From Big Data to Real-Time Actionable Insight in the Care Sector

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How can technology make us smarter and more efficient, and how can it release more time for care. How can we use technology to increase our knowledge and automate more processes so that staff can spend their time doing more care-related tasks?

In the last couple of years, the concept of big data has been seen as an ever more important opportunity in many sectors, including the care sector. The idea is that we can learn more about patients and residents and use this knowledge to help us structure procedures and care more efficiently. However, as effective as big data is, it also represents challenges when it comes to collecting vast piles of knowledge and obtaining a good overview of the big picture.

The challenges of big data

One of the challenges with big data in the care sector is that big data often provides too much information. There is data available at society level, at facility level and at resident level. The higher the level, the harder it is to use the data and make a difference to the resident in everyday life. Sstaff do not have time to analyse and use the data at the care centres. Time is already a scarce resource, and staff are not necessarily trained to analyse this kind of data. The result is information overload – a huge bulk of information that nobody uses.

Another challenge is using big data in a world in which the life quality of the resident is dependent on the individual care they receive. The challenge is that the individual rarely matches the big data exactly. Therefore, there is a risk that procedures based on big data will end up in a daily routine which really fits nobody. This in turn links to the third challenge with big data – it is not actionable here and now. It does not offer instructions as to how we can use the information to improve the care of the individual resident in real time.

Actionable insight: The intelligent incontinence product

So, how do we use technology to improve efficiency and care for residents in the care sector without increases in administration costs? We need technology and data that are actionable here and now in the everyday tasks we perform at the care centres with the individual residents. We need technology that helps the care takers understand and react to the specific needs of the patients in real time. In this context, it is relevant to take a further look at wearable sensor technology.

One example of wearable sensor technology is the intelligent incontinence product. Many care centres have a large percentage of residents who suffer from incontinence. The challenge wiith incontinent residents is twofold. The first is to improve the life quality of the residents. The second is to make the procedures more efficient so that staff can spend their time on caring for patients instead of following inflexible changing routines not designed for the individual – sometimes changing an incontinence product that is not wet, sometimes changing an incontinence product that is far too wet.

The intelligent incontinence product has built-in sensors which register incontinence via leading carbon fibre material. A discreet device is attached to the incontinence product and registers wetness via the sensors.

BIG DATA

refers to data sets so large and complex that they are difficult to process using traditional information and communication technology applications.

Big data is described by:

VOLUME: Large
VARIETY: It comes from different sources including unstructured data such as text and emails
VELOCITY: Collected or analyzed in near real time

Source: World Federation of Incontinent Patients

DATA ANALYTICS

refers to the techniques and processes that are applied to data, in particular big data, in order to reveal patterns and correlations. They are used to extract, from the raw data, information and knowledge that can be used in making decisions, improving productivity or developing innovations.

Source: European Parliament

The device informs the care givers of the leak via wireless technology in real time. And the caregiver can react on the information here and now. There is no data which needs to be analyzed, and no patterns you need to take into account – just information here and now, that a resident needs a fresh incontinence product.

Obviously, an intelligent incontinence product does not secure more "warm hands" in the care sector on its own. Caretakers still need to change the incontinence product. However, they no longer need to waste time changing dry incontinence products, they have fewer leaks to deal with and fewer inflexible routines. Ultimately, hopefully they have more time to care for the residents.

ACTIONABLE INSIGHT

is a term in data analytics and big data for information that can be acted upon or information that gives enough insight into the future that the actions that should be taken become clear for decision makers.

Source: Techopedia

This is the future of the Internet of Things. The idea that we build in technology in everyday products and make them smarter. Make us smarter and more efficient and enable us to react informed and in real-time where a reaction is needed. Not based on a lot of stored data, but on the reality of here and now.

The advantages of tiny big data

Real-time actionable technology helps us be more efficient and provide better care – it also accumulates information about the resident that we can take advantage of. After a period of time, the personalized real-time data creates a pattern, and the caregivers have access to structured information about the individual residents – tiny big data – which they can use to improve the care of a resident in the long run. What does the pattern look like for a specific resident during the span of a year? Does the pattern change with the seasons? Does the resident show unfamiliar behaviour etc? And always coupled with the real-time actionable information about the incontinence product. This allows the caregivers both to use the structured information to learn more about the resident's behaviour over time, and to improve more general procedures and ensure good care.

Empowerment of staff

With big data, caregivers at care centres are faced with the availability of data and information they do not have the time and perhaps the skills to analyse. With tiny big data coupled with real-time actionable insight, the staff can act on specific information here and now and they have access to limited, structured information about the residents and their behaviour patterns. With this information, caregivers can act independently and this will hopefully empower them over time, as they can make informed decisions on their own.

