

COMPASS-ONC: Explainable Artificial Intelligence for the Early Identification of Palliative Care Needs in Oncology

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Introduction. In oncology patients, the identification of palliative care needs is still often delayed and inconsistent, with negative consequences for symptom control, continuity of care, appropriateness of care pathways, and quality of life. In this context, artificial intelligence could represent an innovative tool to support an earlier, more equitable, and more systematic recognition of these needs. The aim of this project is to develop and preliminarily validate an explainable machine learning algorithm for the early identification of palliative care needs in the oncology population, in order to support appropriate referral, proactive care planning, and integration across care settings.

Methods. The project is based on the Medical Research Council framework for complex interventions. The development phase includes evidence review, conceptual model definition, and construction of a multidimensional dataset including clinical, functional, psychosocial, and caregiver-related variables. The algorithm will be developed using ensemble machine learning models and made interpretable through Explainable Artificial Intelligence techniques. Preliminary validation on historical data is planned, followed by a pilot study in community-based palliative care settings. Evaluation will address predictive performance, usability, acceptability, organizational impact, and ethical governance, with specific attention to algorithmic bias and preservation of clinical decision-making autonomy.

Results. Expected outcomes include a validated and clinically interpretable algorithm able to improve the timely identification of cancer patients with palliative care needs. Anticipated results include improved referral appropriateness, stronger continuity across hospital, community, and home care, reduced inappropriate acute care use, and improved perceived quality of care.

Discussion. COMPASS-ONC proposes an innovative model with strong translational potential for integrating artificial intelligence into oncology and nursing practice. Early identification of palliative care needs through explainable, person-centred tools may contribute to more appropriate, equitable,

and sustainable care pathways, with relevant clinical, organizational, and research implications.

Keywords: Artificial Intelligence, Palliative Care, Oncology Nursing

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