

Supplementary Material

Machine learning using longitudinal prescription and medical claims for the detection of nonalcoholic steatohepatitis (NASH)

Authors Ozge Yasar^{1*}, Patrick Long^{2*}, Brett Harder², Hanna Marshall², Sanjay Bhasin², Suyin Lee², Mark Delegge³, Stephanie Roy², Orla Doyle¹, Nadea Leavitt², John Rigg¹

Author Affiliations

¹ Real World Solutions, IQVIA, London, United Kingdom, N1 9JY

² Real World Solutions, IQVIA, Plymouth Meeting, Pennsylvania, United States, 19462

³ Therapeutic Center of Excellence, IQVIA, Durham, North Carolina, United States, 27703

*Authors contributed equally

Corresponding Author:

Patrick Long, PhD

Real World Solutions, IQVIA

1 IMS Drive

Plymouth Meeting, PA, United States, 19462

Email: patrick.long@us.imshealth.com

Tel: 1-215-317-6802

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Supplementary Table 1. Patient Cohort Inclusion and Exclusion Criteria. Stratification criteria were applied over each 24-month cross-section lookback period preceding the cross-section index date.

Variable	Application	Source	Claim Code or Medication
Disqualifying Diagnoses			
Alcoholic Liver Disease	Exclusion Criteria	ICD-10	K70, K70.0, K70.1, K70.10, K70.11, K70.2, K70.3, K70.30, K70.31, K70.4, K70.40, K70.41, K70.9
Liver Disorders in Pregnancy	Exclusion Criteria	ICD-10	O26.6, O26.61, O26.611, O26.612, O26.613, O26.619, O26.62, O26.63
Primary Sclerosing Cholangitis	Exclusion Criteria	ICD-10	K83.01
Hepatorenal Syndrome	Exclusion Criteria	ICD-10	K76.7
Portal Hypertension	Exclusion Criteria	ICD-10	K76.6
Primary Biliary Cirrhosis	Exclusion Criteria	ICD-10	K74.3
Non-Alcoholic Liver Disease	Exclusion Criteria	ICD-10	K74.0, K74.1, K74.2, K74.60, K74.69
Toxic Liver Disease	Exclusion Criteria	ICD-10	K71, K71.0, K71.1, K71.10, K71.11, K71.2, K71.3, K71.4, K71.5, K71.50, K71.51, K71.6, K71.7, K71.8, K71.9
Spontaneous Bacterial Peritonitis	Exclusion Criteria	ICD-10	K65.2
Ascites	Exclusion Criteria	ICD-10	R18, R18.0, R18.8
Esophageal Varices	Exclusion Criteria	ICD-10	I85, I85.0, I85.00, I85.01, I85.1, I85.10, I85.11
Alcohol Abuse	Exclusion Criteria	ICD-10	F10, F10.1, F10.10, F10.11, F10.12, F10.120, F10.121, F10.129, F10.14, F10.15, F10.150, F10.151, F10.159, F10.18, F10.180, F10.181, F10.182, F10.188, F10.19, F10.2, F10.20, F10.21, F10.22, F10.220, F10.221, F10.229, F10.23, F10.230, F10.231, F10.232, F10.239, F10.24, F10.25, F10.250, F10.251, F10.259, F10.26, F10.27, F10.28, F10.280, F10.281, F10.282, F10.288, F10.29, F10.9, F10.92, F10.920, F10.921, F10.929, F10.94, F10.95, F10.950, F10.951, F10.959, F10.96, F10.97, F10.98, F10.980, F10.981, F10.982, F10.988, F10.99, Z71.41
Alpha 1 Antitrypsin Deficiency	Exclusion Criteria	ICD-10	E88.01
Hemochromatosis	Exclusion Criteria	ICD-10	E83.11, E83.110, E83.111, E83.118, E83.119
Wilson's	Exclusion Criteria	ICD-10	E83.0, E83.00, E83.01, E83.09, H18.04, H18.041, H18.042, H18.043, H18.049
Gaucher Disease	Exclusion Criteria	ICD-10	E75.22
Liver Cancers	Exclusion Criteria	ICD-10	C22, C22.0, C22.1, C22.2, C22.3, C22.4, C22.7, C22.8, C22.9, C78.7, C7B.02, D01.5, D37.6, Z85.05

Hepatitis	Exclusion Criteria	ICD-10	A51.45, B15.0, B15.9, B16, B16.0, B16.1, B16.2, B16.9, B17, B17.0, B17.1, B17.10, B17.11, B17.2, B17.8, B17.9, B18, B18.0, B18.1, B18.2, B18.8, B18.9, B19, B19.0, B19.1, B19.10, B19.11, B19.2, B19.20, B19.21, B19.9, B25.1, B26.81, B58.1, K73, K73.0, K73.1, K73.2, K73.8, K73.9, K75.4, K75.9, O98.4, O98.41, O98.411, O98.412, O98.413, O98.419, O98.42, O98.43
Other Alcohol Related Conditions	Exclusion Criteria	ICD-10	G62.1, G72.1, I42.6, K29.20, K29.21, O99.31, O99.310, O99.311, O99.312, O99.313, O99.314, O99.315
Encephalopathy	Exclusion Criteria	ICD-10	G32.89, G92, G93.4, G93.40, G93.41, G93.49, P91.81, P91.811, P91.819
Qualifying Treatments			
Glp 1 Receptor Agonists	Inclusion Criteria	Medication	Byetta, Rybelsus, Trulicity, Victoza, Bydureon, Tanzeum, Bydureon Pen, Adlyxin, Adlyxin Starter Pack, Bydureon Bcise, Ozempic, Saxenda
Obesity	Inclusion Criteria	Medication	Methamphetamine HCl, Phentermine HCl, Phentride, Diethylpropion HCl, Phendimetrazine Tartrate, Diethylpropion HCl Er, Phentermine Hydrochloride, Bontril Pdm, Xenical, Didrex, Tenuate, Tenuate Dospan, Bontril Slow Release, Ionamin-30, Adipex-P, Bontril Sr, Ionamin, Diethylpropion HCl Cr, Benzphetamine HCl, Ionamin-15, Oby-Trim, Pro-Fast Sr, Pro-Fast Sa, Pro-Fast Hs, Desoxyn, Suprenza, Belviq, Qsymia, Regimex, Evekeo, Contrave, Saxenda, Lomaira, Belviq Xr, Diethylpropion Hydrochlor, Amphetamine Sulfate, Evekeo Odt
Other Diabetes	Inclusion Criteria	Medication	Glipizide, Glimepiride, Jardiance, Metformin Hydrochloride E, Metformin Hydrochloride, Glipizide Er, Myxredlin, Pioglitazone Hydrochlorid, Pioglitazone HCl, Fiasp Penfill, Nateglinide, Glipizide/Metformin Hydro, Glyburide, Alogliptin, Segluromet, Insulin Lispro, Insulin Lispro Kwikpen, Qtern, Toujeo Solostar, Novolog Mix 70/30, Novolog Mix 70/30 Prefill, Admelog Solostar, Humalog Kwikpen, Novolog Penfill, Afrezza, Tresiba, Admelog, Novolin 70/30 Flexpen, Novolin 70/30 Flexpen Rel, Levemir, Humalog, Lantus Solostar, Novolog, Novolog Flexpen, Levemir Flextouch, Lantus, Glyburide/Metformin Hydro, Novolin 70/30, Humulin N, Novolin N, Novolin R, Glumetza, Toujeo Max Solostar, Xigduo Xr, Steglatro, Steglujan, Janumet Xr, Janumet, D-Care Dm2, Humalog Junior Kwikpen, Fiasp Flextouch, Fiasp, Pioglitazone

			HCl/Metformin, Synjardy Xr, Prandin, Januvia, Invokamet Xr, Basaglar Kwikpen, Xultophy 100/3.6, Soliqua 100/33, Miglitol, Jentadueto Xr, Glyburide/Metformin HCl, Humulin R U-500 Kwikpen, Repaglinide, Alogliptin/Pioglitazone, Alogliptin/Metformin HCl, Repaglinide/Metformin Hyd, Glyxambi, Glucotrol XL, Pioglitazone HCl-Glimepir, Synjardy, Tresiba Flextouch, Acarbose, Riomet, Onglyza, Kombiglyze Xr, Symlinpen 120, Symlinpen 60, Farxiga, Avandia, Glipizide XL, Invokamet, Levemir Flexpen, Metformin HCl, Humulin 70/30 Kwikpen, Humulin N Kwikpen, Metformin HCl Er, Glyburide Micronized, Invokana, Oseni, Nesina, Kazano, Juvisync, Novolin N Relion, Novolin R Relion, Novolin 70/30 Relion, Tolazamide, Jentadueto, Actos, Actoplus Met, Humalog Mix 75/25, Appformin, Appformin-D, Avandamet, Novolog Mix 70-30 Flexpen, Avandaryl, Tradjenta, Humulin R, Glipizide/Metformin HCl, Humulin 70/30, Cycloset, Humalog Mix 50/50 Pen, Humalog Mix 75/25 Pen, Humalog Mix 75/25 Kwikpen, Humalog Mix 50/50 Kwikpen, Precose, Actoplus Met Xr, Fortamet, Humalog Mix 50/50, Novolin 70-30, Apidra Solostar, Prandimet, Symlin, Glucovance, Humalog Pen, Humulin 50/50, Lantus for Opticlik, Duetact, Glyset, Amaryl, Apidra, Glucophage Xr, Metaglip, Starlix, Novolin R U-100, Chlorpropamide, Relion R, Relion N, Relion 70/30, Glucophage, Relion N Innolet, Relion 70/30 Innolet, Glycron, Diabeta, Tolinase, Glucotrol, Tolbutamide, Glynase, Novolin N U-100, Diabinese, Humulin R U-500 (Concentr, Humulin N U-100 Pen, Humulin 70/30 Pen
Qualifying Diagnoses			
Type 2 Diabetes	Inclusion Criteria	ICD-10	E11, E11.0, E11.00, E11.01, E11.1, E11.10, E11.11, E11.2, E11.21, E11.22, E11.29, E11.3, E11.31, E11.311, E11.319, E11.32, E11.321, E11.3211, E11.3212, E11.3213, E11.3219, E11.329, E11.3291, E11.3292, E11.3293, E11.3299, E11.33, E11.331, E11.3311, E11.3312, E11.3313, E11.3319, E11.339, E11.3391, E11.3392, E11.3393, E11.3399, E11.34, E11.341, E11.3411, E11.3412, E11.3413, E11.3419, E11.349, E11.3491, E11.3492, E11.3493, E11.3499, E11.35, E11.351, E11.3511,

			E11.3512, E11.3513, E11.3519, E11.352, E11.3521, E11.3522, E11.3523, E11.3529, E11.353, E11.3531, E11.3532, E11.3533, E11.3539, E11.354, E11.3541, E11.3542, E11.3543, E11.3549, E11.355, E11.3551, E11.3552, E11.3553, E11.3559, E11.359, E11.3591, E11.3592, E11.3593, E11.3599, E11.36, E11.37, E11.37X1, E11.37X2, E11.37X3, E11.37X9, E11.39, E11.4, E11.40, E11.41, E11.42, E11.43, E11.44, E11.49, E11.5, E11.51, E11.52, E11.59, E11.6, E11.61, E11.610, E11.618, E11.62, E11.620, E11.621, E11.622, E11.628, E11.63, E11.630, E11.638, E11.64, E11.641, E11.649, E11.65, E11.69, E11.8, E11.9
Metabolic Syndrome	Inclusion Criteria	ICD-10	E88.81
Obesity	Inclusion Criteria	ICD-10	E66, E66.0, E66.01, E66.09, E66.1, E66.2, E66.3, E66.8, E66.9, K95, K95.0, K95.01, K95.09, K95.8, K95.81, K95.89, O99.21, O99.210, O99.211, O99.212, O99.213, O99.214, O99.215, O99.840, O99.841, O99.842, O99.843, O99.844, O99.845, Z46.51, Z46.59, Z68.25, Z68.26, Z68.27, Z68.28, Z68.29, Z68.3, Z68.30, Z68.31, Z68.32, Z68.33, Z68.34, Z68.35, Z68.36, Z68.37, Z68.38, Z68.39, Z68.4, Z68.41, Z68.42, Z68.43, Z68.44, Z68.45, Z68.54, Z98.84
Qualifying Procedures			
Other Diabetes	Inclusion Criteria	HCPC	A4224, A4225, A4230, A4231, A4232, A9274, E0784, J1815, J1817, S5550, S5551, S5552, S5553, S5560, S5561, S5565, S5566, S5570, S5571, S8490, S9145, S9353
Obesity	Inclusion Criteria	HCPC	S0160

Supplementary Table 2. NASH Positive Patient Labeling Criteria for NASH Diagnosed and NASH Proxy Patients

Variable	Application	Source	Claim
Diagnoses Codes Used for NASH Labeling			
NASH	NASH Diagnosed Criteria	ICD-10	K75.81
Non-Alcoholic Liver Fibrosis, Sclerosis or Cirrhosis	NASH Proxy Criteria	ICD-10	K74.0, K74.1, K74.2, K74.60, K74.69
NAFL	NASH Proxy Criteria	ICD-10	K76.0

Supplementary Table 3. List of Patient Demographic Features Included in NAFL Inclusive and non-NAFL Models

Variable	Feature Representation
Age	Continuous (in years)
Sex	Categorical (female = 0, male = 1)

Supplementary Table 4. List of Data-Driven Clinical Concepts for Feature Engineering and Included in NAFL Inclusive and non- NAFL Models. Features are represented as continuous variables in units of total claims or visits over the 24-month cross-section lookback period and as date differences in days between a first and final occurrence relative to the cross-section index date and as the total days between first and final occurrences.

