

PMRI Terminology

VA Comments for Testimony to the NCVHS Subcommittee on Standards and Security

August 28, 2002

VA now has a nearly complete electronic medical record featuring clinician data entry of virtually all notes, orders, problems, and other clinical data. The VA's electronic medical record requires good terminology support now and into the future. VA believes that information systems' essential value comes from data, not programs. Thus, the VA is committed to data standardization in order to improve patient care and safety and to maximize the potential of our information systems. VA believes collaborative efforts between federal, private, and academic partners will be the most effective solution to data standardization.

The VA wishes to give information to the NCVHS Subcommittee on Standards and Security on August 28, 2002 to:

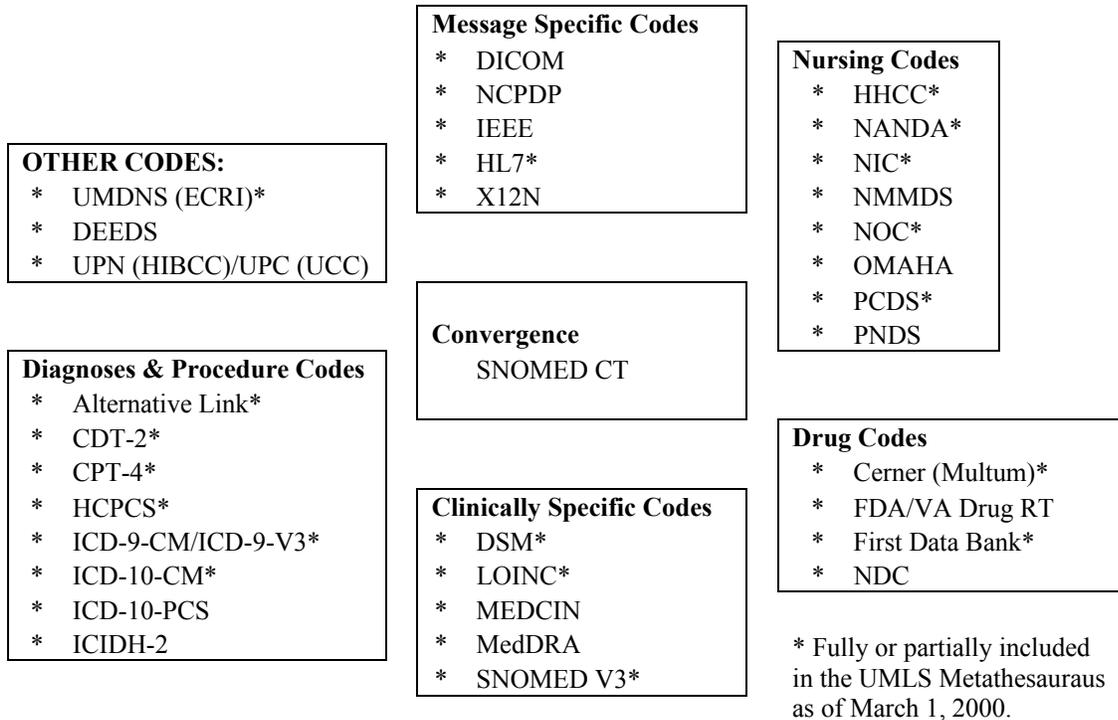
- (1) define the scope of Patient Medical Record Information (PMRI) terminologies
- (2) determine the criteria for selection of PMRI terminologies.

VA has already spent substantial time on these two tasks as part of the VA collaboration in the Federal Health Information Exchange/Government Computerized Patient Record (FHIE/GCPR). Other work has focused on the terminology needed to enable the VA's Health Data Repository effort, Health-e-People, and the Consolidated Health Informatics (CHI) initiative.

SCOPE OF PMRI TERMINOLOGIES

We have carefully analyzed the graphic below of PMRI terminologies delivered to the Secretary of HHS in August 2000. We feel that the current organization of the subsets is quite variable. For example, the drug subset is very consistent, consisting of similar, drug-related codes. However, the "clinically specific codes" are less consistent, ranging from MeDRA, a coding system used to report adverse drug events, to DSM, a terminology for psychiatric diagnoses, to SNOMED, a terminology that covers broad medical domains. Perhaps a domain orientation (e.g., pharmacy terms, laboratory terms, diagnosis coding terms, history and physical exam terms) would be a better schema. We were also concerned about the so-called "Convergence" subset. VA feels that one terminology (whether proprietary or not) is unlikely to serve all needs. Convergence is more likely to occur as a series of interlocking terminologies with complimentary content are adopted. These terminologies, as suggested by Chute and Campbell, should share formal foundations and have well defined boundaries.

