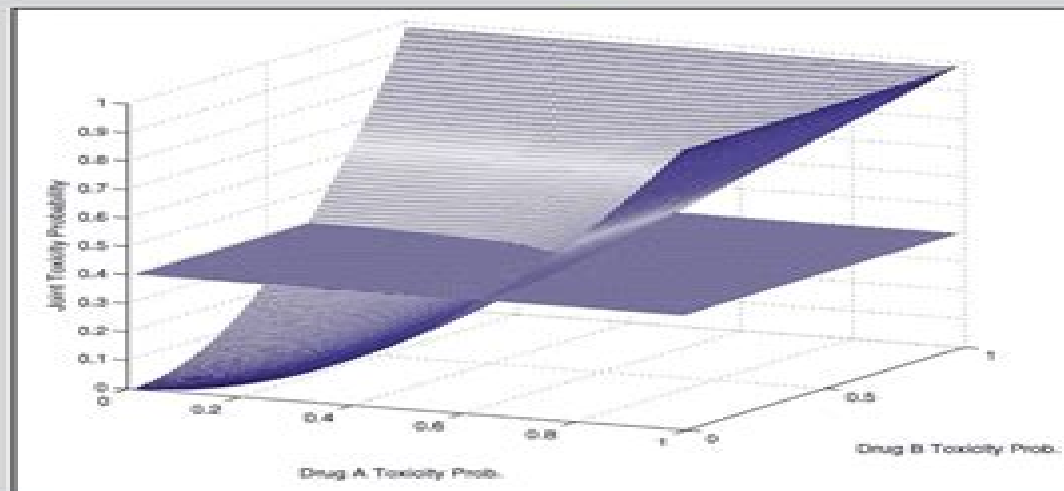


Handbook of Adaptive Designs in Pharmaceutical and Clinical Development



Edited by
Annpey Pong
Shein-Chung Chow



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Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development

Sandeep Menon, Richard C. Zink



Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development:

Handbook of Adaptive Designs in Pharmaceutical and Clinical Development Annpey Pong, Shein-Chung Chow, 2016-04-19 In response to the US FDA's Critical Path Initiative innovative adaptive designs are being used more and more in clinical trials due to their flexibility and efficiency especially during early phase development Handbook of Adaptive Designs in Pharmaceutical and Clinical Development provides a comprehensive and unified presentation of the principle Handbook of Adaptive Designs in Pharmaceutical and Clinical Development Annpey Pong, Shein-Chung Chow, 2016-04-19 In response to the US FDA's Critical Path Initiative innovative adaptive designs are being used more and more in clinical trials due to their flexibility and efficiency especially during early phase development Handbook of Adaptive Designs in Pharmaceutical and Clinical Development provides a comprehensive and unified presentation of the principle

Group Sequential and Confirmatory Adaptive Designs in Clinical Trials Gernot Wassmer, Werner Brannath, 2025-10-14 This book provides an up to date review of the general principles and techniques of confirmatory adaptive designs a generalization of group sequential designs With these designs interim analyses are performed in order to stop a trial prematurely under control of the Type I error rate In adaptive designs it is also permissible to perform a data driven change of relevant aspects of the study design at interim stages This includes for example a sample size reassessment a treatment arm selection or a selection of a pre specified sub population First introduced in the 1990s this popular adaptive methodology has become the focus of intense discussion and is still a rapidly growing field of statistical research The book describes adaptive design methodology at an elementary level while also considering design and planning issues It also looks at methods for analyzing an adaptively planned trial such as estimation methods and methods for determining an overall p value Part I provides the group sequential preliminaries required to understand and apply the adaptive design methodology supplied in Parts II and III Many examples are included that illustrate the practical applications of the techniques An overview of recent developments is given and new to this edition detailed descriptions of the R commands used for the calculations are provided The R package rpact which is available on CRAN allows for the recalculation of most tables and results presented in the monograph The required knowledge of R has been kept to a minimum and an online Shiny app has been made available for rpact Primarily written for applied statisticians from academia and industry who are interested in confirmatory adaptive designs the text is also suitable for an advanced statistical course for applied statisticians or clinicians with a sound statistical background

