Toward Precision Medicine Building A Knowledge Network For Biomedical Research And A New Taxonomy Of Disease

Keep It UpChildhood Leukemia and Cancer, An Issue of Pediatric Clinics, E-BookBiomarker Tests for Molecularly Targeted TherapiesToward Precision MedicineThe Hastings Law JournalAllergy BioinformaticsPrecision Medicine and the Reinvention of Human DiseaseExtending the Spectrum of Precompetitive Collaboration in Oncology ResearchSex-Specific Analysis of Cardiovascular FunctionArtificial Intelligence for Drug Development, Precision Medicine, and HealthcareThe Patient EquationComparative Effectiveness ResearchThe Road from Nanomedicine to Precision MedicineArtificial Intelligence in Precision HealthTranslational Systems BiologyAdvancing Disease Modeling in Animal-Based Research in Support of Precision MedicinePrecision Public HealthToward Precision MedicineMe Medicine vs. We MedicineClinical Precision MedicinePersonalized and Precision Medicine InformaticsGenomic and Personalized MedicineImproving Diagnosis in Health CareImplementing Precision Medicine in Best Practices of Chronic Airway DiseasesHastings Law JournalOncology InformaticsThe Bloomsbury Companion to Contemporary Philosophy of MedicineAdvancing Healthcare Through Personalized MedicineThe Biologist's ImaginationBest Care at Lower CostPrecision in Pulmonary, Critical Care, and Sleep MedicineApplied Data ScienceAbeloff's Clinical Oncology E-BookPrecision Community HealthMoneyBall MedicineToward Precision MedicineBiomimetic MicroengineeringNutrigenomics and BeyondCapturing Social and Behavioral Domains in Electronic Health RecordsBeyond Bioethics

Keep It Up

Do You Have Low T? As a man ages, a slow decline takes root that, day to day, is imperceptible. Sometime around age 30, levels of the male hormone testosterone begin to drop each year. One morning he looks in the mirror and sees someone who he doesn't recognize. He's tired-looking, lacks motivation, his belly is sagging over his belt, his mind is foggy, and maybe his sex drive has evaporated. What happened? Oh, you're just getting older, people tell him—even his doctor! Endocrinologist Florence Comite, MD, doesn't believe we should accept aging as is. In fact, she has helped many men to turn around their health for the better. She believes any man can restore his body, mind, and energy; prevent disease; and feel strong, confident, and in control once again. How? By using her Precision Medicine analysis, a highly personalized plan of action designed to combat the decline triggered by the age-related fall in testosterone. This book will show you how to quantify your own health and then make lifestyle changes that will reduce your belly fat and risk of diabetes, revitalize your sex drive and strengthen your erections, and give you more muscle and greater mental agility. Because testosterone affects all of the above aspects of a man's vitality, Dr. Comite shows readers how the cutting-edge science of hormone optimization for men with low testosterone is an effective way to prevent the disorders of aging.

Childhood Leukemia and Cancer, An Issue of Pediatric Clinics, E-

Book

The last decade has seen sweeping changes in US health care policy. With more changes on the way, the emerging field of comparative effectiveness research-the science of determining how different treatments work best for different conditions-is critical for patients and clinicians who wish to make wise decisions regarding therapeutic choices. Comparative Effectiveness Research is the first textbook to offer an introduction to this topic. Written by an experienced university educator and researcher, the goal of this text is to provide readers with a gentle introduction to this diverse field. This accessible text facilitates participatory learning by including inquiries and links to web-based resources. This book will be a welcome addition to any number of courses in medicine, public health, nursing, dentistry, and allied health-or to the reference shelf of the working medical practitioner.

Biomarker Tests for Molecularly Targeted Therapies

Motivated by the explosion of molecular data on humans-particularly data associated with individual patients-and the sense that there are large, as-yet-untapped opportunities to use this data to improve health outcomes, Toward Precision Medicine explores the feasibility and need for "a new taxonomy of human disease based on molecular biology" and develops a potential framework for creating one. The book says that a new data network that integrates emerging research on the molecular makeup of diseases with clinical data on individual patients could drive the development of a more accurate classification of diseases and ultimately enhance diagnosis and treatment. The "new taxonomy" that emerges would define diseases by their underlying molecular causes and other factors in addition to their traditional physical signs and symptoms. The book adds that the new data network could also improve biomedical research by enabling scientists to access patients' information during treatment while still protecting their rights. This would allow the marriage of molecular research and clinical data at the point of care, as opposed to research information continuing to reside primarily in academia. Toward Precision Medicine notes that moving toward individualized medicine requires that researchers and health care providers have access to very large sets of health- and disease-related data linked to individual patients. These data are also critical for developing the information commons, the knowledge network of disease, and ultimately the new taxonomy.

Toward Precision Medicine

This book will examine the relevant biological subjects involved in biomimetic microengineering as well as the design and implementation methods of such engineered microdevices. Physiological topics covered include regeneration of complex responses of our body on a cellular, tissue, organ, and inter-organ level. Technological concepts in cell and tissue engineering, stem cell biology, microbiology, biomechanics, materials science, micro- and nanotechnology, and synthetic biology are highlighted to increase understanding of the transdisciplinary methods used to create the more complex, robust biomimetic engineered models. The effectiveness of the new bioinspired microphysiological systems as replacements for existing in vitro or in vivo models is explained through sections

