

Research networks in pediatric critical care: Productivity and impact

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Background

Conducting randomized controlled trials (RCTs) in critically ill children is challenging given the unique nature of this population, complexity of consent and assent, funding limitations, and small eligible patient pool(1). These challenges may impact not only the quantity, but the quality of pediatric RCTs.

Commitments to optimizing the conduct of research, sharing expertise and building capacity have led to the emergence of research groups or networks(2, 3). The productivity and quality of trials conducted by these groups within pediatric critical care have not been systematically evaluated.

Objectives

To evaluate the productivity, quality indicators, and the impact of RCTs conducted by established pediatric critical care research networks, compared to RCTs not conducted by research networks.

Methods

Data source: We used the Evidence in Pediatric Intensive Care database (epicc.mcmaster.ca) to identify network and non-network RCTs. This is a comprehensive repository of published RCTs (Searches updated January 2014), of interventions applied to critically ill children(4). It excludes cross-over trials and trials enrolling only preterm infants.

Inclusion criteria: We included all RCTs published in English in 1999 or later (the year the first research network trial was published). Trials were identified as being conducted by a research network if the publication reported that the project was conducted by, or in collaboration with, a research network or similar group.

Data extraction: Pairs of reviewers independently abstracted data. We defined a research network as a formal consortium, collective, cooperative or collaborative research group established for the purpose of facilitating the conduct of clinical research.

Impact: We assessed the impact of trials using the impact factor of the journal and the number of citations (using Web of Science™).

Results

We found a total of 254 RCTs in pediatric critical care, enrolling 27,660 children, published between 1986 and 2013.

Of these, 206 trials were published in 1999 or later. 11 (5%) of these trials reported that they were conducted research network.

There were 3 research networks, all based in North America.

We found two types of research networks:

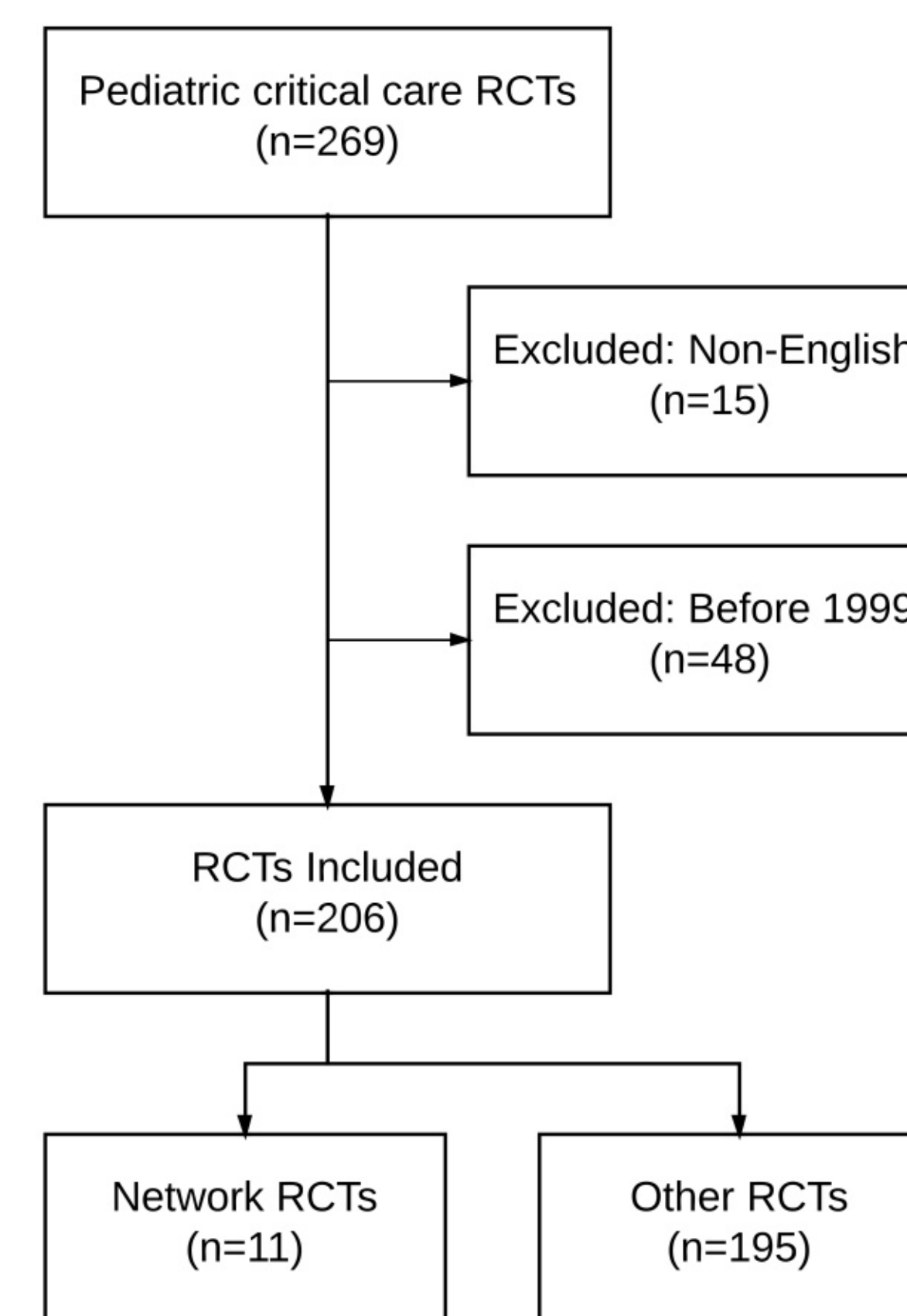
1. Investigator-initiated

networks: The Canadian Critical Care Trials Group (CCCTG) (3 RCTs), The Pediatric Acute Lung Injury and Sepsis Investigators (PALISI) (5 RCTs) and both CCCTG and PALISI (1 RCT).

