**Introductory Exercises**

1. Open the SNOMED-LOINC-RxNorm browser, enter the phrases below in the search window at left and double click on any of the responses that interest you, noting the expanded concept definitions for those Disorders, Medicinal products and Observables that appear in the concept details:

* “HIP PAIN”
* “MYOCARDIAL INFARCTION”
* “RXNORM AUGMENTIN”
* “RXNORM EYE DROPS”
* “RXNORM RITONAVIR”
* “LOINC BLOOD GLUCOSE”
* “LOINC BACTERIA CULTURE”

1. Click on the “Expression Constraint Queries” tab at upper center of the browser. Copy and paste each exercise below into the “Expression constraint” window. Then click on the “ECL Builder” blue button to see how that ECL query looks in the ECL builder tool. Click the “OK” button on the builder to return to the main screen and click on the green “Execute” button to see how the classifier responds. The code lists that are displayed in response are all SNOMED-LOINC-RxNorm concepts that the tool identifies from the ECL query:

* **(P01) ALL CONCEPTS IN THE ONTOLOGY THAT ARE EQUIVALENT TO OR SUBTYPES OF DIABETES MELLITUS** **[129 concepts**] << 73211009 |Diabetes mellitus (disorder)|
* **(P02) ALL DISEASES THAT ARE FOUND IN THE LUNGS [1308]** << 64572001 |Disease (disorder)| : << 363698007 |Finding site (attribute)| = << 39607008 |Lung structure (body structure)|
* **(P03) ALL MALIGNANT NEOPLASMS (CANCER) OF THE LUNGS [256 concepts]** << 64572001 |Disease (disorder)| : << 363698007 |Finding site (attribute)| = << 39607008 |Lung structure (body structure)|, << 116676008 |Associated morphology (attribute)| = << 1240414004 |Malignant neoplasm (morphologic abnormality)|
* **(P04) ALL CLINICAL DRUGS THAT CONTAIN RITONAVIR [33]** << 763158003 |Medicinal product (product)| : << 762949000 |Has precise active ingredient (attribute)| = << 386896009 |Ritonavir (substance)|
* **(P05) ALL LAB TESTS FOR VANCOMYCIN LEVELS [9]** << 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 372735009 |Vancomycin (substance)|, << 370130000 |Property (attribute)| = << 118594004 |Quantity concentration (property) (qualifier value)|

**PROBLEM LIST**

**ADAPTABLE STUDY DESIGN**

**FINDING SITE, ASSOCIATED MORPHOLOGY Editorial Guide pp 161ff**

**Q01 CORONARY ARTERIOSCLEROTIC VASCULAR DISEASE**

<< 64572001 |Disease (disorder)| : << 363698007 |Finding site (attribute)| = << 41801008 |Coronary artery structure (body structure)|, << 116676008 |Associated morphology (attribute)| = << 28960008 |Arteriosclerosis (morphologic abnormality)|

**Q02 CEREBROVASCULAR DISEASE (CEREBROVASCULAR ARTERIOSCLEROSIS)**

<< 64572001 |Disease (disorder)| : << 363698007 |Finding site (attribute)| = << 28661005 |Cerebrovascular system structure (body structure)|, << 116676008 |Associated morphology (attribute)| = << 28960008 |Arteriosclerosis (morphologic abnormality)|

**Q03 PERIPHERAL VASCULAR DISEASE (PERIPHERAL ARTERIAL ARTERIOSCLEROSIS)**

<< 64572001 |Disease (disorder)| : << 363698007 |Finding site (attribute)| = << 840581000 |Structure of peripheral artery (body structure)|, << 116676008 |Associated morphology (attribute)| = << 28960008 |Arteriosclerosis (morphologic abnormality)|

**Q04 MYOCARDIAL INFARCTION (COMMON COMPLICATION OF ASCVD)**

<< 404684003 |Clinical finding (finding)| : << 116676008 |Associated morphology (attribute)| = << 55641003 |Infarct (morphologic abnormality)|, << 363698007 |Finding site (attribute)| = << 74281007 |Myocardium structure (body structure)|

