

Supplementary materials and methods

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Supplementary methods

Data processing

Vital signs for the first four hours were summarized using maximum, minimum, median, mean, chronological first, and chronological last for each patient. For laboratory results, in cases where multiple results were available (e.g., lactic acid measurements), only the first was used.

Missing value imputation was required for all models with the exception of CSI gradient boosting, which handles missing data without imputation using a default sorting rule. For the Elixhauser mortality score modeling, patients without coded comorbidities were assumed not to have them. For qSOFA and CURB-65 scores, patients without a documented Glasgow Coma Score (GCS) were assumed to have GCS = 15 and the vital sign associated with the highest disease severity was used in the calculation (e.g., the lowest recorded systolic blood pressure for qSOFA). For the qCSI, patients who were documented as on ambient air were assigned an oxygen flow rate of zero. Otherwise, patients on nasal cannula with missing flow rates were assigned a flow rate by median value imputation on the given cross-validation bootstrap.

Feature selection methods

There are varied methods for feature selection, each with associated strengths and weaknesses. We therefore took an ensemble approach trying to leverage the unique aspects of each method. For logistic regression with recursive elimination and LASSO regression techniques, we first normalized and imputed data and then used variable coefficients to compare variable importance. For the chi-square filter method variables were normalized and median imputed prior to ranking according to their chi-square value. We used Gini importance measure for random forest and both information gain and SHAP values for gradient boosted trees. Neither random forests or gradient boosting required normalization or imputation. We ranked features based on their occurrence within the top variables across the selection techniques. Vital sign and other variables summarized with maximum, minimum, mean, etc., we chose only a single summary variable (e.g., maximum heart rate) based on ranking importance and usability considerations.

Derivation of qCSI point system

To develop the qCSI, we first binned our model variables of interest and ran logistic regression with 10-fold cross-validation across 1,000 bootstrap iterations, reviewing AU-ROC, odds ratios, and number of individuals in each variable bin to derive preliminary weights and variable intervals (Table 2). Patients on room air were assigned a flow rate of zero and missing values were imputed with medians, fit on training or validation samples separately. All odds ratio for these binnings were significant at 95% confidence level. Odds ratios were multiplied by two and rounded to the nearest integer in order to convert decimals to whole numbers. We then subtracted 2 from each odds ratio so that the reference variable would assign a score of zero. Our 10-fold cross-validation of logistic regression for 1,000 bootstrap iterations revealed an odds ratio of 1.38 (95% CI: 1.36-1.40) per point with an AU-ROC 0.90 [0.85-0.96] in predicting the composite, primary outcome.

CSI optimization

To select an optimal set of hyperparameters, we used a tree-structured Parzen estimator (TPE) for sequential model-based global optimization based on maximization of expected improvement.^{1,2} To define our hyperparameter search space, we used Gaussian, uniform, and log-uniform distributions across gradient boosting parameters. Our hyperparameter search space included maximum depth, learning rate, minimum child weight, max delta step, scaled weight of positive outcomes, gamma, subsampling ratios, sampling method, and L1 and L2 regularization parameters. For the objective function, the AU-ROC from the best evaluation of 10 cross-validation folds was used to calculate the loss for a particular hyperparameter set, $\text{loss} = 1 - \text{AU-ROC}$. After updating posterior hyperparameter distributions for 1,000 epochs, we selected the best set of hyperparameters for use in CSI. For the CSI, we used a learning rate of $1e - 4$, $\alpha = 0.8$, $\lambda = 0.5$, $\gamma = 33$, a maximum delta step of 66, a max depth of 34, scaled weight for positive outcomes of 23, a minimum child weight of 79, and a random subsample of 80% of the training data per boosting iteration.

We stored the best model after 1,000 bootstrap iterations as defined by AU-ROC and Brier score loss. We then scaled the model output using isotonic regression. These transformed values were used to evaluate the model's calibration with observed risk on the external validation dataset.

Model performance

We used 10-fold cross-validation with bootstrapping (1,000 iterations) to assess model performance of all five models used in this study. Elixhauser comorbidity scores, CURB-65, qSOFA, and qCSI scores were all converted to probabilities using logistic regression. The CSI yields a probability output directly and so was not processed with logistic regression.

ROC curves describe the relationship between model sensitivity and specificity as each point represents model sensitivity and specificity at a specific cutoff. The area under these curves (AU-ROC) are a common and facile metric for comparing models to one another. Area under precision recall curves (AU-PRCs) are an alternate metric that shows the relationship between precision (inversely related to the false positive rate), and recall (inversely related to false negative rate). The average precision and F1 metrics are related to the AU-PRC, representing the weighted mean of precision across varied thresholds and the the weighted means of precision and recall, respectively. Accuracy is the ratio of correctly predicted positive observations to total observations. Sensitivity is the ratio of correctly predicted positive outcomes to all positive outcomes while specificity is the ratio of all correctly predicted negative observations to all negative outcomes. Brier score is a measure of calibration - the mean squared difference between the model-assigned probability of an outcome and the actual binary outcome itself. The Brier score is the only included metric for which a low score is considered optimal.

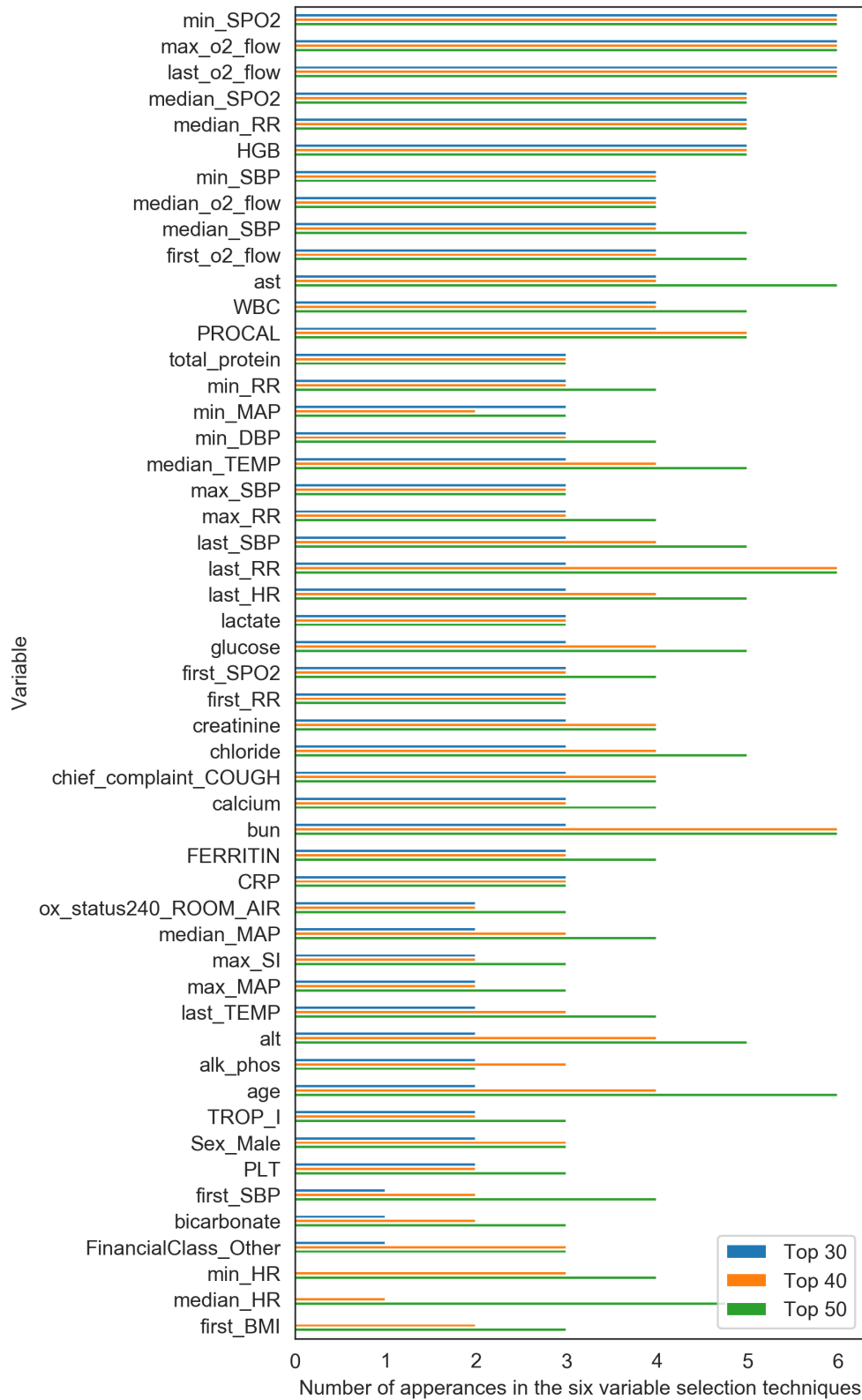


Figure S1: Six variable selection methods were used to identify potentially predictive variables. We limited each technique to the top 30, 40, and 50 variables of each of the methods and counted the number of models that each variable was identified by. Here, we show only those features identified by three or more models.

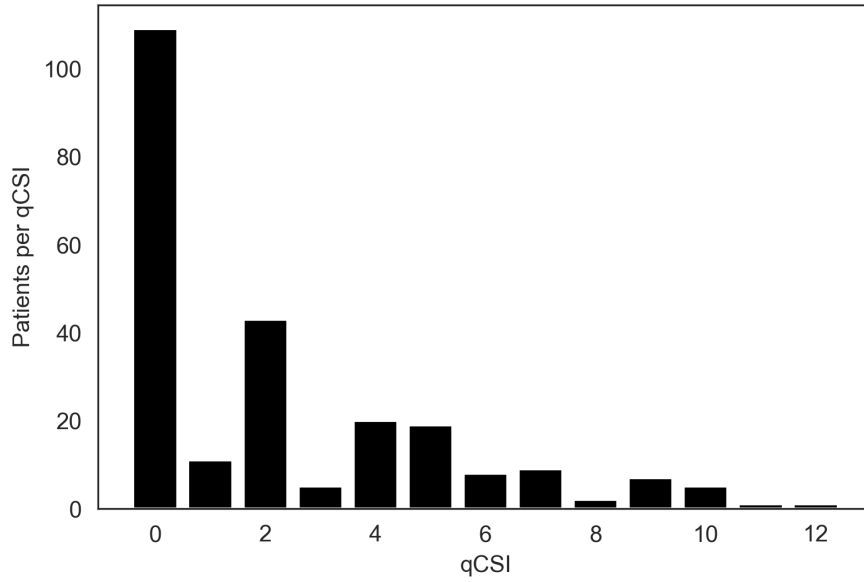


Figure S2: Frequency plot of validation cohort qCSI.

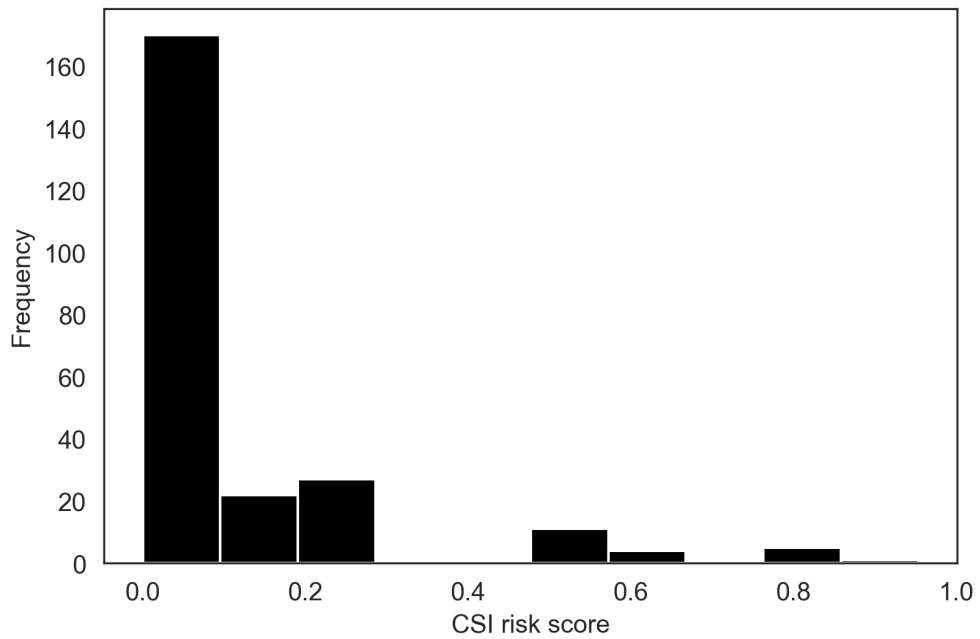


Figure S3: Frequency plot of validation cohort CSI. The CSI was generated by first training the gradient boosting model on the training cohort with cross-validation and isotonic regression. The best model was then retrained on the combined training and cross-validation cohorts. This model was then used to assign CSI to the external validation cohort.

