

Original Article

Training fellows in paediatric cardiology: the Harvard experience*

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Abstract The Fellowship Program of the Department of Cardiology at Boston Children's Hospital seeks to train academically oriented leaders in clinical care and laboratory and clinical investigation of cardiovascular disease in the young. The core clinical fellowship involves 3 years in training, comprising 24 months of clinical rotations and 12 months of elective and research experience. Trainees have access to a vast array of research opportunities – clinical, basic, and translational. Clinical fellows interested in basic science may reverse the usual sequence and start their training in the laboratory, deferring clinical training for 1 or more years. An increasing number of clinical trainees apply to spend a fourth year as a senior fellow in one of the subspecialty areas of paediatric cardiology. From the founding of the Department to the present, we have maintained a fundamental and unwavering commitment to training and education in clinical care and research in basic science and clinical investigation, as well as to the training of outstanding young clinicians and investigators.

Keywords: Cardiovascular diseases; fellowships and scholarships; paediatrics; research

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THE FELLOWSHIP PROGRAM OF THE DEPARTMENT of Cardiology has as its main goal the training of academically oriented leaders in clinical care and laboratory and clinical investigation of cardiovascular disease in the young. In this manuscript, we review the history of the Training Program, the structure of clinical training, and opportunities in meaningful contribution to research.

History of the Training Program

The Cardiology Fellowship Program at Boston Children's Hospital, among the oldest in the country, was founded in 1949 by Dr Alexander S. Nadas.

Only 11 years earlier, a major milestone had been achieved at Children's when Dr Robert E. Gross ligated a patent ductus arteriosus in a young girl, the world's first successful surgery for CHD. Faced with the increasing numbers of patients with CHD who were being drawn to the Hospital as a result of Dr Gross' achievement, Dr Nadas began in earnest to build the rigorous programme in paediatric cardiology that he was to head for 33 years.

Dr Nadas' programme attracted a growing body of fellows, both paediatricians and internists, seeking experience in paediatric cardiology (Fig 1). The learning curve was steep for students and teachers alike. The Training Program was based on the strength of the clinical service and its contributions to the diagnosis, classification, and management of paediatric cardiovascular disease. The knowledge and experience accumulated at that time formed much of the infrastructure of modern paediatric cardiology, culminating in Dr Nadas' first textbook, published in 1957. The Cardiology Program at Children's grew rapidly during the next decade. This period was

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*Cardiology Group
1959 - 1960*

Figure 1.

Department of Cardiology in the 1959–1960 academic year, including luminaries Alexander Nadas, Abraham Rudolph, Jacqueline Noonan, Julien Hoffman, and Jerome Liebman among others.

marked by the return of one of Dr Nadas' first fellows, Dr Donald C. Fyler, who initiated the New England Regional Infant Cardiac Program, the first study of its kind to prospectively document the incidence, natural history, and treatment outcome of structural heart disease. Indeed, with this and other work, the emphasis of the Cardiology Program expanded on its base of outstanding patient care to include substantial clinical and whole-organ physiology research efforts. By the mid-1960s, Children's Hospital had become the largest centre for paediatric cardiology in the United States, with 15 staff physicians and as many fellows, and achieved national recognition for its cardiac research.

In 1972, Dr Gross was succeeded as chief of cardiac surgery by Dr Aldo R. Castaneda, who pioneered neonatal and infant heart surgery for the early correction of CHDs. Successes in the operating room were paralleled by rapidly advancing diagnostic and technical skills in cardiology that permitted earlier and more detailed diagnosis and improved survival. Through the efforts of Dr Castaneda and Dr Nadas, an extraordinarily cooperative working relationship was forged between the Cardiac Surgery and Cardiology Departments at Boston Children's Hospital, a rapport that flourishes even today. Following the retirement of Dr Nadas in 1982, Dr Bernardo Nadal-Ginard was appointed chairman of the Department of Cardiology.

Dr Nadal-Ginard's commitment to a strong basic science research effort in paediatric cardiology resulted in the development of an outstanding research group focussing on the most fundamental problems of cardiovascular biology.

Dr Lock became the third Chairman of Cardiology in 1995 and inspired enormous growth in the Department of Cardiology and the Cardiovascular Program as a whole, with continued commitment to excellence in clinical care, innovation, research, and training. Under his direction, the Department of Cardiology joined with the Department of Cardiac Surgery and Division of Cardiac Anesthesia to form the Boston Children's Heart Center in 2011. Lock's tenure was marked by a commitment to clinical innovation; indeed, he developed and provided the initial descriptions of nearly a dozen new techniques in interventional cardiology, and designed successful device trials for rare diseases. His legendary skills in interventional catheterisation and development of new treatments for children with CHD inspired a generation of young paediatric cardiologists. By 2016, the Cardiology Fellowship Training Program had grown to more than 35 categorical and senior fellows.

