



VelfærdsInnovation
Sjælland

1st International congress on mobile health
devices and seizure detection in epilepsy

Copenhagen, 8 July 2017

Mr. Hasse PETERSEN, Project Manager
Welfare Innovation Zealand Denmark (VIS)

www.vi-s.dk

haspe@holb.dk

Implementation of wearable devices in praxis: the point of view of the
healthcare providers

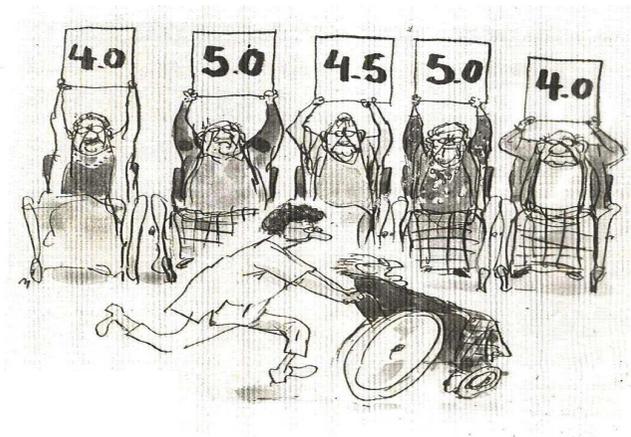


VIS

- VIS is a network of 14 municipalities in Region Zealand. Denmark has 98 municipalities in total
- Each municipality has app. 22.000 – 83.000 citizens. The 14 municipalities have app. 630.000 citizens in total
- The municipalities of the region have predominantly a rural character which is influenced by proximity to Greater Copenhagen

The daily task of VIS is to initiate and manage intermunicipal pilots of healthcare/AAL technology in the field of:

- Primary healthcare (prevention and rehabilitation)
- Elderly care
- Special needs and disability
- Social psychiatry





Two sensor projects of patients with dementia

I will now present the results of two projects related to in-home application of devices for patients with dementia.

From the point of view of healthcare providers, the requirements would be the same for patients with epilepsy too.

Intermunicipal pilots of healthcare/AAL technology in primary care

Research and technological development:
User analysis,
market analysis,
development of technology

Feasibility study –
Testing project - Pilot B:
Real life testing,
technological pretest,
evidence based
documentation

Usability study -
Implementation and
deployment - Pilot A:
Procurement,
organisational adaptations,
benefit realisation,
evidence based
documentation





1. SenSi Project (feasibility study)

Pretesting sensor solutions within homecare of citizens with cognitive impairments



The pilot targeted citizens with cognitive impairments combined with behaviour challenges, such as falls, wandering or sleeplessness.

The involved personnel of the municipalities include dementia coordinators, referral coordinators, social care workers, AAL ICT project managers and AAL living lab coordinators

17 citizens from 6 municipalities have participated in the pilot.

Intermunicipal pilot in the period of January 2016 to January 2017.



SenSi objectives

Overall objective

To pretest sensor technological solutions within homecare aiming at adaptation of the homecare services based on the functional level of the citizens

Sub-objectives

- To pretest sensor technological solutions aiming at replacing home night visits in Holbaek and Naestved Municipalities
- To pretest sensor technological solutions aiming at postponing the move of citizens from private home to residential home in Slagelse Municipality
- To pretest a sensor technological solution which can map activity patterns of citizens with 24 hours in-home support aiming at partly replacing in-home support if possible in Solroed Municipality
- To pretest a sensor technological solution which can map activity patterns of the citizens across 14 days in Lolland Municipality. The aim is hereby to detect behavior challenges which can provide the municipality with an opportunity of optimizing homecare services, including timing
- To pretest a clinical validated sensor technological solution which can map behavior challenges of the citizens aiming at optimizing homecare services in Faxe Municipality



SenSi success criteria and evaluation method

Success criteria

To carry out real life pretesting of the sensor solutions in accordance to the sub-objectives.

Evaluation method

The evaluation of the pilot has been based on qualitative data which has been collected throughout evaluation meetings with project managers and key personnel of each municipality.

The baseline of all evaluation meetings was a joint 'Checklist for assessment of sensor solutions'.



SenSi results

‘Homecare support can be adapted via sensors in praxis’

The municipalities have demonstrated that the application of sensors makes it possible:

- to replace night home visits for citizens
- to reduce a 24 hours in-homecare support to a few citizens
- to postpone the move of citizens from private homes to residential homes
- to optimize homecare support, including to reduce/increase the number of homecare visits



SenSi results

‘The homecare providers face significant risks throughout the procurement process’

What type of sensor technological solution to choose for the specific homecare objectives: Room sensor, bed sensor or wearable sensor?

