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Review Article

A Narrative Review of Challenges and Management Strategies for Pediatric Clients with Neurodevelopmental Disorders in Non-Psychiatric Settings

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Abstract

Objective: The prevalence of Neurodevelopmental Disorders (NDDs), including Autism Spectrum Disorder (ASD), is increasing globally, driven largely by evolving diagnostic criteria, diagnostic substitution, and increased public awareness. While children with NDDs frequently visit Emergency Departments (EDs) for medical, non-psychiatric complaints, acute care environments are often ill-equipped to meet their unique sensory and communicative needs. This mismatch frequently leads to behavioral escalation, increased use of restraint, and caregiver dissatisfaction.
Method: This narrative review synthesizes current literature to examine the challenges facing pediatric clients with NDDs in non-psychiatric settings and identifies evidence-based strategies to optimize their management.
Results: Analysis reveals that the chaotic nature of the ED, characterized by sensory overload and unpredictable routines, acts as a significant barrier to care. Clinicians frequently report higher procedural difficulty for these clients, as measured by tools such as the Task Completion Index (TCI). Evidence indicates these patients are five times more likely to have difficulty with vital signs and eight times more likely to undergo physical or pharmacological restraint compared to neurotypical peers. Key management strategies identified include the implementation of "Health Passports" for communicating baseline needs, early identification via EMR flagging, and environmental modifications such as "Low-Stimulation Rooms" and sensory toolkits. Furthermore, adopting behavioral pain scales (e.g., r-FLACC) and "Tell-Show-Do" techniques are essential for accurate assessment and procedural success.
Conclusion: Current acute care models are often reactive rather than proactive regarding neurodiversity. Bridging the gap requires a systemic shift towards "support-first" methodologies. By integrating sensory-friendly protocols, leveraging caregiver expertise, and prioritizing staff training, healthcare systems can significantly reduce the reliance on coercive measures and improve clinical outcomes for this vulnerable population, which should be considered a core competency in pediatric emergency medicine.

Key words: *Autism Spectrum Disorder; Emergency Department; Neurodevelopmental Disorders; Pediatric Emergency Medicine; Restraint*

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The epidemiological landscape of pediatric healthcare has undergone a significant paradigm shift over the last two decades, characterized by a marked increase in the reported prevalence of Neurodevelopmental Disorders (NDDs) (1). This umbrella categorization encompasses a diverse group of conditions, including Autism Spectrum Disorder (ASD), Intellectual Disability (ID), and Attention-Deficit/Hyperactivity Disorder (ADHD), Communication Disorders and Specific Learning Disorders. With recent global increase in the prevalence of NDDs, e.g., the global number of individuals with ASD increased by 39.3% from 1990 to 2019 (a trend heavily influenced by broadened diagnostic criteria and enhanced public awareness), the interaction between this neurodiverse population and the acute care system has intensified (2). While historically viewed through a psychiatric lens, contemporary national data reveals a critical clinical reality: the vast majority of Emergency Department (ED) visits for children with NDDs are for non-psychiatric medical complaints, ranging from acute trauma and infections to surgical emergencies (3).

Despite the increasing frequency of these encounters, the standard operating model of the modern ED remains fundamentally discordant with the neurocognitive and sensory needs of this population. The typical acute care environment is designed for high-throughput efficiency and rapid turnover, characterized by high-intensity sensory inputs—harsh lighting, frequent alarms, and unpredictable transitions in care providers (3). For the neurotypical child, these factors are merely stressful; for a child with NDDs, they often constitute a “sensory mismatch” that can precipitate significant behavioral distress (4). This environmental incompatibility creates a unique clinical hazard: the patient’s distress is frequently misinterpreted by untrained providers as behavioral non-compliance rather than a manifestation of sensory overload, a phenomenon that complicates assessment and delays care (5). This highlights the critical importance of the “Golden Hour” in the ED—the initial period of assessment where proactive, sensory-friendly interventions can effectively prevent behavioral escalation.

Current literature highlights a pervasive “preparedness gap” within healthcare systems. Although these patients present with the same spectrum of acute illnesses as their peers, they face distinct systemic barriers. Children with NDDs are disproportionately susceptible to procedural failure, care plan disruptions, and the utilization of restrictive interventions, such as physical or pharmacological restraint (6). Furthermore, the lack of standardized neuro-inclusive protocols often forces caregivers to act as the sole buffer between their child and a system they perceive as unsafe, leading to significantly lower satisfaction rates and feelings of marginalization (7).