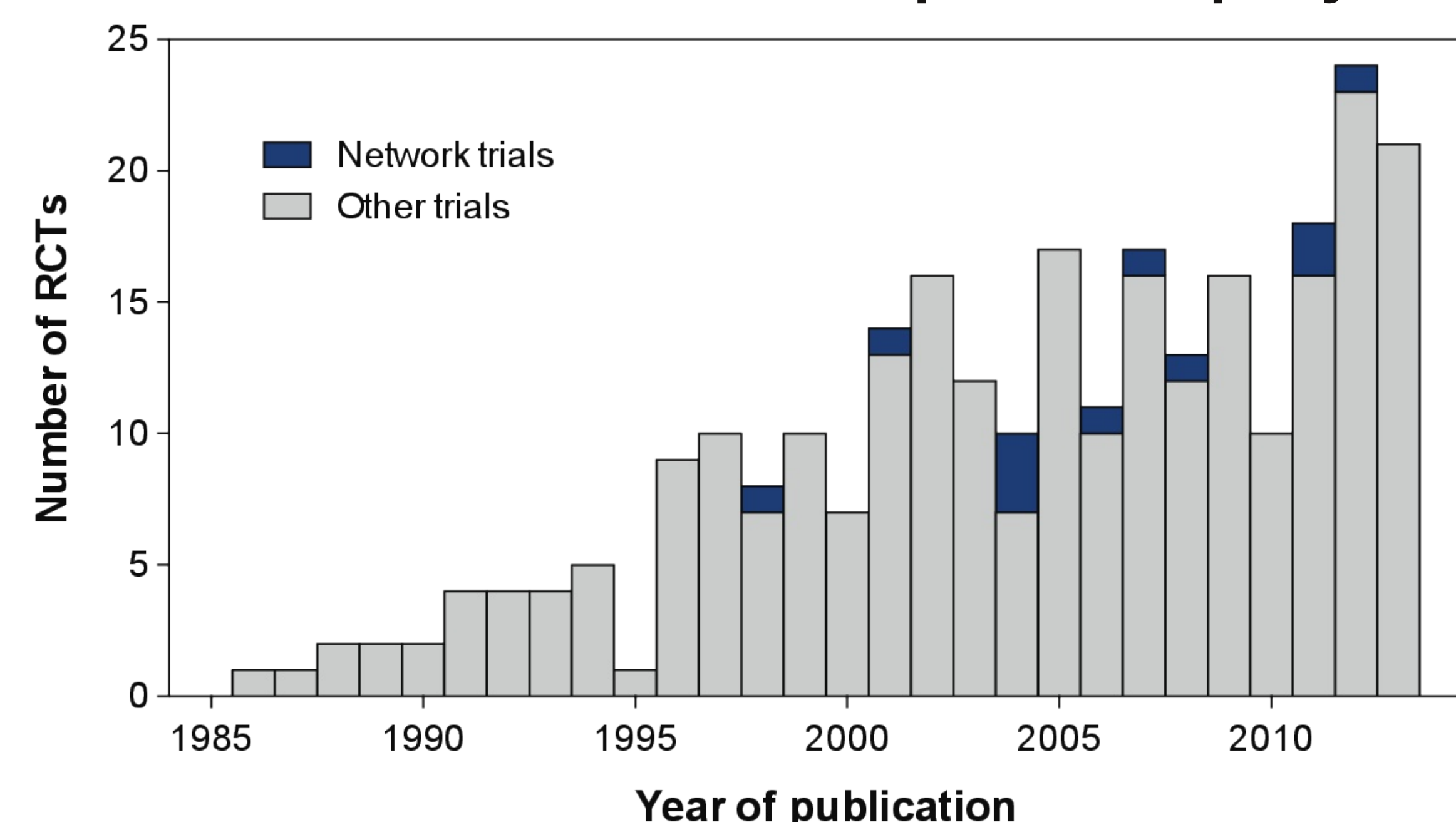
2. Funder-initiated networks: National Institute of Child Health and Human Development Collaborative Pediatric Critical Care Research Network (CPCCRN) (1 RCT).

1 (9%) network RCT was described by the researchers as a pilot or feasibility trial, compared to 25 (13%) of non-network trials.

Review flow diagram



Pediatric critical care RCTs published per year



Trial characteristics

Characteristics of pediatric critical care RCTs

Characteristic	Network trials (n=11)	Other trials (n=195)	p value*
Design			
Multi-centre trials	11 (100)	29 (15)	<0.001
Studied medications	7 (64)	109 (56)	0.76
At high risk of bias	4 (36)	85 (44)	0.76
Recruitment			
Duration (months)	33 (31, 44)	21 (12, 31)	0.002
Children/centre/month	0.2 (0.2, 0.8)	2.6 (1.2, 5.6)	<0.001
Children randomized	152 (69, 225)	50 (30, 96)	0.002
Stopped early	6 (55)	26 (13)	0.002