A supplier workshop took place which involved 6 selected suppliers and the 6 municipalities.

Eventually various pretests of 6 sensor solutions have been carried out throughout homecare support of the 17 citizens:

- A bed sensor solution by Emfit in Holbaek Municipality
- A room sensor solution by Just Checking in Lolland Municipality
- A room sensor solution by Access IOT in Lolland Municipality
- A room sensor solution by AnyGroup in Slagelse, Naestved and Solroed Municipalities
- A wearable fall sensor solution by Tunstall in Slagelse Municipality
- A bed sensor (clinical validated) by Medema in Faxe Municipality

The municipalities have demonstrated that homecare providers face currently a significant risk of selecting a ‘wrong’ sensor technological solution for the specific homecare objective.

Application of sensor solutions within homecare of citizens with dementia implies that ‘the right sensor solution must be applied in the right way for the right homecare objective’. If not, the homecare providers will not succeed applying the sensors in praxis.

Here there might be a difference between patients with epilepsy and patients with dementia!



SenSi results

'Target groups of citizens with cognitive impairments will be reduced significantly throughout the process of implementing the sensors'

The municipalities have demonstrated various organizational circumstances which will cause a significant reduction of the target groups of citizens throughout the implementation process in praxis. This is mainly due to:

- that many citizens perceive sensor solutions as invading objects. They have a feeling of being watched and will not accept the presence of sensor technological solutions in their homes.
- legal problems in the context of obtaining consent of citizens with severe cognitive impairments.
- that citizens with mild cognitive impairments have possibly not yet accepted the new situation, wherefore they do not recognize the need for homecare support. These citizens will often not be prepared to accept the application of sensor technological solutions.
- the progression of cognitive impairments across time. The citizens will cognitive decline which will result in a different need for homecare support. Throughout the identification of new homecare needs/different needs for application of sensor solutions it will often be necessary for the homecare providers to react soon in order to obtain the necessary homecare impact. A quick action is by far not always possible for suppliers due to delivery time and complexity of set up of sensors, e.g. room sensors.
- that citizens with a partner or a domestic animal can not apply the sensors which include motion sensors, since the sensors can not distinguish movements of the citizen, partner and animals



SenSi results

‘There is a need for further pretests of wearable fall sensors in praxis’

One of the municipalities experienced the following challenges throughout the implementation of a wearable fall sensor solution:

1. It was necessary to procure a new version of the home-based emergency alert system for the 4 involved citizens since the previous version could not operate alerts from the wearable fall sensors.
2. False emergency alerts from 2-3 citizens have been activated - due to a citizen dropped the device, the device hit a table edge, or a citizen activated the alert due to confusion of the button's functionality.
3. Implementation of wearable fall sensor solutions is subject to that the citizens want to wear them as well as subject to that the citizens do not forget to wear them.
4. It was not possible for the municipality to access log data of the wearable fall sensor solution throughout the test due to technical challenges related to storage of sensor data. Consequently it was not possible for the municipality to check whether the alerts had been sent correctly.

As a results of several false alerts of the sensor solutions throughout the pretests the municipalities discussed whether it should be a requirement of the front personnel within primary care to access and assess log data of the sensor solutions prior to implement and deployment.

There is a need for further real life testing of wearable fall sensor solutions to the target group of citizens.



2. KiiK Project (usability study)

Implementation of sensor nappies to citizens with cognitive impairments at residential homes

The pilot targeted citizens with cognitive impairments at residential homes. Besides the pilot involved a few citizens with physical disabilities.

The involved personnel of the municipalities included continence nurses, social care workers, residential home managers and AAL ICT project managers.

140 citizens from 7 municipalities participated in the pilot.

The Intermunicipal pilot was carried out in the period of February 2015 to May 2016.





KiiK objectives

Overall objective

To improve the individual and knowledge based continence care within residential homes

Sub-objectives

- To obtain a more individual professional and knowledge based continence care of the citizens
- To increase the feeling of welfare among the citizens as a result of an adapted continence care
- To increase the experience of quality in the continence care among the employees of residential homes
- To optimize the working procedures of the residential homes
- To adapt the size of nappies and decrease the absorbency capability of nappies
- To reduce the actual hours of social care givers for controlling nappy leaks
- To reduce the actual hours of social care givers for nappy changes
- To decrease the number of urine leakages



KiiK Implementation of sensor nappies

The involved citizens used sensor nappies throughout a 72 hours period aiming at mapping incontinence patterns.

