A SNOMED-CT Findings & Diagnosis Subset in BC

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INTRODUCTION

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Setting

The Province of British Columbia, Canada with a population of approximately 5 million that receive health care through a publicly funded system. The BC health system has been focused for more than a decade on improving primary care. A health information standards infrastructure was implemented in 2016 to implement terminology and other standards to support effective EMR use, interoperability and analytics. This subset is a product of that infrastructure.

Problem

A list of health concerns (aka "the problem list") is a core component of the medical record yet it is often poorly maintained. When the problem list is not complete or accurate, care coordination, clinical decision support, panel management, context of clinical issues and other care elements supporting patient safety are significantly compromised[1]. Electronic medical records had the promise of tremendously improving important components of the clinical record but improvements in the problem list have been slow to materialize. EMR usability, especially with respect to clinician selection of coded items has been identified as a major barrier. Clinicians have challenges thinking abstractly in choosing health concerns so become frustrated with classification systems, especially systems like ICD-9 which has long been retired and has limited choices. However, classification systems are useful in various contexts. Also, many vital health system current functions such as claim submissions and analytics are built around classification systems like ICD9 and ICD10

Approach

- Develop a SNOMED-CT based clinically useful subset that covers most of the diagnoses and findings that clinicians encounter in various settings, especially primary care.

- Map the subset to the primary classifications that are required to conduct health care at the moment such as claim submission to the BC Medical Services Plan (ICD-9), reporting in acute care facilities (ICD-10) and Emergency Department encounter reports to Canadian Institute for Health Information (CED-DxS, a small subset of ICD-10).

- Provide vendors with an implementation guide.

- Build a system to maintain the reference set that is responsive to clinical developments such as Covid-19/SARS Cov2.

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Concept Content

The subset was informed by already existing subsets such as the Pan Canadian short and long health concerns subset hosted by Canada Health Infoway[2], the UMLS CORE problem list subset of SNOMED-CT[3], frequency of use data from the NLM UMLS, the CED-DxS subset[4], the concept coverage provided by DSM-V and the lookup table of an EMR vendor product in the province that has received clinician feedback on lookup lists for over 2 decades. Pre-coordinated items such as "Hypertensive heart and renal disease…" or terms containing "And/Or" were excluded but pre-coordination requirements for commonly used terms such as "Bipolar affective disorder, currently depressed" were included. To minimize mapping complications with context (e.g. age and gender) related concepts, some generic high-level items were removed and replaced with more specific concepts e.g. adult versus neonatal pneumonia.

Figure 1: Excerpt of the mapping spreadsheet

Mapping

Preliminary automated mapping was done using SNOMED-CT mapping tables from the NLM. Unfortunately, this was complicated by the significant differences between US and Canadian version of ICD-9 and ICD-10 but it did provide start content for manual mapping. HIM professionals from the Northern Health Authority were recruited to edit the mapping. It was quickly apparent that mapping to CED-DxS would have to be done entirely manually. The end-product of the HIM mapping was edited thoroughly by 2 physicians experienced with clinical terminologies and classifications. The mapping was iteratively submitted to the Canadian Institute of Health Information for feedback which was primarily directed towards the challenges of CED-DxS mapping as well as ensuring that mapping was entirely in reference to the Canadian versions of ICD-9 and 10. A number of issues of mapping to age and gender specific concepts were identified and fixed.

