	683	131	39497	21345	15390	2762
Other	1.6 [1.05-2.43]	2.80E-02	0.264	48	20	21	7	45990	24895	17912	3183
Sleep Disturbances	1.05 [1.01-1.1]	2.81E-02	0.265	11561	6191	4525	845	9404	5143	3626	635
Disorders of the pituitary gland and its hypothalamic control	0.86 [0.76-0.98]	2.82E-02	0.266	620	351	243	26	37349	20131	14568	2650
Wrist Sprain	1.23 [1.02-1.47]	2.87E-02	0.264	274	135	111	28	41856	22693	16274	2889
Acute upper respiratory infections of multiple or unspecified sites	0.96 [0.92-1]	2.89E-02	0.264	8420	4630	3236	554	30956	16683	12088	2185
Acute upper respiratory infections of unspecified site	0.96 [0.92-1]	2.89E-02	0.264	8408	4624	3231	553	30971	16693	12093	2185
Convulsions	1.1 [1.01-1.19]	2.97E-02	0.262	1675	869	676	130	10067	5532	3861	674
Disorders involving the immune mechanism	1.19 [1.02-1.4]	3.05E-02	0.263	362	180	149	33	29126	15872	11221	2033
Esophageal Varices In Diseases Classified Elsewhere	0.69 [0.49-0.97]	3.08E-02	0.265	105	70	28	7	38513	20819	14959	2735
Malignant neoplasm of tongue	1.87 [1.06-3.29]	3.10E-02	0.264	25	10	10	5	48850	26448	18990	3412
Supervision of high-risk pregnancy with other poor reproductive history:Subset(Females)	0.85 [0.74-0.99]	3.17E-02	0.263	662	365	275	22	22196	12055	8578	1563
Unspecified disorder of eyelid	1.36 [1.03-1.82]	3.31E-02	0.263	107	54	36	17	29794	16203	11513	2078
Emphysematous bleb	0.48 [0.25-0.95]	3.39E-02	0.264	34	25	8	1	41427	22439	16091	2897
Fracture Of Shaft Or Unspecified Part Of Femur	1.24 [1.02-1.51]	3.48E-02	0.264	231	114	92	25	45969	24884	17902	3183
Fracture Of Unspecified Part Of Radius With Ulna	0.79 [0.64-0.98]	3.51E-02	0.265	238	141	88	9	46624	25196	18168	3260
Ganglion And Cyst Of Synovium	1.11 [1.01-1.23]	3.56E-02	0.266	970	496	393	81	29129	15706	11388	2035
Alcoholic fatty liver	0.6 [0.37-0.97]	3.64E-02	0.266	56	39	14	3	36491	19649	14289	2553
Retinal Defects Without Detachment	0.77 [0.6-0.99]	3.77E-02	0.263	182	114	58	10	29830	16228	11522	2080
Cerebral cysts	0.67 [0.45-0.98]	3.83E-02	0.263	84	53	30	1	40056	21755	15519	2782
Inattention or concentration deficit;Cognitive communication deficit;Visuospatial deficit;Psychomotor deficit;Frontal lobe and executive function deficit;Other signs and symptoms involving cognition	1.32 [1.01-1.72]	3.92E-02	0.264	127	54	64	9	45924	24908	17821	3195
Cyst of Bartholins gland:Subset(Females)	1.5 [1.02-2.2]	3.94E-02	0.264	57	24	26	7	25972	14105	10025	1842
Known or suspected fetal abnormality affecting management of mother:Subset(Females)	0.89 [0.79-0.99]	3.95E-02	0.264	909	508	352	49	25852	14026	9973	1853
Fracture of other and unspecified parts of femur	1.21 [1.01-1.46]	3.95E-02	0.264	271	135	108	28	45950	24875	17894	3181
Acne	0.92 [0.86-1]	3.96E-02	0.264	1872	1050	708	114	39357	21260	15350	2747
Hypertensive Heart And Renal Disease	0.49 [0.25-0.97]	3.96E-02	0.264	33	23	10	0	43067	23330	16707	3030
Other multiple and ill-defined fractures of lower limb	1.54 [1.02-2.34]	4.02E-02	0.264	49	21	21	7	45989	24894	17912	3183
Atherosclerosis of other specified arteries	1.36 [1.01-1.84]	4.03E-02	0.264	99	41	51	7	40966	22208	15881	2877
Other specified pruritic conditions	1.3 [1.01-1.68]	4.28E-02	0.265	136	64	57	15	39907	21561	15558	2788
Unspecified persistent mental disorders due to conditions classified elsewhere	1.17 [1.01-1.35]	4.31E-02	0.264	420	206	180	34	46823	25416	18129	3278
Fracture of pelvis	1.2 [1.01-1.44]	4.36E-02	0.264	292	143	121	28	47012	25477	18239	3296
Displacement of cervical intervertebral disc without myelopathy	1.07 [1-1.15]	4.40E-02	0.265	2276	1209	872	195	33532	18129	13055	2348
Benign neoplasm of other endocrine glands and related structures	0.89 [0.79-1]	4.47E-02	0.264	785	445	301	39	39971	21637	15536	2798
Scout	1.06 [1-1.13]	4.48E-02	0.264	3385	1793	1337	255	28809	15686	11121	2002
Erythematous conditions	0.94 [0.88-1]	4.56E-02	0.264	2895	1621	1084	190	38353	20722	14958	2673
Unspecific (abnormal) findings on radiological and other examination of abdominal area	0.65 [0.43-0.99]	4.58E-02	0.266	71	48	19	4	23742	12738	9358	1646
Irregular menstrual cycle:Subset(Females)	0.92 [0.85-1]	4.60E-02	0.265	2168	1201	826	141	15169	8152	5955	1062
Encounter for other and unspecified procedures and aftercare	1.03 [1-1.07]	4.69E-02	0.265	18828	10082	7400	1346	21551	11740	8349	1462
Benign mammary dysplasias:Subset(Females)	1.09 [1-1.19]	4.78E-02	0.263	1421	747	556	118	23408	12775	8997	1636
Spondylosis and allied disorders	1.06 [1-1.12]	4.84E-02	0.266	3707	1976	1429	302	32994	17845	12832	2317
Dermatophytosis of unspecified site	0.84 [0.7-1]	4.92E-02	0.264	350	207	124	19	38712	20960	15045	2707
Gastroenteritis and colitis due to radiation	0.54 [0.29-1]	5.00E-02	0.264	37	26	10	1	46796	25343	18169	3284
Concussion	1.21 [1-1.47]	5.05E-02	0.264	247	118	108	21	47983	26018	18618	3347
Spinal stenosis in cervical region	1.12 [1-1.26]	5.05E-02	0.265	726	376	285	65	33789	18272	13149	2368
Hypopituitarism	0.71 [0.5-1]	5.14E-02	0.266	100	61	37	2	37534	20237	14639	2658
Thesaurus Isoimmunization Affecting Management Of Mother:Subset(Females)	0.84 [0.7-1]	5.25E-02	0.264	358	204	137	17	26165	14194	10094	1877
Family history of stroke (cerebrovascular)	0.71 [0.5-1]	5.30E-02	0.264	99	60	38	1	29714	16123	11510	2081
Thyroiditis	0.89 [0.79-1]	5.48E-02	0.264	786	450	293	43	42498	22958	16565	2975
Routine postpartum follow-up	0.89 [0.79-1]	5.55E-02	0.263	1287	711	513	63	41743	22611	16234	2898
Apraxia	1.25 [0.99-1.57]	5.58E-02	0.260	184	89	78	17	10106	5553	3876	677
Hepatic encephalopathy	0.8 [0.63-1.01]	5.59E-02	0.265	206	124	72	10	36489	19650	14288	2551
Disorders of uterus not elsewhere classified:Subset(Females)	0.87 [0.76-1]	5.64E-02	0.265	547	321	191	35	15470	8322	6066	1082
Persistent mental disorders due to conditions classified elsewhere	1.1 [1-1.21]	5.67E-02	0.264	1100	549	476	75	46516	25250	18007	3259
Screening for other and unspecified cardiovascular conditions	1.07 [1-1.14]	5.72E-02	0.267	2632	1373	1063	196	12730	6885	4953	892

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Curvature of spine	1.11 [1-1.24]	5.87E-02	0.264	795	404	328	63	39206	21229	15260	2717
Primary Or Secondary	1.09 [1-1.18]	5.87E-02	0.265	1470	769	584	117	28806	15582	11235	1989
Sepsicemia Due To Other Gram-Negative Organisms	0.78 [0.61-1.01]	5.92E-02	0.264	175	104	65	6	45032	24377	17517	3138
Retinal detachments and defects	0.89 [0.79-1.01]	5.95E-02	0.262	778	447	287	44	29782	16206	11499	2077
Disorders of adrenal glands	0.89 [0.78-1.01]	6.02E-02	0.265	677	388	250	39	37246	20082	14523	2641
Diverticula of intestine	0.96 [0.91-1]	6.16E-02	0.265	5719	3130	2220	369	29808	16039	11634	2135
Contusion of abdominal wall	0.75 [0.55-1.02]	6.25E-02	0.264	125	76	45	4	45413	24617	17635	3161
Cellulitis and abscess of other specified sites	1.38 [0.98-1.94]	6.28E-02	0.263	76	39	24	13	40949	22214	15909	2826
Other diseases of respiratory system	0.9 [0.81-1.01]	6.29E-02	0.264	877	504	318	55	42503	22999	16548	2956
Hernia of other specified sites without mention of obstruction or gangrene	1.36 [0.98-1.89]	6.37E-02	0.264	81	38	33	10	42377	22958	16443	2976
Superficial injury of eye and adnexa	0.88 [0.76-1.01]	6.37E-02	0.264	554	330	183	41	45800	24749	17855	3196
Benign neoplasm of brain and other parts of nervous system	0.85 [0.72-1.01]	6.40E-02	0.264	381	224	135	22	40148	21742	15595	2811
Placenta Previa Without Hemorrhage:Subset(Females)	0.77 [0.59-1.02]	6.46E-02	0.264	153	92	54	7	25470	13819	9841	1810
Benign neoplasm of cerebral meninges	0.83 [0.67-1.01]	6.53E-02	0.264	263	161	84	18	40215	21770	15631	2814
Social maladjustment	1.55 [0.97-2.46]	6.56E-02	0.265	39	17	16	6	36244	19613	14090	2541
Benign neoplasm of pituitary gland and craniopharyngeal duct	0.84 [0.7-1.01]	6.60E-02	0.264	314	179	124	11	40212	21764	15629	2819
Postpartum care and examination immediately after delivery	0.69 [0.46-1.03]	6.70E-02	0.264	78	50	24	4	41757	22618	16240	2899
Exercise induced bronchospasm;Cough variant asthma	0.83 [0.69-1.01]	6.70E-02	0.264	287	170	101	16	41332	22391	16052	2889
Screening for other and unspecified deficiency anemia	1.17 [0.99-1.39]	6.71E-02	0.266	335	162	146	27	13002	7027	5065	910
Other psoriasis	1.08 [0.99-1.17]	6.77E-02	0.265	1455	753	591	111	39745	21473	15498	2774
Elevated blood pressure reading without diagnosis of hypertension	0.94 [0.89-1]	6.79E-02	0.265	2955	1637	1133	185	22445	12046	8839	1560
Family history of other conditions	0.85 [0.71-1.01]	6.80E-02	0.263	358	201	146	11	29615	16072	11465	2078
Regeneration Of Macula And Posterior Pole Of Retina	0.94 [0.87-1.01]	6.84E-02	0.262	2799	1564	1051	184	29638	16115	11454	2069
Edema	1.05 [1-1.11]	6.94E-02	0.263	8289	4475	3200	614	9258	5086	3552	620
Other disorders of liver	0.92 [0.85-1.01]	6.96E-02	0.266	1402	797	509	96	35763	19235	14020	2508
Diverticula Of Colon	0.96 [0.91-1]	7.02E-02	0.266	5702	3118	2215	369	29841	16054	11649	2138
Superficial injury of cornea	0.88 [0.77-1.01]	7.04E-02	0.264	551	328	182	41	45865	24792	17874	3199
Tracheostomy status	0.71 [0.49-1.03]	7.19E-02	0.263	88	53	34	1	26269	14215	10271	1783
Sout	1.06 [0.99-1.13]	7.21E-02	0.263	3002	1591	1186	225	28912	15747	11156	2009
Cough	1.04 [1-1.09]	7.22E-02	0.263	11237	6048	4396	793	8466	4662	3239	565
General symptoms	1.04 [1-1.09]	7.26E-02	0.265	26574	14274	10413	1887	6582	3605	2541	436
Arthropathy associated with neurological disorders	0.71 [0.49-1.03]	7.27E-02	0.264	88	59	22	7	29486	15955	11485	2046
Acquired absence of both cervix and uterus;Acquired absence of uterus with remaining cervical stump;Acquired absence of cervix with remaining uterus:Subset(Females)	0.88 [0.76-1.01]	7.29E-02	0.264	542	312	201	29	27369	14847	10581	1941
Benign neoplasm of skin	1.05 [1-1.1]	7.45E-02	0.266	4448	2335	1796	317	33495	18120	13032	2343
Other nonspecific abnormal findings	0.95 [0.91-1.01]	7.53E-02	0.264	4609	2548	1768	293	21736	11688	8552	1496
Open wound of buttock	0.59 [0.33-1.06]	7.56E-02	0.264	40	29	8	3	46566	25211	18112	3243
Congenital anomalies of the integument	0.89 [0.79-1.01]	7.63E-02	0.264	670	383	247	40	42088	22787	16363	2938
Inguinal hernia	0.93 [0.85-1.01]	7.77E-02	0.264	1558	861	611	86	41934	22724	16261	2949
Dementia	1.14 [0.99-1.33]	7.79E-02	0.264	448	221	190	37	46950	25473	18191	3286
Noninfectious disorders of lymphatic channels	0.85 [0.71-1.02]	7.84E-02	0.265	341	199	124	18	38340	20726	14892	2722
Unspecified viral hepatitis C without hepatic coma;Unspecified viral hepatitis C with hepatic coma	0.85 [0.71-1.02]	7.86E-02	0.264	347	202	128	17	43692	23674	16982	3036
Inguinal Hernia	0.93 [0.85-1.01]	7.89E-02	0.264	1553	857	611	85	41942	22726	16265	2951
Specified anomalies of nails	0.83 [0.67-1.02]	7.98E-02	0.264	247	145	89	13	43067	23325	16729	3013
Other Aftercare Following Surgery	1.13 [0.99-1.29]	8.00E-02	0.263	520	269	204	47	37646	20467	14559	2620
Fragments Of Torsion Dystonia	1.2 [0.98-1.48]	8.05E-02	0.263	211	101	93	17	43740	23759	16941	3040
Special screening for cardiovascular respiratory and genitourinary diseases	1.06 [0.99-1.13]	8.17E-02	0.266	2789	1460	1124	205	12678	6863	4927	888
Early or threatened labor:Subset(Females)	0.89 [0.79-1.01]	8.20E-02	0.264	776	430	302	44	25086	13600	9703	1783
Other mycoses	0.76 [0.56-1.04]	8.21E-02	0.264	123	76	41	6	39101	21170	15190	2741
Other cellulitis and abscess	1.04 [1-1.09]	8.24E-02	0.264	5917	3171	2287	459	34899	18932	13579	2388
Other forms of chronic ischemic heart disease	0.97 [0.93-1]	8.27E-02	0.264	12612	6869	4906	837	33343	18021	12976	2346
Acute Myocardial Infarction	0.87 [0.74-1.02]	8.28E-02	0.265	429	249	155	25	38977	21077	15146	2754
Mention Of Hemorrhage Or Perforation	1.13 [0.98-1.29]	8.29E-02	0.264	516	260	214	42	39262	21269	15265	2728
Effects of other external causes	1.12 [0.98-1.28]	8.38E-02	0.263	555	282	230	43	43250	23469	16801	2980
Screening For Malignant Neoplasms Of The Breast:Subset(Females)	1.05 [0.99-1.12]	8.47E-02	0.264	16628	9009	6432	1187	4807	2644	1832	331
Dyspepsia and other specified disorders of function of stomach	0.87 [0.74-1.02]	8.47E-02	0.264	430	253	150	27	38714	20967	15048	2699
Benign localized hyperplasia of prostate without urinary obstruction and other lower urinary tract symptoms (LUTS);Benign localized hyperplasia of prostate with urinary obstruction and other lower urinary tract symptoms (LUTS):Subset(Males)	0.89 [0.79-1.02]	8.64E-02	0.262	762	429	295	38	11017	5949	4326	742
Malignant neoplasm of rectosigmoid junction	0.69 [0.45-1.06]	8.79E-02	0.264	66	45	16	5	47900	25935	18614	3351
Urinary tract infection	0.97 [0.93-1.01]	8.87E-02	0.263	10049	5509	3872	668	27255	14764	10560	1931
Supervision of high-risk pregnancy:Subset(Females)	0.92 [0.85-1.01]	8.87E-02	0.263	3073	1686	1195	192	22147	12025	8559	1563
Congenital anomalies of respiratory system	1.16 [0.98-1.37]	8.88E-02	0.264	334	166	140	28	42967	23265	16695	3007
Abnormal finding on antenatal screening	0.83 [0.67-1.03]	8.90E-02	0.266	239	139	88	12	23800	12778	9376	1646
Personal History Of Injury	1.2 [0.97-1.49]	9.03E-02	0.264	203	101	82	20	29588	16052	11464	2072
Mononeuritis of unspecified site	1.08 [0.99-1.19]	9.08E-02	0.264	1172	608	477	87	37888	20543	14734	2611
Diabetes mellitus	0.97 [0.94-1]	9.09E-02	0.265	14993	8174	5782	1037	29202	15705	11398	2099
Unspecified disorder of autonomic nervous system	1.29 [0.96-1.72]	9.09E-02	0.263	105	47	50	8	43763	23771	16949	3043
Chondromalacia of patella	0.85 [0.71-1.03]	9.10E-02	0.264	314	185	111	18	29307	15855	11422	2030

