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Bailey's Head and Neck Surgery Lippincott Williams & Wilkins

Organized to serve as a ready reference, this book covers the design & principles of operation of microwave electron linear accelerators for the radiation treatment of cancer. Designed for use by persons without extensive knowledge & experience of accelerator technology, the book assumes a knowledge of elementary physics & mathematics & places its emphasis on how accelerators actually function & how they are used in cancer treatment. Coverage includes the history of development & application, general theory of acceleration, accelerator systems, radiation beam systems & associated equipment, performance characteristics, testing & use. The major modules of a representative medical accelerator are described, including principles of operation & how these models function collectively to produce electron & X-ray beams for radiotherapy.

Iterative CBCT - Improving CBCT Image Quality at ProBeam U of Minnesota Press

Advances in Lymphatic System Research and Application / 2012 Edition is a ScholarlyEditions™ eBook that delivers timely, authoritative, and comprehensive information about Lymphatic System. The editors have built *Advances in Lymphatic System Research and Application / 2012 Edition* on the vast information databases of ScholarlyNews.™ You can expect the information about Lymphatic System in this eBook to be deeper than what you can access anywhere else, as well as consistently reliable, authoritative, informed, and relevant. The content of *Advances in Lymphatic System Research and Application / 2012 Edition* has been produced by the world's leading scientists, engineers, analysts, research institutions, and companies. All of the content is from peer-reviewed sources, and all of it is written, assembled, and edited by the editors at ScholarlyEditions™ and available exclusively from us. You now have a source you can cite with authority, confidence, and credibility. More information is available at <http://www.ScholarlyEditions.com/>.

Gunderson & Tepper's Clinical Radiation Oncology, E-Book McGraw-Hill

This book is a comprehensive review of image guided interventions of the spine. Beginning with a chapter dedicated to the history of image guided spinal interventions, authors set the stage for the role these procedures have and will play in the field. Chapters cover the key procedures, techniques, and considerations to maximize effectiveness and patient care. Some major topics covered include: imaging osseo-ligamentous spine anatomy, percutaneous vertebroplasty, image guided tumor ablation, and vascular spine intervention. Additional features include high-quality illustrations with concise descriptions and clinical cases discussions. This is an ideal guide for interventional neuroradiologists, radiologists, pain management physicians, neurosurgeons, orthopedic spine surgeons, and related residents, fellows, and students wanting in depth information on image guided interventions of the spine.

Radiation Therapy Dosimetry CRC Press

Breast cancer, its causes, early detection and treatment have received considerable attention, since this widespread disease is one of the most important health concerns for women. This book provides a comprehensive overview of the diagnostic and therapeutic aspects of the management of early-stage breast cancer, including essential information on basic topics like pathology, and radiology, as well as the latest developments. Further, it discusses all aspects of surgical care, chemotherapy and radiation therapy, together with the controversies and current management guidelines. Helping readers acquire a deep, holistic understanding of the topic, the book is a valuable resource for practitioners and postgraduate students in the field of gynecologic oncology. Moreover, it is a useful aid to decision-making in day-to-day practice for oncologists, residents, fellows and experienced practitioners.

Usability Testing of Medical Devices Springer Nature

This book provides a first comprehensive summary of the basic principles, instrumentation, methods, and clinical applications of three-dimensional dosimetry in modern radiation therapy treatment. The presentation reflects the major growth in the field as a result of the widespread use of more sophisticated radiotherapy approaches such as intensity-modulated radiation therapy and proton therapy, which require new 3D dosimetric techniques to determine very accurately the dose distribution. It is intended as an essential guide for those involved in the design and implementation of new treatment technology and its application in advanced radiation therapy, and will enable these readers to select the most suitable equipment and methods for their application. Chapters include numerical data, examples, and case studies.