As the prevalence of NDDs continues to rise, the maintenance of a rigid, “one-size-fits-all” model of emergency care is no longer tenable. There is an urgent imperative to transition from a reactive model—which relies on crisis management and containment—to a proactive, adaptable framework that anticipates neurodiverse needs. This narrative review aims to synthesize existing literature regarding the challenges faced by children with NDDs in non-psychiatric acute care settings. By examining the complex interplay between environmental stressors, communication barriers, and workflow inefficiencies, this review seeks to outline evidence-based, high-impact strategies—from environmental modifications to pharmacological protocols—that can bridge the gap between provider capability and patient need, ultimately optimizing clinical outcomes and preserving the dignity of this vulnerable patient population.

Materials and Methods

A narrative review methodology was selected to synthesize the broad and heterogeneous literature encompassing clinical, behavioral, and operational aspects of NDD care in acute settings. This approach allows for the integration of quantitative workflow data, qualitative provider experiences, and expert consensus guidelines, which would be difficult to capture fully in a strict systematic review. A comprehensive literature search was conducted across electronic databases, including PubMed, Scopus, and Google Scholar, focusing on peer-reviewed articles, clinical guidelines, and quality improvement reports published within the last two decades (2004-2024). Key search terms included “Autism Spectrum Disorder,” “Pediatric Emergency Department,” “Sensory Processing,” “Procedural Sedation,” and “Acute Care Management.”

Articles were included if they were peer-reviewed, published in English, and specifically addressed the management of pediatric patients (ages 0-18) with NDDs in non-psychiatric acute care or emergency settings. Articles focusing exclusively on long-term psychiatric management or lacking direct relevance to the acute care environment were excluded. The selection process prioritized studies providing quantitative data on workflow efficiency (e.g., Task Completion Index) and qualitative insights into caregiver and provider experiences. The gathered evidence was synthesized thematically to categorize systemic barriers and to consolidate evidence-based strategies for optimizing pre-arrival planning, triage, and clinical management.

Results

Challenges and Barriers to Care

The delivery of acute medical care to children with NDDs is complicated by a multifactorial set of barriers. These challenges can be categorized into environmental mismatches, communication deficits, procedural difficulties, and systemic inadequacies.

The Sensory-Environmental Mismatch

The inherent volatility of the ED constitutes a significant barrier to effective healthcare delivery for children with NDDs (8). For this patient population, particularly those diagnosed with ASD, the standard acute care milieu presents a fundamental “sensory mismatch”. These children frequently possess a heightened neurophysiological sensitivity to environmental input (hyper-reactivity), making the typical ED setting—characterized by the convergence of high-intensity auditory stimuli such as monitor alarms, overhead paging, and crying, alongside the visual stress of harsh fluorescent lighting—a catalyst for sensory overload (7, 9). Furthermore, routine clinical interventions that are benign to neurotypical children, such as the tactile pressure of a blood pressure cuff or physical examination by unfamiliar providers, act as potent stressors that trigger behavioral escalation.

This cumulative sensory burden often precipitates acute behavioral decompensation, manifesting as agitation, withdrawal, or self-injurious behavior. Crucially, literature indicates that untrained clinicians frequently fall into the trap of “diagnostic overshadowing” (10). This cognitive bias manifests in two distinct ways: first, by misinterpreting manifestations of physiological distress or pain as willful behavioral non-compliance or psychiatric aggression, and second, by attributing new, acute physical symptoms solely to the patient’s underlying anxiety or NDD rather than investigating a true concurrent medical illness (11). Both forms of diagnostic overshadowing can lead to the inappropriate escalation of restrictive interventions or critical delays in medical management. Beyond immediate sensory insults, the structural unpredictability of the ED further compromises care. Patients with NDDs often rely on rigid routines and predictability for emotional regulation and safety (12). The inherent nature of emergency care—marked by indeterminate wait times, frequent transitions of care, and an unfamiliar physical environment—systematically dismantles these essential coping mechanisms. This disruption of routine not only exacerbates anxiety but significantly reduces patient cooperation, creating a cycle of distress that hinders clinical assessment and prolongs the length of stay (7).

