Letter to the Editor

Paediatric RRTs belong in tertiary care, paediatric hospitals

Kristina Krmpotic MD MSc, Jennifer Foster MD

Department of Paediatric Critical Care, IWK Health Centre and Department of Critical Care, Dalhousie University, Halifax, Nova Scotia

Correspondence: Kristina Krmpotic, Department of Paediatric Critical Care, IWK Health Centre and Department of Critical Care, Dalhousie University, 5850/5980 University Ave., PO Box 9700, Halifax, Nova Scotia B3K 6R8. Telephone 902-470-7515, fax 902-470-7264, e-mail Kristina.Krmpotic@iwk.nshealth.ca

Dear Editor,

The Canadian Paediatric Society (CPS) position statement ‘Rapid response systems for paediatrics: Suggestions for optimal organization and training’ provides a brief summary and interpretation of the literature supporting paediatric Rapid Response System (RRS) and Rapid Response Teams (RRTs), and recommends that “hospitals caring for paediatric in-patients should develop and implement an RRS...and implement and train RRTs with expertise in paediatrics” (1). These recommendations are based on evidence from studies conducted in tertiary care paediatric hospitals; the findings are not generalizable to all hospitals caring for paediatric in-patients. Given the potential medico-legal implications of recommendations published by the standard-setting body for paediatrics in Canada, we advocate for a significant revision to the position statement based on a more conservative interpretation of the literature, taking into consideration the different tiers of service that tertiary care, regional, and community hospitals provide for paediatric patients.

The evidence for paediatric RRS and RRTs comes from studies conducted in academic, tertiary care, paediatric hospitals with: 1) large volumes of paediatric patients, 2) the ability to urgently transfer the patient to a paediatric intensive care unit (PICU) within the same facility, and 3) RRTs comprised of paediatric critical care-trained professionals (2–4).

Although the CPS position statement cites impressive reductions in mean mortality rates and code rates reported in previous studies, the actual frequency of these events is quite low (Table 1). Demonstration of statistically significant benefits of a paediatric RRS requires very large sample sizes with the best evidence to support implementation provided by pooled meta-analyses of individual studies that collectively required the examination of events occurring over hundreds of thousands of patient admission days (2,3). Even if implementation

of a paediatric RRS has beneficial effects in large volume paediatric hospitals, it is unlikely that similar benefits would be observed in regional and community hospitals.

In Canada, paediatric in-patients include those admitted to tertiary care facilities, regional hospitals with dedicated paediatric wards, and the general wards of small, community hospitals. Generally speaking, academic, tertiary care, paediatric hospitals have continuous in-house physician coverage. The paediatric RRT provides additional specialized support to the primary team, and can rapidly triage patients to a higher level of care within the same facility. Paediatric in-patients at regional and community hospitals are usually already being cared for by the team with the most paediatric expertise and it is unlikely that an RRT consisting of the same individuals would offer additional clinical benefit.

All of the publications demonstrating the benefits of a paediatric RRS describe multidisciplinary RRTs composed of paediatric critical care-trained health care professionals (3,5). The authors of the position statement claim that “training ensures that all RRT staff have the necessary knowledge, skills and team-based behaviours required to deliver quality care to acutely ill patients”. However, there is no evidence to support the notion that implementing RRTs with ‘expertise in paediatrics’ would provide the same clinical benefit as RRTs with paediatric critical care expertise, regardless of the amount of simulation-based team training (SBTT) provided. Medical professionals who choose a career in critical care undertake several years of additional subspecialty training. The nurses and respiratory therapists staffing RRTs in paediatric tertiary care centres must meet minimum requirements of both amount of time spent working in a PICU with large volumes of critically ill patients as well as specific professional competencies prior to undertaking additional specialized RRT training, with ongoing education provided at regular intervals. Although SBTT is an important

Table 1. Paediatric RRS studies showing statistically significant differences in cardiopulmonary arrests outside the intensive care unit or reduction in hospital mortality after RRS implementation

Citation	Number of admissions pre-RRS	Number of admissions post-RRS	Number of arrests pre-RRS (per 1,000 admissions)	Number of arrests post-RRS (per 1,000 admissions)	Number of hospital deaths pre-RRS (per 1,000 admissions)	Number of hospital deaths post-RRS (per 1,000 admissions)
Sharek et al. (8)	22,037	7,257	53 (2.45)	5 (0.69)	547 (24.8)*	158 (21.77)*
Tibballs and Kinney (9)	104,780	138,424	20 (0.19)*	24 (0.17)*	459 (4.38)	398 (2.87)
Haque et al. (10)	4,951	4,389	26 (5.2)	12 (2.7)	Not reported	Not reported
Chan et al. (2) [†]	173,137; 165,633	174,481; 166,978	295 (1.7)	103 (0.59)	1,114 (6.73)	612 (3.67)
Maharaj et al. (3) [†]	244,132; 236,628	240,334; 232,831	542 (2.2)	267 (1.1)	1,792 (7.6)	1,197 (5.1)

RRS Rapid Response System.

*Not statistically significant.

[†]Pooled results meta-analysis.

component of continuing education, RRT providers gain and maintain the necessary expertise in the paediatric intensive care environment.

The cost of implementing and maintaining a paediatric RRS with all of its essential components is substantial. The authors claim that “operational costs could be recouped by reducing the number of clinical deterioration events, even modestly” in reference to a single economic analysis conducted in a tertiary care setting (6). In our hospital, where an RRS has been implemented without additional funding (7), a clinical service has been possible but places a significant additional work-load on paediatric critical care providers, particularly nurses. The administrative and process improvement components of the RRS only survive because of salaried physician leads who have protected nonclinical time. Outside of the academic setting, where paediatricians often operate on a different funding model (e.g., fee-for-service), implementation and maintenance of a paediatric RRS would entail significant burden for care providers and is unlikely to be feasible or sustainable.

All health care providers caring for paediatric in-patients should have the knowledge, skills, and abilities required to recognize the early signs and symptoms of clinical deterioration in children and are empowered to rapidly escalate care for these patients. Monitoring of paediatric in-patients should include regular, accurate, and complete clinical assessments with the intention of detecting and responding to abnormalities in subjective and objective criteria (e.g., deviations from age-appropriate vital signs). Health care providers should have a clear plan for rapid escalation of care in the event of

subjective concern or breach of objective parameters, without fear of negative consequences. Crisis response should include a bedside evaluation by an attending paediatrician (ideally within 15 minutes) and early contact with a tertiary care referral centre offering paediatric critical care services, regardless of whether or not inter-facility transfer is anticipated. Critical events should be evaluated as part of ongoing institutional quality assurance initiatives and health care professionals should be provided with event-related feedback in addition to regular education regarding early identification and management of clinically deteriorating children. Tertiary care paediatric hospitals with critical care services are ideally positioned to provide clinical and nonclinical resources and support to regional and community hospitals within their catchment areas to achieve these goals.

Although the CPS has identified an important need to address the improved recognition and management of clinically deteriorating hospitalized children, the current recommendations should be revised based on a more conservative interpretation of the literature and realistic expectation of program feasibility in regional and community hospitals.

Respectfully yours,

Kristina Krmpotic MD MSc and Jennifer Foster MD

Current and former physician leads of the Specialized Pediatric Outreach Team at IWK Health Centre, Pediatric Critical Care, IWK Health Centre, and Critical Care Medicine and Pediatrics, Faculty of Medicine, Dalhousie University, Halifax, Nova Scotia

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