

Clinical Prediction Rules



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Clinical Prediction Rules

A Physical Therapy Reference Manual

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*To my wife, Buquet, and my daughter, Emma—
thank you for your love, support, and patience.*

You mean the world to me.

PG



For Cara . . . my favorite.

CW

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FOREWORD

Clinical Prediction Rules: A Physical Therapy Reference Manual by Drs. Paul Glynn and P. Cody Weisbach will make a substantial and timely contribution to the physical therapy profession. The profession recently experienced an influx in the development of clinical prediction rules (CPRs), which provide physical therapists with an evidence-based tool to assist in patient management when determining a particular diagnosis or prognosis, or when predicting a response to a particular intervention. Clinicians often are left without evidence to guide clinical decision making. CPRs make terrific contributions to the evidence available to physical therapists and will greatly enhance the quality of care provided to patients. Drs. Glynn and Weisbach have taken the first step in the much-needed process of ensuring that CPRs are used on a consistent basis. They have provided a user-friendly guide to understanding the principles and utilization of CPRs in physical therapy practice. Furthermore, *Clinical Prediction Rules: A Physical Therapy Reference Manual* provides an extensive list of CPRs that have been developed and the potential implications for the patients whom physical therapists treat.

Despite the increasing popularity of CPRs, they are not without limitations and should be subjected to the scientific scrutiny of continued methodologically sound research. The authors of this text have clearly identified that CPRs in the initial stage of development should be used with caution and only within the context of the existing risks and benefits. Evidence provided through the use of uncontrolled cohort studies—which often are used in the development of CPRs—should not be defended as an endpoint but rather as the first step in the research process. Despite the fact that the majority of CPRs useful to physical therapists exist in the initial stages of development, in the absence of strong evidence, they are capable of providing useful information to the clinician that may in turn enhance patient outcomes. The authors have provided readers with all of the tools necessary to decide whether a CPR is appropriate for the patient sitting before them. Furthermore, this text lucidly identifies common methodological flaws associated with CPR studies and provides a quality assessment score for all derivation-level studies of which an assessment tool exists. This will greatly enhance the ability of physical therapists to critique CPRs and determine their applicability to clinical practice. Drs. Glynn and Weisbach emphasize the need to determine a rule's accuracy in different practice settings and its impact on outcomes of care and costs. The caveat is that clinicians cannot be entirely confident in the accuracy of a rule's use until more definitive validation studies are completed. For this reason, the authors did not include CPRs

that have not been validated if the magnitude of the decision being made is such that the risk of making an inaccurate decision exceeds the potential benefits (e.g., the potential of a false negative for cervical spine fracture).

Clinical prediction rules should not be construed as removal of the clinical decision-making process from physical therapist practice. Instead, they should be used to eliminate some of the uncertainty that occurs with each and every clinical encounter and to provide a level of evidence on which clinicians can make decisions with adequate confidence. Sticking with the principles of evidence-based practice, the authors encourage therapists to incorporate the best available evidence (including CPRs) combined with clinical expertise and patient values to enhance the overall quality of care provided to individual patients.

I am certain we will continue to see the use of CPRs assist in advancing clinical practice in the physical therapy profession. Because it will be increasingly difficult for busy clinicians to stay abreast of the current best evidence, this text will assist in alleviating the complicated process of synthesizing the evidence. *Clinical Prediction Rules: A Physical Therapy Reference Manual* provides a succinct and clear guide to the use of CPRs in clinical practice and will prove an invaluable tool for both students and physical therapists in maximizing the quality of care provided to patients. This text is much more than a compendium of CPRs, and it will serve to improve the understanding of the clinical implications of CPRs and should enhance the translation of evidence to clinical practice. The authors should be congratulated, as the text clearly achieves its goal of serving as a clinical resource and reference manual to a collection of clinical prediction rules pertinent to the outpatient, orthopaedic physical therapist.