Variable	NAFL Inclusive Model	Non-NAFL Model	Source	Claim Code or Medication
Provider Specialties for Visits and Prescriptions				
Family Medicine	YES	YES	Visit	Any Claim
Medical Oncology	YES	YES	Visit	Any Claim
Psychology	YES	YES	Visit	Any Claim
Rheumatology	YES	YES	Visit	Any Claim
Otolaryngology	YES	NO	Visit	Any Claim
Urology	YES	YES	Visit	Any Claim
Dermatology	YES	YES	Visit	Any Claim
Pulmonary Disease	YES	NO	Visit	Any Claim
Podiatrist	YES	YES	Visit	Any Claim
Hematology/Oncology	YES	YES	Visit	Any Claim
Orthopedic Surgery	YES	YES	Visit	Any Claim
Ophthalmology	YES	YES	Visit	Any Claim
Neuroradiology	YES	NO	Visit	Any Claim
General Surgery	YES	YES	Visit	Any Claim
Nephrology	YES	YES	Visit	Any Claim
Anesthesiology	YES	YES	Visit	Any Claim
Anatomic/Clinical Pathology	YES	YES	Visit	Any Claim
Physician Assistant	YES	YES	Visit	Any Claim
Emergency Medicine	YES	YES	Visit	Any Claim
Cardiovascular Disease	YES	YES	Visit	Any Claim
Nurse Practitioner	YES	YES	Visit	Any Claim
Internal Medicine	YES	YES	Visit	Any Claim
Diagnostic Radiology	YES	YES	Visit	Any Claim
Gastroenterology	YES	YES	Visit	Any Claim
Endocrinology, Diabetes & Metabolism	NO	YES	Visit	Any Claim
Hematology (Pathology)	NO	YES	Visit	Any Claim
Infectious Disease	NO	YES	Visit	Any Claim
Internal Medicine/Pediatrics	NO	YES	Prescriber	Any Claim
Dentist	YES	YES	Prescriber	Any Claim
Obstetrics & Gynecology	YES	YES	Prescriber	Any Claim
Diagnoses				
Cardiac Murmur, Unspecified	YES	NO	ICD-10	R01.1
Type 2 Diabetes Mellitus without Complications	YES	YES	ICD-10	E11.9

Nicotine Dependence, Unspecified, Uncomplicated	NO	YES	ICD-10	F17.200
Presence of Intraocular Lens	NO	YES	ICD-10	Z96.1
Other Melanin Hyperpigmentation	NO	YES	ICD-10	L81.4
Impaired Fasting Glucose	NO	YES	ICD-10	R73.01
Insomnia, Unspecified	NO	YES	ICD-10	G47.00
Other Abnormal Glucose	NO	YES	ICD-10	R73.09
Dry Eye Syndrome of Bilateral Lacrimal Glands	NO	YES	ICD-10	H04.123
Other Forms of Dyspnea	NO	YES	ICD-10	R06.09
Pure Hyperglyceridemia	NO	YES	ICD-10	E78.1
Hyperglycemia, Unspecified	NO	YES	ICD-10	R73.9
Unspecified Chronic Gastritis without Bleeding	NO	YES	ICD-10	K29.50
Pure Hypercholesterolemia, Unspecified	NO	YES	ICD-10	E78.00
Calculus of Kidney	NO	YES	ICD-10	N20.0
Type 2 Diabetes Mellitus with Diabetic Polyneuropathy	NO	YES	ICD-10	E11.42
Acute Bronchitis, Unspecified	NO	YES	ICD-10	J20.9
Long Term (Current) Use of Insulin	NO	YES	ICD-10	Z79.4
Other Fatigue	NO	YES	ICD-10	R53.83
Encounter for Other Preprocedural Examination	NO	YES	ICD-10	Z01.818
Diarrhea, Unspecified	NO	YES	ICD-10	R19.7
Low Back Pain	NO	YES	ICD-10	M54.5
Encounter for Gyn Exam (General) (Routine) W/O Abn Findings	YES	NO	ICD-10	Z01.419
Essential (Primary) Hypertension	YES	YES	ICD-10	I10
Body Mass Index [Bmi] 28.0-28.9, Adult	YES	YES	ICD-10	Z68.28
Morbid (Severe) Obesity Due To Excess Calories	YES	YES	ICD-10	E66.01
Nausea	YES	NO	ICD-10	R11.0
Urinary Tract Infection, Site Not Specified	YES	NO	ICD-10	N39.0

Encounter for Screening for Malignant Neoplasm of Colon	YES	YES	ICD-10	Z12.11
Vitamin D Deficiency, Unspecified	YES	YES	ICD-10	E55.9
Hypothyroidism, Unspecified	YES	YES	ICD-10	E03.9
Right Upper Quadrant Pain	YES	YES	ICD-10	R10.11
Obesity, Unspecified	YES	YES	ICD-10	E66.9
Other Long Term (Current) Drug Therapy	YES	NO	ICD-10	Z79.899
Mixed Hyperlipidemia	YES	YES	ICD-10	E78.2
Cough	YES	YES	ICD-10	R05
Chest Pain, Unspecified	YES	YES	ICD-10	R07.9
Abnormal Results of Liver Function Studies	YES	YES	ICD-10	R94.5
Shortness of Breath	YES	YES	ICD-10	R06.02
Encounter Screen Mammogram for Malignant Neoplasm of Breast	YES	YES	ICD-10	Z12.31
Encounter for Immunization	YES	YES	ICD-10	Z23
Type 2 Diabetes Mellitus with Hyperglycemia	YES	YES	ICD-10	E11.65
Unspecified Abdominal Pain	YES	NO	ICD-10	R10.9
Hyperlipidemia, Unspecified	YES	YES	ICD-10	E78.5
Other Specified Abnormal Findings of Blood Chemistry	YES	YES	ICD-10	R79.89
Elevated White Blood Cell Count, Unspecified	YES	NO	ICD-10	D72.829
Type 2 Diabetes Mellitus W Diabetic Chronic Kidney Disease	YES	NO	ICD-10	E11.22
Abnormal Levels of Other Serum Enzymes	YES	YES	ICD-10	R74.8
Anemia, Unspecified	YES	YES	ICD-10	D64.9
Headache	YES	NO	ICD-10	R51
Encounter for General Adult Medical Exam W/O Abnormal Findings	YES	YES	ICD-10	Z00.00
Anxiety Disorder, Unspecified	YES	NO	ICD-10	F41.9
Venous Insufficiency (Chronic) (Peripheral)	YES	YES	ICD-10	I87.2
Body Mass Index [Bmi] 50.0-59.9, Adult	YES	YES	ICD-10	Z68.43
Other Obesity Due To Excess Calories	YES	YES	ICD-10	E66.09

Body Mass Index [Bmi] 27.0-27.9, Adult	YES	YES	ICD-10	Z68.27
Body Mass Index [Bmi] 26.0-26.9, Adult	YES	YES	ICD-10	Z68.26
Pain in Thoracic Spine	YES	NO	ICD-10	M54.6
Body Mass Index [Bmi] 25.0-25.9, Adult	YES	YES	ICD-10	Z68.25
Encounter for General Adult Medical Exam W Abnormal Findings	YES	YES	ICD-10	Z00.01
Presbyopia	YES	YES	ICD-10	H52.4
Other Seborrheic Keratosis	YES	YES	ICD-10	L82.1
Cardiomegaly	YES	NO	ICD-10	I51.7
Type 2 Diabetes Mellitus with Other Specified Complication	YES	YES	ICD-10	E11.69
Fibromyalgia	YES	YES	ICD-10	M79.7
Personal History of Nicotine Dependence	YES	NO	ICD-10	Z87.891
Body Mass Index [Bmi]40.0-44.9, Adult	YES	YES	ICD-10	Z68.41
Iron Deficiency Anemia, Unspecified	YES	NO	ICD-10	D50.9
Diaphragmatic Hernia without Obstruction or Gangrene	YES	YES	ICD-10	K44.9
Cyst of Kidney, Acquired	YES	NO	ICD-10	N28.1
Dorsalgia, Unspecified	YES	NO	ICD-10	M54.9
Pain in Right Knee	YES	NO	ICD-10	M25.561
Gastro-Esophageal Reflux Disease with Esophagitis	YES	YES	ICD-10	K21.0
Gastro-Esophageal Reflux Disease without Esophagitis	YES	YES	ICD-10	K21.9
Inflamed Seborrheic Keratosis	YES	YES	ICD-10	L82.0
Medications				
Bile Acid Sequestrants	YES	YES	GPI6	391000
Nonsteroidal Anti-Inflammatory Agents (NSAIDs)	YES	YES	GPI6	661000
Vitamin D	YES	YES	GPI6	772020
Antitussive - Nonnarcotic	YES	NO	GPI6	431020
Anti-Infective Misc. - Combinations	YES	YES	GPI6	169900
Angiotensin II Receptor Antagonists	YES	YES	GPI6	361500

Incretin Mimetic Agents (Glp-1 Receptor Agonists)	YES	YES	GPI6	271700
Sulfonylureas	YES	YES	GPI6	272000
Hmg Coa Reductase Inhibitors	YES	YES	GPI6	394000
Potassium	YES	YES	GPI6	797000
Proton Pump Inhibitors	YES	YES	GPI6	492700
Triazoles	YES	YES	GPI6	114070
Ace Inhibitors	YES	YES	GPI6	361000
Aminopenicillins	YES	YES	GPI6	12000
Opioid Combinations	YES	YES	GPI6	659900
Antispasmodics	YES	NO	GPI6	491030
Antihistamines - Non-Sedating	YES	NO	GPI6	415500
Fibric Acid Derivatives	YES	YES	GPI6	392000
Adrenergic Combinations	YES	YES	GPI6	442099
Tricyclic Agents	YES	YES	GPI6	582000
Thiazides & Thiazide-Like Diuretics	YES	YES	GPI6	376000
Serotonin-Norepinephrine Reuptake Inhibitors (SNRIS)	YES	YES	GPI6	581800
Beta Blockers Cardio-Selective	YES	YES	GPI6	332000
Potassium Sparing Diuretics	YES	YES	GPI6	375000
Tetracyclines	YES	YES	GPI6	40000
Diagnostic Tests	YES	YES	GPI6	941000
Fluoroquinolones	YES	YES	GPI6	50000
Anticonvulsants - Misc.	YES	YES	GPI6	726000
Glucose Monitoring Test Supplies	YES	YES	GPI6	972020
Opioid Agonists	YES	YES	GPI6	651000
Glucocorticosteroids	YES	YES	GPI6	221000
Beta Adrenergics	YES	YES	GPI6	442010
Central Muscle Relaxants	YES	YES	GPI6	751000
5-Ht3 Receptor Antagonists	YES	YES	GPI6	502500
Corticosteroids - Topical	YES	YES	GPI6	905500
Hydrocodone Combinations	YES	YES	GPI6	659917
Needles & Syringes	YES	YES	GPI6	970510
Azithromycin	YES	YES	GPI6	34000
Loop Diuretics	YES	YES	GPI6	372000
Nasal Steroids	YES	YES	GPI6	422000

