PS1: Use case selection and details (Project Sprint 1)

Group Name: **ICD – 5**

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Use Case B: **Clinician to lab - orders from EHR to be generated as a lab worklist item**

Introduction:

For storing medical knowledge in electronic medical records, retrieving, reusing, and requiring effective messaging between users, medical terminology has been standardized extensively(Awaysheh et al., 2018). Medical information can be more effectively used in public health and research, by using standard terminology and structured reporting(Awaysheh et al., 2018). With the help of standardization, healthcare has been able to have a direct impact on patient care and coordination. Medical standards and terminologies are used to improve healthcare by reducing the rate of occurrence of adverse events and misdiagnosis. For this project, the selected use case study has been thoroughly analyzed to determine the different signs, symptoms, lab tests, and diagnosis. To associate and compare each of these we have made use of four terminologies that are in accordance with the standards namely ICD 10-CM, CPT, LOINC and SNOMED CT. With the help of these terminologies, we can build and work towards providing patient safety and support innovations in the healthcare domain.

The International Classification of Diseases, Tenth Revision, Clinical Modification (ICD10-CM) is a standardized coding system that allows the clinicians to code the diagnosis codes for various signs and symptoms of diseases and related health problems (Holman & DelVecchio, 2018). The clinical and outpatient settings in U.S. use the ICD10-CM coding given by The World Health Organization (WHO)(Holman & DelVecchio, 2018).

SNOMED-CT is the most extensive, multidisciplinary medical healthcare terminology standard that is utilized in the healthcare settings(Dennis et al., 2014). It is a source containing thorough clinical content that has been verified by the professionals(Dennis et al., 2014). SNOMED-CT makes it possible for the whole clinical content and data to be represented consistently in

Electronic Health Records(Dennis et al., 2014). It is aligned with other global standards such as ICD-10, CPT, HL7. SNOMED-CT is essential for health records because it enables the display of intricate clinical data in a manner that can be preprocessed(Dennis et al., 2014). In comparison to ICD-10, SNOMED-CT terminology is very distinct. ICD-10 is intended for use by coding specialists after the episode of care is complete, while SNOMED-CT is designed for medical professionals during the course of treatment(Dennis et al., 2014). By capturing clinical data in a standardized, unambiguous, and granular way, SNOMED-CT terminology can improve data quality and patient safety(Dennis et al., 2014).

"The Current Procedural Terminology (CPT) codes offer doctors and health care professionals a uniform language for coding medical services and procedures to streamline reporting, increase accuracy and efficiency." (CPT Overview and Code Approval. American Medical Association, n.d.). It is a standardized practice to report clinical procedures, such as "surgical, radiology, laboratory, anesthesiology, genomic sequencing, evaluation and management." (CPT Overview and Code Approval. American Medical Association, n.d.).

Logical Observation Identifiers Names and Codes, or LOINC, was established in 1994 by Clem McDonald. Regenstrief, an organization connected to Indiana University, is tasked with maintaining LOINC. The LOINC Committee formed this non-profit organization. This LOINC is an international terminology for laboratory and clinical observations. It was created in response to the growing trend of information exchange from electronic health records (EHR) and is used to transfer data to hospitals and clinical offices where it is used to manage clinical treatment(McDonald et al., 2003).

Clinical elements in the use case:

After carefully reviewing the selected use case study, the following clinical elements have been noted down. These clinical elements consist of signs, symptoms, diagnosis, and laboratory tests mentioned in the use case study.

1. **Lethargy:**

   ICD-10-CM: The ICD10-CM code is R53.83 and it is being used since October 1, 2021. This sign is most commonly applicable to tiredness, lack of energy, fatigue. It also means lack of energy and sluggishness to do basic activities.[Link]

   SNOMED-CT: The SNOMED-CT code for Lethargy is 2142264003. [Link]

   LOINC: The LOINC code 45495-9 is applicable to periods of lethargy. [Link]

2. **Generalized weakness:**

   ICD-10-CM: The ICD10-CM suggests the code M62.81 for generalized weakness in a patient. The code covers symptoms like muscle weakness in general and trunk muscle weakness.[Link]