Prototype

An EMR vendor which is prominent in the northern part of the province incorporated the subset in their product in a graduated fashion by supporting preferences of code system by various roles. As per our implementation guide, users were able to escape from the reference set to the full complement of SNOMED diagnosis and findings terms.
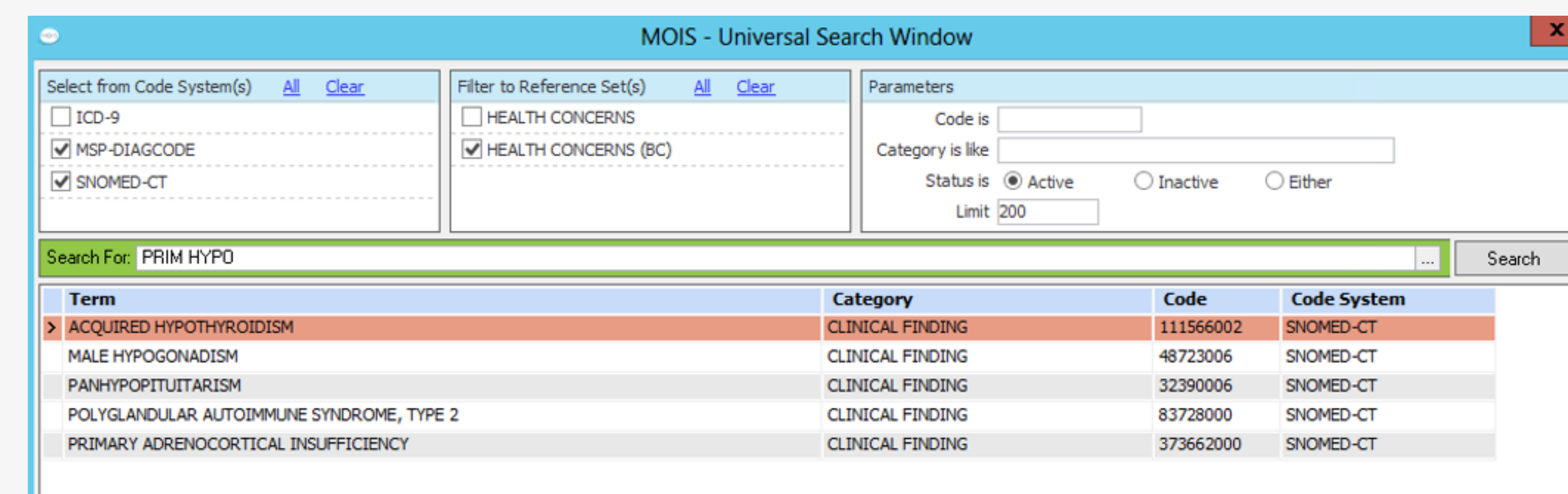

Figure 2: Searching for term in EMR using word fragments in any order and returning preferred terms including that of synonyms containing the strings

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RESULTS

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Concepts

The subset currently contains 5384 concepts that are mapped to ICD-9, ICD-10 and CeDx. A review of the final product to date by CIHI found only one ICD-9 code block that was not represented (Late effects of injuries, poisonings, toxic effects and other external causes). Twenty-seven ICD-9 code blocks had less than 10 terms and 9 code blocks had more than 100 terms.