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Other testicular hypofunction:Subset(Males)	0.92 [0.82-1.02]	1.20E-01	0.265	887	493	348	46	15017	8066	5918	1033
Glaucoma	1.04 [0.99-1.1]	1.20E-01	0.265	4557	2407	1822	328	29386	15960	11372	2054
Other complications of pregnancy not elsewhere classified:Subset(Females)	0.92 [0.83-1.02]	1.21E-01	0.264	1146	636	439	71	25058	13606	9670	1782
Diabetes Mellitus Complicating Pregnancy	0.84 [0.67-1.05]	1.21E-01	0.264	220	127	82	11	25453	13810	9836	1807
Endometrial Cystic Hyperplasia:Subset(Females)	0.86 [0.71-1.04]	1.21E-01	0.265	302	179	104	19	15624	8402	6131	1091
Encounters For Other Specified Administrative Purpose	1.16 [0.96-1.4]	1.22E-01	0.265	262	126	118	18	35956	19439	14000	2517
Other acute reactions to stress	0.85 [0.69-1.04]	1.22E-01	0.263	261	153	95	13	35210	19087	13682	2441
Anomalies Of Pupillary Function	1.24 [0.94-1.62]	1.23E-01	0.263	124	57	58	9	29832	16223	11532	2077
Prostatitis	1.17 [0.96-1.44]	1.23E-01	0.264	239	120	97	22	11030	5959	4333	738
Classical Migraine	1.06 [0.99-1.13]	1.23E-01	0.264	2225	1185	862	178	39802	21616	15421	2765
Fracture of unspecified bone	1.18 [0.96-1.45]	1.23E-01	0.264	213	110	80	23	45723	24749	17812	3162
Late effects of cerebrovascular disease	1.18 [0.96-1.46]	1.24E-01	0.264	209	97	99	13	41852	22686	16247	2919
Nonallopathic lesions	0.89 [0.77-1.03]	1.25E-01	0.264	518	299	186	33	39283	21268	15297	2718
Personal history of surgery to heart and great vessels	0.78 [0.57-1.07]	1.25E-01	0.264	111	66	41	4	29646	16087	11482	2077
Special screening for endocrine nutritional metabolic and immunity disorders	1.04 [0.99-1.09]	1.25E-01	0.267	6682	3561	2614	507	12342	6669	4803	870
Open wound of scalp	1.17 [0.96-1.43]	1.25E-01	0.264	233	116	96	21	46122	24980	17944	3198
Sprain of lumbar	1.13 [0.97-1.31]	1.26E-01	0.264	420	208	183	29	41663	22594	16171	2898
Gingival and periodontal diseases	0.86 [0.71-1.04]	1.26E-01	0.265	295	166	118	11	42076	22745	16362	2969
Other Specified Intestinal Obstruction	1.27 [0.93-1.73]	1.27E-01	0.266	94	45	39	10	33111	17863	12894	2354
Motion sickness	1.12 [0.97-1.28]	1.27E-01	0.263	494	251	206	37	43468	23590	16883	2995
Coagulation defects	0.92 [0.83-1.02]	1.27E-01	0.266	989	563	356	70	35715	19243	13929	2543
Disorders of menstruation and other abnormal bleeding from female genital tract:Subset(Females)	0.96 [0.91-1.01]	1.27E-01	0.264	6351	3494	2407	450	13749	7403	5381	965
Grand mal status	1.37 [0.91-2.05]	1.28E-01	0.263	53	21	29	3	40090	21774	15531	2785
Temporomandibular Joint Disorders	1.08 [0.98-1.19]	1.28E-01	0.265	1062	556	418	88	41343	22348	16072	2923
Swelling	0.92 [0.83-1.02]	1.28E-01	0.258	1001	576	363	62	9990	5486	3833	671
Other Specified Diseases Due To Viruses And Chlamydiae	0.7 [0.44-1.11]	1.29E-01	0.264	57	37	17	3	43683	23674	16972	3037
Diabetes With Ophthalmic Manifestations	0.93 [0.86-1.02]	1.30E-01	0.265	1372	780	491	101	37349	20136	14565	2648
Other anterior pituitary disorders	0.72 [0.47-1.1]	1.30E-01	0.266	63	39	22	2	37530	20234	14638	2658
Supervision Of Other High-Risk Pregnancy:Subset(Females)	0.93 [0.85-1.02]	1.30E-01	0.263	2879	1581	1118	180	22174	12040	8569	1565
Acute reaction to stress	0.9 [0.78-1.03]	1.30E-01	0.263	557	318	208	31	35000	18962	13609	2429
Disorders	0.88 [0.74-1.04]	1.31E-01	0.264	373	212	143	18	29552	16023	11463	2066
Aplastic anemia and other bone marrow failure syndromes	0.88 [0.74-1.04]	1.31E-01	0.266	373	216	134	23	36091	19433	14091	2567
Other congenital anomalies of upper alimentary tract	1.17 [0.95-1.43]	1.32E-01	0.264	231	115	95	21	42936	23248	16688	3000
Late effect of fracture of spine and trunk without mention of spinal cord lesion	0.73 [0.48-1.1]	1.32E-01	0.264	68	44	20	4	48574	26304	18881	3389
Other Malignant Neoplasm Of Skin	1.11 [0.97-1.26]	1.33E-01	0.264	558	277	242	39	44079	23891	17116	3072
Unspecified Drug Dependence	1.16 [0.96-1.42]	1.33E-01	0.264	241	123	94	24	35373	19192	13730	2451
Lower Limb Amputation Status	0.88 [0.75-1.04]	1.33E-01	0.263	411	245	134	32	26238	14197	10260	1781
Cervicitis and endocervicitis:Subset(Females)	1.25 [0.93-1.67]	1.33E-01	0.264	106	50	46	10	25656	13943	9892	1821
Malaise And Fatigue	1.04 [0.99-1.08]	1.34E-01	0.264	13893	7476	5434	983	7982	4382	3056	544
Migraine	1.04 [0.99-1.08]	1.34E-01	0.264	6334	3382	2487	465	38440	20885	14875	2680
Rhinovirus infection in conditions classified elsewhere and of unspecified site	0.82 [0.62-1.07]	1.34E-01	0.264	155	99	42	14	43632	23636	16965	3031
Injury To Kidney Without Mention Of Open Wound Into Cavity	1.43 [0.9-2.27]	1.34E-01	0.264	40	18	17	5	48661	26363	18901	3397
Injury to kidney	1.43 [0.9-2.27]	1.34E-01	0.264	40	18	17	5	48660	26362	18901	3397
Displacement Of Thoracic Or Lumbar Intervertebral Disc	1.04 [0.99-1.1]	1.34E-01	0.265	4028	2142	1589	297	33506	18133	13033	2340
Spinal Stenosis	1.04 [0.99-1.1]	1.35E-01	0.265	3796	2015	1503	278	33503	18113	13042	2348
Droptosis Of Eyelid	0.91 [0.8-1.03]	1.35E-01	0.263	698	395	265	38	29781	16193	11510	2078
Abn Reaction To Surgery	1.07 [0.98-1.16]	1.35E-01	0.264	1434	766	544	124	42373	22976	16480	2917
Cervical root lesions	1.14 [0.96-1.37]	1.35E-01	0.264	304	159	115	30	38246	20740	14866	2640
Non-specific (abnormal) findings on radiological and other examination of lung field	1.06 [0.98-1.14]	1.36E-01	0.267	1950	1040	746	164	23277	12500	9165	1612
Suppurative and unspecified otitis media	1.05 [0.98-1.12]	1.36E-01	0.265	2574	1357	1021	196	33810	18351	13067	2392
Anemia Complicating Pregnancy	0.88 [0.75-1.04]	1.36E-01	0.264	420	240	153	27	25283	13715	9772	1796
Unspecified symptom associated with female genital organs:Subset(Females)	0.94 [0.87-1.02]	1.37E-01	0.265	2110	1177	783	150	14913	8030	5831	1052
Sprain of lumbosacral (joint) (ligament)	1.07 [0.98-1.17]	1.37E-01	0.264	1239	645	502	92	40964	22229	15910	2825
Carbuncle and furuncle of unspecified site	1.24 [0.93-1.65]	1.37E-01	0.263	112	51	53	8	40891	22183	15894	2814
Raynauds syndrome	1.1 [0.97-1.23]	1.38E-01	0.264	677	355	264	58	40780	22109	15810	2861
Polydipsia	1.22 [0.94-1.59]	1.39E-01	0.260	133	67	52	14	10121	5556	3887	678
Unspecified prophylactic or treatment measure	1.15 [0.96-1.38]	1.39E-01	0.264	287	138	130	19	33426	18130	12980	2316
Decubitus Ulcer	0.9 [0.78-1.04]	1.40E-01	0.263	560	329	186	45	30116	16341	11684	2091
Kidney replaced by transplant	1.14 [0.96-1.35]	1.40E-01	0.264	327	169	126	32	26272	14220	10268	1784
Long-term (current) use of anticoagulants;Long-term (current) use of antibiotics;Long-term (current) use of antiplatelet/antithrombotic;Long-term (current) use of non-steroidal anti-inflammatory (NSAID);Long-term (current) use of steroids;Long-term (current) use of aspirin;Long-term (current) use of insulin;Long term (current) use of bisphosphonates;Long-term (current) use of other medications	1.03 [0.99-1.06]	1.40E-01	0.264	13948	7495	5452	1001	27164	14776	10527	1861
Other specified viral hepatitis without mention of hepatic coma	0.91 [0.8-1.03]	1.40E-01	0.264	630	362	228	40	43669	23664	16971	3034
Mixed Conductive And Sensorineural Hearing Loss	1.17 [0.95-1.45]	1.40E-01	0.264	210	109	77	24	36146	19645	13961	2540
Hyperplasia of prostate	0.85 [0.69-1.06]	1.41E-01	0.263	253	144	98	11	11045	5962	4341	742
Internal hemorrhoids without mention of complication	0.94 [0.87-1.02]	1.42E-01	0.265	1704	942	659	103	35269	19060	13694	2515
Herpes Simplex With Ophthalmic Complications	1.28 [0.92-1.77]	1.42E-01	0.263	85	41	35	9	44919	24381	17423	3115

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Carrier or suspected carrier of infectious diseases	0.93 [0.83-1.03]	1.69E-01	0.263	917	506	360	51	33203	17993	12917	2293
symptoms involving respiratory system and other chest symptoms	1.03 [0.99-1.08]	1.70E-01	0.263	25261	13674	9836	1751	6234	3438	2372	424
Supervision of normal first pregnancy:Subset(Females)	0.93 [0.84-1.03]	1.70E-01	0.263	2252	1225	882	145	22157	12030	8563	1564
Polycystic ovaries:Subset(Females)	0.92 [0.81-1.04]	1.71E-01	0.265	731	412	274	45	22200	11999	8599	1602
Other specified disorders of arteries and arterioles	0.85 [0.67-1.07]	1.71E-01	0.264	198	116	71	11	40916	22184	15857	2875
Varicella without mention of complication	1.11 [0.96-1.28]	1.71E-01	0.264	472	241	194	37	44830	24333	17387	3110
Acute Gastric Ulcer Without Mention Of Hemorrhage	1.14 [0.95-1.37]	1.72E-01	0.264	275	135	120	20	39355	21315	15301	2739
Subarachnoid subdural and extradural hemorrhage following injury	1.18 [0.93-1.48]	1.72E-01	0.264	174	85	74	15	48177	26107	18705	3365
Diseases of lips	0.85 [0.67-1.07]	1.73E-01	0.265	198	117	69	12	42131	22776	16379	2976
Herpes zoster	1.05 [0.98-1.13]	1.74E-01	0.263	1984	1054	776	154	42810	23266	16575	2969
Supervision of high-risk pregnancy with other poor obstetric history	0.9 [0.78-1.05]	1.74E-01	0.264	663	365	262	36	41747	22613	16236	2898
Left heart failure	0.87 [0.71-1.06]	1.74E-01	0.264	266	158	90	18	35591	19263	13853	2475
Cellulitis And Abscess Of Toe	1.08 [0.97-1.21]	1.74E-01	0.263	817	428	322	67	40084	21763	15579	2742
Unspecified Complication Of Pregnancy:Subset(Females)	0.87 [0.72-1.06]	1.74E-01	0.264	284	164	102	18	25386	13780	9800	1806
Thyrotoxicosis with or without goiter	0.94 [0.86-1.03]	1.75E-01	0.265	1319	739	496	84	42343	22872	16505	2966
Atopic dermatitis and related conditions	0.91 [0.8-1.04]	1.76E-01	0.265	617	346	235	36	39373	21279	15331	2763
Sprains and strains of ankle and foot	1.06 [0.97-1.16]	1.76E-01	0.264	1256	665	489	102	40228	21834	15602	2792
Other Symptoms Involving Digestive System	1.04 [0.98-1.09]	1.77E-01	0.263	7522	4034	2962	526	9678	5306	3715	657
Genetic Counseling On Procreative Management	0.88 [0.74-1.06]	1.77E-01	0.264	355	197	143	15	41536	22488	16161	2887
Other disorders of breast:Subset(Females)	1.04 [0.98-1.1]	1.77E-01	0.263	3901	2085	1536	280	20973	11453	8066	1454
Septal anomalies and anomalies of cardiac septal closure	0.9 [0.78-1.05]	1.78E-01	0.264	490	279	181	30	43252	23441	16788	3023
symptoms involving digestive system	1.03 [0.99-1.08]	1.78E-01	0.263	14743	7955	5758	1030	8796	4826	3375	595
Tracheoesophageal fistula	1.27 [0.9-1.8]	1.79E-01	0.264	73	35	30	8	43415	23518	16859	3038
Mechanical Complication Of Internal Orthopedic Device	1.14 [0.94-1.37]	1.80E-01	0.264	277	141	112	24	44316	23982	17277	3057
Inflammatory disease of breast:Subset(Females)	1.13 [0.94-1.36]	1.81E-01	0.263	288	146	119	23	23913	13031	9205	1677
Hypertrophy of breast:Subset(Females)	1.11 [0.95-1.28]	1.81E-01	0.263	436	223	179	34	23949	13054	9222	1673
Cardiac dysrhythmias	0.97 [0.93-1.01]	1.82E-01	0.264	9173	5007	3522	644	31169	16838	12146	2185
Other abnormal clinical findings	0.93 [0.85-1.03]	1.82E-01	0.265	1137	639	432	66	23472	12603	9253	1616
Abnormality in fetal heart rate or rhythm	0.82 [0.62-1.1]	1.82E-01	0.264	132	78	46	8	25789	14001	9946	1842
Nausea And Vomiting	1.04 [0.98-1.09]	1.83E-01	0.263	7230	3869	2849	512	9463	5189	3636	638
Disorders of parathyroid gland	0.94 [0.86-1.03]	1.83E-01	0.265	1252	698	473	81	37237	20069	14537	2631
Other emphysema	1.06 [0.97-1.15]	1.84E-01	0.264	1534	813	594	127	40992	22213	15915	2864
Occlusion And Stenosis Of Basilar Artery	0.71 [0.43-1.18]	1.84E-01	0.264	46	29	15	2	41867	22690	16257	2920
Rash and other nonspecific skin eruption	1.05 [0.98-1.14]	1.85E-01	0.260	2115	1133	829	153	9693	5337	3713	643
Acute cholecystitis	0.91 [0.79-1.05]	1.85E-01	0.265	515	297	181	37	36310	19556	14214	2540
Toxic effect of venom	1.1 [0.95-1.28]	1.85E-01	0.264	450	241	163	46	47948	25942	18670	3336
Other diseases and conditions of the teeth and supporting structures	0.94 [0.85-1.03]	1.85E-01	0.265	1187	651	471	65	41462	22415	16133	2914
Personality disorders	1.09 [0.96-1.24]	1.85E-01	0.264	580	307	220	53	35285	19145	13694	2446
Candidiasis of skin and nails	0.93 [0.85-1.03]	1.87E-01	0.264	1047	585	395	67	38192	20674	14839	2679
Threatened Abortion:Subset(Females)	0.9 [0.77-1.05]	1.87E-01	0.264	442	248	167	27	25369	13761	9806	1802
Testicular dysfunction:Subset(Males)	0.93 [0.83-1.04]	1.87E-01	0.265	902	497	358	47	14979	8045	5903	1031
Other disorders of breast:Subset(Males)	0.88 [0.73-1.06]	1.88E-01	0.264	308	175	118	15	19488	10523	7627	1338
Legal circumstances	1.27 [0.89-1.81]	1.89E-01	0.265	71	30	37	4	36271	19631	14099	2541
Nerve root and plexus disorders	1.09 [0.96-1.24]	1.89E-01	0.264	574	311	206	57	38086	20646	14812	2628
Unspecified vitamin deficiency	1.08 [0.96-1.2]	1.90E-01	0.265	826	438	317	71	45529	24616	17758	3155
Follow-Up Examination Following Surgery	0.98 [0.94-1.01]	1.91E-01	0.264	11307	6201	4304	802	24665	13280	9678	1707
Unspecified circulatory system disorder	1.15 [0.93-1.42]	1.91E-01	0.265	212	107	85	20	38362	20747	14893	2722
Benign Hypertensive Heart Disease	1.33 [0.87-2.04]	1.93E-01	0.264	48	19	27	2	43036	23317	16684	3035
Diseases and other conditions of the tongue	1.14 [0.94-1.37]	1.93E-01	0.265	260	137	96	27	41952	22683	16311	2958
Dementia In Conditions Classified Elsewhere	1.13 [0.94-1.36]	1.93E-01	0.264	291	138	137	16	47019	25510	18218	3291
Need for isolation and other prophylactic measures	1.04 [0.98-1.09]	1.93E-01	0.265	4395	2336	1739	320	31474	17058	12228	2188
Hypertassemia	1.05 [0.98-1.12]	1.94E-01	0.263	2238	1197	869	172	28838	15726	11102	2010
Independent abuse of drugs	1.02 [0.99-1.06]	1.95E-01	0.264	11243	6026	4417	800	26978	14662	10466	1850
Other and unspecified manifestations of thiamine deficiency	0.7 [0.4-1.2]	1.95E-01	0.264	40	27	10	3	46028	24900	17934	3194
Malignant neoplasm of bladder	0.91 [0.78-1.05]	1.95E-01	0.264	504	290	178	36	45857	24782	17882	3193
Closed fracture of malar and maxillary bones	0.79 [0.55-1.13]	1.96E-01	0.264	88	54	29	5	48463	26250	18829	3384
Genital prolapse:Subset(Females)	0.94 [0.86-1.03]	1.97E-01	0.266	1482	823	562	97	15339	8229	6040	1070
Fear of lateral cartilage or meniscus of knee	0.83 [0.63-1.1]	1.97E-01	0.264	140	87	42	11	47505	25708	18483	3314
Chronic pain due to trauma;Chronic post-thoracotomy pain;Other chronic postoperative pain;Other chronic pain	1.06 [0.97-1.17]	1.98E-01	0.264	1120	586	449	85	45505	24647	17682	3176
Vascular insufficiency of intestine	1.11 [0.95-1.3]	1.99E-01	0.264	375	196	143	36	46551	25217	18070	3264
Intermediate coronary syndrome	0.96 [0.9-1.02]	1.99E-01	0.264	2552	1394	1003	155	38398	20754	14941	2703
Angina pectoris	0.96 [0.91-1.02]	1.99E-01	0.265	3364	1828	1321	215	37662	20363	14645	2654
Anxiety	1.02 [0.99-1.06]	2.00E-01	0.265	14250	7689	5531	1030	26583	14403	10333	1847
Pathologic Fracture	1.07 [0.97-1.18]	2.01E-01	0.264	1097	576	434	87	39302	21291	15291	2720
Disturbances of sensation of smell and taste	0.86 [0.69-1.08]	2.01E-01	0.259	216	129	75	12	10126	5558	3888	680
Certain Sequelae Of Myocardial Infarction	1.13 [0.94-1.35]	2.01E-01	0.264	298	149	125	24	35561	19241	13845	2475
Adjustment disorder with depressed mood	0.97 [0.93-1.02]	2.02E-01	0.263	5819	3220	2193	406	31505	17072	12245	2188
Hyperparathyroidism	0.94 [0.85-1.03]	2.02E-01	0.266	1129	630	426	73	37295	20093	14568	2634