The first six and a half decades of cardiology at Children's Hospital have witnessed enormous progress in both clinical and research activities. The Department has remained a fertile training



Figure 2.

World map depicting current locations of Boston Children's Hospital trained pediatric cardiologists.

Table 1. Core Clinical Training Experience (months).

	First 18 months	Second 18 months	Total
Boot camp	1	0	1
Echocardiography	4.5	2	6.5
Cardiac ICU	2	3	5
Catheterisation	3	1	4
Inpatient and night float	3.5	0	3.5
Electrophysiology	1	1.5	2.5
Consults	0.5	1	1.5
Subspecialty clinics and adult congenital	0	2	2
Research and elective	1.5	8.5	10
Vacation	1.5	1.5	3
Total	18.5	20.5	39

ground, having graduated more than 300 fellows. Many have become leaders in paediatric cardiology worldwide (Fig 2). With Dr Geva's appointment as Cardiologist-in-Chief in May, 2016, the Department retains an unwavering commitment to patient care and clinical and basic research in paediatric cardiology. These efforts, and the training of outstanding young academic paediatric cardiologists, are fundamental to the mission of the Department.

Overview of the Training Program (Table 1)

A central tenet of the Department's philosophy is the exposure of trainees to the approaches and techniques

that represent the current state of the art. The Program aims to prepare trainees to work at the forefront of the field. In order to build on the recent dramatic advances in paediatric cardiology, it is fundamental to gain a better understanding of cardiovascular structure and function at the molecular, cellular, and organ system levels with respect to development, morphogenesis, physiology, pathology, and pharmacology. These approaches are expected to have a significant impact on the most pressing issues in paediatric cardiology including the "natural history" of surgically corrected complex cardiac malformations, antenatal diagnosis and therapy of congenital defects, the cellular basis of cardiac development and the cellular response to abnormal physiology, and, ultimately, the effective prevention of both congenital and degenerative cardiovascular disease. With these expectations, the Cardiology Department maintains that thorough training in research will be essential for all paediatric cardiologists who are to assume positions of leadership. It is the goal of this Program to participate in the education of such individuals and to graduate exceptionally trained clinically oriented fellows with particular expertise in focussed areas that match their interests and aptitude.

To meet these goals, the Training Program combines the unique resources of the Cardiovascular Program with the clinical and research opportunities of Boston Children's Hospital, Harvard Medical School, and the Longwood medical community to

give an unparalleled opportunity to explore virtually any area of clinical or basic research. With well-developed divisions of interventional cardiology, cardiac imaging, electrophysiology, preventive cardiology, prospective clinical research, intensive care cardiology, transplant cardiology, and adult CHD, along with the unparalleled resource of the Cardiac Registry, the Program offers trainees a range of approaches within each clinical subspecialty that allows an introduction to the core problems and frontiers of clinical paediatric cardiology. The patient population reflects the Program's long history of leadership in caring for congenital and acquired heart disease in the young, and includes large local, regional, national, and international referral sources. This patient base, combined with a highly evolved interdisciplinary approach among cardiology, cardiac surgery, and cardiac anaesthesia, represents the greatest strength of the Fellowship Training Program. The research opportunities are even more diverse, combining intramural expertise in molecular genetics, cardiac morphogenesis, and cellular adhesion with an exceptionally wide range of laboratory investigation occurring throughout the Boston medical community.

Core fellowship

The core fellowship involves 3 years in training, comprising 24 months of clinical rotations and 12 of elective and research experience. Fellows may reverse the usual sequence and start their training in the laboratory, deferring clinical training for 1 or more years. An increasing proportion of trainees spend 1 or more additional years of training as "senior clinical fellows" in the subspecialty areas of paediatric cardiology. There is a reasonable amount of flexibility in scheduling, and individualised programmes may be possible, particularly for those with previous training in paediatric cardiology. New fellows are assigned a faculty advisor who helps with initial orientation and provides ongoing guidance in the form of performance review, selection of clinical electives, and identification of a research mentor. The Fellowship Training Program in Pediatric Cardiology and Cardiovascular Research at Boston Children's Hospital participates in the Specialties Matching Services of the National Resident Matching Program.

Senior fellowship

The Department offers advanced clinical training in the major subspecialty disciplines of paediatric cardiology. This programme is open to individuals who have completed much or all basic paediatric

cardiology training at other institutions. In general, these trainees are funded by a sponsoring institution or grants, although some departmental resources are available. The period of training varies from 6 months to 2 years, based on individual needs. Senior clinical fellowships are available in cardiac catheterisation, echocardiography, MRI, electrophysiology, cardiac intensive care, adults with CHD, preventive cardiology, and heart failure and transplantation.