   SNOMED-CT: The SNOMED-CT code for generalized weakness is 260407003.[Link]

   LOINC: The LOINC code 66669-3 refers to weakness and muscle weakness. This sign shows a lack of energy in the body that causes weakness.[Link]

3. **Inability to do routine work:**

   ICD-10-CM: The ICD-10 code for decreased activity is Z73.6. This sign shows that there has been decreases activities due to life management and tasks.[Link]

   SNOMED-CT: The SNOMED-CT code for alteration in daily living activities is 129818000. [Link]

4. **Excessive bleeding during menstruation:**

   ICD-10-CM: ICD10-CM suggests the billable code N92.0 for heavy bleeding during menstrual cycle. This is applicable to excessive and frequent menstruation which is also called Menorrhagia.[Link]

   SNOMED-CT: The SNOMED-CT code for excessive bleeding during menstruation is 386692008.[Link]

   LOINC: Menstrual history is denoted by the LOINC codes 62668-9, and menstrual status is denoted by 3146-8. Menorrhagia, often known as heavy menstrual bleeding, is sometimes common and other times lasts more than seven days.[Link][Link]

5. **Breathlessness:**

   ICD-10-CM: The code used for breathlessness is R06, but it is neither a specific nor a billable code as it contains a greater level of detail depending on what category of breathlessness is being referred to like shortness of breath (R06.02), acute respiratory distress syndrome (J80), respiratory arrest (R09.2), or respiratory failure (J96).[Link]

   SNOMED-CT: The SNOMED-CT code for 267036007. This condition is also known as Dyspnea. [Link]

LOINC: Breathlessness is identified by the LOINC code 82950-7. Chest tightness can sometimes make it difficult to breathe. [Link]

6. **Palpitations:**

ICD-10-CM: The ICD10-CM code for palpitations is R00.2 and it is a billable code. It explains the clinical situation when an unpleasant sensation and irregular heartbeats are experienced by a person. [Link]

SNOMED-CT: The SNOMED-CT code for palpitations is 80313002. [Link]

LOINC: Palpitation's LOINC code is 76281-5. Most palpitations are caused by stress, depression, or strenuous exercise. [Link]

7. **Light-headedness:**

ICD-10-CM: R42 is the code as developed by the ICD10-CM for light-headedness. The code is basically used for dizziness and giddiness, but it is applicable to light-headedness and a problem called vertigo as well.[Link]

SNOMED-CT: The SNOMED-CT code for 386705008. [Link]

LOINC: The LOINC code - 45699-6 applicable to Dizziness or vertigo. Numerous factors, including hypotension and quick changes in posture, lead to lightheadedness. [Link]

8. **Cramping in legs:**

   ICD-10-CM: R25.2 is the code suggested in ICD10-CM system for the cramped legs. It is broadly used for cramps and spasm but can also be used to relate with benign cramp syndrome, bilateral leg cramps, muscle cramps etc. [Link]

   SNOMED-CT: The SNOMED-CT code for cramps in legs is 449918009. [Link]

   LOINC: The LOINC code 66093-6 applicable to muscle cramps in legs. Standing in a position for long periods of time or muscle strain can cause leg cramps. Sometimes, dehydration also causes this.[Link]

9. **Desire to crunch on ice:** This is a condition that is associated with compulsive eating disorders. It is also known as Pica.

   ICD-10-CM: The ICD-10 code for Pica is F50.89. [Link]

   SNOMED-CT: The SNOMED-CT code for Pica is 423790006. [Link]

10. **No history of fear:**

    ICD-10-CM: The ICD-10 code there was no specific code indicating no history of fear. However, fear of any specific kind is F40.2. [Link]

    SNOMED-CT: The SNOMED-CT code for fear of any specific kind is 1402001.[Link]

11. **No history of abdominal pain:**

    SNOMED-CT: The SNOMED-CT code for no history of abdominal pain situation is 162037008. [Link]

12. No history of drug intake:

SNOMED-CT: There is no code for no history of drug abuse. However, the SNOMED-CT code for nondependent substance or drug abuse disorder is 66214007.[Link]

