SLD003 A SHARED CARE PLATFORM FOR CHRONIC DISEASE MANAGEMENT

ABSTRACT: The increasing incidence of chronic diseases is a challenge for the entire healthcare system. Today, more than 860 million people global have at least one chronic disease and the number is fast growing. In 2020 it is expected that the number of patient with diabetes is doubled and death due to heart diseases will increase to more than 20 million per year. To meet this need and to relieve the pressure on an already overburden healthcare system, a more effective communication between the patients and the health professionals are needed. A cross-sector communication will provide the health professionals with access to the needed information to ensure more qualified decisions regarding the treatment of the individual patient. The Shared Care model has been selected by the Region of South Denmark (1.2 million inhabitants) as the strategy for a reinforced effort for chronic disease management. The ICT solution is a Shared Care Platform connected to the national health care network and the internet. The Shared Care Platform will support the cross-sector collaboration (communication and sharing of data) for patients with chronic diseases between general practitioners, hospitals, municipalities and the patients. The Shared Care Platform will be tested with patient who has chronic heart failures, diabetes and chronic obstructive pulmonary disease.

Keywords: Shared Care, Chronic Disease Management, Interoperability, Standards, Continuity of Care.

RESUMEN: La creciente incidencia de las enfermedades crónicas es un reto para el sistema de atención médica. Hoy en día, más de 860 millones de personas globales tienen al menos una enfermedad crónica y el número está creciendo rápidamente. En 2020 se espera que el número de pacientes con diabetes se duplique y la muerte debido a enfermedades del corazón se incrementará a más de 20 millones por año. Para satisfacer esta necesidad y para aliviar la presión sobre un sistema de salud ya sobrecargado una comunicación más eficaz entre los pacientes y los profesionales de la salud son necesarios. Una comunicación intersectorial proporcionará a los profesionales de la salud con el acceso a la información necesaria para garantizar que las decisiones más cualificados respecto al tratamiento de cada paciente. El modelo de atención compartida ha sido seleccionado por la Región del Sur de Dinamarca (1,2 millones de habitantes) como la estrategia para un mayor esfuerzo para la gestión de las enfermedades crónicas. La solución de las TIC es una plataforma de atención compartida conectada a la red nacional de salud y el Internet. La Plataforma de Atención Compartida apoyará la colaboración entre sectores (comunicación e intercambio de datos) para los pacientes con enfermedades crónicas entre los médicos generales, los hospitales, los municipios y los pacientes. La Plataforma de Atención Compartida se pondrá a prueba con el paciente que tiene fallas crónicas del corazón, diabetes y enfermedad pulmonar obstructiva crónica.

Palabras Clave: Cuidado compartido, Gestión de Enfermedades Crónicas, Interoperabilidad, Estándares, Continuidad de Cuidados.

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1. INTRODUCTION

More than a third of the Danish population suffers from one or more chronic diseases [1]. Chronic diseases take up a significant part of the resources in the regional and national health care system. Besides many have chronic disease without being diagnosed. The clinical pathway is a life-long from the start of the disease and the first contact with the health care system, which are defined as the first contact with the health care system, who perform an assessment and record the diagnose. The Chronic Care Model [2] outlines areas to strengthen the healthcare quality, patient involvement and better use of the resources. Information systems are a central tool in the effort for patients with chronic disease. However, development, implementation and update are a big challenge in large healthcare organizations.

The Region of South Denmark (1.2 mill. inhabitants) have selected the Shared Care Model as the strategy for a reinforced effort for chronic disease management.

The objective is to develop and implement an ICT solution - a Shared Care Platform connected to the national health care network and the internet. The Shared Care Platform will support the cross-sector collaboration (communication and sharing of data) for patients with chronic diseases between general practitioners, hospitals, municipalities and the patients. The Shared Care Platform will be tested with patient who has chronic heart failures, diabetes and chronic obstructive pulmonary disease.

2. CONTENT

2.1 Materials and methods

2.1.1 The Danish Health Care system and use of ITC

Denmark has a population of 5.3 mill. citizens and is divided into 5 regions and 98 municipalities. Health care provision in Denmark is to a very great extent a public task, as 85% of health care costs are financed through taxes. The responsibility for running the service is decentralized, and mostly lies with the regional authorities.

In the Danish health care services, the general practitioners act as "gate keepers" with regard to hospital treatment and treatment by specialists. This means that patients usually start by consulting their general practitioners, whose job it is to ensure that they are offered the treatment they need and that they will not be treated on a more specialist level than necessary.