Table S1: Upper and lower bounds for physiologic variables

Vital	Lower Bound	Upper Bound
Systolic blood pressure (mmHg)	30	300
Diastolic blood pressure (mmHg)	20	200
Heart rate	20	300
Respiratory rate	5	60
Pulse oximetry	40	100
Temperature (F)	80	106
Body mass index	10	80

Table S2: Mapping of text documentation of oxygen devices to respiratory device category. Critical respiratory illness was defined with the following logic: low-flow of greater than 10 liters/minute, high flow at any rate, non-invasive, or invasive.

Category	Text
ROOM-AIR	""
ROOM-AIR	"no"
ROOM-AIR	"room air"
HIGH-FLOW	"tracheostomy collar"
HIGH-FLOW	"nrb"
HIGH-FLOW	"nonrebreather mask"
HIGH-FLOW	"high flow nasal cannula"
HIGH-FLOW	"high-flow nasal cannula"
HIGH-FLOW	"venturi mask"
HIGH-FLOW	"mask"
HIGH-FLOW	"high-flow aerosol mask"
HIGH-FLOW	"high-flow mask"
HIGH-FLOW	"partial rebreather mask"
HIGH-FLOW	"high flow nasal"
LOW-FLOW	"nasal cannula with reservoir (i.e. oximizer)"
LOW-FLOW	"mask"
LOW-FLOW	"face tent"
LOW-FLOW	"oxygen hood/tent"
LOW-FLOW	"oxygen hood"
LOW-FLOW	"heated"
LOW-FLOW	"yes"
LOW-FLOW	"nasal cannula"
LOW-FLOW	"oxygen tent"
LOW-FLOW	"o2 ring"
LOW-FLOW	"nc"
LOW-FLOW	"open oxygen mask"
LOW-FLOW	"other"
LOW-FLOW	"humidified"
LOW-FLOW	"oxyhood/transparent enclosure"
LOW-FLOW	"O2 ring"
LOW-FLOW	"simple face mask"
LOW-FLOW	"transtracheal catheter"
LOW-FLOW	"nasal cannula w/ reservoir (i.e. oximizer)"
LOW-FLOW	"aerosol mask"
LOW-FLOW	"blender system"
LOW-FLOW	"nasal cannula with humidification"
LOW-FLOW	"enclosed incubator"
LOW-FLOW	"other (see comments)"
LOW-FLOW	"blow by"
LOW-FLOW	"nasal cannula w/ humidification"
LOW-FLOW	"low flow nasal cannula"
NON-INVASIVE	"manual resuscitator"
NON-INVASIVE	"bag-valve-mask"
NON-INVASIVE	"t- piece"
NON-INVASIVE	"tracheostomy t-piece"
NON-INVASIVE	"cpap"
NON-INVASIVE	"ventilator - noninvasive"
NON-INVASIVE	"bipap"
NON-INVASIVE	"bubble cpap"
NON-INVASIVE	"nppv/niv"
NON-INVASIVE	"nppv"
NON-INVASIVE	"bag valve mask"
INVASIVE	"mechanical ventilator"
INVASIVE	"ventilator"
INVASIVE	"ventilator - invasive"

Feature Table

age	PANCREATIC ENZYMES
MultiRacial	PARASYMPATHETIC AGENTS
CRP	PEDIATRIC VITAMIN PREPARATIONS
DIMER	PENICILLIN ANTIBIOTICS
FERRITIN	PERIODONTAL COLLAGENASE INHIBITORS
HGB	PHARMACEUTICAL ADJUVANTS, TABLET, CAPSULE COMPONENTS
PLT	PHOSPHATE REPLACEMENT
PROCAL	PHOSPHODIESTERASE-4 (PDE4) INHIBITORS
TROP I	PINEAL HORMONE AGENTS
WBC	PITUITARY SUPPRESSIVE AGENTS
alk phos	PLATELET AGGREGATION INHIBITORS
alt	PLATELET REDUCING AGENTS
ast	POSTHERPETIC NEURALGIA AGENTS
bicarbonate	POTASSIUM REPLACEMENT
bun	POTASSIUM SPARING DIURETICS
calcium	POTASSIUM SPARING DIURETICS IN COMBINATION
chloride	PREGNANCY FACILITATING/MAINTAINING AGENT, HORMONAL
creatinine	PREGNANCY MAINTAINING AGENT, HORMONAL
glucose	PRENATAL VITAMIN PREPARATIONS
lactate	PRENATAL VITAMINS WITH LOW OR NO IRON
potassium	PROGESTATIONAL AGENTS
sodium	PROTECTIVES
total bilirubin	PROTEIN REPLACEMENT
total protein	PROTEIN STABILIZERS
median BMI	PROTON-PUMP INHIBITORS
median DBP	PSEUDOBULBAR AFFECT (PBA) AGENTS, NMDA ANTAGONISTS
median GCS	PULM ANTI-HTN, SOLUBLE GUANYLATE CYCLASE STIMULATOR
median HR	PULM ANTI-HTN, SEL. C-GMP PHOSPHODIESTERASE T5 INHIB
median MAP	PULMONARY ANTI-HTN, ENDOTHELIN RECEPTOR ANTAGONIST
median RR	PULMONARY ANTIHYPERTENSIVES, PROSTACYCLIN-TYPE
median SBP	PULMONARY FIBROSIS - SYSTEMIC ENZYME INHIBITORS
median SI	QUINOLONE ANTIBIOTICS
median SPO2	RECTAL PREPARATIONS
median TEMP	RECTAL/LOWER BOWEL PREP, GLUCOCORT. (NON-HEMORR)
min BMI	RENIN INHIBITOR, DIRECT
min DBP	RESPIRATORY AIDS, DEVICES, EQUIPMENT
min GCS	RIFAMYCINS AND RELATED DERIVATIVE ANTIBIOTICS
min HR	ROSACEA AGENTS, TOPICAL
min MAP	RUBBER SYRINGES
min RR	SALIVA STIMULANT AGENTS
min SBP	SALIVA SUBSTITUTE AGENTS
min SI	SEDATIVE-HYPNOTICS - BENZODIAZEPINES
min SPO2	SEDATIVE-HYPNOTICS, NON-BARBITURATE
min TEMP	SELECTIVE ESTROGEN RECEPTOR MODULATORS (SERMS)
max BMI	SELECTIVE SEROTONIN REUPTAKE INHIBITOR (SSRIS)
max DBP	SEROTONIN (5HT-4) PARTIAL AGONIST AGENTS
max GCS	SEROTONIN-2 ANTAG, REUPTAKE INH/DIETARY SUPP. COMB.
max HR	SEROTONIN-2 ANTAGONIST/REUPTAKE INHIBITORS (SARIS)
max MAP	SEROTONIN-NOREPINEPHRINE REUPTAKE-INHIB (SNRIS)
max RR	SEXUAL DYSFUNCTION DEVICES
max SBP	SICKLE CELL ANEMIA AGENTS
max SI	SKELETAL MUSCLE RELAXANTS
max SPO2	SMOKING DETERRENT AGENTS (GANGLIONIC STIM, OTHERS)
max TEMP	SMOKING DETERRENT-NICOTINIC RECEPT. PARTIAL AGONIST
first BMI	SODIUM/SALINE PREPARATIONS
first DBP	SOLVENTS
first GCS	SOMATOSTATIC AGENTS
first HR	SSRI AND 5HT1A PARTIAL AGONIST ANTIDEPRESSANTS
first MAP	SSRI, SEROTONIN RECEPTOR MODULATOR ANTIDEPRESSANTS
first RR	SSRI-ANTIPSYCH, ATYPICAL, DOPAMINE, SEROTONIN ANTAG
first SBP	STEROID ANTINEOPLASTICS
first SI	SUPPORT HOSIERY
first SPO2	SYRINGES AND ACCESSORIES
first TEMP	TETRACYCLINE ANTIBIOTICS
last BMI	THERMOMETERS
last DBP	THIAZIDE AND RELATED DIURETICS
last GCS	THICKENING AGENTS, ORAL
last HR	THROMBIN INHIBITORS, SELECTIVE, DIRECT, REVERSIBLE
last MAP	THROMBOPOIETIN RECEPTOR AGONISTS
last RR	THYROID FUNCTION DIAGNOSTIC AGENTS
last SBP	THYROID HORMONES
last SI	TOOTH ACHE PREPARATIONS
last SPO2	TOP. ANTI-INFLAM., PHOSPHODIESTERASE-4 (PDE4) INHIB
last TEMP	TOPICAL AGENTS, MISCELLANEOUS
n measurement BMI	TOPICAL ANTI-INFLAMMATORY STEROID-LOCAL ANESTHETIC
n measurement DBP	TOPICAL ANTI-INFLAMMATORY STEROIDAL
n measurement GCS	TOPICAL ANTI-INFLAMMATORY, NSAIDS
n measurement HR	TOPICAL ANTIBIOTICS
n measurement MAP	TOPICAL ANTICHOLINERGIC HYPERHIDROSIS TX AGENTS
n measurement RR	TOPICAL ANTIFUNGAL/ANTI-INFLAMMATORY, STEROID AGENT