Adaptive Design Methods in Clinical Trials Shein-Chung Chow, Mark Chang, 2011-12-01 With new statistical and scientific issues arising in adaptive clinical trial design including the U S FDA's recent draft guidance a new edition of one of the first books on the topic is needed Adaptive Design Methods in Clinical Trials Second Edition reflects recent developments and regulatory positions on the use of adaptive designs in clinical trials

Adaptive Design Theory and Implementation Using SAS and R Mark Chang, 2014-12-01 Get Up to Speed on Many Types of Adaptive Designs Since the publication of the first edition

there have been remarkable advances in the methodology and application of adaptive trials Incorporating many of these new developments Adaptive Design Theory and Implementation Using SAS and R Second Edition offers a detailed framework to understand the Practical Considerations for Adaptive Trial Design and Implementation Weili He, José Pinheiro, Olga M. Kuznetsova, 2014-10-15 This edited volume is a definitive text on adaptive clinical trial designs from creation and customization to utilization As this book covers the full spectrum of topics involved in the adaptive designs arena it will serve as a valuable reference for researchers working in industry government and academia The target audience is anyone involved in the planning and execution of clinical trials in particular statisticians clinicians pharmacometricians clinical operation specialists drug supply managers and infrastructure providers In spite of the increased efficiency of adaptive trials in saving costs and time ultimately getting drugs to patients sooner their adoption in clinical development is still relatively low One of the chief reasons is the higher complexity of adaptive design trials as compared to traditional trials Barriers to the use of clinical trials with adaptive features include the concerns about the integrity of study design and conduct the risk of regulatory non acceptance the need for an advanced infrastructure for complex randomization and clinical supply scenarios change management for process and behavior modifications extensive resource requirements for the planning and design of adaptive trials and the potential to relegate key decision makings to outside entities There have been limited publications that address these practical considerations and recommend best practices and solutions This book fills this publication gap providing guidance on practical considerations for adaptive trial design and implementation The book comprises three parts Part I focuses on practical considerations from a design perspective whereas Part II delineates practical considerations related to the implementation of adaptive trials Putting it all together Part III presents four illustrative case studies ranging from description and discussion of specific adaptive trial design considerations to the logistic and regulatory issues faced in trial implementation Bringing together the expertise of leading key opinion leaders from pharmaceutical industry academia and regulatory agencies this book provides a balanced and comprehensive coverage of practical considerations for adaptive trial design and implementation *Randomised Response-Adaptive Designs in Clinical Trials* Anthony C Atkinson, Atanu Biswas, 2013-12-26 Randomised Response Adaptive Designs in Clinical Trials presents methods for the randomised allocation of treatments to patients in sequential clinical trials Emphasizing the practical application of clinical trial designs the book is designed for medical and applied statisticians clinicians and statisticians in training After introducing clin *Modern Adaptive Randomized Clinical Trials* Oleksandr Sverdlov, 2015-06-30 Is adaptive randomization always better than traditional fixed schedule randomization Which procedures should be used and under which circumstances What special considerations are required for adaptive randomized trials What kind of statistical inference should be used to achieve valid and unbiased treatment comparisons following adaptive random **Adaptive Designs for Sequential Treatment Allocation** Alessandro Baldi Antognini, Alessandra Giovagnoli, 2015-04-06 Adaptive Designs for Sequential Treatment Allocation presents

a rigorous theoretical treatment of the results and mathematical foundation of adaptive design theory The book focuses on designing sequential randomized experiments to compare two or more treatments incorporating information accrued along the way The authors first introduce the terminology and statistical models most commonly used in comparative experiments They then illustrate biased coin and urn designs that only take into account past treatment allocations as well as designs that use past data such as sequential maximum likelihood and various types of doubly adaptive designs The book also covers multipurpose adaptive experiments involving utilitarian choices and ethical issues It ends with adaptive methods that include covariates in the design The appendices present basic tools of optimal design theory and address Bayesian adaptive designs This book helps readers fully understand the theoretical properties behind various adaptive designs Readers are then equipped to choose the best design for their experiment