Digitalization of the Health Care Sector has been ongoing for the past 25 years and particular the sharing of data across organizations and sectors is a difficult and complex task.

Today, all parts of the health care sector make use of IT to a certain extent. Denmark ranks among the countries with the most widespread use of electronic communication [3] between different actors of the health care service.

2.2.1 Interoperability

Today, it is a common requirement that eHealth solutions can share data (i.e. are interoperable) seamlessly between products from different vendors and across organisations. It is evident that implementing systems, that are interoperable, is complex and requires special attention to improve the quality. From a technical and interoperability perspective, quality is judged as if the system complies with agreed (international) requirements (eq. profiles and standards) and can exchange information with systems supporting the same requirements.

A prerequisite for sharing data in a cross sector in a clinical pathway, is a common agreement to use standards. Some standards may describe a health pathway and what data to be shared and other standards may describe how data can be communicated among the systems.

![Figure 1 - Interoperability levels (ALT model)](image)

The ALT model [4], can be used to thematize the areas which are needed to be standardised, to ensure that data from the treatment can be communicated and reused across health care organisations.

The ALT-model includes the organizational level,
the application level, the logical level and the technical level. On each level an agreement on the use of standards is needed to achieve organisational, clinical, semantic and technical interoperability.

2.2.2 A Shared Care Platform

The Region of South Denmark has for many years been in front by the development of new innovative IT-solutions, which improves the continuity of care across the hospitals, general practitioners and the municipalities.

![Figure 2 - Concept for the Shared Care Platform](image)

The methodology for the establishment of Shared Care Platform was:

- An in-depth review of the existing ICT infrastructure and services, with the aim to reuse as much of the existing data as possible. The challenge is the use of standards and to achieve semantic interoperability
- Development of functionality in a new Shared Care Platform, which are complementary to the already existing ITC systems in hospitals, primary care and the municipalities
- Development of an integration architecture for access to data in from various existing sources
- Development of a new ITC infrastructure for patient monitoring in their own homes
- A public tender to select a vendor
- Pilot testing – in vitro - for chronic heart failures with hospitals, general practitioners, municipalities and patients

2.2 Results

2.2.3 The existing ICT infrastructure

The status and use of ICT by November 2012 is:

- A “closed” national health care network based on the internet. All health care organisations are connected.
- Electronic exchange of most frequent messages. Prescriptions, discharge letters (approx. 5.5 mill. messages per month). More than 130 different profiles for the data to be exchanged are used.
- 100% of pharmacies use IT and communicate with GPs and hospitals
- 100% of hospitals have PAS and communicate with GPs and other hospitals
- 99% of GPs have EHR and communicate with other parties
- 99% municipalities have care systems and communicate with other parties
- 80% hospital beds served by EHR and communicate electronically with other parties
- A national public health portal with guidelines to health professionals, patients and citizens including access from the citizens to own data
- National clinical databases with information on the quality for the treatment
- .. and much more

Chronic Disease Management and sharing of the needed data has been discussed for many years. The current ITC situation as outlined above is a good basic for sharing data but is not sufficient as many data and services have been developed for other specific purposes.

2.2.4 Functionality in the Shared Care Platform

The fundamental for the Shared Care Platform requirements was that it may be a supplement to the existing system used in the different health care organizations. The data to be shared may give added value for all parties. The Shared Care Platform may not include functionality and/or data, which replace existing systems or services and/or is only used for one organization. The aim is only to support the cross-sector collaboration including the involvement of the patient. The development work was divided into 8 work packages.

WP1: A basic system

A survey done by the Region of South Denmark in November 2010 [5], shows that ITC support of chronic diseases is fragmented and no solutions exist that fulfills the requirements. However more vendors can offer solutions or components which can be used for pilot operation and be used for the
further development in close collaboration with the users.

Using the first version of the Shared Care Platform, the user may be able to enter data for patients with chronic heart failure and all data shall be presented in one screen, including historic data.

A fast delivery of the basic system is a prerequisite for the further development in order to get the users feedback on the continuous development of new functionality.

WP2: Minimum data, standards and integration

The Shared Care Platform will reuse selected data which have been entered once in the different IT-systems which the health professionals already are using to document the treatment (EHR-systems in hospitals, GP-systems and social care system in the municipalities).

