

## Common problems and their solutions in paediatric cardiac intensive care

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**T**HERE ARE MANY DAUNTING CHALLENGES THAT need to be met by any seeking to achieve leadership in the area of cardiac intensive care. Paediatric cardiac intensive care has now emerged as a specialized clinical area, focusing on the unique needs of critically-ill neonates, children, and adults with congenital and acquired heart disease.<sup>1</sup> Although an increasing number of centres dealing with paediatric cardiology have either started, or are considering starting, a dedicated cardiac intensive care unit and programme, there are no published primers regarding the logistical aspects of such a challenging endeavour. While there may be an ongoing debate about the preferred strategy in the clinical ownership of the patients treated in intensive care, most authorities agree that it is beneficial to have a dedicated team devoted to the needs of critically-ill children and adults with congenital and acquired cardiac disease.

In this review, I have emphasized 25 essential elements that can serve to underpin a balanced strategy when starting a programme devoted to paediatric cardiac intensive care. In making my selections, I have used a compendium of clinical experiences, as well as making reference to the principles that underscore the administration of health care. In addition, I introduce a “scorecard” approach which incorporates these elements, and which can usefully be used as an objective tool, initially to assess any new project, or serially to measure the progress and success of such a programme.

### Essential elements of a successful service for cardiac intensive care

#### *Philosophy and strategy*

*Multidisciplinary collaboration.* One of the most important paradigmatic shifts in the philosophy of paediatric cardiac intensive care has been the deeper appreciation of the need for multidisciplinary involvement. A multidisciplinary approach at the highest level eliminates conventional boundaries between subspecialties, even the need to establish surgical as opposed to medical patients, and creates an egalitarian system that takes full advantage of the expertise and experience of each discipline. This approach should not, however, be accompanied by dispersion of responsibilities and accountabilities. Those responsible for leadership need to learn to negotiate from positions of strength, and strive for a win-win situation in the many situations that potentially involve conflict. Effective negotiating tactics are well published. They include separating the people from the problem, focusing on interests rather than positions, inventing options for mutual gain, and insisting on the use of objective criterions.<sup>2</sup>

*Continuum of service.* Another important, but understated, concept is that cardiac intensive care should be delivered as a continuum of service, and not merely as postoperative care after a surgical or interventional procedure.

*Individualized approach.* While there are generalized principles in cardiac intensive care, it is important to maintain an individualized approach when delivering care.

*Anticipatory care.* Strategies used in cardiac intensive care unit should include indoctrination of anticipatory, rather than reactive, care.

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*Gradual transition.* A gradual transition from the substantial support provided in cardiopulmonary intensive care to the beginning of convalescence is preferred over abrupt changes in pharmacological and ventilatory management. It is generally easier to recover from a smaller rather than a larger error in judgment.

#### *Leadership and personnel*

*Leadership by physicians.* In my opinion, in order to achieve cohesiveness of the team and consistency of care, it is essential to have a physician occupying the position of leader of the programme providing cardiac intensive care. It is less important for the physician assuming the role of leader to possess multidisciplinary training than for the director to be a seasoned clinician who possesses the supreme skills of management, organization, and mentorship.<sup>3-6</sup> Increasing focus is now being placed on the art of leadership in the arenas of both business and medicine.<sup>7-10</sup> Dealing with a group of physicians is a difficult endeavour, and has been compared to "herding cats" or "forcing eagles to fly in formation". Leadership is about asserting influence, rather than control, and empowering all those around to achieve their potential. This philosophy enables all members to have ownership in any activity involving the group. This effort is facilitated by clearly delineating roles and delegating responsibilities, while maintaining respect from all members of the group.

*Covering the service.* Ensuring adequate levels of staffing, or "coverage" is a key issue that will continue to be challenging.<sup>11</sup> The problem needs to be delineated so that the scheme of coverage can be individualized to the institution. It often requires "out-of-the-box" thinking. The shortage of manpower will continue in the arena of cardiac intensive care, and possibly worsen in the coming years.

*Nursing empowerment.* The leader of the nursing team needs to be someone who is a skilled manager, but also a seasoned intensive care nurse who has the confidence and respect among nursing peers.

*Morale of the group.* Healthy dynamics within the group among leaders of the subspecialties, and an overall "esprit de corps" of the entire team, is essential for honest interchanges. In addition, career burnout is very common in intensive care, with its constancy of high-level stress, and yet there is very little assessment and support for this devastating occupational problem.<sup>12</sup>

*Effecting change.* When groups of physicians and nurses have worked together for a long time, there is a tendency for "groupthink", a well-described business phenomenon in which members of the group start to think the same, thus producing a process of

decision-making that is rendered much less than effective.<sup>13</sup> Although research in the business realm has demonstrated that organizations can change in two ways, either through drastic action or evolutionary adaptation, smaller incremental changes to effect overall change may be more widely accepted than a major strategy of re-engineering.<sup>14</sup> It is useful to have regular meetings as a group to monitor forward momentum, so that all members are accountable for progress. This progress needs to be measurable. All projects should follow the cycle of plan-do-study-act, a cycle which is more familiar to those working in the business than the medical world. One means of assuring progress is to institute a system for differential rewarding as a method of motivating the group. Effecting change is a well-studied behaviour in the business world, but is a particularly difficult challenge for physicians and those involved in academic research. Change can be effected from the stance of the tempered radical, leading by going from inside, and from the bottom up. This is preferable to approaching from the outside, and from top down. In addition, if needed changes are to be promoted, it is far easier to accomplish these changes with support from most, if not all, members of the group. Although research has demonstrated that organizations can change either through drastic action or evolutionary adaptation, smaller incremental changes may be more acceptable than a major strategy of re-engineering.