Selective Serotonin Reuptake Inhibitors (SSRIs)	YES	YES	GPI6	581600
Penicillin Combinations	YES	YES	GPI6	19900
Human Insulin	YES	YES	GPI6	271040
Benzodiazepines	YES	NO	GPI6	571000
Imidazole-Related Antifungals - Topical	YES	YES	GPI6	901540
Antibiotics - Topical	YES	NO	GPI6	901000
Laxatives - Miscellaneous	YES	YES	GPI6	466000
Antimetabolites	YES	YES	GPI6	213000
Viral Vaccines	NO	YES	GPI6	171000
Antihistamines - Phenothiazines	YES	YES	GPI6	414000
Anti-Infective Agents - Misc.	YES	YES	GPI6	160000
Gout Agents	YES	YES	GPI6	680000
Low Molecular Weight Heparins	YES	NO	GPI6	831010
Direct Factor XA Inhibitors	YES	YES	GPI6	833700
Antimalarials	YES	NO	GPI6	130000
Anorexiant Non-Amphetamine	YES	YES	GPI6	612000
Surfactant Laxatives	YES	NO	GPI6	465000
Rosacea Agents	YES	YES	GPI6	900600
Salicylates	YES	YES	GPI6	641000
Antidepressants - Misc.	YES	YES	GPI6	583000
Calcium Channel Blockers	YES	YES	GPI6	340000
Beta Blockers Non-Selective	YES	YES	GPI6	331000
Alpha 1-Adrenoceptor Antagonists	NO	YES	GPI6	568520
Antiemetics - Anticholinergic	NO	YES	GPI6	502000
Ophthalmic Antibiotics	NO	YES	GPI6	861010
Antitussive-Expectorant	NO	YES	GPI6	439970
Antifungals - Topical	NO	YES	GPI6	901500
Urinary Anti-Infectives	YES	NO	GPI6	530000
Procedures				
Assay of Phosphorus	NO	YES	CPT/HCPC	84100
Methylprednisolone 40 Mg Injection	NO	YES	CPT/HCPC	J1030
Tc99M Sestamibi	NO	YES	CPT/HCPC	A9500
Rheumatoid Factor Quant	NO	YES	CPT/HCPC	86431
Cardiovascular Stress Test	NO	YES	CPT/HCPC	93018

Cardiovascular Stress Test	NO	YES	CPT/HCPC	93017
Eye Exam & Tx Estab Pt 1/>Vst	NO	YES	CPT/HCPC	92014
Us Exam Abdomal Complete	NO	YES	CPT/HCPC	76700
Iron Binding Test	NO	YES	CPT/HCPC	83550
Locm 300-399Mg/MI Iodine,1MI	NO	YES	CPT/HCPC	Q9967
Hepatitis C Ab Test	NO	YES	CPT/HCPC	86803
Glucose Blood Test	NO	YES	CPT/HCPC	82962
C-Reactive Protein	NO	YES	CPT/HCPC	86140
Office Consultation	NO	YES	CPT/HCPC	99244
Cardiovascular Stress Test	NO	YES	CPT/HCPC	93016
Office Consultation	NO	YES	CPT/HCPC	99243
Nasal Application Device	NO	YES	CPT/HCPC	A7034
Docrev Cur Meds by Elig Clin	NO	YES	CPT/HCPC	G8427
Colonoscopy W/Lesion Removal	NO	YES	CPT/HCPC	45385
Breast Tomosynthesis Bi	NO	YES	CPT/HCPC	77063
Tubing with Heating Element	NO	YES	CPT/HCPC	A4604
Cardiovascular Stress Test	NO	YES	CPT/HCPC	93015
Hep B Surface Antibody	YES	YES	CPT/HCPC	86706
X-Ray Exam of Ankle	YES	YES	CPT/HCPC	73610
Assay of Iron	YES	NO	CPT/HCPC	83540
Emergency Dept Visit	YES	YES	CPT/HCPC	99285
Emergency Dept Visit	YES	YES	CPT/HCPC	99284
Emergency Dept Visit	YES	YES	CPT/HCPC	99283
Urinalysis Auto W/Scope	YES	YES	CPT/HCPC	81001
Chest X-Ray 2Vw Frontal & Latl	YES	YES	CPT/HCPC	71020
Electrocardiogram Report	YES	YES	CPT/HCPC	93010
Egd Biopsy Single/Multiple	YES	NO	CPT/HCPC	43239
Assay of Urine Creatinine	YES	YES	CPT/HCPC	82570
Vitamin D 25 Hydroxy	YES	YES	CPT/HCPC	82306
Vitamin B-12	YES	YES	CPT/HCPC	82607
Ct Abd & Pelvic W/Contrast	YES	YES	CPT/HCPC	74177
Assay of Lipase	YES	NO	CPT/HCPC	83690
Electrocardiogram Complete	YES	YES	CPT/HCPC	93000
Antinuclear Antibodies	YES	YES	CPT/HCPC	86038

Urinalysis Auto W/O Scope	YES	YES	CPT/HCPC	81003
Ur Albumin Quantitative	YES	NO	CPT/HCPC	82043
Assay of Ferritin	YES	YES	CPT/HCPC	82728
Diagnostic Colonoscopy	YES	NO	CPT/HCPC	45378
Assay Thyroid Stim Hormone	YES	YES	CPT/HCPC	84443
Comprehensive Metabolic Panel	YES	YES	CPT/HCPC	80053
Complete CBC W/Auto Diff WBC	YES	YES	CPT/HCPC	85025
Office/Outpatient Visit Est	YES	YES	CPT/HCPC	99214
Office/Outpatient Visit Est	YES	YES	CPT/HCPC	99213
Office/Outpatient Visit Est	YES	YES	CPT/HCPC	99215
Office/Outpatient Visit Est	YES	YES	CPT/HCPC	99211
Office/Outpatient Visit Est	YES	YES	CPT/HCPC	99212
Glycosylated Hemoglobin Test	YES	YES	CPT/HCPC	83036
Routine Venipuncture	YES	YES	CPT/HCPC	36415
Office/Outpatient Visit New	YES	YES	CPT/HCPC	99204
Office/Outpatient Visit New	YES	YES	CPT/HCPC	99203
Office/Outpatient Visit New	YES	YES	CPT/HCPC	99202
Office/Outpatient Visit New	YES	YES	CPT/HCPC	99205
Lipid Panel	YES	YES	CPT/HCPC	80061
Tissue Exam by Pathologist	YES	YES	CPT/HCPC	88305
Tte W/Doppler Complete	YES	YES	CPT/HCPC	93306
Complete CBC Automated	YES	YES	CPT/HCPC	85027
Immunization Admin	YES	YES	CPT/HCPC	90471
Ther/Proph/Diag Injection Sc/Im	YES	YES	CPT/HCPC	96372
liv4 Vacc No Prsv 0.5 Ml Im	YES	YES	CPT/HCPC	90686
Assay of Blood/Uric Acid	YES	YES	CPT/HCPC	84550
X-Ray Exam of Foot	YES	YES	CPT/HCPC	73630
Imag No Les	YES	NO	CPT/HCPC	G9551
Initial Hospital Care	YES	YES	CPT/HCPC	99223
Initial Hospital Care	YES	YES	CPT/HCPC	99222
Previous Visit Est Age 40-64	YES	NO	CPT/HCPC	99396

Bilirubin Direct	YES	NO	CPT/HCPC	82248
Microbe Susceptible Mic	YES	NO	CPT/HCPC	87186
Airway Inhalation Treatment	YES	NO	CPT/HCPC	94640
Protein E-Phoresis Serum	YES	NO	CPT/HCPC	84165
Assay of Urea Nitrogen	YES	NO	CPT/HCPC	84520
Ground Mileage	YES	YES	CPT/HCPC	A0425
Calc BMI Abv Up Param F/U	YES	YES	CPT/HCPC	G8417
Psych Diagnostic Evaluation	YES	YES	CPT/HCPC	90791
Subsequent Hospital Care	YES	YES	CPT/HCPC	99233
Subsequent Hospital Care	YES	YES	CPT/HCPC	99232
Assay of Natriuretic Peptide	YES	YES	CPT/HCPC	83880
Immunoassay Nonantibody	YES	YES	CPT/HCPC	83516
Assay of Free Thyroxine	YES	YES	CPT/HCPC	84439
Hepatitis B Surface Ag la	YES	YES	CPT/HCPC	87340
Assay of Magnesium	YES	YES	CPT/HCPC	83735
Ondansetron HCl Injection	YES	NO	CPT/HCPC	J2405
Acute Hepatitis Panel	YES	YES	CPT/HCPC	80074
Therapeutic Exercises	YES	YES	CPT/HCPC	97110
Ct Abd & Pelvis W/O Contrast	YES	NO	CPT/HCPC	74176
Admin Influenza Virus Vac	YES	NO	CPT/HCPC	G0008
Injection Midazolam Hydrochloride	YES	NO	CPT/HCPC	J2250
Assay of Folic Acid Serum	YES	NO	CPT/HCPC	82746
Chest X-Ray 1 View Frontal	YES	YES	CPT/HCPC	71010
Assay of Ck (Cpk)	YES	YES	CPT/HCPC	82550
Hep B Core Antibody Total	YES	YES	CPT/HCPC	86704
Pos Airway Pressure Tubing	YES	NO	CPT/HCPC	A7037
Metabolic Panel Total Ca	YES	YES	CPT/HCPC	80048

Supplementary Table 5. List of Knowledge-Driven Clinical Concepts for Feature Engineering Included in the Final NAFL Inclusive and non-NAFL Models. Features are represented as continuous variables in units of total claims or visits over the 24-month cross-section lookback period and as date differences in days between a first and final occurrence relative to the cross-section index date and as the total days between first and final occurrences.

Variable	NAFL Inclusive Model	Non-NAFL Model	Source	Claim Code or Medication
Medications				
Depression	YES	YES	Medication	Paroxetine Hydrochloride, Fluoxetine Hydrochloride, Bupropion Hydrochloride E, Venlafaxine Hydrochloride, Escitalopram Oxalate, Fluoxetine HCl, Olanzapine, Mirtazapine, Duloxetine Hydrochloride, Drizalma Sprinkle, Paxil Cr, Sertraline HCl, Amitriptyline HCl, Trazodone Hydrochloride, Amitriptyline Hydrochloride, Sertraline Hydrochloride, Duloxetine HCl, Doxepin Hydrochloride, Citalopram Hydrobromide, Nortriptyline HCl, Venlafaxine HCl Er, Aripiprazole, Bupropion Hydrochloride, Paroxetine HCl, Quetiapine Fumarate Er, Nortriptyline Hydrochloride, Venlafaxine HCl, Zulresso, Bupropion HCl, Desvenlafaxine Er, Olanzapine Odt, Imipramine Hydrochloride, Desipramine Hydrochloride, Trimipramine Maleate, Marplan, Tranylcypromine Sulfate, Spravato 84Mg Dose, Spravato 56Mg Dose, Paxil, Imipramine HCl, Aripiprazole Odt, Nefazodone Hydrochloride, Doxepin HCl, Abilify Mycite, Mirtazapine Odt, Trazodone HCl, Citalopram, Pexeva, Zolof, Forfivo XI, Desipramine HCl, Pristiq, Tofranil, Paroxetine HCl Er, Dermacinrx Dpn Pak, Bupropion HCl XI, Norpramin, Elavil, Trintellix, Bupropion HCl Sr, Parnate, Effexor Xr, Pramlyte, Emsam, Irenka, Rexulti, Viibryd Starter Pack, Cymbalta, Aplenzin, Abilify, Olanzapine/Fluoxetine, Nefazodone HCl, Khedezla, Bupropion HCl Er, Trazamine, Fetzima, Fetzima Titration Pack, Protriptyline HCl, Brintellix, Wellbutrin XI, Phenelzine Sulfate, Seroquel Xr, Lexapro, Viibryd, Amoxapine, Budeprion Sr, Budeprion XI, Gaboxetine, Sentravitl Pm-25, Appbutamone, Appbutamone-D, Sentroxatine, Sentraflox Am-10, Sentralopram Am-10, Zyprexa, Wellbutrin Sr, Fluoxetine Dr, Oleptro, Imipramine Pamoate, Zyprexa Zydis, Citalopram Hbr, Effexor, Rapiflux, Prozac, Chlordiazepoxide/Amitriptyl, Pamelor, Remeron Soltab, Remeron, Symbyax, Celexa, Surmontil, Vivactil, Nardil, Abilify Discmelt, Perphenazine/Amitriptylin, Desyrel, Wellbutrin, Prozac Weekly, Tofranil-Pm, Duo-Vil, Maprotiline HCl
Corticosteroids	YES	YES	Medication	Celestone, Betamethasone Sodium Phos, Betamethasone Sp, Uceris, Budesonide, Budesonide Er, Entocort Ec, Cortisone

