

Structuring Clinical Decision Support Log: Beyond Deploying Prediction Model

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Background

- Adverse drug events (ADE) were recognized the major source of harm.
- Clinical decision support system (CDSS) combined with computerized provider order entry had introduced to prevent it.
- However, there has been reports that CDSS malfunction which resulted in patient harm.
- CDS should be monitored, and CDM could be aid this objectives.

Objectives

- Designing a table that store the log of a CDSS
- Introduce a prototype dashboard for visualizing CDSS alert log

Methods

- Extract and review the CDSS alert log data which were applied to tertiary academic hospital in Seoul, South Korea.
- We cannot map the sufficient information from log data into DEVICE_OCCURANCE table, even if this table provides alert related vocabulary.
- We proposed CDS_EXPOSURE table which is related to existing CDM structure: PERSON; DEVICE_EXPOSURE; DRUG_EXPOSURE; VISIT_OCCURANCE, and PROVIDER tables.
- We also designed CDS alert log analytic tool using these tables.
- The demo application developed an open source software R, and shiny.

Results

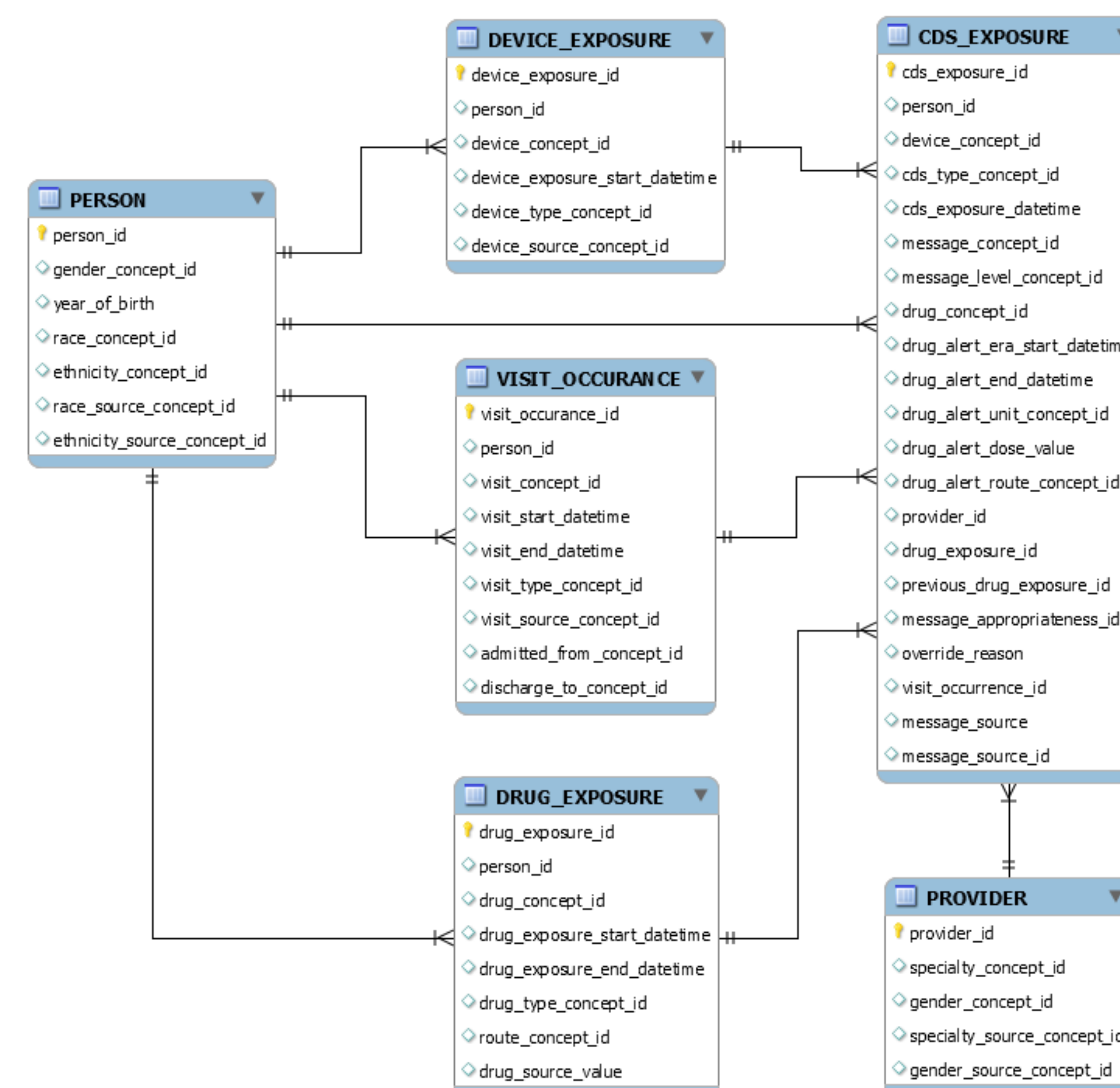


Figure 1. Entity-Relationship diagram for CDS_EXPOSURE table



Figure 2. The prototype dashboard for alert monitoring system based on CDS_EXPOSURE table

- Successfully mapped the commercial and national CPOE system log to the CDS_EXPOSURE table. (Figure 1, Table 1)
- We also developed an interactive dashboard to provide at-a-glance view of the alert log. (Figure 2)

Table 1. Detailed description of CDS_EXPOSURE table

Field	Description
cds_exposure_id	Unique identifier of the table
person_id	A foreign key (PERSON)
Device_concept_id	Reflecting name of CDSS (ex. medi-span)
cds_type_concept_id	Reflecting type of CDSS (ex. Alert, reminder)
cds_exposure_date_time	CDSS log storing date time
override_concept_id	Regarding whether provider accept the alert
override_reason	Reason for ignoring alert
message_concept_id	Reflecting message of CDSS (ex. route, drug-drug-interaction, high dosage)
message_level_concept_id	Reflecting the severity of CDSS (ex. High, low)
drug_concept_id	A foreign key (DRUG)
drug_alert_era_start_Datetime	Drug start date time among the order component which the alert occurred
drug_alert_end_datetime	Drug end date time among the order component which the alert occurred
drug_alert_quantity	Quantity among the order component which the alert occurred
drug_alert_route_concept_id	Route among the order component which the alert occurred
visit_occurrence_id	A foreign key (VISIT_OCCURRENCE)
drug_exposure_id	A foreign key (DRUG_EXPOSURE)
previous_drug_exposure_id	A foreign key (DRUG_EXPOSURE)
provider_id	A foreign key (PROVIDER)
message_appropriateness_id	Data about the appropriateness of the alert

Conclusions

- We proposed the CDS_OCCURANCE table for storing CDS alert data and introduced the dashboard to visualize it.
- Further discussions on structuring CDS log data should be held in the OHDSI community.