

# Norrandicus Care Lab – The Novel Test Method for Aging Society Innovations

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**Abstract.** Many countries with ageing populations need to work on how to incorporate innovations of different forms into the ongoing process of change in social service, support and care of the elderly. In Sweden, a national initiative to innovate elderly care is taken. Norrandicus Care Lab (NCL) is a test environment formed as a Living Lab for actors aiming to develop health and social care for elderly through innovation. NCL offers organizations and companies a test and evaluation method as an activity in their intrinsic development process, suited to services, processes and products. The vision is to conceptualize NCL into a European model to forge the challenges of elderly care to progress with new innovative businesses and ideas. Thus, the objective is to create an interdisciplinary open collaboration platform for actors who want to develop long-term care through innovation. Each innovation is assessed in NCL via quality measures from the users' perspectives. This paper describes the foundation of the novel test method that is the basis for the NCL test process. Testing in NCL will be carried out by elderly themselves, health and social care staff and relatives together with different academic parts in a multidisciplinary test process. Products and services will be evaluated from three perspectives; the "care customer" (elderly or seniors), their relatives and health and social care professionals. There are two main quality criteria that guide the evaluation: quality as stated in the "National Values for Social Care of Elderly" and usability as a function of the innovation and its primary end-users. The expected result from an academic point of view is that the test method as such is validated and measures the contribution of the innovation in terms of "a dignified life for the elderly" as well as the degree of usability of the innovation. Expected results from the innovators and the aging society may vary depending on type of innovation. In Norrandicus Care Lab, this unique method allows for interaction between innovators and senior stakeholders as well as other primary end-users in the elderly care sector. Thanks to the establishment of this novel method and the support from researchers, the users' quality aspects are kept in focus when innovations for the aging society are tested in Norrandicus Care Lab.

**Keywords.** Aging society, elderly care, innovation, living lab, user participation, health/welfare development, test, evaluation, validation, usability, patient-centricity

## Introduction

The Swedish "National Innovation Strategy" [1] states that 20% of the inhabitants in Sweden will be over 65 years old by 2030. In a medium-sized Swedish municipality, Sundsvall, the social service authority made a simulation of future care of the elderly

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[2]. It shows that between 2010 and 2030, the proportion of elderly (80 years old and over) increased by approximately 38 percent. Already today the need for care activities in the home increases. In 2011 about 911 000 care activities were executed in the local homecare area and in 2012 the number increased to approximately 982 000 care activities in Sundsvall [2]. Despite this increased need, a local savings requirement on social services is set to over 100 million SEK [2].

To handle this, the municipality has recently started to apply a “lean” method where one ambition is to work more oriented towards “the patient as a customer” and at the same time implement new ways to work with quality development and quality assurance through evidence-based practice [3]. Therefore it is imperative to bring in new methods, systems or tools to aid the renewal of life situations and work processes. Innovations or new ideas may arrive from different actors; e.g. from well experienced care personnel as well as from technical innovators. An important matter is that the innovations need to be tested in real-life situations before implemented in elderly care practice, to date an activity hard to achieve.

The purpose of this paper is to describe the foundation of the novel test method that is the basis for the test process used in the test bed Norrlandicus Care Lab (NCL).

## **1. Background - Norrlandicus Care Lab**

As we wish to live longer, healthier, and in our own homes, elderly care innovations need to be tested in a realistic environment and by test participants that are potential users of the final product [4], preferably in the home of real users.

The assembly and management of a realistic testbed, both related to e.g. technology and real-life observations is costly and impossible for small innovative companies, especially when testing their first product. To enable relevant and qualitative testing, it is of outmost importance that test facilities are available, and on a per usage cost [5].

Norrlandicus Care Lab is such a test facility; a Vinnova funded, recently developed open innovation platform formed as a Living Lab to support actors aiming to develop and commercialize health and social care innovations for an aging society.