Communication and Behavioral Barriers

Effective triage and clinical history-taking are frequently compromised by profound deficits in both expressive and receptive language, creating a fundamental “communication mismatch” that threatens patient safety.

Standardized pain assessment tools reliant on self-report (e.g., Visual Analog Scale) are often developmentally inappropriate for this population (13). Unlike their neurotypical peers, children with NDDs—particularly those with significant cognitive impairments or ASD—frequently lack the verbal capacity to articulate distress (14). Instead, pain manifests idiosyncratically through subtle physiological shifts (e.g., changes in breathing patterns, pallor, sweating, trembling) or behavioral escalations such as self-injurious behavior, paradoxical laughter, or catatonic withdrawal (15). Specific phenotypes present unique challenges; for instance, children with Down syndrome may exhibit delays in localizing pain, while those with ASD often demonstrate a significantly slower recovery response to painful stimuli compared to neurotypical children (16). This atypical presentation dramatically elevates the risk of diagnostic overshadowing. In this cognitive error, clinicians attribute acute physical symptoms—such as agitation stemming from an acute abdomen or otitis media—solely to the patient’s underlying psychiatric or developmental disorder, leading to critical delays in medical management and under-treatment of pain (11).

The high-velocity, high-stress environment of the ED severely degrades the receptive language capabilities of children with NDDs. Complex, rapid-fire instructions from unfamiliar, masked personnel can induce confusion and immediate resistance (17). Furthermore, nuances of non-verbal communication are frequently misinterpreted; patients may actively avoid eye contact or utilize distinct, repetitive gestures to self-soothe, which untrained staff may misperceive as disinterest or impending aggression (15, 16). This misalignment is exacerbated when providers fail to adjust the speed, tone, and complexity of their speech, inadvertently creating a cycle of escalation where the child’s inability to comply is mistaken for willful defiance (16).

Procedural Difficulties and Resource Utilization

Quantitative analyses of ED workflows substantiate the anecdotal challenges reported by clinicians, revealing profound disparities in the “ease of care” for children with NDDs. By utilizing the Task Completion Index (TCI)—a validated metric designed to objectively assess the operational difficulty of standard clinical encounters from the provider’s perspective—researchers have demonstrated that essential medical tasks are markedly more arduous to perform for clinicians treating children with ASD compared to neurotypical controls (18). Importantly, a high TCI score does not denote a pathological trait or deliberate non-compliance of the patient; rather, it reflects a systemic incompatibility between the patient’s neurophysiological needs and the standard ED process (6).

The data delineates striking operational burdens across the trajectory of care. The initial triage assessment often becomes an immediate bottleneck, with staff being five times more likely to report significant difficulty or failure in obtaining baseline vital signs for patients with ASD. As clinical acuity rises, the complexity of intervention scales disproportionately. Standard procedural necessities, such as peripheral intravenous (IV) placement, frequently necessitate increased resource allocation, with these patients being three times more likely to require additional personnel for holding, stabilization, or distraction during vascular access (as summarized in Table 1) (6).

Table 1. Summary of Identified Clinical Challenges and Strategic Management Solutions for Pediatric Clients with Neurodevelopmental Disorders (NDDs) in Acute Care Settings

