Doñate-Martínez A et al, 2022 The Aleph: A Multi-Purpose Clinical Decision Support Platform for Palliative Care Screening. International Journal of Integrated Care 22(S3):372 DOI: doi.org/10.5334/ijic.ICIC22372

POSTER ABSTRACT

The Aleph: A Multi-Purpose Clinical Decision Support Platform for Palliative Care Screening

22nd International Conference on Integrated Care, Odense, Denmark, 23-25 May 2022

Ascensión Doñate-Martínez[1], Vicent Blanes-Selva[2], Gordon Linklater[3], Sabina Asensio-Cuesta[2], Felipe Pereira Mesquita[4], Jorge Garcés[1], Ángel Sánchez-García[2], Juan M. García-Gómez[2]

1: Polibienestar Research Institute, University of Valencia, Spain
2: Biomedical Data Science Laboratory, Instituto Universitario de Tecnologías de la Información y Comunicaciones (ITACA), Universitat Politècnica de València
3: Highland Hospice and NHS Highland, Scotland
4: Division of Hematology and Bone Marrow Transplantation, Hospital Monte Sinai, Brazil

Introduction: A significant amount of research on palliative care (PC) has demonstrated the benefits of identification for a timely referral as well as enabling an integrated care approach. However, the prompt identification of PC in clinical practice has been a challenge.

Despite PC needs may differ widely between patients, a short survival prediction is one of the most common proxies to start PC conversations, therefore predicting if the death will occur within the next year has a real value when screening for patients who may benefit from PC.

Our objective was to create a clinical decision support system called Aleph to support healthcare providers in their screening for patients with PC needs. Aleph incorporates different quantitative and data-driven predictive services based on machine learning technology and electronic health records (EHR) data.

Methods: Two machine learning services have been developed using retrospective hospital admission data from the EHR (39,310 episodes from 19,753 different patients; age >= 65). The first service incorporated three models: t models: a one-year mortality classifier, a mortality regressor, and a one-year frailty status classifier. The second service incorporated a compact and minimalist version of the one-year mortality models using only common variables. We validated Aleph's usability and user experience using a user-centred methodology involving 21 healthcare providers from six countries.

Results: The models on the first service reported an area under the ROC curve (AUC-ROC) of 0.87 for the one-year mortality classifier, 94.67 days of mean absolute error for the regression model, and 0.89 of AUC-ROC for the one-year frailty classifier. The compact model on the second service reported an AUC-ROC of 0.83. Aleph made a great impression among the validation participants and scored 65 over 100 points on System Usability Scale and 1.5 over 3 in the User Experience Questionnaire-Short.

Discussion: Aleph was developed as a multi-purpose clinical decision support system web application. Its design allows the incorporation of further integrated care services, even out of the

realm of the PC. We have incorporated two PC services based on powerful predictive models. Documentation to create a new predicted service will be openly distributed to encourage researchers to contribute to the Aleph so their predictive models could be incorporated immediately into a usability-validated platform.

Conclusion: Our contribution to the identification of patients who may benefit from PC are two predictive services with high predictive power models and a user-centred validated platform. These allow the integration of this outcome with other services available to address patients' needs as well as to 'plug and play' other predictive services.

Implications for applicability and limitations: The use of Aleph can improve the detection of patients in need of PC, helping physicians and hospital administrators to address the growing demand for PC and improving the patient's care. The main limitation of the study is the lack of validation of the predictive model with other data sources.