Image Guided Interventions of the Spine Elsevier Health Sciences

The ProBeam proton therapy system offers CBCT imaging for patient setup with a Feldkamp-Davis-Kress (FDK) algorithm with a kernel-based scatter correction. For the TrueBeam radiotherapy system, Varian Medical Systems commercially offers for Head and Pelvis protocols additionally an advanced reconstruction technique u2013 Iterative CBCT (iCBCT), using a statistical reconstruction and in the case of pelvis protocol a deterministic Boltzmann Transport Equation solver-based scatter correction. Preliminary results from an early evaluation of ProBeam clinical head/neck and pelvis scans reconstructed with iCBCT show a significant improvement of image quality. iCBCT reconstructions show a reduction of cone-beam, streak and shading artifacts and noise, resulting in enhancements of soft-tissue definition. iCBCT will be implemented at ProBeam and ProBeam 360u00b0 to improve visualization and facilitate more precise patient setup. The improved image quality is expected

to enable new applications like usage of CBCT images for replanning and adaptive radiotherapy at ProBeam and ProBeam 360u00b0.

World Congress on Medical Physics and Biomedical Engineering 2018 Frontiers Media SA

Stereotactic Body Radiation Therapy Springer Science & Business Media

Technical Basis of Radiation Therapy Springer

A comprehensive, multidisciplinary resource for the entire radiation oncology team, Gunderson & Tepper's *Clinical Radiation Oncology*, 5th Edition, thoroughly covers all aspects of this complex and dynamic field. Concise, templated chapters cover the basic biology of oncologic disease processes as well as updated treatment algorithms, the latest clinical guidelines, and state-of-the-art techniques and modalities. More than 1,000 images—detailed anatomy drawings, radiographic images, and more—provide outstanding visual support for every area of the text. Divides content into three distinct sections for quick access to information: Scientific Foundations, Techniques and Modalities, and Disease Sites. Disease Site chapters include overviews summarizing the most important issues and concluding discussions on controversies and problems. Features new and expanded content on molecular and cellular biology and its relevance in individualized treatment approaches, stereotactic radiation therapy, radiosurgery, proton therapy, biologic therapy, precision radiation therapy, targeted radiation, dosing guidelines for better quality of life and improved patient outcomes, and more. Includes new chapters on Radiation Physics: Particle Therapy, Interventional Radiology, Radiation Therapy in the Elderly, Palliative Care, Quality and Safety, and Immunotherapy with Radiotherapy. Provides guidance on single-modality and combined-modality approaches, as well as outcome data including disease control, survival, and treatment tolerance. Includes access to videos on Intraoperative Irradiation, Prostate Brachytherapy, Penile Brachytherapy, and Ocular Melanoma.

Stereotactic Radiosurgery and Stereotactic Body Radiation Therapy Cambridge University Press