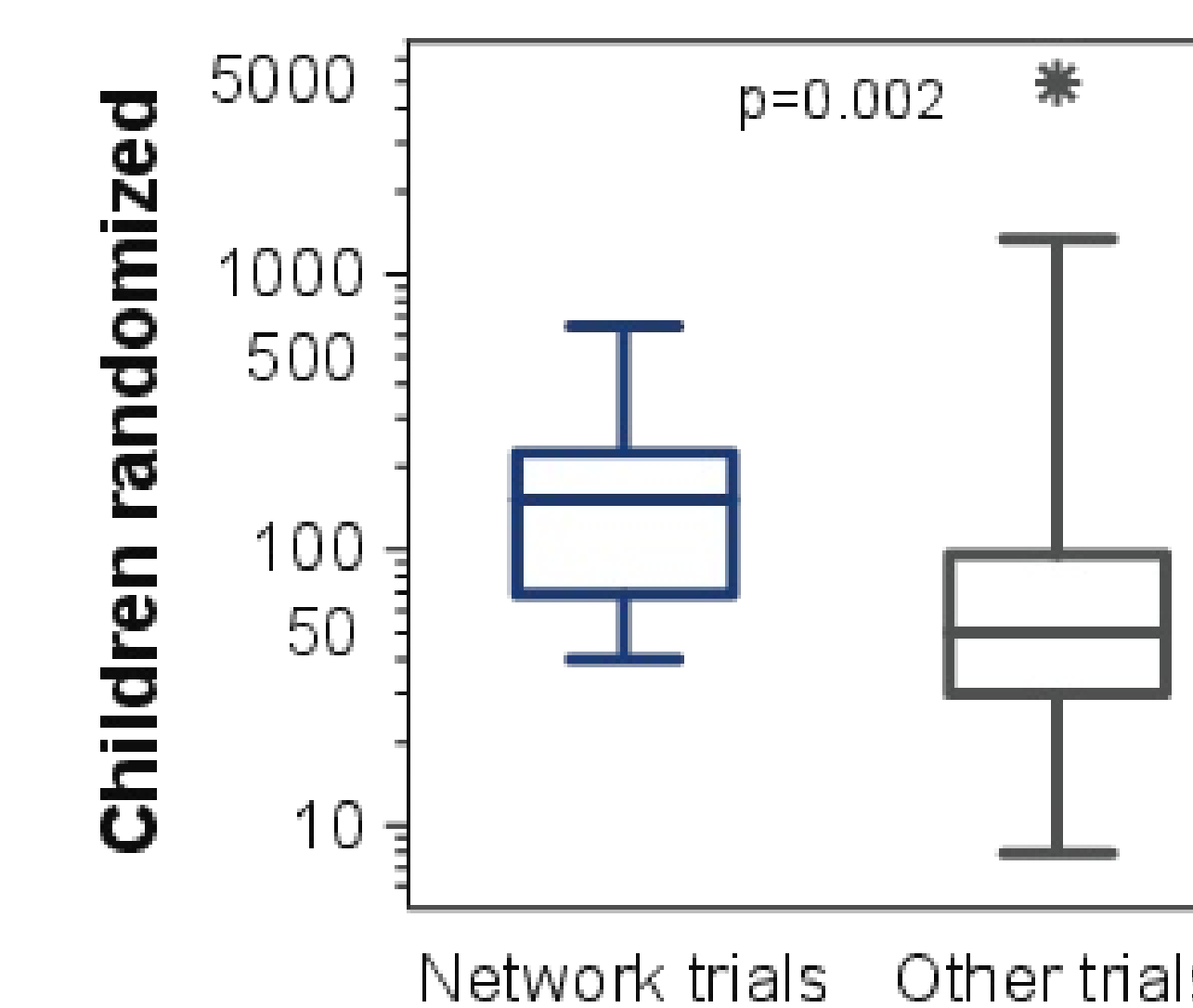
Data are reported as median (1st quartile, 3rd quartile) or n(%).

*Mann-Whitney or Fisher's Exact comparing Network trials to other trials.