The NCL is based on the conceptual idea of enhancing quality of life for the elderly and each innovation (product, service or process) needs to be assessed using quality measures from the users’ point of view. Addressing basic health and functional needs is important; however a salutogenic approach to health, considering participation and independence, promotes good health and rehabilitation [6]. Dignity and well-being are two dimensions of Dignity in Life that are important to consider. To our knowledge, there is a lack of such quality measures in the care sector. Further, healthcare to date has been focused on service for illnesses rather than addressing citizens’ holistic health needs, including e.g. social services, prevention and support for informal care givers [7]. In recent publication, researchers call for the inclusion of social care informatics as an essential part of holistic healthcare, stressing the importance of this emerging field of research [8]. In order to strengthen the role of patients and relatives, the NCL method focuses on patient-centric provision of care, following the ongoing shift from organization to citizen-centred care [9]. The usability of the intended innovation is another quality measure, a key to failure or success of a product [10].

The target audience of NCL Living Labs consists of people older than 65 years with age-related needs. They live in various kinds of senior housing; from private houses to nursing homes, as well as retirement homes providing different degrees of

support. Seniors and their relatives, together with private or municipal health and social care staff, test and evaluate innovative solutions that aim to increase the quality of life or improve the use of resources in care processes in the immediate environment of the elderly. Multidisciplinary NCL experts from academia and industry who are experienced in evaluating usability, nursing and healthcare quality, innovation, business models, functionality and health economics assist in the assessments.

## **2. The Norrlandicus Method**

The Norrlandicus approach to test an innovation is to combine a test of the usability of the innovation on one hand with, on the other hand, pre- and post-measurements of the elderly person's sense of dignity in life.

The Swedish National Board of Health and Welfare issues mandatory regulations for municipalities and other actors. In the case of care of elderly, the concept of dignity in life is used in such regulations and has been clarified by a number of texts and other material issued by the authority [11]. However, these materials do not constitute an operationalized definition of the construct, but clarifies that it should mainly be a combination of two parts, well-being and dignity [12].

To be able to measure the impact of an innovation/intervention in the experience of dignity of life for a person in elderly care, a scale with two dimensions, i.e. two sets of items is developed. Furthermore, the scale is developed using three different perspectives of the elderly person's experience of dignity of life, the actual persons' own perspective, relatives' perspectives and that of the care personnel. This means a triangulation of the measurement. In order to handle this, items of the questionnaires in three versions with almost similar wording are created. The differences will be limited to what is needed to distinguish between the different roles of the respondents.

The two dimensions of the construct dignity of life—dignity and well-being—are operationalized as numerical variables, and differences in means between post- and pre-intervention measures in any of the two dimensions would indicate that the intervention had an effect on the dignity of life of the elderly persons in the sample. However, it is obvious that the innovation being tested may have a practically significant impact in a specific part of the elderly person's well-being or dignity, but still be of limited importance in measuring dignity of life. In such a case we anticipate that there will be no significant difference between pre- and post-intervention mean. Instead, we will be guided by a few specific items about the innovation together with the results from the usability test as to how we interpret the overall results of the investigation of the innovation.

Usability on the other hand, is a quality characteristic of interactive systems. According to the International standard (ISO 9241-11), usability is defined as "The extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use" [13]. Usability is thus a characteristic or quality dimension that is only apparent in the interaction between a system and its users over a period of time, i.e. in real use. Usability is not an inherent system property, such as a function. Another important international standard in this area is ISO 9241-210 [14] describing the importance of user-centred development. When these standards are used, it is especially important to have a good understanding of the system's context, users' characteristics, their tasks and

requirements [4], issues that will be investigated in the usability part of the Norrlandicus Method.

### 3. Expected Results

As a result, the Norrlandicus method provides a statistical description of the structure of the factors from three perspectives, in order to see if the experience of dignity is changing with the introduction of an innovation. An innovation can affect the elderly directly or indirectly, and will in terms of an assessment design be considered as an intervention. The innovation will therefore be evaluated specifically, using the criteria of the International usability standard (ISO 9241-11). The effectiveness and efficiency of the innovation can thus be measured. Together with future user satisfaction questionnaires regarding the innovation, the potential benefits for current healthcare organization or the elderly care sector as a whole are estimated.

The results of tests conducted in NCL will thus benefit both elderly care sector innovators and its primary stakeholders. Currently, Norrlandicus method is primarily located in Västernorrland where the pilots are taking place. However national and international dissemination is planned. The vision is that NCL is an established brand and the European example of how the aging society will be supported through innovation.

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