Purpose: To determine the limit of detectability and resolution of the ArcCheck QA Phantom (Sun Nuclear, Inc.) for quality assurance of volumetric-modulated arc therapy and stereotactic radiosurgery procedures when used in small field sizes. **Methods:** Eight different square field sizes (0.6x0.6, 1x1, 2x2, 3x3, 5x5, 7x7, 10x10, 15x15 cm²) were measured on the ArcCheck QA phantom at three different gantry angles: 0, 90, and 270 degrees, using a 6 MV beam at its maximum dose rate of 600 MU/min and a dose computed from a 200 MU beam from the Varian Edge linear accelerator (Varian Medical Systems, Palo Alto, CA) at the University of Toledo Dana Cancer Center. Four different types of errors were introduced into quality-assurance analysis procedures. Measured square field sizes were compared against the same measured square field sizes with induced collimator and MLC errors. Induced collimator errors were defined by an expansion of the jaw-defined field size by 1 mm on all axes, a collimator shift of 1 mm on the X2 and Y2 axes, a table shift by 1 mm vertically and longitudinally at 270 and 90 degrees and a table shift of 1mm laterally and longitudinally for angles of 0 and 180 degrees. MLC induced errors included the addition of one and subsequently two opposing MLC leaves in the center of each square field. Dose distributions for the normal square fields and square fields with induced errors were imported into SNC patient software (Sun Nuclear Corporation, Melbourne, FL) in the form of DICOM RT dose files and measured dose distributions were compared between the normally measured square fields and fields containing induced errors. Percent pass rates were computed using gamma analysis criteria of 2 mm/2% with a threshold value of 20%. Point dose ratios were also analyzed for fields with induced MLC errors and output factors were calculated in order to determine the magnitude of the effect that these induced errors had on output measurements as compared with the ability of gamma criteria analysis in SNC to catch errors. A point dose calibration pertaining to each field size at each photon energy of the TrueBeam and Edge linear accelerators (Varian Medical Systems, Palo Alto, CA) was calculated by measuring a point dose at a range of field sizes at each energy (6 MV, 6 FFF and 10FFF for the Edge and 6 MV, 6FFF, 10 MV, and 18 MV for the TrueBeam) and dividing this number by the treatment planning system calculated point dose (calculated in Pinnacle) to obtain a cGy/MU dose calibration. An Exradin A16 Micropoint chamber (Exradin A1SL, Standard Imaging, Inc., Middleton WI) was placed in the center of the plug insert in the center of the ArcCheck phantom and a CNMC 206 electrometer (CNMC Instruments, Nashville, Tn) reading pertaining to a beam of 200 MU at different field sizes for each energy. The dose calibration factor for each energy was calculated and applied to six different patient-specific point dose QA analyses in order to determine the field size dependence of the dose calibration and to determine if the calibration improved the overall QA pass rate as well as the pass rate for individual fields for SRS QA. Finally, MLC errors were induced into three different patient-specific QA procedures performed on the Edge and TrueBeam linear accelerators. Two opposing MLC leaves were extended into the middle of the field (leaf position 30) at each control point of the first 180-180 degree clockwise field in each of the two patient QAs on the Edge and TrueBeam linear accelerators. The effect of extending the MLC leaves was analyzed using gamma analysis in SNC patient software. A point dose analysis of each QA was also taken into account and compared with the result measured using gamma criteria. **Results:** Examination of results in SNC patient software between measured normal fields and those with induced jaw field size errors indicate that the gamma criteria percent pass rates decrease significantly when errors are induced in the quality assurance analysis. Pass rates for a table shift and increase in field sizes by 1 mm on all axes of the square field indicate the greatest average errors for all gantry angles measured. Evidence of normal error detection was seen at a field size of 3x3 cm² for a table shift at a 0-degree gantry angle. The field size at which normal error detection was seen by the ArcCheck was indicated at 2x2 cm² for the 1mm margin errors induced at 90 degree and 270 degree gantry angles. The field size at which normal error detection was seen by the ArcCheck with MLC error induction into square field sizes was indicated at a field size of 2x2 cm². Two QA procedures that did not improve by applying the field-size specific calibration factor decreased by an average of 0.44%. Three patient-specific quality assurance procedure dose distributions measured with an induced MLC error indicate that errors in MLC leaf position when applied to all control points of a full 360-degree arc are indicated with a lower percent gamma/DTA criteria pass rate. These pass rates were 77.4% and 96.1% on the Edge and 96.5% on the TrueBeam accelerator, respectively, when a measured normal dose distribution and a dose distribution with an induced MLC error were compared in SNC patient software. Of the six patient-specific quality assurance procedures for which a field-size specific point dose calibration factor was applied, four were improved significantly by an average of 87.6% with the application of a field-size specific calibration factor. **Discussion and Conclusion:** This work indicates the potential for having the ability to detect potential errors in VMAT quality assurance for small field sizes using the ArcCheck QA phantom. The ability of the ArcCheck to detect uncertainties in quality assurance procedures is based on the size of the field and the position and spacing of the diode detectors. Gamma analysis and point dose measurements indicate a

3x3 cm² field size as the smallest field size at which accurate quality assurance is analyzed. Pass rates resulting in an induction of MLC errors in square field sizes can be utilized to predict pass rates resulting from the induction of MLC errors in patient-specific quality assurance procedures. It is suggested that a field-size specific CGy/MU calibration factor is utilized in order to more accurately predict patient-specific point dose measurements.