that include the protocols to reconstitute three-dimensional (3D) structures, recapitulate physiological functions, and emulate the pathophysiology of human diseases. This book will also discuss how researchers can discover bridge technologies for disease modeling and personalized precision medicine. Features Focuses on cutting edge technologies that enable manipulation of living systems in a spatiotemporal manner. Incorporates research on reverse engineering of comples microenvironmental factors in human diseases. Highlights technologies related to patient-specific personalized medicine and their potential uses. Written by chapter authors who are highly respected researchers in science and engineering. Includes extensive references at the end of each chapter to enhance further study. Hyun Jung Kim is an Assistant Professor in the Department of Biomedical Engineering at The University of Texas at Austin. After receiving hois Ph.D. degree at Yonsei University in the Republic of Korea, he did extensive postdctoral research at both the University of Chicago and the Wyss Institute at Harvard University. These efforts resulted in cutting-edge breakthroughs in synthetic microbial community research and organomimetic human Gut-on-a-Chip microsystem. His research on Gut-on-a-Chip technology leads to the creation of a microfluidic device that mimics the physiology and pathology of the living human intestine. Since 2015, he has explored novel human host-microbiome ecosystems to discover the disease mechanism and new therapeutics in inflammatory bowel disease and colorectal cancers at UT Austin. In collaboration with clinicians, his lab is currently developing disease-oriented, patient-specific models for the advancement in pharmaceutical and clinical fields. • Focuses on cutting edge technologies that enable manipulation of living systems in a spatiotemporal manner. • Incorporates research on reverse engineering of complex microenvironmental factors in human diseases. • Highlights technologies related to patient-specific personalized medicine and their potential uses. • Written by chapter authors who are highly respected researchers in science and engineering. • Includes extensive references at the end of each chapter to enhance further study. Hyun Jung Kim is an Assistant Professor in the Department of Biomedical Engineering at The University of Texas at Austin. After receiving his Ph.D. degree at Yonsei University in the Republic of Korea, he did extensive postdoctoral research at both the University of Chicago and the Wyss Institute at Harvard University. These efforts resulted in cutting-edge breakthroughs in synthetic microbial community research and organomimetic human Gut-on-a-Chip microsystem. His research on Gut-on-a-Chip technology leads to the creation of a microfluidic device that mimics the physiology and pathology of the living human intestine. Since 2015, he has explored novel human host-microbiome ecosystems to discover the disease mechanism and new therapeutics in inflammatory bowel disease and colorectal cancer at UT Austin. In collaboration with clinicians, his lab is currently developing disease-oriented, patient-specific models for the advancement in pharmaceutical and clinical fields.

The Hastings Law Journal

This book gathers together contributions from internationally renowned authors in the field of cardiovascular systems and provides crucial insight into the importance of sex- and gender-concepts during the analysis of patient data. This innovative title is the first to offer the elements necessary to consider sex-related properties in both clinical and basic studies regarding the heart and circulation on multiscale

levels (i.e. molecular, cellular, electrophysiologically, neuroendocrine, immunoregulatory, organ, allometric, and modeling). Observed differences at (ultra)cellular and organ level are quantified, with focus on clinical relevance and implications for diagnosis and patient management. Since the cardiovascular system is of vital importance for all tissues, Sex-Specific Analysis of Cardiovascular Function is an essential source of information for clinicians, biologists, and biomedical investigators. The wide spectrum of differences described in this book will also act as an eye-opener and serve as a handbook for students, teachers, scientists and practitioners.

Allergy Bioinformatics

This innovative book provides a unique perspective on the biomedical and societal implications of personalized medicine and how it will help mitigate the healthcare crisis and rein in ever-growing expenditure. It introduces the reader to underlying concepts at the heart of personalized medicine - pharmacogenomics, targeted therapies and individualized diagnosis and treatment - and shows how, with the advent of genomic technologies, clinicians will have the capability to predict and diagnose disease more efficiently. Advocating a patient-centred approach at the heart of care, this introduction to personalized medicine, the science behind it, its economic effects, its effects upon patients and its overall implications for society will be invaluable to clinicians, to healthcare providers and to patients.

Precision Medicine and the Reinvention of Human Disease

Technologies such as direct-to-consumer genetic testing, pharmacogenetically developed therapies in cancer care, private umbilical cord blood banking, and neurocognitive enhancement claim to cater to an individual's specific biological character, and, in some cases, these technologies have shown powerful potential. Yet in others they have produced negligible or even negative results. Donna Dickenson examines the economic and political factors fueling the Me Medicine phenomenon and explores how, over time, this paradigm shift in how we approach our health might damage our individual and collective well-being. Drawing on the latest findings from leading scientists, social scientists, and political analysts, she critically examines four possible hypotheses driving the Me Medicine moment: a growing sense of threat; a wave of patient narcissism; corporate interests driving new niche markets; and the dominance of personal choice as a cultural value. She concludes with insights from political theory that emphasize a conception of the commons and the steps we can take to restore its value to modern biotechnology.

Extending the Spectrum of Precompetitive Collaboration in Oncology Research

Despite what you may have read in the popular press and in social media, Precision Medicine is not devoted to finding unique treatments for individuals, based on analyzing their DNA. To the contrary, the goal of Precision Medicine is to find general treatments that are highly effective for large numbers of individuals who fall into precisely diagnosed groups. We now know that every disease develops over time, through a sequence of defined biological steps, and that these

steps may differ among individuals, based on genetic and environmental conditions. We are currently developing rational therapies and preventive measures, based on our precise understanding of the steps leading to the clinical expression of diseases. Precision Medicine and the Reinvention of Human Disease explains the scientific breakthroughs that have changed the way that we understand diseases, and reveals how medical scientists are using this new knowledge to launch a medical revolution. Clarifies the foundational concepts of Precision Medicine, distinguishing this field from its predecessors such as genomics, pharmacogenetics, and personalized medicine. Gathers the chief conceptual advances in the fields of genetics, pathology, and bioinformatics, and synthesizes a coherent narrative for the field of Precision Medicine. Delivers its message in plain language, and in a relaxed, conversational writing style, making it easy to understand the complex subject matter. Guides the reader through a coherent and logical narrative, gradually providing expertise and skills along the way. Covers the importance of data sharing in Precision Medicine, and the many data-related challenges that confront this fragile new field.

Sex-Specific Analysis of Cardiovascular Function

Precision Public Health is a new and rapidly evolving field, that examines the application of new technologies to public health policy and practice. It draws on a broad range of disciplines including genomics, spatial data, data linkage, epidemiology, health informatics, big data, predictive analytics and communications. The hope is that these new technologies will strengthen preventive health, improve access to health care, and reach disadvantaged populations in all areas of the world. But what are the downsides and what are the risks, and how can we ensure the benefits flow to those population groups most in need, rather than simply to those individuals who can afford to pay? This is the first collection of theoretical frameworks, analyses of empirical data, and case studies to be assembled on this topic, published to stimulate debate and promote collaborative work.