A citizen's map of incontinence patterns provides the personnel with an opportunity of:

- adapting the time schedule for toilet visits
- adapting the time schedule for nappy changing
- selecting an individual nappy product



KiiK success criteria and evaluation method

Succes criteria

1.1: 75 % of the personnel will experience better continence care of the citizens

2.1: 50 % of the personnel will experience better workflows of continence care (after mapping incontinence patterns of the citizens)

3.1: The citizens will receive a more individual adapted continence care in accordance to their needs

4.1: An increased number of uninterrupted night sleeps of the citizens - previously the interruption of night sleeps was due to continence care

4.2: An increased number of successful toilet visits of the citizens

5.1: Reduction in the costs of nappies

6.1: Reduction in the number of controls of nappy leaks

7.1: Reduction in the number of nappy changes

8.1: Reduction in the number of clothes changes and bed sheets changes as a result of nappy leaks

Evaluation method

The evaluation was based on the collection of qualitative and quantitative data.

The data was collected through registration schemes, questionnaires, focus group interviews and evaluation meetings with key persons.



KiiK results

‘Low risks throughout the procurement process of sensor nappy solution’

What type of sensor nappy solution should be selected for the specific continence care objectives: Night sensor nappies with an alert function or 24 hours sensor nappies without an alert function etc.?

A supplier workshop took place which involved 3 selected suppliers and the 7 municipalities.

Eventually each municipality procured and implemented 1 out of 2 similar 24 hours sensor nappy solutions without an alert function. The two suppliers were Abena and SCA.

All 7 municipalities have experienced that their procured sensor nappy solution was easy-to-operate in praxis.

The municipalities have demonstrated that they currently face a low risk of procuring a ‘wrong’ sensor nappy solution in accordance to the continence care objectives.



KiiK results

‘The pilot indicated that implementation of sensor nappies resulted in profit realization of the continence care at residential homes in each municipality’

The results of the pilot indicate that the 7 municipalities have each obtained economic profit realization of the continence care in accordance to the following four sub-objectives of the pilot:

1. Decreased nappy absorbency capability and adaptation of nappy sizes/types
2. Reduction in the actual hours of social care givers for controlling nappy leaks
3. Reduction in the actual hours of social care givers for nappy changing
4. Decreased number of urine leaking

In some of the municipalities the economic profit realization was a result of fewer ‘urine leaking’ combined with less costs of nappies (mainly due to a decrease in the absorbency capability of the nappies).

In other municipalities the economic profit realization was a result of a reduction in the actual hours of social care workers applied for controlling nappy leakages and nappy changes combined with less costs of nappies.

The differences between economic profit realization in the municipalities have been affected by (and correlated with) several other factors. These include original working procedures, original level of continence care, readiness for changes of the personnel, actual management of adapting working procedures, communication between day/evening/night personnel and communication of the SenSi pilot towards personnel, usage of bladder scanner etc.



KiiK results

‘The citizens receive a more individual adapted continence care’

The citizens receive now a more individual adapted continence care as a result of the implementation of sensor nappies. E.g. more citizens experience toilet visits and nappy changing at the right time.

More citizens experience longer continuous night sleeps.

Mapping of incontinence patterns of the target group has resulted in increased dialogue of continence care of the citizens among the personnel.



KiiK results

‘All groups of professions have accepted the implementation of sensor nappies’

The new working procedure ‘mapping of incontinence patterns’ has been accepted by all groups of professions.

Besides the adapted working procedures of continence care have affected the mental working atmosphere positively within residential homes - different groups of personnel appreciate the fact that workflows of continence care have been adapted in order to better meet the needs of the citizens.

The majority of the personnel has experienced that ‘mapping of incontinence patterns’ has contributed towards an optimization of the workflows of continence care.



Conclusions – viewpoints of the healthcare providers

Healthcare providers, before deciding on implementation of the device, need to know:

- How reliable is the device?
- What are the implications of implementing the device into the work processes (training of personnel, etc)?
- What are the benefits of using the device, in term of increase in the patients' quality-of-life and in term of optimization of work-processes (cost-effective)?

We had to carry out the evaluation of effects ourselves. It would be an advantage if the enterprises could provide most of this information themselves, based on studies that are conducted unbiased (objective validation studies, feasibility studies, applicability and effect studies)!

However, these studies might not cause an unacceptable increase in the prices of the devices, since there is an increasing economic pressure on the healthcare providers.



Thank you!