Feature Table

n measurement SBP	TOPICAL ANTIFUNGALS
n measurement SI	TOPICAL ANTINEOPLASTIC PREMALIGNANT LESION AGENTS
n measurement SPO2	TOPICAL ANTIPARASITICS
n measurement TEMP	TOPICAL ANTIVIRALS
median o2 flow	TOPICAL HYPERTRICHOTIC AGENTS, EYELASHES
min o2 flow	TOPICAL IMMUNOSUPPRESSIVE AGENTS
max o2 flow	TOPICAL LOCAL ANESTHETICS
first o2 flow	TOPICAL PREPARATIONS,ANTIBACTERIALS
last o2 flow	TOPICAL PREPARATIONS,MISCELLANEOUS
n measurement o2 flow	TOPICAL SULFONAMIDES
PharmaceuticalClass *Unspecified	TOPICAL/MUCOUS MEMBR./SUBCUT. ENZYMES
PharmaceuticalClass 1ST GEN ANTIHIST-DECON-NSAID,COX NONSPEC	TOPICALS, HYPERTRICHOTIC AGENTS
PharmaceuticalClass 1ST GEN ANTIHISTAMINE AND DECONGESTANT COMBINATION	INFANT FORMULAS
PharmaceuticalClass 1ST GEN ANTIHISTAMINE-DECONGESTANT-ANALGESIC COMB	INFLUENZA VIRUS VACCINES
PharmaceuticalClass 2ND GEN ANTIHISTAMINE AND DECONGESTANT COMBINATION	INOTROPIC DRUGS
PharmaceuticalClass 2ND GEN. ANAEROBIC ANTIPROTOZOAL-ANTIBACTERIAL	INSULINS
PharmaceuticalClass ABSORBABLE SULFONAMIDE ANTIBACTERIAL AGENTS	INTEGRIN RECEPTOR ANTAGONIST, MONOCLONAL ANTIBODY
PharmaceuticalClass ACE INHIBITOR-CALCIUM CHANNEL BLOCKER COMBINATION	INTERLEUKIN-4(IL-4) RECEPTOR ALPHA ANTAGONIST, MAB
PharmaceuticalClass ACE INHIBITOR-THIAZIDE OR THIAZIDE-LIKE DIURETIC	INTERLEUKIN-5(IL-5) RECEPTOR ALPHA ANTAGONIST, MAB
PharmaceuticalClass ACNE AGENTS,SYSTEMIC	INTERLEUKIN-6 (IL-6) RECEPTOR INHIBITORS
ACNE AGENTS, TOPICAL	INTESTINAL MOTILITY STIMULANTS
ADRENERGIC VASOPRESSOR AGENTS	INTRA-UTERINE DEVICES (IUDS)
ADRENERGICS, AROMATIC, NON-CATECHOLAMINE	IODINE CONTAINING AGENTS
AGENTS TO TREAT HYPOGLYCEMIA (HYPERGLYCEMICS)	IRON REPLACEMENT
AGENTS TO TREAT MULTIPLE SCLEROSIS	IRRIGANTS
AGTS TX NEUROMUSC TRANSMISSION DIS.POT-CHAN BLKR	IRRITABLE BOWEL SYND. AGENT,5-HT4 PARTIAL AGONIST
ALLERGENIC EXTRACTS, THERAPEUTIC	IRRITANTS/COUNTER-IRRITANTS
ALPHA-2 RECEPTOR ANTAGONIST ANTIDEPRESSANTS	IV SOLUTIONS: DEXTROSE-SALINE
ALPHA-ADRENERGIC BLOCKING AGENTS	IV SOLUTIONS: DEXTROSE-WATER
ALPHA/BETA-ADRENERGIC BLOCKING AGENTS	JANUS KINASE (JAK) INHIBITORS
ALZHEIMER'S THERAPY, NMDA RECEPTOR ANTAGONISTS	KERATOLYTICS
ALZHEIMER'S THX.NMDA RECEPTOR ANTAG-CHOLINES INHIB	LAXATIVES AND CATHARTICS
AMINOGLYCOSIDE ANTIBIOTICS	LAXATIVES, LOCAL/RECTAL
AMMONIA INHIBITORS	LEUKOCYTE (WBC) STIMULANTS
AMYOTROPHIC LATERAL SCLEROSIS AGENTS	LEUKOTRIENE RECEPTOR ANTAGONISTS
ANAEROBIC ANTIPROTOZOAL-ANTIBACTERIAL AGENTS	LHRH (GNRH) AGONIST ANALOG PITUITARY SUPPRESSANTS
ANALGESIC, NON-SAL.- 1ST GENERATION ANTIHISTAMINE	LHRH(GNRH) ANTAGONIST,PITUITARY SUPPRESSANT AGENTS
ANALGESIC, NON-SALICYLATE AND BARBITURATE COMBINAT	LINCOSAMIDE ANTIBIOTICS
ANALGESIC, NON-SALICYLATE-EXPECTORANT COMBINATION	LIPOTROPICS
ANALGESIC, SALICYLATE, BARBITURATE, XANTHINE COMB.	LOCAL ANESTHETICS
ANALGESIC, NON-SALICYLATE, BARBITURATE, XANTHINE COMB	LOCAL ANORECTAL NITRATE PREPARATIONS
ANALGESIC, NON-SALICYLATE-1ST GEN ANTIHIST-XANTHINE	LOOP DIURETICS
ANALGESIC, NSAID-1ST GEN. ANTIHISTAMINE, SEDATIVE CMB	MACROLIDE ANTIBIOTICS
ANALGESIC/ANTIPYRETICS, SALICYLATES	MAGNESIUM SALTS REPLACEMENT
ANALGESIC/ANTIPYRETICS, NON-SALICYLATE	MAOIS -NON-SELECTIVE, IRREVERSIBLE ANTIDEPRESSANTS
ANAPHYLAXIS THERAPY AGENTS	MAST CELL STABILIZERS
ANDROGEN/ESTROGEN PREPS FOR FEMALE SEXUAL DYSFUNC	MAST CELL STABILIZERS, ORALLY INHALED
ANDROGENIC AGENTS	MEDICAL SUPPLIES, MISCELLANEOUS
ANGIOTEN. RECEPTR ANTAG-CALCIUM CHANL. BLKR-THIAZIDE	MEDICAL SUPPLIES, MISCELLANEOUS(GROUP 2)
ANGIOTENSIN RECEPT-NEPRILYSIN INHIBITOR COMB(ARNI)	MENOPAUSAL SYMPT SUPP-SEL. ESTROGEN RECEPT MODULATOR
ANGIOTENSIN RECEPTOR ANTAG.-THIAZIDE DIURETIC COMB	METABOLIC DEFICIENCY AGENTS
ANGIOTENSIN RECEPTOR BLOCKR-CALCIUM CHANNEL BLOCKR	METALLIC POISON, AGENTS TO TREAT
ANTACIDS	MINERAL REPLACEMENT, MISCELLANEOUS
ANTHELMINTICS	MINERALOCORTICOIDS
ANTI-ALCOHOLIC PREPARATIONS	MIOTICS AND OTHER INTRAOCULAR PRESSURE REDUCERS
ANTI-ANXIETY - BENZODIAZEPINES	MONOAMINE OXIDASE (MAO) INHIBITOR ANTIDEPRESSANTS
ANTI-ANXIETY DRUGS	MONOCLONAL ANTIBODIES TO IMMUNOGLOBULIN E (IGE)
ANTI-ARTHRITIC, FOLATE ANTAGONIST AGENTS	MONOCLONAL ANTIBODY - INTERLEUKIN-5 ANTAGONISTS
ANTI-CD20 (B LYMPHOCYTE) MONOCLONAL ANTIBODY	MONOCLONAL ANTIBODY-HUMAN INTERLEUKIN 12/23 INHIB
ANTI-INFLAMMATORY TUMOR NECROSIS FACTOR INHIBITOR	MU-OPIOID RECEPTOR ANTAGONISTS, PERIPHERALLY-ACTING
ANTI-INFLAMMATORY, INTERLEUKIN-1 BETA BLOCKERS	MUCOLYTICS
ANTI-INFLAMMATORY, PYRIMIDINE SYNTHESIS INHIBITOR	MULTIVITAMIN PREPARATIONS
ANTI-INFLAMMATORY, PHOSPHODIESTERASE-4(PDE4) INHIB.	MYDRIATICS
ANTI-INFLAMMATORY/ANTIARTHRITICS AGENTS, MISC.	NARCOLEPSY AND SLEEP DISORDER THERAPY AGENTS
ANTI-MYCOBACTERIUM AGENTS	NASAL ANTI-INFLAMMATORY STEROIDS
ANTI-OBESITY - ANOREXIC AGENTS	NASAL ANTIHISTAMINE
ANTI-OBESITY GLUCAGON-LIKE PEPTIDE-1 RECEPTOR AGONIST	NASAL ANTIHISTAMINE AND ANTI-INFLAM. STEROID COMB.
ANTI-OBESITY SEROTONIN 2C RECEPTOR AGONISTS	NASAL MAST CELL STABILIZERS
ANTI-OBESITY-OPIOID ANTAG-NOREPL, DOPAMINE RU INHIB	NASAL MOISTURIZER
ANTI-ULCER PREPARATIONS	NASAL WASHES
ANTI-ULCER-H.PYLORI AGENTS	NEEDLES/NEEDLELESS DEVICES
ANTIANGINAL, ANTI-ISCHEMIC AGENTS, NON-HEMODYNAMIC	NEUROMUSCULAR BLOCKING AGENTS
ANTIARRHYTHMICS	NIACIN PREPARATIONS
ANTIBIOTIC, ANTIBACTERIAL, MISC.	NITROFURAN DERIVATIVES ANTIBACTERIAL AGENTS
ANTICHOLINERGICS, ORALLY INHALED LONG ACTING	NON-OPIOID ANTITUSS-1ST GEN ANTIHIST-ANALGESIC COMB
ANTICHOLINERGICS, ORALLY INHALED SHORT ACTING	NON-OPIOID ANTITUSS-1ST GEN ANTIHISTAMINE-DECONGEST
ANTICHOLINERGICS, QUATERNARY AMMONIUM	NON-OPIOID ANTITUSS-1ST GEN ANTIHIST-DECON-ANALGESIC
ANTICHOLINERGICS/ANTISPASMODICS	NON-OPIOID ANTITUSS-DECONGESTANT-ANALGESIC-EXPECT
ANTICOAGULANTS, COUMARIN TYPE	NON-OPIOID ANTITUSSIVE AND EXPECTORANT COMBINATION
ANTICONVULSANT - BENZODIAZEPINE TYPE	NON-OPIOID ANTITUSSIVE-1ST GEN ANTIHISTAMINE COMB.
ANTICONVULSANT - CANNABINOID TYPE	NON-OPIOID ANTITUSSIVE-DECONGESTANT-ANALGESIC COMB
ANTICONVULSANTS	NOREPINEPHRINE AND DOPAMINE REUPTAKE INHIB (NDRIS)
ANTIDIARRHEAL MICROORGANISMS AGENTS	NOSE PREPARATIONS ANTIBIOTICS
ANTIDIARRHEALS	NOSE PREPARATIONS, MISCELLANEOUS (OTC)
ANTIDIURETIC AND VASOPRESSOR HORMONES	NOSE PREPARATIONS, MISCELLANEOUS (RX)

Feature Table

ANTIEMETIC, CANNABINOID-TYPE	NOSE PREPARATIONS, VASOCONSTRICTORS(OTC)
ANTIEMETIC/ANTIVERTIGO AGENTS	NSAID AND HISTAMINE H2 RECEPTOR ANTAGONIST COMB.
ANTIFIBRINOLYTIC AGENTS	NSAID,COX INHIBITOR-TYPE AND PROTON-PUMP INHIBITOR
ANTIFIBROTIC THERAPY - PYRIDONE ANALOGS	NSAIDS(COX NON-SPEC.INHIB)AND PROSTAGLANDIN ANALOG
ANTIFLATULENTS	NSAIDS, CYCLOOXYGENASE INHIBITOR - TYPE ANALGESICS
ANTIFUNGAL AGENTS	NSAIDS,CYCLOOXYGENASE-2(COX-2) SELECTIVE INHIBITOR
ANTIFUNGAL ANTIBIOTICS	NUTRITIONAL THERAPY, MED COND SPECIAL FORMULATION
ANTIHEMOPHILIC FACTORS	OINTMENT/CREAM BASES
ANTIHISTAMINES	OPHTH VASC. ENDOTHELIAL GROWTH FACTOR ANTAGONISTS
ANTIHISTAMINES - 1ST GENERATION	OPHTHALMIC ANTI-INFLAMMATORY IMMUNOMODULATOR-TYPE
ANTIHISTAMINES - 2ND GENERATION	OPHTHALMIC ANTIBIOTICS
ANTIHYPERGLY.INCRETIN MIMETIC(GLP-1 RECEPT.AGONIST)	OPHTHALMIC CYSTINE DEPLETING AGENTS
ANTIHYPERGLY.INSULIN.LONG ACT-GLP-1 RECEPT.AGONIST	OPHTHALMIC PREPARATIONS, MISCELLANEOUS
ANTIHYPERGLYCEMIC-SOD/GLUC COTRANSPORT2(SGLT2)INHIB	OPIOID ANALGESIC AND NON-SALICYLATE ANALGESICS
ANTIHYPERGLYCEMIC, ALPHA-GLUCOSIDASE INHIBITORS	OPIOID ANALGESIC AND NSAID COMBINATION
ANTIHYPERGLYCEMIC, BIGUANIDE TYPE	OPIOID ANALGESIC AND SALICYLATE ANALGESIC COMB
ANTIHYPERGLYCEMIC, DPP-4 INHIBITORS	OPIOID ANALGESIC, ANESTHETIC ADJUNCT AGENTS
ANTIHYPERGLYCEMIC, INSULIN-RELEASE STIMULANT TYPE	OPIOID ANALGESICS
ANTIHYPERGLYCEMIC, SGLT-2 AND DPP-4 INHIBITOR COMB	OPIOID AND SALICYLATE ANALGESICS,BARBIT,XANTHINE
ANTIHYPERGLYCEMIC, THIAZOLIDINEDIONE AND BIGUANIDE	OPIOID ANTAGONISTS
ANTIHYPERGLYCEMIC, THIAZOLIDINEDIONE-SULFONYLUREA	OPIOID ANTITUSSIVE-1ST GENERATION ANTIHISTAMINE
ANTIHYPERGLYCEMIC,DPP-4 INHIBITOR-BIGUANIDE COMBS.	OPIOID ANTITUSSIVE-ANTICHOLINERGIC COMBINATIONS
ANTIHYPERGLYCEMIC,INSULIN-RELEASE STIM.-BIGUANIDE	OPIOID ANTITUSSIVE-EXPECTORANT COMBINATION
ANTIHYPERGLYCEMIC,THIAZOLIDINEDIONE(PPARG AGONIST)	OPIOID WITHDRAWAL THERAPY AGENTS, OPIOID-TYPE
ANTIHYPERGLYCEMIC-GLUCOCORTICOID RECEPTOR BLOCKER	OPIOID,NON-SALICYL.ANALGESIC,BARBITURATE,XANTHINE
ANTIHYPERGLYCEMIC-SGLT2 INHIBITOR-BIGUANIDE COMBS.	ORAL LIPID SUPPLEMENTS
ANTIHYPERLIP.HMG COA REDUCT INHIB-CHOLEST.AB.INHIB	ORAL MUCOSITIS/STOMATITIS AGENTS
ANTIHYPERLIPID- HMG-COA RI-CALCIUM CHANNEL BLOCKER	OSMOTIC DIURETICS
ANTIHYPERLIPIDEMIC - PCSK9 INHIBITORS	OSTOMY SUPPLIES
ANTIHYPERLIPIDEMIC-HMGCOA REDUCTASE INHIB(STATINS)	OTIC PREPARATIONS,ANTI-INFLAMMATORY-ANTIBIOTICS
ANTIHYPERTENSIVES, ACE INHIBITORS	OVERACTIVE BLADDER AGENTS, BETA-3 ADRENERGIC RECEPTOR
ANTIHYPERTENSIVES, ANGIOTENSIN RECEPTOR ANTAGONIST	OVULATION TESTS
ANTIHYPERTENSIVES, SYMPATHOLYTIC	OXAZOLIDINONE ANTIBIOTICS
ANTIHYPERTENSIVES, VASODILATORS	OXIDIZING AGENTS
ANTILEPTOTICS	OXYTOCICS
ANTIMIGRAINE PREPARATIONS	PANCREATIC ENZYMES
ANTINEOPLAST HUM VEGF INHIBITOR RECOMB MC ANTIBODY	PARASYMPATHETIC AGENTS
ANTINEOPLASTIC - ALKYLATING AGENTS	PEDIATRIC VITAMIN PREPARATIONS
ANTINEOPLASTIC - ANTIANDROGENIC AGENTS	PENICILLIN ANTIBIOTICS
ANTINEOPLASTIC - ANTIMETABOLITES	PERIODONTAL COLLAGENASE INHIBITORS
ANTINEOPLASTIC - AROMATASE INHIBITORS	PHARMACEUTICAL ADJUVANTS, TABLET, CAPSULE COMPONENTS
ANTINEOPLASTIC - BRAF KINASE INHIBITORS	PHOSPHATE REPLACEMENT
ANTINEOPLASTIC - HALICHONDRIIN B ANALOGS	PHOSPHODIESTERASE-4 (PDE4) INHIBITORS
ANTINEOPLASTIC - JANUS KINASE (JAK) INHIBITORS	PINEAL HORMONE AGENTS
ANTINEOPLASTIC - MEK1 AND MEK2 KINASE INHIBITORS	PITUITARY SUPPRESSIVE AGENTS
ANTINEOPLASTIC - MTOR KINASE INHIBITORS	PLATELET AGGREGATION INHIBITORS
ANTINEOPLASTIC IMMUNOMODULATOR AGENTS	PLATELET REDUCING AGENTS
ANTINEOPLASTIC LHRH(GNRH) AGONIST,PITUITARY SUPPR.	POSTHERPETIC NEURALGIA AGENTS
ANTINEOPLASTIC SYSTEMIC ENZYME INHIBITORS	POTASSIUM REPLACEMENT
ANTINEOPLASTIC,ANTI-PROGRAMMED DEATH-1 (PD-1) MAB	POTASSIUM SPARING DIURETICS
ANTINEOPLASTIC-B CELL LYMPHOMA-2(BCL-2) INHIBITORS	POTASSIUM SPARING DIURETICS IN COMBINATION
ANTINEOPLASTIC-SELECT INHIB OF NUCLEAR EXP (SINE)	PREGNANCY FACILITATING/MAINTAINING AGENT,HORMONAL
ANTINEOPLASTICS,MISCELLANEOUS	PREGNANCY MAINTAINING AGENT,HORMONAL
ANTINFLAMMATORY, SEL.COSTIM.MOD.,T-CELL INHIBITOR	PRENATAL VITAMIN PREPARATIONS
ANTIOXIDANT AGENTS	PRENATAL VITAMINS WITH LOW OR NO IRON
ANTIOXIDANT MULTIVITAMIN COMBINATIONS	PROGESTATIONAL AGENTS
ANTIPARKINSONISM DRUGS,ANTICHOLINERGIC	PROTECTIVES
ANTIPARKINSONISM DRUGS,OTHER	PROTEIN REPLACEMENT
ANTIPERSPIRANTS	PROTEIN STABILIZERS
ANTIPROTOZOAL DRUGS,MISCELLANEOUS	PROTON-PUMP INHIBITORS
ANTIPTURITICS, TOPICAL	PSEUDOBULBAR AFFECT (PBA) AGENTS, NMDA ANTAGONISTS
ANTIPSORIATIC AGENTS,SYSTEMIC	PULM ANTI-HTN,SOLUBLE GUANYLATE CYCLASE STIMULATOR
ANTIPSORIATICS AGENTS	PULM.ANTI-HTN,SEL.C-GMP PHOSPHODIESTERASE T5 INHIB
ANTIPSYCHOTIC,ATYPICAL,DOPAMINE,SEROTONIN ANTAGONIST	PULMONARY ANTI-HTN, ENDOTHELIN RECEPTOR ANTAGONIST
ANTIPSYCHOTIC-ATYPICAL,D3/D2 PARTIAL AG-5HT MIXED	PULMONARY ANTIHYPERTENSIVES, PROSTACYCLIN-TYPE
ANTIPSYCHOTICS, ATYP. D2 PARTIAL AGONIST/5HT MIXED	PULMONARY FIBROSIS - SYSTEMIC ENZYME INHIBITORS
ANTIPSYCHOTICS, DOPAMINE AND SEROTONIN ANTAGONISTS	QUINOLONE ANTIBIOTICS
ANTIPSYCHOTICS,DOPAMINE ANTAGONISTS, THIOXANTHENES	RECTAL PREPARATIONS
ANTIPSYCHOTICS,DOPAMINE ANTAGONISTS,BUTYROPHENONES	RECTAL/LOWER BOWEL PREP.GLUCOCORT. (NON-HEMORR)
ANTIPSYCHOTICS,PHENOTHIAZINES	RENIN INHIBITOR, DIRECT
ANTIRETROVIRAL-INTEGRASE INHIBITOR AND NNRTI COMB.	RESPIRATORY AIDS,DEVICES,EQUIPMENT
ANTIRETROVIRAL-INTEGRASE INHIBITOR AND NRTI COMB.	RIFAMYCINS AND RELATED DERIVATIVE ANTIBIOTICS
ANTIRETROVIRAL-NRTIS AND INTEGRASE INHIBITORS COMB	ROSACEA AGENTS, TOPICAL
ANTIRETROVIRAL-NUCLEOSIDE,NUCLEOTIDE,PROTEASE INH.	RUBBER SYRINGES
ANTISEBORRHEIC AGENTS	SALIVA STIMULANT AGENTS
ANTISEPTICS,GENERAL	SALIVA SUBSTITUTE AGENTS
ANTISERA	SEDATIVE-HYPNOTICS - BENZODIAZEPINES
ANTITHYROID PREPARATIONS	SEDATIVE-HYPNOTICS, NON-BARBITURATE
ANTITUBERCULAR ANTIBIOTICS	SELECTIVE ESTROGEN RECEPTOR MODULATORS (SERMS)
ANTITUSSIVE-1ST GEN ANTI-T-A ANALGESIC-EXPECT COMB	SELECTIVE SEROTONIN REUPTAKE INHIBITOR (SSRIS)
ANTITUSSIVES, NON-OPIOID	SEROTONIN (5HT-4) PARTIAL AGONIST AGENTS
ANTIVIRALS, GENERAL	SEROTONIN-2 ANTAG.REUPTAKE INH/DIETARY SUPP. COMB.
ANTIVIRALS, HIV-SPEC, NON-PEPTIDIC PROTEASE INHIB	SEROTONIN-2 ANTAGONIST/REUPTAKE INHIBITORS (SARIS)
ANTIVIRALS, HIV-SPEC, NUCLEOSIDE-NUCLEOTIDE ANALOG	SEROTONIN-NOREPINEPHRINE REUPTAKE-INHIB (SNRIS)
ANTIVIRALS, HIV-SPEC., NUCLEOSIDE ANALOG, RTI COMB	SEXUAL DYSFUNCTION DEVICES

