injuries; those judged to be at low risk would receive no further evaluation and could be safely managed without imaging. Application of a decision instrument would be reserved for patients judged to be at risk on the basis of clinical impression, and for whom CT imaging is contemplated. Patients from among this cohort who are classified as being at low risk by a highly sensitive decision instrument could then be safely managed without imaging, whereas all other patients would undergo the imaging dictated by clinical judgment.

This approach differs from the approach embedded in most decision instruments, in which children with blunt head injury are assigned risk status by the decision instrument, and clinical judgment plays no role in risk assessment.

To date, the National Emergency X-Radiography Utilization Study (NEXUS) pediatric head CT imaging rule is the only decision instrument that has been developed and validated for use in children judged to be at high risk on the basis of clinical judgment.[5] This rule exhibits the high sensitivity needed to ensure that patients with significant intracranial injuries would not be reclassified as being at low risk while safely reclassifying nearly one third of patients as being at low risk and suitable for exclusion from CT imaging. Application of this rule could achieve the goals of imaging essentially all children with significant injuries while safely reducing overall imaging rates.

Our goal as scientists is not to promote a particular rule, but to identify optimal imaging strategies regardless of their origins. In this regard, it is unlikely that the NEXUS rule is the only one that can safely identify low-risk children from among those selected for CT imaging on the basis of clinical judgment. Modifications to the existing rules, including the Pediatric Emergency Care Applied Research Network rule, could provide similar benefit. This would require the investigators of other rules to shift their attention from the large population of all head-injured children and focus on children whose presentations were sufficiently concerning to merit CT imaging. Because this population contains essentially all children with significant injuries, the sensitivity of these rules should not change when the rule is applied to this select cohort. What will change is the functional specificity of the rules as they reclassify patients to low-risk status, making it safe to omit imaging.

As a consequence, we strongly urge the developers of pediatric head-imaging tools to perform secondary analyses of their data sets that focus only on children selected for imaging. The primary outcome from these analyses would be the specificity of the tool among this new target population and the proportion of children safely reclassified as being at low risk, and for whom imaging could safely be omitted. This in turn would enable us as scientists to identify the optimal imaging strategies that provide the greatest benefit to our patients.

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In reply:

We thank Dr. Mower for his response to our analysis of the cost-effectiveness of 3 clinical decision rules for neuroimaging in pediatric head injury in the Australasian Paediatric Head Injury Rules (APHRIST) study[1] comparing Children's Head Injury Algorithm for the Prediction of Important Clinical Events (CHALICE), Pediatric Emergency Care Applied Research Network (PECARN), and Canadian Assessment of Tomography for Childhood Head Injury (CATCH) with Australian and New Zealand usual care.[2]

Dr. Mower's concerns center on the fundamental premise and setup of the 3 clinical decision rules under investigation compared with the National Emergency X-Radiography Utilization Study II (NEXUS II) rule.[3] Specifically, argument is made that clinical judgment can remove low-risk populations before application of a clinical decision rule. However, clinical judgment is not universally applied, as evidenced by the 3-fold baseline difference in neuroimaging rates observed in the US hospitals participating in PECARN[4] compared with the Australian and New Zealand hospitals participating in APHIRST.[1] Furthermore, clinical judgment is variable with respect to

more junior staff and clinicians who have less experience with pediatric patients and who may have difficulty reaching the clinician judgment to order or not order neuroimaging (which CHALICE, PECARN, and CATCH are designed to assist with). Indeed, the PECARN clinical decision rule was not developed to identify whom to neuroimage, but whom to safely discharge without neuroimaging in direct response to the very high levels observed in pediatric and community hospitals in North America,[4] suggesting that clinical judgment was previously failing these patients.

The aim of APHIRST[1] was to identify, externally validate, and compare existing clinical decision rules for neuroimaging in pediatric head injury. We had no preconceptions of which clinical decision rules should be compared. The final clinical decision rules were identified as appropriate for inclusion in the initial analysis and subsequent cost-effectiveness analysis because they were a priori focused on children, based on large prospective data sets, and of high quality.[5] We did consider the inclusion of NEXUS II in the primary APHIRST analysis.[3] However, although NEXUS II was prospectively derived from a large multicenter data set, only 12% were pediatric patients. Our main concern was restriction of derivation solely to patients who had undergone neuroimaging. NEXUS II did not include follow-up of patients who did not undergo neuroimaging (except for some patients at 1 of the 21 sites) and it is unknown how many patients with blunt head injury presented during the study period.

Clinicians may consider use of NEXUS II for the broader cohort of all blunt head injuries. We investigated NEXUS II using closely approximated predictor variables in our setting for patients who actually underwent neuroimaging, as well as for patients presenting with any blunt head injury whether they underwent neuroimaging or not.[6] Although we found sensitivity and specificity similar to that of the NEXUS derivation cohort,[3] half of all patients in the broader cohort fulfilled at least one NEXUS predictor variable. Such use of NEXUS in our setting with a baseline neuroimaging rate of approximately 10% would have the potential to considerably increase the neuroimaging rate, associated radiation exposure, and cost, with no clinical benefit.

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Transesophageal Echocardiography Use During Cardiopulmonary Resuscitation

To the Editor:

We congratulate the authors of the well-done and important study showing the benefits of transesophageal echocardiography (TEE) during cardiopulmonary resuscitation (CPR) and would like to make some comments.[1]

The utility and accuracy of diagnosis using TEE during CPR has been known for greater than 20 years.[2] In addition to shortening the pauses in CPR to maximize the compression fraction, TEE has the additional benefits of giving real-time feedback on cardiac compression, improving hand positioning on the sternum to optimize blood flow and limit left ventricular outflow obstruction.[3] It also can detect subtle ventricular fibrillation that was thought to be asystole, resulting in defibrillation's being applied.[4] We applaud the authors for avoiding the usage of the term "resuscitative" to describe TEE, which, although appearing often in recent publications, is inaccurate and misleading because the TEE is purely diagnostic but obtains vital information that allows appropriate resuscitation strategies and procedures, the therapies that are the actual resuscitation. Because there are already several terms in current use for augmented CPR, such as extracorporeal-CPR for use of extracorporel membrane oxygenation during CPR and telemedicine-CPR for telephone operator instructions during CPR, we suggest TEE-CPR or alternatively the broader term "TEEGR" for TEE–guided resuscitation.[5]

Last, we would like to highlight that successful practice integration of newer technologies, such as point-of-care TEE, can be difficult for postgraduate physicians. Significant institutional and group support, such as compensation for credentialing, has been shown to be effective in implementing point-of-care ultrasonographic programs.[6]

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What We Consider Emergency Medicine Research and Promoting Success of Aspiring Researchers of New Areas

To the Editor:

Consecutive articles addressing paths of research pioneers by Coates et al[1] and fragility of randomized controlled trials in emergency medicine by Brown et al[2] in the June 2019 edition of *Annals* illustrate a major hurdle for aspiring researchers of new areas of