				<p>Acetate, Emflaza, Zonacort 11 Day, Zonacort 7 Day, Dexamethasone, Zodex 12-Day, Zodex 6-Day, Zema-Pak 10 Day, Zema-Pak 13 Day, Zema-Pak 6 Day, Dexamethasone 10-Day Dose, Dexamethasone 13-Day Dose, Dexamethasone 6-Day Dose, Locort 11-Day, Locort 7-Day, Decadron, Taperdex 12-Day, Taperdex 6-Day, Taperdex 7-Day, Dexamethasone Intensol, Baycadron, Dexpak 10 Day, Dexpak 13 Day, Dexpak 6 Day, Hidex 6-Day, Dxevo 11-Day, Dex La 16, Dexamethasone (La), Dex La 8, Dexamethasone Sodium Phos, Readysharp Dexamethasone, Topidex, Doubledex, Dexonto 0.4%, Mas Care-Pak, Active Injection Kit D, Hydrocortisone, Cortef, Solu-Cortef, A-Hydrocort, Methylprednisolone Dose P, Methylprednisolone, Medrol Dosepak, Medrol, Methylprednisolone Acetat, P-Care D40, P-Care D80, Depo-Medrol, Methylprednisolone Pf, Readysharp Methylpredniso, Solu-Medrol, A-Methapred, Methylprednisolone Sodium, Prednisolone, Prelone, Millipred Dp, Millipred, Flo-Pred, Prednisolone Sodium Phosp, Pediapred, Veripred 20, Asmalpred, Orapred, Orapred Odt, Asmalpred Plus, Prednisone, Prednisone Intensol, Rayos, Deltasone, Aristocort, Readysharp Triamcinolone, Kenalog-40, Triamcinolone Acetonide, Kenalog-80, Zilretta, Kenalog-10, Triamcinolone, Arze-Ject-A, Pod-Care 100K, P-Care K80, P-Care K40, Triamcinolone Acetonide P, Pro-C-Dure 5 Kit, Pro-C-Dure 6 Kit, Triamcinolone Pf, Triamcinolone Diacetate, Aristospan Intra-Articula, Aristospan Intralesional, Readysharp Betamethasone, Betamethasone Acetate/Bet, Pod-Care 100C, Celestone-Soluspan, Betamethasone Combo, Beta 1 Kit, Dex Combo, Dexamethasone Acetate/Dex, Dmt Suik, Mardex-25, Active Injection Kit M-1, Dexamethasone/Sodium Phos, Lidocidex I, Dextrido, Active Injection Kit DI, Ropidex, Dexopin, P-Care D40G, P-Care D80G, Medroloan Suik, Medroloan Ii Suik, Physicians Ez Use M-Pred, Point of Care L.2, Point of Care L.5, Methylprednisolone/Lidoca, Multi-Specialty Kit, Dyural-L, Active Injection Kit L, Contrast Allergy Premed P, P-Care K80G, P-Care K40G, Pod-Care 100Kg, Triloan Ii Suik, Triloan Suik, Bupivillog Kit, Point of Care Km, Bt Injection Kit, Active Injection Kit Km,</p>
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				Triamcinolone Acetonide/B, Triamcinolone/Lidocaine, Lidocilone I, Lidolog Kit, Lt Injection Kit, K10-Lido, K40-Lido, Betaloan Suik, Pod-Care 100Cg, Marbeta-25, Active Injection Kit Bm, Betalido, Beta Inject Kit, Active Injection Kit DIm, Dextido-M, Readysharp Anesthetics +, P-Care D80Mx, P-Care D40Mx, Dyural-Lm, Dyural-40, Dyural-80, Active Injection Kit Lm-D, Readysharp-P80, Readysharp-P40, Point of Care Lm Dep 2, Mlp A-2, Mlp A-1, P-Care K80Mx, P-Care K40Mx, Readysharp-K, Mlk F4 Kit, Mlk F3 Kit, Mlk F1 Kit, Pro-C-Dure 1 Kit, Pro-C-Dure 4 Kit, Pod-Care 100Kmx, Mlk F2 Kit, Pro-C-Dure 3 Kit, Pro-C-Dure 2 Kit, Interarticular Joint Kit, Active Injection Kit KI-3, Jtt Physicians Kit, Physicians Ez Use Joint T, Dermacinrx Cinlone-I Cpi, Marbeta-L, Active Injection Kit Blm-, Pod-Care 100Cmx, Medpredkit, Fludrocortisone Acetate
Restless Leg Syndrome	YES	NO	Medication	Pramipexole Dihydrochlori, Ropinirole HCl, Ropinirole Hydrochloride, Horizant, Neupro, Requip, Mirapex
Glp 1 Receptor Agonists	YES	YES	Medication	Byetta, Rybelsus, Trulicity, Victoza, Bydureon, Tanzeum, Bydureon Pen, Adlyxin, Adlyxin Starter Pack, Bydureon Bcise, Ozempic, Saxenda
Hyperlipidemia	YES	YES	Medication	Pravastatin Sodium, Rosuvastatin Calcium, Praluent, Ezetimibe, Fenofibrate, Atorvastatin Calcium, Colesevelam Hydrochloride, Lovastatin, Omega-3-Acid Ethyl Esters, Simvastatin, Niacin Er, Ezetimibe/Simvastatin, Omega-3 Rx Complete, Ezallor Sprinkle, Gemfibrozil, Fibracor, Fenofibric Acid, Niacin, Tricor, Fenofibrate Micronized, Repatha, Repatha Pushtronex System, Repatha Sureclick, Cholestyramine, Fenofibric Acid Dr, Fluvastatin Sodium Er, Cholestyramine Light, Niaspan, Zypitamag, Triglide, Niacor, Triklo, Flolipid, Kynamro, Trilipix, Altoprev, Zetia, Vascepa, Sure Result O3D3 System, Lovaza, Colestipol HCl, Juxtapid, Amlodipine Besylate/Atorv, Equapax/Atorvastatin Calc, Omega-3/D-3 Wellness Pack, Crestor, Welchol, Antara, Liptruzet, Livalo, Vytorin, Fenoglide, Lipitor, Juvisync, Fluvastatin, Questran Light, Questran, Advicor, Simcor, Prevalite, Lescol, Lipofen, Caduet, Lescol XI, Zocor, Pravachol, Colestid, Lofibra, Mevacor, Lopid, Colestid Flavored
Obesity	YES	NO	Medication	Methamphetamine HCl, Phentermine HCl, Phentride, Diethylpropion HCl, Phendimetrazine Tartrate, Diethylpropion

				HCl Er, Phentermine Hydrochloride, Bontril Pdm, Xenical, Didrex, Tenuate, Tenuate Dospan, Bontril Slow Release, Ionamin-30, Adipex-P, Bontril Sr, Ionamin, Diethylpropion HCl Cr, Benzphetamine HCl, Ionamin-15, Oby-Trim, Pro-Fast Sr, Pro-Fast Sa, Pro-Fast Hs, Desoxyn, Suprenza, Belviq, Qsymia, Regimex, Evekeo, Contrave, Saxenda, Lomaira, Belviq Xr, Diethylpropion Hydrochlor, Amphetamine Sulfate, Evekeo Odt
Other Diabetes	YES	YES	Medication	Glipizide, Glimepiride, Jardiance, Metformin Hydrochloride E, Metformin Hydrochloride, Glipizide Er, Myxredlin, Pioglitazone Hydrochlorid, Pioglitazone HCl, Fiasp Penfill, Nateglinide, Glipizide/Metformin Hydro, Glyburide, Alogliptin, Segluromet, Insulin Lispro, Insulin Lispro Kwikpen, Qtern, Toujeo Solostar, Novolog Mix 70/30, Novolog Mix 70/30 Prefill, Admelog Solostar, Humalog Kwikpen, Novolog Penfill, Afrezza, Tresiba, Admelog, Novolin 70/30 Flexpen, Novolin 70/30 Flexpen Rel, Levemir, Humalog, Lantus Solostar, Novolog, Novolog Flexpen, Levemir Flextouch, Lantus, Glyburide/Metformin Hydro, Novolin 70/30, Humulin N, Novolin N, Novolin R, Glumetza, Toujeo Max Solostar, Xigduo Xr, Steglatro, Steglujan, Janumet Xr, Janumet, D-Care Dm2, Humalog Junior Kwikpen, Fiasp Flextouch, Fiasp, Pioglitazone HCl/Metformi, Synjardy Xr, Prandin, Januvia, Invokamet Xr, Basaglar Kwikpen, Xultophy 100/3.6, Soliqua 100/33, Miglitol, Jentadueto Xr, Glyburide/Metformin HCl, Humulin R U-500 Kwikpen, Repaglinide, Alogliptin/Pioglitazone, Alogliptin/Metformin HCl, Repaglinide/Metformin Hyd, Glyxambi, Glucotrol XL, Pioglitazone HCl-Glimepir, Synjardy, Tresiba Flextouch, Acarbose, Riomet, Onglyza, Kombiglyze Xr, Symmlinpen 120, Symmlinpen 60, Farxiga, Avandia, Glipizide XL, Invokamet, Levemir Flexpen, Metformin HCl, Humulin 70/30 Kwikpen, Humulin N Kwikpen, Metformin HCl Er, Glyburide Micronized, Invokana, Oseni, Nesina, Kazano, Juvisync, Novolin N Relion, Novolin R Relion, Novolin 70/30 Relion, Tolazamide, Jentadueto, Actos, Actoplus Met, Humalog Mix 75/25, Appformin, Appformin-D, Avandamet, Novolog Mix 70-30 Flexpen, Avandaryl, Tradjenta, Humulin R, Glipizide/Metformin HCl, Humulin 70/30, Cycloset, Humalog Mix 50/50 Pen, Humalog Mix 75/25 Pen, Humalog Mix 75/25

				Kwikpen, Humalog Mix 50/50 Kwikpen, Precose, Actoplus Met Xr, Fortamet, Humalog Mix 50/50, Novolin 70-30, Apidra Solostar, Prandimet, Symlin, Glucovance, Humalog Pen, Humulin 50/50, Lantus for Opticlik, Duetact, Glyset, Amaryl, Apidra, Glucophage Xr, Metaglip, Starlix, Novolin R U-100, Chlorpropamide, Relion R, Relion N, Relion 70/30, Glucophage, Relion N Innolet, Relion 70/30 Innolet, Glycron, Diabeta, Tolinase, Glucotrol, Tolbutamide, Glynase, Novolin N U-100, Diabinese, Humulin R U-500 (Concentr, Humulin N U-100 Pen, Humulin 70/30 Pen
Tamoxifen	YES	YES	Medication	Tamoxifen Citrate, Soltamox, Nolvadex
Metformin	YES	YES	Medication	Metformin HCl, Metformin Hydrochloride, Metformin HCl Er, Fortamet, Metformin Hydrochloride E, Glumetza, Glucophage, Glucophage Xr, Riomet
Cardiovascular Related	YES	YES	Medication	Quinidine Gluconate, Reopro, Pronestyl, Cardene, Prazosin HCl, Prinzide, Hyzaar, Cozaar, Dyazide, Coreg, Cordarone, Corvert, Fragmin, Aldactone, Aldactazide, Calan, Calan Sr, Covera-Hs, Norpace Cr, Norpace, Adalat Cc, Aceon, Lasix, Trental, Inderal, Cardura, Furosemide, Propranolol HCl, Coumadin, Ascriptin Maximum Strength, Ascriptin, Norvasc, Procardia, Procardia XI, Minipress, Tikosyn, Nitrostat, Accupril, Bumetanide, Mannitol, Lovenox, Lozol, Diovan Hct, Diovan, Hyperstat Iv, Nitro-Dur, Integrilin, Avapro, Avalide, Nitroglycerin Transdermal, Dilatrate Sr, Verelan, Monoket, Univasc, Uniretic, Verelan Pm, Levatol, Enalapril Maleate, Captopril/Hydrochlorothia, Diltiazem HCl, Metoprolol Tartrate, Atenolol, Terazosin HCl, Nicardipine HCl, Nifedical XI, Nifediac Cc, Enalapril Maleate/Hydroch, Sotalol HCl, Disopyramide Phosphate, Diltiazem Hydrochloride E, Pentoxifylline Er, Doxazosin Mesylate, Mexiletine HCl, Amiodarone HCl, Quinidine Sulfate Er, Methazolamide, Goodsense Aspirin Adult L, Goodsense Aspirin, Captopril, Chlorothiazide, Isosorbide Mononitrate, Isosorbide Dinitrate, Hydrochlorothiazide, Guanabenz Acetate, Verapamil HCl Er, Labetalol Hydrochloride, Lanoxin, Lanoxin Pediatric, Trandate, Aspirin, Hydralazine HCl, Aspirin Ec, Reserpine, Bisoprolol Fumarate/Hydro, Bisoprolol Fumarate, Quinidine Sulfate, Nitroglycerin Cr, Papaverine HCl Cr, Nitroglycerin Sr, Atacand, Atacand Hct, Xylocaine, Toprol XL, Clonidine HCl, Clonidine Hydrochloride,

