

# The Pediatric Emergency Research Network: a decade old and growing

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High-quality research is essential to advance and guide best clinical practices in all settings and across diverse populations. Conducting high-quality research in pediatric emergency care (PEC) offers unique challenges related to the variety of patient presentations, the high patient volume, the low incidence of serious outcomes, the short-term nature of hospital care and the stressful circumstances of emergency department (ED) encounters. Geographically-focused multicenter research networks both within and outside Europe have been able to overcome many of these challenges and have substantially contributed to high-quality clinically meaningful research in PEC over the past decades. To advance towards the goal of delivering high-quality PEC to all children worldwide, representatives of five existing national and regional PEC research networks established the Pediatric Emergency Research Network (PERN; <https://pern-global.com/>) in October 2009 [1–2]. Despite the advances made by the

individual networks in research pertaining to acutely ill and injured children, there was a clear need to generate and implement research evidence beyond the possibilities afforded by the existing geographically-focused networks. To mark the occasion of Emergency Medicine Day 2021, here we briefly summarize the content of a recent PERN publication [3] on its history, achievements and challenges in addressing global health issues in PEC research over the past decade along with a vision for the future, including European-specific efforts.

The five networks represented at the inaugural meeting included the Pediatric Emergency Care Applied Research Network (PECARN, USA) [4]; the Pediatric Emergency Medicine Collaborative Research Committee of the American Academy of Pediatrics (PEM CRC, USA); Pediatric Emergency Research Canada (PERC) [5]; Paediatric Research in Emergency Departments

International Collaborative (PREDICT, Australia and New Zealand) [6]; and Research in European Pediatric Emergency Medicine (REPEM, Europe and the Middle East) [7]. PERN has subsequently supported the creation and strengthening of regional efforts within Europe and Latin America, with the formation of Paediatric Emergency Research in the UK and Ireland (PERUKI) [8], Red de Investigación de la Sociedad Española de Urgencias de Pediatría / Spanish Pediatric Emergency Research Group (RISeUP/SPERG) [9], and most recently, Red de Investigación y Desarrollo de la Emergencia Pediátrica Latinoamericana (RIDEPLA) [10].

PERN is governed by an executive committee consisting of two representatives from each member network. It serves as a supportive rather than a governing function. A PERN study is defined simply as one in which two or more of its eight current member networks collaborate. Proposals are presented to the PERN executive for consideration and approval, followed by networking and recruitment for endorsed proposals. As PERN has limited funding for infrastructure, regional networks are organized and managed as independent entities subject to their governance. PERN member networks consistently report that involvement with other networks through PERN has strengthened both the scope and quality of their research.

PERN research began as a pandemic response with a large retrospective case-controlled study of H1N1 risk factors for severe disease [11]. At that time, the study was the largest in PEC for the number of sites involved. The following observational studies, both prospective and retrospective, further enhanced the collaborative relationships and research capacity within PERN, addressing other key globally relevant questions. PERN studies on bronchiolitis and acute poisoning, and their secondary analyses, revealed practice variations and substantial rates of nonindicated testing and interventions unsupported by evidence or consensus guidelines. Survey studies on professional skills and knowledge development revealed a substantial gap among emergency care professionals in psychosocial care of injured children, and consensus in practice frequency and modality for critical pediatric procedures. Two ongoing observational studies will report precise risk stratification in pediatric community-acquired pneumonia (CAP) and the variation and outcomes of analgesia and sedation in the success of non-operative reduction of intussusception. The infrastructure of the CAP study enabled the rapid launch of a prospective observational study in response to the current COVID-19 pandemic [12].

Over the years, PERN research has progressed to global randomized controlled trials (RCTs). Two such efforts are underway: PRagMatic Pediatric Trial of Balanced vs. nOrmal saline fLUid in Sepsis (PROMPT BOLUS) is a multicenter randomized, open-label, pragmatic trial

to test the comparative effectiveness and relative safety of two commonly used fluid types in the treatment of septic shock in children [13]; Bronchiolitis in Infants Placebo vs. Epinephrine and Dexamethasone (BIPED) RCT compares combination therapy to placebo in a double-blinded fashion, to establish whether this approach can reduce hospitalizations [14].

Connected to PERN's research focus since its inception is the recognized need for translation of research knowledge into clinical practice to ensure that all children who present to EDs globally benefit from high-quality research evidence. PERN has therefore begun to disseminate its study findings globally in multiple languages through its website and associated digital and social media. This infrastructure to enhance rapid adoption of definitive evidence may be seen as the seed of international knowledge mobilization efforts that will grow within PERN. In addition, a coordinated, international effort to improve emergency care for children by ensuring effective implementation of best practices for common and treatable acute conditions in all ED settings is warranted.

The realization of PERN's vision for the future will require expanding the model of collaboration by adding to the network experts in such disciplines as implementation science, behavioral science, health economics, and patient and public engagement. However, for any true progress in improving the healthcare of all children globally, research must take into consideration the principles of equity, diversity, and inclusion. It is increasingly clear that racial and ethnic disparities exist in PEC, both within regions, including Europe, and globally. Achieving the PERN long-term vision for the future will involve collaborating with experts in disparities work and focusing on four areas: (1) expanding the capacity for global RCTs and improving the efficiency of global research efforts through minimizing barriers and increasing incentives; (2) deepening the focus on implementation science; (3) increasing attention to healthcare disparities and their origins, with the goal of achieving health equity; and (4) expanding PERN's global reach to add sites and networks from resource-restricted regions.

Looking forward, the ongoing contributions of European networks to PERN will hinge on the ability of European study sites to participate broadly in global research, in compliance with the General Data Protection Regulation (GDPR), which became binding law in the European Union (EU) in May 2018. Although its aim was to harmonize practices to facilitate data sharing, a significant part of decision-making is still left to the EU Member States, often leading to confusion and bureaucratic complexity [15]. Collaboration with research partners outside the EU is even more challenging, requiring complex negotiations to allow research data transfer. Heterogeneity in regulations influencing decision-making at a national or

individual institution level has hampered the participation of many European sites in the most recent PERN projects and hence reduced the benefits of research participation. In order to ensure full participation in multinational research collaboration future efforts in Europe must also be directed toward (1) developing shared GDPR compliant research procedures to be adopted by future studies at inception; (2) joining ongoing multidisciplinary work involving the relevant societies and stakeholders toward optimizing the GDPR to facilitate transnational research that will benefit child health globally. By doing so European centers will continue to partner in collaborative knowledge generation and implementation pertaining to PEC with the aim to improve health outcomes for acutely ill and injured children both within Europe and globally.

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