Intracranial Stereotactic Radiosurgery Elsevier Health Sciences

With the added complexity of current radiation treatment dose delivery modalities such as IMRT (Intensity Modulated Radiation Therapy) and VMAT (Volumetric Modulated Arc Therapy), quality assurance (QA) of these plans become multifaceted and labor intensive. To simplify the patient specific quality assurance process, 2D or 3D diode arrays are used to measure the radiation fluence for IMRT and VMAT treatments which can then be quickly and easily compared against the planned dose distribution. Because the arrays that can be used for IMRT and VMAT patient-specific quality assurance are of different geometry (planar vs. cylindrical), the same IMRT or VMAT treatment plan measured by two different arrays could lead to different measured radiation fluences, regardless of the output and performance of linear accelerator. Thus, the purpose of this study is to compare patient specific QA results as measured by the MapCHECK 2 and ArcCHECK diode arrays for the same IMRT and VMAT treatment plans to see if one diode array consistently provides a closer comparison to reference data. Six prostate and three thoracic spine IMRT treatment plans as well as three prostate and three thoracic spine VMAT treatment plans were produced. Radiotherapy plans for this study were generated using the Pinnacle TPS v9.6 (Philips Radiation Oncology Systems, Fitchburg, WI) using 6 MV, 6 MV FFF, and 10 MV x-ray beams from a Varian TrueBeam linear accelerator (Varian Medical Systems, Palo Alto, CA) with a 120-millennium multi-leaf collimator (MLC). Each IMRT and VMAT therapy plan was measured on Sun Nuclear's MapCHECK 2 and ArcCHECK diode arrays. IMRT measured data was compared with planned dose distribution using Sun Nuclear's 3DVH quality assurance software program using gamma analysis and dose-volume histograms for target volumes and critical structures comparison. VMAT arc plans measured on the MapCHECK 2 and ArcCHECK were compared using beam-by-beam analysis with the gamma evaluation method with Sun Nuclear's SNC Patient analysis software. MapCHECK 2 showed a slightly better agreement with planned data for IMRT verifications with a mean pass rate of 99.4% for clinically used acceptance criteria of 3%/3mm. MapCHECK 2's 99.4% mean pass rate for IMRT verifications was 1.4% higher than ArcCHECK's mean pass rate. For VMAT verifications, the MapCHECK 2 had a mean pass rate of 99.6% and 100% for each arc respectively, resulting in a 1.25% to 1.92% higher mean passing rates than those measured by the ArcCHECK using an acceptance criteria of 3%/3mm. MapCHECK 2 showed consistently higher ROI-specific mean gamma passing rates, ranging from +0.2% to +5.6%. While neither diode array showed any advantage in regards to D95 measurements within the PTV, MapCHECK 2 again showed closer comparison data in the CTV/GTV with an absolute deviation of -1.14 Gy compared to -3.39 Gy as measured by the ArcCHECK. Lastly, while the MapCHECK 2 and ArcCHECK both closely matched with the reference doses within the PTV and CTV/GTV, the ArcCHECK consistently overestimated the maximum absolute dose to all ROI, from 0.026 Gy to 2.243 Gy. In conclusion, the MapCHECK 2 diode array measured data more closely matched with planned data compared to the ArcCHECK diode array for IMRT verifications. While MapCHECK 2 showed a marginally better gamma passing rates over the ArcCHECK diode array, the ArcCHECK's ability to simultaneously measure flatness, symmetry, output, and MLC positional accuracy as a function of gantry angle make it a more realistic and efficient measurement device for VMAT verifications.

World Congress on Medical Physics and Biomedical Engineering, June 7-12, 2015, Toronto, Canada Elsevier Health Sciences

Stereotactic body radiation therapy (SBRT) has emerged as an important innovative treatment for various primary and metastatic cancers. This book provides a comprehensive and up-to-date account of the physical/technological, biological, and clinical aspects of SBRT. It will serve as a detailed resource for this rapidly developing treatment modality. The organ sites covered include lung, liver, spine, pancreas, prostate, adrenal, head and neck, and female reproductive tract. Retrospective studies and prospective clinical trials on SBRT for various organ sites from around the world are examined, and toxicities and normal tissue constraints are discussed. This book features unique insights from world-renowned experts in SBRT from North America, Asia, and Europe. It will be necessary reading for radiation oncologists, radiation oncology residents and fellows, medical physicists, medical physics residents, medical oncologists, surgical oncologists, and cancer scientists.

IMRT, IGRT, SBRT CRC Press

Usability Testing of Medical Devices covers the nitty-gritty of usability test planning, conducting, and results reporting. The book also discusses the government regulations and industry standards that motivate many medical device manufacturers to conduct usability tests. Since publication of the first edition, the FDA and other regulatory groups have