#### *The facility and its equipment*

*Location.* A geographical separation of the cardiac intensive care unit is less important than the philosophical focus of a dedicated team to take care of children with critical cardiac conditions. It is logistically more sound, nonetheless, to have closely together the facilities needed to diagnose, treat, and care for the patients.

*Spatial organization.* The initial design of the unit should be achieved in multidisciplinary fashion, including input from the medical and nursing directors, the hospital architect, the hospital administration, and the operating engineer. The overall design of a unit needs not only to adhere to regulatory standards, but also to reflect the specific needs of patients with cardiac disease.<sup>15</sup>

*Use of technology.* The basic equipment and utilities within the unit, as well as its access to laboratory and radiologic services, must be capable of supporting the needs of the patients under both normal and emergency situations.

#### *Operations and management*

*Operational efficiency.* The overall operational efficiency of the unit is determined by the pattern of

flow of admissions, including transports, and discharges, as well as flexibility with the operating room and catheterization laboratory during both busy and slow periods. It is just as easy to diagram this operational process as it is for any other complex business operation.<sup>16</sup>

*Forming policies.* A periodic meeting between the physician in charge of cardiac intensive care and those responsible for the nursing staff is very useful in formulating new policies, as well as monitoring existing policies.

*Variations in practice.* Attempts should be made to minimize unnecessary individual variations in clinical practice in the cardiac intensive care unit. Even preprinted orders for several broad categories of patients, such as neonates undergoing open-heart operations, can improve potential inconsistencies in perioperative care. This overall strategy to minimize unnecessary variations can lead both to decrease in inconsistencies in care and avoidable errors.

*Analysis of data.* Assuring accuracy of records in the unit from an hour-to-hour perspective is very similar to the accuracy required in accounting for any business. An example of such analysis is noting that there is an increase in accidental extubations during the night shift. With sophisticated software, these analyses can be automated on a periodic basis.

*Financial health.* An important aspect of financial health of the cardiac intensive care unit is monitoring of its unjustified costs, especially unnecessary tests ordered by those responsible for care. The leaders of both the physicians and the nursing staff should be knowledgeable in cost-to-charge ratios, as well as direct and indirect expenses in the setting of intensive care.<sup>17</sup>

*Management of quality.* While assurance of quality is a process in which the collection of data is improved, and the "status quo" is maintained, improvement and management of quality is the preferred process with which incremental improvements are achieved by slow and careful changes. Overall, quality should be treated as a vital part of day-to-day operations, rather than as a hurried exercise prior to inspections by regulatory agencies.<sup>18</sup> A clear understanding of the business concept of "six sigma", a methodology to strive for perfection, is invaluable here as it is rarely used in medicine.<sup>19</sup> In addition, the Japanese philosophy of "kaizen" teaches that it is preferable to make small incremental changes on a daily basis to achieve high quality in the long term, as opposed to a major radical restructuring that often falls short of expectations.<sup>20</sup> For any project or proposal, the team must be inspired daily to move forward, however small the forward step might be. Maintaining a high level of morale among physicians can be particularly challenging after the initial wave of enthusiasm for a new development starts to wane.

*Improvement of performance.* Improvement of performance is a process that leads to bold improvements and adaptation for change. In short, as in management of quality, it is an analysis of situations rather than analysis of data. The improvement of performance, therefore, interacts with resources for management of risk, as well as management of information.

*Satisfaction of the patients.* Overall, the satisfaction of the patients being treated has been an important aspect in determining the quality of the medical care provided in the environment of managed care.

### *Education and research*

*Educational objectives.* Education for all members of the team is obviously a vital part of the programme developed to provide cardiac intensive care, and demands constant attention. Special knowledge concerning areas such as the pathophysiology of the functionally univentricular circulation, pulmonary hypertension, cardiopulmonary interaction, use of mechanical support, and complex tachyarrhythmias, are particularly demanding. They should be reviewed on a periodic basis with all those responsible for care.

*Team learning.* The service responsible for intensive care should be positioned to accommodate new types of patients, such as adults with congenital cardiac malformations, or patients who undergo lung transplantation. A recent review article in the Harvard Business Review, examining cardiac surgical teams learning a new technique, revealed that important skills needed by leaders to foster learning within the team included accessibility, seeking input from others, and being a model for fallibility.<sup>21</sup>

*Research activity.* Trainees in both the medical team and amongst the nursing staff should be encouraged to undertake research projects, with guidance provided by the senior physicians. Some of the research projects can easily be extensions of projects designed to improve quality or performance.