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.ipoprotein deficiencies	1.08 [0.95-1.22]	2.39E-01	0.263	630	324	263	43	29164	15892	11241	2031
Malignant neoplasm of central portion of female breast:Subset(Females)	1.27 [0.85-1.9]	2.39E-01	0.264	56	26	25	5	26219	14246	10129	1844
Thoracic or lumbosacral neuritis or radiculitis	1.03 [0.98-1.08]	2.40E-01	0.265	4560	2439	1784	337	33357	18039	12985	2333
Concussion	1.11 [0.93-1.32]	2.42E-01	0.264	308	154	132	22	47561	25789	18461	3311
Unemployment	0.8 [0.54-1.17]	2.43E-01	0.264	75	45	26	4	36261	19621	14101	2539
Noninflammatory disorders of ovary fallopian tube and broad ligament:Subset(Females)	0.95 [0.88-1.03]	2.44E-01	0.266	1766	973	675	118	15197	8165	5966	1066
Other And Unspecified Disorders Of Eating	0.93 [0.83-1.05]	2.44E-01	0.263	827	469	303	55	33650	18272	13055	2323
Other Specified Forms Of Glaucoma	1.13 [0.92-1.38]	2.44E-01	0.263	233	120	93	20	29865	16238	11546	2081
Encounters for administrative purposes	0.93 [0.83-1.05]	2.45E-01	0.264	765	426	293	46	35821	19364	13949	2508
Chronic prostatitis:Subset(Males)	0.9 [0.75-1.08]	2.45E-01	0.263	344	192	136	16	11048	5961	4345	742
Other headache syndromes	1.08 [0.95-1.24]	2.45E-01	0.264	544	283	217	44	47916	25946	18623	3347
Need for prophylactic vaccination and inoculation against diphtheria-tetanus-pertussis	0.96 [0.89-1.03]	2.45E-01	0.263	2107	1179	774	154	24068	13025	9384	1659
Asthma	0.98 [0.94-1.02]	2.47E-01	0.264	7782	4267	2959	556	35785	19341	13950	2494
Chemotherapy Encounter	1.05 [0.97-1.15]	2.47E-01	0.263	1398	737	561	100	38176	20763	14763	2650
Endometriosis:Subset(Females)	0.92 [0.8-1.06]	2.48E-01	0.266	573	328	200	45	15567	8359	6124	1084
Chronic kidney disease	0.95 [0.88-1.04]	2.49E-01	0.264	1582	871	611	100	42646	23105	16545	2996
Contact dermatitis and other eczema due to plants [except food]	0.95 [0.87-1.04]	2.50E-01	0.264	1416	795	520	101	38201	20630	14908	2663
Other extrapyramidal disease and abnormal movement disorders	1.03 [0.98-1.09]	2.50E-01	0.264	3721	1994	1445	282	42211	22918	16355	2938
Bipolar Affective Disorder	1.18 [0.89-1.56]	2.50E-01	0.264	119	56	55	8	44113	23873	17171	3069
Peripheral Retinal Degenerations	0.85 [0.64-1.12]	2.51E-01	0.263	136	82	45	9	29869	16245	11542	2082
Crushing injury of upper limb	0.67 [0.33-1.33]	2.51E-01	0.264	26	17	8	1	48928	26495	19016	3417
Family history of psychiatric condition	0.68 [0.35-1.31]	2.52E-01	0.264	28	18	9	1	29736	16140	11514	2082
Cushings syndrome	0.8 [0.54-1.18]	2.52E-01	0.266	72	44	24	4	37516	20227	14631	2658
Injury other and unspecified	0.95 [0.88-1.04]	2.54E-01	0.265	1585	867	623	95	40923	22114	15933	2876
Overweight	1.02 [0.99-1.06]	2.55E-01	0.265	20144	10842	7884	1418	16159	8817	6196	1146
Strain of neck	1.06 [0.96-1.18]	2.55E-01	0.263	919	485	364	70	41041	22279	15929	2833
Other Symptoms Involving Nervous And Musculoskeletal Systems	1.07 [0.95-1.21]	2.56E-01	0.260	775	417	297	61	10042	5510	3859	673
Other acquired musculoskeletal deformity	0.92 [0.8-1.06]	2.56E-01	0.264	534	306	191	37	39115	21178	15230	2707
Unspecified retinal disorder	0.77 [0.5-1.2]	2.56E-01	0.263	58	35	21	2	29848	16231	11537	2080
Degeneration of cervical intervertebral disc	1.05 [0.97-1.14]	2.57E-01	0.265	1426	756	563	107	33500	18106	13038	2356
Cellulitis and abscess of leg	1.04 [0.97-1.11]	2.57E-01	0.264	2555	1372	979	204	39509	21412	15372	2725
Obstructive hydrocephalus	0.82 [0.57-1.16]	2.57E-01	0.263	88	52	32	4	43761	23767	16955	3039
Other specified contraceptive management	1.15 [0.9-1.46]	2.58E-01	0.264	178	87	77	14	41735	22606	16230	2899
Other benign neoplasm of connective and other soft tissue	1.14 [0.91-1.42]	2.59E-01	0.265	187	96	73	18	39999	21642	15547	2810
Diverticula Of Small Intestine	0.74 [0.44-1.25]	2.59E-01	0.266	42	26	14	2	33104	17861	12891	2352
Contusion Of Back	1.12 [0.92-1.37]	2.59E-01	0.264	235	121	93	21	44999	24409	17454	3136
Viral hepatitis	0.94 [0.83-1.05]	2.61E-01	0.264	779	435	298	46	43557	23608	16921	3028
Other general medical examination for administrative purposes	0.9 [0.76-1.08]	2.62E-01	0.264	336	194	120	22	12932	6993	5035	904
Acute maxillary sinusitis	1.06 [0.96-1.16]	2.62E-01	0.264	1070	559	431	80	44052	23879	17086	3087
Neuralgia	1.06 [0.96-1.16]	2.62E-01	0.265	1171	615	469	87	29251	15777	11438	2036
Peripheral enthesopathies and allied syndromes	1.02 [0.98-1.06]	2.63E-01	0.266	10541	5672	4095	774	24799	13399	9668	1732
Infections of kidney	0.92 [0.81-1.06]	2.64E-01	0.264	545	304	209	32	35043	18958	13619	2466
Other Specified Antenatal Screening	1.09 [0.94-1.27]	2.65E-01	0.264	617	315	248	54	41752	22616	16237	2899
Excessive or frequent menstruation:Subset(Females)	0.96 [0.89-1.03]	2.65E-01	0.265	2566	1414	969	183	15264	8216	5989	1059
Other indications for care or intervention related to labor and delivery not elsewhere classified:Subset(Females)	0.93 [0.82-1.06]	2.66E-01	0.264	708	397	261	50	25633	13913	9884	1836
Other and unspecified infectious and parasitic diseases	1.21 [0.86-1.7]	2.66E-01	0.264	79	37	36	6	48067	26035	18680	3352
Ovarian dysfunction:Subset(Females)	0.95 [0.87-1.04]	2.66E-01	0.266	1350	745	519	86	21581	11642	8383	1556
Other Specified Erythematous Conditions	0.94 [0.83-1.05]	2.66E-01	0.265	773	434	288	51	39349	21267	15329	2753
Postmenopausal bleeding:Subset(Females)	0.95 [0.87-1.04]	2.68E-01	0.266	1452	827	511	114	15339	8224	6038	1077
Osteoporosis	1.03 [0.98-1.08]	2.68E-01	0.264	7171	3892	2756	523	35712	19319	13923	2470
Psychalgia	1.07 [0.95-1.19]	2.68E-01	0.264	802	420	323	59	34799	18871	13514	2414
Unspecified visual loss	0.83 [0.61-1.15]	2.70E-01	0.263	105	61	40	4	29772	16184	11510	2078
Special screening for disorders of blood and blood-forming organs	1.07 [0.95-1.22]	2.70E-01	0.266	628	324	257	47	12930	6984	5043	903
Fracture of Humerus Shaft/Nos-CI	0.89 [0.73-1.09]	2.70E-01	0.265	252	147	87	18	46719	25250	18194	3275
Asymptomatic menopausal or female climacteric states:Subset(Females)	0.97 [0.92-1.02]	2.71E-01	0.265	6054	3342	2289	423	11525	6174	4534	817
Obesity	1.02 [0.99-1.05]	2.73E-01	0.265	20023	10780	7830	1413	16200	8837	6213	1150
Adrenocortical insufficiency	0.89 [0.73-1.09]	2.73E-01	0.266	262	146	104	12	37470	20207	14611	2652
Other venous embolism and thrombosis	1.04 [0.97-1.12]	2.74E-01	0.266	1821	965	715	141	38038	20553	14787	2698
Other retinal disorders	0.97 [0.92-1.02]	2.74E-01	0.262	5027	2769	1921	337	29184	15871	11275	2038
Other specified congenital anomalies of brain	0.82 [0.58-1.17]	2.76E-01	0.264	90	53	33	4	43371	23495	16846	3030
Myopia	1.13 [0.9-1.42]	2.77E-01	0.264	187	94	78	15	40957	22201	15877	2879
Disorders of phosphorus metabolism	1.09 [0.94-1.26]	2.78E-01	0.262	438	222	187	29	29186	15920	11231	2035
Joint Replacement Status	1.03 [0.97-1.09]	2.79E-01	0.264	4031	2156	1575	300	25996	14065	10166	1765
Other Corneal Disorders	0.88 [0.69-1.11]	2.80E-01	0.263	186	110	64	12	29821	16215	11529	2077
Other And Unspecified Disc Disorder	1.03 [0.97-1.1]	2.80E-01	0.265	2961	1562	1199	200	33571	18140	13074	2357
Organ or tissue replaced by other means	1.03 [0.98-1.08]	2.80E-01	0.264	7071	3794	2765	512	25660	13881	10039	1740
Dentofacial anomalies	1.05 [0.96-1.15]	2.80E-01	0.265	1211	640	476	95	41262	22298	16045	2919
Atherosclerosis of aorta	0.91 [0.77-1.08]	2.81E-01	0.264	374	206	151	17	40525	21981	15701	2843

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Other congenital anomalies of circulatory system	0.94 [0.82-1.07]	3.21E-01	0.264	629	347	244	38	42902	23244	16653	3005
Malignant neoplasm of posterior wall of urinary bladder	0.82 [0.55-1.22]	3.21E-01	0.265	70	40	28	2	45916	24809	17909	3198
Acute Conjunctivitis	0.93 [0.82-1.07]	3.23E-01	0.263	581	322	227	32	28828	15685	11137	2006
Sarthritis and duodenitis	1.04 [0.97-1.11]	3.23E-01	0.265	2272	1202	907	163	37319	20178	14521	2620
Other specified urticaria	1.14 [0.88-1.47]	3.24E-01	0.264	145	72	62	11	30271	16409	11757	2105
Malignant neoplasm of tongue	1.21 [0.83-1.77]	3.24E-01	0.264	63	31	26	6	48841	26445	18984	3412
Undiagnosed cardiac murmurs	1.05 [0.95-1.16]	3.24E-01	0.260	1213	656	465	92	9969	5478	3823	668
Calculus Of Gallbladder Without Mention Of Cholecystitis	0.97 [0.91-1.03]	3.25E-01	0.266	2463	1353	940	170	35759	19241	14014	2504
Intracerebral hemorrhage	0.89 [0.71-1.12]	3.25E-01	0.264	210	122	73	15	41830	22674	16238	2918
Ulcer Of Esophagus	1.1 [0.91-1.31]	3.25E-01	0.264	291	147	123	21	39335	21310	15290	2735
Acute pharyngitis	1.02 [0.98-1.07]	3.26E-01	0.264	6724	3590	2665	469	34365	18631	13366	2368
Other current conditions in the mother classifiable elsewhere but complicating pregnancy:childbirth or the puerperium:Subset(Females)	0.96 [0.89-1.04]	3.27E-01	0.264	2314	1262	898	154	24580	13326	9514	1740
Disorders of lacrimal system	0.97 [0.9-1.03]	3.27E-01	0.263	2711	1493	1041	177	29278	15906	11333	2039
Carbuncle and furuncle of upper arm and forearm	1.18 [0.85-1.64]	3.28E-01	0.263	84	40	38	6	40948	22217	15908	2823
Suspected damage to fetus from drugs affecting management of mother:Subset(Females)	0.87 [0.66-1.15]	3.28E-01	0.265	137	79	49	9	26178	14203	10096	1879
Inflammatory and toxic neuropathy	1.03 [0.97-1.09]	3.29E-01	0.264	3129	1690	1193	246	37370	20233	14559	2578
Closed fracture of unspecified vertebral column without mention of spinal cord injury	0.89 [0.7-1.13]	3.29E-01	0.264	189	105	76	8	47043	25501	18248	3294
Unspecified Polyarthropathy Or Polyarthritits	0.95 [0.86-1.05]	3.29E-01	0.264	1076	609	391	76	29355	15893	11427	2035
Sensorineural Hearing Loss	0.96 [0.9-1.04]	3.30E-01	0.263	2192	1209	834	149	35470	19297	13680	2493
Other Speech Disturbance	1.1 [0.91-1.34]	3.30E-01	0.260	260	136	104	20	10109	5549	3882	678
Paralytic Strabismus	1.12 [0.89-1.42]	3.30E-01	0.263	174	85	79	10	29865	16238	11546	2081
Carbuncle and furuncle	1.05 [0.95-1.15]	3.31E-01	0.264	1133	592	461	80	39521	21433	15364	2724
Nodular prostate without urinary obstruction;Nodular prostate with urinary obstruction:Subset(Males)	1.11 [0.9-1.37]	3.33E-01	0.264	231	117	96	18	11044	5965	4338	741
Dermatophytosis of foot	1.05 [0.95-1.16]	3.33E-01	0.265	1073	573	414	86	38310	20738	14886	2686
Congenital insufficiency of aortic valve	0.9 [0.73-1.11]	3.34E-01	0.264	243	142	83	18	43355	23483	16839	3033
Herpes simplex	1.04 [0.96-1.12]	3.34E-01	0.264	1814	965	717	132	43754	23747	16951	3056
Struck By Object/Person	1.12 [0.89-1.41]	3.35E-01	0.264	175	84	81	10	46926	25427	18207	3292
Mental Disorders Complicating Pregnancy	0.93 [0.8-1.08]	3.35E-01	0.264	507	274	206	27	25262	13712	9762	1788
Other venous embolism and thrombosis of unspecified site	1.05 [0.95-1.17]	3.37E-01	0.265	908	484	347	77	38353	20738	14894	2721
Impetigo	1.11 [0.9-1.36]	3.37E-01	0.263	229	119	90	20	40517	21989	15738	2790
Effusion Of Joint	0.93 [0.79-1.08]	3.37E-01	0.264	431	241	165	25	29040	15724	11308	2008
Other specific muscle disorders	1.17 [0.85-1.6]	3.38E-01	0.265	94	48	37	9	29741	16051	11627	2063
Dysthymic disorder	0.96 [0.88-1.04]	3.40E-01	0.263	1570	857	625	88	34714	18827	13484	2403
Spontaneous abortion:Subset(Females)	0.92 [0.76-1.1]	3.40E-01	0.264	326	184	121	21	28019	15189	10843	1987
Spontaneous Abortion Without Mention Of Complication:Subset(Females)	0.92 [0.76-1.1]	3.41E-01	0.264	326	184	121	21	28023	15191	10845	1987
Other atopic dermatitis and related conditions	0.94 [0.82-1.07]	3.41E-01	0.265	597	330	231	36	39404	21291	15347	2766
Unspecified disorders of menstruation and other abnormal bleeding from female genital tract:Subset(Females)	1.08 [0.92-1.27]	3.41E-01	0.266	383	189	169	25	15578	8373	6126	1079
Functional digestive disorders not elsewhere classified	0.98 [0.95-1.02]	3.42E-01	0.265	9553	5193	3697	663	29220	15763	11374	2083
Other Disorders Of Synovium	0.91 [0.74-1.11]	3.42E-01	0.265	258	141	108	9	29649	15995	11602	2052
Dysmenorrhea:Subset(Females)	1.05 [0.95-1.16]	3.43E-01	0.267	1115	580	443	92	15486	8317	6089	1080
Unspecified follow-up examination	1.04 [0.96-1.12]	3.43E-01	0.265	1858	991	723	144	34450	18604	13431	2415
Diabetic Retinopathy	0.96 [0.88-1.05]	3.44E-01	0.263	1349	761	490	98	29703	16154	11478	2071
Observation For Other Specified Suspected Conditions	1.1 [0.9-1.34]	3.44E-01	0.265	252	130	102	20	12983	7019	5056	908
External hemorrhoids without mention of complication	0.96 [0.88-1.05]	3.45E-01	0.264	1298	712	512	74	36986	20031	14340	2615
Chronic sinusitis	0.97 [0.92-1.03]	3.45E-01	0.264	3079	1692	1185	202	36893	19981	14314	2598
Acute Myocardial Infarction	0.96 [0.87-1.05]	3.45E-01	0.265	1231	691	444	96	38865	21016	15103	2746
Heartburn	1.05 [0.95-1.15]	3.46E-01	0.260	1372	738	536	98	10015	5499	3845	671
Follow-up examination	0.98 [0.95-1.02]	3.47E-01	0.264	13456	7360	5122	974	22531	12120	8860	1551
Postsurgical States Following Surgery Of Eye And Adnexa	1.04 [0.96-1.13]	3.47E-01	0.264	1703	898	694	111	25906	14017	10124	1765
Secondary hypertension	1.07 [0.93-1.24]	3.48E-01	0.264	477	239	211	27	42813	23199	16594	3020
Screening examination for unspecified viral and chlamydial disease	1.07 [0.93-1.24]	3.49E-01	0.265	473	243	198	32	12871	6960	5010	901
Astium secundum type atrial septal defect	0.93 [0.79-1.09]	3.50E-01	0.264	416	235	154	27	43276	23454	16798	3024
Dermatophytosis of the body	1.05 [0.94-1.18]	3.51E-01	0.264	822	435	323	64	38217	20706	14826	2685
Hematuria	0.98 [0.93-1.03]	3.51E-01	0.264	5243	2881	1997	365	33138	17927	12891	2320
Other specified diseases of sebaceous glands	0.92 [0.78-1.09]	3.51E-01	0.264	383	210	155	18	29949	16235	11629	2085
Barbiturate And Similarly Acting Sedative Or Hypnotic Abuse	0.76 [0.43-1.35]	3.52E-01	0.263	35	22	11	2	35407	19210	13744	2453
Herpes Zoster With Other Nervous System Complications	1.09 [0.91-1.29]	3.52E-01	0.263	327	168	135	24	44822	24331	17392	3099
Gastrointestinal hemorrhage	0.97 [0.91-1.03]	3.53E-01	0.266	2969	1620	1141	208	34572	18587	13571	2414
Backache	1.02 [0.98-1.05]	3.53E-01	0.265	13147	7073	5131	943	24549	13274	9562	1713
Unspecified Enthesopathy	0.89 [0.71-1.13]	3.55E-01	0.265	189	109	69	11	29614	15981	11578	2055
Hereditary and idiopathic peripheral neuropathy	1.04 [0.96-1.13]	3.56E-01	0.264	1509	804	592	113	37774	20479	14680	2615
Enthesopathy Of Elbow Region	1.03 [0.96-1.11]	3.56E-01	0.266	2126	1135	831	160	28733	15496	11238	1999
Parkinsons disease	1.06 [0.93-1.21]	3.57E-01	0.263	598	307	250	41	43770	23770	16955	3045
Lymphosarcoma and reticulosarcoma and other specified malignant tumors of lymphatic tissue	1.14 [0.86-1.5]	3.58E-01	0.264	125	64	50	11	48088	26080	18652	3356
Persistent vomiting	0.87 [0.66-1.16]	3.58E-01	0.264	129	74	48	7	39327	21288	15301	2738
Cardiac dysrhythmia	0.94 [0.83-1.07]	3.59E-01	0.264	674	376	254	44	35040	18951	13645	2444

