

G. CORNET. (Convener). **Alzheimer's disease wandering behaviour: Gerontechnology and ethics in three French Speaking countries.** *Gerontechnology* 2012;11(2):266; doi:10.4017/gt.2012.11.02.159.00

**Participants:** C.F. CRISPIM JR (France), V. RIALLE (France), L. CORRADO (Switzerland) and J. PETERMANS (Belgium) **ISSUE** The goal of this symposium is to contribute to the state of the art in francophone countries concerning the challenging issues raised by cognitive impaired old persons' wandering. As the population at risk of wandering is likely to increase in the future, the demand for efficient solutions is on the rise. Wandering is an issue of concern to the cognitively impaired persons themselves and a central issue on the agenda of the Gerontechnology community as well for care homes, family care givers, professional carers, public organizations, as well as insurance companies. To what extent can technological innovations and services supply safe, robust, acceptable and sustainable solutions? How do we assess if they really match the needs, taking in account diversity of contexts and the limits of medical treatment efficacy, constraining measures, and ethical & legal issues concerning responsibility? Another range of issues to be addressed relates to technical solutions performance assessment. What is already available on the market or at experimental level? To what extent do these solutions constitute progress and represent a fair compromise between freedom, respect of dignity, efficient security support and relief for care givers? **CONTENT** First of all a better understanding is needed of abnormal wandering behaviour resulting from chronic diseases evolution, such as Alzheimer's'. It is necessary to differentiate between what can be considered as the last remaining freedom of the severely cognitively impaired and disoriented persons, and how to balance this against the risk of getting lost or to endanger oneself or other persons. The user-centered assessment of innovative solutions must be multidisciplinary. On the individual level it is a case management approach, integrating clinical, psychological, sociological, organizational, law and ethical perspectives. Beyond the basic dilemma between freedom and security, to what extent can innovative technology be developed and used for designing a friendly environment, reducing anxiety, stimulating the remaining cognitive capacity, providing pleasure and helping to communicate in spite of declining capacities? James Fozard et al.<sup>1</sup> have already opened the tracks suggesting new ideas and experimentations, we now examine what is the state of the art in research experimentations and progress for such kind of empowerment? **STRUCTURE** Evidence on existing technologies fitting solutions and filling gaps will be presented by Prof. emer. Gérard Cornet (introduction), followed by a presentation of Carlos F. Crispim jr on fusion of sensor results to analyse daily activities of older adults, and Prof. Vincent Rialle (Grenoble) looking at the results of the Estima qualitative and quantitative program and updated consumers supply studies. Prof. Luigi Corrado (Switzerland, Geneva) and Prof. Jean Petermans (Belgium, Liege) will present the state of the art in their respective countries. **CONCLUSION** By comparing the situation among these three countries we intend to develop better guidelines.

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**Keywords:** dementia, wandering, technology, ethics

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C.F. CRISPIM-JUNIOR, V. JOUMIER, Y-L. HSU, M-C. PAI, P-C. CHUNG, A. DECHAMPS, P. ROBERT, F. BREMOND. **Alzheimer's patient activity assessment using different sensors.** *Gerontechnology* 2012;11(2):266-267; doi:10.4017/gt.2012.11.02.597.00

**Purpose** The number of people requiring care, including Alzheimer patients, will grow while the number of people able to provide care will decrease. We focus on the development of medical, information and communication technologies for improved diagnosis and evaluation of dementia progression in early-stage Alzheimer disease (AD) patients. **Method** We compared several sensors (video and accelerometer) to assess elderly performance on instrumental activities of daily living (IADL) and gait tests in the clinical protocol developed and executed by the Memory Center of the Nice Hospital and the Department of Neurology at National Cheng Kung University Hospital, Taiwan. This clinical protocol defines a set of daily living tasks (e.g., preparing coffee, watching TV), and physical tests (e.g.

a balance test), that could be realistic achieved in the designed observation room (Figure 1), and at the same time provide objective information about dementia symptoms. Previous works analyzed only accelerometer sensors for elderly gait analysis for dementia symptoms differentiation, while video-sensors were dedicated to ADL-detection<sup>1-3</sup>. The comparison of several sensors could provide new evidence about patients' activities. The proposed systems used a constraint-based ontology to model and detect events based on the sensors data output. 2D-video stream data is converted to 3D-geometric information that is combined with a priori semantic information about the clinical scenario. The ontology language is declarative and intuitive (as it uses natural terms), allowing medical experts to easily define and modify the IADL and gait events models (using spatial, temporal, video-tracking and accelerometers data to describe events). The sensor system has been tested with 44 participants (healthy=21, AD=23). A stride detection algorithm was developed by the Taiwan team for the automatically acquisition of gait information using a triaxial accelerometer embedded in a wearable device. It acquires data about the participant locomotion (e.g., walking time, stride length, stride frequency). It was tested with 33 participants (healthy=17, AD=16), on a 40-meter walking test.

