

PAI

Predicting Care Needs of Older Adults in the Healthcare System through AI-enabled Analysis of Patient-Monitoring Data

KEYWORDS

Timely care intervention, Predictive analytics, Older people care, Patient centered care, Continuity of inpatient and outpatient care, Patient-care workflow optimization, Context adapted scalable implementation

DURATION

36 months

ABSTRACT

Problem: Increasing care demands of older people and limited healthcare staff resources Every country in the world is experiencing growth in both the size and the proportion of older persons in the population. Older age is generally associated with increased health-related care needs and increased healthcare costs. Much of the cost is related to acute episodes, which require immediate attention and thus costly emergency care, and increased level of care afterwards. The care of older people is often managed at different levels of care (at home, in nursing homes, in primary care, in hospitals). Healthcare staff resources are becoming more and more limited in light of increasing demands due to the demographic shift. Consequently, the European healthcare of the future needs to be able to reduce the total care needs of older persons, by either early adequate interventions at the current care level, or a timely transfer to the appropriate care level. **Aim:** Reduce care needs for older people by early detection of signs of decline in health and function The PAI project proposes to predict the care needs of older people by AI-based data-driven analysis of current and historical patient-monitoring data. One benefit of the early detection of a decline in health and function is that preventive measures can be taken to reduce costly acute care and increased care demands afterwards. Avoiding hospitalization can for example be achieved by preventing fall incidents in nursing homes by assisting older people in risky situations, or by avoiding heart attacks through timely adjustment of medication in primary care. Another benefit of early insight in changing care needs is that older patients can be transferred to another care level at the right moment so that they receive the care they need and scarce healthcare staff resources are used effectively. The latter contributes to the continuity of care and the coordination between inpatient and outpatient care. Implementation and use of care need predictions has been proved challenging as data availability, data quality, type of possible deteriorations and type of possible interventions may differ strongly between care levels and different complaints. Hence, a central aspect of the project is the implementation of the solutions through redefining work routines in healthcare facilities, analyzing how cultural or context-based differences may affect implementation results and developing guidelines on how implementation can be achieved in different countries and in different care levels. **Methods** The project will follow a design science approach where an artifact (context adapted analytics for predicting older patient care needs) will be developed in close collaboration with end-users (care recipients and health care practitioners) and implemented in real-life settings (nursing homes, primary care units and hospitals in Spain, Sweden and Norway). Two design cycles will be performed where lessons learned in the first design cycle will inform the next cycle. Each design cycle will consist of five steps: (1) identify and

capture historical data, (2) design new work processes (how to act when the AI-based prediction signals a health status deterioration), (3) train and validate algorithms, (4) implement in real life setting, (5) evaluate impact. Impact on research community and society Predictions of care needs will benefit older people (adequate care in an early stage will prevent injuries and avoid worsening disease states) and healthcare staff (effective use of their scarce resources will create a sustainable and more satisfying work environment). From an academic perspective, promising results have been shown in demonstrators but there is a need to investigate how these methods actually can be applied for selected patient groups in real-life settings where data availability and other conditions may not be optimal.

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