Artificial Intelligence for Drug Development, Precision Medicine, and Healthcare

The Patient Equation

Clinical Precision Medicine: A Primer offers clinicians, researchers and students a practical, up-to-date resource on precision medicine, its evolving technologies, and pathways towards clinical implementation. Early chapters address the fundamentals of molecular biology and gene regulation as they relate to precision medicine, as well as the foundations of heredity and epigenetics. Oncology, an early adopter of precision approaches, is considered with its relationship to genetic variation in drug metabolism, along with tumor immunology and the impact of DNA variation in clinical care. Contributions by Stephanie Kramer, a Clinical Genetic Counselor, also provide current information on prenatal diagnostics and adult genetics that highlight the critical role of genetic counselors in the era of precision medicine. Includes applied discussions of chromosomes and chromosomal

abnormalities, molecular genetics, epigenetic regulation, heredity, clinical genetics, pharmacogenomics and immunogenomics Features chapter contributions from leaders in the field Consolidates fundamental concepts and current practices of precision medicine in one convenient resource

Comparative Effectiveness Research

The integration of biology, genomics, and health has opened the possibility of applying genomics technology to nutrition. In 2001, scientists associated with the Human Genome Project announced the successful mapping of the reference sequence of the human genome. Since then, a body of information has emerged. Genomics and related areas of research have contributed greatly to efforts to understand the cellular and molecular mechanisms underlying diet-disease relationships. Integration and application of genetic and genomics technology into nutrition research is, therefore, needed to develop nutrition research programs that are aimed at the prevention and control of chronic disease through genomics-based nutritional interventions. Of interest is the integration of relevant computational methods into nutritional genomics research; the enhancement of tools applicable to systems biology; and the effective dissemination of genomics-derived information to scientists, policy makers, and the interested public. To address these issues, a workshop was held on June 1 and 2, 2006. The workshop included presentations that were structured around three focus sessions: human genetic variation, epigenetics, and systems biology. A fourth session presented discussions on the implications of nutrigenomics for the future of nutrition science research. Numerous themes emerged from the workshop presentations. First, nutrigenomics is a complex field because it addresses issues related to multigenetic traits that can be modified by a number of nutritional and other environmental factors. Such complexity presents a challenge to the field; and the ensuing research opportunities will require cooperative work among scientific disciplines and across government, academic, and industrial centers, as well as adequate funding, to be realized. Additionally, the ability to stretch the limits of conventional research methodologies afforded by new genetic and genomic applications at the level of the individual opens the door to a wealth of potential benefits to areas such as disease prevention and wellness, bearing in mind the necessity of ethical safeguards. This potential, however, must be wisely exploited to avoid the pitfalls of overpromising research results and prematurely setting unrealistic expectations for beneficial outcomes. Finally, careful and rigorous research must be employed to optimize outcomes and assure acceptance by the scientific community. In summary, nutrition science is uniquely poised to serve as the crossroads for many disciplines and, using genomics tools, can bring this knowledge together to better understand and address diet-related chronic diseases and molecular responses to dietary factors.

The Road from Nanomedicine to Precision Medicine

The enormous advances in nanomedicine and precision medicine in the past two decades necessitated this comprehensive reference, which can be relied upon by researchers, clinicians, pharmaceutical scientists, regulators, policymakers, and lawyers alike. This standalone, full-color resource broadly surveys innovative technologies and advances pertaining to nanomedicine and precision medicine. In

addition, it addresses often-neglected yet crucial areas such as translational medicine, intellectual property law, ethics, policy, FDA regulatory issues, nano-nomenclature, and artificial nano-machines—all accomplished in a user-friendly, broad yet interconnected format. The book is essential reading for the novice and the expert alike in diverse fields such as medicine, law, pharmacy, genomics, biomedical sciences, ethics, and regulatory science. The book's multidisciplinary approach will attract a global audience and serve as a valuable reference resource for industry, academia, and government.

Artificial Intelligence in Precision Health

Translational Systems Biology

Despite spending more time and money in developing novel therapeutics, the success rate for new pharmacologic treatments has been poor. Although the research and development expenditures have grown 13 percent each year since 1970 (a 50-fold increase), the number of new drugs approved annually is no greater now than it was 50 years ago. Over the past decade, skyrocketing costs and the complexity of the scientific knowledge upon which to develop new agents have provided incentives for alternative approaches to drug development, if we are to continue to improve clinical care and reduce mortality. These challenges create opportunities for improved collaboration between industry, academia, government, and philanthropic organizations at each stage in new drug development, marketing, and implementation. Perhaps the most appropriate initial step in addressing the need for collaboration is to consider more precompetitive relationships that allow sharing of scientific information to foster drug development. While these collaborative relationships in basic and preclinical research on drug targets and the early stages of clinical testing are acknowledged to be potentially important drivers for innovation and more rapid marketing of new agents, they also raise a number of concerns that must be addressed. For example, acknowledgment of academic productivity and independence and economic competitiveness must be considered and these challenges managed to foster a culture of collaboration. At the same time, regulatory issues, the need for standardization, and intellectual property concerns must be confronted if the current models for drug development are to be refined to encourage robust participation in precompetitive collaborations. Recognizing the growing importance of precompetitive collaborations in oncology drug development, as well as the challenges these innovative collaborations pose, the National Cancer Policy Forum of the Institute of Medicine held a workshop on February 9 and 10, 2010. This book is a summary of the workshop proceedings.