				<p>Nifedipine, Indapamide, Diltiazem Cd, Spironolactone, Sorine, Pentoxil, Pacerone, Acetazolamide, Zestril, Lidocaine HCl, Altace, Cardizem Cd, Lopressor, Lopressor Hct, Zestoretic, Isosorbide Dinitrate Er, Lidocaine HCl in D5W, Tenormin, Tenoretic 50, Tenoretic 100, Osmitrol Viaflex, Lidocaine HCl/Dextrose, Nitroglycerin in Dextrose, Clorpres, Nadolol, Pindolol, Timolol Maleate, Spironolactone/Hydrochlor, Methylothiazide, Propranolol Hydrochloride, Chlorthalidone, Propranolol/Hydrochloroth, Methyldopa, Nifedipine Er, Methyldopa/Hydrochlorothi, Verapamil HCl, Amiloride/Hydrochlorothia, Verapamil Hydrochloride, Guanfacine HCl, Acebutolol HCl, Triamterene/Hydrochloroth, Atenolol/Chlorthalidone, Terazosin Hydrochloride, Prazosin Hydrochloride, Diltiazem HCl Er, Digoxin, Hydralazine Hydrochloride, Isosorbide Dinitrate Sa, Verapamil HCl Sa, Tiazac, Adenocard, Papaverine HCl, Childrens Aspirin, Dipyridamole, Warfarin Sodium, Propafenone HCl, Verapamil HCl Sr, Quinidine Gluconate Sa, Minoxidil, Aggrenox, Catapres, Persantine, Catapres-Tts-3, Heparin Sodium, Nitroglycerin Td, Aspirin Ec Low Dose, Isoxsuprine HCl, Nitroglycerin Er, Tri-Buffered Aspirin, Diltiazem Xr, Aspir-Low, Brevibloc, Aspirin Childrens, Buffinol, Buffaprin, Aspercine Extra, Ra Aspirin, Ra Pain Relief Aspirin, Ra Aspirin Ec, Ra Aspirin Ec Maximum Str, Ra Aspirin Ec Adult Low S, Bayer Low Dose, Bayer Chewable Low Dose, Bayer Aspirin, Bayer Aspirin Regimen, Bayer Plus, Sb Aspirin Ec, Sb Low Dose Asa Ec, Sb Childrens Aspirin, Sb Aspirin, Pentoxifylline Cr, Gnp Adult Aspirin Low Str, Gnp Aspirin, Gnp Aspirin Low Dose, Quality Aspirin, Buffered Aspirin Extra St, Aspirin Low Dose, Buffered Aspirin, Aspirin Ec Lo-Dose, Amyl Nitrite, St Joseph Adult Analgesic, St Joseph Adult, Albertson'S Children'S As, Albertsons Enteric Coated, Albertsons Aspirin, Albertsons Buffered Aspir, Soba Analgesic, Eql Aspirin, Eql Aspirin Ec, Soba Aspirin Extra Streng, Eql Childrens Aspirin, Soba Enteric Coated Aspir, Eql Buffered Aspirin, Soba Aspirin, Meijer Aspirin Ec, Sm Aspirin, Sm Aspirin Enteric Coated, Sm Childrens Aspirin, Sm Aspirin Ec Low Strengt, Sm Aspirin Low Dose, Para-Time, Nitro-Time, Adult Aspirin Ec Low Stre, Amiloride HCl,</p>
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				<p>Metoprolol Succinate Er, Tnkase, Cathflo Activase, Activase, Betapace, Betapace Af, St Joseph Aspirin, Eq Aspirin Ec, Quinidine Gluconate Cr, Aspirtab, Aspirtab Maximum Strength, Vasotec, Maxzide, Corgard, Dilacor Xr, Microzide, Propranolol HCl Er, Aspirin Dr, Zaroxolyn, Retavase, Verapamil HCl Cr, Nitroglycerin, Lotrel, Plavix, Nitrolingual Pumpspray, Isosorbide Mononitrate Er, Teveten Hct, Catapres-Tts-2, Catapres-Tts-1, Cardizem, Inderal La, Maxzide-25, Prinivil, Procainamide HCl Er, Lotensin, Minitran, Nitro-Bid, Ismo, Carvedilol, Imdur, Papaverine HCl Er, Cardene Sr, Demadex, Ziac, Pletal, Labetalol HCl, Isoptin Sr, Vaseretic, Isosorbide Dinitrate Tr, Enalaprilat, Inamrinone, Phentolamine Mesylate, Acetazolamide Sodium, Halfprin, 1/2Halfprin, Diltiazem HCl Sr, Capoten, Flecainide Acetate, Hytrin, Procainamide HCl, Lisinopril, Dilt-Xr, Thalitone, Cartia Xt, Childrens Aspirin Low Str, Aspirin 81, Ecpirin, Heparin Sodium Dcu, Qc Aspirin, Pentopak, Dyrenium, Dynacirc Cr, Coated Aspirin, Gnp Childrens Aspirin, Corlopam, Eq Aspirin, Cvs Aspirin, Benicar, Tarka, Milrinone Lactate, Milrinone in Dextrose, Torsemide, Cvs Aspirin Ec, Cvs Childrens Aspirin, Cvs Aspirin Low Dose, Lisinopril/Hydrochlorothi, Accuretic, Digox, Introl, Zebeta, Isochron, Enteric Coated Aspirin, Teveten, Tambocor, Mavik, Cvs Aspirin Child, Qc Childrens Aspirin, Methyldopate HCl, Cardizem La, Kerlone, Innopran Xl, Taztia Xt, Afeditab Cr, Moexipril HCl, Zero-Order Release Aspi, Ra Childrens Aspirin, Ra Tri-Buffered Aspirin, Esmolol HCl, Diamox, Benicar Hct, Ra Aspirin Adult Low Stre, Sotalol HCl (Af), Sotalol HCl Af, Metolazone, Jantoven, Lotensin Hct, Betaxolol HCl, Inspra, Amlodipine Besylate, Qc Tri-Buffered Aspirin, Fosinopril Sodium, Ecotrin Maximum Strength, Ecotrin Regular Strength, Aspirin Enteric Coated Ad, Sm Aspirin Tri-Buffered, Benazepril HCl, Ecotrin Low Strength, Benazepril HCl/Hydrochlor, Benazepril Hydrochloride, Sm Aspirin Adult Low Stre, Caduet, Micardis Hct, Aspirin Adult Low Strengt, Adenosine, Dilt-Cd, Metoprolol/Hydrochlorothi, Cilostazol, Fenoldopam Mesylate, Micardis, Felodipine Er, Quinaretic, Quinidine Gluconate Er, Aspirin 81 Low Dose, Norwich Aspirin, Quinapril HCl, Quinapril Hydrochloride, Rythmol, Nitroglycerin in 5% Dextr, Nitropress, Bidil, Corzide, Fosinopril</p>
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				<p>Sodium/Hydroch, Eq Childrens Aspirin, Eq Adult Aspirin Low Stre, Eq Buffered Aspirin, Eq Aspirin Adult Low Dose, Eq Aspirin Low Dose, Isordil Titrados, Quinapril/Hydrochlorothia, Sodium Diuril, Ranexa, Isradipine, Lytensopril, Clopidogrel, Qc Aspirin Low Dose, Sotalol Hydrochloride, Sectral, Tenex, Cvs Aspirin Adult Low Str, Trandolapril, Coreg Cr, Tekturna, Moexipril/Hydrochlorothia, Lytensopril-90, Hypertensolol, Hctz/Triamterene, Amlodipine Besylate/Benaz, Exforge, Mm Aspirin, Nadolol/Bendroflumethiazi, Aspirin Low Strength, Azor, Anacin, Ramipril, Bystolic, Bufferin, Bufferin Extra Strength, Edecrin, Diuril, Tekturna Hct, Tgt Aspirin, Sular, Kinlytic, Aggrastat, Sodium Edecrin, Tgt Childrens Aspirin, Gnp Safety Coated Aspirin, Nisoldipine Er, Eplerenone, Cleviprex, Hypertenevide-12.5, Hypertenipine-2.5, Acetazolamide Er, Cardene I.V., Diltzac, Cardene Iv, Midamor, Tgt Aspirin Low Dose, Exforge Hct, Diltiazem Hydrochloride/D, Children'S Aspirin, Aspirin Buffered, Ethacrynic Acid, Cvs Aspirin Low Strength, Pentoxifylline, Propafenone Hydrochloride, Ecotrin, Adult Low Dose Aspirin Ec, Multaq, Effient, Rythmol Sr, Valturna, Px Enteric Aspirin, Chlorothiazide Sodium, Twynsta, Px Aspirin, Bayer Aspirin Ec Low Dose, Low Dose Aspirin Ec, Perindopril Erbumine, Retavase Half-Kit, Sotalol Hydrochloride, Ibutilide Fumarate, Nitromist, Matzim La, Bufferin Low Dose, Losartan Potassium/Hydroc, Losartan Potassium, Isoditrate Er, Nisoldipine, Trandolapril/Verapamil Hc, Neptazane, Enoxaparin Sodium, Tribenzor, Metoprolol Succinate, Tekamlo, Pradaxa, Nexiclon Xr, Propafenone HCl Er, Amturnide, Eql Aspirin Low Dose, Miniprin Low Dose, Eql Adult Aspirin Low Str, Diltiazem HCl-0.9% Nacl, Nitroglycerin Lingual, Edarbi, Amiodarone Hydrochloride/, Kls Aspirin Ec, Kls Aspirin Low Dose, Th Aspirin, Th Enteric Aspirin, Th Aspirin Low Dose, Nexterone, Xarelto, Brilinta, Cvs Buffered Aspirin, Ec-81 Aspirin, Lytensopril Kit, Ra Aspirin Adult Low Dose, Bayer Advanced Aspirin Ex, Amlodipine Besylate/Atorv, Eprosartan Mesylate, Cvs Aspirin Adult Low Dos, Dutoprol, Edarbyclor, Hm Aspirin Ec Low Dose, Hm Aspirin, Hm Aspirin Ec, Irbesartan/Hydrochlorothi, Irbesartan, Cvs Enteric Aspirin, St. Joseph Aspiri</p>
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Glitazones	YES	YES	Medication	Pioglitazone Hydrochlorid, Pioglitazone HCl, Actos, Avandia
SglT2S	YES	YES	Medication	Invokana, Farxiga, Jardiance, Steglatro
Omega 3 Fatty Acids	YES	YES	Medication	Vascepa, Omega-3-Acid Ethyl Esters, Triklo, Lovaza
Ursodiol	YES	YES	Medication	Ursodiol, Actigall, Ursodiol/Syrspend Sf Ph4, Urso, Urso 250, Urso Forte
Anti-Obesity Medication	YES	YES	Medication	Amphetamine Sulfate, Evekeo Odt, Evekeo, Methamphetamine HCl, Desoxyn, Benzphetamine HCl, Didrex, Regimex, Diethylpropion HCl, Diethylpropion HCl Er, Tenuate, Tenuate Dospan, Diethylpropion Hydrochlor, Diethylpropion HCl Cr, Phendimetrazine Tartrate, Bontril Slow Release, Bontril Pdm, Bontril Sr, Phentermine HCl, Phentride, Phentermine Hydrochloride, Adipex-P, Suprenza, Lomaira, Oby-Trim, Pro-Fast Hs, Pro-Fast Sa, Pro-Fast Sr, Ionamin-15, Ionamin-30, Ionamin, Diet Aid Caffeine Free, Ra Diet Aid Maximum Stren, Weight Down, Osco Appetite Control Max, Just One Per Day, Efed li, Sav-On Appetite Control M, Thinz Before Meals, Thinz-Span Tr, Thinz Drops, Thinz Back To Nature Tr, Dexatrim, Ayds, Hungrex Plus, Permathene, Ra Diet Aid/Vitamin C Max, Diet Aid/Vitamin C Extra, Qsymia, Extra Strength Grapefruit, Grapefruit Diet, Xenical, Alli, Belviq, Belviq Xr, Contrace
Vitamin E	YES	YES	Medication	Vitamin E, Pa Vitamin E, E-Oil, Vitamin E/DI-Alpha, Nature'S Glo Natural Vita, Formula E 400, Cvs E, Cvs E Oil, Key-E, Sm Vitamin E, Sm Vitamin E Blended, Alph-E, Alph-E-Mixed, Alph-E-Mixed 1000, Aqua-E, EqI Vitamin E, Vitamin E Complex Natural, Vitamin E High Potency, Vitamin E Mixed, YI Vitamin E, Cvs Vitamin E, Vitamin E Mtc, Vitamin E Natural, Vitamin Supplement E-1000, Vitamin Supplement E-400, Vitamin E Water Dispersib, Gnp Vitamin E, Vitamin E-200, Vitamin E-400, Vitamin E/D-Alpha, Gnp Vitamin E Natural, Gnp Vitamin E Water Dispe, Vitamin E/D-Alpha Natural, Vitamin E Blend, Vitamin E Complex, E1000, E200, E400, E400 Mixed, E600, Th Vitamin E, Th Vitamin E/D-Alpha, Ra Vitamin E, Vitamin E Water Solubiliz, Vitamin E Water Soluble, Ra Vitamin E Blend, Ra Vitamin E Natural, Albertsons Vitamin E, Albertsons Natural Vitami, Dry E-Synthetic, Ester-E, E-200, E-400, E-400-Clear, E-400-Mixed, E 1000, E 400 Blended, E-1000, E-Max-1000, Aquasol E, Aquavit-E, Aqueous Vitamin E, Nutr-E-Sol, Ra Natural Vitamin E, Vita-Plus E, Px Vitamin E, Natural Mixed Tocopherols,