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INTRODUCTION BY THE SERIES EDITOR

I think it is safe to say that the advent of clinical prediction rules has caused quite a stir in the orthopaedic physical therapy world. Clinical prediction rules are decision-making tools that contain predictor variables obtained from patient history, examination, and simple diagnostic tests; they can assist in making a diagnosis, establishing a prognosis, or determining appropriate management strategies.¹ In other words, clinical prediction rules (CPRs) are diagnostic, prognostic, or interventional/prescriptive. To date, the large majority of clinical prediction rules within the physical therapy literature are prescriptive in nature. Prescriptive clinical prediction rules are an exponent of the treatment-based system. In this type of diagnostic classification system, a cluster of signs and symptoms from the patient history and physical examination is used to classify patients into subgroups with specific implications for management.² As such, it produces homogeneous subgroups where all subjects within that group are expected to respond favorably to a matched intervention. All orthopaedic physical therapists will be able to recall various systematic reviews and meta-analyses published in leading biomedical journals that have indicated interventions that we know to be effective in our everyday clinical practice. These reviews are either no more effective than the standard of care or have an effect size similar to placebo interventions. A 2003 meta-analysis showing a lack of evidence for the use of manipulation in the management of patients with low back pain can serve as an often-referenced illustration.³ Not that this finding should surprise us: If studies included in a systematic review or meta-analysis use no patient classification other than a broad category of nonspecific regional pain, the resultant heterogeneous study samples pretty much preclude finding real effects of even the most effective intervention.⁴ Their ability to identify homogeneous subgroups immediately makes the development and validation of prescriptive clinical prediction rules a priority for our profession. As *Clinical Prediction Rules: A Physical Therapy Reference Manual* shows, many researchers have indeed recognized this importance, and the result is the impressive number of clinical prediction rules presented in this text.

So why has the development and application of clinical prediction rules, particularly prescriptive rules, led to such controversy in orthopaedic physical therapy? One obvious reason is the fear that such rules may lead to a loss of autonomy with regard to clinical decision making. In this context, the choice of the word *prescriptive* has been less than fortuitous. And, admittedly, this fear is grounded in reality. Colleagues have told me that some healthcare organizations instituted company-wide educational programs and policies that (inappropriately and prematurely) positioned the application of nonvalidated clinical prediction rules as the new

standard of care. As with any research, there is the potential that interested third parties use their findings to inappropriately limit care and reimbursement. Another reason for this fear is that clinical prediction rules may seem hard to integrate with the mechanism-based classification system still used as the predominant paradigm by many orthopaedic physical therapists today. This paradigm is based on the premise that impairments identified during examination are the cause of musculoskeletal pain and dysfunction; interventions aimed at resolving these impairments are assumed to lead to decreased pain and increased function.⁵

Why is—despite these concerns—this book a worthwhile text that should ideally be included in the professional library of all orthopaedic physical therapists as well as of other conservative musculoskeletal care providers? First, clinical prediction rules were never intended to replace mechanism-based decision making. As with all research, we need to take into account external validity, which means that we can only apply clinical prediction rule research to patient populations that are sufficiently similar to the populations in which the tool was developed or validated. Acknowledging that the majority of clinical decisions will still be made using the mechanism-based paradigm, clinical prediction rules simply provide us with another tool for a specific subpopulation, albeit that for this subpopulation it provides a higher level of support from research evidence than does reasoning using the mechanism-based paradigm. However, to appropriately use this extra tool in our clinical toolbox, we need to know about content and relevance to our clinical practice of the clinical prediction rule. Second, any clinician will want to guard against misinterpretation and misuse of this tool for the purpose of limiting therapist autonomy and patient care. This means we need to be aware of limitations not only relevant to the individual rules but also inherent in the research process involved in deriving and validating these rules.