Feature Table

ANTIVIRALS, HIV-SPECIFIC, NON-NUCLEOSIDE, RTI	SICKLE CELL ANEMIA AGENTS
ANTIVIRALS, HIV-SPECIFIC, NUCLEOSIDE ANALOG, RTI	SKELETAL MUSCLE RELAXANTS
ANTIVIRALS, HIV-SPECIFIC, NUCLEOTIDE ANALOG, RTI	SMOKING DETERRENT AGENTS (GANGLIONIC STIM.OTHERS)
ANTIVIRALS, HIV-SPECIFIC, PROTEASE INHIBITOR COMB	SMOKING DETERRENT-NICOTINIC RECEPT.PARTIAL AGONIST
ANTIVIRALS, HIV-SPECIFIC, PROTEASE INHIBITORS	SODIUM/SALINE PREPARATIONS
ANTIVIRALS,HIV-1 INTEGRASE STRAND TRANSFER INHIBTR	SOLVENTS
APPETITE STIM. FOR ANOREXIA,CACHEXIA,WASTING SYND.	SOMATOSTATIC AGENTS
ARGININE VASOPRESSIN (AVP) RECEPTOR ANTAGONISTS	SSRI AND 5HT1A PARTIAL AGONIST ANTIDEPRESSANTS
ARTIFICIAL TEARS	SSRI, SEROTONIN RECEPTOR MODULATOR ANTIDEPRESSANTS
ARTV NUCLEOSIDE,NUCLEOTIDE,NON-NUCLEOSIDE RTI COMB	SSRI-ANTIPSYCH, ATYPICAL,DOPAMINE,SEROTONIN ANTAG
ARV-NUCLEOSIDE,NUCLEOTIDE RTI,INTEGRASE INHIBITORS	STEROID ANTINEOPLASTICS
ASTRINGENTS	SUPPORT HOSIERY
BANDAGES AND RELATED SUPPLIES	SYRINGES AND ACCESSORIES
BARBITURATES	TETRACYCLINE ANTIBIOTICS
BELLADONNA ALKALOIDS	THERMOMETERS
BENIGN PROSTATIC HYPERTROPHY/MICTURITION AGENTS	THIAZIDE AND RELATED DIURETICS
BETA-ADRENERGIC AGENTS	THICKENING AGENTS, ORAL
BETA-ADRENERGIC AGENTS, INHALED, SHORT ACTING	THROMBIN INHIBITORS, SELECTIVE, DIRECT, REVERSIBLE
BETA-ADRENERGIC AGENTS, ORALLY INHALED,LONG ACTING	THROMBOPOIETIN RECEPTOR AGONISTS
BETA-ADRENERGIC AND ANTICHOLINERGIC COMBO, INHALED	THYROID FUNCTION DIAGNOSTIC AGENTS
BETA-ADRENERGIC AND GLUCOCORTICOID COMBO, INHALED	THYROID HORMONES
BETA-ADRENERGIC BLOCKING AGENTS	TOOTH ACHE PREPARATIONS
BETA-ADRENERGIC-ANTICHOLINERGIC-GLUCOCORT, INHALED	TOP. ANTI-INFLAM.,PHOSPHODIESTERASE-4 (PDE4) INHIB
BETA-BLOCKERS AND THIAZIDE,THIAZIDE-LIKE DIURETICS	TOPICAL AGENTS,MISCELLANEOUS
BICARBONATE PRODUCING/CONTAINING AGENTS	TOPICAL ANTI-INFLAMMATORY STEROID-LOCAL ANESTHETIC
BILE SALT SEQUESTRANTS	TOPICAL ANTI-INFLAMMATORY STEROIDAL
BILE SALTS	TOPICAL ANTI-INFLAMMATORY, NSAIDS
BIOFLAVONOIDS	TOPICAL ANTIBIOTICS
BIPOLAR DISORDER DRUGS	TOPICAL ANTICHOLINERGIC HYPERHIDROSIS TX AGENTS
BLOOD SUGAR DIAGNOSTICS	TOPICAL ANTIFUNGAL/ANTI-INFLAMMATORY,STEROID AGENT
BONE FORMATION STIM. AGENTS - PARATHYROID HORMONE	TOPICAL ANTIFUNGALS
BONE FORMATION STIMULATING AGTS - PTH REL PEPTIDES	TOPICAL ANTINEOPLASTIC PREMALIGNANT LESION AGENTS
BONE RESORPTION INHIBITORS	TOPICAL ANTIPARASITICS
BPH 5-ALPHA-REDUCTASE INHIB-ALPHA1-ADRENOCEP ANTAG	TOPICAL ANTIVIRALS
BRACES AND RELATED DEVICES	TOPICAL HYPERTRICHOTIC AGENTS, EYELASHES
BULK CHEMICALS	TOPICAL IMMUNOSUPPRESSIVE AGENTS
C1 ESTERASE INHIBITORS	TOPICAL LOCAL ANESTHETICS
CALCIMIMETIC,PARATHYROID CALCIUM ENHANCER	TOPICAL PREPARATIONS,ANTIBACTERIALS
CALCIUM CHANNEL BLOCKING AGENTS	TOPICAL PREPARATIONS,MISCELLANEOUS
CALCIUM REPLACEMENT	TOPICAL SULFONAMIDES
CARBAPENEM ANTIBIOTICS (THIENAMYCINS)	TOPICAL/MUCOUS MEMBR./SUBCUT. ENZYMES
CARBOHYDRATES	TOPICALS, HYPERTRICHOTIC AGENTS
CARBONIC ANHYDRASE INHIBITORS	INFANT FORMULAS
CATHETERS AND RELATED DEVICES	INFLUENZA VIRUS VACCINES
CEPHALOSPORIN ANTIBIOTICS - 1ST GENERATION	INOTROPIC DRUGS
CEPHALOSPORIN ANTIBIOTICS - 2ND GENERATION	INSULINS
CEPHALOSPORIN ANTIBIOTICS - 3RD GENERATION	INTEGRIN RECEPTOR ANTAGONIST, MONOCLONAL ANTIBODY
CEPHALOSPORIN ANTIBIOTICS - 4TH GENERATION	INTERLEUKIN-4(IL-4) RECEPTOR ALPHA ANTAGONIST, MAB
CHEMOTHERAPY RESCUE/ANTIDOTE AGENTS	INTERLEUKIN-5(IL-5) RECEPTOR ALPHA ANTAGONIST, MAB
CHOLINESTERASE INHIBITORS	INTERLEUKIN-6 (IL-6) RECEPTOR INHIBITORS
CHRONIC INFLAM. COLON DX, 5-A-SALICYLAT,RECTAL TX	INTESTINAL MOTILITY STIMULANTS
COLCHICINE	INTRA-UTERINE DEVICES (IUDS)
COLORING AGENTS AND DYES	IODINE CONTAINING AGENTS
CONTACT LENS PREPARATIONS(GAS,HARD,SOFT)	IRON REPLACEMENT
CONTRACEPTIVES, INTRAVAGINAL, SYSTEMIC	IRRIGANTS
CONTRACEPTIVES,IMPLANTABLE	IRRITABLE BOWEL SYND. AGENT,5-HT4 PARTIAL AGONIST
CONTRACEPTIVES,INJECTABLE	IRRITANTS/COUNTER-IRRITANTS
CONTRACEPTIVES,ORAL	IV SOLUTIONS: DEXTROSE-SALINE
CONTRACEPTIVES,TRANSDERMAL	IV SOLUTIONS: DEXTROSE-WATER
COUGH AND/OR COLD PREPARATIONS	JANUS KINASE (JAK) INHIBITORS
CYCLIC LIPOPEPTIDES	KERATOLYTICS
CYSTIC FIBROSIS-CFTR POTENTIATOR-CORRECTOR COMBIN.	LAXATIVES AND CATHARTICS
DECARBOXYLASE INHIBITORS	LAXATIVES, LOCAL/RECTAL
DECONGEST-ANALGESIC,NON-SALICYLATE COMB.	LEUKOCYTE (WBC) STIMULANTS
DECONGESTANT-ANALGESIC-EXPECTORANT COMBINATION	LEUKOTRIENE RECEPTOR ANTAGONISTS
DECONGESTANT-EXPECTORANT COMBINATIONS	LHRH (GNRH) AGONIST ANALOG PITUITARY SUPPRESSANTS
DECONGESTANT-NSAID, COX NON-SPEC COMB.	LHRH(GNRH) ANTAGONIST,PITUITARY SUPPRESSANT AGENTS
DECONGESTANTS, ORAL	LINCOSAMIDE ANTIBIOTICS
DENTAL AIDS AND PREPARATIONS	LIPOTROPICS
DIABETIC SUPPLIES	LOCAL ANESTHETICS
DIAGNOSTIC PREPARATIONS,MISCELLANEOUS	LOCAL ANORECTAL NITRATE PREPARATIONS
DIALYSIS SOLUTIONS	LOOP DIURETICS
DIETARY SUPPLEMENT, MISCELLANEOUS	MACROLIDE ANTIBIOTICS
DIGITALIS GLYCOSIDES	MAGNESIUM SALTS REPLACEMENT
DIRECT FACTOR XA INHIBITORS	MAOIS -NON-SELECTIVE,IRREVERSIBLE ANTIDEPRESSANTS
DRUG TX-CHRONIC INFLAM. COLON DX,5-AMINOSALICYLAT	MAST CELL STABILIZERS
DRUGS TO TREAT ERECTILE DYSFUNCTION (ED)	MAST CELL STABILIZERS, ORALLY INHALED
DRUGS TO TREAT MOVEMENT DISORDERS	MEDICAL SUPPLIES,MISCELLANEOUS
DURABLE MEDICAL EQUIPMENT,MISC(GROUP 1)	MEDICAL SUPPLIES,MISCELLANEOUS(GROUP 2)
DURABLE MEDICAL EQUIPMENT,MISC(GROUP 2)	MENOPAUSAL SYMPT SUPP-SEL ESTROGEN RECEPT MODULATOR
DURABLE MEDICAL EQUIPMENT,MISCELLANEOUS	METABOLIC DEFICIENCY AGENTS
EAR PREPARATIONS ANTI-INFLAMMATORY	METALLIC POISON,AGENTS TO TREAT
EAR PREPARATIONS, MISCELLANEOUS (OTC)	MINERAL REPLACEMENT, MISCELLANEOUS
EAR PREPARATIONS,ANTIBIOTICS	MINERALOCORTICIODS
EAR PREPARATIONS,EAR WAX REMOVERS	MIOTICS AND OTHER INTRAOCULAR PRESSURE REDUCERS

