

Standardized Terminologies for Data Interoperability in Health Information Exchange

Parent(s):
(Select a parent to make it the "Current Concept")
Viral upper respiratory tract infection (disorder)

Current Concept:
Common cold (disorder)

Child(ren):
(N=0) (Select a child to make it the "Current Concept")

Heart Disease Hierarchy:

```
graph TD
    HD[Heart Disease] --> MD[Myocardial disorder]
    HD --> HVD[Heart valve disorder]
    HD --> CAD[Coronary artery disease]
    HVD --> AVD[Aortic valve disorder]
    HVD --> MVD[Mitral valve disorder]
    AVD --> AR[Aortic regurgitation]
    AVD --> AS[Aortic stenosis]
```

Current Concept:

Defining Relationships:

Qualifiers:

Descriptions (Synonyms):

| Members count | Mapping | Mapping status | Correlation ID |
|---------------|-----------------------|----------------|----------------------|
| 1 | code | Not accepted | Exact match map hour |
| 2 | code | Not accepted | Exact match map hour |
| 3 | Physiological process | Not accepted | Exact match map hour |
| 4 | Disorder of ear | Not accepted | Exact match map hour |
| 5 | Systemic condition | Not accepted | Exact match map hour |
| 6 | Systemic condition | Not accepted | Exact match map hour |
| 7 | Systemic condition | Not accepted | Exact match map hour |
| 8 | Systemic condition | Not accepted | Exact match map hour |
| 9 | Systemic condition | Not accepted | Exact match map hour |
| 10 | Systemic condition | Not accepted | Exact match map hour |
| 11 | Systemic condition | Not accepted | Exact match map hour |
| 12 | Systemic condition | Not accepted | Exact match map hour |
| 13 | Systemic condition | Not accepted | Exact match map hour |
| 14 | Systemic condition | Not accepted | Exact match map hour |
| 15 | Systemic condition | Not accepted | Exact match map hour |
| 16 | Systemic condition | Not accepted | Exact match map hour |
| 17 | Systemic condition | Not accepted | Exact match map hour |

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EXECUTIVE SUMMARY

Accessible and shareable health information is an accepted prerequisite of good healthcare¹. Sharable health information requires a structured, concept-oriented approach achieved by standardized clinical terminologies. Standardized reference terminologies are essential to the knowledge-based healthcare environment. The value of standardized healthcare terminologies is the ability to collect, document and process comparable healthcare data concepts. This allows insight into the healthcare and services required to achieve optimal patient health outcomes. The use of standardized terminologies strengthens clinical decision making as data congruency increases the usefulness and reliability of the data and increases the value to business owners and clinicians. Congruent, consistent, accurate and interoperable data is fundamental to the process to improve U.S. healthcare quality and population health outcomes. An accurate representation of a patient's clinical status through standardized terminologies provides consistent information flows. A recommendation to the Office of the National Coordinator for Health Information Technology (ONC) Interoperability Standards Advisory is to recognize a standardized nursing terminology. The Clinical Care Classification (CCC) System, nursing terminology, was developed with federal funding in 1990-1992. The value of standardized terminologies in interoperability includes consistent data for strategic Clinical Decision Support (CDS) and research thus providing a return on investment from data consistency and usability in the documentation of healthcare outcomes. Standardized terminologies allow the rapid retrieval of internationally unambiguous information and collection of comparable data to assess the quality of healthcare and services and provide standardized data with which to assess the efficacy of treatment models.

PROBLEM STATEMENT



The United States ranks highest in healthcare spending per capita as measured by the Gross Domestic Product (GDP). Currently, the U.S. healthcare system does not reflect a correlation of population health outcomes in proportion to spending². Data may be sent between providers, but if the coded data is not understandable, the exchange is in vain.

The problem is that different EHR vendor systems code data for file storage in different ways. For example, one vendor might code the patient blood type of O+ as a number, 4346, while another EHR system might store the same blood type as 0023737. When data entry is done by a user in hospital A, choices selected from drop down boxes are coded before being stored in the patient's record. When another user at hospital A displays the data, the look up tables translate the codes back to English text for display on their monitor.

These vendors made substantial investments in building their own detailed proprietary clinical terminologies. The decisions of how to code the data were made long before interoperability was a requirement. A problem arises when the data is sent outside this EHR system to hospital B. The original lookup table is not in this second EHR system at hospital B, so display of the coded data item stored as 4346 is not possible. There is no

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value 4346 for blood type found in hospital B's lookup table. It does not know the proper code for hospital B is 0023737. Standard reference terminologies give us one internationally agreed upon code for a "O+" blood type.