Advancing Disease Modeling in Animal-Based Research in Support of Precision Medicine

Every patient is unique, and the evolving field of precision medicine aims to ensure the delivery of the right treatment to the right patient at the right time. In an era of rapid advances in biomedicine and enhanced understanding of the genetic basis of disease, health care providers increasingly have access to advanced technologies

that may identify molecular variations specific to an individual patient, which subsequently can be targeted for treatment. Known as biomarker tests for molecularly targeted therapies, these complex tests have the potential to enable the selection of the most beneficial treatment (and also to identify treatments that may be harmful or ineffective) for the molecular underpinnings of an individual patient's disease. Such tests are key to unlocking the promise of precision medicine. Biomarker tests for molecularly targeted therapies represent a crucial area of focus for developing methods that could later be applicable to other areas of precision medicine. The appropriate regulatory oversight of these tests is required to ensure that they are accurate, reliable, properly validated, and appropriately implemented in clinical practice. Moreover, common evidentiary standards for assessing the beneficial impact of biomarker-guided therapy selection on patient outcomes, as well as the effective collection and sharing of information related to those outcomes, are urgently needed to better inform clinical decision making. Biomarker Tests of Molecularly Targeted Therapies examines opportunities for and challenges to the use of biomarker tests to select optimal therapy and offers recommendations to accelerate progress in this field. This report explores regulatory issues, reimbursement issues, and clinical practice issues related to the clinical development and use of biomarker tests for targeting therapies to patients. Properly validated, appropriately implemented biomarker tests hold the potential to enhance patient care and improve outcomes, and therefore addressing the challenges facing such tests is critical.

Precision Public Health

Substantial empirical evidence of the contribution of social and behavioral factors to functional status and the onset and progression of disease has accumulated over the past few decades. Electronic health records (EHRs) provide crucial information to providers treating individual patients, to health systems, including public health officials, about the health of populations, and to researchers about the determinants of health and the effectiveness of treatment. Inclusion of social and behavioral health domains in EHRs is vital to all three uses. The Health Information Technology for Economic and Clinical Health Act and the Patient Protection and Affordable Care Act place new importance on the widespread adoption and meaningful use of EHRs. "Meaningful use" in a health information technology context refers to the use of EHRs and related technology within a health care organization to achieve specified objectives. Achieving meaningful use also helps determine whether an organization can receive payments from the Medicare EHR Incentive Program or the Medicaid EHR Incentive Program. Capturing Social and Behavioral Domains in Electronic Health Records is the first phase of a two-phase study to identify domains and measures that capture the social determinants of health to inform the development of recommendations for meaningful use of EHRs. This report identifies specific domains to be considered by the Office of the National Coordinator, specifies criteria that should be used in deciding which domains should be included, identifies core social and behavioral domains to be included in all EHRs, and identifies any domains that should be included for specific populations or settings defined by age, socioeconomic status, race/ethnicity, disease, or other characteristics.

Toward Precision Medicine

America's health care system has become too complex and costly to continue business as usual. Best Care at Lower Cost explains that inefficiencies, an overwhelming amount of data, and other economic and quality barriers hinder progress in improving health and threaten the nation's economic stability and global competitiveness. According to this report, the knowledge and tools exist to put the health system on the right course to achieve continuous improvement and better quality care at a lower cost. The costs of the system's current inefficiency underscore the urgent need for a systemwide transformation. About 30 percent of health spending in 2009--roughly $750 billion--was wasted on unnecessary services, excessive administrative costs, fraud, and other problems. Moreover, inefficiencies cause needless suffering. By one estimate, roughly 75,000 deaths might have been averted in 2005 if every state had delivered care at the quality level of the best performing state. This report states that the way health care providers currently train, practice, and learn new information cannot keep pace with the flood of research discoveries and technological advances. About 75 million Americans have more than one chronic condition, requiring coordination among multiple specialists and therapies, which can increase the potential for miscommunication, misdiagnosis, potentially conflicting interventions, and dangerous drug interactions. Best Care at Lower Cost emphasizes that a better use of data is a critical element of a continuously improving health system, such as mobile technologies and electronic health records that offer significant potential to capture and share health data better. In order for this to occur, the National Coordinator for Health Information Technology, IT developers, and standard-setting organizations should ensure that these systems are robust and interoperable. Clinicians and care organizations should fully adopt these technologies, and patients should be encouraged to use tools, such as personal health information portals, to actively engage in their care. This book is a call to action that will guide health care providers; administrators; caregivers; policy makers; health professionals; federal, state, and local government agencies; private and public health organizations; and educational institutions.

Me Medicine vs. We Medicine

How the data revolution is transforming biotech and health care, especially in the wake of COVID-19—and why you can’t afford to let it pass you by We are living through a time when the digitization of health and medicine is becoming a reality, with new abilities to improve outcomes for patients as well as the efficiency and success of the organizations that serve them. In The Patient Equation, Glen de Vries presents the history and current state of life sciences and health care as well as crucial insights and strategies to help scientists, physicians, executives, and patients survive and thrive, with an eye toward how COVID-19 has accelerated the need for change. One of the biggest challenges facing biotech, pharma, and medical device companies today is how to integrate new knowledge, new data, and new technologies to get the right treatments to the right patients at precisely the right times—made even more profound in the midst of a pandemic and in the years to come. Drawing on the fascinating stories of businesses and individuals that are already making inroads—from a fertility-tracking bracelet changing the game for couples looking to get pregnant, to an entrepreneur reinventing the treatment of diabetes, to Medidata's own work bringing clinical trials into the 21st

century—de Vries shares the breakthroughs, approaches, and practical business techniques that will allow companies to stay ahead of the curve and deliver solutions faster, cheaper, and more successfully—while still upholding the principles of traditional therapeutic medicine and reflecting the current environment. How new approaches to cancer and rare diseases are leading the way toward precision medicine What data and digital technologies enable in the building of robust, effective disease management platforms Why value-based reimbursement is changing the business of life sciences How the right alignment of incentives will improve outcomes at every stage of the patient journey Whether you're a scientist, physician, or executive, you can't afford to let the moment pass: understand the landscape with this must-read roadmap for success—and see how you can change health care for the better.

