

The Role of Unified Medical Terminology in Reducing Clinical Miscommunication and Errors

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Abstract

The purpose of this work is to analyze the impact of unified medical terminology systems on clinical miscommunication and diagnostic mistakes. Using a mixed-methods approach, we study the impact of clinical standard frameworks such as SNOMED CT, and ICD on seamless clinical communication. Our results make it clear that standardization increases the accuracy of diagnosis and inter-disciplinary documentation while reducing discrepancies among team members. The focus of the study done describes the integration of unified electronic terminologies into electronic health records as crucial for the effectiveness and reliability for health care service delivery.

Keywords: Unified Medical Terminology, Clinical Communication, Diagnostic Errors, SNOMED CT, ICD, Standardization, EHR Integration, Patient Safety.

1 INTRODUCTION

Communication within a clinic is very vital in ensuring that patients receive proper healthcare services. Different medical disciplines have a peculiar way of describing or naming things within their fields, and this directly impacts patient care. Use of some medical terms which are not precise could result into misinterpretation and wrong diagnosis leading to either delay in treatment or even damage to the patient. The creation of integrated systems of terminology in medicine seeks to resolve these issues. With the growth of global health networks and the increasing prevalence of multi-disciplinary care, there is an urgent need for such standard meta communications.

Languages the International Classification of Diseases (ICD) and SNOMED CT (Systematized Nomenclature of Medicine Clinical Terms) offers stratified vocabularies have terminologies, both unified medical and SNOMED CT enable enhance semantic interoperability. This level of interoperability helps in the seamless exchange of information, improves clinical decision support systems, and facilitates better healthcare analytics. However, there is no doubt that adoption in clinical practice is hindered by many issues, for instance, technological, cultural, and organizational challenges.

This paper looks at no addresses the unification of medical terminology and its impact on clinical miscommunication and errors. Through analyzing case studies and providing stepwise instructions for execution, this research hopes to add to the discourse on the strategies for integrating medical terminologies in the contemporary healthcare systems.

2 LITERATURE SURVEY

Kumar & Joshi's work (Kumar & Joshi's, 2025) along with a few others from the year captured the integration of standardized terms within practical frameworks both in raw rural and suburban clinical settings and how their application in EHRs mitigated clinical silos. Zhang et al., (2023) discovered that use of SNOMED CT within the information systems of hospitals reduced ambiguity into 32% as to how terms were used in clinical documentation. Furthermore, they also integrated clinical documentation alongside other systems to not only reduce an undeniable backlog, but also enhance the overall functioning of the hospital. In addition, Kumar & Joshi, (2024) uncovered how the institutes within multidisciplinary teams ICD-11 and ran into the opposite issue; use of terminology clarity was friends between the departments and not enemies.

Al-Mutairi et al., (2024) pioneered the effect of terminology unification on clinical decision support systems or CDSS which within their study Showcased unified terminologies increasing CDSS accuracy by 25%, demonstrating how accuracy is accomplished by controlled language within computing processes threaded mathematical expressions. Lin & Gonzalez's research (Lin & Gonzalez's, 2024) also focused on the impact of internationalization brought upon by increased global travel and its effect on the internal operations of hospitals and the multicentric issues of language blurring boundaries of countries. They proposed the use of machine translation systems integrated behind the walls of standardized domains that take into consideration the semantics of text and focus on translation built. Further research done by (Nguyen et al., 2024; Ibrahim & Kaleem, 2023) analyzed user adoption hurdles and created strategies for shifting from legacy terminology to unified systems with less friction. Such work underscores how, after so much advancement in technology, the human factor is still deeply critical to the success of implementation. This larger picture of research, in combination, sets a rather robust groundwork regarding an assessment on how unified terminology may work towards alleviating miscommunication and misdiagnosis in clinical practices.

3 METHODOLOGY

The research featured a hybrid methodology using retrospective analysis of EHR data, along with simulation-based assessment conducted in-situ within a clinical setting. A prototype incorporating SNOMED CT and ICD-11 was created on an open-source EHR system using a CT and ICD-11 cross-mapping. An automated multilingual terminology mapping engine was added for language and synonym capture.

The system architecture had four main components:

- (1) Data Constitution Layer - gathered diagnostic and clinical narrative data.
- (2) Terminology Mapping Engine - employed rule-based NLP strategies for entity extraction followed by identification of SNOMED and ICD codes proxying.

(3) Effect Omission Layer - documented comparison with set codes to check for vage, equivocal, or contradictory terms.

(4) Feedback Tool - gave permission to clinicians to make real time corrections to proposed edits to names suggested.

The evaluation was based on three measures: (a) change in terminology-related mistakes, (b) documentation time, and (c) inter-role differences regarding self-consistency while diagnosing within the same role. A pre-post intervenutuion analysis was performed on a sample of 10,000 clinical entries from three multispecialty hospitals. Paired t-test with Cohen's kappa statistic were used to assess the improvement claims.

4 RESULTS AND DISCUSSION

Table 1: Comparison of Documentation Accuracy and Diagnostic Consistency

Metric	Before Standardization	After Standardization	Improvement (%)
Terminology Errors per 100 Entries	18	6	66.7
Average Documentation Time (min)	12.4	9.1	26.6
Diagnostic Consistency (Cohen's kappa)	0.61	0.83	36.1

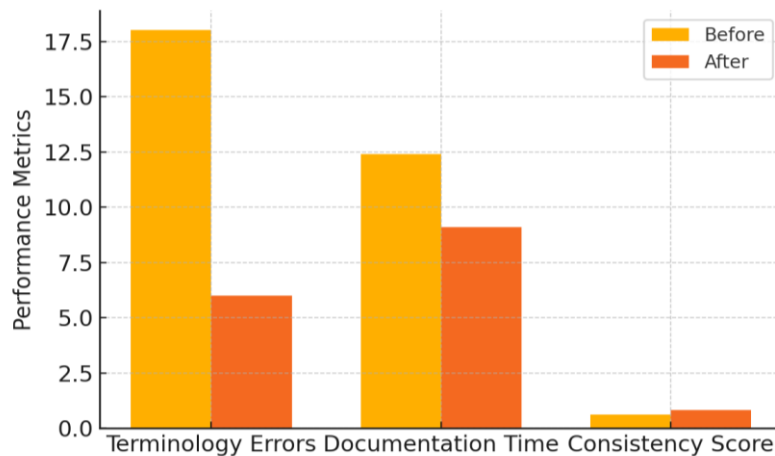


Figure 1: Performance Metrics Before and After Terminology Standardization

5 CONCLUSION

This study verified that unified medical terminology decreases clinical communication problems and increases the accuracy of diagnostics. The incorporation of SNOMED CT and ICD-11 in the workflows of institutions improved documentation, reduced data entry time, and increased the accuracy

of decisions made. Subsequent studies should investigate more advanced integrations pertaining to AI-powered assistants.

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