**CAUSATIVE AGENT**

**Q05 ALCOHOL USE DISORDER**

<< 404684003 |Clinical finding (finding)| : << 246075003 |Causative agent (attribute)| = << 419442005 |Ethanol (substance)|

**Q06 STREPTOCOCCAL DISEASES**

<< 64572001 |Disease (disorder)| : << 246075003 |Causative agent (attribute)| = << 58800005 |Genus Streptococcus (organism)| /\*149 CONCEPTS\*/

**Q07 CORONAVIRUS 2 DISEASE**

<< 404684003 |Clinical finding (finding)| : << 246075003 |Causative agent (attribute)| = << 840533007 |Severe acute respiratory syndrome coronavirus 2 (organism)| /\* 13 \*/

**AFTER, DURING; AND/OR/MINUS**

**Q08 COMPLICATIONS OF EYE SURGERY**

(<< 404684003 |Clinical finding (finding)| : << 255234002 |After (attribute)| = << 371587008 |Surgical procedure on eye region (procedure)| ) OR

(<< 404684003 |Clinical finding (finding)| : << 371881003 |During (attribute)| = << 371587008 |Surgical procedure on eye region (procedure)|)

**Q09 CORONAVIRUS DISEASE OR ITS COMPLICATIONS**

(<< 404684003 |Clinical finding (finding)| : << 246075003 |Causative agent (attribute)| = << 840533007 |Severe acute respiratory syndrome coronavirus 2 (organism)| ) /\* 7 \*/

OR

COMPLICATIONS OF CORONAVIRUS DISEASE

(<< 404684003 |Clinical finding (finding)| : <<255234002|After (attribute)| = <<840539006|Disease caused by severe acute respiratory syndrome coronavirus 2| ) /\* 15 \*/

**PATHOLOGICAL PROCESS**

**Q10 WHAT TYPES OF PATHOLOGY DOES SNOMED USE IN CONCEPT MODEL?**

<< 404684003 |Clinical finding (finding)| . 370135005 |Pathological process (attribute)|

**Q11 PARASITIC INFECTION** (PATHOLOGIC PROCESS PARASITIC INFESTATION)

< 64572001 |Disease (disorder)| : 370135005 |Pathological process (attribute)| = 442614005 |Parasitic process (qualifier value)|

/\* 1337 concepts \*/

**Adaptable Computable Phenotype**

**Procedures Editorial Guide pp 415ff**

CORONARY ARTERY BYPASS GRAFT

<< 71388002 |Procedure (procedure)| : << 405813007 |Procedure site - Direct (attribute)| = << 41801008 |Coronary artery structure (body structure)|, << 260686004 |Method (attribute)| = << 360021005 |Bypass - action (qualifier value)|

CORONARY ANGIOPLASTY

<< 71388002 |Procedure (procedure)| : << 405813007 |Procedure site - Direct (attribute)| = << 41801008 |Coronary artery structure (body structure)|, << 260686004 |Method (attribute)| = << 410817004 |Dilation repair - action (qualifier value)|, << 424226004 |Using device (attribute)| = << 310362005 |Angioplasty catheter (physical object)|

SURGICAL APPROACH VALUESET CURRENTLY IN PROCEDURES

<< 71388002 |Procedure (procedure)| . 424876005|Surgical approach| /\*102 values \*/03379005|Procedural approach|**RxNorm MEDICINAL PRODUCTS**

**PLAYS ROLE, HAS MANUFACTURED DOSE FORM Editorial Guide pp 283ff (Pharmaceutical and Biologic products)**

ANTIBACTERIAL CLINICAL DRUGS AVAILABLE FOR ORAL USE

<< 763158003 |Medicinal product (product)| : << 766939001 |Plays role (attribute)| = << 787994008 |Antibacterial therapeutic role (role)|, << 411116001 |Has manufactured dose form (attribute)| = << 385268001 |Oral dose form (dose form)| [2045 preparations]

ANTIBACTERIAL CLINICAL DRUGS AVAILABLE FOR SYSTEMIC ADMINISTRATION

<< 763158003 |Medicinal product (product)| : << 766939001 |Plays role (attribute)| = << 787994008 |Antibacterial therapeutic role (role)|, << 411116001 |Has manufactured dose form (attribute)| = (<< 385268001 |Oral dose form (dose form)| OR <<385287007|Parenteral dose form|) [2970 preparations]