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Chronic airway obstruction	1.02 [0.98-1.07]	3.59E-01	0.264	5701	3069	2195	437	37946	20567	14749	2630
Unspecified disorder of the teeth and supporting structures	0.94 [0.82-1.07]	3.60E-01	0.265	583	321	228	34	41720	22560	16231	2929
Spontaneous pneumothorax and air leak	0.9 [0.73-1.12]	3.60E-01	0.264	219	125	81	13	43544	23548	16964	3032
Family Disruption	0.82 [0.53-1.26]	3.61E-01	0.264	59	33	25	1	36206	19604	14068	2534
Other Congenital Anomalies Of Peripheral Vascular System	0.91 [0.74-1.12]	3.61E-01	0.264	238	135	88	15	43201	23399	16776	3026
Contact dermatitis and other eczema	0.98 [0.95-1.02]	3.62E-01	0.264	12527	6836	4815	876	25890	13970	10112	1808
Unspecified musculoskeletal disorders and symptoms referable to neck	0.88 [0.67-1.16]	3.64E-01	0.265	146	83	56	7	33778	18265	13146	2367
Other Specified Congenital Anomalies Of Skin	0.92 [0.77-1.1]	3.65E-01	0.264	326	188	114	24	42791	23176	16628	2987
Non-specific (abnormal) findings on radiological and other examination of body structure	1.02 [0.98-1.07]	3.66E-01	0.267	7400	3999	2829	572	20932	11213	8272	1447
Anorexia	1.09 [0.9-1.32]	3.66E-01	0.260	283	145	119	19	10113	5552	3881	680
Hereditary Corneal Dystrophies	0.94 [0.82-1.07]	3.66E-01	0.263	621	345	238	38	29834	16222	11535	2077
Benign neoplasm of stomach	0.92 [0.77-1.1]	3.67E-01	0.264	326	179	132	15	39659	21475	15411	2773
Enlargement of lymph nodes	1.04 [0.95-1.13]	3.68E-01	0.260	1574	846	615	113	9925	5450	3812	663
Other psychosocial circumstances	0.96 [0.87-1.05]	3.68E-01	0.264	1152	636	438	78	35152	19022	13674	2456
Signs And Symptoms In Breast:Subset(Males)	0.89 [0.7-1.14]	3.70E-01	0.264	174	99	66	9	19607	10592	7670	1345
Other and unspecified diseases of the oral soft tissues	0.94 [0.81-1.08]	3.70E-01	0.265	496	275	192	29	41821	22606	16259	2956
Fitting and adjustment of other device	0.94 [0.81-1.08]	3.70E-01	0.263	508	283	196	29	37808	20548	14632	2628
Superficial injury of hip thigh leg and ankle	0.87 [0.64-1.18]	3.70E-01	0.264	115	64	47	4	46006	24878	17913	3215
Dislocation of knee	0.95 [0.86-1.06]	3.71E-01	0.264	992	555	368	69	46527	25172	18095	3260
Closed fracture of nasal bones	0.9 [0.72-1.13]	3.71E-01	0.264	209	119	78	12	48312	26162	18768	3382
Striangles bacillus infection in conditions classified elsewhere and of unspecified site	1.27 [0.75-2.16]	3.72E-01	0.264	32	17	10	5	45155	24455	17545	3155
Iron deficiency anemia	0.98 [0.93-1.03]	3.72E-01	0.265	4661	2557	1771	333	35013	18869	13670	2474
Urinary Incontinence	1.03 [0.96-1.1]	3.73E-01	0.260	3741	2052	1410	279	9912	5456	3793	663
Other Specified Complications Of Procedures	1.09 [0.9-1.32]	3.73E-01	0.264	263	137	104	22	44099	23839	17210	3050
Dystrophy Of Vulva:Subset(Females)	1.16 [0.84-1.61]	3.73E-01	0.266	88	46	32	10	15659	8414	6153	1092
Calculus of ureter	1.04 [0.95-1.15]	3.73E-01	0.265	1151	607	460	84	35158	19028	13660	2470
Uterus:Subset(Females)	0.9 [0.72-1.13]	3.74E-01	0.264	212	117	84	11	25414	13787	9820	1807
Acute Nonsuppurative Otitis Media	0.95 [0.86-1.06]	3.76E-01	0.263	925	498	382	45	35109	19079	13554	2476
Congenital anomalies of urinary system	1.05 [0.95-1.16]	3.77E-01	0.264	962	502	393	67	42707	23150	16564	2993
Parosmia agitata	1.06 [0.93-1.21]	3.77E-01	0.263	577	296	242	39	43776	23774	16957	3045
Mandible Fracture-Closed	1.21 [0.79-1.85]	3.78E-01	0.264	51	23	25	3	48474	26258	18827	3389
Neoplasm of uncertain behavior of other and unspecified sites and tissues	0.98 [0.94-1.02]	3.78E-01	0.264	6839	3704	2674	461	35374	19124	13777	2473
Screening examination for pulmonary tuberculosis	0.97 [0.89-1.05]	3.78E-01	0.264	1962	1086	743	133	12867	6950	5021	896
Central Nervous System	1.16 [0.83-1.64]	3.80E-01	0.266	81	41	32	8	23814	12784	9386	1644
Nonallopathic lesions not elsewhere classified	0.95 [0.85-1.07]	3.81E-01	0.264	803	449	298	56	38901	21065	15142	2694
Intervertebral disc disorders	1.02 [0.98-1.05]	3.81E-01	0.266	10036	5390	3932	714	31941	17257	12432	2252
Throat pain	0.89 [0.68-1.16]	3.81E-01	0.259	154	88	59	7	10096	5540	3877	679
Infertility	0.94 [0.82-1.08]	3.82E-01	0.266	568	313	215	40	15628	8397	6145	1086
Personal history of mental disorder	0.91 [0.74-1.12]	3.82E-01	0.264	235	126	102	7	29584	16055	11457	2072
Localized adiposity	1.07 [0.92-1.24]	3.83E-01	0.262	456	240	181	35	29041	15838	11177	2026
Gastrectomy status	1.1 [0.88-1.38]	3.83E-01	0.263	199	106	74	19	26262	14214	10266	1782
Encounter for routine screening for malformation using ultrasonics	0.9 [0.71-1.14]	3.83E-01	0.264	208	114	84	10	41752	22615	16238	2899
Other congenital anomalies of heart	0.93 [0.79-1.1]	3.84E-01	0.264	390	223	138	29	43208	23410	16777	3021
Contracture of palmar fascia	0.91 [0.75-1.12]	3.85E-01	0.265	260	148	95	17	29757	16063	11630	2064
Routine infant or child health check	1.07 [0.92-1.24]	3.85E-01	0.264	1241	652	505	84	41547	22494	16166	2887
Mitral stenosis	1.13 [0.86-1.49]	3.86E-01	0.264	124	65	46	13	47940	25962	18636	3342
Peripheral autonomic neuropathy in disorders classified elsewhere	1.18 [0.81-1.73]	3.87E-01	0.263	64	31	28	5	43716	23748	16934	3034
Health supervision of infant or child	1.07 [0.92-1.24]	3.87E-01	0.264	1241	652	505	84	41542	22492	16164	2886
Alopecia	0.95 [0.86-1.06]	3.87E-01	0.264	919	516	342	61	29749	16115	11555	2079
Unspecified general medical examination	0.97 [0.9-1.04]	3.87E-01	0.264	2106	1155	814	137	12880	6960	5021	899
Anal fistula	0.89 [0.67-1.17]	3.87E-01	0.266	139	81	48	10	33139	17878	12905	2356
Schizoaffective Type Schizophrenia	1.12 [0.87-1.43]	3.88E-01	0.264	154	80	60	14	44107	23865	17174	3068
Unspecified disorder of gallbladder	0.91 [0.74-1.13]	3.90E-01	0.265	232	129	91	12	36366	19594	14227	2545
Systemic inflammatory response syndrome	1.03 [0.96-1.11]	3.90E-01	0.264	1838	991	701	146	42865	23241	16679	2945
Screening for malignant neoplasms of cervix:Subset(Females)	0.98 [0.92-1.03]	3.91E-01	0.262	8170	4485	3121	564	5832	3156	2251	425
Organ or tissue replaced by transplant	1.05 [0.93-1.19]	3.91E-01	0.264	694	363	281	50	26244	14207	10254	1783
Personal history of allergy to medicinal agents	1.09 [0.9-1.31]	3.92E-01	0.264	267	140	104	23	28866	15646	11200	2020
Other Specified Disorders Of Stomach And Duodenum	0.94 [0.8-1.09]	3.93E-01	0.264	441	254	152	35	38789	21000	15088	2701
Disorders of muscle ligament and fascia	0.98 [0.94-1.02]	3.93E-01	0.264	7138	3919	2712	507	26095	14079	10212	1804
Entropion And Trichiasis Of Eyelid	1.12 [0.87-1.44]	3.93E-01	0.263	151	79	59	13	29860	16231	11547	2082
Disorders Of Calcium Metabolism	0.97 [0.9-1.04]	3.93E-01	0.262	1873	1030	728	115	28843	15721	11109	2013
Arteriovenous fistula	0.92 [0.75-1.12]	3.94E-01	0.264	273	154	102	17	40959	22200	15881	2878
Pruritus ani	1.12 [0.86-1.46]	3.94E-01	0.265	136	71	52	13	39916	21554	15569	2793
Bipolar Affective Disorder	1.07 [0.92-1.24]	3.94E-01	0.264	430	224	172	34	44073	23851	17153	3069
Educational circumstances	0.92 [0.75-1.12]	3.94E-01	0.264	269	148	108	13	35856	19412	13932	2512
Atrial Fibrillation And Flutter	0.98 [0.93-1.03]	3.96E-01	0.265	5830	3188	2225	417	33884	18294	13223	2367
Acute pain due to trauma;Acute post-thoracotomy pain;Other acute postoperative pain;Other acute pain	0.93 [0.79-1.1]	3.98E-01	0.264	399	226	146	27	45676	24728	17751	3197
Other anaphylactic reaction	1.12 [0.86-1.44]	3.98E-01	0.263	144	76	54	14	44149	23954	17156	3039

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Calculus of kidney	0.98 [0.92-1.03]	3.98E-01	0.264	3650	1999	1404	247	34701	18772	13492	2437
Other and unspecified noninfectious gastroenteritis and colitis	0.96 [0.88-1.05]	3.98E-01	0.264	1209	655	489	65	44593	24189	17262	3142
Obsessive-compulsive disorders	0.92 [0.76-1.11]	3.99E-01	0.263	297	169	109	19	35373	19189	13730	2454
Malnutrition of moderate degree	0.9 [0.71-1.15]	3.99E-01	0.264	183	109	58	16	45961	24864	17908	3189
Other Malignant Neoplasm Of Skin Of Other And Unspecified	1.04 [0.95-1.13]	3.99E-01	0.264	1555	820	619	116	43523	23598	16893	3032
Non-specific Reaction To Tuberculin Skin Test Without Active	0.92 [0.76-1.12]	3.99E-01	0.266	275	153	107	15	23788	12766	9377	1645
Labyrinthitis	1.08 [0.9-1.29]	3.99E-01	0.264	305	160	119	26	35755	19423	13809	2523
Other family circumstances	0.96 [0.86-1.06]	4.00E-01	0.264	1000	544	396	60	35637	19285	13862	2490
Unspecified disorder of liver	1.06 [0.92-1.22]	4.01E-01	0.266	505	265	200	40	36257	19506	14211	2540
Benign neoplasm of skin	1.03 [0.96-1.1]	4.01E-01	0.265	2401	1278	951	172	36895	19976	14326	2593
Syncope and collapse	1.03 [0.97-1.09]	4.01E-01	0.261	3825	2057	1493	275	9890	5430	3802	658
Other late effects of cerebrovascular disease	0.91 [0.73-1.14]	4.01E-01	0.264	213	116	88	9	41824	22670	16238	2916
Trigeminal neuralgia	0.93 [0.78-1.11]	4.01E-01	0.263	328	188	116	24	38342	20802	14894	2646
Cellulitis and abscess of foot	1.05 [0.94-1.17]	4.02E-01	0.264	795	425	306	64	40458	21924	15755	2779
Malignant neoplasm of prostate:Subset(Males)	0.96 [0.88-1.05]	4.02E-01	0.265	1528	843	577	108	17875	9597	7060	1218
Abnormal involuntary movements	1.05 [0.94-1.17]	4.03E-01	0.260	877	472	338	67	10074	5533	3864	677
Disorders of lipid metabolism	1.02 [0.98-1.06]	4.04E-01	0.264	32368	17534	12578	2256	10860	5919	4174	767
Non-toxic nodular goiter	0.97 [0.91-1.04]	4.05E-01	0.265	2276	1251	874	151	42180	22777	16443	2960
Retinal Detachment With Retinal Defect	0.94 [0.81-1.09]	4.05E-01	0.263	484	268	189	27	29853	16233	11540	2080
Unspecified Hemiplegia And Hemiparesis	0.9 [0.71-1.15]	4.06E-01	0.263	181	108	58	15	39876	21650	15458	2768
Malignant neoplasm of other specified sites of bladder	0.9 [0.71-1.15]	4.07E-01	0.265	178	104	60	14	45916	24809	17909	3198
Acute prostatitis:Subset(Males)	0.94 [0.8-1.1]	4.10E-01	0.263	434	244	161	29	10958	5925	4299	734
Other arthropod-borne diseases	0.94 [0.82-1.09]	4.10E-01	0.264	523	296	189	38	47965	25954	18660	3351
Actinic keratosis	0.98 [0.92-1.03]	4.10E-01	0.263	4606	2501	1781	324	29170	15833	11318	2019
Other Nonspecific Immunological Findings	1.04 [0.94-1.16]	4.12E-01	0.266	961	503	390	68	23493	12612	9255	1626
Hydronephrosis	0.95 [0.85-1.07]	4.13E-01	0.264	840	461	328	51	35149	19040	13642	2467
Other Personality Disorders	1.09 [0.89-1.34]	4.13E-01	0.264	231	122	88	21	35375	19190	13731	2454
Other disorders of pancreatic internal secretion	0.97 [0.9-1.04]	4.14E-01	0.266	2064	1123	806	135	36860	19867	14384	2609
Dementias	0.93 [0.78-1.11]	4.14E-01	0.264	346	194	129	23	46991	25488	18216	3287
Supervision of other normal pregnancy:Subset(Females)	0.97 [0.89-1.05]	4.15E-01	0.264	3220	1739	1277	204	22088	11991	8540	1557
Leurisy	0.96 [0.88-1.05]	4.16E-01	0.264	1367	762	504	101	42504	22971	16571	2962
Person with feared complaint in whom no diagnosis was made	0.84 [0.54-1.29]	4.16E-01	0.264	58	32	25	1	36165	19579	14049	2537
Metrorrhagia:Subset(Females)	0.92 [0.76-1.12]	4.17E-01	0.266	277	153	107	17	15582	8376	6118	1088
Contracture Of Joint	1.19 [0.78-1.82]	4.17E-01	0.264	52	24	25	3	29457	15936	11478	2043
Other Spontaneous Pneumothorax	0.91 [0.71-1.15]	4.18E-01	0.264	182	103	69	10	43650	23605	17005	3040
Phlebitis And Thrombophlebitis Of Deep Veins Of Lower Extremities	0.95 [0.85-1.07]	4.19E-01	0.265	744	415	277	52	38379	20750	14906	2723
Acute Gastritis	0.93 [0.77-1.12]	4.19E-01	0.264	298	165	118	15	39230	21241	15262	2727
Personal history of other mental disorders	0.88 [0.64-1.21]	4.19E-01	0.263	104	58	42	4	29671	16114	11480	2077
Epistaxis	1.04 [0.94-1.16]	4.20E-01	0.260	1067	578	412	77	10033	5508	3851	674
Acute laryngitis and tracheitis	1.07 [0.9-1.27]	4.20E-01	0.264	328	171	131	26	45007	24367	17510	3130
Arteriosclerotic Dementia	0.9 [0.7-1.16]	4.21E-01	0.264	164	94	59	11	47059	25528	18238	3293
Acute sinusitis	0.99 [0.96-1.02]	4.22E-01	0.264	16000	8699	6214	1087	25652	13868	9971	1813
Other Pyelonephritis Or Pyonephrosis	0.94 [0.81-1.09]	4.23E-01	0.264	474	262	183	29	35091	18986	13638	2467
Disruption Of Operation Wound	1.1 [0.88-1.37]	4.23E-01	0.264	195	102	76	17	44323	23959	17289	3075
Abnormal Glucose Tolerance Test	0.98 [0.94-1.03]	4.23E-01	0.265	6002	3271	2322	409	22607	12151	8891	1565
Unspecified cataract	1.03 [0.96-1.09]	4.23E-01	0.263	3751	2009	1486	256	29255	15906	11305	2044
Pulmonary congestion and hypostasis	0.91 [0.73-1.14]	4.23E-01	0.264	218	120	88	10	43517	23540	16949	3028
Amblyopia Ex Anopsia	1.08 [0.9-1.28]	4.24E-01	0.263	311	164	122	25	29780	16197	11507	2076
Other Specified Diseases Of Blood And Blood-Forming Organs	0.96 [0.86-1.07]	4.25E-01	0.266	841	468	312	61	35987	19385	14043	2559
Other Specified Congenital Anomalies Of Muscle	0.81 [0.48-1.37]	4.26E-01	0.264	40	24	14	2	43412	23507	16869	3036
Pneumococcal pneumonia [Streptococcus pneumoniae pneumonia]	0.82 [0.49-1.35]	4.26E-01	0.264	44	26	16	2	43396	23462	16919	3015
Hallux valgus (acquired)	1.09 [0.88-1.35]	4.26E-01	0.264	209	106	89	14	39450	21361	15356	2733
Other Specified Arthropod-Borne Diseases	0.94 [0.82-1.09]	4.28E-01	0.264	520	294	188	38	47969	25956	18662	3351
Other Background Retinopathy And Retinal Vascular Changes	0.95 [0.84-1.08]	4.29E-01	0.263	663	370	249	44	29780	16186	11518	2076
Infection And Inflammatory Reaction Due To Internal Prosthetic	1.06 [0.92-1.23]	4.31E-01	0.264	445	231	182	32	44355	23997	17284	3074
Other Otitis Externa	0.96 [0.85-1.07]	4.31E-01	0.263	806	447	305	54	35512	19301	13709	2502
Closed fracture of other facial bones	1.12 [0.84-1.49]	4.31E-01	0.264	117	60	47	10	48346	26182	18788	3376
Duodenal ulcer	1.06 [0.91-1.24]	4.32E-01	0.264	429	226	170	33	39241	21261	15253	2727
Cellulitis And Abscess Of Finger	0.94 [0.79-1.1]	4.32E-01	0.263	377	210	145	22	40378	21928	15668	2782
Abdominal Or Pelvic Swelling	1.05 [0.93-1.19]	4.32E-01	0.260	705	377	279	49	10003	5486	3846	671
Aortic aneurysm and dissection	0.97 [0.91-1.04]	4.33E-01	0.264	2360	1272	941	147	40750	22090	15796	2864
Chronic ischemic heart disease	0.98 [0.92-1.03]	4.36E-01	0.265	4008	2146	1620	242	38373	20746	14912	2715
Screening examination for venereal disease	0.94 [0.81-1.1]	4.36E-01	0.264	508	282	194	32	12900	6976	5018	906
Chest Pain	1.02 [0.97-1.07]	4.37E-01	0.261	14952	8139	5792	1021	7915	4343	3029	543
Gun Injury-Closed	0.83 [0.51-1.33]	4.37E-01	0.264	48	28	18	2	48587	26328	18869	3390
Conduction disorders	0.97 [0.9-1.05]	4.39E-01	0.264	2030	1103	797	130	34855	18850	13584	2421
Unspecified diseases due to mycobacteria	0.83 [0.51-1.35]	4.41E-01	0.264	46	28	15	3	45287	24529	17597	3161
Organs replaced by other means	1.03 [0.96-1.11]	4.41E-01	0.264	2354	1267	917	170	26012	14074	10174	1764
Toxic Diffuse Goiter	0.95 [0.84-1.08]	4.42E-01	0.265	642	357	244	41	42555	22994	16581	2980