Schedule of clinical training

The first 18 months

The first 18 months of training constitute an intensive immersion in clinical cardiology with a focus on caring for a large number of patients in inpatient and outpatient settings and on learning what information is important in making clinical decisions. Fellows rotate through six clinical services and a night float position at approximately monthly intervals; three core rotation fellows are on call in the hospital every night – two to cover the cardiac ICU as his or her sole responsibility and a night float to supervise cardiac medical and surgical patients on the cardiology floor, as well as to respond to urgent consults from other services. At present, fellows work on a night float schedule with 7–10 days of night float coverage for each of 3 cardiac ICU months during the first 18 months of training. Ample back-up support is available from more senior fellows on call and from staff cardiologists covering the subspecialty services within the Department. An attending cardiac intensivist is present in the hospital 24 hours a day to provide support and teaching.

The first year starts with an innovative, month-long, boot camp for all first-year fellows. This programme engages new fellows with hands-on training and skill development. Fellows complete a checklist "passport" of tasks in the areas of cardiac ICU, electrophysiology, exercise physiology, catheterisation, and echocardiography. Tasks vary widely, from using a state-of-the-art vascular access simulator to practise entering a vein before a catheterisation procedure, to obtaining consent for a procedure from a patient's family, to practising emergency situations with a responsive human mannequin simulator followed by a team debriefing. A core group of committed teaching staff oversees the programme and supplement the clinical experiences with lectures that impart fundamental knowledge, including an in-depth cardiac pathology curriculum utilising the resources of the Cardiac Registry. The curriculum is designed to reach all styles of adult learners through a combination of hands on, didactic, and self-directed learning opportunities.

The remainder of the Core Curriculum is an intense immersion in clinical cardiology. The focus is on caring for a large number of patients in inpatient and outpatient settings and on learning how to make complex clinical decisions. By completion, fellows would have completed core rotations in each of the following main subspecialties of paediatric cardiology: imaging, cardiac intensive care, inpatient care, catheterisation, electrophysiology, consultation, outpatient longitudinal care, adult CHD, and heart failure/advanced therapies/transplantation.

The Core Curriculum consists of 13 block rotations/academic year – each block is for 4 weeks – with a total of 39 blocks in the 3-year programme. Of these, 25 are core clinical rotations and 14 are reserved for research/vacation/electives. Fellows typically choose an area of focus to guide their elective rotation selections, similar to a college major, with further exposure to clinical and laboratory rotations that will be most helpful in their chosen future career.

Academic research is a key component of the fellowship, and all fellows complete a hypothesis-driven research project during their training. During the first year, fellows take a longitudinal *Research Methods Course*, which covers all aspects of clinical research, from hypothesis generation to study design to statistical analysis. Our goal is to provide fellows with the tools to become academically successful clinician scientists upon graduation.

Educating fellows in patient safety and quality improvement science is another important goal of the Core Fellowship, and all fellows take a longitudinal course in Quality Improvement Methods during the first year. Following this, fellows are expected to meaningfully participate in ongoing Quality Improvement (QI) projects in the Cardiovascular Program or to design and implement their own QI project.

Fellows rotate through a series of clinical rotations, which are described below.

Cardiac medicine/surgery. The fellow leads a team of three or four paediatric residents in the care of cardiac medical patients on 8 East, the cardiac inpatient floor. The fellow also assists the surgical team, which includes nurse practitioners, in the postoperative care of cardiac patients convalescing on the floor, assuming the role of consulting cardiologist and paediatrician. The fellow runs morning rounds, manages patient care in tandem with attending cardiologists, and teaches the residents on an informal basis during the day. More formal teaching and supervision of patient care are provided by the attending cardiologist assigned each month. Additional daily teaching sessions are conducted by the cardiology faculty.

Cardiac intensive care. A total of two or three core rotation cardiology fellows are scheduled each month to

the cardiac ICU along with advanced training fellows and fellows rotating from the general paediatric ICU and the neonatal ICU. Over the first 18 months of training, each fellow will have 3 clinical months in the cardiac ICU, with additional 2 months in the second 18 months of training. The clinical commitment is <80 hours/week including call. Fellows in the cardiac ICU are responsible for the direct intensive care management of cardiac surgery, cardiac medical, and select patients with cardiac disease undergoing non-cardiac surgery; three attending intensive care faculty members are responsible for providing direct supervision of patient care and teaching during daily rounds. Fellows receive training in cardiac pathophysiology, intensive care management, critical care monitoring and procedures, and mechanical support of the circulation with both extracorporeal membrane oxygenation and ventricular assist devices. Bedside teaching in cardiac intensive care is supplemented by a longitudinal didactic curriculum with weekly lectures.

