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# CareNet Tyrol - Information System Success Assessment for Case & Care Management Service

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Abstract. Background: CareNet is the IT-based tool for Case and Care Management (CCM) in Tyrol, which facilitates standardised documentation of CCM activities. Objectives: Analysing the pilot usage of CareNet Tyrol. Methods: Evaluation of the success and user experience of CareNet, expert interviews and a questionnaire-based assessment. Results: Feedback from users in both phases indicated that the CareNet platform provides general benefits, but falls short of fully supporting the daily work of CCM experts and avoiding the need for parallel use of different documentation tools. Conclusion: This paper provides an insight into the ongoing transition to digital documentation is proved to be beneficial for the CCM team.

**Keywords.** case & care management, case management, ict in healthcare, patient care management, integrated care, ehealth, ict technologies

## 1. Introduction

Due to the aging population, healthcare is changing, resulting in increased cost [1]. The demand for services from various stakeholders, such as healthcare and social insurance providers, is continuously rising. The entitlement to assistance, which was initially defined purely in socio-legal terms, has now evolved into a working alliance that considers economic aspects and promotes cooperation among all parties involved [2].

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The increasing complexity of caring for chronically ill people in different life situations and the complexity of care structures within the health care system make case management (CM) necessary [3]. The literature suggests that case and care management (CCM) is increasingly being used in various areas of the social and healthcare sector, including nursing, social work, and medicine [4, 5].

CCM combines a structured social and nursing care concept with individual coordination and organization of care and support services. The patient is supported throughout the entire course of the (chronic) condition wherever possible. The concept is described as cross-structural, networked care that is tailored to the needs of individual patients and optimizes the use of available services and resources [6]. The term 'care management' refers to the management tasks involved in providing comprehensive care, including assistance, nursing, inpatient treatment, and outpatient care [7]. Case management is a practical and widely applicable method for organising care for clients [4]. It involves different professions and actors in dealing with complex cases. The process supports independent client care and is tailored towards specific target groups. Further, it provides solution- and goal-orientation, and follows guidelines [6].

Supplementary, the ubiquitous use of information and communication technologies (ICT) is having an increasing impact on citizen's daily lives. The potential for developing and adapting ICT solutions in nearly all areas of society, including healthcare, is vast due to the wide range of possible uses of multimedia interfaces [8]. ICT acts as a bridge between healthcare and technology [9]. Further, cooperation and networking between stakeholders are necessary for planning public health strategies and implementing ICT tools to promote health and serve a better healthcare system [8].

This article analyses the pilot use of an ICT solution for CCM in Tyrol, Austria, and highlights the challenges and requirements for its implementation. The study also explores critical barriers and hurdles, as well as the advantages and disadvantages of using an ICT solution for CCM. Finally, the work addresses the acceptance of the implemented solution.

### 2. Methods

The initial stage of the projects involved examining the existing CCM procedures and processes at the Tyrolean Federal Institute for Integrated Care (LIV Tyrol) and conducting a comprehensive requirement analysis bases on an actual state analysis. The initial requirements for an integrated care network solution were identified through discussions on a regular basis with a group of experts from LIV Tyrol and the participants within the treatment network [10]. The results were utilised to establish and configure the CareNet Tyrol ICT solution, utilising core components of the KIT telehealth framework developed by the AIT Austrian Institute of Technology GmbH [11]. CareNet Tyrol comprises of the following features and functions (see to Figure 1): user administration, client view, and data export for evaluation.

Fundamental functions encompass (1) user management, (2) separate user groups for all districts in Tyrol, (3) a general overview, and (4) client and task lists.

The client view offers information on the client's administrative data, contact persons (such as family doctor, specialist, relatives, etc.), status of the care process (ongoing, evaluation, completed), notes with categories (such as contact information, goals, assessments, etc.), task creation and processing, task categories, appointment series and reminders, and document uploads in different formats with folder structure.

In March 2023, the 'CareNet Tyrol' service was launched on the IT network of Tirol Kliniken GmbH [12]. To assess the success of the information system in an applied environment, we established a two-step approach.



Figure 1. Visualization of the CareNet Tyrol system architecture showing the main components of the software platform that is based on the KIT telehealth framework [10].

# Step 1 – Expert interviews after pilot application

After a three-month pilot application, expert interviews were conducted. The experts were selected based on their extensive experience and expertise in case and care management as well as their usage of CareNet during the pilot phase. To answer the questions, we conducted a comprehensive and systematic literature review and created a plan for guided interviews with experts. We evaluated the results using Mayring's qualitative content analysis [13]. For this study, we used transcript analysis as the summarizing method, which is the most appropriate for answering questions in qualitative content analysis. The material was reduced to the essentials, resulting in a summary of the relevant findings. We used both inductive and deductive methods, developing superordinate categories for the questions from the theory at the beginning. After completing the transcription, the transcripts were coded and the subcategories were categorized inductively. Finally, the theoretical and empirical results were summarised and the questions were answered [14].

## Step 2 – Assessment questionnaire after six months of routine use

Following a six-month rollout phase, we assessed user experience using the Information System Success Model Survey, which is based on the Delone and McLean Information System Success Model [15]. The survey comprises questions in six dimensions: information quality (5 items), system quality (7 items), service quality (6 items), user satisfaction (5 items), net benefits (7 items), and intention to use (4 items). The questionnaire included six open-ended questions regarding benefits and potential areas for improvement. It was derived from previous research but has not undergone formal validation [16].