Clinical Domain	Identified Challenges & Barriers	Strategic & Operational Solutions
Physical & Sensory Environment	Sensory Overload: Hyper-reactivity to fluorescent lighting, monitor alarms, and ambient noise leading to behavioral escalation. Disrupted Routine: Loss of structure creates anxiety and non-compliance.	Low-Stimulation Protocols: Immediate placement in private, dimmed rooms; minimizing staff traffic. Sensory Toolkits: Provision of noise-canceling headphones, weighted blankets, and tactile toys to regulate sensory input.
Triage & Intake	Delayed Recognition: Lack of immediate identification of NDD status leads to standard (ineffective) processing. Wait Times: Prolonged exposure to chaotic waiting rooms triggers agitation.	EMR Flagging: Automated alerts upon registration to trigger adaptive protocols. “Direct Bedding”: Prioritizing immediate room placement to bypass the waiting area. Health Passports: Reviewing caregiver-completed forms detailing baseline behaviors and triggers.
Communication & History	Communication Mismatch: Difficulty with receptive/expressive language; non-compliance misinterpreted as “bad behavior.” Caregiver Marginalization: Parents feeling “unheard” regarding their child’s specific needs.	Caregiver Partnership: Utilizing parents as primary interpreters and active partners in care. Visual Aids: Using picture exchange systems or tablets to explain steps. “One Voice” Rule: Designating a single staff member to speak to the child to reduce confusion.
Procedural Success	High Task Completion Index (TCI): Data indicates a 5-fold increase in difficulty obtaining vitals and a 3-fold increase in difficulty for IV placement. Fear of Equipment: Heightened anxiety regarding medical devices.	“Tell-Show-Do” Technique: Verbal explanation, demonstration on a doll/parent, followed by execution. Active Distraction: High-interest distractors (bubbles, light spinners) during procedures. Non-Invasive Alternatives: Using chemically heated pads or vein finders to minimize attempts.
Pain Management	Assessment Barriers: Invalidity of self-report scales; pain often presents as laughter, self-injury, or withdrawal. Diagnostic Overshadowing: Attributing physical distress solely to the psychiatric diagnosis.	Behavioral Scales: Mandatory use of validated tools like r-FLACC or NCCPC for non-verbal children. Empirical Treatment: Low threshold for analgesia; treating potential pain sources before assuming psychiatric agitation.
Safety & Restraint	Disproportionate Restraint: Children with ASD are 8 times more likely to undergo physical or pharmacological restraint. Trauma: Physical holding exacerbates the “fight or flight” response.	Early Procedural Sedation: Prioritizing anxiolytics (e.g., intranasal midazolam) over physical holding for invasive tasks. Least Restrictive Practice: Physical restraint utilized only as a last resort for imminent safety threats.

Note: EMR: Electronic Medical Record; r-FLACC: Revised Face, Legs, Activity, Cry, Consolability scale; NCCPC: Non-Communicating Children’s Pain Checklist; ASD: Autism Spectrum Disorder.

Perhaps the most critical finding is the correlation between procedural difficulty and the escalation to restrictive interventions. A high TCI score is strongly predictive of adverse safety outcomes; specifically, children with ASD are eight times more likely to be subjected to physical or pharmacological restraint during medical visits compared to their peers (6). This statistic highlights a disturbing clinical trajectory where procedural difficulty—often stemming from unaddressed sensory dysregulation—rapidly devolves into physical containment. Consequently, these procedural hurdles translate into a measurable intensification of resource utilization, contributing to prolonged staff engagement times and extended lengths of stay (LOS) for observation and admission (19).

Caregiver and Provider Perspectives

Qualitative data highlights a critical misalignment between the psychosocial support required by families and the current clinical capabilities of emergency providers. For caregivers, the ED visit imposes an exhausting dual burden; they effectively function not only as guardians but as the primary medical interpreters and behavioral stabilizers for their children. Despite this essential role, analyses indicate that caregivers of children with NDDs report significantly lower satisfaction scores regarding "provider empathy" and the quality of communication compared to the general population (7). A recurrent narrative in family interviews is the distressing experience of feeling "unheard," particularly when attempting to articulate their child's specific sensory triggers to time-pressured clinical staff (16).

Conversely, this dissatisfaction is mirrored by a lack of self-efficacy among providers. ED staff frequently report feeling ill-equipped to manage acute behavioral dysregulation in neurodiverse patients. This deficit in formal training regarding non-pharmacological de-escalation generates provider anxiety. Consequently, clinicians may resort to procedural sedation or physical restraint earlier in the care pathway, utilizing these restrictive measures as a compensatory mechanism for a lack of specialized behavioral competence rather than as a strict clinical necessity (3).

Management Strategies

To mitigate the challenges outlined above, a multi-modal approach is required. Successful management relies on shifting from a reactive model—addressing agitation once it occurs—to a proactive model that anticipates neurodivergent needs.

Pre-Arrival and Triage Optimization

Optimizing emergency care for children with NDDs necessitates shifting the clinical focus to the pre-physician phase—a critical "Golden Hour" (defined here as the crucial initial period upon arrival where proactive environmental and behavioral interventions can stabilize the patient and prevent the escalation of distress) where the trajectory of the visit is often determined by the initial environmental interface. Systemic preparedness begins with early identification; Electronic Medical Records (EMR) must integrate specific "flagging systems" that alert triage staff to a client's NDD diagnosis immediately upon registration. This electronic signal serves as a crucial prompt for the immediate activation of adaptive care protocols rather than standard, often incompatible, workflows (20).

