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RHEA: Real-World Observational Health Data Exploration Application

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Abstract. We developed a standardized framework named RHEA to represent longitudinal status of patient with cancer. RHEA generates a dashboard to visualize patients' data in the Observational Medical Outcomes Partnership-Common Data Model format. The generated dashboard consists of three main parts for providing the macroscopic characteristics of the patient: 1) cohort-level visualization, 2) individual-level visualization and 3) cohort generation.

Keywords. Common data model, data visualization, electronic health records

1. Introduction

For clinicians' appropriate clinical decision-making, patients' clinical data should be readily available. However, in general, patient data in electronic health records (EHRs) are fragmented and passive in nature, which makes it difficult to understand. We aim to develop a framework named REHA, a real-world observational health data exploration application, to reduce clinicians' cognitive efforts to understand patients' data and to provide insight into patients.

2. Methods

RHEA was developed using real-world data of 2.9 million patients from the Ajou University School of Medicine database, which is a tertiary hospital database in South Korea converted to Observational Medical Outcome Partnership-Common Data Model (OMOP-CDM) format. As a proof of concept study, we defined the target cohort as patients diagnosed with colorectal cancer (CRC), which is the second most deadly cancer

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worldwide [1]. We extracted key information for patients with cancer from standardized and unstructured data. The TNM stage was extracted by MEASUREMENT table of OMOP-CDM converted the cancer registry that existed separately from EHRs. We extract the chemotherapy information as regimen-level using the Tool for Regimen-level Abstraction of Chemotherapy Episode Records [2]. RHEA generates a dashboard using the R shiny that visualizes prepared patients' data as tables and graphs, consisting of three main parts: 1) cohort-level visualization, 2) individual-level visualization and 3) cohort generation.

3. Results

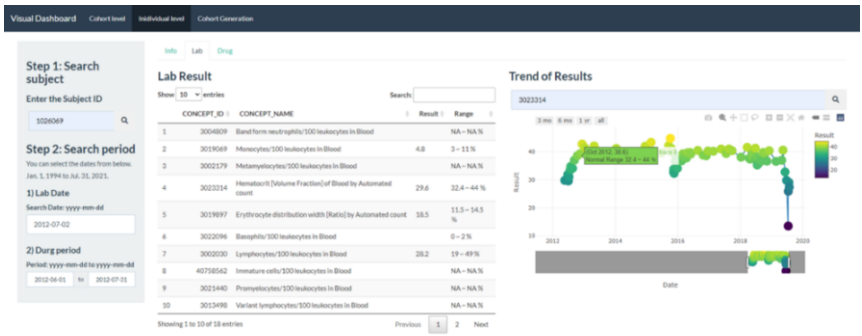

Figure 1. Snapshots of the dashboard of the individual-level page that visualize the patient' clinical data.

Total of 10,258 patients with CRC was identified. Pathology information including cancer type and gene mutation tests was driven from 16,072 pathology reports. 17,759 TNM staging was linked to the MEASUREMENT table through the combination of cancer registry. We obtained 212,327 episodes, the regimen-level chemotherapy and filled it into the EPISODE table. Through RHEA, we generated a dashboard that visualizes the macroscopic information of patients (Figure 1).

4. Conclusions

We developed a standardized framework named RHEA, which uses standardized data converted to OMOP-CDM to visualize the longitudinal status of patients with cancer. We hope this visualized information can support clinicians to monitor or analyze patients with cancer more in-depth. RHEA is going to evolve into a multimodal framework by integrating more diverse medical data.

References

[1] Xi Y, Xu P. Global colorectal cancer burden in 2020 and projections to 2040. Transl Oncol. 2021 Oct;14(10):101174, doi: 10.1016/j.tranon.2021.101174.

[2] Jeon H, You SC, Kang SY, Seo SI, Warner JL, Belenkaya R, Park RW. Characterizing the anticancer treatment trajectory and pattern in patients receiving chemotherapy for cancer using harmonized observational databases: retrospective study. JMIR Med Inform. 2021 Apr;9(4):e25035, doi: 10.2196/25035.