Clinical Precision Medicine

Personalized and Precision Medicine Informatics

"For several decades, the field of bioethics has played a dominant role in shaping the way society thinks about ethical problems related to developments in science, technology, and medicine. But its traditional emphases on, for example, doctor-patient relationships, informed consent, and individual autonomy have led the field to not be fully responsive to the challenges posed by new human biotechnologies such as assisted reproduction, human genetic enhancement, and DNA forensics. Beyond Bioethics provides a focused overview for students and others grappling with the profound social dilemmas posed by these developments. It brings together the work of cutting-edge thinkers from diverse fields of study and public engagement, all of them committed to a new perspective that is grounded in social justice and public interest values. The contributors to this volume seek to define an emerging field of scholarly, policy, and public concern: a new biopolitics."--Provided by publisher.

Genomic and Personalized Medicine

Oncology Informatics: Using Health Information Technology to Improve Processes and Outcomes in Cancer Care encapsulates National Cancer Institute-collected evidence into a format that is optimally useful for hospital planners, physicians, researcher, and informaticians alike as they collectively strive to accelerate progress against cancer using informatics tools. This book is a formational guide for turning clinical systems into engines of discovery as well as a translational guide for moving evidence into practice. It meets recommendations from the National Academies of Science to "reorient the research portfolio" toward providing greater "cognitive support for physicians, patients, and their caregivers" to "improve patient outcomes." Data from systems studies have suggested that oncology and primary care systems are prone to errors of omission, which can lead to fatal consequences downstream. By infusing the best science across disciplines, this book creates new environments of "Smart and Connected Health." Oncology Informatics is also a policy guide in an era of extensive reform in healthcare settings, including new incentives for healthcare providers to demonstrate

"meaningful use" of these technologies to improve system safety, engage patients, ensure continuity of care, enable population health, and protect privacy. Oncology Informatics acknowledges this extraordinary turn of events and offers practical guidance for meeting meaningful use requirements in the service of improved cancer care. Anyone who wishes to take full advantage of the health information revolution in oncology to accelerate successes against cancer will find the information in this book valuable. Presents a pragmatic perspective for practitioners and allied health care professionals on how to implement Health I.T. solutions in a way that will minimize disruption while optimizing practice goals Proposes evidence-based guidelines for designers on how to create system interfaces that are easy to use, efficacious, and timesaving Offers insight for researchers into the ways in which informatics tools in oncology can be utilized to shorten the distance between discovery and practice

Improving Diagnosis in Health Care

A definitive and authoritative guide to a vibrant and growing discipline in current philosophy, The Bloomsbury Companion to Contemporary Philosophy of Medicine presents an overview of the issues facing contemporary philosophy of medicine, the research methods required to understand them and a trajectory for the discipline's future. Written by world leaders in the discipline, this companion addresses the ontological, epistemic, and methodological challenges facing philosophers of medicine today, from the debate between evidence-based and person-centered medicine, medical humanism, and gender medicine, to traditional issues such as disease, health, and clinical reasoning and decision-making. Practical and forward-looking, it also includes a detailed guide to research sources, a glossary of key terms, and an annotated bibliography, as well as an introductory survey of research methods and discussion of new research directions emerging in response to the rapid changes in modern medicine. "Philosophy needs medicine', Hillel Braude argues, 'to become more relevant'. By showing how modern medicine provides philosophers with a rich source of material for investigating issues facing contemporary society, The Bloomsbury Companion to Contemporary Philosophy of Medicine introduces the opportunities medicine offers philosophers together with the resources and skills required to contribute to contemporary debates and discussions.

Implementing Precision Medicine in Best Practices of Chronic Airway Diseases

Genomic and Personalized Medicine, Second Edition — winner of a 2013 Highly Commended BMA Medical Book Award for Medicine — is a major discussion of the structure, history, and applications of the field, as it emerges from the campus and lab into clinical action. As with the first edition, leading experts review the development of the new science, the current opportunities for genome-based analysis in healthcare, and the potential of genomic medicine in future healthcare. The inclusion of the latest information on diagnostic testing, population screening, disease susceptability, and pharmacogenomics makes this work an ideal companion for the many stakeholders of genomic and personalized medicine. With advancing knowledge of the genome across and outside protein-coding regions of

DNA, new comprehension of genomic variation and frequencies across populations, the elucidation of advanced strategic approaches to genomic study, and above all in the elaboration of next-generation sequencing, genomic medicine has begun to achieve the much-vaunted transformative health outcomes of the Human Genome Project, almost a decade after its official completion in April 2003. Highly Commended 2013 BMA Medical Book Award for Medicine More than 100 chapters, from leading researchers, review the many impacts of genomic discoveries in clinical action, including 63 chapters new to this edition Discusses state-of-the-art genome technologies, including population screening, novel diagnostics, and gene-based therapeutics Wide and inclusive discussion encompasses the formidable ethical, legal, regulatory and social challenges related to the evolving practice of genomic medicine Clearly and beautifully illustrated with 280 color figures, and many thousands of references for further reading and deeper analysis

Hastings Law Journal

Are we satisfied with the rate of drug development? Are we happy with the drugs that come to market? Are we getting our money's worth in spending for basic biomedical research? In Translational Systems Biology, Drs. Yoram Vodovotz and Gary An address these questions by providing a foundational description the barriers facing biomedical research today and the immediate future, and how these barriers could be overcome through the adoption of a robust and scalable approach that will form the underpinning of biomedical research for the future. By using a combination of essays providing the intellectual basis of the Translational Dilemma and reports of examples in the study of inflammation, the content of Translational Systems Biology will remain relevant as technology and knowledge advances bring broad translational applicability to other diseases. Translational systems biology is an integrated, multi-scale, evidence-based approach that combines laboratory, clinical and computational methods with an explicit goal of developing effective means of control of biological processes for improving human health and rapid clinical application. This comprehensive approach to date has been utilized for in silico studies of sepsis, trauma, hemorrhage, and traumatic brain injury, acute liver failure, wound healing, and inflammation. Provides an explicit, reasoned, and systematic approach to dealing with the challenges of translational science across disciplines Establishes the case for including computational modeling at all stages of biomedical research and healthcare delivery, from early pre-clinical studies to long-term care, by clearly delineating efficiency and costs saving important to business investment Guides readers on how to communicate across domains and disciplines, particularly between biologists and computational researchers, to effectively develop multi- and trans-disciplinary research teams