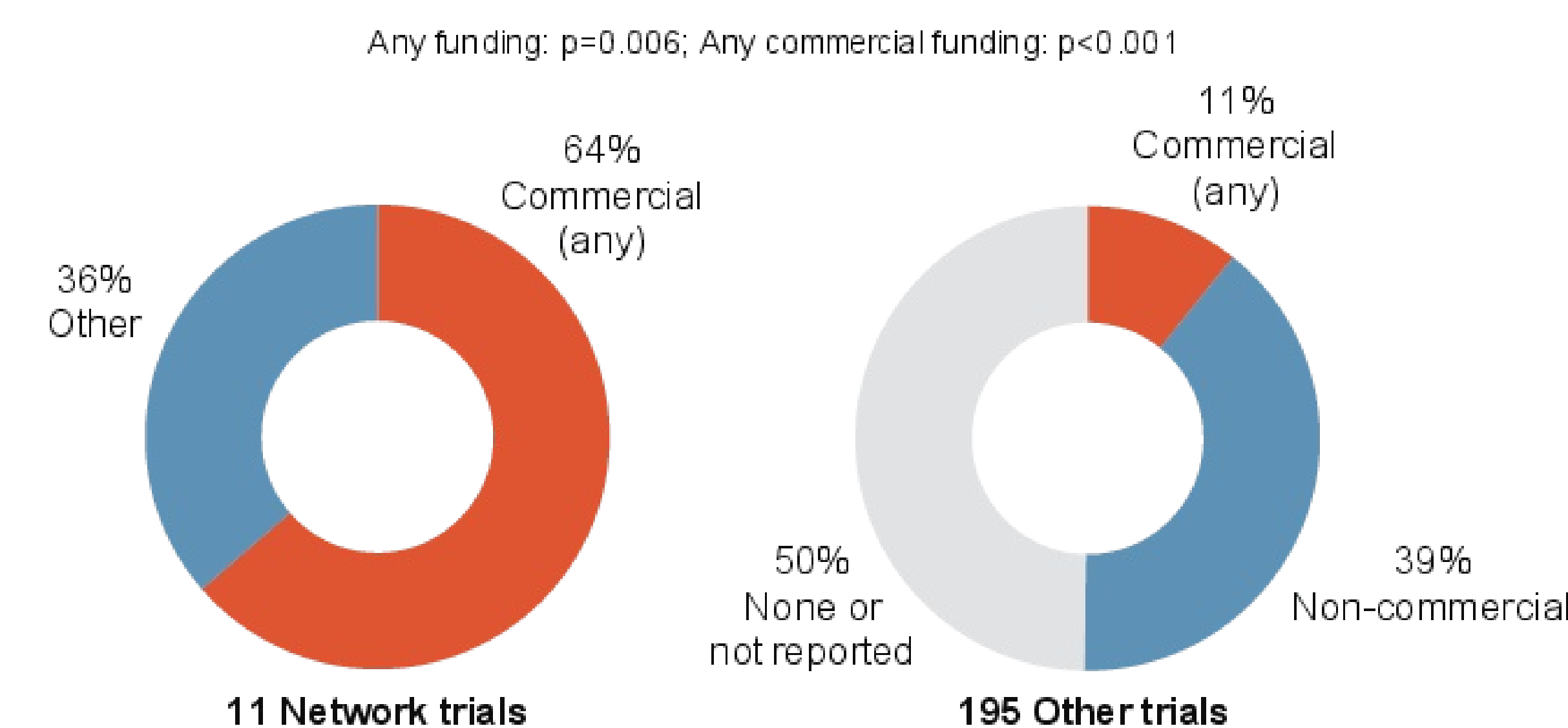
Early stopping

5 (67%) network RCTs reported stopping early for futility and 1 (20%) for recruitment. 38% of other trials were stopped for futility, 25% for recruitment and 38% for other reasons.

