**This four hour hands-on workshop will employ SNOMED CT International, recent SNOMED developments for anatomic pathology, a LOINC observables extension and an extension deploying RxNorm content to explore in detail utility of an integrated ontology pertinent to pragmatic research in cancer, public health and clinical quality improvement. Workshop leaders will present clinical and research use cases for utilization of SNOMED CT integrated extensions supporting interoperation of electronic health record(EHR) data. Decision-analytic use cases will be presented as exercises for participants who will study the utility of the integrated ontology models interactively on their computers. The workshop will employ the SNOMED CT International Browser and ECL Query tools for workshop exercises. Workshop participants should bring their own computers equipped for wireless internet loaded with web browser in order to participate fully. However, observers are also welcome.**

**Agenda 20241024**

1. 13:30 Introduction to workshop content and resources JRC (5 min)
2. RxNorm SNOMED Ontology in clinical research (1 hr) KWF&RW
   1. Scope and role of RxNorm is US Healthcare
   2. Introduction to the International Medicinal Product ontology model
   3. Use case exercises for an RxNorm ontology
3. Lab LOINC Ontology in healthcare and clinical research (I hr) SH
   1. Scope and role of Lab LOINC in international healthcare
   2. Introduction to the Lab LOINC SNOMED extension ontology model
   3. Use case exercises for LOINC ontology
4. 15:00-15:30 Break
5. SNOMED Observables Ontology in Cancer healthcare and clinical research (1 hr) JRC
   1. Introduction to the SNOMED CT Cancer Synoptic Reporting module and the Observable Entity ontology model
   2. Use case exercises for SNOMED Cancer Synoptic Observables ontology
6. 17:00 Wrap-up Q&A, handout material and internet resources (15 min) JRC

**Use Cases for an extension SNOMED-LOINC-RxNorm Ontology**

ECL Queries in Nebraska Extension

**RxNorm MEDICINAL PRODUCTS**

**Pharmaceutical and Biologic Products SNOMED Editorial Guide pp 284ff**

**SUBSTANCE MECHANISM OF ACTION, HAS MANUFACTURED DOSE FORM Editorial Guide pp 283ff (Pharmaceutical and Biologic products)**

ANTIBACTERIAL CLINICAL DRUGS AVAILABLE FOR ORAL USE

<< 763158003 |Medicinal product (product)| : 732943007 |Has basis of strength substance (substance)|= << 419241000|Substance with antibacterial mechanism of action (substance)|, << 411116001 |Has manufactured dose form (attribute)| = << 385268001 |Oral dose form (dose form)| [1864 preparations]

ANTIBACTERIAL CLINICAL DRUGS AVAILABLE FOR SYSTEMIC ADMINISTRATION

<< 763158003 |Medicinal product (product)| : 732943007 |Has basis of strength substance (substance)|= << 419241000| Substance with antibacterial mechanism of action (substance)|, << 411116001 |Has manufactured dose form (attribute)| = (<< 385268001 |Oral dose form (dose form)| OR <<385287007|Parenteral dose form|) [2763 preparations]

ANTIBACTERIAL EYE DROPS

<< 763158003 |Medicinal product (product)| : 732943007 |Has basis of strength substance (substance)|= << 419241000| Substance with antibacterial mechanism of action (substance)|, << 411116001 |Has manufactured dose form (attribute)| = << 422060001 |Conventional release eye solution (dose form)|

[15 preparations]

Find oral antibacterial for a patient with allergy to sulfa antibiotics (sulphonamides)

(<< 763158003 |Medicinal product (product)| : 732943007 |Has basis of strength substance (substance)|= << 419241000|Substance with antibacterial mechanism of action (substance)|, << 411116001 |Has manufactured dose form (attribute)| = << 385268001 |Oral dose form (dose form)| ) MINUS

(<< 763158003 |Medicinal product (product)| : 732943007 |Has basis of strength substance (substance)|= << 387406002 |Sulfonamide (substance)|)

[1723 concepts]