Oncology Informatics

The book introduces the bioinformatics resources and tools available for the study of allergenicity. Allergy symptoms affect more than 25% of the population in industrialized countries. At the same time, biotechnology is a rapidly developing field, which often involves the introduction of potentially allergenic novel proteins into drugs or foods. It is essential to avoid transferring a gene that encodes a major allergenic protein (from any source) into a drug/food crop that did not previously

contain that protein. Accurately distinguishing candidate genes from allergens before transferring them into a drug or food would aid preventive efforts to curb the rising incidence of allergies. Several public databases have been created in response to increasing allergen data. The resources provided by these databases have paved the way for the creation of specialized bioinformatics tools that allow allergenicity to be predicted. The book is a useful resource for biologists and biomedical informatics scientists, as well as clinicians. Dr. Ailin Tao is the chief of Guangdong Province Key Laboratory of Allergy & Clinical Immunology, Principal Investigator of the State Key Laboratory of Respiratory Disease, the Second Affiliated Hospital of Guangzhou Medical University; Dr. Prof. Eyal Raz is a Professor of Medicine at University of California, San Diego, La Jolla, California, USA. They collaborate very well on allergy research and this book editi ng.

The Bloomsbury Companion to Contemporary Philosophy of Medicine

Artificial Intelligence in Precision Health: From Concept to Applications provides a readily available resource to understand artificial intelligence and its real time applications in precision medicine in practice. Written by experts from different countries and with diverse background, the content encompasses accessible knowledge easily understandable for non-specialists in computer sciences. The book discusses topics such as cognitive computing and emotional intelligence, big data analysis, clinical decision support systems, deep learning, personal omics, digital health, predictive models, prediction of epidemics, drug discovery, precision nutrition and fitness. Additionally, there is a section dedicated to discuss and analyze AI products related to precision healthcare already available. This book is a valuable source for clinicians, healthcare workers, and researchers from diverse areas of biomedical field who may or may not have computational background and want to learn more about the innovative field of artificial intelligence for precision health. Provides computational approaches used in artificial intelligence easily understandable for non-computer specialists Gives know-how and real successful cases of artificial intelligence approaches in predictive models, modeling disease physiology, and public health surveillance Discusses the applicability of AI on multiple areas, such as drug discovery, clinical trials, radiology, surgery, patient care and clinical decision support

Advancing Healthcare Through Personalized Medicine

Getting the right diagnosis is a key aspect of health care - it provides an explanation of a patient's health problem and informs subsequent health care decisions. The diagnostic process is a complex, collaborative activity that involves clinical reasoning and information gathering to determine a patient's health problem. According to Improving Diagnosis in Health Care, diagnostic errors-inaccurate or delayed diagnoses-persist throughout all settings of care and continue to harm an unacceptable number of patients. It is likely that most people will experience at least one diagnostic error in their lifetime, sometimes with devastating consequences. Diagnostic errors may cause harm to patients by preventing or delaying appropriate treatment, providing unnecessary or harmful treatment, or resulting in psychological or financial repercussions. The committee

concluded that improving the diagnostic process is not only possible, but also represents a moral, professional, and public health imperative. Improving Diagnosis in Health Care a continuation of the landmark Institute of Medicine reports To Err Is Human (2000) and Crossing the Quality Chasm (2001) finds that diagnosis-and, in particular, the occurrence of diagnostic errorsâ€"has been largely unappreciated in efforts to improve the quality and safety of health care. Without a dedicated focus on improving diagnosis, diagnostic errors will likely worsen as the delivery of health care and the diagnostic process continue to increase in complexity. Just as the diagnostic process is a collaborative activity, improving diagnosis will require collaboration and a widespread commitment to change among health care professionals, health care organizations, patients and their families, researchers, and policy makers. The recommendations of Improving Diagnosis in Health Care contribute to the growing momentum for change in this crucial area of health care quality and safety.

The Biologist's Imagination

Artificial Intelligence for Drug Development, Precision Medicine, and Healthcare covers exciting developments at the intersection of computer science and statistics. While much of machine-learning is statistics-based, achievements in deep learning for image and language processing rely on computer science’s use of big data. Aimed at those with a statistical background who want to use their strengths in pursuing AI research, the book: · Covers broad AI topics in drug development, precision medicine, and healthcare. · Elaborates on supervised, unsupervised, reinforcement, and evolutionary learning methods. · Introduces the similarity principle and related AI methods for both big and small data problems. · Offers a balance of statistical and algorithm-based approaches to AI. · Provides examples and real-world applications with hands-on R code. · Suggests the path forward for AI in medicine and artificial general intelligence. As well as covering the history of AI and the innovative ideas, methodologies and software implementation of the field, the book offers a comprehensive review of AI applications in medical sciences. In addition, readers will benefit from hands on exercises, with included R code.

Best Care at Lower Cost

This book has two main goals: to define data science through the work of data scientists and their results, namely data products, while simultaneously providing the reader with relevant lessons learned from applied data science projects at the intersection of academia and industry. As such, it is not a replacement for a classical textbook (i.e., it does not elaborate on fundamentals of methods and principles described elsewhere), but systematically highlights the connection between theory, on the one hand, and its application in specific use cases, on the other. With these goals in mind, the book is divided into three parts: Part I pays tribute to the interdisciplinary nature of data science and provides a common understanding of data science terminology for readers with different backgrounds. These six chapters are geared towards drawing a consistent picture of data science and were predominantly written by the editors themselves. Part II then broadens the spectrum by presenting views and insights from diverse authors – some from academia and some from industry, ranging from financial to health and from

manufacturing to e-commerce. Each of these chapters describes a fundamental principle, method or tool in data science by analyzing specific use cases and drawing concrete conclusions from them. The case studies presented, and the methods and tools applied, represent the nuts and bolts of data science. Finally, Part III was again written from the perspective of the editors and summarizes the lessons learned that have been distilled from the case studies in Part II. The section can be viewed as a meta-study on data science across a broad range of domains, viewpoints and fields. Moreover, it provides answers to the question of what the mission-critical factors for success in different data science undertakings are. The book targets professionals as well as students of data science: first, practicing data scientists in industry and academia who want to broaden their scope and expand their knowledge by drawing on the authors' combined experience. Second, decision makers in businesses who face the challenge of creating or implementing a data-driven strategy and who want to learn from success stories spanning a range of industries. Third, students of data science who want to understand both the theoretical and practical aspects of data science, vetted by real-world case studies at the intersection of academia and industry.