Handbook of Methods for Designing, Monitoring, and Analyzing Dose-Finding Trials John O'Quigley, Alexia Iasonos, Björn Bornkamp, 2017-04-27

Handbook of Methods for Designing Monitoring and Analyzing Dose Finding Trials gives a thorough presentation of state of the art methods for early phase clinical trials The methodology of clinical trials has advanced greatly over the last 20 years and arguably nowhere greater than that of early phase studies The need to accelerate drug development in a rapidly evolving context of targeted therapies immunotherapy combination treatments and complex group structures has provided the stimulus to these advances Typically we deal with very small samples sequential methods that need to be efficient while at the same time adhering to ethical principles due to the involvement of human subjects Statistical inference is difficult since the standard techniques of maximum likelihood do not usually apply as a result of model misspecification and parameter estimates lying on the boundary of the parameter space Bayesian methods play an important part in overcoming these difficulties but nonetheless require special consideration in this particular context The purpose of this handbook is to provide an expanded summary of the field as it stands and also through discussion provide insights into the thinking of leaders in the field as to the potential developments of the years ahead With this goal in mind we present An introduction to the field for graduate students and novices A basis for more established researchers from which to build A collection of material for an advanced course in early phase clinical trials A comprehensive guide to available methodology for practicing statisticians on the design and analysis of dose finding experiments An extensive guide for the multiple comparison and modeling MCP Mod dose finding approach adaptive two stage designs for dose finding as well as dose time response models and multiple testing in the context of confirmatory dose finding studies John O Quigley is a professor of mathematics and research director at the French National Institute for Health and Medical Research based at the Faculty of Mathematics University Pierre and Marie Curie in Paris France He is author of Proportional Hazards Regression and has published extensively in the field of dose finding Alexia Iasonos is an associate attending biostatistician at the Memorial Sloan Kettering Cancer Center in New York She has over one hundred publications in the leading statistical and clinical journals on the methodology and design of early phase clinical

trials Dr Iasonos has wide experience in the actual implementation of model based early phase trials and has given courses in scientific meetings internationally Björn Bornkamp is a statistical methodologist at Novartis in Basel Switzerland researching and implementing dose finding designs in Phase II clinical trials He is one of the co developers of the MCP Mod methodology for dose finding and main author of the DoseFinding R package He has published numerous papers on dose finding nonlinear models and Bayesian statistics and in 2013 won the Royal Statistical Society award for statistical excellence in the pharmaceutical industry

Introductory Adaptive Trial Designs Mark Chang, 2015-05-21 All the Essentials to Start Using Adaptive Designs in No Time Compared to traditional clinical trial designs adaptive designs often lead to increased success rates in drug development at reduced costs and time Introductory Adaptive Trial Designs A Practical Guide with R motivates newcomers to quickly and easily grasp the essence of adaptive design

Biopharmaceutical Applied Statistics Symposium Karl E. Peace, Ding-Geng Chen, Sandeep Menon, 2018-08-20 This BASS book Series publishes selected high quality papers reflecting recent advances in the design and biostatistical analysis of biopharmaceutical experiments particularly biopharmaceutical clinical trials The papers were selected from invited presentations at the Biopharmaceutical Applied Statistics Symposium BASS which was founded by the first Editor in 1994 and has since become the premier international conference in biopharmaceutical statistics The primary aims of the BASS are 1 to raise funding to support graduate students in biostatistics programs and 2 to provide an opportunity for professionals engaged in pharmaceutical drug research and development to share insights into solving the problems they encounter The BASS book series is initially divided into three volumes addressing 1 Design of Clinical Trials 2 Biostatistical Analysis of Clinical Trials and 3 Pharmaceutical Applications This book is the first of the 3 volume book series The topics covered include A Statistical Approach to Clinical Trial Simulations Comparison of Statistical Analysis Methods Using Modeling and Simulation for Optimal Protocol Design Adaptive Trial Design in Clinical Research Best Practices and Recommendations for Trial Simulations in the Context of Designing Adaptive Clinical Trials Designing and Analyzing Recurrent Event Data Trials Bayesian Methodologies for Response Adaptive Allocation Addressing High Placebo Response in Neuroscience Clinical Trials Phase I Cancer Clinical Trial Design Single and Combination Agents Sample Size and Power for the Mixed Linear Model Crossover Designs in Clinical Trials Data Monitoring Structure for Clinical Trials and Sequential Monitoring Procedures Design and Data Analysis for Multiregional Clinical Trials Theory and Practice Adaptive Group Sequential Multi regional Outcome Studies in Vaccines Development and Validation of Patient reported Outcomes Interim Analysis of Survival Trials Group Sequential Analyses and Conditional Power A Non proportional Hazards Perspective