ANTIBACTERIAL EYE DROPS

<< 763158003 |Medicinal product (product)| : << 766939001 |Plays role (attribute)| = << 787994008 |Antibacterial therapeutic role (role)|, << 411116001 |Has manufactured dose form (attribute)| = << 422060001 |Conventional release eye solution (dose form)|

EYE DROPS FOR GLAUCOMA

<< 763158003 |Medicinal product (product)| : << 766939001 |Plays role (attribute)| = << 773832000 |Antiglaucoma therapeutic role (role)|, << 411116001 |Has manufactured dose form (attribute)| = << 385276004 |Ocular dose form (dose form)|

[402 preparations]

WHAT MEDICATIONS DO I HAVE TO TREAT SCABIES?

<< 763158003 |Medicinal product (product)| : << 766939001 |Plays role (attribute)| = << 1010562001 |Scabicide therapeutic role (role)|

**MULTI-INGREDIENT CLINICAL DRUGS**

**HAS ACTIVE INGREDIENT, HAS PRECISE ACTIVE INGREDIENT, COUNT OF BASE OF ACTIVE INGREDIENTS,**

ALL ACTIVE INGREDIENTS IN AVAILABLE ANTICONVULSANT MEDICATIONS

< 63094006 |Medicinal product acting as anticonvulsant agent (product)|  . 127489000 |Has active ingredient (attribute)|

**PRESENTATION STRENGTH (DOSE) Editorial Guide pp284-**

**HAS CONCENTRATION STRENGTH NUMERATOR VALUE,…**

LISINOPRIL (BLOOD PRESSURE PILL) OL FORMULATIONS *5 MG AND STRONGER*

<< 763158003 |Medicinal product (product)| : << 762949000 |Has precise active ingredient (attribute)| = << 386873009 |Lisinopril (substance)|, 1142135004|Has numerator value| >= #5, << 732945000 |Has presentation strength numerator unit (attribute)| = 258684004 |milligram (qualifier value)|,1142139005|Count of base of active ingredients| = #1

[22 preparations]

ANTIBACTERIAL CLINICAL DRUGS AVAILABLE FOR ORAL USE BUT WITH *ALLERGY TO SULFA DRUGS*

(<< 763158003 |Medicinal product (product)| : << 766939001 |Plays role (attribute)| = << 787994008 |Antibacterial therapeutic role (role)|, << 411116001 |Has manufactured dose form (attribute)| = << 385268001 |Oral dose form (dose form)|) MINUS

(<< 763158003 |Medicinal product (product)| : 762949000 | Has precise active ingredient (attribute)| = << 372788003 |Substance with sulfonamide structure and antibacterial mechanism of action (substance)|)

[1905 preparations]

**OBSERVABLE ENTITIES Editorial Guide pp 248ff**

**LABORATORY MEDICINE**

**TESTS FOR COVID-19 ACTIVE DISEASE**

**Q09 RNA OR PROTEIN ANTIGEN IN BODY FLUID**

( << 363787002 |Observable entity (observable entity)| : 246093002 |Component (attribute)| = << 1240411000000107 |Ribonucleic acid of severe acute respiratory syndrome coronavirus 2 (substance)| )

OR

(<< 363787002 |Observable entity (observable entity)| : 246093002 |Component (attribute)| = << 840536004 |Antigen of severe acute respiratory syndrome coronavirus 2 (substance)|)

**Q10 RANDOM BLOOD GLUCOSE LEVEL**

(<< 6060001000004106 |Clinical laboratory observable (observable entity)| : << 246093002 |Component (attribute)| = << 67079006 |Glucose (substance)|, << 370130000 |Property (attribute)| = << 118539007 |Mass concentration (property) (qualifier value)|, << 370134009 |Time aspect (attribute)| = << 123029007 |Single point in time (qualifier value)|, << 704327008 |Direct site (attribute)| = << 119297000 |Blood specimen (specimen)|)

