

Systems Analysis in Health Care: Framework and Example

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Summary

Objectives: Due to the high complexity of structures and processes in health care, thorough systems analyses in health care run the risk of becoming very complex and difficult to handle. Therefore, we aimed to support systematic systems analysis in health care by developing a comprehensive framework that presents and describes potential areas of analysis.

Methods: A framework for systems analysis in health care was developed and applied in a health care setting. To provide a clear structure, the framework describes the potential views and levels of systems analyses in a health care environment.

Results: The framework comprises five views (roles and responsibilities, information processing and tools, communication, business processes, teams structure and cooperation) and five levels of analysis (overall organization, organizational unit, staff member, role, task). The framework was successfully applied in an analysis of the structures and processes of the Department of Child and Adolescent Psychiatry of the University Medical Center Heidelberg.

Conclusions: The proposed comprehensive framework aims to structure the views and levels of systems analysis in the complex health care environment. Our first experiences support the usefulness of such a framework.

Keywords

Systems analysis, communication, coordination, patient care team, delivery of health care, process assessment

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1. Introduction: Systems Analysis in Health Care

1.1 Background and Motivation

The complexity of information processing in health care institutions is tremendous due to the high complexity of their structures and processes. Nearly everyone working in a hospital has an enormous demand for information, which must be fulfilled to guarantee excellent and efficient patient care [1, 2]. To achieve high-quality patient care, different professional groups, such as physicians, nurses, and administrative staff, must communicate and cooperate closely [3, 4]. The stakeholders' issue is quite complex [5]. Patient care aims must be discussed, decided upon and revised in treatment teams, which are made up of different members for each patient. Processes are highly variable and flexible, standard "reference" patient care processes are difficult to define. Patients receive individual treatment – not only in emergency cases that demand immediate care. Decisions must be made quickly and are often based on incomplete information. Therefore, systematic information management is of tremendous importance in order to plan, monitor and direct information processing in such a way that the information needs of the various user groups are fulfilled in any situation and location [6].

The quality of information management can only be assessed by rigorous systems analysis. The general aim of such an analysis is to analyze the current state and weaknesses of organizational structures and processes in a defined area. A thorough

systems analysis in a health care institution is the precondition for all activities aiming at improving structures and processes in health care, such as business process reengineering, quality management, or the introduction of new information processing tools [3]. The more precise the analysis, the better the structures and processes of the institution can be redesigned, improved or supported [7, 8].

Due to the high complexity and interconnectivity of workflow, information management, communication and cooperation, thorough health care systems analyses run the risk of becoming very complex and difficult to handle. If relevant parts are overlooked, insufficient systems analyses may even lead to project failures [9, 10]. For example, an insufficient analysis of communication may lead to the failure of a new electronic record system [11].

In our opinion, a description of the possible views and levels of a systems analysis in health care could help clearly define the areas requiring analysis without overlooking relevant parts.

Approaches used in more structured environments do not seem useful in assessing the complexity surrounding health care. For example, available frameworks for computer-based enterprise information systems – such as ARIS (Architecture of Integrated Information Systems) [12], or the Zachmann framework [13], concentrate on the computer-supported part of an information systems, often omitting, for example, an explicit analysis of the specific complexity surrounding health care, such as paper-based information processing, communication and cooperation within the health professional team. Thus, they are not

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Systems Analysis In Health Care

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Systems Analysis in Health Care Vijay Mahajan, C. Carl Pegels, 1979-01 *Systems Analysis in Health-care Delivery* Arnold Reisman, 1979 **Systems Analysis Tools for Better Health Care Delivery** Panos M. Pardalos, Pando G. Georgiev, Petraq Papajorgji, Britta Neugaard, 2013-01-04 This book presents some recent systems engineering and mathematical tools for health care along with their real world applications by health care practitioners and engineers. Advanced approaches, tools, and algorithms used in operating room scheduling and patient flow are covered. State of the art results from applications of data mining, business process modeling, and simulation in healthcare together with optimization methods form the core of the volume. *Systems Analysis Tools for Better Health Care Delivery* illustrates the increased need of partnership between engineers and health care professionals. This book will benefit researchers and practitioners in health care delivery institutions, staff members, and professionals of specialized hospital units, and lecturers and graduate students in engineering, applied mathematics, business administration, and health care.

Expert Systems and Decision Support in Medicine Otto Rienhoff, Ursula Piccolo, Berthold Schneider, 2012-12-06 The 33rd Annual Meeting of the German Association for Medical Documentation Informatics and Statistics was combined with a Special Topic Conference of the European Federation for Medical Informatics and takes place at Hannover, F.R.G. from September 26 to 29, 1988. It was planned and initially prepared by the late Prof. P. L. Reichertz, who headed the Hannover Institute from 1969 to 1987. To commemorate his contribution to the development of medicine, the conference was devoted to him. Peter Reichertz Memorial Conference on Expert Systems and Decision Support in Medicine. Since computers in the early Fifties were first applied to support medical reasoning, various phases of euphoria and resignation have followed. Every new methodology which became technically possible was and will be applied to the old question of how to diagnose diseases more reliably. Artificial Intelligence is just one new approach to the old challenge. Over the years, some authors have been very optimistic and put forward opinions which motivated the common press to coin the phrase "Dr. med. computer." Papers printed under this heading rebuffed the majority of physicians for many years. Today we know that medical decision making is a most complex human performance. And 30 years of research on decision support have given us only limited insight into the underlying processes. Most of the principal methodological questions were already asked very early on.

Handbook of Healthcare Delivery Systems Yuehwen Yih, 2016-04-19 With rapidly rising healthcare costs directly impacting the economy and quality of life, resolving improvement challenges in areas such as safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity has become paramount. Using a system engineering perspective, *Handbook of Healthcare Delivery Systems* offers theoretical foundation.

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