Advanced Medical Statistics (2nd Edition) Ying Lu, Ji-qian Fang, Lu Tian, Hua Jin, 2015-06-29 The book aims to provide both comprehensive reviews of the classical methods and an introduction to new developments in medical statistics The topics range from meta analysis clinical trial design causal inference personalized medicine to machine learning and next generation sequence analysis Since the

publication of the first edition there have been tremendous advances in biostatistics and bioinformatics The new edition tries to cover as many important emerging areas and reflect as much progress as possible Many distinguished scholars who greatly advanced their research areas in statistical methodology as well as practical applications also have revised several chapters with relevant updates and written new ones from scratch The new edition has been divided into four sections including Statistical Methods in Medicine and Epidemiology Statistical Methods in Clinical Trials Statistical Genetics and General Methods To reflect the rise of modern statistical genetics as one of the most fertile research areas since the publication of the first edition the brand new section on Statistical Genetics includes entirely new chapters reflecting the state of the art in the field Although tightly related all the book chapters are self contained and can be read independently The book chapters intend to provide a convenient launch pad for readers interested in learning a specific topic applying the related statistical methods in their scientific research and seeking the newest references for in depth research

Modern Approaches to Clinical Trials Using SAS Sandeep Menon, Richard C. Zink, 2015-12-09 Get the tools you need to use SAS in clinical trial design Unique and multifaceted Modern Approaches to Clinical Trials Using SAS Classical Adaptive and Bayesian Methods edited by Sandeep M Menon and Richard C Zink thoroughly covers several domains of modern clinical trial design classical group sequential adaptive and Bayesian methods that are applicable to and widely used in various phases of pharmaceutical development Written for biostatisticians pharmacometricians clinical developers and statistical programmers involved in the design analysis and interpretation of clinical trials as well as students in graduate and postgraduate programs in statistics or biostatistics the book touches on a wide variety of topics including dose response and dose escalation designs sequential methods to stop trials early for overwhelming efficacy safety or futility Bayesian designs that incorporate historical data adaptive sample size re estimation adaptive randomization to allocate subjects to more effective treatments and population enrichment designs Methods are illustrated using clinical trials from diverse therapeutic areas including dermatology endocrinology infectious disease neurology oncology and rheumatology Individual chapters are authored by renowned contributors experts and key opinion leaders from the pharmaceutical medical device industry or academia Numerous real world examples and sample SAS code enable users to readily apply novel clinical trial design and analysis methodologies in practice

Dose-Finding Designs for Early-Phase Cancer Clinical Trials Takashi Daimon, Akihiro Hirakawa, Shigeyuki Matsui, 2019-05-21 This book provides a comprehensive introduction to statistical methods for designing early phase dose finding clinical trials It will serve as a textbook or handbook for graduate students and practitioners in biostatistics and clinical investigators who are involved in designing conducting monitoring and analyzing dose finding trials The book will also provide an overview of advanced topics and discussions in this field for the benefit of researchers in biostatistics and statistical science Beginning with backgrounds and fundamental notions on dose finding in early phase clinical trials the book then provides traditional and recent dose finding designs of phase I trials for e g cytotoxic agents in

oncology to evaluate toxicity outcome Included are rule based and model based designs such as 3 3 designs accelerated titration designs toxicity probability interval designs continual reassessment method and related designs and escalation overdose control designs This book also covers more complex and updated dose finding designs of phase I II and I II trials for cytotoxic agents and cytostatic agents focusing on both toxicity and efficacy outcomes such as designs with covariates and drug combinations maximum tolerated dose schedule finding designs and so on

