Program Description – Pediatric Cardiac Anesthesia
Children’s Hospital, Boston

A. Program Demographics

1. Host Institution: Children’s Hospital Boston
2. Program Subspecialty: Pediatric Cardiac Anesthesia
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B. Introduction

1. The Department of Anesthesia at Children’s Hospital Boston and its Cardiac Anesthesia Service have been providing training in pediatric cardiac anesthesiology for more than 20 years. The breadth and depth of the abilities and responsibilities of the Service led to its reorganization as the Division of Cardiac Anesthesia within the Department of Anesthesiology, Perioperative and Pain Medicine in 2002. Members of the Division of Cardiac Anesthesia provide care for infants, children, and adults with various forms of congenital and acquired heart disease having both cardiac and non-cardiac surgery, in the cardiac intensive care unit, cardiac catheterization, and other invasive and non-invasive diagnostic and therapeutic procedures. The Division’s caseload is the largest in the United States, comprising over 1000 cardiac surgical operations (including more than 800 that utilize cardiopulmonary bypass) and more than 1400 cardiac catheterizations and other procedures (e.g. cardiac magnetic resonance imaging, transesophageal echocardiography, consultation and management of non-cardiac surgery in patients with various forms of congenital heart disease).
The one-year fellowship program in pediatric cardiac anesthesiology at Children’s Hospital Boston began in 1993. Fifteen fellows have completed the program since its inception. In addition, the program provides training in pediatric cardiac anesthesia for approximately 30 other trainees per year (for 1-3 month periods) as part of their fellowship programs in either pediatric anesthesiology or adult cardiac anesthesiology. It should be noted that the pediatric cardiac anesthesia fellowship is directly associated with the ACGME-accredited program in pediatric anesthesiology at Children’s Hospital Boston.

2. **Duration:** The fellowship program in pediatric cardiac anesthesiology at Children’s Hospital Boston is 12 months in duration.

3. **Prerequisite Training/Selection Criteria:** Applicants for the fellowship must a) have satisfactorily completed residency training in anesthesiology; b) qualify for and obtain either a limited (training) or unrestricted license to practice medicine in the Commonwealth of Massachusetts; and c) qualify for and obtain house-staff privileges at Children’s Hospital Boston.

   Selection criteria include a) superior performance during previous anesthesiology training, as demonstrated by letters of recommendation and objective examination(s) and/or board or specialty society certification (where applicable); b) assessment of the applicant’s interest and aptitude in, rationale for, and commitment to the practice of pediatric cardiac anesthesia, based upon evaluations from current and former supervisors and interviews with members of the Division; c) evidence of need for and commitment to the applicant’s training in pediatric cardiac anesthesia by the applicant’s home institution and/or country of origin (where applicable). Additional training and/or experience in pediatrics, pediatric anesthesia, adult cardiac anesthesia, or other relevant branches of medicine are also desirable.

4. **Goals and Objectives for Training:** The primary purpose of the program is to train anesthesiologists to be expert in the perioperative care of patients with both straightforward and complex forms of congenital heart disease. At the completion of the program, fellows are expected to have the pathophysiologic knowledge and technical skills to direct the perioperative management of infants, children, and adults with congenital and acquired heart disease undergoing cardiac and non-cardiac surgery, cardiopulmonary bypass, deep hypothermic circulatory arrest, hemodynamic and interventional cardiac catheterization, and other procedures such as radiofrequency ablation, transesophageal echocardiography, and magnetic resonance imaging. Applicants are also expected to develop consultant-level knowledge of relevant areas such as echocardiography and perioperative cardiac intensive care, and the management of children and adults with congenital heart disease having non-cardiac surgery and other procedures.

5. **Other Program Certifications:** None

**C. Resources**

1. **Teaching Staff:** The clinical and teaching staff of the Division of Cardiac Anesthesia is currently comprised of 11 board-certified anesthesiologists who are engaged in the full-time clinical practice of pediatric cardiac anesthesia. All Division staff are responsible for direct clinical supervision and training of fellows.
on a one-on-one basis during patient care. In addition, all members of the Division are active participants in the Division’s didactic program, and most have significant clinical or laboratory research programs as well. The current members of the Division are:

Alfonso Casta, MD, Associate Professor of Anaesthesia

James A. DiNardo, MD, Associate Professor of Anaesthesia
   (Program Director)

Paul R. Hickey, MD, Professor of Anaesthesia
   (Chairman, Department of Anesthesiology, Perioperative and Pain Medicine)