				Liqui-E, Natural Vitamin E, Kp Vitamin E, Hm Vitamin E, Natural Blend E-400, E-Pherol, Qc Vitamin E, Soluvita E, Hm E Vitamin
Hypothyroidism	YES	YES	Medication	Armour Thyroid, Thyroid, Levothyroxine Sodium, Synthroid, Cytomel, Levoxyl, Thyrolar-1/4, Thyrolar-1/2, Thyrolar-1, Thyrolar-2, Thyrolar-3, Nature Thyroid, Nature-Throid, Westhroid, Levothroid, Unithroid, Unithroid Direct, Liothyronine Sodium, Triostat, Tirosint, Np Thyroid 30, Np Thyroid 60, Np Thyroid 90, Nature-Throid Nt-2.5, Westhroid-P, Wp Thyroid, Np Thyroid, Np Thyroid 15, Levo-T, Levothyroxine/Liothyronin, Np Thyroid 120, Tirosint-Sol, Euthyrox
Insomnia	NO	YES	Medication	Ramelteon, Zolpidem Tartrate Er, Phenobarbital, Zolpidem Tartrate, Triazolam, Doral, Eszopiclone, Temazepam, Zaleplon, Lunesta, Pentobarbital Sodium, Quazepam, Estazolam, Zolpimist, Seconal Sodium, Ambien, Amytal Sodium, Belsomra, Rozerem, Flurazepam HCl, Intermezzo, Nembutal Sodium, Silenor, Ambien Cr, Gabazolpidem-5, Strazepam, Sentrazolpidem Pm-5, Sonata, Edluar, Restoril, Seconal, Phenobarbital Sodium, Halcion, Luminal, Nembutal, Prosom, Somnote, Butisol Sodium, Chloral Hydrate
Diagnoses				
NAFL	YES	NO	ICD-10	K76.0
Hypertension	YES	YES	ICD-10	I10, I11, I11.0, I11.9, I12, I12.0, I12.9, I13, I13.0, I13.1, I13.10, I13.11, I13.2, I15, I15.0, I15.1, I15.2, I15.8, I15.9, I16, I16.0, I16.1, I16.9, O10, O10.0, O10.01, O10.011, O10.012, O10.013, O10.019, O10.02, O10.03, O10.1, O10.11, O10.111, O10.112, O10.113, O10.119, O10.12, O10.13, O10.2, O10.21, O10.211, O10.212, O10.213, O10.219, O10.22, O10.23, O10.3, O10.31, O10.311, O10.312, O10.313, O10.319, O10.32, O10.33, O10.4, O10.41, O10.411, O10.412, O10.413, O10.419, O10.42, O10.43, O10.9, O10.91, O10.911, O10.912, O10.913, O10.919, O10.92, O10.93, O11, O11.1, O11.2, O11.3, O11.4, O11.5, O11.9, O13, O13.1, O13.2, O13.3, O13.4, O13.5, O13.9, O16, O16.1, O16.2, O16.3, O16.4, O16.5, O16.9
Cardiomyopathy	NO	YES	ICD-10	I42, I42.0, I42.1, I42.2, I42.3, I42.4, I42.5, I42.7, I42.8, I42.9, I43, O90.3
Cardiovascular Disease	NO	YES	ICD-10	I24.0, I25.10, I25.3, I25.41, I25.42, I25.5, I25.6, I25.8, I25.81, I25.810, I25.811, I25.812, I25.82, I25.83, I25.84, I25.89
Type 1 Diabetes	YES	YES	ICD-10	E10, E10.1, E10.10, E10.11, E10.2, E10.21, E10.22, E10.29, E10.3, E10.31, E10.311,

				E10.319, E10.32, E10.321, E10.3211, E10.3212, E10.3213, E10.3219, E10.329, E10.3291, E10.3292, E10.3293, E10.3299, E10.33, E10.331, E10.3311, E10.3312, E10.3313, E10.3319, E10.339, E10.3391, E10.3392, E10.3393, E10.3399, E10.34, E10.341, E10.3411, E10.3412, E10.3413, E10.3419, E10.349, E10.3491, E10.3492, E10.3493, E10.3499, E10.35, E10.351, E10.3511, E10.3512, E10.3513, E10.3519, E10.352, E10.3521, E10.3522, E10.3523, E10.3529, E10.353, E10.3531, E10.3532, E10.3533, E10.3539, E10.354, E10.3541, E10.3542, E10.3543, E10.3549, E10.355, E10.3551, E10.3552, E10.3553, E10.3559, E10.359, E10.3591, E10.3592, E10.3593, E10.3599, E10.36, E10.37, E10.37X1, E10.37X2, E10.37X3, E10.37X9, E10.39, E10.4, E10.40, E10.41, E10.42, E10.43, E10.44, E10.49, E10.5, E10.51, E10.52, E10.59, E10.6, E10.61, E10.610, E10.618, E10.62, E10.620, E10.621, E10.622, E10.628, E10.63, E10.630, E10.638, E10.64, E10.641, E10.649, E10.65, E10.69, E10.8, E10.9
Type 2 Diabetes	YES	YES	ICD-10	E11, E11.0, E11.00, E11.01, E11.1, E11.10, E11.11, E11.2, E11.21, E11.22, E11.29, E11.3, E11.31, E11.311, E11.319, E11.32, E11.321, E11.3211, E11.3212, E11.3213, E11.3219, E11.329, E11.3291, E11.3292, E11.3293, E11.3299, E11.33, E11.331, E11.3311, E11.3312, E11.3313, E11.3319, E11.339, E11.3391, E11.3392, E11.3393, E11.3399, E11.34, E11.341, E11.3411, E11.3412, E11.3413, E11.3419, E11.349, E11.3491, E11.3492, E11.3493, E11.3499, E11.35, E11.351, E11.3511, E11.3512, E11.3513, E11.3519, E11.352, E11.3521, E11.3522, E11.3523, E11.3529, E11.353, E11.3531, E11.3532, E11.3533, E11.3539, E11.354, E11.3541, E11.3542, E11.3543, E11.3549, E11.355, E11.3551, E11.3552, E11.3553, E11.3559, E11.359, E11.3591, E11.3592, E11.3593, E11.3599, E11.36, E11.37, E11.37X1, E11.37X2, E11.37X3, E11.37X9, E11.39, E11.4, E11.40, E11.41, E11.42, E11.43, E11.44, E11.49, E11.5, E11.51, E11.52, E11.59, E11.6, E11.61, E11.610, E11.618, E11.62, E11.620, E11.621, E11.622, E11.628, E11.63, E11.630, E11.638, E11.64, E11.641, E11.649, E11.65, E11.69, E11.8, E11.9
Polycystic Ovary Syndrome	YES	YES	ICD-10	E28.2
Obesity	YES	YES	ICD-10	E66, E66.0, E66.01, E66.09, E66.1, E66.2, E66.3, E66.8, E66.9, K95, K95.0, K95.01,

				K95.09, K95.8, K95.81, K95.89, O99.21, O99.210, O99.211, O99.212, O99.213, O99.214, O99.215, O99.840, O99.841, O99.842, O99.843, O99.844, O99.845, Z46.51, Z46.59, Z68.25, Z68.26, Z68.27, Z68.28, Z68.29, Z68.3, Z68.30, Z68.31, Z68.32, Z68.33, Z68.34, Z68.35, Z68.36, Z68.37, Z68.38, Z68.39, Z68.4, Z68.41, Z68.42, Z68.43, Z68.44, Z68.45, Z68.54, Z98.84
Hyperlipidemia	YES	YES	ICD-10	E78.0, E78.00, E78.01, E78.1, E78.2, E78.3, E78.4, E78.41, E78.49, E78.5
Metabolic Syndrome	YES	YES	ICD-10	E88.81
Kidney Failure	YES	YES	ICD-10	N17, N17.0, N17.1, N17.2, N17.8, N17.9, N19, O90.4, Z91.15, Z99.2
Depression	YES	NO	ICD-10	F32, F32.0, F32.1, F32.2, F32.3, F32.4, F32.5, F32.8, F32.81, F32.89, F32.9, F33, F33.0, F33.1, F33.2, F33.3, F33.4, F33.40, F33.41, F33.42, F33.8, F33.9, F34.1, F43.23, F53.0
Cerebrovascular Disease	YES	YES	ICD-10	G45, G45.0, G45.1, G45.2, G45.3, G45.4, G45.8, G45.9, I61, I61.0, I61.1, I61.2, I61.3, I61.4, I61.5, I61.6, I61.8, I61.9, I62, I62.0, I62.00, I62.01, I62.02, I62.03, I62.1, I62.9, I63, I63.0, I63.00, I63.01, I63.011, I63.012, I63.013, I63.019, I63.02, I63.03, I63.031, I63.032, I63.033, I63.039, I63.09, I63.1, I63.10, I63.11, I63.111, I63.112, I63.113, I63.119, I63.12, I63.13, I63.131, I63.132, I63.133, I63.139, I63.19, I63.2, I63.20, I63.21, I63.211, I63.212, I63.213, I63.219, I63.22, I63.23, I63.231, I63.232, I63.233, I63.239, I63.29, I63.3, I63.30, I63.31, I63.311, I63.312, I63.313, I63.319, I63.32, I63.321, I63.322, I63.323, I63.329, I63.33, I63.331, I63.332, I63.333, I63.339, I63.34, I63.341, I63.342, I63.343, I63.349, I63.39, I63.4, I63.40, I63.41, I63.411, I63.412, I63.413, I63.419, I63.42, I63.421, I63.422, I63.423, I63.429, I63.43, I63.431, I63.432, I63.433, I63.439, I63.44, I63.441, I63.442, I63.443, I63.449, I63.49, I63.5, I63.50, I63.51, I63.511, I63.512, I63.513, I63.519, I63.52, I63.521, I63.522, I63.523, I63.529, I63.53, I63.531, I63.532, I63.533, I63.539, I63.54, I63.541, I63.542, I63.543, I63.549, I63.59, I63.6, I63.8, I63.81, I63.89, I63.9, I65, I65.0, I65.01, I65.02, I65.03, I65.09, I65.1, I65.2, I65.21, I65.22, I65.23, I65.29, I65.8, I65.9, I66, I66.0, I66.01, I66.02, I66.03, I66.09, I66.1, I66.11, I66.12, I66.13, I66.19, I66.2, I66.21, I66.22, I66.23, I66.29, I66.3, I66.8, I66.9, I67, I67.0, I67.1, I67.2, I67.3, I67.4, I67.5, I67.6, I67.7, I67.8, I67.81, I67.82, I67.83, I67.84, I67.841, I67.848, I67.85, I67.850, I67.858, I67.89, I67.9, I68,