Given the need to exchange data with not just one but hundreds of healthcare providers, standardized terminologies are used to establish consistency in how health data concepts, e.g. blood type, are coded so data can be exchanged among multiple organizations using HL7 data standards. This creates meaningful and actionable healthcare data for patient safety and improved outcomes. The purpose of standardizing terminologies is to reduce unstructured, inconsistently coded health information, so clinical data exchanged between multiple health information exchange networks and healthcare providers is meaningful and usable. The availability of accurate and accessible health information benefits the provider, patient and healthcare organization at the point of service in delivering appropriate healthcare services based on consistent data for improved healthcare outcomes.



Standard terminologies are essential in the accurate communication of data in Health Information Exchanges and to healthcare interoperability specifications. The HHS Office of the National Coordinator for Health Information Technology (ONC) recognizes standardized terminologies as a vital requirement in establishing quality conformance measures to achieve comparable health data across diverse health information systems. Standardized terminologies normalize health communication with accessible, available, consistent, congruent, unambiguous understanding of a patient's current and past medical history and care. The availability of accurate interdisciplinary patient care communication for clinical decision making for healthcare services depends on the representation of health data using standardized terms³.

PURPOSE

The purpose of this White Paper is to discuss the value of standardized terminologies in the exchange and documentation of health information from the viewpoints of the clinician, patient and healthcare organization.

BACKGROUND

Clinicians and healthcare professionals plan, collect, store, retrieve, and communicate healthcare data⁴. An important role of standardized terminologies is to effectively manage the structured data concepts underlying all aspects of health care delivery. Standardized terminologies are comprised of formal structured data sets of clinical concepts crucial to evaluating healthcare quality across diverse health information systems and care settings. The use of standardized terminologies in clinical decision making promotes evidence-based practice and strengthens clinical information systems as the terminologies increase the congruency between technology, business processes and management. Standardized terminologies can also achieve a common business-focused approach through the mapping of system requirements to business processes⁵. Standardized

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terminologies support the surveillance of population health through the exchange of standardized data between and among internal and community healthcare partners. With the use of standardized terminologies, patient care interventions for prevention of illness and disease management may have greater visibility. Use of local codes may cause a reduction in accessible care information for longitudinal studies, clinical trials, and population health surveillance to advance evidence-based practice.

DISCUSSION

According to HIMSS, [interoperability](#) is the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged. Interoperability requires health information systems to work together across organizational boundaries to advance the effective delivery of healthcare for individuals and communities⁶. A common representation of data is explicit in a standardized terminologies approach. Electronic Health Records (EHRs) support the documentation of clinical practice at the point of service. Frequently EHR data is collected without the use of an information model and concepts are expressed in local code sets based on the unique clinical requirements of an organization. These local code sets result in significant non-standard variations in logical data organization, physical formats and clinical concepts for patient conditions that produce serious inconsistencies within and across health information sources. Congruent, consistent, accurate data communication is needed to evaluate healthcare quality and achieve practice-based evidence for improvements in U.S. healthcare outcomes from a wide variety of information sources. For example: the Observational Medical Outcomes Partnership (OMOP), public-private partnership between the U.S. Food and Drug Administration (FDA), Foundation for the National Institutes of Health and pharmaceutical companies, found disparate coding systems can be harmonized with minimal information loss to standardized terminology for better data outcomes⁷.

VALUE OF STANDARDIZED TERMINOLOGIES TO PHYSICIANS AND NURSES

Clinical documentation is important to every patient encounter. Standardized terminologies provide internationally accepted structured sets of data concepts to reflect the clinical scope of care and services provided to patients. The accurate representation of a patient's clinical status through the use of standardized terminologies allows for consistency in information flows and permits the accurate comparability of data underlying quality reports, claims reimbursement, public health data, and population health trending⁴. **Standard terminologies normalize the diagnostic process and establish consistency in patient data for outcomes research.** Physicians and nurses often prepare detailed clinical documentation and patient instructions. Standardized terminologies reduce the clinical workload required to describe similar patient care. With the use of standardized terminologies, there is an important relationship between data quality and documentation effort. The convergence of clinical care, documentation, and coding in standardized terminologies are essential to improving national health outcomes and enhance clinical information exchanges among all members of the healthcare team including clinicians providing clinical care and services to a patient in the future.

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Other standardized terminology value to Physicians and Nurses include: a) unambiguous interpretations of data in contrast to free text, b) shared business-focused approach to patient care delivery, c) minimal spontaneous data entry, d) access to congruent and consistent clinical care documentation; e) access to data on medical orders is less labor intensive, i.e. correlation of order patterns to healthcare resources and costs; f) standard documentation of population health outcomes measure for prediction; g) atomic data element information for each patient-provider encounter; h) increased pace of data entry at the point of service and i) supports consistent evaluation of the clinical efficacy of treatment models.