Feature Table

ELECTROLYTE DEPLETERS	MONOAMINE OXIDASE (MAO) INHIBITOR ANTIDEPRESSANTS
ELECTROLYTE MAINTENANCE	MONOCLONAL ANTIBODIES TO IMMUNOGLOBULIN E (IGE)
EMOLLIENTS	MONOCLONAL ANTIBODY - INTERLEUKIN-5 ANTAGONISTS
ERYTHROPOIESIS-STIMULATING AGENTS	MONOCLONAL ANTIBODY-HUMAN INTERLEUKIN 12/23 INHIB
ESTROGEN AND PROGESTIN COMBINATIONS	MU-OPIOID RECEPTOR ANTAGONISTS,PERIPHERALLY-ACTING
ESTROGEN/ANDROGEN COMBINATIONS	MUCOLYTICS
ESTROGENIC AGENTS	MULTIVITAMIN PREPARATIONS
EXPECTORANTS	MYDRIATICS
EYE ANTI-INFLAMMATORY AGENTS	NARCOLEPSY AND SLEEP DISORDER THERAPY AGENTS
EYE ANTIBIOTIC AND GLUCOCORTICOID COMBINATIONS	NASAL ANTI-INFLAMMATORY STEROIDS
EYE ANTIHISTAMINE-VASOCONSTRICTOR COMBINATIONS	NASAL ANTIHISTAMINE
EYE ANTIHISTAMINES	NASAL ANTIHISTAMINE AND ANTI-INFLAM. STEROID COMB.
EYE ANTIVIRALS	NASAL MAST CELL STABILIZERS
EYE LOCAL ANESTHETICS	NASAL MOISTURIZER
EYE MAST CELL STABILIZERS	NASAL WASHES
EYE PREPARATIONS, MISCELLANEOUS (OTC)	NEEDLES/NEEDLELESS DEVICES
EYE SULFONAMIDES	NEUROMUSCULAR BLOCKING AGENTS
EYE VASOCONSTRICTORS (OTC ONLY)	NIACIN PREPARATIONS
FAT ABSORPTION DECREASING AGENTS	NITROFURAN DERIVATIVES ANTIBACTERIAL AGENTS
FEEDING DEVICES	NON-OPIOID ANTITUS-1ST GEN ANTIHIST-ANALGESIC COMB
FERTILITY STIMULATING PREPARATIONS,NON-FSH	NON-OPIOID ANTITUS-1ST GEN.ANTIHISTAMINE-DECONGEST
FIBROMYALGIA AGENTS,SEROTONIN-NOREPINEPH RU INHIB	NON-OPIOID ANTITUS-1STGEN ANTIHIST-DECON-ANALGESIC
FLUORIDE PREPARATIONS	NON-OPIOID ANTITUSS-DECONGESTANT-ANALGESIC-EXPECT
FOLIC ACID PREPARATIONS	NON-OPIOID ANTITUSSIVE AND EXPECTORANT COMBINATION
FOLLICLE-STIMULATING HORMONE (FSH)	NON-OPIOID ANTITUSSIVE-1ST GEN ANTIHISTAMINE COMB.
GASTRIC ENZYMES	NON-OPIOID ANTITUSSIVE-DECONGESTANT-ANALGESIC COMB
GENERAL ANESTHETICS,INJECTABLE	NOREPINEPHRINE AND DOPAMINE REUPTAKE INHIB (NDRIS)
GENERAL ANESTHETICS,INJECTABLE-BENZODIAZEPINE TYPE	NOSE PREPARATIONS ANTIBIOTICS
GENERAL BRONCHODILATOR AGENTS	NOSE PREPARATIONS, MISCELLANEOUS (OTC)
GENERAL INHALATION AGENTS	NOSE PREPARATIONS, MISCELLANEOUS (RX)
GERIATRIC VITAMIN PREPARATIONS	NOSE PREPARATIONS, VASOCONSTRICTORS(OTC)
GLOVES	NSAID AND HISTAMINE H2 RECEPTOR ANTAGONIST COMB.
GLUCOCORTICIODS	NSAID,COX INHIBITOR-TYPE AND PROTON-PUMP INHIBITOR
GLUCOCORTICIODS, ORALLY INHALED	NSAIDS(COX NON-SPEC.INHIB)AND PROSTAGLANDIN ANALOG
GLYCYLCLYCLINES	NSAIDS, CYCLOOXYGENASE INHIBITOR - TYPE ANALGESICS
GRAM (-) BACILLI (NON-ENTERIC) VACCINES	NSAIDS,CYCLOOXYGENASE-2(COX-2) SELECTIVE INHIBITOR
GRAM NEGATIVE COCCI VACCINES	NUTRITIONAL THERAPY, MED COND SPECIAL FORMULATION
GRAM POSITIVE COCCI VACCINES	OINTMENT/CREAM BASES
GROWTH HORMONES	OPHTH VASC. ENDOTHELIAL GROWTH FACTOR ANTAGONISTS
HAIR GROWTH REDUCTION AGENTS	OPHTHALMIC ANTI-INFLAMMATORY IMMUNOMODULATOR-TYPE
HEARING AIDS AND RELATED DEVICES	OPHTHALMIC ANTIBIOTICS
HEART RATE REDUCING, SELECTIVE I(F) CURRENT INHIB.	OPHTHALMIC CYSTINE DEPLETING AGENTS
HEMORRHOLOGIC AGENTS	OPHTHALMIC PREPARATIONS, MISCELLANEOUS
HEMORRHOID PREP,ANTI-INFLAM STEROID-LOCAL ANESTHET	OPIOID ANALGESIC AND NON-SALICYLATE ANALGESICS
HEMORRHOIDAL PREPARATIONS	OPIOID ANALGESIC AND NSAID COMBINATION
HEMORRHOIDALS, LOCAL RECTAL ANESTHETICS	OPIOID ANALGESIC AND SALICYLATE ANALGESIC COMB
HEP C VIRUS-NS5B POLYMERASE AND NS5A INHIB. COMBO.	OPIOID ANALGESIC, ANESTHETIC ADJUNCT AGENTS
HEPARIN AND RELATED PREPARATIONS	OPIOID ANALGESICS
HEPATITIS B TREATMENT AGENTS	OPIOID AND SALICYLATE ANALGESICS,BARBIT,XANTHINE
HEPATITIS C VIRUS- NS5A AND NS3/4A INHIBITOR COMB	OPIOID ANTAGONISTS
HERBAL DRUGS	OPIOID ANTITUSSIVE-1ST GENERATION ANTIHISTAMINE
HISTAMINE H2-RECEPTOR INHIBITORS	OPIOID ANTITUSSIVE-ANTICHOLINERGIC COMBINATIONS
HOT WATER BOTTLE AND RELATED DEVICES	OPIOID ANTITUSSIVE-EXPECTORANT COMBINATION
HYDROPHILIC CREAM/OINTMENT BASES	OPIOID WITHDRAWAL THERAPY AGENTS, OPIOID-TYPE
HYPERTHYROID TX AGENTS - VITAMIN D ANALOG-TYPE	OPIOID,NON-SALICYL.ANALGESIC,BARBITURATE,XANTHINE
HYPERTRICHOTIC AGENTS, SYSTEMIC/INCL. COMBINATIONS	ORAL LIPID SUPPLEMENTS
HYPURICEMIA TX - XANTHINE OXIDASE INHIBITORS	ORAL MUCOSITIS/STOMATITIS AGENTS
HYPNOTICS, MELATONIN MT1/MT2 RECEPTOR AGONISTS	OSMOTIC DIURETICS
HYPOPIGMENTATION AGENTS	OSTOMY SUPPLIES
IBS AGENTS,MIXED OPIOID RECEP AGONISTS/ANTAGONISTS	OTIC PREPARATIONS,ANTI-INFLAMMATORY-ANTIBIOTICS
IBS-C/IC AGENTS, GUANYLATE CYCLASE-C AGONIST	OVERACTIVE BLADDER AGENTS, BETA-3 ADRENERGIC RECEPT
IMMUNOMODULATOR,B-LYMPHOCYTE STIM(BLYS)-SPEC INHIB	OVULATION TESTS
IMMUNOMODULATORS	OXAZOLIDINONE ANTIBIOTICS
IMMUNOSUPPRESSIVES	OXIDIZING AGENTS
INCONTINENCE SUPPLIES	OXYTOCICS
INFANT FORMULAS	PANCREATIC ENZYMES
INFLUENZA VIRUS VACCINES	PARASYMPATHETIC AGENTS
INOTROPIC DRUGS	PEDIATRIC VITAMIN PREPARATIONS
INSULINS	PENICILLIN ANTIBIOTICS
INTEGRIN RECEPTOR ANTAGONIST, MONOCLONAL ANTIBODY	PERIODONTAL COLLAGENASE INHIBITORS
INTERLEUKIN-4(IL-4) RECEPTOR ALPHA ANTAGONIST, MAB	PHARMACEUTICAL ADJUVANTS, TABLET,CAPSULE COMPONENTS
INTERLEUKIN-5(IL-5) RECEPTOR ALPHA ANTAGONIST, MAB	PHOSPHATE REPLACEMENT
INTERLEUKIN-6 (IL-6) RECEPTOR INHIBITORS	PHOSPHODIESTERASE-4 (PDE4) INHIBITORS
INTESTINAL MOTILITY STIMULANTS	PINEAL HORMONE AGENTS
INTRA-UTERINE DEVICES (IUDS)	PITUITARY SUPPRESSIVE AGENTS
IODINE CONTAINING AGENTS	PLATELET AGGREGATION INHIBITORS
IRON REPLACEMENT	PLATELET REDUCING AGENTS
IRRIGANTS	POSTHERPETIC NEURALGIA AGENTS
IRRITABLE BOWEL SYND. AGENT,5-HT4 PARTIAL AGONIST	POTASSIUM REPLACEMENT
IRRITANTS/COUNTER-IRRITANTS	POTASSIUM SPARING DIURETICS
IV SOLUTIONS: DEXTROSE-SALINE	POTASSIUM SPARING DIURETICS IN COMBINATION
IV SOLUTIONS: DEXTROSE-WATER	PREGNANCY FACILITATING/MAINTAINING AGENT,HORMONAL
JANUS KINASE (JAK) INHIBITORS	PREGNANCY MAINTAINING AGENT,HORMONAL
KERATOLYTICS	PRENATAL VITAMIN PREPARATIONS
LAXATIVES AND CATHARTICS	PRENATAL VITAMINS WITH LOW OR NO IRON