Find Oral ANTIBACTERIAL CLINICAL DRUGS with more than one active ingredients

<< 763158003 |Medicinal product (product)| : << 732943007 |Has basis of strength substance (substance)|= << 419241000|Substance with antibacterial mechanism of action (substance)|, << 411116001 |Has manufactured dose form (attribute)| = << 385268001 |Oral dose form (dose form)|, 1142139005|Count of base of active ingredients| > #1

[305 concepts]

Find an oral pill with 10 mg of lisinopril

<< 763158003 |Medicinal product (product)| : {<< 762949000 |Has precise active ingredient (attribute)| = << 386873009 |Lisinopril (substance)|, 1142135004|Has numerator value| = #10, << 732945000 |Has presentation strength numerator unit (attribute)| = 258684004 |milligram (qualifier value)|}

[11 concepts]

\*\*\*Contrast with this (without role grouping)\*\*\*

<< 763158003 |Medicinal product (product)| : << 762949000 |Has precise active ingredient (attribute)| = << 386873009 |Lisinopril (substance)|, 1142135004|Has numerator value| = #10, << 732945000 |Has presentation strength numerator unit (attribute)| = 258684004 |milligram (qualifier value)|

[12 concepts – 1 false positive: Amlodipine (as amlodipine besilate) 10 mg and lisinopril 20 mg oral tablet]

Find a oral pill with 10 mg of lisinopril not in combination with another active ingredient

<< 763158003 |Medicinal product (product)| : {<< 762949000 |Has precise active ingredient (attribute)| = << 386873009 |Lisinopril (substance)|, 1142135004|Has numerator value| = #10, << 732945000 |Has presentation strength numerator unit (attribute)|= 258684004 |milligram (qualifier value)|}, 1142139005|Count of base of active ingredients|= #1

[5 concepts]

Find the routes of administration of beta blockers

<< 33252009 |Beta blocker-containing product|.411116001 |Has manufactured dose form|

[19 concepts]

Find all routes of administration of antibacterial agents

(<< 763158003 |Medicinal product (product)| : << 732943007 |Has basis of strength substance (substance)|= << 419241000|Substance with antibacterial mechanism of action (substance)|). 411116001 |Has manufactured dose form (attribute)|

[69 concepts]

**OBSERVABLE ENTITIES**

**SNOMED Editorial Guide pp 250ff**

**LABORATORY MEDICINE**

ECL Queries in LOINC SNOMED Extension

**All Hepatitis B antigen tests (26)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 303233001 |Antigen of Hepatitis B virus (substance)|

**Hepatitis B antigen Titer (Semi Quant) – 0nly one result**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 303233001 |Antigen of Hepatitis B virus (substance)|, << 370132008 |Scale type (attribute)| = << 103392008 |Semi-quantitative (qualifier value)|

**Presence of Hepatitis B antigen (19)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 303233001 |Antigen of Hepatitis B virus (substance)|, << 370130000 |Property (attribute)| = << 705057003 |Presence (property) (qualifier value)|

**Hepatitis B surface antigen only (17)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 22290004 |Antigen of Hepatitis B virus surface protein (substance)|

**Hep B and C antigen (Hep C is not in the extension yet)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 726592002 |Antigen of Hepatitis C virus core (substance)| or << 246093002 |Component (attribute)| = << 303233001 |Antigen of Hepatitis B virus (substance)|

**Hepatitis Delta and B antigens (31)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 120990004 |Antigen of Hepatitis delta virus (substance)| or << 246093002 |Component (attribute)| = << 303233001 |Antigen of Hepatitis B virus (substance)|

**Hep B RNA (only 1)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 121184008 |Ribosomal ribonucleic acid of Hepatitis B virus (substance)|

**Hep B DNA (33)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 121112003 |Deoxyribonucleic acid of Hepatitis B virus (substance)|