VALUE OF STANDARDIZED TERMINOLOGIES TO PATIENTS

Standardized terminologies, while establishing consistency in clinical data, also provide value for patients including: a) less unstructured text or natural language to interpret, b) enables key concept electronic health record inquiries and c) expedites knowledgebase responses to potential emergency situations d) allows for interoperability between providers and for human language translation. SNOMED concepts are coded in many human languages. Once a concept is coded, the text can be output in English, French, Spanish, Danish or Swedish, etc.

VALUE OF STANDARDIZED TERMINOLOGIES TO HEALTHCARE ORGANIZATIONS

The American Recovery and Reinvestment Act (ARRA) established incentives to stimulate investments in health information management and technology (Health IM/IT) specifically Meaningful Use (MU). In MU legislation, standardized terminology is intended to link clinical encounters together for individual patients over time (longitudinal patient data). The ONC recommended standardized terminologies to collect structured data elements at a high-level of concept granularity for population health disease surveillance, bioterrorism, and medical specificity. The hierarchical nature of international terminologies, such as [SNOMED](#), allows processing of the concepts' data above the detail level entered. The ONC established metrics and organization incentives for MU to achieve the cost, quality, and health improvement goals set forth by ARRA and advanced the national adoption of standardized terminologies by diverse clinicians, healthcare practices, and organizations⁸.

RECOMMENDATION

The collection of structured data elements at a high-level of concept granularity is a vital component of healthcare encounters. Nurses are legally responsible for a patient's care plan and documentation of a patient's progress toward planned healthcare outcomes or goals. A 2019 recommendation of this White Paper is for the inclusion of a nursing terminology standard, the [Clinical Care Classification \(CCC\) System](#), in the [ONC Interoperability Standards Advisory](#). The CCC System was developed with federal funding in 1990-1992. The CCC System terminology structure is based on J. J. Cimino's (1989) description of twelve desiderata for the design of controlled healthcare vocabulary content. An ISA nursing terminology could contribute to the knowledge-based healthcare environment and accelerate the documentation of care for healthcare outcomes research. The value of standardized nursing terminology is an ability to collect comparable healthcare data to

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assess quality in healthcare delivery and provide insight into the essential clinical resources to achieve optimal outcomes.

CONCLUSION

Standardized terminologies accelerate the interoperability of health information by establishing clinical data congruency between systems, organizations, business, and management capabilities. The value of standardized terminologies in health interoperability includes consistent data for strategic and clinical decision-making and a return on investment in data consistency for the documentation of healthcare outcomes. Standardized terminologies allow the rapid retrieval of information; collect comparable data to assess the quality of health care and services and provide standardized data with which to assess the efficacy of treatment models.

REFERENCES

1. Hardiker, N.R., Bakken, S., & Kim, T. Y. (2015). Advanced Terminological Approaches in Nursing. In V. K. Saba, & K. A. McCormick (Eds.). *Essentials of Nursing Informatics, 6th Edition*. New York, NY: McGraw-Hill Publ.
2. U.S. Department of Health and Human Services (HHS). Strategic Goal #1: Reform, Strengthen, and Modernize the Nation's Healthcare System. Available from: <https://www.hhs.gov/about/strategic-plan/strategic-goal-1/index.html>
3. Sensmeier, J. (2011). Health Data Standards: Development, Harmonization, and Interoperability. In V. K. Saba, & K. A. McCormick (Eds.). *Essentials of Nursing Informatics, 5th Edition*. New York, NY: McGraw-Hill Publ.
4. Clinical Documentation Improvement. The American Health Information Management Association (AHIMA). Available from <http://www.ahima.org/topics/cdi>
5. International Organization for Standardization. (2018). Terminology resource: Map Quality Measures: DTS 21564. Geneva, Switzerland: ISO Press.
6. Interoperability. Whittenburg, L. (Ed.) (2013). Health Information and Management Systems Society (HIMSS) Dictionary of Healthcare Information Technology Terms, Acronyms and Organizations, 3rd ed. Health Information and Management Systems Society: Chicago, IL.
7. OMOP Common Data Model, Available from <https://www.ohdsi.org/data-standardization/the-common-data-model/>
8. Markle Foundation: Achieving the health IT objectives of American Recovery and Reinvestment Act: A framework for 'Meaningful Use' and 'Certified or Qualified' EHR. Available from: <http://library.ahima.org/PdfView?oid=90884>
9. Clinical Care Classification (CCC) System. Available at <https://www.sabacare.com/about/characteristics/>
10. Cimino, JJ (1998). Desiderata for Controlled Medical Vocabularies in the Twenty-First Century. *Meth Inform Med* 1998, (37), 394-403. Available from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3415631/>
11. Cimino JJ, Hripcsak G, Johnson SB, & Clayton PD. (1989). Designing an Introspective, Multipurpose, Controlled Medical Vocabulary. In: Kingsland LC (Ed). *Proceedings of the Thirteenth Annual Symposium on Computer Applications in Medical Care*. New York: IEEE Computer Society Press, 1989: 513-8



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