Feature Table

LAXATIVES, LOCAL/RECTAL	PROGESTATIONAL AGENTS
LEUKOCYTE (WBC) STIMULANTS	PROTECTIVES
LEUKOTRIENE RECEPTOR ANTAGONISTS	PROTEIN REPLACEMENT
LHRH (GNRH) AGONIST ANALOG PITUITARY SUPPRESSANTS	PROTEIN STABILIZERS
LHRH(GNRH) ANTAGONIST,PITUITARY SUPPRESSANT AGENTS	PROTON-PUMP INHIBITORS
LINCOSAMIDE ANTIBIOTICS	PSEUDOBLBAR AFFECT (PBA) AGENTS, NMDA ANTAGONISTS
LIPOTROPICS	PULM ANTI-HTN,SOLUBLE GUANYLATE CYCLASE STIMULATOR
LOCAL ANESTHETICS	PULM.ANTI-HTN,SEL.C-GMP PHOSPHODIESTERASE T5 INHIB
LOCAL ANORECTAL NITRATE PREPARATIONS	PULMONARY ANTI-HTN, ENDOTHELIN RECEPTOR ANTAGONIST
LOOP DIURETICS	PULMONARY ANTIHYPERTENSIVES, PROSTACYCLIN-TYPE
MACROLIDE ANTIBIOTICS	PULMONARY FIBROSIS - SYSTEMIC ENZYME INHIBITORS
MAGNESIUM SALTS REPLACEMENT	QUINOLONE ANTIBIOTICS
MAOIS -NON-SELECTIVE,IRREVERSIBLE ANTIDEPRESSANTS	RECTAL PREPARATIONS
MAST CELL STABILIZERS	RECTAL/LOWER BOWEL PREP.,GLUCOCORT. (NON-HEMORR)
MAST CELL STABILIZERS, ORALLY INHALED	RENIN INHIBITOR, DIRECT
MEDICAL SUPPLIES,MISCELLANEOUS	RESPIRATORY AIDS,DEVICES,EQUIPMENT
MEDICAL SUPPLIES,MISCELLANEOUS(GROUP 2)	RIFAMYCINS AND RELATED DERIVATIVE ANTIBIOTICS
MENOPAUSAL SYMPT SUPP-SEL ESTROGEN RECEPTOR MODULATOR	ROSACEA AGENTS, TOPICAL
METABOLIC DEFICIENCY AGENTS	RUBBER SYRINGES
METALLIC POISON,AGENTS TO TREAT	SALIVA STIMULANT AGENTS
MINERAL REPLACEMENT, MISCELLANEOUS	SALIVA SUBSTITUTE AGENTS
MINERALOCORTICIDS	SEDATIVE-HYPNOTICS - BENZODIAZEPINES
MIOTICS AND OTHER INTRAOCULAR PRESSURE REDUCERS	SEDATIVE-HYPNOTICS,NON-BARBITURATE
MONOAMINE OXIDASE (MAO) INHIBITOR ANTIDEPRESSANTS	SELECTIVE ESTROGEN RECEPTOR MODULATORS (SERMS)
MONOCLONAL ANTIBODIES TO IMMUNOGLOBULIN E (IGE)	SELECTIVE SEROTONIN REUPTAKE INHIBITOR (SSRIS)
MONOCLONAL ANTIBODY - INTERLEUKIN-5 ANTAGONISTS	SEROTONIN (5HT-4) PARTIAL AGONIST AGENTS
MONOCLONAL ANTIBODY-HUMAN INTERLEUKIN 12/23 INHIB	SEROTONIN-2 ANTAG,REUPTAKE INH/DIETARY SUPP. COMB.
MU-OPIOID RECEPTOR ANTAGONISTS,PERIPHERALLY-ACTING	SEROTONIN-2 ANTAGONIST/REUPTAKE INHIBITORS (SARIS)
MUCOLYTICS	SEROTONIN-NOREPINEPHRINE REUPTAKE-INHIB (SNRIS)
MULTIVITAMIN PREPARATIONS	SEXUAL DYSFUNCTION DEVICES
MYDRIATICS	SICKLE CELL ANEMIA AGENTS
NARCOLEPSY AND SLEEP DISORDER THERAPY AGENTS	SKELETAL MUSCLE RELAXANTS
NASAL ANTI-INFLAMMATORY STEROIDS	SMOKING DETERRENT AGENTS (GANGLIONIC STIM,OTHERS)
NASAL ANTIHISTAMINE	SMOKING DETERRENT-NICOTINIC RECEPT.PARTIAL AGONIST
NASAL ANTIHISTAMINE AND ANTI-INFLAM. STEROID COMB.	SODIUM/SALINE PREPARATIONS
NASAL MAST CELL STABILIZERS	SOLVENTS
NASAL MOISTURIZER	SOMATOSTATIC AGENTS
NASAL WASHES	SSRI AND 5HT1A PARTIAL AGONIST ANTIDEPRESSANTS
NEEDLES/NEEDLELESS DEVICES	SSRI, SEROTONIN RECEPTOR MODULATOR ANTIDEPRESSANTS
NEUROMUSCULAR BLOCKING AGENTS	SSRI-ANTIPSYCH. ATYPICAL,DOPAMINE,SEROTONIN ANTAG
NIACIN PREPARATIONS	STEROID ANTINEOPLASTICS
NITROFURAN DERIVATIVES ANTIBACTERIAL AGENTS	SUPPORT HOSIERY
NON-OPIOID ANTITUS-1ST GEN ANTIHIST-ANALGESIC COMB	SYRINGES AND ACCESSORIES
NON-OPIOID ANTITUS-1ST GEN.ANTIHISTAMINE-DECONGEST	TETRACYCLINE ANTIBIOTICS
NON-OPIOID ANTITUS-1STGEN ANTIHIST-DECON-ANALGESIC	THERMOMETERS
NON-OPIOID ANTITUSS-DECONGESTANT-ANALGESIC-EXPECT	THIAZIDE AND RELATED DIURETICS
NON-OPIOID ANTITUSSIVE AND EXPECTORANT COMBINATION	THICKENING AGENTS, ORAL
NON-OPIOID ANTITUSSIVE-1ST GEN ANTIHISTAMINE COMB.	THROMBIN INHIBITORS, SELECTIVE, DIRECT, REVERSIBLE
NON-OPIOID ANTITUSSIVE-DECONGESTANT-ANALGESIC COMB	THROMBOPOIETIN RECEPTOR AGONISTS
NOREPINEPHRINE AND DOPAMINE REUPTAKE INHIB (NDRIS)	THYROID FUNCTION DIAGNOSTIC AGENTS
NOSE PREPARATIONS ANTIBIOTICS	THYROID HORMONES
NOSE PREPARATIONS, MISCELLANEOUS (OTC)	TOOTH ACHE PREPARATIONS
NOSE PREPARATIONS, MISCELLANEOUS (RX)	TOP. ANTI-INFLAM.,PHOSPHODIESTERASE-4 (PDE4) INHIB
NOSE PREPARATIONS, VASOCONSTRICTORS(OTC)	TOPICAL AGENTS,MISCELLANEOUS
NSAID AND HISTAMINE H2 RECEPTOR ANTAGONIST COMB.	TOPICAL ANTI-INFLAMMATORY STEROID-LOCAL ANESTHETIC
NSAID,COX INHIBITOR-TYPE AND PROTON-PUMP INHIBITOR	TOPICAL ANTI-INFLAMMATORY STEROIDAL
NSAIDS(COX NON-SPEC.INHIB)AND PROSTAGLANDIN ANALOG	TOPICAL ANTI-INFLAMMATORY, NSAIDS
NSAIDS, CYCLOOXYGENASE INHIBITOR - TYPE ANALGESICS	TOPICAL ANTIBIOTICS
NSAIDS,CYCLOOXYGENASE-2(COX-2) SELECTIVE INHIBITOR	TOPICAL ANTICHOLINERGIC HYPERHIDROSIS TX AGENTS
NUTRITIONAL THERAPY, MED COND SPECIAL FORMULATION	TOPICAL ANTIFUNGAL/ANTI-INFLAMMATORY,STEROID AGENT
OINTMENT/CREAM BASES	TOPICAL ANTIFUNGALS
OPHTH VASC. ENDOTHELIAL GROWTH FACTOR ANTAGONISTS	TOPICAL ANTINEOPLASTIC PREMALIGNANT LESION AGENTS
OPHTHALMIC ANTI-INFLAMMATORY IMMUNOMODULATOR-TYPE	TOPICAL ANTIPARASITICS
OPHTHALMIC ANTIBIOTICS	TOPICAL ANTIVIRALS
OPHTHALMIC CYSTINE DEPLETING AGENTS	TOPICAL HYPERTRICHOTIC AGENTS, EYELASHES
OPHTHALMIC PREPARATIONS, MISCELLANEOUS	TOPICAL IMMUNOSUPPRESSIVE AGENTS
OPIOID ANALGESIC AND NON-SALICYLATE ANALGESICS	TOPICAL LOCAL ANESTHETICS
OPIOID ANALGESIC AND NSAID COMBINATION	TOPICAL PREPARATIONS,ANTIBACTERIALS
OPIOID ANALGESIC AND SALICYLATE ANALGESIC COMB	TOPICAL PREPARATIONS,MISCELLANEOUS
OPIOID ANALGESIC, ANESTHETIC ADJUNCT AGENTS	TOPICAL SULFONAMIDES
OPIOID ANALGESICS	TOPICAL/MUCOUS MEMBR./SUBCUT. ENZYMES
OPIOID AND SALICYLATE ANALGESICS,BARBIT,XANTHINE	TOPICALS, HYPERTRICHOTIC AGENTS
OPIOID ANTAGONISTS	TRICYCLIC ANTIDEPRESSANTS,REL.NON-SEL.REUPT-INHIB
OPIOID ANTITUSSIVE-1ST GENERATION ANTIHISTAMINE	TX FOR ADHD - SELECTIVE ALPHA-2 RECEPTOR AGONIST
OPIOID ANTITUSSIVE-ANTICHOLINERGIC COMBINATIONS	TX FOR ATTENTION DEFICIT-HYPERACT(ADHD)/NARCOLEPSY
OPIOID ANTITUSSIVE-EXPECTORANT COMBINATION	TX FOR ATTENTION DEFICIT-HYPERACT.(ADHD), NRI-TYPE
OPIOID WITHDRAWAL THERAPY AGENTS, OPIOID-TYPE	URICOSURIC AGENTS
OPIOID,NON-SALICYL.ANALGESIC,BARBITURATE,XANTHINE	URINARY PH MODIFIERS
ORAL LIPID SUPPLEMENTS	URINARY TRACT ANALGESIC AGENTS
ORAL MUCOSITIS/STOMATITIS AGENTS	URINARY TRACT ANESTHETIC/ANALGESIC AGENT (AZO-DYE)
OSMOTIC DIURETICS	URINARY TRACT ANTISPASMODIC, M(3) SELECTIVE ANTAG.
OSTOMY SUPPLIES	URINARY TRACT ANTISPASMODIC/ANTIINCONTINENCE AGENT
OTIC PREPARATIONS,ANTI-INFLAMMATORY-ANTIBIOTICS	URINE ACETONE TEST AIDS
OVERACTIVE BLADDER AGENTS, BETA-3 ADRENERGIC RECEPTOR	URINE GLUCOSE/ACETONE TEST AIDS,STRIPS
OVULATION TESTS	URINE TEST AIDS,MISCELLANEOUS