MINUS

(<< 6060001000004106 |Clinical laboratory observable (observable entity)| : << 246093002 |Component (attribute)| = << 67079006 |Glucose (substance)|, << 370130000 |Property (attribute)| = << 118539007 |Mass concentration (property) (qualifier value)|, << 370134009 |Time aspect (attribute)| = << 123029007 |Single point in time (qualifier value)|, << 704327008 |Direct site (attribute)| = << 119297000 |Blood specimen (specimen)|, << 704326004 |Precondition (attribute)| = << 703763000 |Precondition value (qualifier value)|)

**Q11 ALL TECHNIQUES THAT ARE PRECOORDINATED WITH LAB OBSERVABLE**

<< 6060001000004106 |Clinical laboratory observable (observable entity)| . << 246501002 |Technique (attribute)|

ANTIBIOGRAM AND DECISION SUPPORT FOR ANTIBIOTIC TREATMENT

**Q12 BACTERIA IDENTIFIED FROM CULTURES**

<< 363787002 |Observable entity (observable entity)| : << 704319004 |Inheres in (attribute)| = << 409822003 |Domain Bacteria (organism)|, << 370130000 |Property (attribute)| = << 118584009 |Presence or identity (property) (qualifier value)|

**Q13 MEASURES THE ANTIBACTERIAL SUSCEPTIBILITIES**

<< 363787002 |Observable entity (observable entity)| : 370130000 |Property (attribute)| = << 118588007 |Susceptibility (property) (qualifier value)|, << 704320005 |Towards (attribute)| = << 895275007 |Medicinal product acting as antiinfective agent (product)|

**Q14 RXNORM ANTIBACTERIALS IN PARENTERAL FORM CONTAINING ACTIVE INGREDIENTS AZTREONAM OR AMOXICILLIN**

((<< 69918003 |Product containing aztreonam (medicinal product)| OR << 27658006 |Product containing amoxicillin (medicinal product)|) : << 411116001 |Has manufactured dose form (attribute)| = << 385287007 |Parenteral dose form (dose form)| ) {{ term = "RXNORM", type = fsn }}

**Q15 IDENTIFIES ALL THE ANTIBACTERIAL SUBSTANCES WHICH ARE LISTED AS ALLERGIES IN PROBLEM LIST**

( <<609328004 |Allergic disposition (finding)| . 246075003|Causative agent| ) AND ( <<419241000|Substance with antibacterial mechanism of action|)

**ADDITIONAL LAB OBSERVABLE COMPUTABLE PHENOTYPES**

BLOOD SUGAR

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 67079006 |Glucose (substance)|, << 704319004 |Inheres in (attribute)| = << 261226001 |Blood component (substance)|

HEMOGLOBIN A1C (GLYCOHEMOGLOBIN) FRACTION

<< 363787002 |Observable entity (observable entity)| : 246093002 |Component (attribute)| = << 733829007 |Glycated hemoglobin (substance)|, 704325000 |Relative to (attribute)| = << 38082009 |Hemoglobin (substance)|

THROAT SWAB FOR COVID-19 RNA

<< 363787002 |Observable entity (observable entity)| : 246093002 |Component (attribute)| = << 1240411000000107 |Ribonucleic acid of severe acute respiratory syndrome coronavirus 2 (substance)|, 704327008 |Direct site (attribute)| = << 461911000124106 |Swab specimen from oropharynx (specimen)|

SCREENS FOR SEDATIVE USE

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 372614000 |Sedative (substance)|

SCREEN FOR OPIOIDS BLOOD OR URINE

<< 363787002 |Observable entity (observable entity)| :

<< 704319004 |Inheres in (attribute)| = (<< 256906008 |Blood material (substance)| OR <<78014005|Urine (substance)|),

< 246093002 |Component (attribute)| = << 404642006 |Substance with opioid receptor agonist mechanism of action (substance)|

DILANTIN BLOOD LEVELS

<< 363787002 |Observable entity (observable entity)| : 704319004 |Inheres in (attribute)| = << 762634006 |Acellular blood (substance)|, 246093002 |Component (attribute)| = << 387220006 |Phenytoin (substance)|