MEDINFO 2023 — The Future Is Accessible
J. Bichel-Findlay et al. (Eds.)

doi:10.3233/SHTI231201

Development of Clinical Decision Support System for Patient Blood Management in Hospital Information System

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Abstract. A data pipeline was developed to send and receive patient blood management (PBM) data from all medical institutions in Korea. By incorporating the collected data with national big data, the system will be able to generate key performance index for each medical institution. The central PBM system also provides feedback to each individual medical institution.

Keywords. Patient blood management, clinical decision support system, hospital information system, standard

1. Introduction

Patient blood management (PBM) permits patients who lack blood due to acute or chronic conditions to promote blood production on their own [1]. The development of standardized CDSS based on standard clinical terminology has the potential to reduce medical costs, improve patient care, and reduce errors and omissions by supporting clinicians' decision-making during the treatment process [2].

2. Methods

In this study, international standards such as data standards SNOMED-CT and LOINC and transmission standards HL7 FHIR (Health Level 7 Fast healthcare Interoperability Resources) were used to improve interoperability degradation caused by each medical institution using different hospital information system (HIS). A computerized guideline that can be used by multiple institutions has been developed by actively utilizing it. A CDSS was developed to improve compliance [3] and a pipeline was designed to transmit and receive data from the HIS of each medical institution through a standard module.

3. Results

When medical staff treat an anemic patient, the CDSS proposes an expected diagnosis based on the patient's test results and provides necessary information for customized

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prescriptions and consultations. The entire process of implementing CDSS requires following four stages: screening, initiation, activation, and evaluation. If a patient is confirmed as a candidate for PBM during the screening stage, it progresses to the initiation stage. During the initiation stage, HIS informs doctors that the patient is a PBM candidate. In order to collect PBM-related key data, HIS encourages the doctors to include necessary orders and diagnoses into the system. In the activation stage, CDSS creates a pre-defined laboratory or prescription order set that has been customized for each patient's state. Furthermore, it provides scenario-based decision support that has been customized for each case. Finally, in the evaluation stage, PBM-related data are transferred to the central PBM system. By incorporating the collected data with Big Data provided by the National Health Insurance Service, we are able to generate KPI for each medical institution. To provide effective PBM, the central PBM system also provides feedback such as the level of adherence to PBM guidelines and the patient's outcome to each individual medical institution (Figure 1).

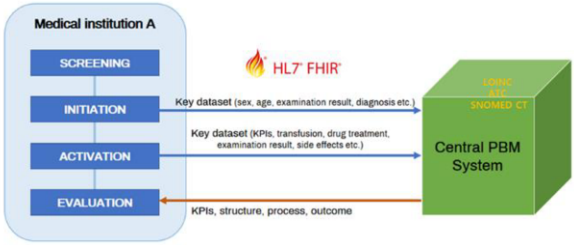

Figure 1. PBM data to central PBM system.

4. Conclusions

The study intends to provide clinical decision support system and pre-defined prescription patterns, enabling all medical institutions to easily integrate PBM.

Acknowledgements

This work was supported by supported by Ministry of Health and Welfare grant funded by the Korean government (grant number: 20223101D90-00), the Korea Health Promotion Research and Development Project funded by Ministry of Health and Welfare (grant number: HS21C0016), and the Korea Health Industry Development Institute (grant number: HI23C0955).

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