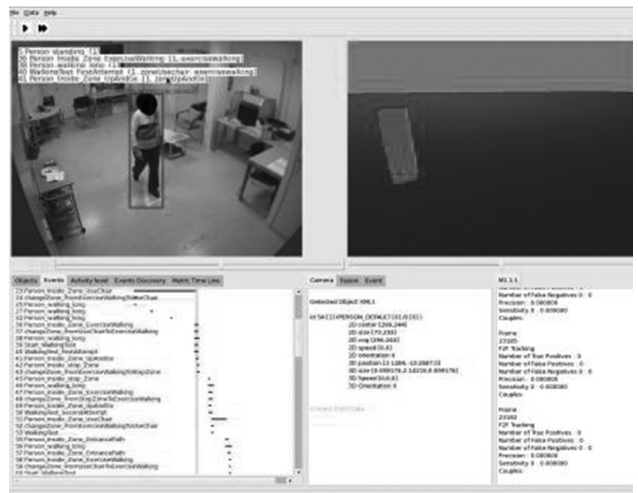


Figure 1. Multi-sensors monitoring system results being analysed in the evaluation platform (VISEVAL)

Results & Discussion This monitoring system detected the full set of activities of the first part of the clinical protocol (e.g., balance test, repeated sequence of sitting-standing positions) with a detection rate of 96.9% to 100% (true positive rate).

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Keywords: health & self-esteem, multiple sensors monitoring systems, alzheimer dementia

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V. RIALLE, C. OLLIVET, C. BRISSONNEAU, J. SABLIER. **French studies on dementia, ethics and geolocation.** *Gerontechnology* 2012;11(2):267-268; doi:10.4017/gt.2012.11.02.315.00 **Purpose** A series of French studies on Alzheimer's, ethics and geolocation started in 2005 with ALICE<sup>1</sup>, a study on the wishes, fears, and expectation of family caregivers (n=270) regarding various advanced gerontechnologies. ALICE gave evidence of the predominant interest in technologies aimed at monitoring or identifying a patient's location. Indeed, these devices are supposed to enhance the patient's safety and independence and to provide peace of mind for caregivers and family mem-

bers. Moreover, providing family caregivers and healthcare professionals or policy makers with convincing data and good practice recommendations regarding such devices turned out to be an ethical imperative<sup>2</sup>. In this respect, we recently undertook a multidisciplinary study called ESTIMA<sup>3</sup> which involves a large sample of patients, caregivers and stakeholders. **Method** ESTIMA's approach is threefold: (i) sociological, based on the semi-directive interview of 60 people belonging to all categories of persons involved in caregiving or in position of institutional responsibility;

(ii) statistical, with a retrospective observational study of 29 months of activity of a non-profit Social Alarm Association (SAA) specialised in geolocation of wandering patients (n=327); and (iii) ethical, with a thorough examination of ethical issues raised by facts and figures that emerged from the two other studies.

**Results & Discussion** The richness of the data collected resulted in a wealth of information. First, the SAA's Remote Call Centre (RCC) received many more alerts from patients living at home than from those living in institutions, while the latter account for more of the subscribers (Figure 2). Second, in spite of the performance of the device and the searchers involved, retrieving a patient is generally time consuming (>1h per research); this raises a cost effectiveness issue. Fourth, the sociological and ethical parts of the study look closely at the risk of developing a technological society obsessed by profitability and 'modernization', leading to a devaluation of humaneness. Finally, thirteen useful recommendations for families, stakeholders, and policy makers, which fully respond to the French Alzheimer Plan 2008-2012, completed the study.

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**Keywords:** geolocation, dementia care, ethics, family caregiving, user needs, acceptability

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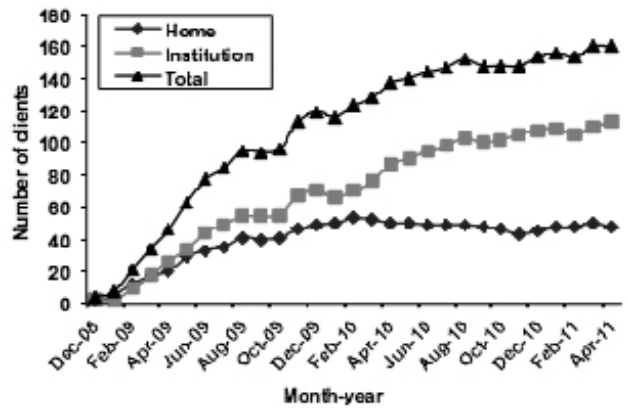


Figure 2. Curves of the progression of the subscriptions number since the onset of the geolocation service