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Other Nonspecific Findings On Examination Of Blood	0.98 [0.92-1.04]	4.77E-01	0.266	3453	1884	1327	242	23135	12411	9121	1603
Constipation	0.98 [0.94-1.03]	4.78E-01	0.265	5695	3084	2218	393	30105	16261	11706	2138
Contusion Shoulder/Arm	1.09 [0.87-1.36]	4.78E-01	0.264	190	97	79	14	44963	24342	17476	3145
Cavernangioma and lymphangioma any site	0.94 [0.8-1.11]	4.79E-01	0.264	380	214	140	26	39604	21435	15385	2784
Other specified noninflammatory disorders of vagina:Subset(Females)	1.08 [0.88-1.32]	4.79E-01	0.266	237	124	92	21	15509	8341	6085	1083
Asymptomatic varicose veins	0.96 [0.87-1.07]	4.80E-01	0.265	1044	569	416	59	38032	20564	14766	2702
Secondary malignant neoplasm of respiratory and digestive systems	0.94 [0.79-1.12]	4.80E-01	0.264	355	196	138	21	47225	25563	18365	3297
Genetic carrier status	0.83 [0.51-1.38]	4.80E-01	0.264	43	26	14	3	48853	26457	18987	3409
Pregnancy Examination Or Test	0.94 [0.78-1.12]	4.82E-01	0.265	357	199	135	23	6544	3538	2534	472
Pneumonia due to other virus not elsewhere classified	1.15 [0.78-1.7]	4.83E-01	0.265	61	33	20	8	43468	23494	16955	3019
Unspecified pleural effusion	0.97 [0.88-1.06]	4.83E-01	0.264	1148	640	422	86	42927	23198	16739	2990
Special investigations and examinations	1.02 [0.97-1.07]	4.83E-01	0.263	27279	14808	10554	1917	5896	3207	2285	404
Dermatophytosis of nail	0.98 [0.93-1.04]	4.83E-01	0.264	3469	1922	1290	257	37508	20333	14550	2625
Juvenile dementia	0.92 [0.72-1.17]	4.84E-01	0.264	176	99	66	11	47058	25530	18236	3292
Chronic Serous Otitis Media	0.93 [0.76-1.14]	4.85E-01	0.263	262	149	94	19	36099	19620	13942	2537
Diastolic heart failure	0.98 [0.91-1.05]	4.85E-01	0.264	2470	1347	957	166	35462	19184	13811	2467
Hearing loss	1.02 [0.97-1.07]	4.86E-01	0.264	4524	2418	1781	325	34047	18498	13172	2377
Abn Reaction To Oth Proc	0.93 [0.76-1.14]	4.86E-01	0.264	255	145	92	18	45825	24805	17820	3200
Unspecified Adverse Effect Of Drug	0.97 [0.89-1.06]	4.86E-01	0.263	1436	803	525	108	42518	23053	16531	2934
Delirium due to conditions classified elsewhere	0.92 [0.72-1.17]	4.87E-01	0.264	177	98	70	9	46898	25441	18180	3277
Classified	0.94 [0.79-1.12]	4.87E-01	0.265	351	187	146	18	26122	14171	10077	1874
Anomalies of spleen	1.18 [0.74-1.88]	4.88E-01	0.264	42	20	19	3	43425	23525	16862	3038
Ill-defined intestinal infections	0.94 [0.79-1.12]	4.89E-01	0.264	328	187	118	23	46987	25462	18241	3284
Borderline Glaucoma (Glaucoma Suspect)	1.02 [0.96-1.08]	4.89E-01	0.264	3363	1794	1340	229	29568	16071	11429	2068
Synovitis And Tenosynovitis	1.02 [0.96-1.08]	4.89E-01	0.266	3457	1860	1336	261	28075	15123	10989	1963
Spotting complicating pregnancy	0.81 [0.44-1.48]	4.91E-01	0.264	30	19	8	3	25463	13816	9837	1810
Contusion Knee/Lower Leg	0.95 [0.83-1.09]	4.91E-01	0.264	560	314	206	40	44053	23861	17118	3074
Abnormal glucose tolerance of mother complicating pregnancy childbirth or the peripartum:Subset(Females)	0.97 [0.87-1.07]	4.91E-01	0.264	1196	659	449	88	25348	13757	9790	1801
After-Cataract	1.02 [0.96-1.09]	4.93E-01	0.264	3798	2006	1540	252	29807	16207	11524	2076
Atrioventricular block	0.95 [0.81-1.11]	4.94E-01	0.264	431	239	164	28	35580	19251	13855	2474
Juvenile Chronic Polyarthritis	0.85 [0.52-1.37]	4.94E-01	0.264	47	30	12	5	29507	15968	11492	2047
Deficiency of other vitamins	1.11 [0.83-1.48]	4.94E-01	0.264	111	59	41	11	45934	24836	17910	3188
Atrophic Gastritis	1.1 [0.84-1.42]	4.94E-01	0.264	142	73	58	11	38981	21108	15160	2713
Unspecified adjustment reaction	1.06 [0.9-1.25]	4.95E-01	0.263	367	193	147	27	35231	19122	13675	2434
Diabetes With Other Specified Manifestations	0.96 [0.87-1.07]	4.96E-01	0.266	965	539	351	75	37366	20155	14561	2650
Dysuria	0.98 [0.93-1.04]	4.96E-01	0.260	6590	3621	2516	453	9486	5201	3638	647
Special screening for malignant neoplasms for intestine	0.98 [0.94-1.03]	4.98E-01	0.263	17162	9367	6599	1196	11050	5984	4286	780
Hypotension	0.98 [0.91-1.05]	4.98E-01	0.265	2115	1157	810	148	36344	19652	14095	2597
Anodontia	0.92 [0.72-1.18]	4.98E-01	0.265	167	97	57	13	42389	22915	16481	2993
Other personal history presenting hazards to health	1.01 [0.98-1.05]	4.99E-01	0.264	10204	5504	3967	733	20724	11301	7966	1457
Internal hemorrhoids with other complication	0.92 [0.74-1.16]	5.00E-01	0.265	197	106	83	8	38354	20729	14897	2728
Complications peculiar to certain specified procedures	1.03 [0.95-1.1]	5.00E-01	0.264	1929	1031	757	141	42091	22804	16374	2913
Deficiency of b-complex components	0.97 [0.89-1.06]	5.00E-01	0.264	1475	818	552	105	45394	24553	17699	3142
Abdominal Pain	1.02 [0.97-1.06]	5.01E-01	0.261	13894	7533	5431	930	8563	4714	3261	588
Stomatitis	0.91 [0.69-1.2]	5.01E-01	0.265	134	73	56	5	42173	22816	16380	2977
Gastrointestinal Complications	0.94 [0.77-1.14]	5.01E-01	0.264	276	161	91	24	43935	23742	17150	3043
Influenza	0.96 [0.85-1.08]	5.02E-01	0.264	681	374	264	43	41776	22582	16298	2896
Hemoptysis	0.95 [0.82-1.1]	5.03E-01	0.259	501	281	193	27	10106	5546	3881	679
Subjective Visual Disturbances	1.06 [0.9-1.24]	5.03E-01	0.263	393	221	129	43	29588	16083	11440	2065
Unspecified vitamin D deficiency	1.01 [0.98-1.05]	5.03E-01	0.265	13387	7217	5239	931	31740	17171	12354	2215
Horticaia	1.03 [0.94-1.12]	5.03E-01	0.264	1363	733	526	104	29354	15932	11384	2038
Other demyelinating diseases of central nervous system	0.94 [0.77-1.14]	5.05E-01	0.263	282	154	115	13	40001	21732	15493	2776
Other disorders of prostate:Subset(Males)	0.95 [0.81-1.11]	5.06E-01	0.263	455	253	176	26	10982	5928	4321	733
Adjustment reaction	0.99 [0.95-1.03]	5.06E-01	0.263	7457	4086	2847	524	30910	16753	12019	2138
Personal history of allergy to other specified medicinal agents	0.89 [0.62-1.27]	5.07E-01	0.264	81	49	25	7	29418	15955	11401	2062
Acute Myocardial Infarction	0.95 [0.83-1.1]	5.09E-01	0.265	533	303	187	43	39021	21103	15164	2754
Other specified forms of chronic ischemic heart disease	0.98 [0.91-1.05]	5.09E-01	0.265	2162	1172	844	146	38779	20963	15073	2743
Dental examination	0.98 [0.91-1.05]	5.10E-01	0.264	2248	1235	857	156	12834	6935	4997	902
Chronic pharyngitis	0.87 [0.58-1.31]	5.10E-01	0.264	65	41	17	7	39181	21198	15238	2745
Acute Laryngitis	1.07 [0.88-1.29]	5.10E-01	0.264	265	138	107	20	45160	24464	17560	3136
Vitamin d deficiency	1.01 [0.98-1.05]	5.10E-01	0.265	13394	7221	5242	931	31729	17163	12352	2214
Epoma	0.95 [0.83-1.1]	5.13E-01	0.265	508	285	188	35	39702	21466	15450	2786
Regional enteritis of unspecified site	0.95 [0.81-1.11]	5.14E-01	0.264	405	229	146	30	46774	25338	18154	3282
Other Advanced Maternal Age:Subset(Females)	0.95 [0.82-1.1]	5.14E-01	0.265	518	283	200	35	26095	14157	10062	1876
Bipolar I disorder	0.94 [0.77-1.14]	5.15E-01	0.264	274	152	105	17	44085	23851	17166	3068
Contusion Of Hip & Thigh	1.07 [0.87-1.33]	5.16E-01	0.264	208	109	82	17	44998	24407	17458	3133
Acute Myocardial Infarction	0.97 [0.9-1.05]	5.17E-01	0.265	1769	949	714	106	38821	20990	15086	2745
Normal delivery:Subset(Females)	0.96 [0.84-1.09]	5.18E-01	0.264	668	359	268	41	24887	13493	9622	1772

HSD17B13 and liver disease

Other Retinal Disorders	0.99 [0.89-1.1]	8.26E-01	0.263	988	540	379	69	29813	16218	11519	2076
Cellulitis and abscess of hand	0.98 [0.81-1.19]	8.27E-01	0.263	272	153	97	22	40653	22060	15789	2804
Fracture of one or more phalanges of foot	1.02 [0.86-1.21]	8.27E-01	0.264	327	180	119	28	45580	24676	17750	3154
Unspecified Osteomyelitis	1.02 [0.88-1.17]	8.28E-01	0.264	504	278	184	42	39445	21361	15359	2725
Unspecified transient cerebral ischemia	1.01 [0.94-1.08]	8.28E-01	0.264	2094	1124	817	153	41302	22379	16041	2882
Pain in limb	1 [0.96-1.03]	8.28E-01	0.264	15201	8262	5889	1050	19621	10597	7673	1351
Observation and evaluation for suspected conditions not found	1.01 [0.91-1.13]	8.28E-01	0.264	911	490	357	64	12819	6939	4986	894
Unspecified infectious and parasitic diseases	1.05 [0.69-1.59]	8.29E-01	0.264	55	29	22	4	48091	26049	18688	3354
Open wound of other and unspecified parts of trunk	1.03 [0.8-1.33]	8.29E-01	0.264	148	83	50	15	46384	25113	18042	3229
Inflammation of eyelids	0.99 [0.93-1.06]	8.30E-01	0.263	2528	1367	998	163	28806	15652	11159	1995
Need for prophylactic vaccination and inoculation against varicella	1.01 [0.92-1.11]	8.30E-01	0.264	1327	706	535	86	31911	17288	12427	2196
Other Symptoms Involving Head And Neck	1.02 [0.88-1.17]	8.31E-01	0.259	553	302	214	37	10009	5497	3839	673
Variants Of Migraine	1.01 [0.9-1.13]	8.31E-01	0.263	802	424	331	47	39818	21640	15415	2763
Chronic Conjunctivitis	1.01 [0.9-1.14]	8.31E-01	0.263	721	385	289	47	29547	16077	11418	2052
Dizziness and giddiness	1.01 [0.95-1.06]	8.32E-01	0.261	6714	3660	2610	444	9561	5227	3684	650
Other disorders of synovium tendon and bursa	1 [0.95-1.04]	8.33E-01	0.266	5741	3109	2219	413	26659	14325	10449	1885
Atherosclerosis	0.99 [0.93-1.06]	8.33E-01	0.264	2980	1607	1172	201	39910	21641	15468	2801
Unspecific abnormal findings on radiological and other examination of other sites of body	1.02 [0.83-1.26]	8.34E-01	0.266	233	125	90	18	23659	12695	9324	1640
Diseases of pancreas	1.01 [0.92-1.1]	8.35E-01	0.266	1283	681	517	85	36076	19442	14111	2523
Contusion Of Ankle And Foot	1.02 [0.84-1.24]	8.35E-01	0.264	256	135	104	17	44654	24181	17368	3105
Malignant essential hypertension	0.98 [0.81-1.18]	8.36E-01	0.264	291	160	111	20	42810	23202	16589	3019
Occlusion and stenosis of precerebral arteries	1.01 [0.95-1.07]	8.36E-01	0.264	3163	1682	1277	204	41014	22256	15906	2852
Unspecified anomaly of urinary system	0.95 [0.59-1.53]	8.36E-01	0.264	45	25	17	3	43378	23498	16846	3034
Embolism And Thrombosis Of Arteries Of The Extremities	0.97 [0.75-1.26]	8.36E-01	0.264	153	83	60	10	40971	22205	15889	2877
Osteomyelitis periostitis and other infections involving bone	0.99 [0.86-1.13]	8.37E-01	0.264	592	331	214	47	39375	21324	15336	2715
Tachycardia	1.01 [0.92-1.11]	8.38E-01	0.259	1192	639	483	70	9987	5483	3839	665
Pain	1.01 [0.94-1.08]	8.38E-01	0.264	1936	1045	752	139	44028	23834	17111	3083
Right bundle branch block	0.99 [0.85-1.14]	8.38E-01	0.264	499	271	194	34	35312	19102	13755	2455
Circadian rhythm sleep disorder	1.02 [0.84-1.24]	8.38E-01	0.264	257	137	102	18	45437	24597	17649	3191
Other	0.98 [0.85-1.14]	8.38E-01	0.263	475	254	193	28	35284	19145	13693	2446
Open Wound Of Elbow	0.97 [0.74-1.27]	8.39E-01	0.264	139	75	56	8	47229	25582	18364	3283
Ectopic pregnancy:Subset(Females)	1.03 [0.75-1.42]	8.39E-01	0.264	97	50	41	6	28146	15262	10889	1995
Jaundice	1.02 [0.84-1.25]	8.40E-01	0.259	259	143	97	19	10124	5558	3886	680
Carpal tunnel syndrome	1.01 [0.96-1.06]	8.40E-01	0.263	4760	2580	1856	324	36739	19913	14287	2539
Other And Unspecified Peripheral Vertigo	0.99 [0.91-1.08]	8.41E-01	0.263	1384	749	544	91	35012	19094	13526	2472
Ascites	1.02 [0.87-1.19]	8.43E-01	0.259	414	228	156	30	10110	5552	3879	679
Personal History Of Diseases Of Digestive System	0.99 [0.94-1.05]	8.43E-01	0.265	3385	1829	1324	232	27749	15042	10732	1975
Embolism And Thrombosis Of Other Specified Veins	1.02 [0.83-1.26]	8.43E-01	0.265	222	119	87	16	38427	20770	14928	2729
Benign neoplasm of eye	0.98 [0.84-1.16]	8.44E-01	0.264	382	208	148	26	40083	21698	15579	2806
Post-surgical Renal Dialysis Status	0.99 [0.85-1.14]	8.44E-01	0.263	466	249	191	26	26237	14195	10261	1781
Habitual Aborter	1.03 [0.74-1.44]	8.45E-01	0.264	91	47	38	6	25474	13820	9843	1811
Other Specified Bacterial Infections In Conditions	1.01 [0.88-1.16]	8.46E-01	0.264	530	286	207	37	44720	24235	17376	3109
Dermatographic urticaria	1.04 [0.69-1.57]	8.46E-01	0.264	57	30	23	4	30285	16419	11761	2105
Special screening for malignant neoplasms	1 [0.96-1.04]	8.46E-01	0.264	29963	16258	11624	2081	9045	4894	3528	623
Douty Arthropathy	1.01 [0.92-1.11]	8.47E-01	0.262	1195	644	472	79	29154	15890	11233	2031
Arthropathy	1.01 [0.94-1.08]	8.47E-01	0.263	2040	1107	794	139	28646	15538	11134	1974
Malignant neoplasm of colon	1.01 [0.88-1.17]	8.47E-01	0.264	486	257	198	31	47840	25903	18589	3348
Incontinence Of Feces	1.02 [0.86-1.2]	8.48E-01	0.259	391	213	150	28	10125	5559	3888	678
Disorders of tooth development and eruption	1.01 [0.9-1.14]	8.49E-01	0.265	755	411	285	59	41989	22700	16330	2959
Acute venous embolism and thrombosis of unspecified deep vessels of lower extremity;Acute venous embolism and thrombosis of deep vessels of proximal lower extremity;Acute venous embolism and thrombosis of deep vessels of distal lower extremity	0.99 [0.89-1.1]	8.49E-01	0.265	959	523	367	69	38332	20721	14890	2721
Adult failure to thrive	0.97 [0.71-1.33]	8.50E-01	0.259	105	61	35	9	10133	5563	3891	679
Other nonspecific findings on examination of urine	0.99 [0.87-1.12]	8.50E-01	0.266	644	351	247	46	23467	12594	9246	1627
Cellulitis and abscess of upper arm and forearm	1.01 [0.89-1.16]	8.51E-01	0.263	572	311	217	44	40274	21866	15636	2772
Delusional disorder	1.05 [0.65-1.67]	8.51E-01	0.264	44	23	18	3	44095	23859	17169	3067
Anal fissure and fistula	0.99 [0.86-1.13]	8.51E-01	0.266	563	305	220	38	32938	17766	12833	2339
Malignant melanoma of skin of lower limb	0.97 [0.69-1.36]	8.52E-01	0.264	86	46	36	4	44408	24069	17241	3098
Other disorders of biliary tract	0.99 [0.88-1.11]	8.52E-01	0.266	739	407	273	59	36232	19516	14179	2537
Cornea replaced by transplant	1.03 [0.73-1.47]	8.52E-01	0.263	82	41	38	3	26272	14217	10271	1784
Traumatic amputation of other finger(s) (complete) (partial)	0.96 [0.66-1.42]	8.52E-01	0.264	68	37	27	4	47714	25848	18546	3320
Sprains and strains of shoulder and upper arm	0.99 [0.92-1.07]	8.53E-01	0.263	1872	1017	729	126	40495	21963	15724	2808
Stenosis of rectum and anus	1.05 [0.63-1.76]	8.55E-01	0.266	36	18	16	2	33146	17880	12910	2356
Other Threatened Labor:Subset(Females)	0.98 [0.82-1.18]	8.56E-01	0.265	321	171	127	23	25362	13752	9806	1804
Personal history of malignant neoplasm of breast:Subset(Females)	1.01 [0.91-1.12]	8.56E-01	0.262	1004	555	370	79	17416	9507	6689	1220
Other dermatoses	1 [0.95-1.04]	8.56E-01	0.264	6564	3543	2565	456	27483	14905	10680	1898
Endocarditis	1.03 [0.78-1.34]	8.57E-01	0.264	135	73	51	11	35583	19256	13852	2475
Chalazion	1.02 [0.86-1.2]	8.58E-01	0.263	358	197	132	29	29647	16116	11466	2065
Other orthopedic aftercare	1.01 [0.88-1.16]	8.59E-01	0.264	532	288	205	39	37370	20274	14491	2605

HSD17B13 and liver disease

Need for prophylactic vaccination and inoculation against viral hepatitis	1 [0.92-1.08]	9.75E-01	0.263	1728	928	688	112	33350	18098	12949	2303
Without Mention Of Abscess:Subset(Males)	1 [0.85-1.18]	9.76E-01	0.264	392	208	160	24	10907	5883	4297	727
Attention Deficit Disorder Of Childhood	1 [0.88-1.13]	9.77E-01	0.263	728	399	275	54	35341	19180	13714	2447
Need for prophylactic vaccination and inoculation against certain viral diseases	1 [0.97-1.03]	9.77E-01	0.264	24568	13293	9560	1715	16910	9162	6585	1163
Other Acquired Deformities Of Ankle And Foot	1 [0.87-1.16]	9.78E-01	0.264	482	256	197	29	39200	21224	15264	2712
Ulcerative enterocolitis	1 [0.88-1.14]	9.78E-01	0.264	608	329	238	41	46683	25279	18127	3277
Endometriosis	1 [0.85-1.17]	9.79E-01	0.266	412	226	151	35	15646	8408	6150	1088
Neurosyphilis	0.99 [0.68-1.46]	9.79E-01	0.264	67	36	27	4	48765	26402	18952	3411
Injury to heart and lung	1.01 [0.65-1.56]	9.80E-01	0.264	51	28	19	4	48571	26317	18865	3389
Diaphragmatic hernia without mention of obstruction or gangrene	1 [0.94-1.06]	9.80E-01	0.264	2932	1574	1158	200	40219	21786	15605	2828
Ascitis	0.99 [0.63-1.57]	9.80E-01	0.265	48	26	19	3	29778	16070	11646	2062
Stress incontinence	1 [0.93-1.08]	9.81E-01	0.266	2135	1171	791	173	15093	8106	5932	1055
Closed fracture of dorsal [thoracic] vertebra without mention of spinal cord injury	1 [0.84-1.2]	9.82E-01	0.264	305	162	124	19	46989	25458	18236	3295
Chronic pharyngitis and nasopharyngitis	1 [0.95-1.06]	9.84E-01	0.264	3745	2016	1479	250	37296	20198	14508	2590
Melanoma of skin	1 [0.78-1.28]	9.85E-01	0.264	163	88	64	11	44375	24053	17229	3093
Anomalies of skull and face bones	1.01 [0.47-2.16]	9.85E-01	0.264	17	10	5	2	43452	23540	16873	3039
Other congenital anomalies of nervous system	1 [0.78-1.28]	9.86E-01	0.264	158	85	63	10	43316	23466	16824	3026
Screening for iron deficiency anemia	1 [0.84-1.2]	9.86E-01	0.265	308	168	117	23	12988	7016	5065	907
Other Ill-Defined Conditions	1 [0.83-1.21]	9.87E-01	0.264	281	147	120	14	45671	24769	17721	3181
Disease of capillaries	1 [0.85-1.18]	9.88E-01	0.264	390	211	154	25	40078	21731	15541	2806
Unspecified disorder of kidney and ureter	1 [0.93-1.08]	9.89E-01	0.265	1996	1087	761	148	34424	18625	13380	2419
Personal History Of Other Genital System And Obstetric	1 [0.77-1.3]	9.90E-01	0.264	146	77	60	9	29584	16053	11457	2074
Fall On Level-Tripping	1 [0.86-1.16]	9.91E-01	0.264	460	253	171	36	44599	24159	17342	3098
Other disorders of male genital organs:Subset(Males)	1 [0.88-1.14]	9.91E-01	0.263	673	360	270	43	10728	5798	4213	717
Examination of participant in clinical trial	1 [0.89-1.13]	9.93E-01	0.264	44548	24126	17300	3122	700	372	282	46
Viral pneumonia	1 [0.75-1.33]	9.95E-01	0.264	124	66	50	8	43406	23467	16925	3014
Anal and rectal polyp	1 [0.78-1.29]	9.95E-01	0.266	157	85	60	12	32697	17645	12731	2321
Acute cystitis	1 [0.95-1.06]	9.96E-01	0.265	3794	2038	1491	265	32908	17779	12806	2323
Pruritus and related conditions	1 [0.93-1.08]	9.96E-01	0.265	1709	929	653	127	38167	20586	14900	2681
Diverticulum of esophagus	1 [0.63-1.58]	9.97E-01	0.264	47	28	13	6	39392	21334	15318	2740
Growing nail	1 [0.93-1.08]	9.97E-01	0.264	1791	973	687	131	29532	16016	11462	2054
Acute appendicitis	1 [0.82-1.21]	9.98E-01	0.264	269	146	104	19	48460	26249	18827	3384
Open wound of finger(s)	1 [0.87-1.15]	9.98E-01	0.264	541	291	213	37	45859	24853	17816	3190
Foreign body in ear	1 [0.59-1.69]	9.98E-01	0.264	36	20	13	3	48387	26212	18801	3374
Hyperkinetic syndrome of childhood	1 [0.89-1.13]	9.98E-01	0.263	729	399	276	54	35332	19176	13709	2447
Diseases of pulp and periapical tissues	1 [0.91-1.1]	1.00E+00	0.265	1244	673	482	89	41199	22294	15998	2907

Gray shading indicates P-values meeting the Bonferroni significance threshold of $P < 1.58E-05$.