Clinical Prediction Rules: A Physical Therapy Reference Manual provides ready access to the clinical prediction rules relevant to orthopaedic clinical practice. It starts with a discussion of rules used for screening patients for the need for referral, followed by a presentation of rules organized by body region, and further divided into diagnostic, prognostic, and interventional rules. Taking into account the dire consequences of incorrect decisions during the screening portion of the examination, only screening rules that have undergone broad-based validation are included. An in-depth but accessible discussion of the research process, common methodological shortcomings in clinical prediction rule research, and relevant statistics provide the clinician with the tools required for critical analysis and appropriate application. Methodological quality scores are provided for prognostic and prescriptive rules and for validation studies. In the absence of a validated methodological quality assessment tool for diagnostic studies, the authors have proposed and

provided a quality checklist for such studies. This allows for further critical interpretation by the clinician interested in application of the rules in clinical practice. Current, evidence-informed, and patient-centered clinical practice in orthopaedic physical therapy and other conservative musculoskeletal care professions requires the clinician to provide care based on an integration of current best research evidence, clinician expertise, and patient preferences. This text provides not only the current best evidence but also adds to clinician expertise by providing the tools required for critical analysis of this evidence. Finally, by providing the clinician with the knowledge required to educate the patient with regard to appropriate interpretation of clinical prediction rules, it also allows for truly informed patient input in the clinical decision-making process.

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Paul E. Glynn, PT, DPT, OCS, FAAOMPT

Dr. Glynn graduated from the University of Massachusetts at Lowell with a BS in Exercise Physiology and later earned his MS in Physical Therapy in 1997. In 2001, he completed a Certificate of Advanced Studies in Orthopaedic Physical Therapy as well as his Doctorate in Physical Therapy from the MGH Institute of Health Professions in Boston, Massachusetts. Dr. Glynn achieved board certification as an Orthopaedic Clinical Specialist in 2002. In 2006, he completed his manual therapy fellowship training at Regis University in Denver, Colorado, and he currently serves as affiliate faculty in the university's transitional DPT and fellowship programs. Dr. Glynn also serves as affiliate faculty at the University of Medicine and Dentistry in Newark, New Jersey, as well as for Evidence in Motion, Inc. in Louisville, Kentucky. Currently he works as the Supervisor of Staff Development and Clinical Research at Newton-Wellesley Hospital in Newton, Massachusetts, where he is a member of the Institutional Review Board.

Dr. Glynn has published research in numerous peer-reviewed journals, including *Physical Therapy*, the *Journal of Manual and Manipulative Therapy*, the *Journal of Sports Rehabilitation*, and the *Journal of Shoulder and Elbow Surgery*. He is the recipient of the 2006 Excellence in Research Award, the JMMT Therapeutic Exercise Award, and the 2008 Jack Walker Award. He is an active researcher and national presenter in the field, a manuscript reviewer for the *Journal of Manual and Manipulative Therapy*, and an item writer for the National Physical Therapy Exam (NPTE) and the Specialization Academy of Content Experts (SACE). Dr. Glynn also is an associate member of the Federation of State Boards of Physical Therapy (FSBPT) and has recently served on the FSBPT's standards setting task force for the NPTE.

P. Cody Weisbach, PT, DPT

Dr. Weisbach earned his BA in Kinesiology and Applied Physiology from the University of Colorado at Boulder and completed his Doctorate in Physical Therapy at Simmons College in Boston, Massachusetts, in 2007. He is currently enrolled in a manual therapy fellowship at Regis University in Denver, Colorado.

Since graduation, Dr. Weisbach has worked with an orthopaedic population in a hospital-based outpatient setting at Newton-Wellesley Hospital in Newton, Massachusetts. In addition to his clinical duties, he has acted as a clinical investigator for several studies pending publication and is the primary investigator of a study investigating the effects of manual physical therapy applied to the hip in patients with

low back pain. Dr. Weisbach has been published in *Physical Therapy* and recently participated in a clinical commentary on the influence of the hip in lower-back pain published in the *Journal of Sports Rehabilitation*.

Dr. Weisbach has been active in the American Physical Therapy Association (APTA) since 2004 and is a member of the Orthopaedic Section of the APTA and the American Academy of Orthopaedic Manual Physical Therapists.