**Active Hepatitis B (antigen, DNA, or rRNA) (60)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 121184008 |Ribosomal ribonucleic acid of Hepatitis B virus (substance)| or << 246093002 |Component (attribute)| = << 303233001 |Antigen of Hepatitis B virus (substance)| or << 246093002 |Component (attribute)| = << 121112003 |Deoxyribonucleic acid of Hepatitis B virus (substance)|

**Glucose MCnc Ser/Plas (278)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 67079006 |Glucose (substance)|, << 370130000 |Property (attribute)| = << 118539007 |Mass concentration (property) (qualifier value)|, << 704327008 |Direct site (attribute)| = << 122592007 |Acellular blood (serum or plasma) specimen (specimen)|

**Glucose PT MCnc Ser/Plas (277)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 67079006 |Glucose (substance)|, << 370130000 |Property (attribute)| = << 118539007 |Mass concentration (property) (qualifier value)|, << 704327008 |Direct site (attribute)| = << 122592007 |Acellular blood (serum or plasma) specimen (specimen)|, << 370134009 |Time aspect (attribute)| = << 123029007 |Single point in time (qualifier value)|

**Glucose PT MCnc Ser/Plas with precondition (15) pre conditions mostly not defined in the current work in progress release)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 67079006 |Glucose (substance)|, << 370130000 |Property (attribute)| = << 118539007 |Mass concentration (property) (qualifier value)|, << 704327008 |Direct site (attribute)| = << 122592007 |Acellular blood (serum or plasma) specimen (specimen)|, << 704326004 |Precondition (attribute)| = << 703763000 |Precondition value (qualifier value)|, << 370134009 |Time aspect (attribute)| = << 123029007 |Single point in time (qualifier value)|

**Glucose MCnc Ser/Plas without precondition (pre conditions mostly not defined in the current work in progress release)**

(<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 67079006 |Glucose (substance)|, << 370130000 |Property (attribute)| = << 118539007 |Mass concentration (property) (qualifier value)|, << 704327008 |Direct site (attribute)| = << 122592007 |Acellular blood (serum or plasma) specimen (specimen)|, << 370134009 |Time aspect (attribute)| = << 123029007 |Single point in time (qualifier value)|)

MINUS

(<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 67079006 |Glucose (substance)|, << 370130000 |Property (attribute)| = << 118539007 |Mass concentration (property) (qualifier value)|, << 704327008 |Direct site (attribute)| = << 122592007 |Acellular blood (serum or plasma) specimen (specimen)|, << 704326004 |Precondition (attribute)| = << 703763000 |Precondition value (qualifier value)|, << 370134009 |Time aspect (attribute)| = << 123029007 |Single point in time (qualifier value)|)

**Finds all of the values of technique for observables**

<< 363787002 |Observable entity (observable entity)| . << 246501002 |Technique (attribute)|

**Finds all of techniques used with glucose observables (3)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 67079006 |Glucose (substance)|) . << 246501002 |Technique (attribute)|

**Finds all of preconditions used with observables**

<< 363787002 |Observable entity (observable entity)| . << 704326004 |Precondition (attribute)|

**Neisseria gonorrhoeae cultures, all types (14)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 68704007 |Neisseria gonorrhoeae (organism)|

**Neisseria gonorrhoeae antibodies (7)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 120834006 |Antibody to Neisseria gonorrhoeae (substance)|

**Neisseria gonorrhoeae DNA (16)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 703483000 |Deoxyribonucleic acid of Neisseria gonorrhoeae (substance)|

**Neisseria gonorrhoeae rRNA (17)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 121172006 |Ribosomal ribonucleic acid of Neisseria gonorrhoeae (substance)|

**Active Neisseria gonorrhoeae infection (culture, rRNA, DNA) (47)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 703483000 |Deoxyribonucleic acid of Neisseria gonorrhoeae (substance)| or << 246093002 |Component (attribute)| = << 121172006 |Ribosomal ribonucleic acid of Neisseria gonorrhoeae (substance)| or << 246093002 |Component (attribute)| = << 68704007 |Neisseria gonorrhoeae (organism)|