13. Appetite has also decreased:

ICD-10-CM: R63.0 is the code for appetite loss. It mainly covers lack of appetite due to cancer, mental disorder, or other diseases.[Link]

SNOMED-CT: The SNOMED-CT code for this is 64379006.[Link]

LOINC: Decreased appetite in LOINC is represented by the code 65961-5.[Link]

14. Taking meals once a day:

ICD-10-CM: Z72.4 is the code for inappropriate eating habits as suggested by ICD10-CM. This code covers eating disorders, lack of adequate food, and malnutrition and other nutritional deficiencies. [Link]

15. Had tachycardia:

ICD-10-CM: ICD10-CM gives R00.0 as the code for Tachycardia. This covers inappropriate heart rate, sinus tachycardia, and rapid heartbeat.[Link]

SNOMED-CT: The SNOMED-CT code for this is 3424008. Tachycardia is a condition where heart rate is increased rapidly.[Link]

LOINC: Rhythmic or arrhythmic heart rate in LOINC is represented by 88104-5 code. [Link]

16. Pale gums:

ICD-10-CM: The code is K06.8 and covers signs and symptoms like giant cell epulis, flabby alveolar ridge. [Link]

SNOMED-CT: The SNOMED-CT code for pale gums is 274134003. This condition is also known as "Leukoplakia". [Link]

LOINC: 34013-3 is the LOINC code for the Gingiva periodontal assessment.[Link]

17. Nail beds:

ICD-10-CM: L60.9 is the code for nail beds. This basically covers all types of nail disorders and nail diseases along with discoloration of nails and fungal or bacterial infections in nails.[Link]

SNOMED-CT: The SNOMED-CT code for nail beds is 719193000. [Link]

18. Swollen tongue:

SNOMED-CT: The SNOMED-CT code for Swollen tongue is 45534005. This condition is also known as Glossitis. [Link]

LOINC: The LOINC code for physical findings of the tongue is 32483-0.[Link]

19. Anemic:

ICD-10-CM: D64.9 is the code for anemia. The code covers many types of anemia like anemia due to pregnancy, due to medication, due to radiation or other diseases.[Link]

SNOMED-CT: The SNOMED-CT code for anemic condition is 271737000.[Link]

LOINC: The LOINC code for anemia is 45676-4.[Link]

20. Blood sample ordered:

SNOMED-CT: The SNOMED-CT code for blood sample is 119297000.[Link]

LOINC: 58410-2 is the LOINC code for Blood by Automated count.[Link]

Conclusion:

Although the necessity for data standards and terminologies in clinical research is becoming increasingly evident, clinical medicine receives more attention than clinical research when it comes to standards for representing, managing, and sharing data(Richesson et al., 2006). For our project proposal we have made use of different terminologies and researched about how they are used in the medical industry. We have used explored and found standard codes in SNOMED-CT, ICD-10, LOINC, and CPT. As we studied further, we learnt that CPT is used as a standard vocabulary for surgical procedures, minor surgeries that are performed by physicians. Additionally, for majority of the signs and symptoms we were able to find their ICD-10 and SNOMED-CT codes. However, there were a few conditions wherein a direct code was not associated with the term, but it comprises under the broader umbrella. We discovered that SNOMED-CT appears to be suitable for representing a variety of healthcare clinical concepts(Richesson et al., 2006). It and can be used to represent medical information that provides high specificity(Awaysheh et al., 2018). It is very useful to report diagnostic information with SNOMED-CT codes(Awaysheh et al., 2018). A mechanism for filtering set value definitions and searching for operators is also built into the FHIR mechanism, making SNOMED-CT an HL7-FHIR standard(Richesson et al., 2006). ICD-10-CM on the other hand provides more data about the severity of a patient's signs, symptoms, and medical conditions(Holman & DelVecchio, 2018). Furthermore, LOINC codes were also used as this provides a universal code system for reporting

laboratory and clinical observations in the case study(McDonald et al., 2003). Thus, in conclusion, through most of the literature review we included the standard codes and terminologies that were in terms and well aligned with the clinical elements found in the selected. case study.

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