To bridge the communication gap, literature strongly advocates for the utilization of standardized "Health Passports" or "About Me" forms. Completed by caregivers prior to or upon arrival, these documents provide clinicians with granular insight into the child's idiosyncratic needs, including baseline communication methods (e.g., use of assistive tablets or sign language), specific sensory triggers (such as tactile defensiveness or phobias of medical attire), and preferred de-escalation strategies. Reviewing this data at the point of triage not only expedites clinical assessment but establishes immediate rapport by validating the caregiver's expertise and pre-empting known stressors (3, 20). Furthermore, operational protocols should prioritize "accelerated triage" to bypass the sensory overstimulation of the standard waiting room. Whenever feasible, patients with NDDs require "direct bedding" to a prepared, low-stimulation environment. This structural modification is a critical preventive strategy, mitigating the risk of sensory-induced behavioral escalation and ensuring that the patient remains calm enough for effective medical evaluation (15, 21).

Environmental Modifications: The "Sensory Safety Net"

Establishing a "neuro-inclusive" environment within the acute care setting does not necessitate prohibitive infrastructural overhaul. Rather, it relies on the strategic modification of existing spaces to construct a "Sensory Safety Net" that mitigates the inherent sensory overload of the ED. The cornerstone of this approach is the rapid sequestration of the patient into a low-stimulation environment. Protocols should prioritize placing these patients in private rooms located distally from high-decibel zones, such as the ambulance bay or central nursing station. Inside the room, immediate modifiable factors are critical: dimming harsh overhead fluorescent lighting, silencing non-critical monitor alarms, and strictly limiting staff ingress to essential providers only to prevent social overcrowding (3, 17, 21).

To further bridge the sensory gap, progressive centers have successfully implemented mobile "Sensory Carts" or bedside toolkits. These resources are equipped with adaptive aids such as noise-canceling headphones to dampen auditory chaos, sunglasses to reduce visual glare, and weighted blankets or tactile fidget toys to provide grounding proprioceptive input. These tools function as more than simple distractions; they provide competing sensory input that helps regulate the patient's autonomic nervous system. By proactively offering these coping mechanisms, clinicians can stabilize the patient's sensory experience, thereby facilitating cooperation and significantly reducing the reliance on pharmacological interventions during stressful periods (3, 17, 21).

Clinical and Communication Approaches

Optimizing clinical interactions requires a fundamental shift from a provider-centric model to a collaborative partnership with the caregiver. Parents serve as the primary experts on their child's specific neurotype; their input is indispensable for distinguishing between habitual stereotypies and non-verbal manifestations of acute pathology. Consequently, clinicians must actively integrate parental guidance to interpret obscure cues. Furthermore, literature suggests that maximizing parental involvement—such as allowing them to facilitate comfort positioning during vascular access—yields significantly better outcomes than utilizing additional medical staff for physical restraint (6, 19).

To bridge the comprehension gap, procedural communication must be rigorously adapted utilizing the "Tell-Show-Do" methodology (9). This desensitization technique involves verbally describing the stimulus in simple terms, demonstrating the action on a neutral object or the parent, and only then proceeding with the patient. For non-verbal children or those with processing delays, this verbal approach should be augmented with visual pedagogies, such as picture exchange cards or digital storyboards. Complementing these communication strategies, the application of high-valence distractors—including bubbles, light spinners, or tablet-based media—provides competing sensory input. This "cognitive refocusing" has been proven to effectively lower pain perception during venipuncture and examination, thereby decreasing the reliance on physical containment measures (9, 20).

Pharmacological Management and Restraint

Accurate pain assessment is the linchpin of behavioral management, yet the inherent "communication mismatch" renders standard self-report metrics unreliable for many children with NDDs. Consequently, clinicians must pivot to observational tools validated for cognitive impairment, such as the Revised Face, Legs, Activity, Cry, Consolability (r-FLACC) scale or the Non-Communicating Children's Pain Checklist (NCCPC). It is clinically imperative to recognize that acute behavioral dysregulation is frequently a somatic manifestation of untreated pain rather than a primary psychiatric feature; therefore, adequate analgesia must precede antipsychotic intervention (20, 22).