Handbook of Statistical Methods for Randomized Controlled Trials KyungMann Kim, Frank Bretz, Ying Kuen K. Cheung, Lisa V. Hampson, 2021-08-23 Statistical concepts provide scientific framework in experimental studies including randomized controlled trials In order to design monitor analyze and draw conclusions scientifically from such clinical trials clinical investigators and statisticians should have a firm grasp of the requisite statistical concepts The Handbook of Statistical Methods for Randomized Controlled Trials presents these statistical concepts in a logical sequence from beginning to end and can be used as a textbook in a course or as a reference on statistical methods for randomized controlled trials Part I provides a brief historical background on modern randomized controlled trials and introduces statistical concepts central to planning monitoring and analysis of randomized controlled trials Part II describes statistical methods for analysis of different types of outcomes and the associated statistical distributions used in testing the statistical hypotheses regarding the clinical questions Part III describes some of the most used experimental designs for randomized controlled trials including the sample size estimation necessary in planning Part IV describe statistical methods used in interim analysis for monitoring of efficacy and safety data Part V describe important issues in statistical analyses such as multiple testing subgroup analysis competing risks and joint models for longitudinal markers and clinical outcomes Part VI addresses selected miscellaneous topics in design and analysis including multiple assignment randomization trials analysis of safety outcomes non inferiority trials incorporating historical data and validation of surrogate outcomes

Clinical Trial Design Guosheng Yin, 2013-06-07 A balanced treatment of the theories methodologies and design issues involved in clinical trials using statistical methods There has been enormous interest and development in Bayesian adaptive designs especially for early phases of clinical trials However for phase III trials frequentist methods still play a dominant role through controlling type I and type II errors in the hypothesis testing framework From practical perspectives Clinical Trial Design Bayesian and Frequentist Adaptive Methods provides comprehensive coverage of both Bayesian and frequentist approaches to all phases of clinical trial design Before underpinning various adaptive methods the book establishes an overview of the fundamentals of clinical trials as well as a comparison of Bayesian and frequentist statistics Recognizing that clinical trial design is one of the most important and useful skills in the pharmaceutical industry this book provides detailed discussions on a variety of statistical designs their properties and operating characteristics for phase I II and III clinical trials as well as an introduction to phase IV trials Many practical issues and challenges arising in clinical trials are addressed Additional topics of coverage include Risk and benefit analysis for toxicity and efficacy trade offs

Bayesian predictive probability trial monitoring Bayesian adaptive randomization Late onset toxicity and response Dose finding in drug combination trials Targeted therapy designs The author utilizes cutting edge clinical trial designs and statistical methods that have been employed at the world's leading medical centers as well as in the pharmaceutical industry The software used throughout the book is freely available on the book's related website equipping readers with the necessary tools for designing clinical trials Clinical Trial Design is an excellent book for courses on the topic at the graduate level The book also serves as a valuable reference for statisticians and biostatisticians in the pharmaceutical industry as well as for researchers and practitioners who design conduct and monitor clinical trials in their everyday work

Design and Analysis of Clinical Trials Shein-Chung Chow, Jen-Pei Liu, 2013-09-30 Praise for the Second Edition a grand feast for biostatisticians It stands ready to satisfy the appetite of any pharmaceutical scientist with a respectable statistical appetite Journal of Clinical Research Best Practices The Third Edition of Design and Analysis of Clinical Trials provides complete comprehensive and expanded coverage of recent health treatments and interventions Featuring a unified presentation the book provides a well balanced summary of current regulatory requirements and recently developed statistical methods as well as an overview of the various designs and analyses that are utilized at different stages of clinical research and development Additional features of this Third Edition include New chapters on biomarker development and target clinical trials adaptive design trials for evaluating diagnostic devices statistical methods for translational medicine and traditional Chinese medicine A balanced overview of current and emerging clinical issues as well as newly developed statistical methodologies Practical examples of clinical trials that demonstrate everyday applicability with illustrations and examples to explain key concepts New sections on bridging studies and global trials QT studies multinational trials comparative effectiveness trials and the analysis of QT QTc prolongation A complete and balanced presentation of clinical and scientific issues statistical concepts and methodologies for bridging clinical and statistical disciplines An update of each chapter that reflects changes in regulatory requirements for the drug review and approval process and recent developments in statistical design and methodology for clinical research and development Design and Analysis of Clinical Trials Third Edition continues to be an ideal clinical research reference for academic pharmaceutical medical and regulatory scientists researchers statisticians and graduate level students