				I68.0, I68.2, I68.8, I69, I69.0, I69.00, I69.01, I69.010, I69.011, I69.012, I69.013, I69.014, I69.015, I69.018, I69.019, I69.02, I69.020, I69.021, I69.022, I69.023, I69.028, I69.03, I69.031, I69.032, I69.033, I69.034, I69.039, I69.04, I69.041, I69.042, I69.043, I69.044, I69.049, I69.05, I69.051, I69.052, I69.053, I69.054, I69.059, I69.06, I69.061, I69.062, I69.063, I69.064, I69.065, I69.069, I69.09, I69.090, I69.091, I69.092, I69.093, I69.098, I69.1, I69.10, I69.11, I69.110, I69.111, I69.112, I69.113, I69.114, I69.115, I69.118, I69.119, I69.12, I69.120, I69.121, I69.122, I69.123, I69.128, I69.13, I69.131, I69.132, I69.133, I69.134, I69.139, I69.14, I69.141, I69.142, I69.143, I69.144, I69.149, I69.15, I69.151, I69.152, I69.153, I69.154, I69.159, I69.16, I69.161, I69.162, I69.163, I69.164, I69.165, I69.169, I69.19, I69.190, I69.191, I69.192, I69.193, I69.198, I69.2, I69.20, I69.21, I69.210, I69.211, I69.212, I69.213, I69.214, I69.215, I69.218, I69.219, I69.22, I69.220, I69.221, I69.222, I69.223, I69.228, I69.23, I69.231, I69.232, I69.233, I69.234, I69.239, I69.24, I69.241, I69.242, I69.243, I69.244, I69.249, I69.25, I69.251, I69.252, I69.253, I69.254, I69.259, I69.26, I69.261, I69.262, I69.263, I69.264, I69.265, I69.269, I69.29, I69.290, I69.291, I69.292, I69.293, I69.298, I69.3, I69.30, I69.31, I69.310, I69.311, I69.312, I69.313, I69.314, I69.315, I69.318, I69.319, I69.32, I69.320, I69.321, I69.322, I69.323, I69.328, I69.33, I69.331, I69.332, I69.333, I69.334, I69.339, I69.34, I69.341, I69.342, I69.343, I69.344, I69.349, I69.35, I69.351, I69.352, I69.353, I69.354, I69.359, I69.36, I69.361, I69.362, I69.363, I69.364, I69.365, I69.369, I69.39, I69.390, I69.391, I69.392, I69.393, I69.398, I69.8, I69.80, I69.81, I69.810, I69.811, I69.812, I69.813, I69.814, I69.815, I69.818, I69.819, I69.82, I69.820, I69.821, I69.822, I69.823, I69.828, I69.83, I69.831, I69.832, I69.833, I69.834, I69.839, I69.84, I69.841, I69.842, I69.843, I69.844, I69.849, I69.85, I69.851, I69.852, I69.853, I69.854, I69.859, I69.86, I69.861, I69.862, I69.863, I69.864, I69.865, I69.869, I69.89, I69.890, I69.891, I69.892, I69.893, I69.898, I69.9, I69.90, I69.91, I69.910, I69.911, I69.912, I69.913, I69.914, I69.915, I69.918, I69.919, I69.92, I69.920, I69.921, I69.922, I69.923, I69.928, I69.93, I69.931, I69.932, I69.933, I69.934, I69.939, I69.94, I69.941, I69.942, I69.943, I69.944, I69.949, I69.95, I69.951, I69.952, I69.953, I69.954, I69.959, I69.96, I69.961, I69.962,
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Sleep Apnea Other	YES	YES	ICD-10	G47.3, G47.30, G47.31, G47.32, G47.34, G47.35, G47.36, G47.37, G47.39
Sleep Apnea Obstructive	YES	YES	ICD-10	G47.33
Smoking	YES	YES	ICD-10	F17.20, F17.200, F17.201, F17.203, F17.208, F17.209, F17.21, F17.210, F17.211, F17.213, F17.218, F17.219, F17.29, F17.290, F17.291, F17.293, F17.298, F17.299, O99.33, O99.330, O99.331, O99.332, O99.333, O99.334, O99.335, T65.22, T65.221, T65.221A, T65.221D, T65.221S, T65.222, T65.222A, T65.222D, T65.222S, T65.223, T65.223A, T65.223D, T65.223S, T65.224, T65.224A, T65.224D, T65.224S, T65.29, T65.291, T65.291A, T65.291D, T65.291S, T65.292, T65.292A, T65.292D, T65.292S, T65.293, T65.293A, T65.293D, T65.293S, T65.294, T65.294A, T65.294D, T65.294S, Z87.891
Myocardial Infarction	YES	YES	ICD-10	I21, I21.0, I21.01, I21.02, I21.09, I21.1, I21.11, I21.19, I21.2, I21.21, I21.29, I21.3, I21.4, I21.9, I21.A, I21.A1, I21.A9, I22, I22.0, I22.1, I22.2, I22.8, I22.9, I23, I23.0, I23.1, I23.2, I23.3, I23.4, I23.5, I23.6, I23.7, I23.8, I25.2
Hepatomegaly	YES	YES	ICD-10	R16.0, R16.2
Chronic Kidney Disease	YES	YES	ICD-10	N18, N18.1, N18.2, N18.3, N18.4, N18.5, N18.6, N18.9
Edema	YES	YES	ICD-10	O12, O12.0, O12.00, O12.01, O12.02, O12.03, O12.04, O12.05, O12.1, O12.10, O12.11, O12.12, O12.13, O12.14, O12.15, O12.2, O12.20, O12.21, O12.22, O12.23, O12.24, O12.25, R60, R60.0, R60.1, R60.9
Atrial Fibrillation	YES	YES	ICD-10	I48.0, I48.1, I48.11, I48.19, I48.2, I48.20, I48.21, I48.91
Abdominal Pain	YES	YES	ICD-10	R10, R10.0, R10.1, R10.10, R10.11, R10.12, R10.13, R10.2, R10.3, R10.30, R10.31, R10.32, R10.33, R10.8, R10.81, R10.811, R10.812, R10.813, R10.814, R10.815, R10.816, R10.817, R10.819, R10.82, R10.821, R10.822, R10.823, R10.824, R10.825, R10.826, R10.827, R10.829, R10.84, R10.9
Bloating	YES	NO	ICD-10	R14.0
Anemia	YES	YES	ICD-10	D50, D50.0, D50.1, D50.8, D50.9, D51, D51.0, D51.1, D51.2, D51.3, D51.8, D51.9, D52, D52.0, D52.1, D52.8, D52.9, D53, D53.0, D53.1, D53.2, D53.8, D53.9, D55, D55.0, D55.1, D55.2, D55.3, D55.8, D55.9, D56, D56.0, D56.1, D56.2, D56.3, D56.4, D56.5, D56.8, D56.9, D57, D57.0, D57.00, D57.01, D57.02, D57.1, D57.2, D57.20, D57.21, D57.211, D57.212, D57.219, D57.3, D57.4, D57.40, D57.41, Det57.411,

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Splenomegaly	YES	YES	ICD-10	R16.1
Malaise Fatigue	YES	YES	ICD-10	R53, R53.1, R53.2, R53.8, R53.81, R53.82, R53.83
Abnormal Loss of Weight	YES	YES	ICD-10	R63.4
Liver Failure	YES	YES	ICD-10	K72, K72.0, K72.00, K72.01, K72.1, K72.10, K72.11, K72.9, K72.90, K72.91
Hypothyroidism	YES	YES	ICD-10	E00, E00.0, E00.1, E00.2, E00.9, E02, E03, E03.0, E03.1, E03.2, E03.3, E03.4, E03.5, E03.8, E03.9, E89.0
Peripheral Vascular Disease	YES	NO	ICD-10	I70.2, I70.20, I70.201, I70.202, I70.203, I70.208, I70.209, I70.21, I70.211, I70.212, I70.213, I70.218, I70.219, I70.22, I70.221, I70.222, I70.223, I70.228, I70.229, I70.23, I70.231, I70.232, I70.233, I70.234, I70.235, I70.238, I70.239, I70.24, I70.241, I70.242, I70.243, I70.244, I70.245, I70.248, I70.249, I70.25, I70.26, I70.261, I70.262, I70.263, I70.268, I70.269, I70.29, I70.291, I70.292, I70.293, I70.298, I70.299, I70.3, I70.30, I70.301, I70.302, I70.303, I70.308, I70.309, I70.31, I70.311, I70.312, I70.313, I70.318, I70.319, I70.32, I70.321, I70.322, I70.323, I70.328, I70.329, I70.33, I70.331, I70.332, I70.333, I70.334, I70.335, I70.338, I70.339, I70.34, I70.341, I70.342, I70.343, I70.344, I70.345, I70.348, I70.349, I70.35, I70.36, I70.361, I70.362, I70.363, I70.368, I70.369, I70.39, I70.391, I70.392, I70.393, I70.398, I70.399, I70.4, I70.40, I70.401, I70.402, I70.403, I70.408, I70.409, I70.41, I70.411, I70.412, I70.413, I70.418, I70.419, I70.42, I70.421, I70.422, I70.423, I70.428, I70.429, I70.43, I70.431, I70.432, I70.433, I70.434, I70.435, I70.438, I70.439, I70.44, I70.441, I70.442, I70.443, I70.444, I70.445, I70.448, I70.449, I70.45, I70.46, I70.461, I70.462, I70.463, I70.468, I70.469, I70.49, I70.491, I70.492, I70.493, I70.498, I70.499, I70.5, I70.50, I70.501, I70.502, I70.503, I70.508, I70.509, I70.51, I70.511, I70.512, I70.513, I70.518, I70.519, I70.52, I70.521, I70.522, I70.523, I70.528, I70.529, I70.53, I70.531,

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Procedures				
Liver Panel	YES	YES	CPT/HCPC	0002M, 0003M, 80076
Bariatric Surgery	YES	YES	CPT/HCPC	43644, 43645, 43770, 43771, 43772, 43773, 43774, 43775, 43842, 43843, 43845, 43846, 43847, 43848, 43886, 43887, 43888
Liver Biopsy	YES	YES	CPT/HCPC	47000, 47001
Abdominal Ultrasound	YES	YES	CPT/HCPC	76700, 76705
Gamma Glutamyl Transferase	YES	YES	CPT/HCPC	82977
Alanine Aminotransferase	YES	YES	CPT/HCPC	84460
Complete Blood Count	YES	YES	CPT/HCPC	85025, 85027
Prothrombin Time	YES	YES	CPT/HCPC	85610
Liver Elastography	YES	YES	CPT/HCPC	91200
Lipid Panel	YES	YES	CPT/HCPC	0052U, 80061, 83719, 83721, 83722

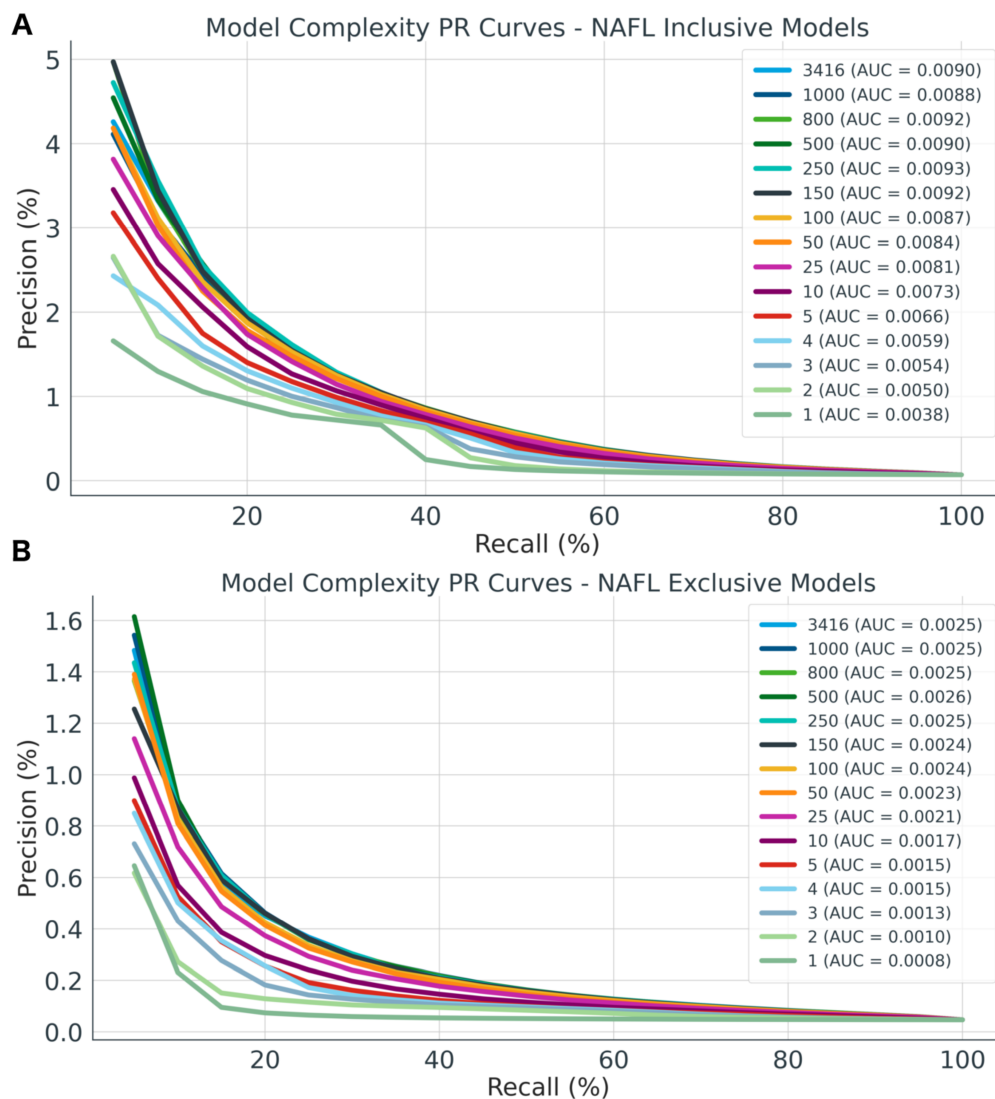
Supplementary Table 6. XGBoost Hyperparameters for the NAFL Inclusive and non-NAFL Models

Modeling Parameters	NAFL Inclusive Model	Non-NAFL Model
Random State	42	42
Max Depth	6	6
Gamma	0	0