**Active Neisseria gonorrhoeae infection (culture, rRNA, DNA) of uterine cervix (5)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 703483000 |Deoxyribonucleic acid of Neisseria gonorrhoeae (substance)| or << 246093002 |Component (attribute)| = << 121172006 |Ribosomal ribonucleic acid of Neisseria gonorrhoeae (substance)| or << 246093002 |Component (attribute)| = << 68704007 |Neisseria gonorrhoeae (organism)| and << 704327008 |Direct site (attribute)| = << 119395005 |Specimen from uterine cervix (specimen)|

**Opioid Observables (505)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = < 404642006 |Substance with opioid receptor agonist mechanism of action (substance)|

**Opioid MCnc (185)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = < 404642006 |Substance with opioid receptor agonist mechanism of action (substance)|, << 370130000 |Property (attribute)| = << 118539007 |Mass concentration (property) (qualifier value)|

**Opioid MCnc SER/PLASMA Therapeutic Monitoring (39)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = < 404642006 |Substance with opioid receptor agonist mechanism of action (substance)|, << 370130000 |Property (attribute)| = << 118539007 |Mass concentration (property) (qualifier value)|, << 704327008 |Direct site (attribute)| = << 122592007 |Acellular blood (serum or plasma) specimen (specimen)|

**Opioid Screening Presence (208)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = < 404642006 |Substance with opioid receptor agonist mechanism of action (substance)|, << 370130000 |Property (attribute)| = << 705057003 |Presence (property) (qualifier value)|

**Opioid Urine Screening (85)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = < 404642006 |Substance with opioid receptor agonist mechanism of action (substance)|, << 370130000 |Property (attribute)| = << 705057003 |Presence (property) (qualifier value)|, << 704327008 |Direct site (attribute)| = << 122575003 |Urine specimen (specimen)|

**All Observables where the component is an organism (377)**

<< 363787002 |Observable entity (observable entity)| : << 246093002 |Component (attribute)| = << 410607006 |Organism (organism)|

**All STDs that have a causative agent, Sexually transmitted infectious disease organisms (15)**

1. << 8098009 |Sexually transmitted infectious disease (disorder)| . << 246075003 |Causative agent (attribute)|
2. << 8098009 |Sexually transmitted infectious disease (disorder)| . 246075003 |Causative agent (attribute)|
3. < 410607006 |Organism (organism)|: R 246075003 | Causative agent (attribute) | = < 8098009 | Sexually transmitted infectious disease (disorder) |

**OBSERVABLE ENTITIES**

**SNOMED Editorial Guide pp 250ff**

**CANCER (Synoptic Case Reporting Dataset)**

ECL Queries in Nebraska Extension

**Primary Malignant Neoplasm Tumor Site**

**Inheres in; Anatomic Location property; Characterizes**

**83 concepts**

<< 363787002 |Observable entity (observable entity)| : << 704319004 |Inheres in (attribute)| = << 1240414004 |Malignant neoplasm (morphologic abnormality)|, << 370130000 |Property (attribute)| = << 758637006 |Anatomic location (property) (qualifier value)|, << 704321009 |Characterizes (attribute)| = << 1204295007 |Malignant proliferation of neoplasm (qualifier value)|

**Tumor Size**

**What are dimensions of surgically excised primary malignancies**

**13 concepts**

<< 363787002 |Observable entity (observable entity)| : << 704319004 |Inheres in (attribute)| = << 1240414004 |Malignant neoplasm (morphologic abnormality)|, << 370130000 |Property (attribute)| = << 410668003 |Length property (qualifier value)|, << 704327008 |Direct site (attribute)| = << 439479000 |Tissue specimen obtained by excision (specimen)|, << 704321009 |Characterizes (attribute)| = << 1234914003 |Malignant proliferation of primary neoplasm (qualifier value)|, << 370132008 |Scale type (attribute)| = << 30766002 |Quantitative (qualifier value)|