When invasive interventions are unavoidable, clinicians face complex ethical and clinical dilemmas regarding the use of physical restraint versus pharmacological sedation. Both approaches carry significant risks; however, contemporary guidelines advocate minimizing physical containment, which often exacerbates the patient's "fight or flight" response, converting a medical procedure into a traumatic safety crisis (23). Restraint must remain a measure of absolute last resort, utilized only when there is an imminent risk of injury. Instead, the threshold for utilizing judicious pharmacological adjuncts should be carefully considered to prevent psychological harm, while simultaneously balancing the physiological risks associated with sedation. Non-invasive routes are preferred; specifically, intranasal midazolam or ketamine are recommended to facilitate procedures like imaging or laceration repair. This approach circumvents the trauma of establishing intravenous access while ensuring patient compliance, provided standard safety monitoring is rigorously maintained (20).

Discussion

The synthesis of current literature reveals a fundamental systemic discordance: while Emergency Departments serve as the critical safety net for children with NDDs, the standard operating model of acute care is paradoxically maladapted to their neurophysiological needs. The data highlighting a five-fold increase in difficulty obtaining vital signs and an eight-fold increase in restraint utilization suggests that the challenges observed are not inherent to the patients' pathology, but are rather manifestations of an environmental mismatch. This "preparedness gap" transforms routine medical encounters into highly stressful events, often resulting in diagnostic overshadowing where physiological pain is dismissed as behavioral dysregulation (6, 20).

A critical finding of this review is the imperative to shift the clinical paradigm from "reactive containment" to "proactive accommodation". Historically, the management of agitation in this population has relied heavily on physical and pharmacological restraints—interventions that often exacerbate the "fight or flight" response and degrade trust between caregivers and the healthcare system (23). The evidence supports that low-cost, high-impact interventions—such as the implementation of Health Passports to utilize the pre-contact "Golden Hour" and the use of atraumatic analgesia—can significantly mitigate procedural failure. However, these strategies are currently underutilized and often depend on individual provider initiative rather than institutional protocol. Furthermore, the role of the caregiver emerges as a pivotal, yet undervalued, resource. While studies indicate that caregivers are the experts on their child's baseline, they frequently report feeling marginalized during acute episodes (7). Integrating the caregiver as an active partner in the "care team" is not merely a matter of satisfaction but a clinical necessity for accurate assessment.

However, translating these strategies into practice requires careful consideration of implementation science principles. Systemic barriers, such as provider burnout, high clinical volumes, and the pressure of generating Relative Value Units (RVUs), often deprioritize the time-intensive care required for NDD patients. Furthermore, the feasibility of these interventions in under-resourced or rural EDs—where specialized sensory equipment, Child Life specialists, or dedicated low-stimulation rooms may be unavailable—remains a significant challenge. Future guidelines must carefully differentiate between expert consensus and primary empirical data, ensuring that proposed interventions are adaptable to various resource settings.

Ultimately, the barrier to optimal care is less about a lack of medical knowledge and more about a lack of specific training and standardization. Future efforts must move beyond didactic instruction to integrate Simulation-Based Medical Education (SBME), allowing staff to practice decision-making algorithms in a controlled environment. Moving forward, healthcare systems must recognize that accommodations for neurodivergent children are not optional "perks" but essential requirements for equitable healthcare access.

Limitation

This study is presented as a narrative review, which inherently lacks the exhaustive and reproducible search methodology of a systematic review, potentially introducing selection bias. Additionally, much of the current literature in this domain relies on qualitative data, expert consensus, and quality improvement reports rather than robust, randomized controlled trials. Consequently, further empirical research is necessary to quantify the efficacy and operational feasibility of specific environmental and behavioral interventions across diverse, particularly low-resource, ED settings.

Conclusion

As the prevalence of neurodevelopmental disorders continues to rise, the ability to provide competent, compassionate emergency care to this should be a core competency. By implementing low-cost environmental adaptations, utilizing behavioral pain scales, and fostering a collaborative partnership with caregivers, healthcare systems can transform the ED from a highly stressful environment into a more accommodating setting for children with NDDs. The shift from "restraint-first" to "support-first" strategies is not only ethically imperative but clinically effective in improving outcomes and satisfaction.

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Conflict of Interest

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Author's Contributions

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