James S. Harrington, MD, Instructor in Anaesthesia

Juan C. Ibla, MD, Associate Professor of Anaesthesia

Barry D. Kussman, MD, Assistant Professor of Anaesthesia

Peter C. Laussen, MBBS, Associate Professor of Anaesthesia and Pediatrics (Director, Cardiac Intensive Care)

Francis X. McGowan, Jr., MD, Professor of Anaesthesia
   (Chief, Division of Cardiac Anesthesia)

Kirsten C. Odegard, MD, Assistant Professor of Anaesthesia

Annette Y. Schure, MD, Instructor in Anaesthesia

Avinash C. Shukla, MBBS, Instructor in Anesthesia

Mark C. Wesley, MD, Instructor in Anaesthesia

Koichi Yuki, MD, Instructor in Anaesthesia

2. The primary training sites for Cardiac Anesthesia fellows are the operating rooms and catheterization laboratories at Children’s Hospital Boston. Depending upon the interests and requirements of the individual fellow, elective rotations may also be done in the Cardiac Intensive Care Unit and echocardiography laboratory at Children’s Hospital, and occasionally (to provide training in aspects of adult cardiac anesthesiology where desired) in the cardiac operating rooms or echocardiography laboratory in neighboring and affiliated institutions (Brigham and Women’s Hospital or Beth Israel-Deaconess Medical Center).

D. Educational Program – Basic Curriculum

1. Clinical and Research Components: Advanced clinical training is the primary goal of the one-year fellowship in pediatric cardiac anesthesiology. Fellows spend a minimum of 8 months providing clinical care in the cardiac operating rooms and catheterization laboratory under the direct supervision of one of the Division’s faculty. The remaining time is devoted to elective rotations based upon the
educational interests and needs of the individual fellow, and typically include one-month elective rotations in the pediatric cardiac intensive care unit, echocardiography (transthoracic and transesophageal), pediatric anesthesia (for those trainees with primarily adult anesthesia backgrounds). A mentored clinical research component, on a topic of the fellow’s own choosing or as part of an ongoing project, is also available during this elective time to interested fellows who have demonstrated sufficient clinical progress. Fellows also take the full-day course for anesthesia faculty in crisis management at the Center for Medical Simulation (Cambridge, MA) and a three-day introduction to clinical research methodology (including presentations on HIPAA and research ethics) offered by Children’s Hospital.

2. **Supervising and Patient Care Responsibilities:** The primary responsibility of the fellow is providing clinical care to patients with congenital heart disease requiring anesthesia. As such, they are responsible for performing the initial preoperative assessment and designing the proposed intraoperative management plan for these patients. In conjunction with and under the direct supervision of a member of the attending staff of the Division, they are expected to understand the relevant pathophysiology, specific patient characteristics, and planned procedure and thereby formulate and implement appropriate pre-, intra-, and postoperative treatment. In the final month of their training, to facilitate the transition to independent status, it is expected that they will assume greater responsibility and supervise more junior trainees in these roles (still under the overall supervision of a staff member).

The one-year fellow is also responsible for the orientation and scheduling of other resident and fellow trainees. As his/her knowledge base and experience grow, they serve as an educational resource for the other trainees. He/she is expected to prepare and deliver a lecture on current or controversial issues in pediatric cardiac anesthesia (aided by a faculty mentor) twice per year as part of the Division’s didactic program (see below). He/she is also responsible for case collection and presentation at the Division’s monthly complications review.

3. **Procedural Requirements:** The fellow is expected to become adept at all procedures related to expert delivery of pediatric cardiac anesthesia care. In addition to the standard components of general anesthesia (e.g. endotracheal intubation), these procedures include insertion of arterial (radial and femoral), peripheral venous, and central venous (internal jugular and femoral) catheters and management of cardiopulmonary bypass. At least 50 of these procedures (each) will be in infants less than one year of age.

4. **Didactic Components:** The Division maintains a comprehensive formal didactic program that includes thrice per week lectures on pertinent topics in pediatric cardiology, cardiac surgery, and anesthesia (e.g. cardiopulmonary bypass, coagulation, myocardial preservation, cerebral protection, tetralogy of Fallot, Fontan physiology, the adult with congenital heart disease). Anesthesia Department conferences attended by the fellow include Anesthesia Grand Rounds (twice per month) and the departmental morbidity and mortality conference (twice per month). Fellows also attend the weekly combined Cardiac Surgery/Cardiology/Cardiac Anesthesia conference where all scheduled cases for the upcoming week are discussed. There is also a quarterly combined (anesthesia/surgery/cardiology) “consensus conference” where difficult or controversial clinical topics are presented
in an evidence-based fashion; the one-year fellow is expected to lead one of these discussions during his/her year.