Precision in Pulmonary, Critical Care, and Sleep Medicine

When Bechara Choucair was a young doctor, he learned an important lesson: treating a patient for hypothermia does little good if she has to spend the next night out in the freezing cold. As health commissioner of Chicago, he was determined to address the societal causes of disease and focus the city's resources on its most vulnerable populations. That targeted approach has led to dramatic successes, such as lowering rates of smoking, teen pregnancy, breast cancer mortalities, and other serious ills. In Precision Community Health, Choucair shows how those successes can be replicated and expanded around the country. The key is to use advanced technologies to identify which populations are most at risk for specific health threats and avert crises before they begin. Big data makes precision community health possible. But in our increasingly complex world, we also need new strategies for developing effective coalitions, media campaigns, and policies. This book showcases four innovations that move public health departments away from simply dispensing medical care and toward supporting communities to achieve true well-being. The approach Choucair pioneered in Chicago requires broadening our thinking about what constitutes public health. It is not simply about access to a doctor, but access to decent housing, jobs, parks, food, and social support. It also means acknowledging that a one-size-fits-all strategy may exacerbate inequities. By focusing on those most in need, we create an agenda that is simultaneously more impactful and more achievable. The result is a wholesale change in the way public health is practiced and in the well-being of all our communities.

Applied Data Science

Scholars and policymakers alike agree that innovation in the biosciences is key to future growth. The field continues to shift and expand, and it is certainly changing the way people live their lives in a variety of ways. With a large share of federal research dollars devoted to the biosciences, the field is just beginning to live up to its billing as a source of innovation, economic productivity and growth. Vast

untapped potential to imagine and innovate exists in the biosciences given new tools now widely available. In The Biologist's Imagination, William Hoffman and Leo Furcht examine the history of innovation in the biosciences, tracing technological innovation from the late eighteenth century to the present and placing special emphasis on how and where technology evolves. Place is often key to innovation, from the early industrial age to the rise of the biotechnology industry in the second half of the twentieth century. The book uses the distinct history of bioinnovation to discuss current trends as they relate to medicine, agriculture, energy, industry, ecosystems, and climate. Fast-moving research fields like genomics, synthetic biology, stem cell research, neuroscience, bioautomation and bioprinting are accelerating these trends. Hoffman and Furcht argue that our system of bioscience innovation is itself in need of innovation. It needs to adapt to the massive changes brought about by converging technologies and the globalization of higher education, workforce skills, and entrepreneurship. The Biologist's Imagination is both a review of past models for bioscience innovation and a forward-looking, original argument for what future models should take into account.

Abeloff's Clinical Oncology E-Book

Implementing Precision Medicine in Best Practices of Chronic Airway Diseases provides a comprehensive overview of the application of precision medicine in airway diseases with a goal of promoting optimal control of disease, higher patient satisfaction and disease prevention. As medical research continues to fund this area, the book highlights the need for implementation of the principles of precision medicine into the bedside management of chronic airway diseases. It is clear that chronic airway diseases are heterogeneous and that a personalized approach is warranted whereby treatment is tailored to the level of the individual patient. Written for basic researchers, medical doctors and other healthcare practitioners this book provides guidance on the implementation of the principles of precision medicine into further research and daily clinical practice. Bridges the gap between precision medicine research and the implementation of the principles into daily clinical practice Includes contributions from key opinion leaders in the field of airway disease giving a worldwide perspective Discusses precision medicine in terms of personalized and stratified medicine, biomarkers, prediction of success, participation of the patient and prevention of disease

Precision Community Health

Practical and clinically focused, Abeloff’s Clinical Oncology is a trusted medical reference book designed to capture the latest scientific discoveries and their implications for cancer diagnosis and management of cancer in the most accessible manner possible. Abeloff’s equips everyone involved - from radiologists and oncologists to surgeons and nurses - to collaborate effectively and provide the best possible cancer care. Consult this title on your favorite e-reader, conduct rapid searches, and adjust font sizes for optimal readability. Select the most appropriate tests and imaging studies for cancer diagnosis and staging of each type of cancer, and manage your patients in the most effective way possible by using all of the latest techniques and approaches in oncology. Enhance your understanding of complex concepts with a color art program that highlights key points and illustrates relevant scientific and clinical problems. Stay at the forefront of the

latest developments in cancer pharmacology, oncology and healthcare policy, survivorship in cancer, and many other timely topics. See how the most recent cancer research applies to practice through an increased emphasis on the relevance of new scientific discoveries and modalities within disease chapters. Streamline clinical decision making with abundant new treatment and diagnostic algorithms as well as concrete management recommendations. Take advantage of the collective wisdom of preeminent multidisciplinary experts in the field of oncology, including previous Abeloff's editors John E. Niederhuber, James O. Armitage, and Michael B. Kastan as well as new editors James H. Doroshow from the National Cancer Institute and Joel E. Tepper of Gunderson & Tepper: Clinical Radiation Oncology. Quickly and effortlessly access the key information you need with the help of an even more user-friendly, streamlined format. Access the complete contents anytime, anywhere at Expert Consult, and test your mastery of the latest knowledge with 500 online multiple-choice review questions.