The concept coverage is broad and granular enough to support most parts of the record where a coded element for findings or diagnosis are required e.g. the problem list, encounter diagnosis, indication for a drug or procedure and reason for referral.
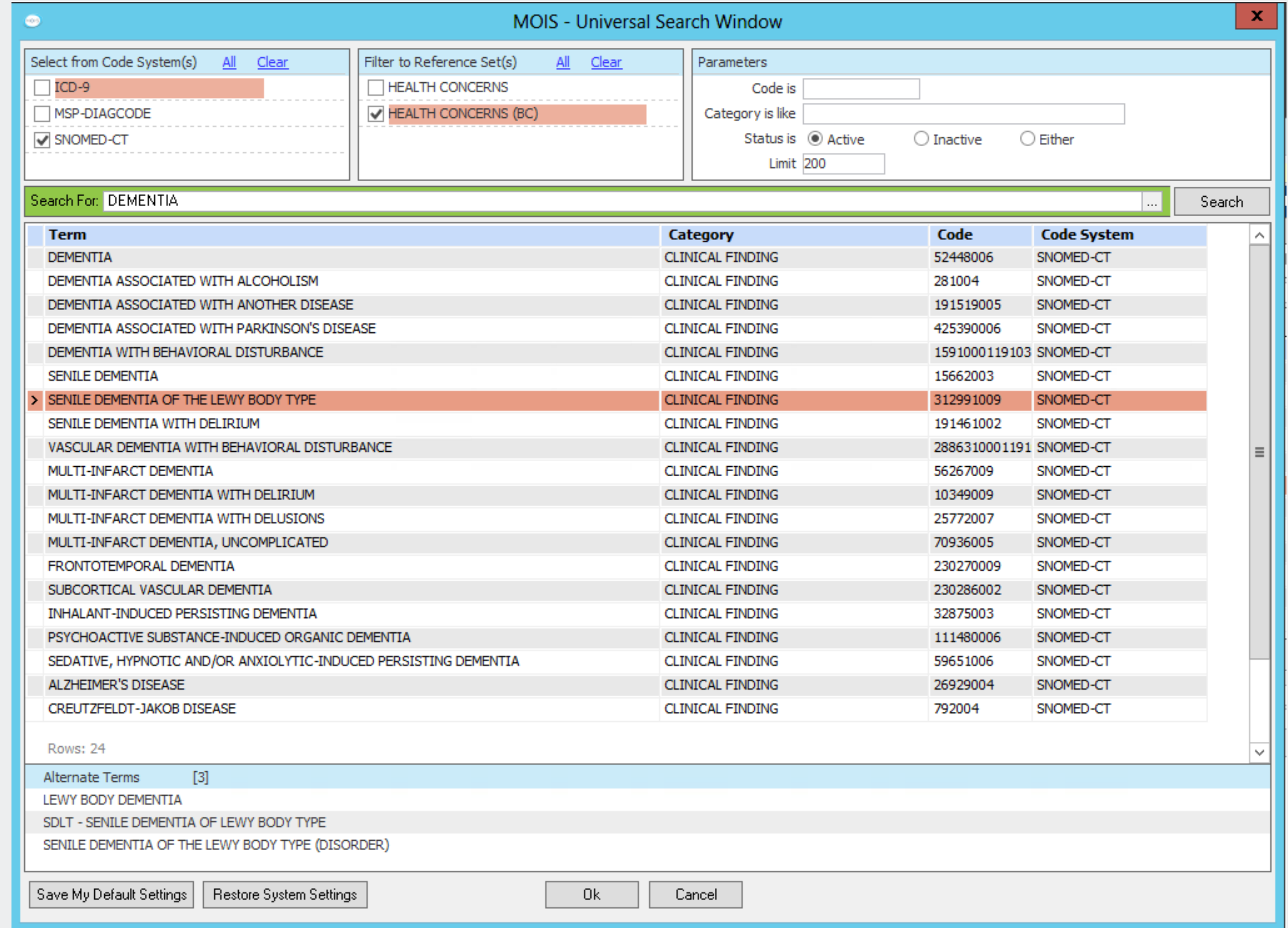

Figure 3: Considerable granularity for common concepts given the relatively small total number. Note alternate term detail at bottom which is functionality recommended in the implementation guide.

Evaluation

Feedback from clinicians using SNOMED terms was very positive as they found it much easier to get to the concept that they wanted to express. Medical Office Assistants on the other hand, were initially not so positive as it disrupted their use of a memorized subset of ICD-9 codes gleaned over years of billing. For them, using SNOMED required invoking a lookup instead of direct entry of the memorized codes. On the positive side, switching to SNOMED-CT would decrease the heavy reliance on "General symptoms" codes and therefore result in more usable data. Subset use across practices is variable but increasingly, SNOMED-CT coded entries are appearing in the problem list as well as encounter diagnosis documentation.