Daily informal one-on-one teaching is also an important component of the educational program. Fellows are expected to fully evaluate and then discuss their cases preoperatively with the responsible staff member. Intraoperative teaching (case-based and on more general didactic topics) is also emphasized and is a daily part of fellow education.

5. N/A

E. Evaluation

Participants work one-on-one with faculty while performing their clinical duties, as well as when preparing lectures, working on clinical research projects, etc. Each fellow is also assigned a faculty advisor for the year. Overall, they are expected to demonstrate continued progress toward independent practitioner and consultant status as a pediatric cardiac anesthesiologist. Specifically, fellows are assessed monthly by each faculty member in 8 domains: 1) fund of knowledge in anesthesia, pediatric anesthesia, and related medical specialties; 2) progression of fund of knowledge in pediatric cardiac anesthesia; 3) medical judgment (decision making skills, initiation and execution of an appropriate clinical plan); 4) technical ability (ability to manage airways, vascular access); 5) leadership skills (teaching ability, trouble shooting, crisis management); 6) administrative skills (scheduling, conference organization, communication); 7) interpersonal skills (availability, team player, relationships with faculty, colleagues, other medical professionals, patients and family members); 8) overall assessment. Faculty use this evaluation at monthly meetings to discuss the fellow’s progress, identify strengths and weaknesses, and devise any needed interventions. Results of the evaluation process are communicated directly to the fellow. Also, fellows evaluate faculty in a similar manner; as a part of this process, fellows are asked to identify weaknesses in the training program and their own knowledge base and abilities, along with proposed solutions.

Fellows are given a list delineating their privileges and requirements for faculty contact at the start of their training and these are reinforced repeatedly throughout their training. In general, given the complex and severe nature of the patients cared for by the Division of Cardiac Anesthesia, fellows are not allowed to perform any procedures or anesthetics without direct contact and supervision by the attending staff. Thus, they know they are expected to contact the attending staff for all cases and other issues. As a principal, they are instructed that they are to notify the attending physician at the first hint of any emergency or unexpected clinical situation. In practice, there are no clinical situations that arise during care of patients by the Division of Cardiac Anesthesia where the attending physician is not present and directly supervising the fellow.

All fellows work less than the 80 hour work week maximum. Their duty hours do not violate any of the ACGME regulations. The Department has a strict and standing policy that fellows do not work more than 24 hours in any stretch without at least 12 hours off. Fellows who are “up all night” providing clinical care are relieved of their responsibilities
the following morning. Any fellow who exhibits fatigue for any reason is also relieved from their clinical responsibilities.

The Division of Cardiac Anesthesia is well aware of the risk of physician impairment in general and amongst anesthesiologists in particular. This heightened awareness and sensitivity to the issues is the initial provision made by the Division to discover the impaired physician. To deal with the problem, the Harvard Anesthesia Departments have formed a Committee on Physician Health and we have available to us our Department’s representative to this Committee, Dr. Julianne Bacsik. Dr. Bacsik is available to answer questions confidentially and to provide resource information to all concerned parties. This is the initial resource of which the fellow is advised along with the information that is strictly confidential. The fellow would also be advised that the Department of Psychiatry at Children’s Hospital Boston has a free, confidential, and freely available counseling service for trainees. In addition, the resources of the Commonwealth of Massachusetts Physician Health Service can also be offered. In addition, random audits of drug use and drug kits are performed by members of the Department and the OR Pharmacy.

Fellows are offered a minimum of four one-hour lectures per year on various aspects of medical ethics by departmental faculty expert in this area. Systems approaches and systems defects in medical care are the particular academic interest of a member of the Division faculty, Dr. James Harrington. In addition to his daily and informed contact with fellows where he discusses these issues, systems approaches to medical care are formally discussed by him during lectures that are given on average four times per year. As noted previously, trainees also attend the faculty level simulation course at the Center for Simulation in Cambridge, Massachusetts. With regards to training in quality improvement, the Division conducts a monthly morbidity and mortality review conference, which as noted previously, is the primary responsibility of the one-year trainee (in conjunction with Dr. Harrington) to gather the cases and relevant data and present this at conference. In addition to this morbidity and mortality conference, trainees attend the bimonthly Department of Anesthesia Morbidity and Mortality/Qulity Improvement Conference, as well as weekly such conferences conducted by the Department of Cardiology and the Cardiovascular Program. There is also a monthly combined quality improvement conference offered by the Department of Cardiac Surgery and the Division of Cardiac Anesthesia, which the trainee is also expected to attend.

Submitted by:

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James A. DiNardo, MD
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Date