Design and Analysis of Experiments, Volume 3 Klaus Hinkelmann, 2012-02-14 Provides timely applications modifications and extensions of experimental designs for a variety of disciplines Design and Analysis of Experiments Volume 3 Special Designs and Applications continues building upon the philosophical foundations of experimental design by providing important modern applications of experimental design to the many fields that utilize them The book also presents optimal and efficient designs for practice and covers key topics in current statistical research Featuring contributions from leading researchers and academics the book demonstrates how the presented concepts are used across various fields from genetics and medicinal and pharmaceutical research to

manufacturing engineering and national security Each chapter includes an introduction followed by the historical background as well as in depth procedures that aid in the construction and analysis of the discussed designs Topical coverage includes Genetic cross experiments microarray experiments and variety trials Clinical trials group sequential designs and adaptive designs Fractional factorial and search choice and optimal designs for generalized linear models Computer experiments with applications to homeland security Robust parameter designs and split plot type response surface designs Analysis of directional data experiments Throughout the book illustrative and numerical examples utilize SAS JMP and R software programs to demonstrate the discussed techniques Related data sets and software applications are available on the book s related FTP site Design and Analysis of Experiments Volume 3 is an ideal textbook for graduate courses in experimental design and also serves as a practical hands on reference for statisticians and researchers across a wide array of subject areas including biological sciences engineering medicine and business

Understanding Evidence-Based Rheumatology Hasan Yazici, Yusuf Yazici, Emmanuel Lesaffre, 2014-10-29 It is imperative that health professionals caring for patients with rheumatic diseases understand how to correctly interpret evidence in their field taking into account the merits and shortcomings of available data *Understanding Evidence Based Rheumatology* offers a practical assessment of criteria drugs trials and registries and provides useful tools for successfully interpreting this data The book introduces readers to basic analysis of trial design statistics and application of data through no nonsense easy to follow insights Using numerous examples chapters outline the difficulties physicians encounter when measuring disease activity in rheumatology and offer strategies for systematically approaching these situations Ethical issues in study design and reporting are examined and the book closes with a summary of future directions for scientific and clinical studies in rheumatology *Understanding Evidence Based Rheumatology* is an invaluable resource for trainees clinicians and scientists preparing them with the necessary tools to correctly gather evidence and shed light on the difficult practice of rheumatology

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Table of Contents Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development

1. Understanding the eBook Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - The Rise of Digital Reading Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - Advantages of eBooks Over Traditional Books
2. Identifying Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - User-Friendly Interface
4. Exploring eBook Recommendations from Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - Personalized Recommendations
 - Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development User Reviews and Ratings

- Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development and Bestseller Lists
- 5. Accessing Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development Free and Paid eBooks
 - Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development Public Domain eBooks
 - Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development eBook Subscription Services
 - Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development Budget-Friendly Options
- 6. Navigating Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development eBook Formats
 - ePub, PDF, MOBI, and More
 - Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development Compatibility with Devices
 - Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development Enhanced eBook Features
- 7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - Highlighting and Note-Taking Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - Interactive Elements Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
- 8. Staying Engaged with Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
- 9. Balancing eBooks and Physical Books Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
- 10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
- 11. Cultivating a Reading Routine Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - Setting Reading Goals Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development
 - Fact-Checking eBook Content of Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development

- Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
- 14. Embracing eBook Trends
 - Integration of Multimedia Elements
 - Interactive and Gamified eBooks

Handbook Of Adaptive Designs In Pharmaceutical And Clinical Development Introduction

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