Parenthetically, the term for VA's new drug vocabulary, called "FDA/VA Drug RT" below should probably now be called "VA NDF-RT/NLM RxNorm"



With regards to findings a better way to organize the subsets, VA has carefully considered the suggested breakdown proposed by the Consolidated Health Informatics initiative. The initial (non-inclusive) breakdown currently includes:

1. Laboratory Data
2. Medications
3. Population Health & Reporting
4. Text-based Reports
5. Immunizations
6. History & Physical Exam
7. Problem Lists
8. Procedures
9. Imaging
10. Nursing

This breakdown is more consistent with the domain focus we prefer. VA also realizes that there are VA-specific codes, such as eligibility and military periods of service, which VA needs. To meet these needs, VA and Department of Defense (DoD) have standards that could be integrated as part of the proposed interlocking set of complimentary terminologies. VA also feels that the currently existing terminology standards for some areas are not mature, particularly history, review of systems, family history, social history, and physical exam. These are not addressed on the CHI list in great detail. Other possible areas of deficiency include codes and terms dealing with end of life and medical-legal issues such as Do Not Resuscitate, emergency contact information, relationships of kin to patients, and advanced directives. Another area VA requires

codes for is Veterans Benefits Administration disability codes. VA recommends that resources be devoted to develop these code sets as needed.

Another area where VA needs better terminology to support its Clinical Procedures package and other functions is specialty medical care. A list of the clinical areas needing support follows:

1. Pulmonary (American Thoracic Society and other efforts)
2. Cardiology (American College of Cardiology efforts)
3. Gastrointestinal
4. Incidents of Care (Inpatient, Outpatient, & Special Programs)
5. Nutritional Status
6. Procedures results (e.g. coded entity for left ventricular end-diastolic volume)
7. Chief Complaint
8. History of Present Illness
9. Measurements
10. Social History
11. Progress Notes and other coded document titles
12. Messages (Crisis Notes, Warnings, and Allergies)
13. Problem List (vs. a simple diagnosis list)
14. Treatment Plan
15. Discharge Plan & Outcome
16. Patient Education
17. Preventive Medicine
18. Prosthetic History
19. Review of Systems
20. Consultations

The more exhaustive lists of domain-centered terminology areas above indicate and support the need for convergence as defined by complimentary, interlocking sets of terminologies with formal structures and well-defined boundaries, as proposed by the Computerized Patient Record Institute (CPRI).

The PMRI terminologies that should receive the highest priority in VA include interlocking terminology sets relating to the domains of medications, laboratory tests, the orderable items for meds and labs, problem list, and a few, smaller, targeted vocabulary sets that are critical for our VA Electronic Medical Record. For example, DNR/DNI and advanced directives are a small domain but critically useful in emergency solutions and in cases of severe illness. Thus they have a high impact for patient safety and satisfaction in VA. We have prioritized these areas because they provide a foundation for the most important clinical coded information required in the EMR. These areas also have a direct impact on patient safety and provide key information for decision support. In addition to an immediate need for such coded data in VA, the domains are also achievable because there are good existing/evolving standards in many of these areas. We consider areas of free text to be low priority as they are too difficult to address within a reasonable amount of time.

CRITERIA FOR SELECTION OF PMRI TERMINOLOGIES

The VA has identified several criteria for selecting PMRI terminologies. These include:

1. Timely update process
2. Relatively inexpensive to acquire and maintain
3. Terminology services should be centralized and standardized
4. Flexibility to adapt to changes processes and technologies
5. Relative vendor independence; address intellectual property issues forthrightly
6. Meets the informational and computational needs for a healthcare terminology

The first criterion, a timely update process that is responsive to field requests, allows terminologies to be updated in a timely manner. Without timely maintenance field sites proliferate local variations on terminologies and standardization is threatened. The second, that terminologies should be relatively inexpensive to acquire and implement, makes coded terminologies more attractive compared to the cheaper but less tractable alternatives, ASCII text (or even scanned text). In one sense, inexpensive means that the terminologies provide relatively high value to important clinical and business processes, such as decision support. Ideally, this cost is less than or equal to alternatives, or if higher provides better clinical value or less encumbrance with intellectual property issues. VA's third criterion is that terminology services acquired for an EMR should be centralized and standardized in order to reduce maintenance costs and increase the quality of terms available to the field. We favor and currently use commercial terminology development tools and existing terminologies wherever appropriate.

Our fourth criterion is that terminologies should allow flexible adaptation to changing clinical processes and technologies. We are developing an Enterprise Reference Terminology (ERT) within VA to provide robust and rapidly responsible maintenance, with a target of a one-day turn around for new terms. An ERT also leverages recent advances in terminology tools and architectures to deliver comparable, computable data to the enterprise. ERT is becoming a VA anchor point for our Health Data Repository development as well as for other government terminology efforts such as those at Federal Health Information Exchange (FHIE, formerly known as GCPR), Health-e-People, and other partners. As part of the ERT effort, VA strongly favors collaboration with government, academic, and industry partners to advance standards.