Advances in Lymphatic System Research and Application: 2012 Edition CRC Press

Written by internationally known experts in the field, Stereotactic Radiosurgery and Stereotactic Body Radiation Therapy examines one of the fastest-developing subspecialties within radiation oncology. These procedures deliver large doses of radiation in one to five sessions to a precisely determined target. Often these techniques have proven to be as or more effective than traditional radiation therapy techniques, while at the same time being cost-efficient and convenient for the patient. These techniques, however, require careful planning, specialized equipment, and well-trained staff. This volume provides a cutting-edge look at the biological and technical underpinnings of SRS and SBRT techniques. It includes a history of the development of SRS and SBRT; clinical applications of the techniques; dedicated devices for delivering precisely shaped, high doses of radiation; use of in-room imaging for treatment planning and treatment guidance; immobilization techniques for accurate targeting; and future developments that will continue to evolve and refine existing techniques. A valuable introduction to those just learning about these specialized techniques, and an ideal reference for those who are already implementing them, this book covers a wide variety of topics, with clear discussions of each aspect of the technology employed.

Practical Radiation Oncology Physics Lippincott Williams & Wilkins

A complete guide to clinical oncology, covering the main treatment modalities and diagnosis and treatment strategies for specific tumour types.

Radiance from Halcyon Springer Science & Business Media

Widely regarded as the definitive reference in the field, Youmans and Winn Neurological Surgery offers unparalleled, multimedia coverage of the entirety of this complex specialty. Fully updated to reflect recent advances in the basic and clinical neurosciences, the 8th Edition covers everything you need to know about functional and restorative neurosurgery, deep brain stimulation, stem cell biology, radiological and nuclear imaging, and neuro-oncology, as well as minimally invasive surgeries in spine and peripheral nerve surgery, and endoscopic and other approaches for cranial procedures and cerebrovascular diseases. In four comprehensive volumes, Dr. H. Richard Winn and his expert team of editors and authors provide updated content, a significantly expanded video library, and hundreds of new video lectures that help you

master new procedures, new technologies, and essential anatomic knowledge in neurosurgery. Discusses current topics such as diffusion tensor imaging, brain and spine robotic surgery, augmented reality as an aid in neurosurgery, AI and big data in neurosurgery, and neuroimaging in stereotactic functional neurosurgery. 55 new chapters provide cutting-edge information on Surgical Anatomy of the Spine, Precision Medicine in Neurosurgery, The Geriatric Patient, Neuroanesthesia During Pregnancy, Laser Interstitial Thermal Therapy for Epilepsy, Fetal Surgery for Myelomeningocele, Rehabilitation of Acute Spinal Cord Injury, Surgical Considerations for Patients with Polytrauma, Endovascular Approaches to Intracranial Aneurysms, and much more. Hundreds of all-new video lectures clarify key concepts in techniques, cases, and surgical management and evaluation. Notable lecture videos include multiple videos on Thalamotomy for Focal Hand Dystonia and a video to accompany a new chapter on the Basic Science of Brain Metastases. An extensive video library contains stunning anatomy videos and videos demonstrating intraoperative procedures with more than 800 videos in all. Each clinical section contains chapters on technology specific to a clinical area. Each section contains a chapter providing an overview from experienced Section Editors, including a report on ongoing controversies within that subspecialty.

Practical Radiation Oncology Physics E-Book John Wiley & Sons

Over the last 4 years, IMRT, IGRT, SBRT: Advances in the Treatment Planning and Delivery of Radiotherapy has become a standard reference in the field. During this time, however, significant progress in high-precision technologies for the planning and delivery of radiotherapy in cancer treatment has called for a second edition to include these new developments. Thoroughly updated and extended, this new edition offers a comprehensive guide and overview of these new technologies and the many clinical treatment programs that bring them into practical use. Advances in intensity-modulated radiotherapy (IMRT), and 4D and adaptive treatment planning are clearly presented. Target localization and image-guided radiotherapy (IGRT) systems are comprehensively reviewed as well. Clinical tutorials illustrate target definitions for the major cancer sites, and useful techniques for organ motion management are described and compared. There are also several chapters that explore the technical basis and latest clinical experience with stereotactic body radiotherapy (SBRT) and summarize practical treatment recommendations. Furthermore, the significant and increasing contributions of proton therapy to cancer care are also highlighted, alongside the practical allocation of all these new technologies from an economic perspective. As a highlight of this volume, a number of images can be viewed online in time-elapse videos for greater clarity and more dynamic visualization. Written by leading authorities in the field, this comprehensive volume brings clinical and technical practitioners of radiotherapy fully up to date with the key developments in equipment, technologies and treatment guidelines.

