

# IT-Based Virtual Medical Centres and Structures

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## INTRODUCTION

Today, medical infrastructures are subject to organisational change the world over. The reasons for this are manifold. On the one hand, it can be observed through scientific innovation and gaining of knowledge that a more in-depth specialisation is taking place, which means that medical healthcare providers are able to offer in-depth knowledge in narrowing fields. On the other hand, through increased process orientation of treatment pathways for patients, the necessity for superior organisational principles has been established. This effects that organisational cooperation models have to be found, which integrate singular specialised institutions into an organisational whole, which then employ integrative processes, information, and quality requirements.

Such organisational structures can be set up in real structures by the spatial accumulation of scattered service units, so that centralised medical centres establish. Alternatively, organisational and technical integration may substitute the physical integration. The individual medical service units stay dislocated, but appear as a virtual medical centre or as specialised medical networks having a clearly defined profile.

The management of the information technology in a virtual medical service centre is subject to different requirements than the IT-management of a hospital resembling more a closed shop.

Building a virtual centre calls for performance of an open shop principle, because the entire treatment chain cannot be mapped within one single institution, but requires integrated cooperation in order to manage a patient's clinical pathway.

Not only the spatial displacement, but also the unavoidable higher process orientation within a virtual cooperation deserves particular consideration.

Additionally, the information management is challenged by the fact that the provision of relevant information in standardised form is an indispensable element of a virtual centre. In this context, the question about potential structural assembling, and organisational principles and elements of virtual medical service centres has to be answered in order to conclude on the basic requirements of data management and the appropriate solution approaches.

This shall be presented partly using the example of the virtual oncological medical centre in Tyrol.

## BACKGROUND

The question about the role of medical informatics in modified organisational structures has been frequently posed in the context of medical service supply (Power, 1999). In particular, an integrative IT-policy has considerably increased in importance through the standardisation of patient pathways, introduction of evidence-based medicine, standards, guidelines, and directives, and therefore, the inevitable necessary cooperation of healthcare providers. Especially in the earlier stages, exemplary models were introduced which were supposed to make the changed requirements more manageable (Ölvingsson, Hallberg, Timpka, & Lindqvist, 2002). This, however, does not only affect the cooperation between healthcare providers, but also the technical-based integration of patient data, as well as the extensive bonding of other persons and units involved with the treatment chain. Particularly opened by the evolution of telemedicine, concepts are currently being

developed in this area (Bradley, Williams, Brownsell, & Levi, 2002), which integrate technical possibilities such as virtual reality into medical treatment processes (Burdea, 2003).

The first and pivotal approaches of information technology in medical networks primarily concentrate on the field of electronic patient record. Correlating to this, scientifically evaluated projects and models introduced criteria which have to be considered by the IT-management in medical networks (Van den Haak, Mludek, Wolff, Bützebruck, Oetzel, & Zierhut, 2002). It can therefore be adhered to, that through this structural development of the various sectors of the health system which are geared towards integrated care, medical informatics becomes more complex, too. Increased dialogue structures, principles of the standardisation of terminology, data exchange, and the comparability of data, and the resulting necessary transparency of medical healthcare providers have become subject matters of discussion and research (Coddington, 1997; Francis & Hart, 1998).

Beside the altered basic conditions, it can be observed that the aspired construct of “patient oriented health networks” actually take shape by the affiliation of medical disciplines towards patient oriented service centres, and hence in practice, forces a complex IT-management (Montreuil & Garon, 2005).

Linked to this is not only the question of the requirements and the practical implementation of such systems (Day & Norris, 2006), but also the investigation about barriers and restraints of a successful realisation of new concepts (Cashen, Dykes, & Gerber, 2004). At least the differing intentions and interests of single system partners (e.g., administration) also play an important role (Hassan, 2005), as do the requirements of health politics (Kaushal, Bates, Poon, Ashish, & Blumenthal, 2005). Dealing with the subject of virtual medical centres, science particularly has to focus on standardising the processes in the networks, and also on the quality of data (Hain, 2002; Stoop & Berg, 2003).

## **IT-BASED VIRTUAL MEDICAL CENTRES AND STRUCTURES**

### **The Model of the Virtual Medical Centre**

Based on the newer findings about organisational concepts and structures in medicine, Tyrolean (Austria)

health politics initiated a project in 2000, whereby it was attempted to integrate oncological healthcare providers in the province of Tyrol into a virtual network. The network was supposed to be implemented on the basis of uniform medical standards coupled in clearly defined treatment paths. The participation in the virtual medical centre was voluntary, but all participants had to comply with the commonly derived directives. Simultaneously, the basic organisational principles of the virtual oncology centre were developed in order to be able to work out the requirements for the subsystems (e.g., the data management).

The basic principle of the virtual medical centre in Tyrol can be described through structural tripartism into strategical, tactical, and operative level. On a processual level, this principle can be best compared with a cybernetic model, whereby the learning ability of the system is centrally controlled and ensured by the interaction of all system participants.

A medical board is operating on the strategic central level, its main task being that of serving as a steering board for the entire medical centre. Its particular function is to validate directives and processes, as well as to adjust system parameters in the area of quality assurance. Complimentary, those carriers who additionally to medical competency have the key competencies for steering the entire system are part of the board (e.g., clinic management executives).

As contract research and pursuit of research projects are related on the board level, an “Open Shop” solution for communication instruments has to be provided (Ohly, 1995). For a consequence, communication and interaction structures have to be connected beyond the virtual medical centre. Pipelines to supraregionally and internationally active healthcare and research centres are provided, as well as structural ties to industrial partners involved with research.

As a tactical element, the central service structure particularly serves data and patient management, and has to include all documentation systems which are of superior importance. Irrespective of this, a regionally spanning consensus still has to be reached about documentation criteria—of patient files for example (Leiner, Gaus & Haux, 1995). This appears feasible if well-described and tested models are employed (Yamasaki & Satomura, 2001). Furthermore, own research projects as well as institutional research is steered and coordinated on the central service level. Treatment structures are only to be maintained up to a

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