**L.C. CORRADO. Gerontechnology issues for home support services in Switzerland facing the challenges raised by Alzheimer's disease and other cognitive disorders.** *Gerontechnology* 2012;11(2):268-269; doi:10.4017/gt.2012.11.02.566.00 **Purpose** The ongoing increase in life expectancy is mainly due to decreased mortality of the older part of the population<sup>1</sup>. As frequency of chronic diseases increases sharply with age, an ageing population is accompanied by an greater number of people with Alzheimer's disease and related disorders, which is a major cause of functional dependence in advanced age. In Switzerland, two parliamentary motions were filed specifically in order to call for the development of a common strategy by the Federal and Cantonal governments for steering their policy in relation to dementia disorders, but both motions have been rejected by the Federal Council<sup>2</sup>. Acceptance of gerontechnology in Switzerland is therefore well behind some other European countries. Acceptance must be generated mainly through 3 different channels: communication –informing the concerned actors on the possible benefits of new technologies; experiments –evaluation of these benefits through specific projects;

and financial ratification –changing the government and health insurance policies about gerontechnology. The aim of this presentation is to explore the challenges and opportunities new technologies present to serve elderly people with a cognitive impairment in the context of home support, to provide information on changes in the number of affected people, and to expose the costs of dementia in Switzerland. **Method** Various projects are being implemented. Firstly, the creation of the ARBT (Association Romande de BioTélévigilance) in 2009 demonstrated a real appetite from different important partners acting in both technical and health and social environments in francophone Switzerland and neighbouring French areas. ARBT is working on a project which will thoroughly analyse the needs of elderly people for whom home support services and experiment innovative technologies are relevant and to come to concrete conclusions regarding proposed services. Secondly the SSG (Swiss Society for Gerontology) has recently created a study group on gerontechnologies in close collaboration with the ARBT. A third example is the new acceptance of the AAL-project called ‘My Guardian’ (in which the ARBT will participate) with the purpose of conceiving a technological device to enhance comfort of elderly people with mild cognitive impairments. **Results & Discussion** What technological advances have generally been made in the home support field over the last 25 years? It could be said that the situation is almost unchanged<sup>3</sup>. Users, natural caregivers, and home support professionals are not often aware of the existence of supportive tools and programmes. Their involvement in projects from the moment of inception and their cooperation should be considered essential. The actual results constructed over the past years consist of a few additions to the basic equipment of the TeleAlarm, allowing emergency calls to be made for assistance and used in the bio-televigilance field. Apart from a few concrete applications in some cantons, gerontechnology developments serving elderly people with cognitive disabilities and their caregivers are still rare and are limited to experiments such as geolocation bracelets or presence sensors used to alert caregivers. The expected results for the future in the case of patients affected by cognitive troubles are, as a first step, providing them with a GPS-tool to detect home run away (fugue); then allowing or facilitating their daily activities by proposing new devices (“My Guardian” project among others); and lastly, ideally a visual-monitoring system able to offer a permanent link with relatives or professional caregivers should be implemented.

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J. PETERMANS, D. GILLAIN, C. LEJEUNE. **Gerontechnology and cognitive disorders in Belgium**. *Gerontechnology* 2012;11(2):269-270; doi:10.4017/gt.2012.11.02.572.00 **Purpose** The proportion of older persons with cognitive dysfunction is growing quickly and the number of care givers specialised in the management of those diseases is insufficient. Therefore, gerontechnology seems to provide interesting opportunities to help not only the professional care givers, but also the informal care givers. Also, these patients have specific risk profiles that can be monitored by some technologies. **Method** We are currently testing some materials in various institutions such as psychogeriatric units, geriatric acute wards, sleep clinics, and in nursing homes. **Results & Discussion** Several institutions have implemented techniques for the surveillance of the older persons<sup>1,2</sup>. The longest-running one is called “Remote Patient Monitoring (RPM)” and is well implemented all over Belgium to help older person in acute situations at home<sup>3-5</sup>. Falls are probably one of the main reasons for using this technology, but also some other crisis situations such delirium, needs of help, or instrumental activities. More sophisticated materials are now being tested in the specific field of dementia<sup>6</sup>. The actimetry seems to be able to give information on corporal

movement in particular situations such as sleeping, walking, or during some sort of activities<sup>7</sup>. Actimetry is now developed for the surveillance of dementia patients in psychogeriatric institutions or at home, to verify where the person is, and if the activities is of interest or not. It can also be used as an alarm when the person is trying to leave the institution. Some studies have demonstrated specific variations of activities, predictive of risk of falling or delirium. More specific are the studies of gait according to the cognitive function. Some parameters (speed, length of step, variability of step in simple and double task) are well known to be associated with a particular cognitive profile. Some gerontechnology, and especially actimetry, seems very useful not only for the detection and the surveillance of risk patients to avoid accident, but also for example in determining risk profile by gait, according to the cognitive disorder. Further research with other materials such as 'intelligent clothes', detective walls, etc., should be realized in future. Senescence opens a large field of research and can lead to many interesting possibilities for the development of new technology in the future.

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