# 3. Results

In March 2023, after the system launch, four CCM experts used CareNet Tyrol to document the first 199 CCM cases in four pilot districts. 116 of all cases were female. At the end of the pilot phase, 76% (152) of the cases were closed, indicating that all stages (see Table 1) and functions of the system were utilised. After Phase 2, the roll-out to all Tyrolean districts, a total of 14 CCM experts documented an additional 399 cases of CCM (see Table 1), of which 223 were female. All clients in care were provided with a written informed consent, which had to be signed, to allow digital documentation in CareNet.

 Table 1. Basic data of CCM clients in the pilot phase from March-June and rollout phase from July to December

 2023 including gender (male (m)/female (f)) and stages.

Stage	Pilot phase (1)	Roll out phase (2)
	CCM cases (m/f)	CCM cases (m/f)
Overall	199 (83/116)	399 (176/223)
Active	34 (13/21)	180 (70/110)
Pending	8 (4/4)	43 (20/23)
Finished	152 (63/89)	162 (77/85)
Paused	5 (3/2)	12 (8/4)
Canceled	0	2 (1/1)

After the pilot phase, and a few adjustments to the system configuration, based on feedback from phase one team, the system was rolled out to all nine Tyrolean districts. Fourteen CCM experts received individual and group training via video sessions. Table 2 displays the distribution of documented cases across the Tyrolean districts.

Tyrolian districts	CCM cases (m/f)	Tyrolian districts	CCM cases (m/f)
Imst	52 (23/29)	Kufstein	14 (6/8)
Innsbruck	36 (14/22)	Landeck	38 (18/20)
Innsbruck Land-Ost	39 (16/23)	Lienz	76 (31/45)

Reutte

Schwaz

59 (27/32)

34 (15/19)

 Table 2. Data from districts in Tyrol including gender (male/female), between July and December 2023.

26 (11/15)

25 (15/10)

## **Results of the expert interviews**

Innsbruck Land-West

Kitzbühel

The expert interviews were conducted with four early-stage users at the end of the pilot phase in June 2023. The interview questions were prepared to focus on the main goals of the CareNet System, which aims to provide a general tool for documentation and workflow support for CCM work. The experts' responses were summarised based on whether one aspect was evaluated as barrier or as advantage (refer to Table 3).

Table 3. Summary of results of expert interview after pilot phase

Feedback topics	Barriers	Advantage
Use of standardized assessment		Х
Use of a flexible system architecture	Х	
Consideration of the GDPR aspects		Х
Change of documentation and workflow	Х	Х
Standardization of data collection and evaluation		Х
Helps to improve teamwork		Х
Helps to improve quality of care for clients		Х

Overall, the responses indicated that the users perceived numerous benefits in using CareNet for CCM work. The main obstacles and challenges have been addressed in the areas of system architecture flexibility and changes to documentation and workflow. It is important to note that while a flexible system architecture may not directly benefit users, it can contribute to sustainable use and adaptation for various applications within the organization. It is important to note that the introduction of a new tool often faces resistance, particularly from users who already have established processes and procedures.

#### **Results of the Information System Success Model Survey**

In the survey of the six dimensions of the Information System Success Model (range 0%-100%), the mean results varied from 58.3% (intention to use) to 95.0% (service quality) (Figure 2), which indicated needs for improvement e.g. regarding intention to use, information quality, where the users see advantages in daily use. All users reported a high level of experience and confidence in using computers and smartphones in their daily work.



**Figure 2.** Aggregated results from the Information System Success Model survey (n=12) after 6 months (minimum=0%, maximum=100%). Information quality 76,9%; system quality 80,6%; service quality 95,0%; user satisfaction 76,8%; net benefit 70,7%; and intention to use 58,3%.

In terms of user benefit and intended use, the experts rated the CCM significantly lower than the other four topics. This was also reflected in the answers of the interview, which suggested (a) integrating additional functions to avoid using multiple documentation tools simultaneously, (b) providing an interface to Microsoft Outlook for joint calendar management and scheduling, and (c) enabling comprehensive data export for reporting. Regarding system quality, the majority rated the consideration of data protection measures and the use of two-factor authentication positively. However, it was noted that automatic logout, which requires re-login after a work interruption (e.g. due to a phone call), can be time-consuming.

# 4. Discussion

Today, leveraging digital applications is crucial for streamlining CCM workflows, offering numerous advantages and simplifications. Standardized data collection and

structure enable essential analyses and evaluations, aiding demand-oriented planning for future years in the field. Implementing ICT standards is essential for uniform data collection and evaluation, easing data exchange through stored information on a platform. This not only saves time and resources but also enhances the quality of care by providing necessary information in a structured and standardized manner. Ensuring secure storage of sensitive personal data is paramount, adhering to GDPR regulations.

Feedback from users highlighted that while the CareNet platform provided general benefits, it fell short in fully supporting daily CCM tasks, particularly in avoiding the parallel use of different documentation tools. To address this, it was recommended to implement an overview of all customer appointments post-evaluation and include functions for quick documentation of anonymous informal cases. Reducing redundant documentation and tool usage is crucial.

This work addresses a critical topic in the health and social care sector, shedding light on the significant shift to digital documentation in Tyrol's CCM. Despite areas for improvement highlighted by user feedback, digital documentation is proving advantageous for organization, execution, and documentation in CCM.

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