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Designing Archetype Models for Each Step of Workflow in Medication

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Abstract

Medication processes are consisted with multiple steps by professionals and consumers. Physicians prescribe drugs to patient with conformance, but sometimes they were changed to other drugs.

We designed concept models to capture medication workflow process records by openEHR archetype models, and four templates were determined with each step of the medication process.

We will show the detail of clinical modeling about medication workflow in this article.

Keywords:
Medication, openEHR, concept models

Introduction

Medication has four steps (shown below) of process with complex workflow.

1. **Prescribe**: Physicians prescribe drugs to patients with instruction to take.
2. **Dispense**: Pharmacists dispense drugs to patients or professionals by the instruction on prescription with packaging. Drugs might be altered to generics of original or others for some reason, such as allergy or shortage of drugs.
3. **Deliver**: If drugs should be delivered by professional in case of injection or other, dispensed drug are delivered by nurses, or other professionals with instruction by the physicians or pharmacists
4. **Consume**: Patients consume drugs by the instruction on the prescription in general, but sometimes abandoned or changed.

We have developed nation-wide Electronic Health Record (EHR) system based on ISO 13606/openEHR archetype technology to capture health related data from care providers [1; 2]. More than 30 hospitals were connected, and two groups of pharmacies will be connected in 2019. At first, we designed a single openEHR template to capture prescription information, but we found dispense information in pharmacies should be designed separately to involve tasks of pharmacies.

And the next, delivery and consumption were identified as other concepts.

In this article, we describe the concept models for the medication process.

Methods

We figured each concept model, prescribe, dispense, deliver, and consume by Mindmap with existing form of items by XMind8 [3] (Figure 1). 16 concept models were identified and compared with openEHR Clinical Knowledge Manager (CKM) [4].

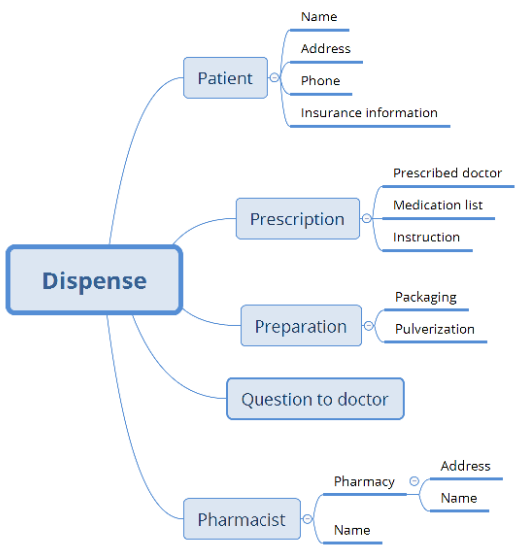

Figure1– Mindmap of drug dispense

Concept models were composed in composite archetypes to conform four openEHR templates by Ocean Template Designer [5].

Results

Table 1 shows the templates and major archetypes that conform medication steps.

Each step of process contains specific information, but existing archetypes on CKM were not well-designed for dispense, deliver, and consume. Therefore, we designed new archetypes, and specialized action-medication archetypes. Because there is specific manners for medication in Japan, specialization for prescription was also requied

Table 1– Major archetypes to construct medication workflow

Template	Archetype
Prescribe	composition-prescription
	instruction-prescription
	cluster-medication-details
Dispense	composition-dispense
	action-dispense
	cluster-packaging
Deliver	composition-delivery
	action-deliver
	cluster-deliver-details
Consume	composition-consumption
	action-consume

Discussion

We idetified clinical concepts in medication process, and designed four templates with archetype models. Prescription data were well-disigned already, but it needed specialization. Because each country or aria has each own manner of medication, universal design of archetypes could not be applicable.

Dispense, deliver, and consumption archetypes were still not well-designed, because the data were not able to capture from pharmacy and patients. However, IoT devices will be able to collect drug consumption data form patients, EHR should have concept model accoring to them.

Even though there are diversity in medication process, standardized process for medication should be desigined for the reference for each derived works.

Conclusions

We designed four steps of medication workflow. Each step required new archetypes and specialization, because existing archetypes were not well designed for dispense, deliver, and consume.

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