Feature Table

OXAZOLIDINONE ANTIBIOTICS	VACCINE/TOXOID PREPARATIONS,COMBINATIONS
OXIDIZING AGENTS	VAGINAL ANTIBIOTICS
OXYTOXICS	VAGINAL ANTIFUNGALS
PANCREATIC ENZYMES	VAGINAL ANTISEPTICS
PARASYMPATHETIC AGENTS	VAGINAL ESTROGEN FOR SEXUAL DYSFUNCTION
PEDIATRIC VITAMIN PREPARATIONS	VAGINAL ESTROGEN PREPARATIONS
PENICILLIN ANTIBIOTICS	VAGINAL LUBRICANTS PREPARATIONS
PERIODONTAL COLLAGENASE INHIBITORS	VAGINAL PREPARATIONS
PHARMACEUTICAL ADJUVANTS, TABLET, CAPSULE COMPONENTS	VANCOMYCIN ANTIBIOTICS AND DERIVATIVES
PHOSPHATE REPLACEMENT	VASODILATORS, CORONARY
PHOSPHODIESTERASE-4 (PDE4) INHIBITORS	VEHICLES
PINEAL HORMONE AGENTS	VIRAL/TUMORIGENIC VACCINES
PITUITARY SUPPRESSIVE AGENTS	VITAMIN A AND D PREPARATIONS
PLATELET AGGREGATION INHIBITORS	VITAMIN A DERIVATIVES
PLATELET REDUCING AGENTS	VITAMIN A PREPARATIONS
POSTHERPETIC NEURALGIA AGENTS	VITAMIN B PREPARATIONS
POTASSIUM REPLACEMENT	VITAMIN B1 PREPARATIONS
POTASSIUM SPARING DIURETICS	VITAMIN B12 PREPARATIONS
POTASSIUM SPARING DIURETICS IN COMBINATION	VITAMIN B2 PREPARATIONS
PREGNANCY FACILITATING/MAINTAINING AGENT, HORMONAL	VITAMIN B6 PREPARATIONS
PREGNANCY MAINTAINING AGENT, HORMONAL	VITAMIN C PREPARATIONS
PRENATAL VITAMIN PREPARATIONS	VITAMIN D PREPARATIONS
PRENATAL VITAMINS WITH LOW OR NO IRON	VITAMIN E PREPARATIONS
PROGESTATIONAL AGENTS	VITAMIN K PREPARATIONS
PROTECTIVES	WATER
PROTEIN REPLACEMENT	WOUND HEALING AGENTS, LOCAL
PROTEIN STABILIZERS	XANTHINES
PROTON-PUMP INHIBITORS	ZINC REPLACEMENT
PSEUDOBULBAR AFFECT (PBA) AGENTS, NMDA ANTAGONISTS	Elixhauser arth
PULM ANTI-HTN, SOLUBLE GUANYLATE CYCLASE STIMULATOR	Elixhauser psych
PULM. ANTI-HTN, SEL. C-GMP PHOSPHODIESTERASE T5 INHIB	Elixhauser alcohol
PULMONARY ANTI-HTN, ENDOTHELIN RECEPTOR ANTAGONIST	Elixhauser chrnlung
PULMONARY ANTIHYPERTENSIVES, PROSTACYCLIN-TYPE	Elixhauser hypothy
PULMONARY FIBROSIS - SYSTEMIC ENZYME INHIBITORS	Elixhauser lytes
QUINOLONE ANTIBIOTICS	Elixhauser neuro
RECTAL PREPARATIONS	Elixhauser obese
RECTAL/LOWER BOWEL PREP, GLUCOCORT. (NON-HEMORR)	Elixhauser anemdef
RENIN INHIBITOR, DIRECT	Elixhauser renlfail
RESPIRATORY AIDS, DEVICES, EQUIPMENT	Elixhauser chf
RIFAMYCINS AND RELATED DERIVATIVE ANTIBIOTICS	Elixhauser htncx
ROSACEA AGENTS, TOPICAL	Elixhauser dmcx
RUBBER SYRINGES	Elixhauser htn
SALIVA STIMULANT AGENTS	Elixhauser drug
SALIVA SUBSTITUTE AGENTS	Elixhauser dm
SEDATIVE-HYPNOTICS - BENZODIAZEPINES	Elixhauser wghtloss
SEDATIVE-HYPNOTICS, NON-BARBITURATE	Elixhauser valve
SELECTIVE ESTROGEN RECEPTOR MODULATORS (SERMS)	Elixhauser pervasc
SELECTIVE SEROTONIN REUPTAKE INHIBITOR (SSRI)	Elixhauser tumor
SEROTONIN (5HT-4) PARTIAL AGONIST AGENTS	Elixhauser liver
SEROTONIN-2 ANTAG. REUPTAKE INH/DIETARY SUPP. COMB.	Elixhauser mets
SEROTONIN-2 ANTAGONIST/REUPTAKE INHIBITORS (SARIS)	Elixhauser bldloss
SEROTONIN-NOREPINEPHRINE REUPTAKE-INHIB (SNRIS)	Elixhauser coag
SEXUAL DYSFUNCTION DEVICES	Elixhauser ulcer
SICKLE CELL ANEMIA AGENTS	Elixhauser para
SKELETAL MUSCLE RELAXANTS	Elixhauser aids
SMOKING DETERRENT AGENTS (GANGLIONIC STIM. OTHERS)	Elixhauser pulmcirc
SMOKING DETERRENT-NICOTINIC RECEPT. PARTIAL AGONIST	Elixhauser lymph
SODIUM/SALINE PREPARATIONS	mrtl scr
SOLVENTS	visit occurrence id
SOMATOSTATIC AGENTS	person id
SSRI AND 5HT1A PARTIAL AGONIST ANTIDEPRESSANTS	curb65
SSRI, SEROTONIN RECEPTOR MODULATOR ANTIDEPRESSANTS	qSOFA
SSRI-ANTIPSYCH. ATYPICAL, DOPAMINE, SEROTONIN ANTAG	ox status240 ROOM AIR
STEROID ANTINEOPLASTICS	FirstRace Other
SUPPORT HOSIERY	FirstRace Other Pacific Islander
SYRINGES AND ACCESSORIES	FirstRace Other/Not Listed
TETRACYCLINE ANTIBIOTICS	FirstRace Patient Refused
THERMOMETERS	FirstRace Unknown
THIAZIDE AND RELATED DIURETICS	FirstRace White or Caucasian
THICKENING AGENTS, ORAL	Ethnicity Hispanic or Latino
THROMBIN INHIBITORS, SELECTIVE, DIRECT, REVERSIBLE	Ethnicity Non-Hispanic
THROMBOPOIETIN RECEPTOR AGONISTS	Ethnicity Patient Refused
THYROID FUNCTION DIAGNOSTIC AGENTS	Ethnicity Unknown
THYROID HORMONES	PreferredLanguage NotEnglish
TOOTH ACHE PREPARATIONS	PreferredLanguage Unknown
TOP. ANTI-INFLAM. PHOSPHODIESTERASE-4 (PDE4) INHIB	SmokingStatus Current Some Day Smoker
TOPICAL AGENTS, MISCELLANEOUS	SmokingStatus Former Smoker
TOPICAL ANTI-INFLAMMATORY STEROID-LOCAL ANESTHETIC	SmokingStatus Heavy Tobacco Smoker
TOPICAL ANTI-INFLAMMATORY STEROIDAL	SmokingStatus Light Tobacco Smoker
TOPICAL ANTI-INFLAMMATORY, NSAIDS	SmokingStatus Never Smoker
TOPICAL ANTIBIOTICS	SmokingStatus Passive Smoke Exposure - Never Smoker
TOPICAL ANTICHOLINERGIC HYPERHIDROSIS TX AGENTS	SmokingStatus Unknown
TOPICAL ANTIFUNGAL/ANTI-INFLAMMATORY, STEROID AGENT	AcuityLevel Emergent
TOPICAL ANTIFUNGALS	AcuityLevel Immediate
TOPICAL ANTINEOPLASTIC PREMALIGNANT LESION AGENTS	AcuityLevel Less Urgent

Feature Table

TOPICAL ANTIPARASITICS	AcuityLevel Urgent
TOPICAL ANTIVIRALS	FinancialClass Medicaid
TOPICAL HYPERTRICHOTIC AGENTS, EYELASHES	FinancialClass Medicare
TOPICAL IMMUNOSUPPRESSIVE AGENTS	FinancialClass Other
TOPICAL LOCAL ANESTHETICS	FinancialClass Self-pay
TOPICAL PREPARATIONS,ANTIBACTERIALS	chief complaint ABDOMINAL PAIN
TOPICAL PREPARATIONS,MISCELLANEOUS	chief complaint BACK PAIN
TOPICAL SULFONAMIDES	chief complaint CHEST PAIN
TOPICAL/MUCOUS MEMBR./SUBCUT. ENZYMES	chief complaint COUGH
TOPICALS, HYPERTRICHOTIC AGENTS	chief complaint EMESIS
NOSE PREPARATIONS, VASOCONSTRICTORS(OTC)	chief complaint FEVER
NSAID AND HISTAMINE H2 RECEPTOR ANTAGONIST COMB.	chief complaint NAUSEA
NSAID,COX INHIBITOR-TYPE AND PROTON-PUMP INHIBITOR	chief complaint Other
NSAIDS(COX NON-SPEC.INHIB)AND PROSTAGLANDIN ANALOG	chief complaint SHORTNESS OF BREATH
NSAIDS, CYCLOOXYGENASE INHIBITOR - TYPE ANALGESICS	Sex Male
NSAIDS,CYCLOOXYGENASE-2(COX-2) SELECTIVE INHIBITOR	Chest X-ray No Opacity
NUTRITIONAL THERAPY, MED COND SPECIAL FORMULATION	Chest X-ray Unilateral Opacity
OINTMENT/CREAM BASES	Chest X-ray Bilateral Opacity
OPHTH VASC. ENDOTHELIAL GROWTH FACTOR ANTAGONISTS	
OPHTHALMIC ANTI-INFLAMMATORY IMMUNOMODULATOR-TYPE	
OPHTHALMIC ANTIBIOTICS	
OPHTHALMIC CYSTINE DEPLETING AGENTS	
OPHTHALMIC PREPARATIONS, MISCELLANEOUS	
OPIOID ANALGESIC AND NON-SALICYLATE ANALGESICS	
OPIOID ANALGESIC AND NSAID COMBINATION	
OPIOID ANALGESIC AND SALICYLATE ANALGESIC COMB	
OPIOID ANALGESIC, ANESTHETIC ADJUNCT AGENTS	
OPIOID ANALGESICS	
OPIOID AND SALICYLATE ANALGESICS,BARBIT,XANTHINE	
OPIOID ANTAGONISTS	
OPIOID ANTITUSSIVE-1ST GENERATION ANTIHISTAMINE	
OPIOID ANTITUSSIVE-ANTICHOLINERGIC COMBINATIONS	
OPIOID ANTITUSSIVE-EXPECTORANT COMBINATION	
OPIOID WITHDRAWAL THERAPY AGENTS, OPIOID-TYPE	
OPIOID,NON-SALICYL ANALGESIC,BARBITURATE,XANTHINE	
ORAL LIPID SUPPLEMENTS	
ORAL MUCOSITIS/STOMATITIS AGENTS	
OSMOTIC DIURETICS	
OSTOMY SUPPLIES	
OTIC PREPARATIONS,ANTI-INFLAMMATORY-ANTIBIOTICS	
OVERACTIVE BLADDER AGENTS, BETA-3 ADRENERGIC RECEPTOR	
OVULATION TESTS	
OXAZOLIDINONE ANTIBIOTICS	
OXIDIZING AGENTS	
OXYTOCICS	

