

Measurement in Medicine

A Practical Guide

The success of the Apgar score demonstrates the astounding power of an appropriate clinical instrument. This down-to-earth book provides practical advice, underpinned by theoretical principles, on developing and evaluating measurement instruments in all fields of medicine. It equips you to choose the most appropriate instrument for specific purposes.

The book covers measurement theories, methods and criteria for evaluating and selecting instruments. It provides methods to assess measurement properties, such as reliability, validity and responsiveness, and to interpret the results. Worked examples and end-of-chapter assignments use real data and well-known instruments to build your skills at implementation and interpretation through hands-on analysis. This is a perfect course book for students and a perfect companion for professionals/researchers in the medical and health sciences who care about the quality and meaning of the measurements they perform.

- Focuses on the methodology of all measurements in medicine
- Provides a solid background in measurement evaluation theory
- Based on feedback from extensive classroom experience
- End-of-chapter assignments give students hands-on experience with real-life cases
- All data sets and solutions are available online

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Measurement in Medicine

A Practical Guide

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Preface

Measuring is the cornerstone of medical research and clinical practice. Therefore, the quality of measurement instruments is crucial. This book offers tools to inform the choice of the best measurement instrument for a specific purpose, methods and criteria to support the development of new instruments, and ways to improve measurements and interpretation of their results.

With this book, we hope to show the reader, among other things,

- why it is usually a bad idea to develop a new measurement instrument
- that objective measures are not better than subjective measures
- that Cronbach's alpha has nothing to do with validity
- why valid instruments do not exist and
- how to improve the reliability of measurements

The book is applicable to all medical and health fields and not directed at a specific clinical discipline. We will not provide the reader with lists of the best measurement instruments for paediatrics, cancer, dementia and so on – but rather with methods for evaluating measurement instruments and criteria for choosing the best ones. So, the focus is on the evaluation of instrument measurement properties, and on the interpretation of their scores.

This book is unique in its integration of methods from different disciplines, such as psychometrics, clinimetrics and biostatistics, guiding researchers and clinicians to the most adequate methods to be used for the development and evaluation of measurements in medicine. It combines theory and practice, and provides numerous examples in the text and in the assignments. The assignments are often accompanied with complete data sets, where the reader can really practise the various analyses.

x **Preface**

This book is aimed at master's students, researchers and interested practitioners in the medical and health sciences. Master's students on courses on measurements in medical and health sciences now finally have a textbook that delivers the content and methods taught in these courses. Researchers always have to choose adequate measurement instruments when designing a study. This book teaches them how to do that in a scientific way. Researchers who need to develop a new measurement instrument will also find adequate methods in this book. And finally, for medical students and clinicians interested in the quality of measurements they make every day and in their sound interpretation, this book gives guidelines for assessing the quality of the medical literature on measurement issues.

We hope that this book raises interest in and improves the quality of measurements in medicine. We also hope you all enjoy the book and like the examples and assignments. We appreciate feedback on this first edition and welcome suggestions for improvement.

The authors
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