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**Title:** Dementia Ambient Care: Home-based monitoring and enablement of people with dementia

**Background:** The prevalence of dementia is expected to increase as our population ages. Enabling people with dementia to remain living wellat home for longer increases their quality of life, as they remain integrated in their families and communities. However, cost-effective home-based solutions are needed to support the autonomy and independence of the person with dementia at home, thereby reducing caregiver burden. Ambient assistive technologies present opportunities to support these goals while providing clinicians with objective assessments of the individual with dementia over time.

**Methods:** Dem@Care is an EU-FP7-funded initiative using ambient and wearable sensors to monitor and support five frequently problematic areas for a person with dementia: physical activity, sleep, activities of daily living, social interaction, and mood. A clinical assessment identifies a person’s unique needs in each domain, and an individualised sensor ‘toolbox’ is jointly agreed to support these needs. Aggregated sensor data identifies behavioural changes over time that could signify improvement, stasis, or deterioration of function.

**Results:** We report findings from two Dem@Care home pilot studies from the perspective of the clinician, the caregiver, and the person with dementia. We present results from user-centred design of the Dem@Care system; the monitoring of physical activity, sleep, activities of daily living, and quality of life; the acceptability and usability of the sensors in the Dem@Care toolbox; and we explore Dem@Care’s potential to support the delivery of cognitive and psycho-social interventions in the home.

**Conclusions:** Dem@Care findings illustrate that multi-sensor monitoring and assessment systems have the ability to preserve autonomy and enable living well at home with dementia. The objective patterns of behaviour in and across functional domains not only assist the individual and their family, but also the clinician, who gains valuable insight into an individual’s behavioural and cognitive changes over time.