Table S4: Patient characteristics for development cohort

		Grouped by acute decompensation outcome			
		Missing	Overall	0	1
n			932	821	111
age, median [Q1,Q3]		0	67.0 [55.8,80.0]	68.0 [56.0,81.0]	64.0 [52.0,77.5]
age_cat, n (%)	age_18_44	0	109 (11.7)	94 (11.4)	15 (13.5)
	age_45-64		322 (34.5)	273 (33.3)	49 (44.1)
	age_great65		501 (53.8)	454 (55.3)	47 (42.3)
Sex, n (%)	Female	0	435 (46.7)	387 (47.1)	48 (43.2)
	Male		497 (53.3)	434 (52.9)	63 (56.8)
FirstRace, n (%)	Black or African American	0	215 (23.1)	186 (22.7)	29 (26.1)
	Other		265 (28.4)	228 (27.8)	37 (33.3)
	White or Caucasian		452 (48.5)	407 (49.6)	45 (40.5)
Ethnicity, n (%)	Hispanic or Latino	0	245 (26.3)	210 (25.6)	35 (31.5)
	Non-Hispanic		668 (71.7)	595 (72.5)	73 (65.8)
	Unknown		19 (2.0)	16 (1.9)	3 (2.7)
PreferredLanguage, n (%)	English	0	728 (78.1)	644 (78.4)	84 (75.7)
	NotEnglish		201 (21.6)	174 (21.2)	27 (24.3)
	Unknown		3 (0.3)	3 (0.4)	
SmokingStatus, n (%)	Former Smoker	0	289 (31.0)	258 (31.4)	31 (27.9)
	Never Smoker		457 (49.0)	402 (49.0)	55 (49.5)
	Smoker		28 (3.0)	24 (2.9)	4 (3.6)
	Unknown		158 (17.0)	137 (16.7)	21 (18.9)
FinancialClass, n (%)	Commercial	0	117 (12.6)	101 (12.3)	16 (14.4)
	Medicaid		118 (12.7)	102 (12.4)	16 (14.4)
	Medicare		500 (53.6)	450 (54.8)	50 (45.0)
	Other		98 (10.5)	82 (10.0)	16 (14.4)
	Self-pay		99 (10.6)	86 (10.5)	13 (11.7)
Comorbidities	cc_hypothy, n (%)		140 (15.0)	123 (15.0)	17 (15.3)
	cc_mets, n (%)		62 (6.7)	53 (6.5)	9 (8.1)
	cc_neuro, n (%)		252 (27.0)	226 (27.5)	26 (23.4)
	cc_renfail, n (%)		166 (17.8)	145 (17.7)	21 (18.9)
	cc_chf, n (%)		154 (16.5)	139 (16.9)	15 (13.5)
	cc_depress, n (%)		199 (21.4)	179 (21.8)	20 (18.0)
	cc_chrlung, n (%)		225 (24.1)	200 (24.4)	25 (22.5)
	cc_htn, n (%)		206 (22.1)	181 (22.0)	25 (22.5)
	cc_valve, n (%)		172 (18.5)	157 (19.1)	15 (13.5)
	cc_bldloss, n (%)		53 (5.7)	47 (5.7)	6 (5.4)
	cc_perivasc, n (%)		177 (19.0)	152 (18.5)	25 (22.5)
	cc_lytes, n (%)		302 (32.4)	268 (32.6)	34 (30.6)
	cc_psych, n (%)		102 (10.9)	91 (11.1)	11 (9.9)
	cc_arth, n (%)		67 (7.2)	57 (6.9)	10 (9.0)
	cc_dm, n (%)		217 (23.3)	189 (23.0)	28 (25.2)
	cc_wghtloss, n (%)		134 (14.4)	119 (14.5)	15 (13.5)
	cc_anemdef, n (%)		260 (27.9)	224 (27.3)	36 (32.4)
	cc_obese, n (%)		220 (23.6)	192 (23.4)	28 (25.2)
	cc_dm, n (%)		90 (9.7)	75 (9.1)	15 (13.5)
	cc_alcohol, n (%)		44 (4.7)	41 (5.0)	3 (2.7)
	cc_drug, n (%)		33 (3.5)	27 (3.3)	6 (5.4)
	cc_liver, n (%)		86 (9.2)	74 (9.0)	12 (10.8)
	cc_coag, n (%)		81 (8.7)	76 (9.3)	5 (4.5)
	cc_htn, n (%)		282 (30.3)	247 (30.1)	35 (31.5)
	cc_tumor, n (%)		80 (8.6)	74 (9.0)	6 (5.4)
	cc_para, n (%)		59 (6.3)	52 (6.3)	7 (6.3)
	cc_ulcer, n (%)		43 (4.6)	40 (4.9)	3 (2.7)
	cc_pulmcirc, n (%)		49 (5.3)	44 (5.4)	5 (4.5)
	cc_lymph, n (%)		10 (1.1)	10 (1.2)	
	cc_aids, n (%)		13 (1.4)	11 (1.3)	2 (1.8)
Model Variables	last_o2_flow, median [Q1,Q3]	8	2.0 [1.0,3.0]	2.0 [0.0,2.5]	3.0 [2.0,4.9]
	last_RR, median [Q1,Q3]	11	20.0 [18.0,22.0]	20.0 [18.0,21.0]	20.0 [18.5,24.0]
	min_SPO2, median [Q1,Q3]	11	93.0 [91.0,95.0]	93.0 [91.0,95.0]	91.0 [88.0,93.0]
	ast, median [Q1,Q3]	236	44.0 [31.0,63.0]	42.0 [30.0,58.2]	59.0 [43.0,82.0]
	chloride, median [Q1,Q3]	34	100.0 [97.0,103.0]	100.0 [97.0,103.0]	98.0 [96.0,102.0]
	PROCAL, median [Q1,Q3]	457	0.1 [0.1,0.3]	0.1 [0.1,0.2]	0.2 [0.1,0.5]
	min_SBP, median [Q1,Q3]	11	117.0 [105.0,128.0]	117.0 [105.0,128.8]	113.0 [102.5,126.5]
	WBC, median [Q1,Q3]	32	6.3 [4.9,8.4]	6.2 [4.9,8.3]	7.0 [5.1,9.2]
	bun, median [Q1,Q3]	28	17.0 [11.0,27.0]	16.0 [11.0,26.0]	20.5 [13.0,32.8]
	creatinine, median [Q1,Q3]	28	1.0 [0.8,1.4]	1.0 [0.8,1.4]	1.0 [0.8,1.8]
	glucose, median [Q1,Q3]	27	119.0 [104.0,150.0]	118.0 [104.0,148.5]	126.0 [109.0,167.5]
	CRP, median [Q1,Q3]	631	85.7 [37.7,144.9]	76.2 [34.5,135.3]	124.5 [87.8,222.4]
	FERRITIN, median [Q1,Q3]	596	622.5 [309.8,1061.2]	568.0 [305.0,1017.0]	843.0 [461.0,1313.5]

Table S5: Patient characteristics for validation cohort

		Grouped by acute decompensation outcome			
		Missing	Overall	0	1
n			240	207	33
age, median [Q1,Q3]		0	71.0 [58.0,84.0]	71.0 [59.0,84.0]	67.0 [56.0,79.0]
age_cat, n (%)	age_18-44	0	15 (6.2)	11 (5.3)	4 (12.1)
	age_45-64		78 (32.5)	67 (32.4)	11 (33.3)
	age_great65		147 (61.3)	129 (62.3)	18 (54.5)
Sex, n (%)	Female	0	132 (55.0)	119 (57.5)	13 (39.4)
	Male		108 (45.0)	88 (42.5)	20 (60.6)
FirstRace, n (%)	Black or African American	0	85 (35.4)	74 (35.7)	11 (33.3)
	Other		27 (11.2)	23 (11.1)	4 (12.1)
	White or Caucasian		128 (53.3)	110 (53.1)	18 (54.5)
Ethnicity, n (%)	Hispanic or Latino	0	32 (13.3)	23 (11.1)	9 (27.3)
	Non-Hispanic		205 (85.4)	181 (87.4)	24 (72.7)
	Unknown		3 (1.2)	3 (1.4)	—
PreferredLanguage, n (%)	English	0	220 (91.7)	192 (92.8)	28 (84.8)
	NotEnglish		20 (8.3)	15 (7.2)	5 (15.2)
SmokingStatus, n (%)	Former Smoker	0	96 (40.0)	82 (39.6)	14 (42.4)
	Never Smoker		112 (46.7)	101 (48.8)	11 (33.3)
	Smoker		19 (7.9)	15 (7.2)	4 (12.1)
	Unknown		13 (5.4)	9 (4.3)	4 (12.1)
FinancialClass, n (%)	Commercial	0	22 (9.2)	17 (8.2)	5 (15.2)
	Medicaid		41 (17.1)	34 (16.4)	7 (21.2)
	Medicare		158 (65.8)	140 (67.6)	18 (54.5)
	Other		13 (5.4)	10 (4.8)	3 (9.1)
	Self-pay		6 (2.5)	6 (2.9)	—
Comorbidities	cc_hypothy, n (%)		68 (28.3)	63 (30.4)	5 (15.2)
	cc_mets, n (%)		13 (5.4)	13 (6.3)	—
	cc_neuro, n (%)		104 (43.3)	94 (45.4)	10 (30.3)
	cc_renlfail, n (%)		69 (28.7)	60 (29.0)	9 (27.3)
	cc_chf, n (%)		69 (28.7)	64 (30.9)	5 (15.2)
	cc_depress, n (%)		92 (38.3)	81 (39.1)	11 (33.3)
	cc_chrnlung, n (%)		89 (37.1)	82 (39.6)	7 (21.2)
	cc_htn, n (%)		94 (39.2)	83 (40.1)	11 (33.3)
	cc_valve, n (%)		84 (35.0)	78 (37.7)	6 (18.2)
	cc_bldloss, n (%)		22 (9.2)	21 (10.1)	1 (3.0)
	cc_perivasc, n (%)		74 (30.8)	68 (32.9)	6 (18.2)
	cc_lytes, n (%)		123 (51.2)	110 (53.1)	13 (39.4)
	cc_psych, n (%)		40 (16.7)	35 (16.9)	5 (15.2)
	cc_arth, n (%)		18 (7.5)	17 (8.2)	1 (3.0)
	cc_dm, n (%)		83 (34.6)	74 (35.7)	9 (27.3)
	cc_wghtloss, n (%)		42 (17.5)	39 (18.8)	3 (9.1)
	cc_anemdef, n (%)		103 (42.9)	91 (44.0)	12 (36.4)
	cc_obese, n (%)		81 (33.8)	69 (33.3)	12 (36.4)
	cc_dm, n (%)		22 (9.2)	18 (8.7)	4 (12.1)
	cc_alcohol, n (%)		26 (10.8)	22 (10.6)	4 (12.1)
	cc_drug, n (%)		30 (12.5)	24 (11.6)	6 (18.2)
	cc_liver, n (%)		26 (10.8)	23 (11.1)	3 (9.1)
	cc_coag, n (%)		27 (11.2)	22 (10.6)	5 (15.2)
	cc_htn, n (%)		76 (31.7)	64 (30.9)	12 (36.4)
	cc_tumor, n (%)		26 (10.8)	22 (10.6)	4 (12.1)
	cc_para, n (%)		21 (8.8)	19 (9.2)	2 (6.1)
	cc_ulcer, n (%)		15 (6.2)	12 (5.8)	3 (9.1)
	cc_pulmcirc, n (%)		21 (8.8)	20 (9.7)	1 (3.0)
	cc_lymph, n (%)		2 (0.8)	2 (1.0)	—
	cc_aids, n (%)		5 (2.1)	5 (2.4)	—
CSI Model Variables	last_o2_flow, median [Q1,Q3]	1	2.0 [1.0,3.0]	2.0 [0.0,2.0]	4.0 [3.0,5.0]
	last_RR, median [Q1,Q3]	6	20.0 [18.0,22.0]	20.0 [18.0,20.0]	20.0 [18.0,22.0]
	min_SPO2, median [Q1,Q3]	6	94.0 [91.0,95.0]	94.0 [92.0,95.0]	91.0 [87.0,93.5]
	ast, median [Q1,Q3]	87	37.0 [26.0,55.0]	37.0 [25.0,52.0]	42.5 [30.0,70.0]
	chloride, median [Q1,Q3]	11	99.0 [95.0,102.0]	99.0 [95.0,102.0]	98.0 [94.0,101.0]
	PROCAL, median [Q1,Q3]	136	0.1 [0.1,0.3]	0.1 [0.1,0.3]	0.3 [0.1,0.8]
	min_SBP, median [Q1,Q3]	6	113.0 [102.2,122.8]	113.0 [103.0,123.0]	112.0 [99.5,121.5]
	WBC, median [Q1,Q3]	8	6.3 [5.0,8.5]	6.3 [5.0,8.2]	6.1 [5.1,8.9]
	bun, median [Q1,Q3]	7	21.0 [13.0,32.0]	20.0 [13.2,30.8]	22.0 [12.5,47.0]
	creatinine, median [Q1,Q3]	7	1.1 [0.8,1.7]	1.1 [0.8,1.6]	1.3 [0.8,2.0]
	glucose, median [Q1,Q3]	7	126.0 [107.0,164.0]	126.0 [107.0,164.0]	122.0 [110.0,172.0]
	CRP, median [Q1,Q3]	146	92.4 [49.7,142.3]	89.0 [47.9,138.5]	117.0 [93.8,202.3]
	FERRITIN, median [Q1,Q3]	185	466.0 [275.5,913.0]	416.5 [265.5,790.5]	1107.0 [934.0,1222.0]

Table S6: Physician-coded chest x-rays and outcome counts

CXR class	Outcome	
	No critical illness	Critical illness
No opacities	251	15
Unilateral opacities	146	19
Bilateral opacities	562	104

Table S7: Performance Characteristics for CSI, qCSI, and comparison models on cross-validation. The best performance for a given metric is shown with bold text.

Model	AU-ROC	Accuracy	Sensitivity	Specificity	AU-PRC	Brier score	F1	Average Precision
CURB-65	0.66 (0.58,0.78)	0.79 (0.56,0.94)	0.67 (0.29,1.00)	0.62 (0.27,0.93)	0.26 (0.09,0.44)	0.10 (0.06,0.15)	0.20 (0.00,0.36)	0.20 (0.10,0.33)
qSOFA	0.76 (0.69,0.86)	0.88 (0.82,0.95)	0.79 (0.62,1.00)	0.70 (0.60,0.80)	0.35 (0.09,0.62)	0.09 (0.05,0.14)	0.21 (0.00,0.46)	0.26 (0.13,0.42)
Elixhauser	0.70 (0.62,0.80)	0.71 (0.40,0.86)	0.73 (0.47,1.00)	0.67 (0.33, 0.88)	0.20 (0.09, 0.36)	0.10 (0.06, 0.15)	0.30 (0.15,0.43)	0.22 (0.11, 0.36)
qCSI	0.90 (0.85,0.96)	0.84 (0.72,0.94)	0.90 (0.70,1.00)	0.79 (0.59,0.94)	0.54 (0.27,0.76)	0.07 (0.04,0.11)	0.49 (0.30,0.67)	0.52 (0.30,0.72)
CSI	0.91 (0.86,0.97)	0.83 (0.70,0.94)	0.94 (0.77,1.00)	0.82 (0.67,0.95)	0.56 (0.25,0.80)	0.25 (0.25,0.28)	0.51 (0.29,0.70)	0.58 (0.31,0.81)

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