The quality of problem list management can be monitored by the Health Data Coalition measures viewable through HDC Discover[5]. Currently, physician governed HDC primary care measures cover nearly a million of BC's citizens through a distributed approach to aggregation. Measures are available for monitoring the net effect of coding and usability interventions for EMR elements like health concerns, medications and adverse reaction risk.
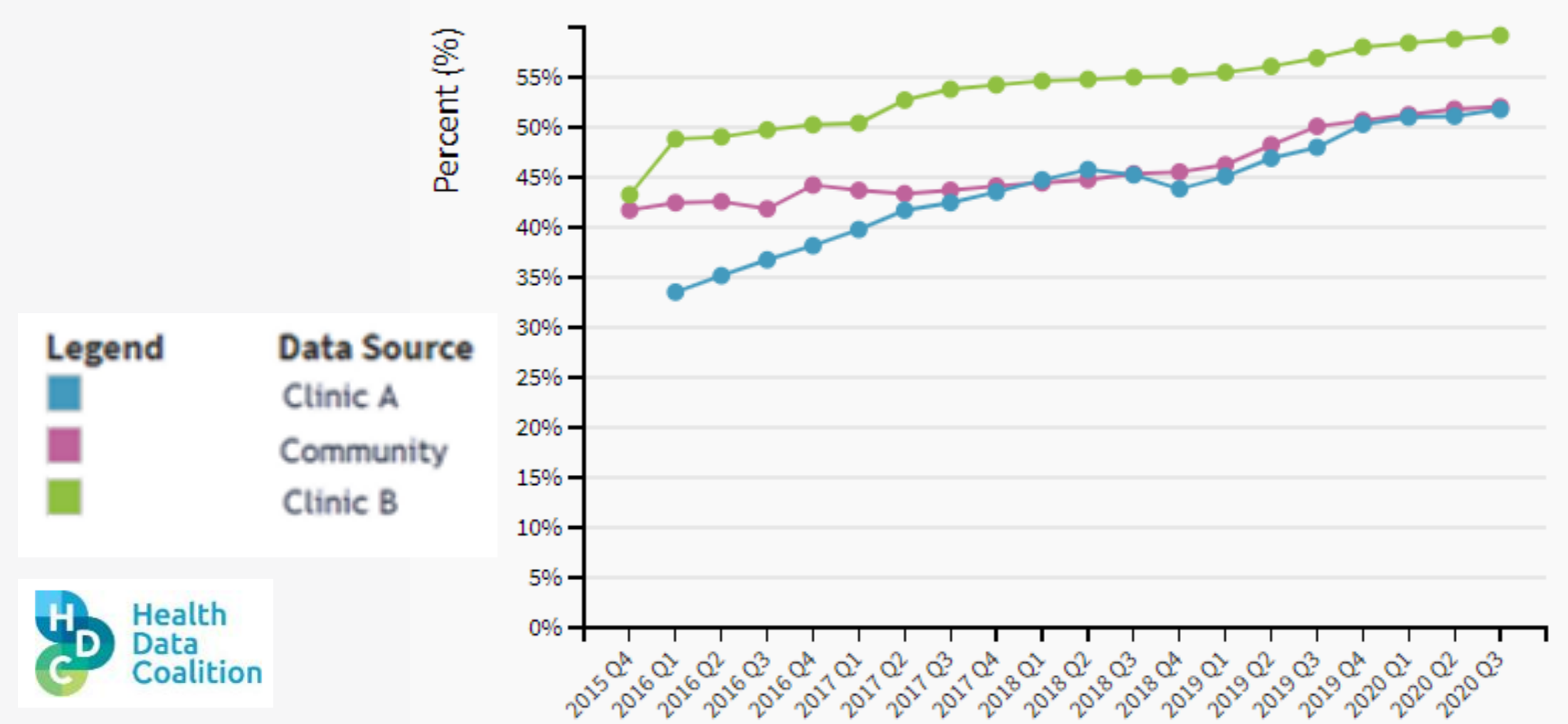

Figure 4: Ratio of coded health conditions over total number of health conditions for patients seen in the last 3 years – HDC Discover.