MoneyBall Medicine

Precision medicine is focused on the individual and will require the rapid and accurate identification and prioritization of causative factors of disease. To move forward and accelerate the delivery of the anticipated benefits of precision medicine, developing predictable, reproducible, and reliable animal models will be essential. In order to explore the topic of animal-based research and its relevance to precision medicine, the National Academies of Sciences, Engineering, and Medicine convened a 2-day workshop on October 5 and 6, 2017. The workshop was designed to focus on the development, implementation, and interpretation of model organisms to advance and accelerate the field of precision medicine. Participants examined the extent to which next-generation animal models, designed using patient data and phenotyping platforms targeted to reveal and inform disease mechanisms, will be essential to the successful implementation of precision medicine. This publication summarizes the presentations and discussions from the workshop.

Toward Precision Medicine

This issue concentrates on the current evidence and the collected experience of pediatric oncologists who care for cancer patients. The individual articles will provide the general pediatrician with a comprehensive primer on diagnosing and managing various types of cancers in the child with cancer. A cancer diagnosis is no longer a death sentence, so management and monitoring is very important and covered in every article.

Biomimetic Microengineering

This book serves as the primary reference for precision medicine in the fields of pulmonary, critical care and sleep medicine by documenting principles written by experts in several aspects of precision medicine. It combines fundamental concepts of the field with state-of-the-art studies and how they translate into individual preventive, diagnostic and therapeutic plans. Precision medicine is focused on the integration of individual variability with disease prevention and

treatment principles derived from population studies. This concept has risen to prominence in recent years in parallel with advances in genetics, molecular diagnostics and novel target-specific therapies. This fundamental shift in the approach to treatment has broad implications in how we prevent, diagnose and treat disease. Describing key concepts of precision medicine and relating these to pulmonary, critical care and sleep disorders is essential to educate relevant stakeholders and increase the impact of pulmonary precision medicine. The book is organized into seven sections: introduction; genetics; biomarkers; precise phenotyping; mobile health, wearables and telemedicine; precision therapeutics; and enabling widespread adoption of precision medicine. The chapters are organized with an introduction to the specific theme, followed by its basic concepts. They then delve into how these basic concepts relate to the larger theme of precision medicine, new precision medicine approaches to dealing with these problems, and key takeaway points. Liberally illustrated with images, figures, and tables, the text is thorough and intuitive for clinicians and researchers to learn the processes and applications of precision medicine. This is an ideal guide for clinicians to learn new precision medicine concepts in the fields of genetics, genomics, mobile health, and how they apply to their practice and their patients, as well as researchers seeking a basic understanding of precision medicine to assist in designing future research studies.

Nutrigenomics and Beyond

This book adopts an integrated and workflow-based treatment of the field of personalized and precision medicine (PPM). Outlined within are established, proven and mature workflows as well as emerging and highly-promising opportunities for development. Each workflow is reviewed in terms of its operation and how they are enabled by a multitude of informatics methods and infrastructures. The book goes on to describe which parts are crucial to discovery and which are essential to delivery and how each of these interface and feed into one-another. Personalized and Precision Medicine Informatics provides a comprehensive review of the integrative as well as interpretive nature of the topic and brings together a large body of literature to define the topic and ensure that this is the key reference for the topic. It is an unique contribution that is positioned to be an essential guide for both PPM experts and non-experts, and for both informatics and non-informatics professionals.

Capturing Social and Behavioral Domains in Electronic Health Records

Motivated by the explosion of molecular data on humans-particularly data associated with individual patients-and the sense that there are large, as-yet-untapped opportunities to use this data to improve health outcomes, Toward Precision Medicine explores the feasibility and need for "a new taxonomy of human disease based on molecular biology" and develops a potential framework for creating one. The book says that a new data network that integrates emerging research on the molecular makeup of diseases with clinical data on individual patients could drive the development of a more accurate classification of diseases and ultimately enhance diagnosis and treatment. The "new taxonomy" that

emerges would define diseases by their underlying molecular causes and other factors in addition to their traditional physical signs and symptoms. The book adds that the new data network could also improve biomedical research by enabling scientists to access patients' information during treatment while still protecting their rights. This would allow the marriage of molecular research and clinical data at the point of care, as opposed to research information continuing to reside primarily in academia. Toward Precision Medicine notes that moving toward individualized medicine requires that researchers and health care providers have access to very large sets of health- and disease-related data linked to individual patients. These data are also critical for developing the information commons, the knowledge network of disease, and ultimately the new taxonomy.

Beyond Bioethics

How can a smartwatch help patients with diabetes manage their disease? Why can’t patients find out prices for surgeries and other procedures before they happen? How can researchers speed up the decade-long process of drug development? How will "Precision Medicine" impact patient care outside of cancer? What can doctors, hospitals, and health systems do to ensure they are maximizing high-value care? How can healthcare entrepreneurs find success in this data-driven market? A revolution is transforming the $10 trillion healthcare landscape, promising greater transparency, improved efficiency, and new ways of delivering care. This new landscape presents tremendous opportunity for those who are ready to embrace the data-driven reality. Having the right data and knowing how to use it will be the key to success in the healthcare market in the future. We are already starting to see the impacts in drug development, precision medicine, and how patients with rare diseases are diagnosed and treated. Startups are launched every week to fill an unmet need and address the current problems in the healthcare system. Digital devices and artificial intelligence are helping doctors do their jobs faster and with more accuracy. MoneyBall Medicine: Thriving in the New Data-Driven Healthcare Market, which includes interviews with dozens of healthcare leaders, describes the business challenges and opportunities arising for those working in one of the most vibrant sectors of the world’s economy. Doctors, hospital administrators, health information technology directors, and entrepreneurs need to adapt to the changes effecting healthcare today in order to succeed in the new, cost-conscious and value-based environment of the future. The authors map out many of the changes taking place, describe how they are impacting everyone from patients to researchers to insurers, and outline some predictions for the healthcare industry in the years to come.

ROMANCE ACTION & ADVENTURE MYSTERY & THRILLER BIOGRAPHIES & HISTORY CHILDREN'S YOUNG ADULT FANTASY HISTORICAL FICTION HORROR LITERARY FICTION NON-FICTION SCIENCE FICTION