Abbreviations: AAF, alternate allele frequency; SE, standard error.

Table S9. Evaluation of Putative HSD17B13 Substrates

Compound Name	HSD17B13 Enzymatic Activity	
	Bioactive Lipid Library	Relative Light Units
(±)10-HDHA	801680	38.28
(±)11-HDHA	1259280	72.31
(±)11-HEDE	1334080	77.87
(±)11-HEPE	791920	37.56
(±)11-HETE	767720	35.76
(±)11(12)-DiHET	599000	20.69
(±)11(12)-EET	306600	1.47
(±)12-HEPE	761600	35.30
(±)12-HETE	1324640	77.17
(±)12-HpETE	165800	-9.27
(±)12(13)-EpOME	358360	2.52
(±)13-HDHA	1154720	64.54
(±)13-HODE	954080	49.62
(±)14(15)-DiHET	403560	5.93
(±)14(15)-DiHETE	356480	2.37
(±)14(15)-EET	305720	1.41
(±)14(15)-EpETE	306600	1.86
(±)15-HEDE	1430720	85.06
(±)15-HEPE	578600	21.70
(±)15-HETE	47880	30.81
(±)16(17)-EpDPA	274120	-0.71
(±)17-HDHA	492440	15.29
(±)17(18)-DiHETE	369120	3.33
(±)17(18)-EpETE	316240	2.19
(±)19(20)-DiHDPA	827600	37.95
(±)19(20)-EpDPA	300600	1.38
(±)20-HDHA	1400640	82.82
(±)4(5)-EpDPA methyl ester	338320	1.00
(±)5-HEPE	344480	4.85
(±)5-HETE	431960	10.79
(±)5-HETE lactone	348120	4.56
(±)5-HETE methyl ester	337600	3.78
(±)5(6)-DiHET	353120	4.93
(±)5(6)-DiHET lactone	411120	6.50
(±)5(6)-EET	360960	5.51
(±)5(6)-EET Ethanolamide	450160	9.45
(±)7-HDHA	361320	5.54
(±)8-HDHA	773120	36.16
(±)8-HEPE	472800	13.83
(±)8-HETE	592720	22.75
(±)8(9)-DiHET	472120	11.11
(±)9-HEPE	699960	30.72
(±)9-HETE	1110120	61.22
(±)9-HODE	695320	30.38
(±)9(10)-DiHOME	391000	4.98
(±)9(10)-EpOME	354560	2.23
10-Nitrooleate	28200	-22.42
11-dehydro Thromboxane B2	349160	5.22
11-dehydro Thromboxane B2-d4	366280	3.11
11-dehydro Thromboxane B3	322480	3.11
11-dehydro-2,3-dinor Thromboxane B2	183120	-7.90
11(12)-EET Ethanolamide	440800	8.74
11(R)-HEDE	1674200	103.16
11(R)-HEPE	940920	48.64

11(R)-HETE	1064120	57.80
11(S)-HEDE	1056440	57.23
11(S)-HEPE	1525600	92.11
11(S)-HETE	696400	30.46
11 β -13,14-dihydro-15-keto Prostaglandin F2 α	310000	2.13
11 β -Misoprostol	331200	3.80
11 β -Prostaglandin E2	354840	5.67
12-epi Leukotriene B3	481880	15.71
12-epi Leukotriene B4	389240	8.39
12(R)-HETE	1932320	122.36
12(S)-HpETE	199760	-6.47
13-epi-12-oxo Phytodienoic Acid	320640	2.97
13,14-dehydro-15-cyclohexyl Carbaprostacyclin	356360	5.79
13,14-dihydro-19(R)-hydroxy Prostaglandin E1	337040	4.26
13(R)-HODE	1105960	60.91
13(S)-HODE	792800	37.62
13(S)-HOTrE	528240	17.95
13(S)-HOTrE(γ)	458840	12.79
13(S)-HpODE	183040	-7.72
13(S)-HpOTrE	35320	-18.70
13(S)-HpOTrE(γ)	268840	-1.34
14(15)-EET Ethanolamide	428760	7.83
15-deoxy- Δ 12,14-Prostaglandin J2-biotin	252400	-2.43
15-OxoEDE	261480	-1.88
15-OxoETE	616120	-8.98
15(R)-HEDE	1862960	117.20
15(R)-HETE	701120	61.00
15(R),19(R)-hydroxy Prostaglandin E1	333200	3.96
15(R),19(R)-hydroxy Prostaglandin E2	346000	4.97
15(R),19(R)-hydroxy Prostaglandin F2 α	382720	7.88
15(S)-Fluprostenol isopropyl ester	410960	10.11
15(S)-HEDE	1060680	57.54
15(S)-HEPE	505240	16.24
15(S)-HETE	1107240	24.49
15(S)-HETE Ethanolamide	535680	19.97
15(S)-HETrE	638320	26.14
15(S)-HpEDE	232720	-4.02
15(S)-HpEPE	316200	2.18
16,16-dimethyl Prostaglandin E2 p-(p-acetamidobenzamido) phenyl ester	322280	3.10
17-trans Prostaglandin F3 α	371720	7.01
19(R)-hydroxy Prostaglandin A2	323320	3.18
19(R)-hydroxy Prostaglandin E1	333160	3.96
19(R)-hydroxy Prostaglandin E2	347280	5.07
19(R)-hydroxy Prostaglandin F1 α	207560	-5.97
19(R)-hydroxy Prostaglandin F2 α	371400	6.98
2,3-dinor Prostaglandin E1	344240	4.83
2,3-dinor Thromboxane B1	364840	3.01
2,3-dinor-11 β -Prostaglandin F2 α	265000	-1.43
2,3-dinor-6-keto Prostaglandin F1 α (sodium salt)	341800	4.64
2,3-dinor-8-iso Prostaglandin F2 α	230040	-4.19
20-carboxy Arachidonic Acid	293760	-2.36
20-carboxy Leukotriene B4	400440	9.28
20-HETE	332640	0.57
20-HETE Ethanolamide	879760	41.89
20-hydroxy Leukotriene B4	654120	29.33
20-hydroxy Prostaglandin E2	348240	5.15
20-hydroxy Prostaglandin F2 α	378680	7.56
5-iPF2 α -VI	293200	0.80

5-OxoETE	261280	-1.90
5-trans Fluprostenol isopropyl ester	551400	21.21
5,6-dehydro Arachidonic Acid	210160	-8.68
5(6)-EpETE methyl ester	337400	0.93
5(S)-HEPE	429120	10.58
5(S)-HETE	430800	10.71
5(S)-HETE lactone	288400	0.12
5(S)-HpETE	225600	-4.55
5(S),15(S)-DiHETE	486600	14.86
5(S),6(R)-DiHETE	166040	1.66
5(S),6(S)-DiHETE	309080	4.07
6-trans Leukotriene B4	1209480	68.61
6,15-diketo-13,14-dihydro Prostaglandin F1 α	262680	-1.61
6(S)-Lipoxin A4	383000	7.90
8-iso Prostaglandin F3 α	361040	6.16
8-iso-13,14-dihydro-15-keto Prostaglandin F2 α	212520	-5.58
8-iso-15-keto Prostaglandin E2	262160	-1.65
8-iso-15-keto Prostaglandin F2 α	312360	2.31
8(9)-EET Ethanolamide	446000	9.14
8(S)-HETrE	412960	9.38
8(S),15(S)-DiHETE	410440	9.19
9-Nitrooleate	31600	-22.16
9-OxoODE	359280	5.39
9(R)-HETE	1656640	101.86
9(R)-HODE	413280	9.40
9(S)-HEPE	564200	20.63
9(S)-HETE	497640	15.68
9(S)-HODE	539560	18.79
9(S)-HOTrE	586800	22.31
9(S)-HpODE	219240	-5.03
Calcitriol	336640	0.88
Carbaprostacyclin	380280	7.68
Carbocyclic Thromboxane A2	309000	2.05
Cholesteryl Linoleate Hydroperoxides	256120	-2.28
Ciprostene (calcium salt)	360560	6.12
D-myo-Inositol-1,2,3,4-tetraphosphate (sodium salt)	447960	9.28
D-myo-Inositol-1,2,3,5-tetraphosphate (sodium salt)	430640	7.98
D-myo-Inositol-1,2,3,6-tetraphosphate (sodium salt)	424280	7.49
D-myo-Inositol-1,2,4,5-tetraphosphate (sodium salt)	403880	5.95
D-myo-Inositol-1,2,4,5,6-pentaphosphate (sodium salt)	398080	5.52
D-myo-Inositol-1,3-diphosphate (sodium salt)	487280	12.25
D-myo-Inositol-1,3,4,5-tetraphosphate (sodium salt)	358920	2.56
D-myo-Inositol-1,4-diphosphate (sodium salt)	439280	8.63
D-myo-Inositol-1,4,5-triphosphate (potassium salt)	358400	2.52
D-myo-Inositol-1,5-diphosphate (sodium salt)	443840	8.97
D-myo-Inositol-2,3,4,5-tetraphosphate (ammonium salt)	372320	3.57
D-myo-Inositol-2,4-diphosphate (sodium salt)	306720	-1.38
D-myo-Inositol-3,4,5-triphosphate (sodium salt)	400520	5.70
D-myo-Inositol-4-phosphate (ammonium salt)	408880	6.33
D-myo-Inositol-4,5-diphosphate (sodium salt)	281680	-3.27
Fluprostenol isopropyl ester	467040	14.54
HPF	273840	-0.73
Hyperforin	23920	-22.74
I-BOP	358960	6.00
I-SAP	245520	-2.97
Iloprost	358880	5.99
Lactacystin	328520	0.26
Leukotriene A3 methyl ester	990560	55.92

Leukotriene A4 methyl ester	463120	14.23
Leukotriene B3	2077280	141.82
Leukotriene B4	1743000	115.40
Leukotriene B4 dimethyl amide	1910040	128.60
Leukotriene B4 Ethanolamide	1948920	131.68
Leukotriene F4	400400	9.27
Lipoxin A4	352680	2.09
MK-571	281520	-0.12
PGPC	371440	6.98
Prostaglandin A1-biotin	309320	2.07
Prostaglandin A3	227000	-4.43
Prostaglandin D2-biotin	367880	3.24
Prostaglandin D3	298960	1.25
Prostaglandin E2 p-benzamidophenyl ester	404280	9.58
Prostaglandin E2-biotin	389960	4.90
Prostaglandin E3	379960	7.66
Prostaglandin F2 α -biotin	340200	1.14
Prostaglandin F3 α	385360	8.08
Prostaglandin H1	145840	-10.85
Prostaglandin H2	166640	-9.20
Prostaglandin I3 (sodium salt)	333560	3.99
Prostaglandin K1	223160	-4.74
Prostaglandin K2	155600	-10.08
PtdIns-(3,4,5)-P3 (1,2-dipalmitoyl) (sodium salt)	334600	0.72
PtdIns-(3,4)-P2 (1,2-dipalmitoyl) (sodium salt)	351680	2.01
PtdIns-(3)-P1 (1,2-dioctanoyl) (sodium salt)	319680	-0.40
PtdIns-(3)-P1 (1,2-dipalmitoyl) (ammonium salt)	15520	-23.38
PtdIns-(4,5)-P2 (1,2-dioctanoyl) (sodium salt)	348680	1.79
PtdIns-(4,5)-P2 (1,2-dipalmitoyl) (ammonium salt)	24120	-22.73
PtdIns-(4)-P1 (1,2-dipalmitoyl) (ammonium salt)	123240	-15.24
PtdIns-(5)-P1 (1,2-dipalmitoyl) (ammonium salt)	19160	-23.10
tetranor-12(R)-HETE	708640	31.37
tetranor-12(S)-HETE	379280	4.10
tetranor-PGDM-d6	375520	3.81
tetranor-PGEM	348440	5.17
tetranor-PGFM	367640	6.68
Thromboxane B3	348080	5.14
U-51605	278680	-0.35
U-75302	425520	7.59
Δ 12-Prostaglandin J2	343320	4.76
Δ 17-6-keto Prostaglandin F1 α	286120	0.24
Estradiol Control	1548190	100.00
DMSO	283090	0.00
Steroid Library		
Apigenin	24440	-2.38
(2a,3a,5 β ,17 β)-Androstan-17ol,2,3-epithio-17-methyl	100160	-1.06
(2 β ,3a,5a,16 β ,17 β)-2-(4-morpholinyl)-16-(1-pyrrolidinyl)androsta	191960	0.55
11-oxo-androsterone	196640	0.63
11-oxo-etiocholanolone	195960	0.62
11 β -Hydroxyandrosterone	224720	1.12
16 α -Hydroxyandrosterone	221840	1.07
18 β -Glycyrrhetic acid	32720	-2.23
2 α ,3 α ,5 α ,16 β -16-(1-pyrrolidinyl)-2,3-epoxyandr	166400	0.10
2 α ,3 α ,5 α ,16 β ,17 β -16-(1-pyrrolidinyl)-2,3-e	103360	-1.00
3 β ,5-Dihydroxy-6 β ,7 β :15 β ,16 β -dimethylene-5 β -androstan-17-one	183120	0.39
5a-androstanedione	181840	0.37
5 α -Androsta-2,16-dien-17-yl acetate	197640	0.65
5 α -Androstane-3,11,17-trione	228280	1.18

5alpha-androstane-3beta, 17beta-diol	398600	4.16
5alpha-dihydrocortisol	139720	-0.36
5alpha-Tetrahydrocortisol	229040	1.20
6-ethylchenodeoxycholic acid	76200	-1.47
Aldosterone	217400	0.99
Androstanediol	488440	5.73
Androstanolone 17-benzoate	217200	0.99
Androstanolone acetate	200560	0.70
Androstenediol	1364160	21.02
Androstenedione	172400	0.21
Androsterone	158120	-0.04
Beta-estradiol	4292760	72.17
Beta-sitosterol	168880	0.14
Corticosterone	215320	0.96
Corticosterone 21-acetate	190160	0.52
cortisol	40080	-2.10
cortisone	204080	0.76
Cortisone 21-acetate	200240	0.69
Dehydroepiandrosterone	196240	0.62
DHT	1886360	30.14
Dromostanolone propionate	212040	0.90
Epiandrosterone	185800	0.44
Epiandrosterone acetate	210960	0.88
Equilin	186840	0.46
Estradiol	5070800	85.76
Estrone	186200	0.45
Formestane	196520	0.63
Glycyrrhizic acid	163600	0.05
Honokiol	52920	-1.88
Oleic Acid	17520	-2.50
Oxymetholone	92000	-1.20
Prednisone	196720	0.63
Pregnanetriol	163920	0.06
Progesterone	175680	0.26
Rostafuroxin	187520	0.47
Spirolactone	184280	0.41
Stanzol	140840	-0.35
Superdrol	105920	-0.95
Testosterone	1125600	16.86
TetrahydroCortisone	232320	1.25
Trilostane	1896560	30.32
Estradiol Control	5885860	100.00
DMSO	160593	0.00

Supplementary Figures

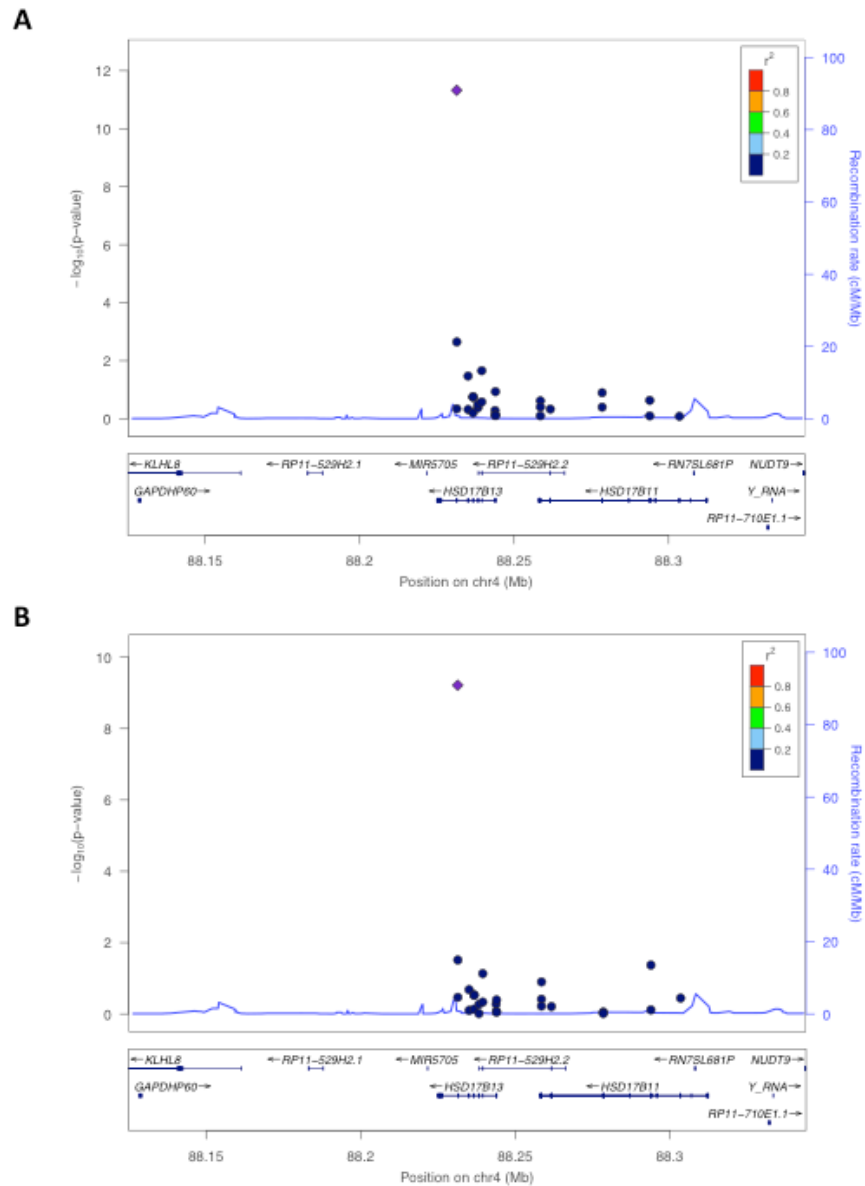


Figure S1. Regional Association Plots for Alanine Aminotransferase (ALT; A) and Aspartate Aminotransferase (AST; B) Levels in the GHS Discovery Cohort in the Region Around *HSD17B13*.

Purple diamonds indicate the splice variant rs72613567. Each circle indicates a single nucleotide variant with the color of the circle indicating the linkage disequilibrium (r^2 calculated in the DiscovEHR cohort) between that variant and rs72613567. Blue lines indicate estimated recombination rates in HapMap. The bottom panels show the relative position and the transcribed strand of each gene in the locus. There were no significant associations between ALT or AST and coding or splice region variants in the neighboring gene *HSD17B11* (most significant P-values 1.4×10^{-1} and 4.3×10^{-2} for ALT and AST, respectively).