**Biomarkers**

**Primary Malignancy Estrogen receptor observables in breast cancer**

**Inheres in; Component; Inherent location**

**2 concepts**

<< 363787002 |Observable entity (observable entity)| : << 704319004 |Inheres in (attribute)| = << 1240414004 |Malignant neoplasm (morphologic abnormality)|, << 246093002 |Component (attribute)| = << 23307004 |Estrogen receptor (substance)|, << 718497002 |Inherent location (attribute)| = << 76752008 |Breast structure (body structure)|

**Lung Excision Surgical Margins**

**Presence Property; Direct site**

**7 concepts**

<< 363787002 |Observable entity (observable entity)| : << 704319004 |Inheres in (attribute)| = << 871811002 |Surgical margin (morphologic abnormality)|, << 370130000 |Property (attribute)| = << 705057003 |Presence (property) (qualifier value)|, << 246093002 |Component (attribute)| = << 1240414004 |Malignant neoplasm (morphologic abnormality)|, << 704327008 |Direct site (attribute)| = << 127458004 |Specimen from lung (specimen)|

**Presence of Malignancy at Surgical Margins**

**Inheres in; Presence property**

**154 concepts**

<< 363787002 |Observable entity (observable entity)| : << 704319004 |Inheres in (attribute)| = << 871811002 |Surgical margin (morphologic abnormality)|, << 246093002 |Component (attribute)| = << 1240414004 |Malignant neoplasm (morphologic abnormality)|, << 370130000 |Property (attribute)| = << 705057003 |Presence (property) (qualifier value)|

**Presence of Malignancy at Surgical Margins of lung resection specimen**

<< 363787002 |Observable entity (observable entity)| : << 704319004 |Inheres in (attribute)| = << 871811002 |Surgical margin (morphologic abnormality)|, << 370130000 |Property (attribute)| = << 705057003 |Presence (property) (qualifier value)|, << 246093002 |Component (attribute)| = << 1240414004 |Malignant neoplasm (morphologic abnormality)|, << 704327008 |Direct site (attribute)| = << 127458004 |Specimen from lung (specimen)|

**Histologic Type of Primary Colon Cancers**

**Inheres in; Inherent location; Histologic type property**

**1 concept**

<< 363787002 |Observable entity (observable entity)| : << 704319004 |Inheres in (attribute)| = << 1240414004 |Malignant neoplasm (morphologic abnormality)|, << 370130000 |Property (attribute)| = << 6030001000004102 |Histologic type property (qualifier value)|, << 704321009 |Characterizes (attribute)| = << 1234914003 |Malignant proliferation of primary neoplasm (qualifier value)|, << 718497002 |Inherent location (attribute)| = << 71854001 |Colon structure (body structure)|

**Invasiveness of Primary Malignancies**

**Characterizes; Process Extends To**

**72 concepts**

<< 363787002 |Observable entity (observable entity)| : << 704319004 |Inheres in (attribute)| = << 1240414004 |Malignant neoplasm (morphologic abnormality)|, << 704321009 |Characterizes (attribute)| = << 1234914003 |Malignant proliferation of primary neoplasm (qualifier value)|, << 704321009 |Characterizes (attribute)| = << 1505281000004101 |Direct local invasion (qualifier value)|, << 1003703000 |Process extends to (attribute)| = << 1340119002 |Structure of lymphatic vessel and/or blood vessel (body structure)|

**Number positive lymph nodes reported by pathologist**

**9 concepts**

<< 363787002 |Observable entity (observable entity)| : << 704319004 |Inheres in (attribute)| = << 59441001 |Structure of lymph node (body structure)|, << 704327008 |Direct site (attribute)| = << 373826004 |Surgical excision specimen (specimen)|, << 246093002 |Component (attribute)| = << 14799000 |Neoplasm, metastatic (morphologic abnormality)|, << 370130000 |Property (attribute)| = << 118536000 |Entitic number (property) (qualifier value)|

**Pathological TNM stage**

<<405978005|Pathologic stage (observable entity)|