Integration and semantic interoperability is important and will be archived by using the national agreed standards for messaging and web-services for access to national registries. In Denmark more than 130 profiles has been defined for the exchange of data in the health care sector and the number is growing each year.

WP3: Decision support

The Shared Care Platform shall have a function for decision support, which continuous are processing the data for the individual patient. The decisions support is based on configurable rules, which support functionalities for co morbidity. Data which are entered by the user can be checked for validity and calculations can be done to suggest the next appointment for a consultation.

WP4: The Patients Plan

A standard plan includes default values for a specific chronic disease. The values can be individualized e.g. values for weight, pulse and blood pressure.

The Patients Plan is tool for communication between the patient and the health care professionals involved in the treatment. At a consultation, the doctor can give advice and make an agreement with the patient regarding areas and values to be improved. The doctor will enter the agreed areas and the data to be monitored. Afterwards the actual values are continuous compared with the goals in the Patients Plan. The actual values are typical laboratory results like blood pressure, pulse, weight and cholesterol but can also include values for exercise, alcohol consumption and smoking. Common for all data is that they can be regarded as laboratory results.

WP5: The Patients own data and home monitoring

The technology to collect information regarding the patient’s health already exists. However, a system to share this information in an effective way is missing. To ensure an optimal treatment, patients with heart failures, diabetes, raised blood pressure and other chronic diseases, shall carefully monitor the current condition and agreed treatment. To ensure and support that the patients take their medications, devices can be used to send reminders for the time to take the medication. The active participation will facilitate a better compliance with the treatment plan and empower the patient to care of his own health.

The individual patient can look-up his own data via an internet browser. Before a scheduled consultation, the doctor can send a questionnaire to the patient and the time allocated to the consultation can be used for more important issues than collect data about the patient.

WP6: Reports and analysis

Data which are stored in the Shared Care Platform can be printed and analyzed. The health care professionals can print out reports for patients where the treatment can be optimized. In that way the health care resources can be focused and used for patients where the disease is not treated well.

Reports can also include patients, which have not shown-up to the last consultation.

WP7: Advanced configuration

The functions in the Shared Care Platform are generic and can used widely for all chronic diseases and later on for other diseases where it is needed to share data across sectors and organizations. New diseases can be added by adding new screens and/or folders including the related data elements. The data elements can be configured so clinical data recorded at a consultation can be entered. The data entry can be based on structured and coded data which are agreed to be used by the National Board of Health and the clinical associations.

WP8: Mobile applications

Mobile applications (apps) can be used by the health professional and the patients as a new way to give access to relevant information.

The patient has access to his own plan (agreed goal for specific values) and the actual measured values.

2.3 Discussion

The objective for the Shared Care Platform is to support, by the use of ITC, the generic pathway for chronic diseases, made by the National Board of Health [1].
The Shared Care Platform will support the cross-sector collaboration (communication and sharing of data) for patients with chronic disease between hospitals, general practitioner and municipalities and the patients:

- To the greatest extent possible is done by the primary care sector (primary care doctor, primary care specialist doctor, physiotherapist etc.)
- The individual patient shall be offered a planned and coordinated treatment between:
  - Primary care doctor (care manager)
    - Stratifies the patients and work out a plan for the treatment
    - Refers to services offered by the municipalities and hospitals
  - Municipalities
    - Education and rehabilitation
  - Hospitals
    - Hospitalizing and specialist treatment
    - Ambulatory treatment
    - Care manager for complex patients
  - Patients
    - Home monitoring
    - Self treatment

3. CONCLUSIONS

The increasing emergence of chronic diseases is a great challenge for the entire health system regarding development and the coordination of effort, which ensures quality, patient empowerment and coherent clinical pathways for the individual patient. Today more than 860 million people suffer from minimum one chronic disease and the number increases heavily. In 2020 it is expected that the number with diabetes is doubled and death caused by heart failures will increase to more than 20 million per year.

It is expected that an improved communication by using the Shared Care Platform will empower the patient to take care of his own health. The Shared Care Platform will also provide the health care professionals with better access to information, which is needed to better quality decisions.

The Shared Care Platform will go into daily pilot operation the 1st February 2013. The findings and learning’s will be reported at the Informática en Salud 2013 – Havana, Cuba: 18-22 March 2013.

4. REFERENCES


3. The Ministry of Health: “eHealth in Denmark, eHealth as a part of a coherent Danish health care system”, May 2012.


5. SYNTHESIS OF THE AUTHOR’S CURRICULUM

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