*Peer review.* It is of paramount importance to have mechanisms for both internal and external periodic peer review. It is equally vital to have a respected external expert assess the programme as an unbiased source of constructive criticism. Any leader of the research group needs to learn and appreciate group dynamics. For example, disruptive behaviour of a team member is usually better treated as a team problem, rather than as a personal issue. Learning activities shared within the group can further consolidate its cohesiveness. As already discussed, the recent Harvard Business Review emphasized the needs of accessibility, seeking input from others, and recognition of fallibility.<sup>21</sup> An approach that incorporates all members of the group, however, should not be accompanied by dispersion of responsibilities and accountabilities.

## The scorecard for paediatric cardiac intensive care

Scorecards for business systems, which examine organizational performance in areas of finance, human resources, internal processes, and customer satisfaction, have been used by businesses serially to monitor the performance of their organizations.<sup>22</sup> The performance

of the team responsible for paediatric cardiac intensive care could similarly be assessed in a quantitative manner by using a scorecard incorporating the 25 issues I have highlighted and discussed above. I show an example of the use of such a card in the Table 1. The scorecard also serves as an effective tool for serial assessment of the unit by internal and external reviewers.

Table 1. The scorecard for paediatric cardiac intensive care. The example shown provides a quantitative assessment of a sample programme before and after a visit from an external reviewer, with subsequent recommendations and interventions. The external reviewer scores each of the 25 issues from 1 to 4 to give a possible total score of 100. A separate composite grade is given for each of the five broad categories as a way to compare areas for relative strengths and weaknesses.

Issue in cardiac intensive care	Before	Recommendations/interventions	After
<i>I. Philosophy and strategy</i> (maximum score 20)	9 (C-)		12 (C+)
Multidisciplinary collaboration	2	Multidisciplinary rounds instituted.	3
Continuity of service	2	Cardiac intensive care service involved in operating room more frequently.	3
Individualized approach	2	No immediate changes.	2
Anticipatory care	1	Improved overall knowledge base for common postoperative issues.	2
Gradual transition	2	No immediate changes.	2
<i>II. Leadership and personnel</i> (maximum score 20)	7 (D+)		14 (B)
Physician leadership	1	New cardiac intensive care director successfully recruited.	3
Covering the service	1	Recruited one senior fellow and provided dedicated coverage for unit.	3
Nursing empowerment	1	Encouraged RNs to present patients on rounds.	2
Morale of the group	2	Initiated weekly meetings to discuss issues.	3
Effecting change	2	Discussed changes in policies with all members of the group.	3
<i>III. Facility and equipment</i> (maximum score 12)	6 (C)		9 (B+)
Location strategy	1	Reorganized to have postoperative patients in one general area of the intensive care unit.	3
Spatial organization	2	Organized a neonatal cardiac intensive care area.	3
Usage of technology	3	No changes but considering database management system.	3
<i>IV. Operations and management</i> (maximum score 32)	14 (C-)		22 (B)
Operational efficiency	2	No immediate changes.	2
Formation of policies	3	No immediate changes.	3
Variations in practice	2	Instituted preprinted orders.	3
Analysis of data	1	Instituted electronic database management system.	3
Financial health	1	Consultant hired for billing and collections.	2
Quality management	2	Introduced weekly conferences to discuss issues.	3
Improvement in performance	1	Introduced several projects with nurses as project leaders.	3
Satisfaction of patients	2	Organized parent support group and initiated patient satisfaction survey.	3
<i>V. Education and research</i> (maximum score 16)	6 (D+)		12 (B+)
Educational objectives	1	Formal orientation for nurses initiated.	3
Team learning	1	Introduced more open discussion of mistakes in conferences.	3
Research activity	1	Started several research projects.	2
Peer review	3	Instituted external reviews on an annual basis.	4
Total score and grade	43 (C-)		70 B

## Conclusion

Starting a programme for paediatric cardiac intensive care is both exciting and challenging. The endeavour demands a balanced clinical and administrative approach to ensure its success. In his best-selling book “Good to Great”, author Jim Collins describes characteristics of the very few Fortune 500 companies that have had sustained greatness.<sup>23</sup> One of the most important qualities of such great companies is the willingness honestly to confront the weaknesses of the organization, and then implement means to improve, while retaining unwavering faith in the company. This is the so-called “Stockdale Paradox”, a concept in business named after Admiral Jim Stockdale, the highest-ranking former prisoner-of-war in Vietnam. His faith in returning to the United States during his eight-year stay at the infamous “Hanoi Hilton” never wavered. He did so while fully recognizing the harsh conditions and brutal facts of his captivity. As in any business organization, long-term greatness of a programme designed to provide cardiac intensive care can only be attained by a relentless effort to improve. This effort, however, needs to be focused, and its effects need to be measurable.

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