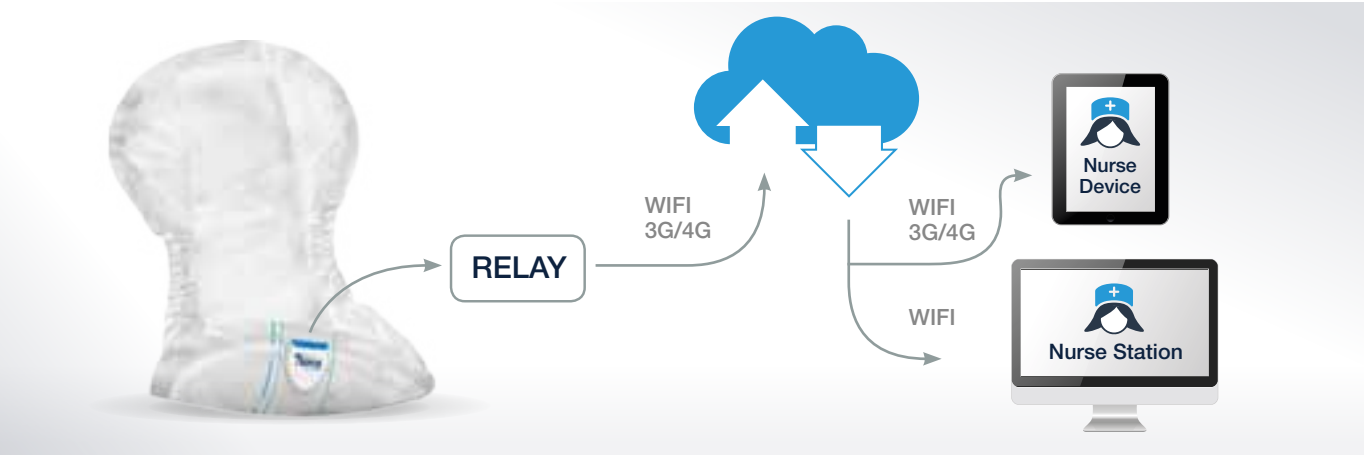

Figure 1: Abena Nova, the intelligent incontinence product for everyday use

Full circle

Even if the care givers don't have the resources to make good use of big data, the information gathered over time, the big data does become relevant. With 600 sensors in a single incontinence product, the incontinence product can register very detailed information about e.g. where in the incontinence product the urine is first detected, and how it spreads in the incontinence product. This information is communicated back to the incontinence product manufacturer, which can use the information to develop and enhance the product further.

The new and improved products might change the behaviour of the residents and hence create a new reality. With the three levels of data the caregivers can react to the changed behaviour registered via wearable sensor technology in real-time, the tiny big data will change over time and create new patterns; and the big data is qualified to improve the products even further and thus creating a full circle.

Items affecting the status and condition of the personnel providing care for elderly with incontinence

A A rapid increase in the number of elderly people,
B Cuts to social spending made each year by different national governments and the consequent reduction in budget allocated to social spending
C Patients are increasingly cared for at home and for longer periods than in the past and this implies admission to nursing homes at a later age which in turn increases the risk of being affected by multiple diseases, whereby these patients require greater specialist care;
D Thanks to immigration, (that is to say, female carers from outside the EU) into Europe, we are in a position to ease the impact of social welfare assistance and care for the elderly and those who live alone;
E In the case of nursing homes, the increasing pressure of work on the support staff offering care to the elderly

Source: World Federation of Incontinent Patients

ABENA Nova with MediSens

Abena Nova is the first intelligent continence aid produced for everyday use. Via carbon fibre sensors built into the product, it can accurately collect all incontinence-related data through a small discreet device attached to the aid. Via wireless technology, caregivers receive a real-time notification (on their smart phones or tablet) about the optimal time to provide incontinence assistance to each person.

ABENA

Abena is one of the largest manufacturers of solutions for incontinence. Abena's promise is to improve the quality of life for those with incontinence. The Group is represented with its own subsidiary companies in 17 countries, supplying more than 25,000 different products and operating in 88 countries throughout the world. Founded in 1953, Abena is a family-owned Danish production and commerce company based in Aabenraa in Southern Jutland.

MediSens

MediSens Wireless, Inc. was founded in 2007. The mission of the company is to provide solutions to improve quality of life. The goal is to develop highly innovative technology platforms and to offer meaningful care solutions to clients at home and in extended care facilities. The company is based in Santa Clara, California (USA).