Mapping Standardized Nursing Statements to OMOP Common Data Model

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Background

- Standardized nursing statements are widely used in tertiary hospitals in Korea to improve the quality and efficiency of nursing documentation. However, creating and maintaining these statements is costly and time-consuming.
- A prior study developed a method for automatic generation of standardized nursing statements using International Classification for Nursing Practice (ICNP) compositional logic, followed by LLM-based validation of statement appropriateness.
- To support large-scale clinical research and enable integration of nursing data into health systems, this study examined the feasibility of mapping these auto-generated nursing statements into the OMOP Common Data Model (CDM).

Methods

Data: 100 valid standardized nursing statements from the previous study (Table 1).

Table 1. Standardized nursing statement examples.

Nursing Judgement (40)	Nursing Action (60)
Cough is severe	Clamping drainage tube
Airway clearance is effective	Applying oxygen mask
Vital signs is normal	Coaching breathing technique
Postnasal drip is improved	Suctioning endo-tracheal tube

Mapping approach:

1. Decomposition of nursing statements into ICNP concepts.
2. Cross-mapping of ICNP concepts to SNOMED CT using the UMLS Metathesaurus.
3. Assignment of mapped concepts to appropriate OMOP CDM domains (e.g., Procedure, Observation, Condition, Drug Exposure, Device Exposure).

Feasibility assessment:

- Measured the proportion of ICNP-based statements successfully mapped to OMOP CDM.
- Identified mapping challenges, including lexical transformation and Post-coordination requirements for complex nursing concepts.

Results

- Most nursing action mapped to ***Procedure_Occurrence***, while nursing judgements primarily mapped to ***Condition_Occurrence*** or ***Observation*** (Table 2).

Table 2. Distribution of Nursing Statements Mapped to OMOP CDM Domains.

Mapped OMAP CDM Table	Nursing Statement Types	
	Nursing Judgement	Nursing Action
Condition_Occurrence	34/34 (100%)	-
Device_Exposure	-	3/3 (100%)
Drug_Exposure	-	1/1 (100%)
Observation	6/6 (100%)	3/3 (100%)
Procedure_Occurrence	-	53/53 (100%)
Total	40/40 (100%)	60/60 (100%)

Key Findings:

- Nursing Judgements → mainly ***Condition_Occurrence***
- Measurement/outcome-based judgements → ***Observation***
- Nursing action → predominantly ***Procedure_Occurrence***
- Device and medication actions → ***Device_Exposure, Drug_Exposure***

Mapping Challenges:

- Frequent need for noun-phrase transformation (e.g., “Cough is severe” → “Severe cough”).
- Partial alignment between ICNP and SNOMED CT.
- Manual post-coordination required for complex or multi-component concepts.

Discussion & Conclusions

- Standardized nursing statements generated using ICNP and LLMs can be mapped to the OMOP CDM via SNOMED CT.
- Assigning statements to appropriate OMOP domains preserves key clinical details, including medication and device information.
- Although some manual post-coordination is still required, the approach provides a practical pathway for integrating nursing documentation into OMOP-based clinical data warehouses to support scalable nursing research.

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