Graphics Processing Unit-Based High Performance Computing in Radiation Therapy CRC Press

Scintillation Dosimetry delivers a comprehensive introduction to plastic scintillation dosimetry, covering everything from basic radiation dosimetry concepts to plastic scintillating fiber optics. Comprised of chapters authored by leading experts in the medical physics community, the book: Discusses a broad range of technical implementations, from point source dosimetry scaling to 3D-volumetric and 4D-scintillation dosimetry. Addresses a wide scope of clinical applications, from machine quality assurance to small-field and in vivo dosimetry. Examines related optical techniques, such as optically stimulated luminescence (OSL) or ?erenkov luminescence. Thus, Scintillation Dosimetry provides an authoritative reference for detailed, state-of-the-art information on plastic scintillation dosimetry and its use in the field of radiation dosimetry.

Medical Electron Accelerators CRC Press

Perfect for radiation oncologists, medical physicists, and residents in both fields, Practical Radiation Oncology Physics provides a concise and practical summary of the current practice standards in therapeutic medical physics. A companion to the fourth edition of Clinical Radiation Oncology, by Drs. Leonard Gunderson and Joel Tepper, this indispensable guide helps you ensure a current, state-of-the-art clinical practice. Covers key topics such as relative and in-vivo dosimetry, imaging and clinical imaging, stereotactic body radiation therapy, and brachytherapy. Describes technical aspects and patient-related aspects of current clinical practice. Offers key practice guideline recommendations from professional societies throughout - including AAPM, ASTRO, ABS, ACR, IAEA, and others. Includes therapeutic applications of x-rays, gamma rays, electron and charged particle beams, neutrons, and radiation from sealed radionuclide sources, plus the equipment associated with their production, use, measurement, and evaluation. Features a "For the Physician" box in each chapter, which summarizes the key points with the most impact on the quality and safety of patient care. Provides a user-friendly appendix with annotated compilations of all relevant recommendation documents. Includes an enhanced Expert Consult eBook with open-ended questions, ideal for self-assessment and highlighting key points from each chapter. Download and search all of the text, figures, and references on any mobile device.

Youmans and Winn Neurological Surgery Springer Publishing Company

In May 1904, the residents of Halcyon—a small utopian community on California's central coast—invited their neighbors to attend the grand opening of the Halcyon Hotel and Sanatorium. As part of the entertainment, guests were encouraged to have their hands X-rayed. For the founders and members of Halcyon, the X-ray was a demonstration of mysterious spiritual forces made practical to human beings. Radiance from Halcyon is the story not only of the community but also of its uniquely inventive members' contributions to religion and science. The new synthesis of religion and science attempted by Theosophy laid the foundation for advances produced by the children of the founding members, including microwave technology and atomic spectral analysis. Paul Eli Ivey's narrative starts in the 1890s in Syracuse, New York, with the rising of the Temple of the People, a splinter group of the theosophical movement. After developing its ideals for an agricultural and artisanal community, the Temple purchased land in California and in 1903 began to live its dream there. In addition to an intriguing account of how a little-known utopian religious community profoundly influenced modern science, Ivey offers a wide-ranging cultural history, encompassing Theosophy, novel healing modalities, esoteric architecture, Native American concepts of community, socialist utopias, and innovative modern music.

Management of Early Stage Breast Cancer CRC Press

In print since 1972, this seventh edition of Radiobiology for the Radiologist is the most extensively revised to date. It consists of two sections, one for those studying or practicing diagnostic radiology, nuclear medicine and radiation oncology; the other for those engaged in the study or clinical practice of radiation oncology—a new chapter, on radiologic terrorism, is specifically for those in the radiation sciences who would manage exposed individuals in the event of a terrorist event. The 17 chapters in Section I represent a general introduction to radiation biology and a complete, self-contained course especially for residents in diagnostic radiology and nuclear medicine that follows the Syllabus in Radiation Biology of the RSNA. The 11 chapters in Section II address more in-depth topics in radiation oncology, such as cancer biology, retreatment after radiotherapy, chemotherapeutic agents and hyperthermia. Now in full color, this lavishly illustrated new edition is replete with tables and figures that underscore essential concepts. Each chapter concludes with a "summary of pertinent conclusions" to facilitate quick review and help readers retain important information.