Independence from specific vendors and technologies, wherever possible, is our fifth criterion. When adopting a vendor terminology, VA has tried to insure that there is export logic available. The situation is analogous to a software source code "escrow agreement". Ideally the export logic will support a common interchange format such as XML. VA likes terminologies such as LOINC that retain copyright (thus preventing fragmentation into competing standards) while providing an open source license. In general, the intellectual property issues that encumber terminology need to be addressed openly. If terminologies make use of a common underlying representation, and an escrow agreement or export logic is available, then patient data is not threatened when software terminology vendors inevitably evolve.

Our sixth criterion is that we recommend that terminologies selected meet the informational and computational needs for healthcare terminologies. The terminology should have a clearly defined purpose and scope, so that it fits into an interlocking set of complimentary terminologies

required for convergence. It should be comprehensive relative to its scope, and support both pre-coordinated terms and post-coordinated term formation. Terminologies selected should adhere to terminology “best practice” standards supported by groups such as HL7 and elaborated in publications such as Cimino’s “Desiderata”. Such terminologies must be concept-oriented, meaning (in part) that each surface form should have a unique meaning, and that by definition there is one meaning per concept. Also, this means that each concept should have formal and systematic definitions that are precise, unambiguous, and computable. Relationships between the concepts should be explicitly defined, internally consistent, and non-redundant.

In addition to these six criteria, we at VA have a strong business need to support interoperation among multiple terminologies. For example, a physician may choose a MeSH code from our Lexicon Utility to indicate that a patient has a reason for encounter, “Mitral Valve Prolapse”. However, this must be mapped to ICD-9 CM code “Mitral Valve Diseases, Other” to generate a bill for the encounter. There has been initial research into mapping broader clinical reference terminologies (for example, see MD Comput 1990 Mar-Apr;7(2):104-9 MD Comput 1990 Jul-Aug;7(4):268 - Automated translation between medical terminologies using semantic definitions, Cimino JJ, Barnett GO. This article addressed almost exactly example we have just given, namely the mapping of MeSH cardiovascular elements to ICD-9).

VA also strongly supports ab initio maintenance of all clinical terminologies. We believe that updates and modifications must be referable to consistent version identifiers (e.g., to be compliant with the Health Improvement Practice and Portability Act). As a result of our commitment to good maintenance, we also recommend that concept term identifiers must not be re-used when a term is obsolete or superseded, and that superseded concepts be marked. We also prefer that the terms not be represented with digits or attributes that create unnecessary limitations. Again, we strongly support implementation of the “Desiderata” and other standards (e.g., ASTM 2087) because they make maintenance tractable.

VA recommends any potential additions to the PMRI terminologies possess semantic models that are explicit and capable of formal representation. The PRMI should judge additions by best terminology practices as promulgated by government, academic, industry, and standards organizations. Potential additions to or deletions from PMRI terminologies should never put patient data “at risk”. Therefore, the ability to use non-proprietary export and import formats should be supported by any terminologies adopted as part of the PMRI. All terminologies adopted in the future should explicitly address intellectual property and copyright issues. VA prefers open source terminologies when appropriate, or otherwise proprietary terminologies that are harmonized with open standards.

We do not recommend modifying the criteria we have proposed in this document according to terminology “subset” or domain. All terminologies should support certain basic functional criteria in order to insure that they are tractable in the Electronic Medical Record. It is not necessary for terminology developers to be ANSI accredited, in our opinion. For example, LOINC is balloted with HL7, and HL7 is ANSI accredited. Therefore the “umbrella” of ANSI extends to LOINC without requiring the LONC committee members or developers to be individually accredited. In a similar fashion, ANSI falls under the ISO umbrella. VA strongly favors that all terminology standards be developed through a process of open meetings.

In summary, VA's Electronic Medical Record is essentially complete, featuring clinician-centered data entry. As a result, it requires good terminology support, and VA has extensively studied terminologies as part of its Health-e-People, EMR, FHIE, GCPR, CHI, and related activities. We have relatively well formed opinions about terminologies and we are putting them into effect as part of our Enterprise Reference Terminology strategy. We strongly favor collaboration with other partners in government (e.g., FDA, NLM, CDC), academia (e.g., Regenstrief), and private industry to advance terminology standards. We emphatically support a strategy of interlocking terminology standards with complimentary content. If the component terminologies share formal foundations and have well defined boundaries, then a suite of components can be assembled to serve any organization's clinical terminology needs.