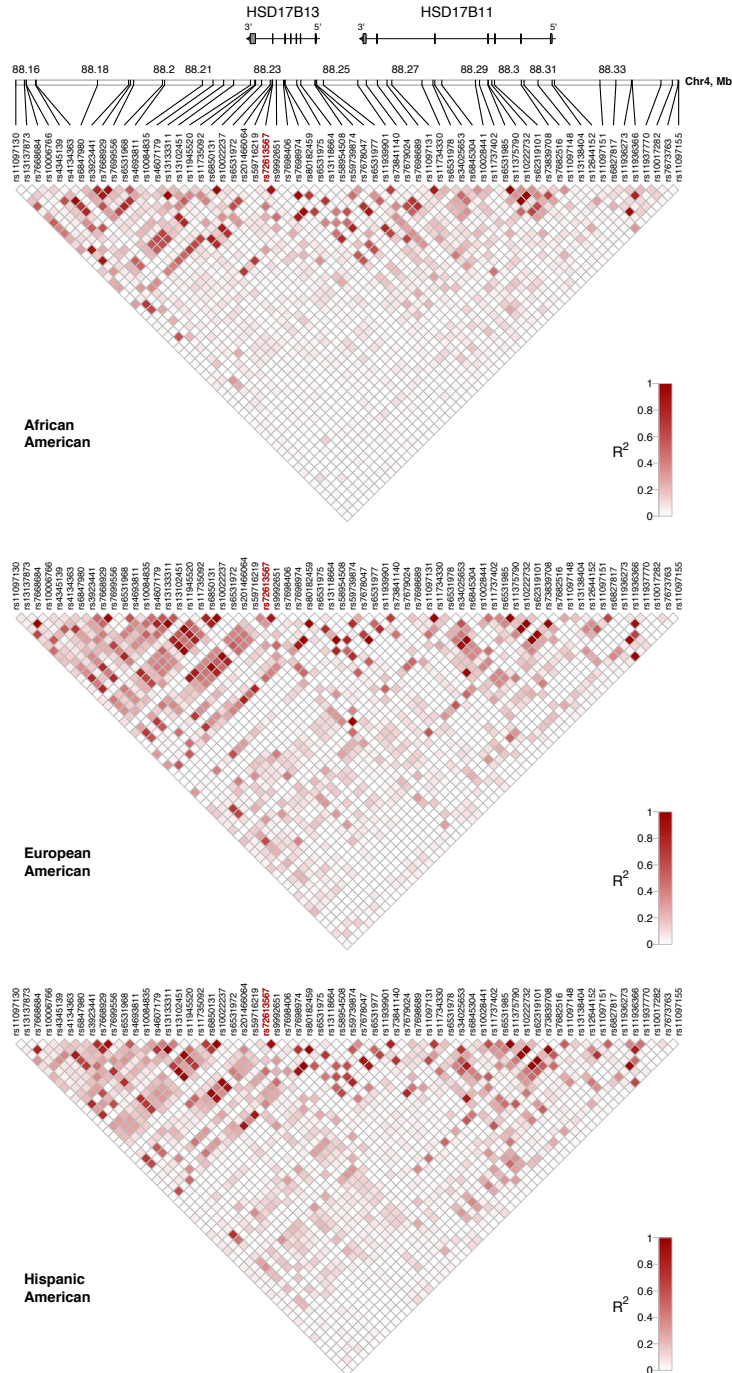


Figure S2. Haplotype Plots Showing Linkage Disequilibrium Around *HSD17B13* and *HSD17B11* in the Dallas Heart Study.

The two genes fall into separate haplotype blocks in European and Hispanic Americans, the populations in which *HSD17B13* rs72613567 association signals were strongest. In particular, rs72613567 (indicated in red) is not in significant linkage disequilibrium with variants in *HSD17B11* ($r^2 < 0.4$). Red shading indicates pairwise r^2 .

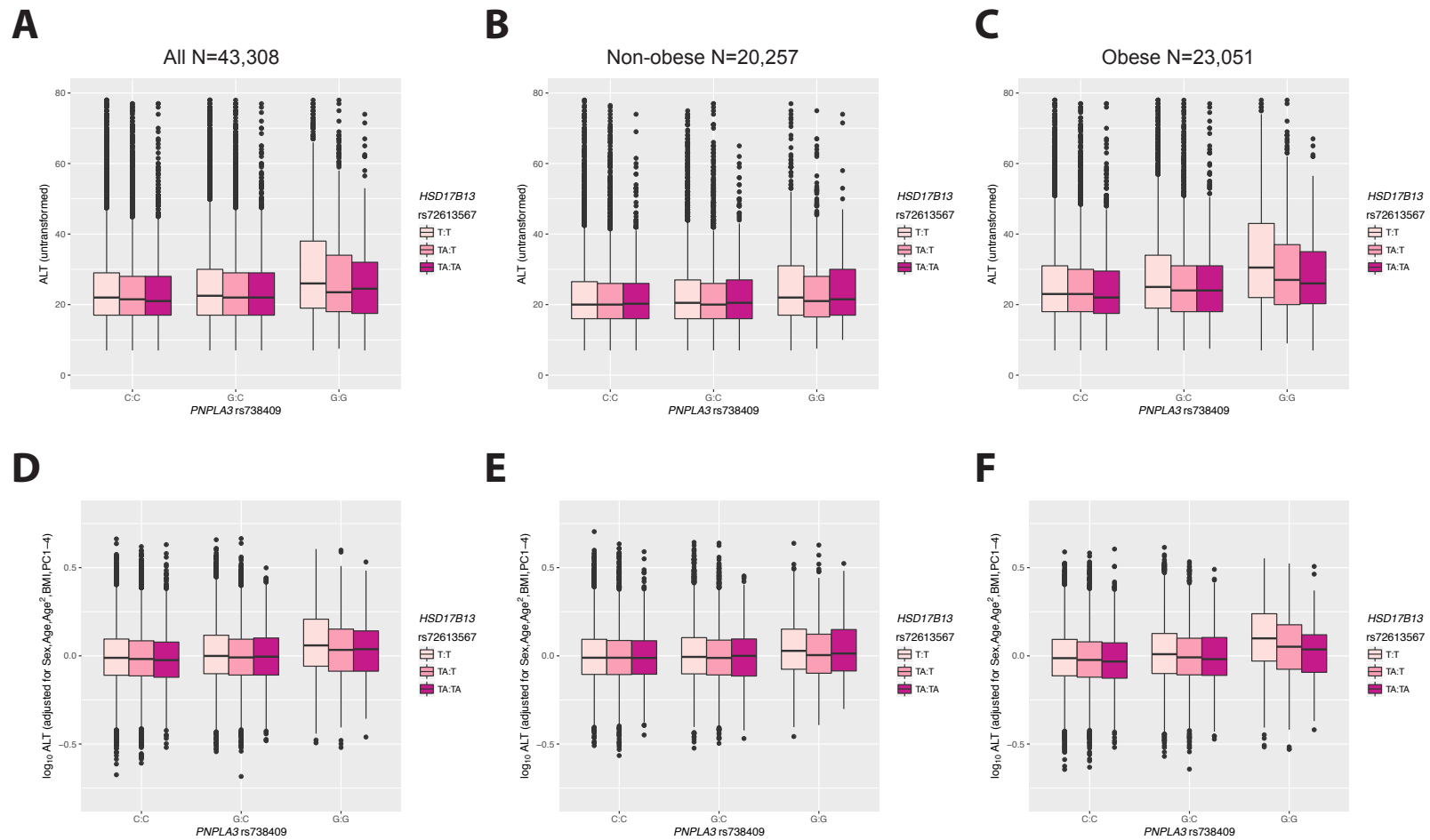


Figure S3. Raw and Residualized ALT levels by *PNPLA3* rs738409 (p.I148M) and *HSD17B13* rs72613567 Genotype.

Residuals calculated by linear regression adjusted for age, age², sex, BMI, and four principal components 1-4.

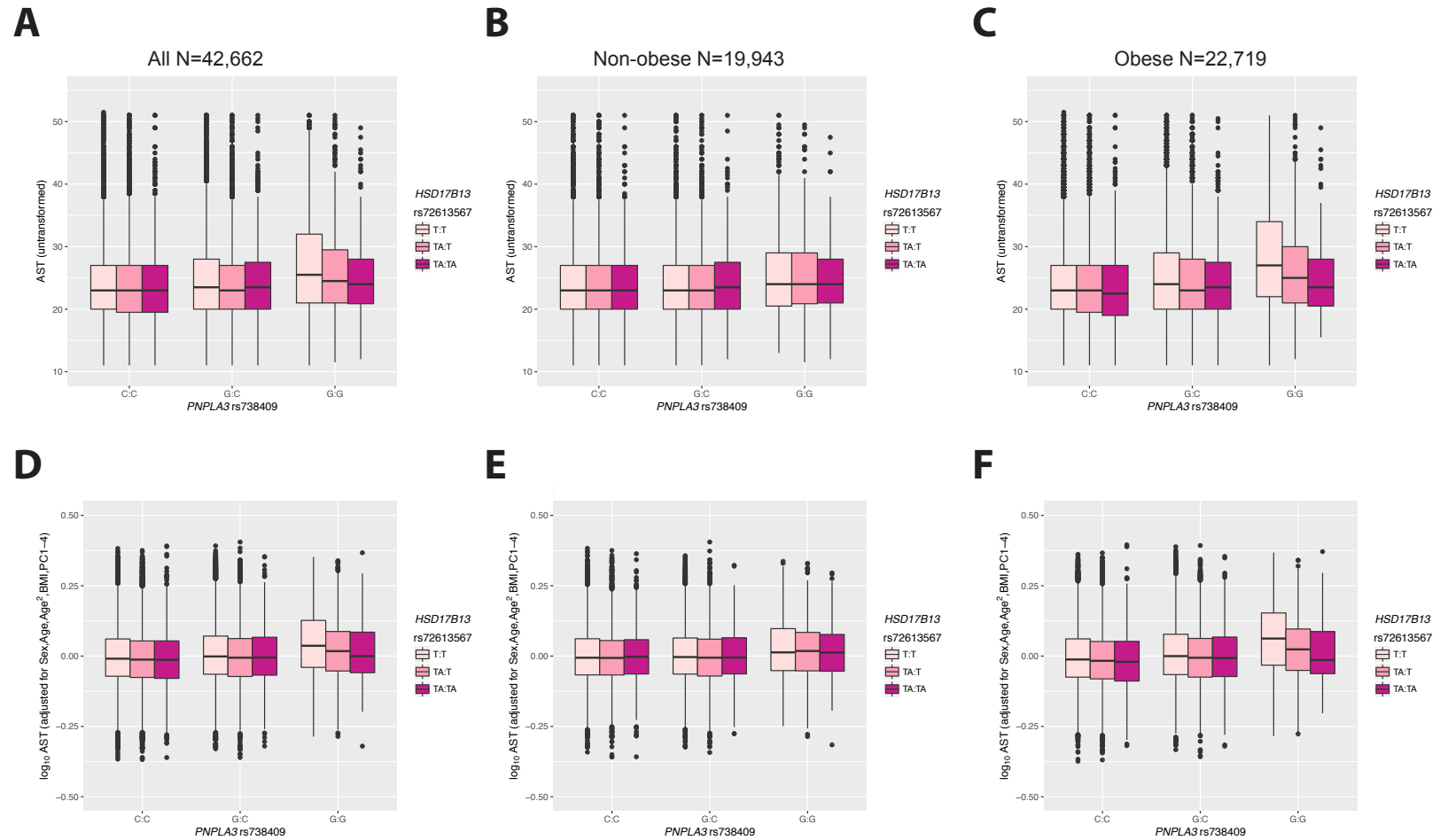


Figure S4. Raw and Residualized AST levels by *PNPLA3* rs738409 (p.I148M) and *HSD17B13* rs72613567 Genotype. Residuals calculated by linear regression adjusted for age, age², sex, BMI, and four principal components 1-4.

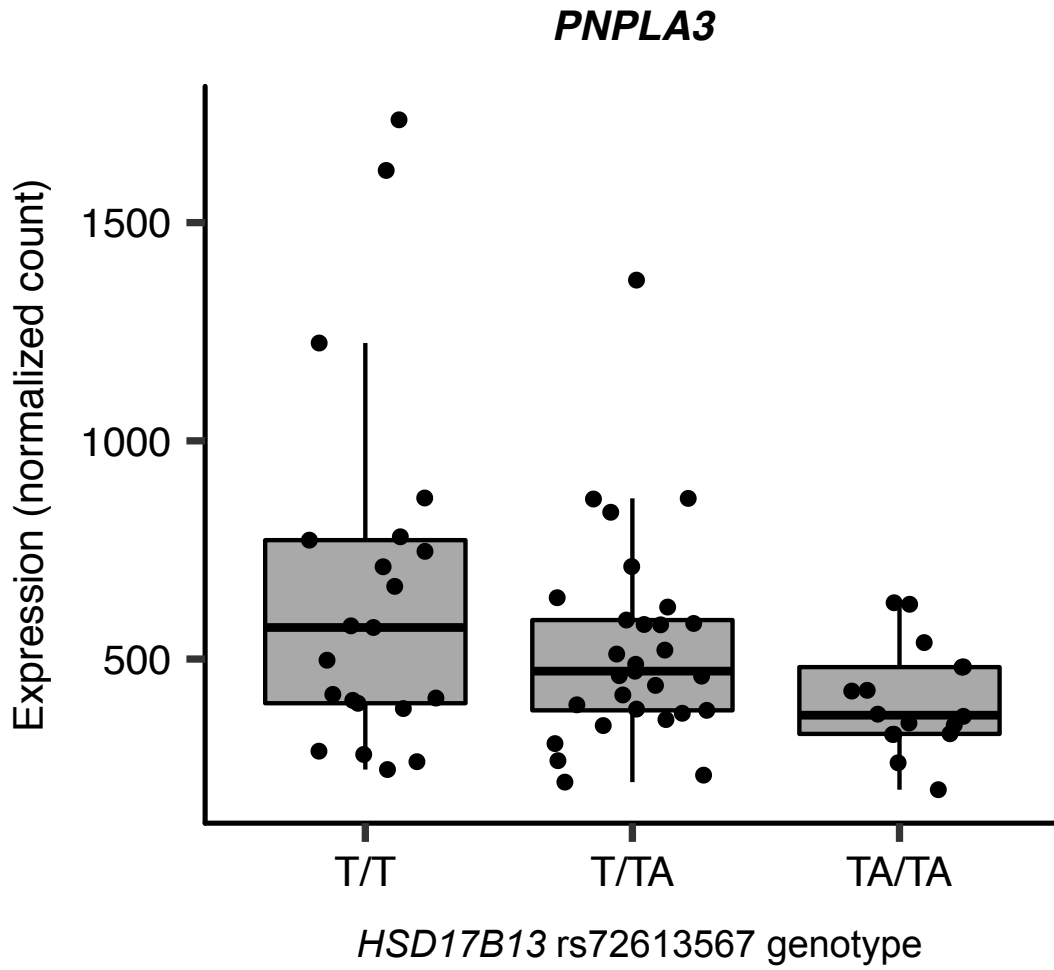


Figure S5. PNPLA3 mRNA Expression According to *HSD17B13* rs72613567 Genotype.

mRNA expression is displayed in normalized count.

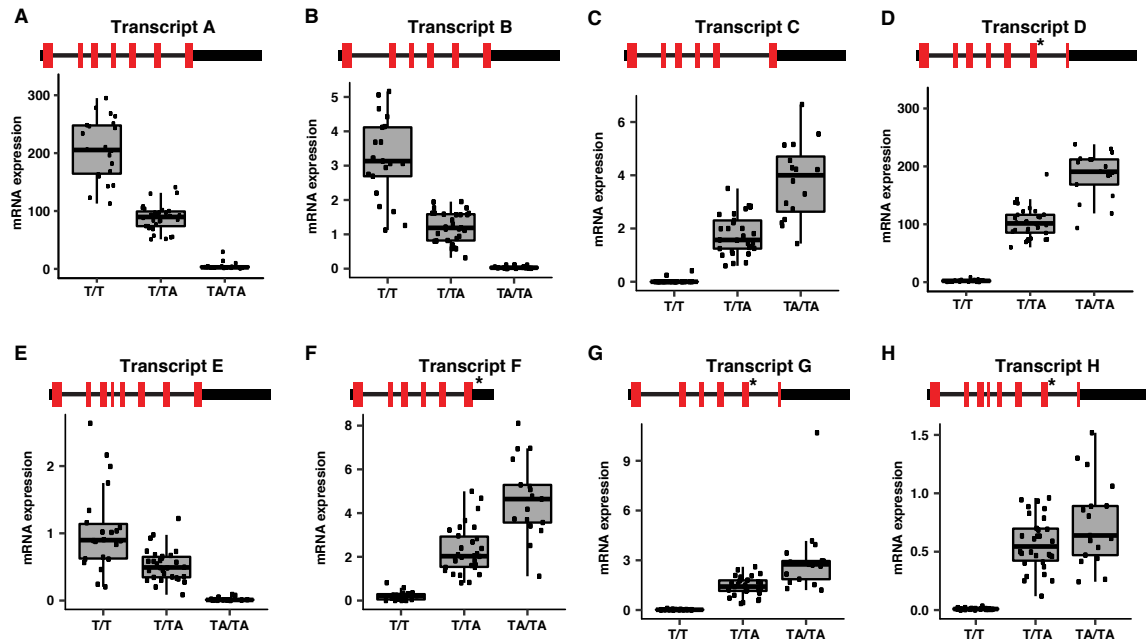


Figure S6. mRNA Expression of Eight *HSD17B13* Transcripts (A-H) in Homozygous Reference (T/T), Heterozygous (T/TA), and Homozygous Alternate (TA/TA) Allele Carriers of the *HSD17B13* Splice Variant.

Each transcript is illustrated with a corresponding gene model. Coding regions in gene models are indicated in red, untranslated regions as thick black lines, and introns as thin black lines. The asterisks indicate the A insertion from rs72613567. Transcripts are differentially expressed according to *HSD17B13* genotype, as shown in the box plots. mRNA expression is displayed in FPKM units (Fragments Per Kilobase of transcript per Million mapped reads).

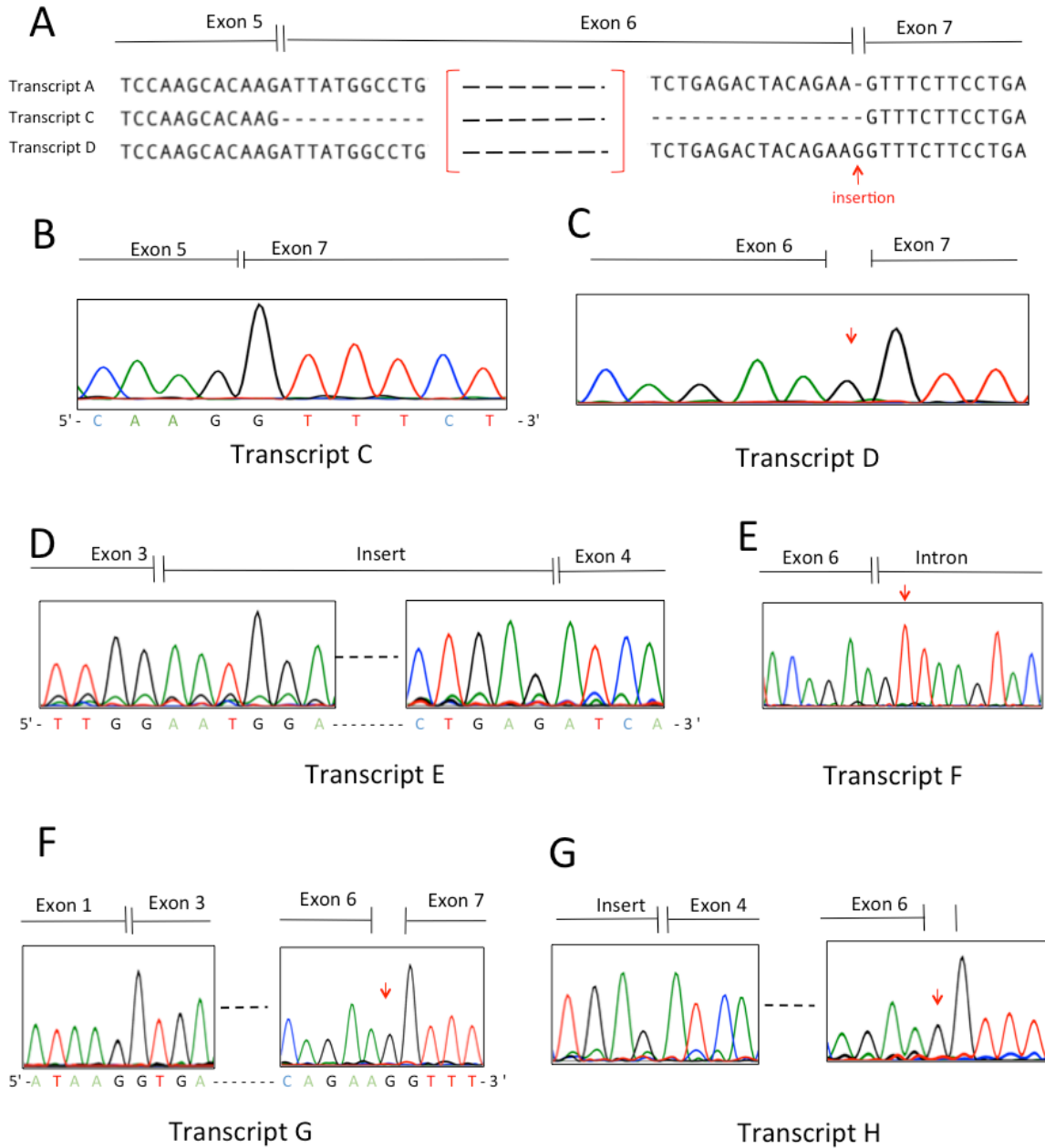


Figure S7. Verification of Novel *HSD17B13* Transcripts (C-H) by Sanger Sequencing of RT-PCR Product.