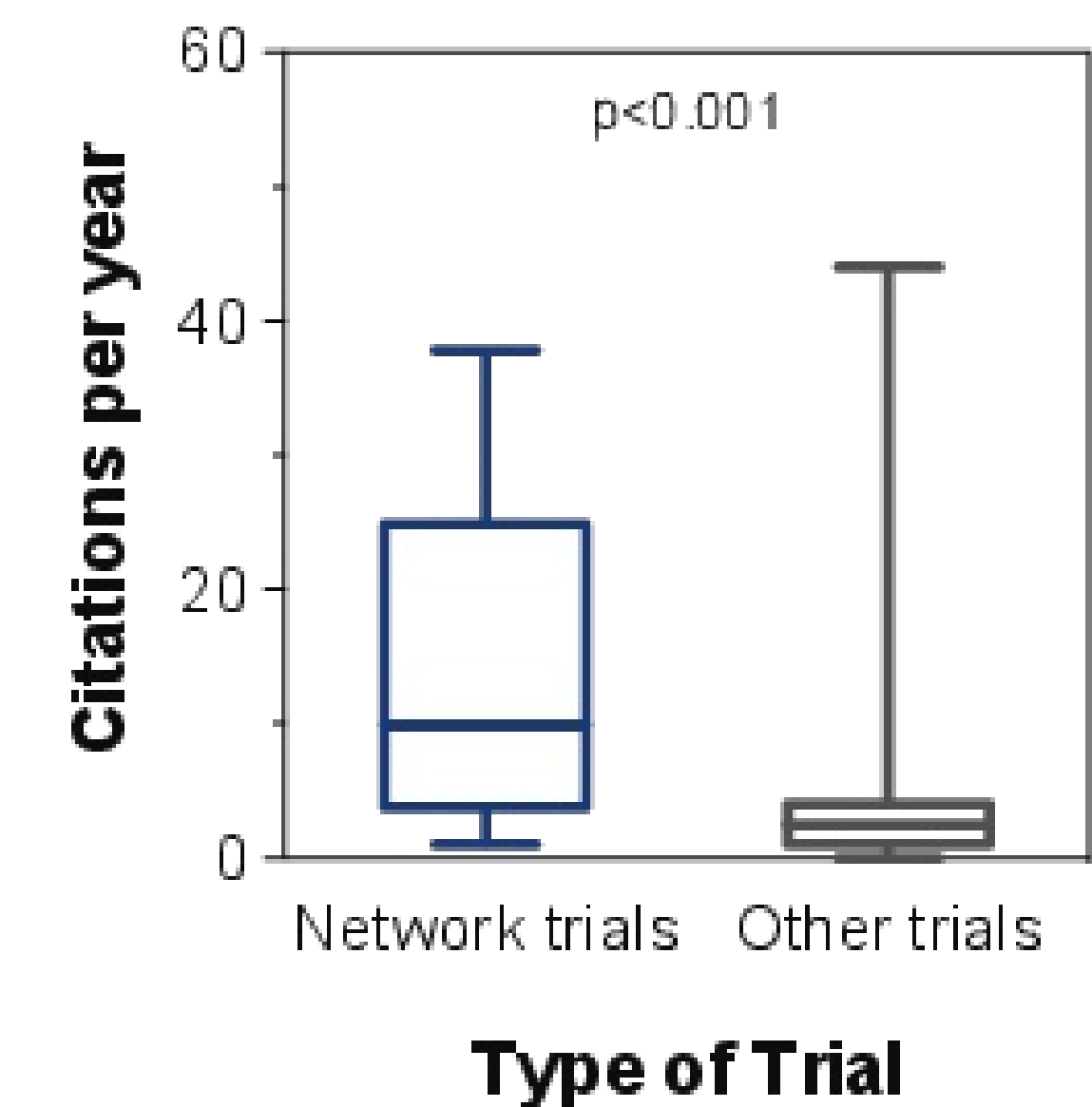
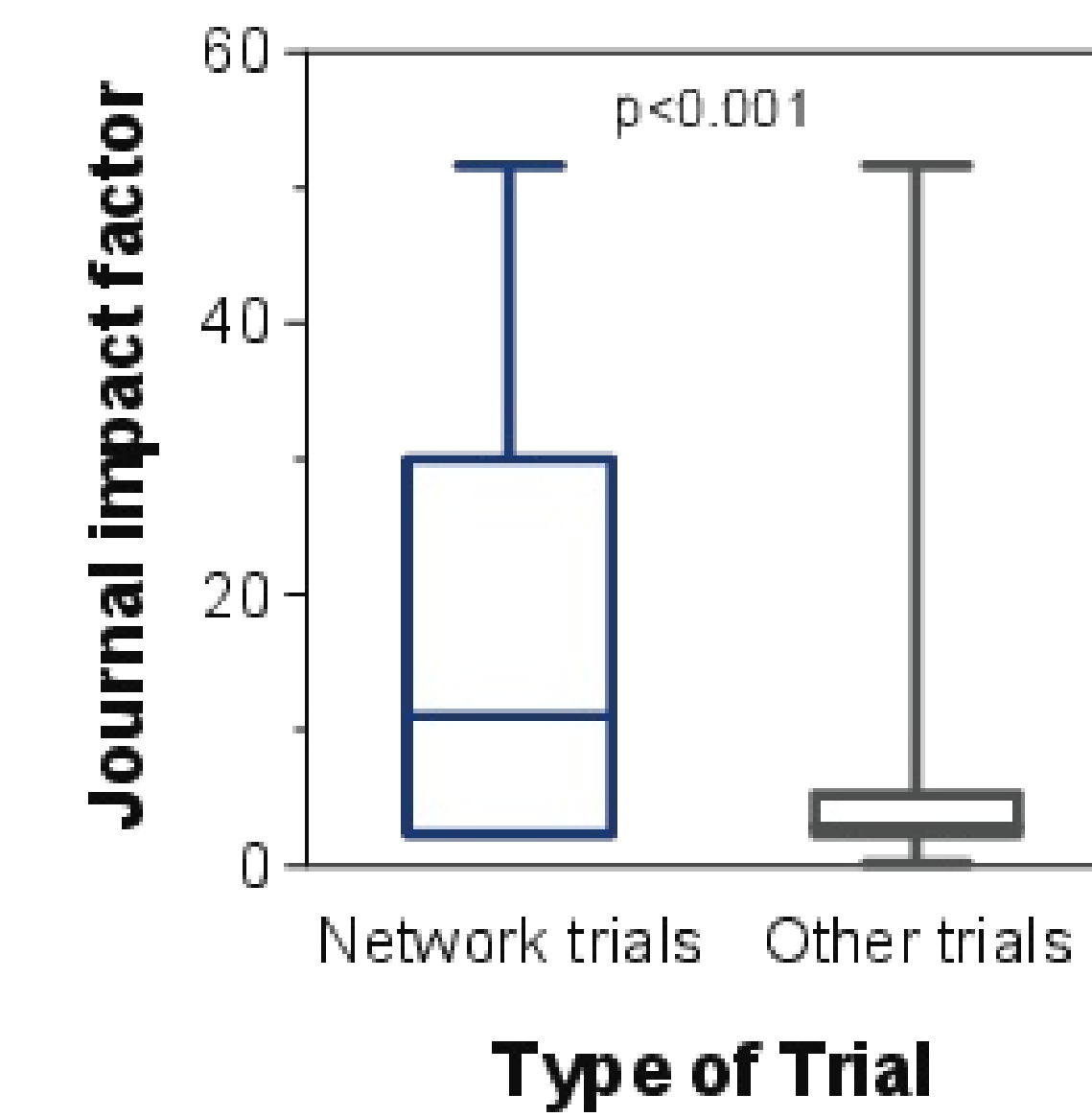
Sample size of RCTs



Funding source in pediatric critical care RCTs



Impact



Discussion

We found only 3 reported established networks conducting RCTs in pediatric critical care. These networks have conducted a minority of all RCTs in critically ill children, however network trials are more likely to be multi-centred, funded, larger in size, be published in higher impact journals and cited more frequently.

Networks trials took longer to complete and more often reported stopping early. These may be because of their size, and specific stopping rules or feasibility outcomes within the design of network trials.

Conclusions

Lessons learned from research networks in pediatric critical care may guide us in fostering future collaborative, well-designed, high quality and efficiently conducted RCTs to inform the care of critically ill children.