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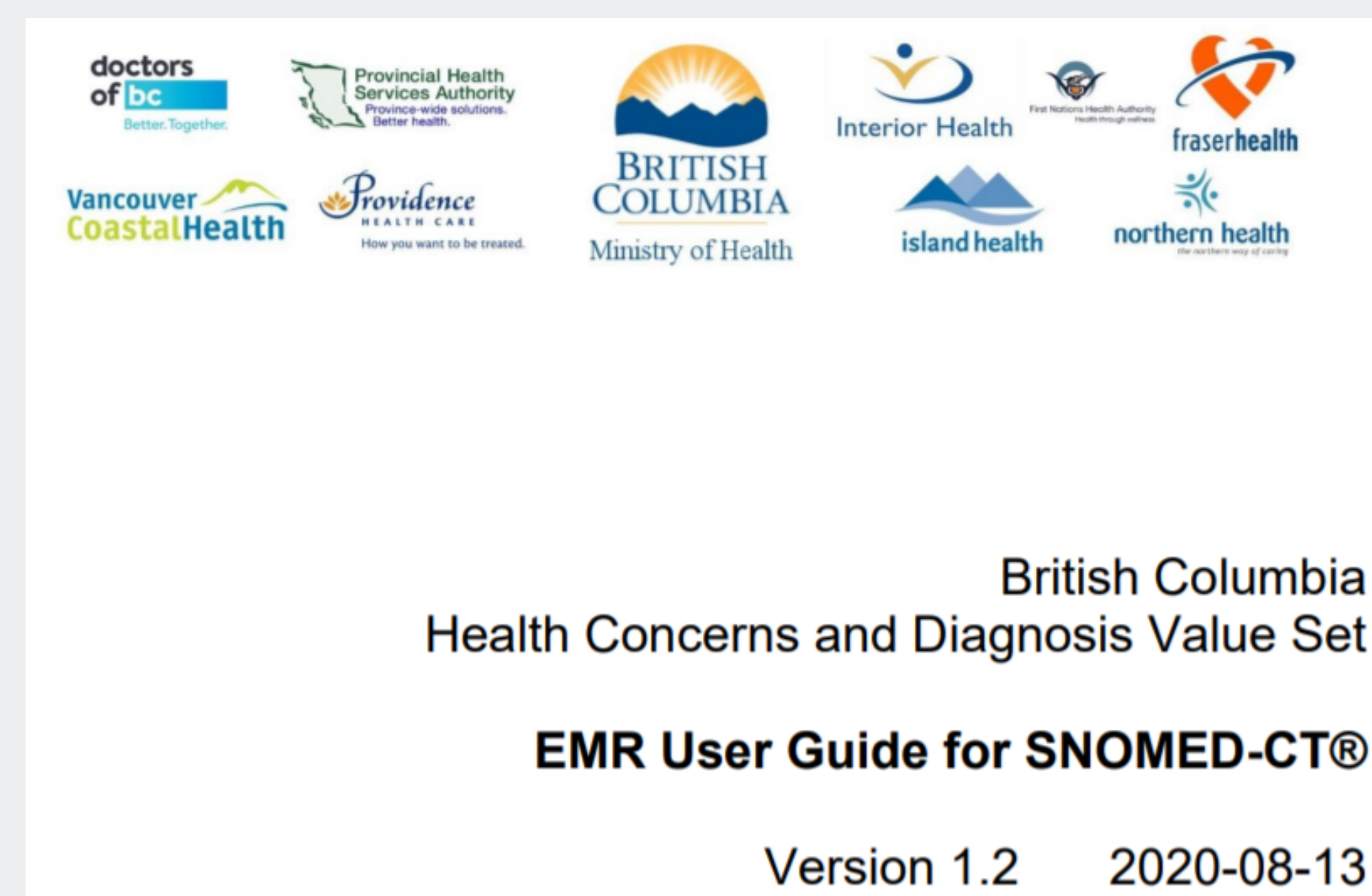William L Clifford, OBC, MD, FCFP | Ray Simkus, MD

DISCUSSION

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Conclusions

Despite having many sources to inform start content of this subset, it took an unexpected amount of time and effort to produce a releasable product. It is challenging to find the sweet spot between minimizing need to escape to the full SNOMED findings and diagnosis content while also constraining the list to a manageable size for mapping and good user experience. Mapping was difficult especially to a small reference set like CED-DxS and an old classification like ICD-9. Further complications included the need to limit pre-coordination while also not including concepts that are too general for mapping (e.g. the age and gender specific concepts). In the end, we feel that this subset meets our original goals and only time will tell if it achieves broad adoption.

Implementation success is hugely dependent on good EMR implementation – hence the value of the implementation guide[6].

British Columbia
Health Concerns and Diagnosis Value Set

EMR User Guide for SNOMED-CT®

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Next Steps

- Provide a way to request the subset via the MOH Health Information Standards website
- Publish the implementation guide on the MOH standards website
- Continue vendor engagement and provide implementation assistance as needed
- Monitor usage and provide a mechanism to receive feedback and requests for content
- Maintain the content – keep up with SNOMED-CT content changes and actively participate in the evolution of SNOMED-CT concept based on what we learn from user and health system experience
- Utilize terminology server functionality to manage changes and publishing

References

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