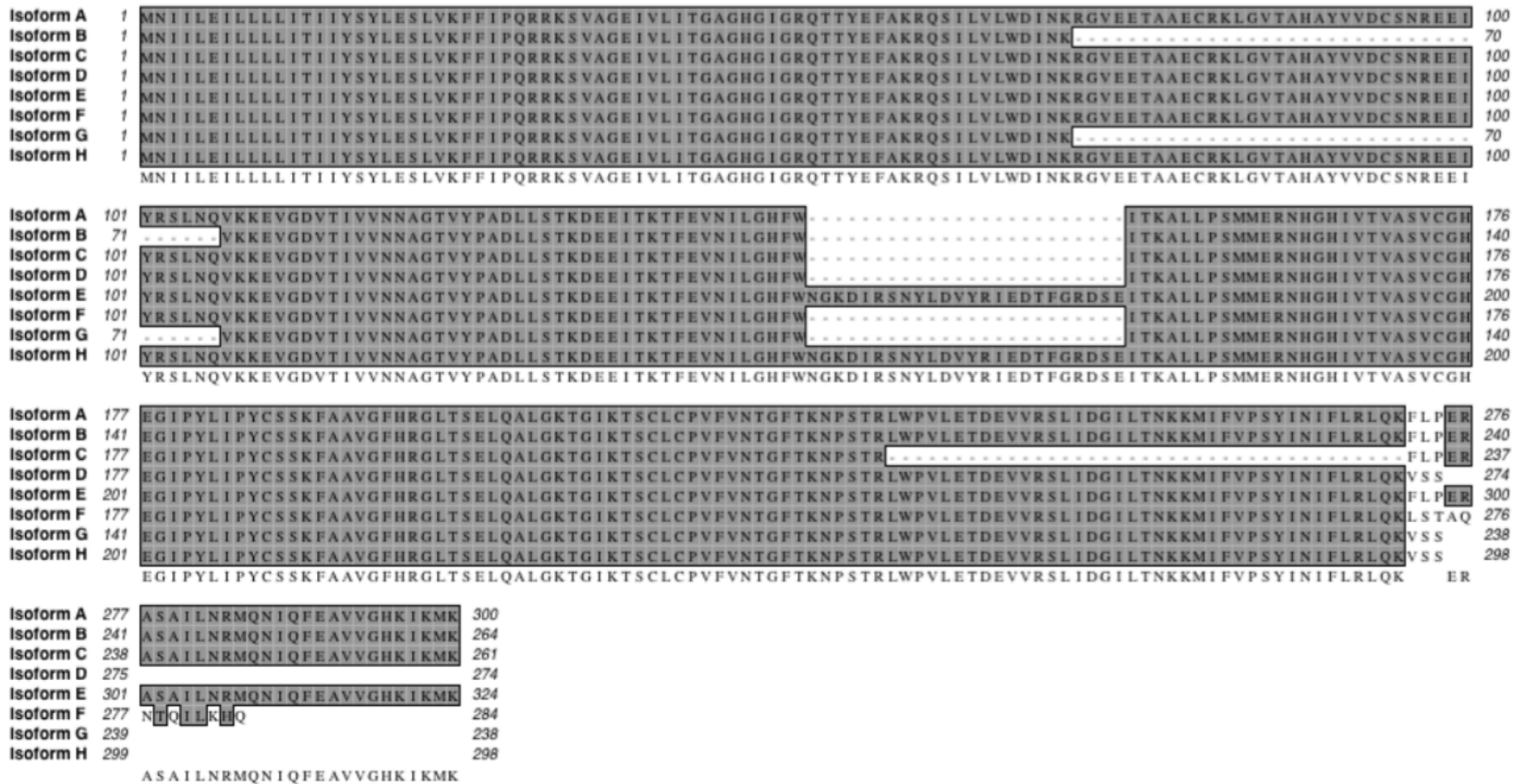


Figure S8. Protein Sequence Alignment of All Identified HSD17B13 Isoforms (A-H).

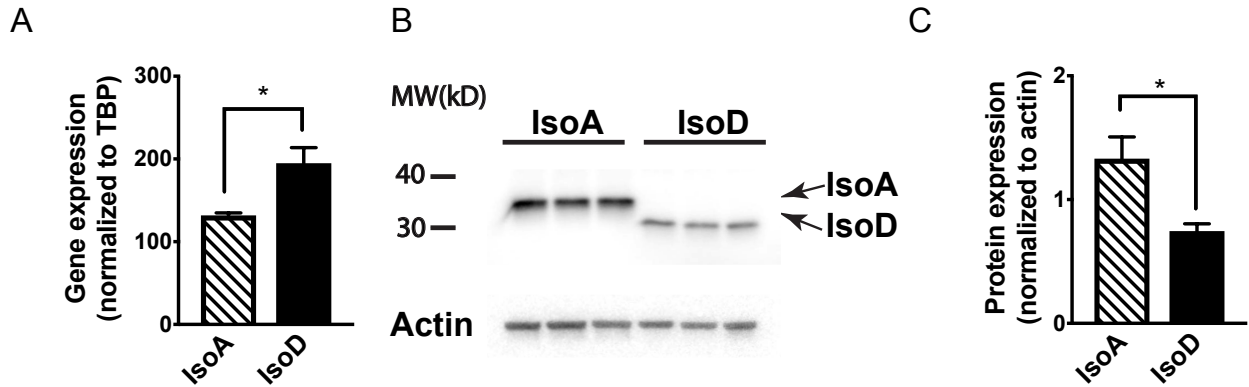


Figure S9. HSD17B13 Isoform D Protein has Lower Molecular Weight and is Unstable when Overexpressed in HEK 293 Cells.

(A) RT-PCR of *HSD17B13* from HEK 293 cells overexpressing *HSD17B13* transcripts A (IsoA) and D (IsoD) indicated that *HSD17B13* IsoD RNA level was higher than IsoA RNA level. (B) Western blot from the same cell lines indicated that *HSD17B13* transcript D was translated to a truncated protein with lower molecular weight compared to *HSD17B13* transcript A. (C) *HSD17B13* IsoD protein levels were lower than IsoA protein levels although the RNA level was higher. *HSD17B13* protein level was normalized to actin. *P<0.05.

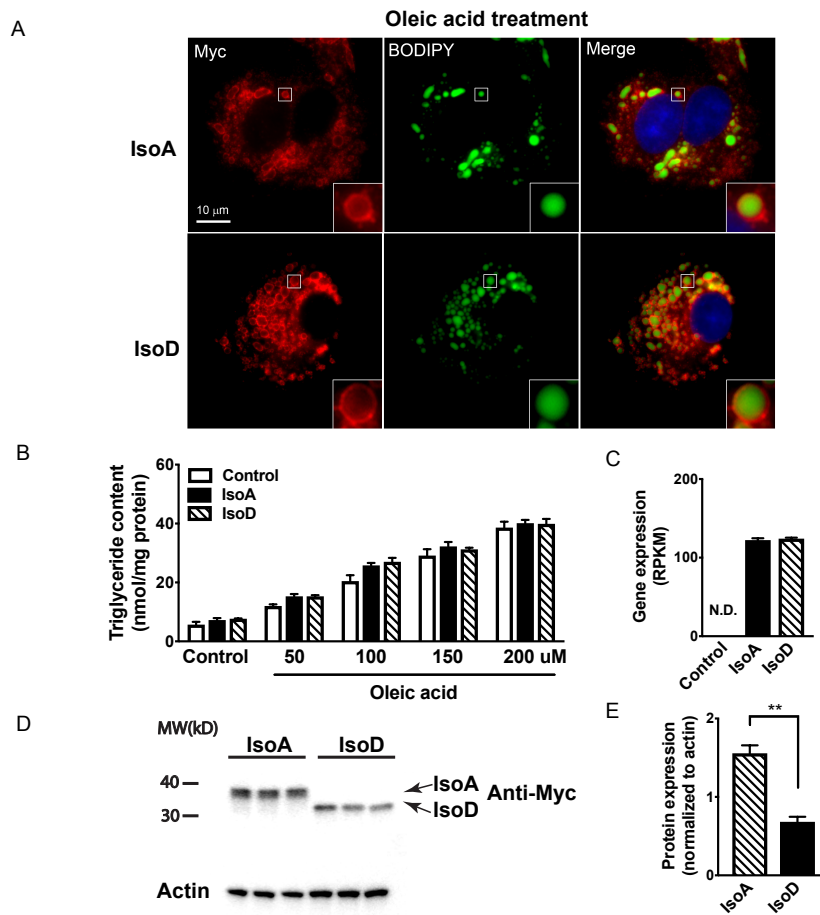


Figure S10. Oleic Acid Increased Triglyceride Content in HepG2 Cells Overexpressing HSD17B13 Transcript A or D.

(A) Oleic acid treatment (200 μM) increased lipid accumulation in lipid droplets in both *HSD17B13* transcript A and D expressing HepG2 cell lines to a similar degree. Cells were labeled with BODIPY to show lipid droplets and anti-Myc to show *HSD17B13* localization. Scale bar indicates 10 μm and for all images. Insets represent 4x amplification of the original images. (B) Treatment with increasing concentrations of oleic acid increased triglyceride (TG) content to a similar extent in control (GFP overexpressing cells), *HSD17B13* transcript A and D cell lines. (C) *HSD17B13* transcripts A and D RNA levels were similar in the cell lines. RNA levels are shown reads per kilobase of transcript per million mapped reads (RPKM). (D) Western blot from HepG2 cells overexpressing *HSD17B13* transcripts A and D. *HSD17B13* transcript D was translated to a truncated protein with lower molecular weight compared to *HSD17B13* transcript A. (E) *HSD17B13* IsoD protein levels were lower than IsoA protein levels. Protein level normalized to actin. **P<0.01

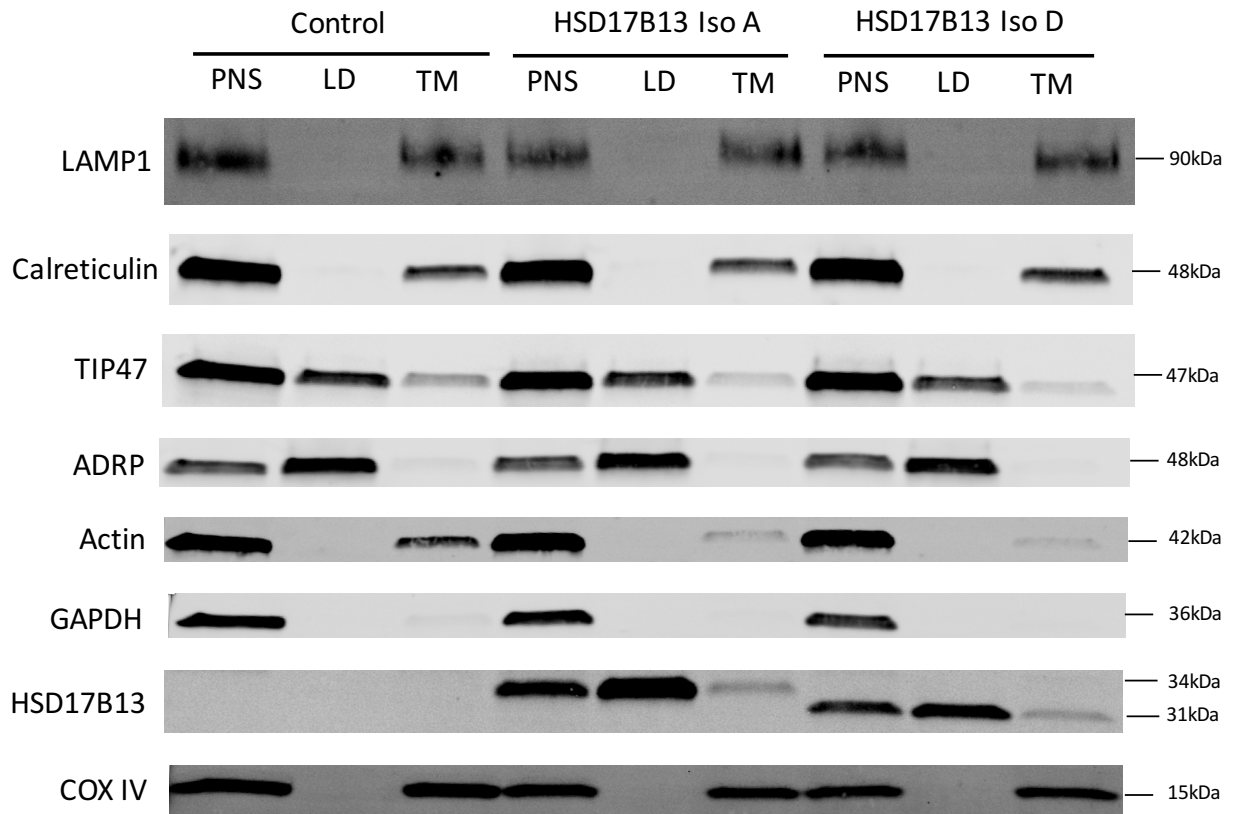


Figure S11. Similar Localization Patterns of HSD17B13 Isoform A and Isoform D to Isolated Lipid Droplets (LD) Derived from HepG2 Stable Cell Lines.

ADRP and TIP47 were used as lipid droplet markers; LAMP1, calreticulin, and COX IV were used as markers for the lysosomal, endoplasmic reticulum, and mitochondrial compartments, respectively; GAPDH was included as a cytosolic marker; and actin was used as a cytoskeletal marker. This experiment was repeated twice in HepG2 cells, with the above being representative of both runs. (PNS=Post-nuclear fraction; TM=total membrane).

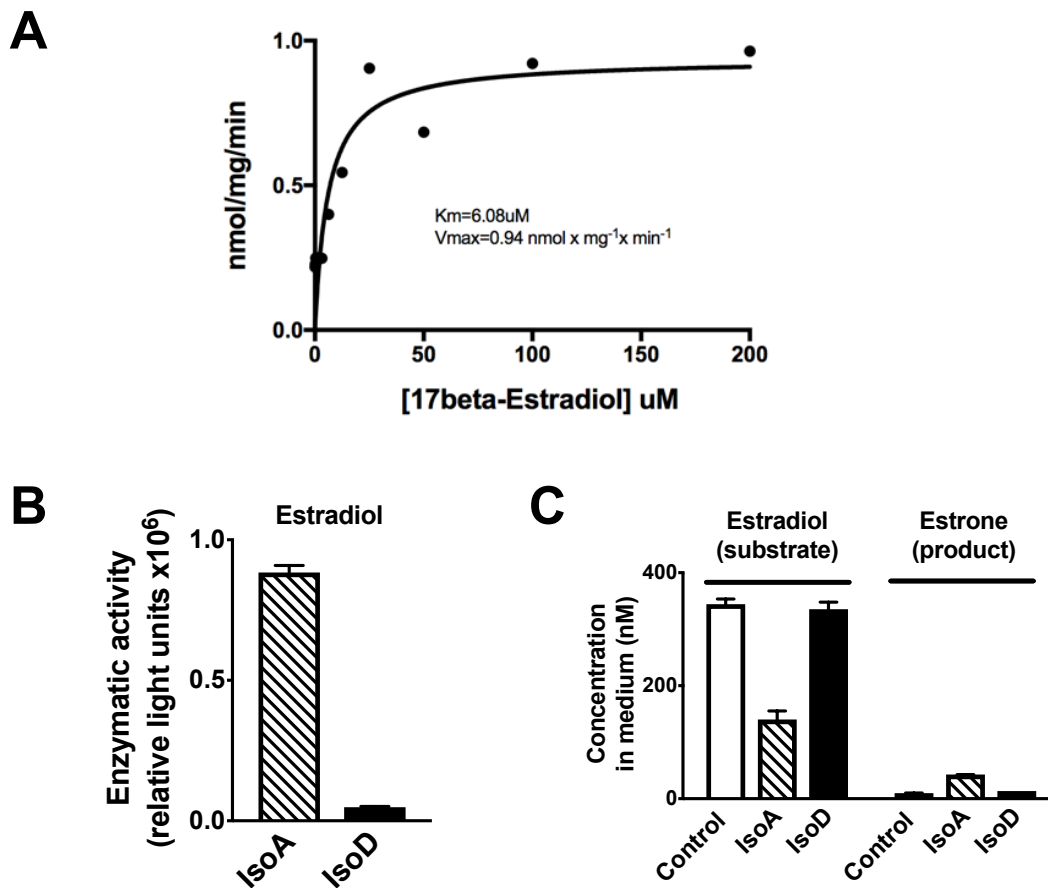


Figure S12. Enzymatic Activity of HSD17B13 Against Estradiol

(A) K_m and V_{max} Values for Estradiol Using Purified Recombinant HSD17B13 Protein. Enzymatic conversion of 17β -estradiol by HSD17B13 results in oxidation of a hydroxyl to a ketone group. For K_m and V_{max} determinations, assays were performed with a dose range of 17β -estradiol between $0.2\mu\text{M}$ to $200\mu\text{M}$ and time points from 5 min to 180 min, with $500\mu\text{M}$ NAD^+ and 228 nM HSD17B13. V_{max} and K_m were then determined using the Michaelis-Menten model and Prism software (GraphPad Software, USA). (B) Enzymatic activity of recombinant human HSD17B13 isoforms A and D purified from *E. coli* to 17-beta estradiol (estradiol). Enzymatic activity was determined through luciferase-based measurement of NADH production using the NAD(P)H-Glo Detection System (Promega). (C) Enzymatic conversion of estradiol (substrate) to estrone (product) by HSD17B13 isoforms A and D overexpressed in HEK293 cells.

References

1. Dewey FE, Murray MF, Overton JD, et al. Distribution and clinical impact of functional variants in 50,726 whole-exome sequences from the DiscovEHR study. *Science* 2016;354.
2. Victor RG, Haley RW, Willett DL, et al. The Dallas Heart Study: a population-based probability sample for the multidisciplinary study of ethnic differences in cardiovascular health. *Am J Cardiol* 2004;93:1473-80.
3. Kleiner DE, Brunt EM, Van Natta M, et al. Design and validation of a histological scoring system for nonalcoholic fatty liver disease. *Hepatology* 2005;41:1313-21.
4. Reid JG, Carroll A, Veeraraghavan N, et al. Launching genomics into the cloud: deployment of Mercury, a next generation sequence analysis pipeline. *BMC Bioinformatics* 2014;15:30.
5. Li H, Durbin R. Fast and accurate short read alignment with Burrows-Wheeler transform. *Bioinformatics* 2009;25:1754-60.
6. McKenna A, Hanna M, Banks E, et al. The Genome Analysis Toolkit: a MapReduce framework for analyzing next-generation DNA sequencing data. *Genome Res* 2010;20:1297-303.
7. Yang J, Lee SH, Goddard ME, Visscher PM. GCTA: a tool for genome-wide complex trait analysis. *Am J Hum Genet* 2011;88:76-82.
8. Willer CJ, Li Y, Abecasis GR. METAL: fast and efficient meta-analysis of genomewide association scans. *Bioinformatics* 2010;26:2190-1.
9. Denny JC, Bastarache L, Ritchie MD, et al. Systematic comparison of phenome-wide association study of electronic medical record data and genome-wide association study data. *Nature biotechnology* 2013;31:1102-10.
10. Denny JC, Ritchie MD, Basford MA, et al. PheWAS: demonstrating the feasibility of a phenome-wide scan to discover gene-disease associations. *Bioinformatics* 2010;26:1205-10.

11. Pruim RJ, Welch RP, Sanna S, et al. LocusZoom: regional visualization of genome-wide association scan results. *Bioinformatics* 2010;26:2336-7.
12. Brasaemle DL, Wolins NE. Isolation of lipid droplets from cells by density gradient centrifugation. *Current protocols in cell biology* 2006;Chapter 3:Unit 3 15.
13. Ding Y, Zhang S, Yang L, et al. Isolating lipid droplets from multiple species. *Nature protocols* 2013;8:43-51.