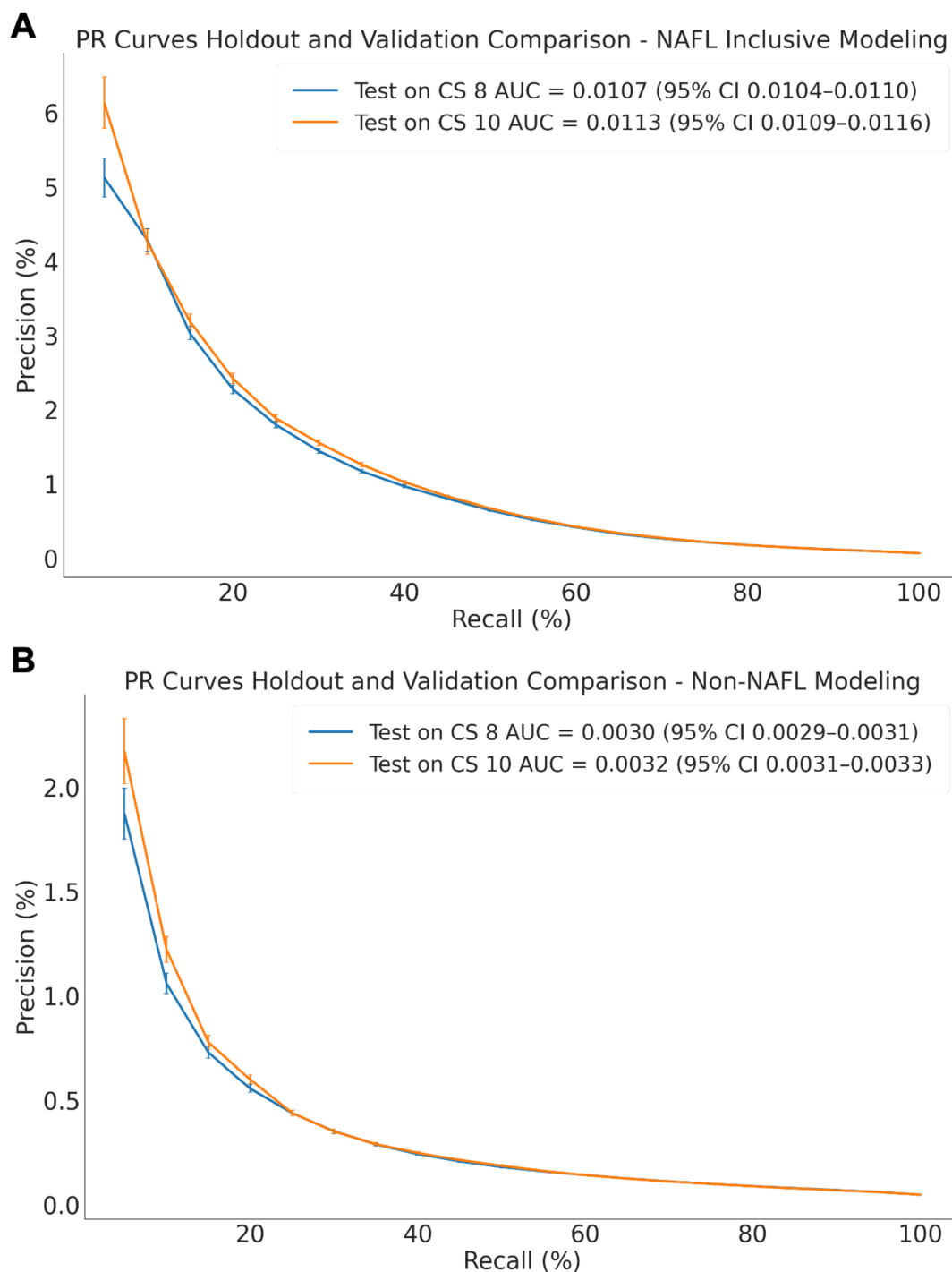
n Estimators	200	200
Learning Rate	0.1	0.1

Supplementary Table	Claim Code or Medication
7. List of NAFL and T2D Clinical Codes Used for Model Benchmarking. Source	
NAFL	
ICD-10	K76.0
T2D	
ICD-10	E11, E11.0, E11.00, E11.01, E11.1, E11.10, E11.11, E11.2, E11.21, E11.22, E11.29, E11.3, E11.31, E11.311, E11.319, E11.32, E11.321, E11.3211, E11.3212, E11.3213, E11.3219, E11.329, E11.3291, E11.3292, E11.3293, E11.3299, E11.33, E11.331, E11.3311, E11.3312, E11.3313, E11.3319, E11.339, E11.3391, E11.3392, E11.3393, E11.3399, E11.34, E11.341, E11.3411, E11.3412, E11.3413, E11.3419, E11.349, E11.3491, E11.3492, E11.3493, E11.3499, E11.35, E11.351, E11.3511, E11.3512, E11.3513, E11.3519, E11.352, E11.3521, E11.3522, E11.3523, E11.3529, E11.353, E11.3531, E11.3532, E11.3533, E11.3539, E11.354, E11.3541, E11.3542, E11.3543, E11.3549, E11.355, E11.3551, E11.3552, E11.3553, E11.3559, E11.359, E11.3591, E11.3592, E11.3593, E11.3599, E11.36, E11.37, E11.37X1, E11.37X2, E11.37X3, E11.37X9, E11.39, E11.4, E11.40, E11.41, E11.42, E11.43, E11.44, E11.49, E11.5, E11.51, E11.52, E11.59, E11.6, E11.61, E11.610, E11.618, E11.62, E11.620, E11.621, E11.622, E11.628, E11.63, E11.630, E11.638, E11.64, E11.641, E11.649, E11.65, E11.69, E11.8, E11.9
HCPC	A4224, A4225, A4230, A4231, A4232, A9274, E0784, J1815, J1817, S5550, S5551, S5552, S5553, S5560, S5561, S5565, S5566, S5570, S5571, S8490, S9145, S9353

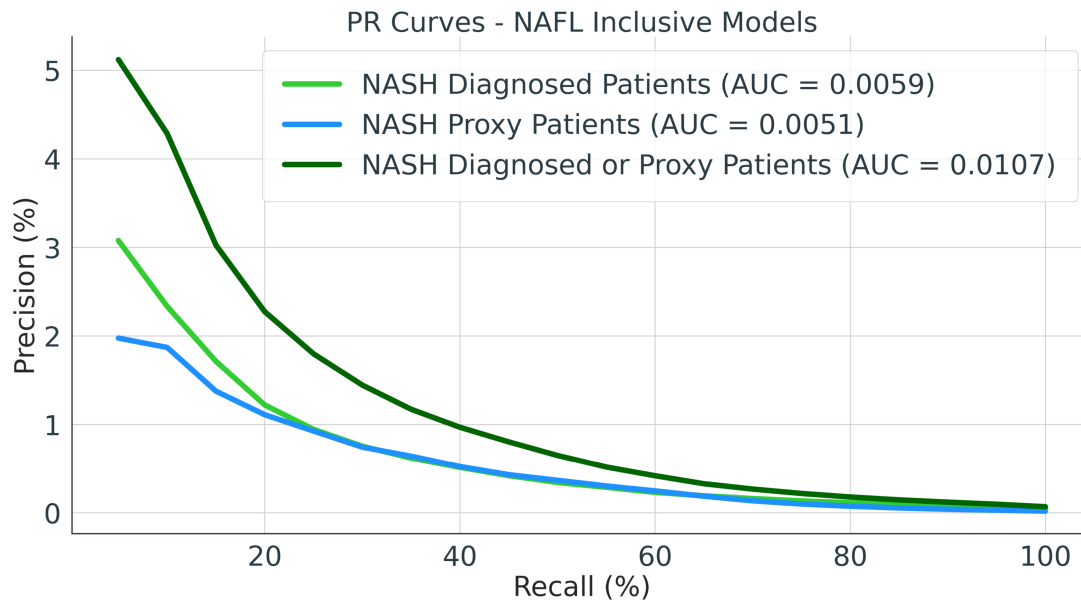
Medication	<p>Byetta, Rybelsus, Trulicity, Victoza, Bydureon, Tanzeum, Bydureon Pen, Adlyxin, Adlyxin Starter Pack, Bydureon Bcise, Ozempic, Saxenda, Glipizide, Glimepiride, Jardiance, Metformin Hydrochloride E, Metformin Hydrochloride, Glipizide Er, Myxredlin, Pioglitazone Hydrochlorid, Pioglitazone HCl, Fiasp Penfill, Nateglinide, Glipizide/Metformin Hydro, Glyburide, Alogliptin, Segluromet, Insulin Lispro, Insulin Lispro Kwikpen, Qtern, Toujeo Solostar, Novolog Mix 70/30, Novolog Mix 70/30 Prefill, Admelog Solostar, Humalog Kwikpen, Novolog Penfill, Afrezza, Tresiba, Admelog, Novolin 70/30 Flexpen, Novolin 70/30 Flexpen Rel, Levemir, Humalog, Lantus Solostar, Novolog, Novolog Flexpen, Levemir Flextouch, Lantus, Glyburide/Metformin Hydro, Novolin 70/30, Humulin N, Novolin N, Novolin R, Glumetza, Toujeo Max Solostar, Xigduo Xr, Steglatro, Steglujan, Janumet Xr, Janumet, D-Care Dm2, Humalog Junior Kwikpen, Fiasp Flextouch, Fiasp, Pioglitazone HCl/Metformin, Synjardy Xr, Prandin, Januvia, Invokamet Xr, Basaglar Kwikpen, Xultophy 100/3.6, Soliqua 100/33, Miglitol, Jentadueto Xr, Glyburide/Metformin HCl, Humulin R U-500 Kwikpen, Repaglinide, Alogliptin/Pioglitazone, Alogliptin/Metformin HCl, Repaglinide/Metformin Hyd, Glyxambi, Glucotrol XI, Pioglitazone HCl-Glimepir, Synjardy, Tresiba Flextouch, Acarbose, Riomet, Onglyza, Kombiglyze Xr, Symlinpen 120, Symlinpen 60, Farxiga, Avandia, Glipizide XI, Invokamet, Levemir Flexpen, Metformin HCl, Humulin 70/30 Kwikpen, Humulin N Kwikpen, Metformin HCl Er, Glyburide Micronized, Invokana, Oseni, Nesina, Kazano, Juvisync, Novolin N Relion, Novolin R Relion, Novolin 70/30 Relion, Tolazamide, Jentadueto, Actos, Actoplus Met, Humalog Mix 75/25, Appformin, Appformin-D, Avandamet, Novolog Mix 70-30 Flexpen, Avandaryl, Tradjenta, Humulin R, Glipizide/Metformin HCl, Humulin 70/30, Cycloset, Humalog Mix 50/50 Pen, Humalog Mix 75/25 Pen, Humalog Mix 75/25 Kwikpen, Humalog Mix 50/50 Kwikpen, Precose, Actoplus Met Xr, Fortamet, Humalog Mix 50/50, Novolin 70-30, Apidra Solostar, Prandimet, Symlin, Glucovance, Humalog Pen, Humulin 50/50, Lantus for Opticlik, Duetact, Glyset, Amaryl, Apidra, Glucophage Xr, Metaglip, Starlix, Novolin R U-100, Chlorpropamide, Relion R, Relion N, Relion 70/30, Glucophage, Relion N Innolet, Relion 70/30 Innolet, Glycron, Diabeta, Tolinase, Glucotrol, Tolbutamide, Glynase, Novolin N U-100, Diabinese, Humulin R U-500 (Concentr, Humulin N U-100 Pen, Humulin 70/30 Pen</p>
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Supplementary Figure 1. PR Curves for Recursive Feature Elimination. Recursive feature elimination (RFE) was used to limit the number of clinical predictors for NAFL inclusive modeling (A) and non-NAFL modeling (B) while preserving model performance. Cross-sections 1-4 were used for model training and cross-section 6 was used for performance evaluation for each RFE iteration. Precision is scaled to the observed 6-month NASH incidence for each modeling cohort.



Supplementary Figure 2. PR Curves for Holdout and Validation Sets. Precision and recall curves for models trained on cross-sections 1-6 then tested on either the holdout validation set (cross-section 8) or the prospective scoring validation set (cross-section 10) for the NAFL inclusive (A) and Non-NAFL (B) models. Precision is scaled to the observed 6-month NASH incidence for each modeling cohort. CS: cross-section.



Supplementary Figure 3. PR Curves for NASH Diagnosed versus NASH Proxy Patients. A)

Precision and recall for NASH patients identified by an ICD-10 diagnosis code, NASH proxy criteria or by either criterion. Performance is for the KD and DD features NAFL inclusive model applied to the holdout validation set. Precision is scaled to the respective incidence of each NASH labeling criteria observed in claims per 6-months.