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# **Quality Assurance in Healthcare Service Delivery, Nursing and Personalized Medicine**

Technologies and Processes



**Athina Lazakidou & Andriani Daskalaki**

# Quality Assurance in Healthcare Service Delivery, Nursing, and Personalized Medicine: Technologies and Processes

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# Preface

In general, outcome measurement has focused on a health gain or health maintenance score, or an overall wellbeing result. However, because quality of life is difficult to define and even more difficult to measure - particularly with physically and mentally vulnerable people - outcomes from nursing in continuing care are not easily articulated. The focus of the nursing assessment tool is therefore on increasing quality of life, rather than perceiving health gain simply as increased longevity.

Assessment is considered to be the first step in the process of individualized nursing care. It provides information that is critical to the development of a plan of action that enhances personal health status. It also decreases the potential for, or the severity of, chronic conditions and helps the individual to gain control over their health through self-care.

One of the great challenges in medicine is to deliver effective therapies tailored to each patient based on his molecular signatures. The so-called “personalized medicine” would involve tools of patient evaluation that would tell clinicians the correct drug and doses for the patient. Patient outcomes of a drug intervention are the result of conditional probabilistic interactions between complexes of drug-metabolizing enzyme genes, a range of metabolic regulatory genes, and environmental factors. Systems biology tools and concepts that integrate modelling of signalling pathways and regulatory networks at many levels of biological organization in the whole organism provide a help to personalized medicine.

The main goal of this new book is to provide innovative and creative ideas for improving the quality of care and to explore all new technologies in medical informatics and health care delivery systems as well as technological advances in personalized medicine.

The topics of this book cover useful areas of general knowledge including concepts of quality, quality assessment and quality assurance, risk management and quality of care, patient and nurse assessment in personalized medicine, role of information technology in healthcare quality assessment, quality in telemedicine services, tools and techniques in systems biology, ethical guidelines for the quality assessment of healthcare, health system policies, and service delivery.

The book covers basic concepts, best practices, techniques, investigative challenges in clinic and research.

## Organization of the Book

The book is divided into four sections:

Section One: “*Clinical Diagnostic Methods*” introduces innovative concepts in medical diagnostics. Chapter 1 presents patient specific cardiovascular diagnosis. The novel method described in this chapter produces a distribution of physiologically interpretable models that allow the identification of disease



specific patterns that corresponded to clinical diagnoses, enabling a probabilistic assessment of human health condition. In this work a technique is presented to identify arterial stenosis and aneurisms from anomalous patterns in signal and parameter space. Chapter 2 introduces experience sharing of Cai's gynecology in Traditional Chinese Medicine. A novel system named TCM-PMES is demonstrated. This system preserves the diagnostic processes in a personalized way.

Section Two, "*Basic Research: A Bridge to Modern Medicine*," serves as a comprehensive introduction to methods supporting basic research. The emphasis of chapter 3 is on new therapeutic approaches using functional cells derived from stem cells. This chapter provides a general overview on technologies applied on stem cell research. Chapter 4 gives an extended analytical consideration of mathematical modelling to the analysis of biological pathways perturbed in disease. Chapter 5 discusses the development of novel universal strategies for exogenous control of gene expression based on designer riboswitches that can function in the cell.

Section Three is titled "*Medical Treatment and Research: Ethics and Applications*." Chapter 6, entitled "Ethical Guidelines for the Quality Assessment of Healthcare," describes how ethical principles can be used as guidelines for the quality assessment of healthcare provision. In Chapter 7, the authors present the computational workflow to investigate the process of tumor progression, and present this approach through an example of childhood neoplasias.

Section Four, "*Healthcare Quality Assessment*," is dedicated to methods applied in the healthcare service delivery. In chapter 8, the authors define ethical requirements in educational practice for healthcare quality. In chapter 9, the author describe the social role of technology in healthcare quality improvement. Chapter 10 presents a novel solution to improve quality assurance, in drugs delivery; i.e. reduce clinical errors caused by drug interaction and dose. Telemedicine services should meet the international quality requirements in order to accomplish quality assurance in healthcare provision. Technology advances have brought forward new and evolved services and technical infrastructure that promote and enhance quality healthcare services, such as telepresence and wearable technology. Nevertheless, there are several obstacles in telemedicine performance that need to be resolved. In Chapter 11 the authors try to define quality issues in Telemedicine Services.

The main purpose of the Chapter 12 is to represent an alternative effective model for measuring the quality of healthcare (SERVQUAL) considering the geographical location of the under examination healthcare sectors. Geographical Information Systems (GIS) play a major role in all areas of health research, especially for the understanding of spatial variations concerning disease monitoring. Chapter 13 describes the methodological approach for the development of a real time electronic health record, for the statistical analysis of geographic information and graphical representation for disease monitoring.

The purpose of the Chapter 14 is to provide innovative knowledge and creative ideas of improving quality of care and to explore how risk management and Knowledge transfer and quality assurance can improve health care. Under careful consideration, our purpose is to summarize which factors improve and promote the quality of care and which factors diminish quality. There are forms of ongoing effort to make performance better. Quality improvement must be a long- term continuous effort, reducing errors and providing a safe trust environment for health professionals and patients. After reading this chapter, the reader should know the answer to these questions: What role can risk management and knowledge transfer play in quality of care? How risk management and knowledge transfer can work together? What are the factors that improve risk management and quality assurance in health care? How does knowledge transfer support inform and improves care?

Quantifying and improving the quality of health care is an increasingly important goal in medicine. Because quality of life is difficult to define and even more difficult to measure - particularly with physically and mentally vulnerable people - outcomes from nursing in continuing care are not easily articulated. The focus of the nursing assessment tool is therefore on increasing quality of life, rather than perceiving health gain simply as increased longevity. Assessment is considered to be the first step in the process of individualized nursing care. It provides information that is critical to the development of a plan of action that enhances personal health status. It also decreases the potential for, or the severity of, chronic conditions and helps the individual to gain control over their health through self-care. In the Chapter 15 the authors try to describe how important is the role of Information and especially of the Information Technology in Healthcare Quality Assessment.

The book, “Quality Assurance in Healthcare Service Delivery, Nursing and Personalized Medicine: Technologies and Processes,” contains text information, but also a glossary of terms and definitions, contributions from international experts, in-depth analysis of issues, concepts, new trends, and advanced technologies in Healthcare Service Delivery, in modern clinical diagnostics, and in advanced medical research.

The new book will be an excellent source of comprehensive knowledge and literature on the topic of quality assurance in healthcare service delivery, nursing and personalized medicine.

All of us who worked on the book hope that readers will find it useful.

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