Electrophysiology. In conjunction with an electrophysiology staff physician, the core rotation fellow functions as a consultant for all inpatients and selected outpatients with arrhythmias. The fellow is responsible for coordinating patient management, helping to plan and execute drug trials, oesophageal electrophysiology studies, cardioversions, and exercise studies, as well as review of all Holter studies. Although more senior fellows in this service are primarily responsible for intracardiac electrophysiology studies, ablations, and intraoperative procedures, the core fellow participates in these procedures as well. A month of electrophysiology occurs during the first 18 months of fellowship, which includes training in exercise physiology; an additional 1 and a half months of rotation occurs during the second 18 months.

Imaging. Core rotation fellows are introduced to cardiac ultrasound through hands-on experience guided by the echocardiography staff, senior fellows, and experienced technologists. In addition, a comprehensive digital library and didactic sessions are provided for the fellows. The fellow is expected to take an active role in the laboratory performing echocardiographic scanning, spending several half-day sessions each week to gain experience in the interpretation of anatomical, Doppler, and ventricular function studies. Of the initial 18 months of training, four are devoted to echocardiography. With each successive rotation, fellows are introduced to advanced applications such as three-dimensional, fetal, and transoesophageal echocardiography. In addition to echocardiography, fellows are introduced to the techniques of cardiac magnetic resonance and cardiac CT.

Catheterisation laboratory. In a week, two to three days are spent performing catheterisations under staff

guidance. Responsibilities of the core rotation fellow include the following: preparation of the case and review of informed consent with the patient's family the day before the procedure, presentation of the case at the morning conference, performance of the catheterisation with a staff physician, and analysis and review of the data at the end of the day. The fellow participates in two or three catheterisations per day. As the rotation progresses, the fellow learns to obtain a complete set of haemodynamic, saturation, and angiographic data in a safe and expedient manner. Training in catheterisation of the newborn infant and interventional procedures begins during the core rotations. There are 4 months of catheterisation during the core clinical rotations.

Night float. A first-year fellow is available in the hospital from 7 p.m. to 7 a.m. to assume patient care responsibilities for the cardiac medical, surgical, and consult services, as well as handling referrals or questions from outside physicians. Extensive clinical back-up is available from a more senior fellow on call, staff cardiologists on service, and the cardiac ICU in-house attending. A staff physician regularly reviews any outstanding patient management issues with the fellow.

Outpatient cardiology clinic. For the first 2 years of the programme, each fellow is assigned to a weekly half-day clinic session at the Longwood site. This is a group clinic model, with shared patients supervised by a panel of attending cardiologists. Fellows evaluate and plan the care of patients referred to the clinic for outpatient evaluation, and also provide long-term continuity care for patients with more serious lesions whose care they have assumed while on their various clinical rotations.

The second 18 months

Midway through the second year of training, fellows have been exposed to each of the main subspecialties of paediatric cardiology and generally have a good sense of how cardiology is practised at a single institution. The goal of the next 18 months is to build on the technical and cognitive skills to allow increasing independence, expand the fellows' knowledge to allow a broader understanding of the controversies and challenges of the field, and most importantly to identify a specific initial career path that allows for the focussing of research and clinical energies. To this end, this period is flexible in combining clinical requirements and protected time for research and study.

During cardiac ICU rotations, fellows take in-house call. The remainder of the time the fellows share "back-up" call from home on nights and weekends, acting as a resource for the core rotation fellows in the hospital. The primary responsibility of

this fellow is to perform night and weekend echocardiograms under supervision of the appropriate staff cardiologist. The catheterisation senior fellows or general fellows interested in invasive cardiology are always on call for the catheterisation laboratory.

Scheduling of clinical responsibilities is generally decided by the fellows themselves. There is always a second- or third-year fellow, or a senior clinical fellow with comparable experience, assigned to the cardiac catheterisation laboratory and the cardiac ICU. In the cardiac catheterisation laboratory, the fellows take increasing responsibility for organising the daily laboratory schedule with a goal of performing haemodynamic cases independently and becoming more involved in interventional procedures.

There is always an experienced fellow on the consult service, providing cardiology consultation to Boston Children's Hospital patients and infants at the affiliated neonatal units at Brigham and Women's Hospital and the Beth Israel/Deaconess Medical Center. This fellow sees all new referrals and provides continuing cardiology coverage on the floors and outpatient clinics as appropriate. Rounds are conducted with the supervision of a staff cardiologist.

During the second 18 months of training, there are opportunities for advanced rotations in cardiac imaging, electrophysiology, cardiac transplant medicine, intensive care medicine, adult CHD, heart failure/advanced therapies/transplantation, and pathology. During these rotations, the fellows assume broader responsibilities based on their interests and abilities.

Research training

The Department maintains that experience in cardiovascular research is an essential component of fellowship training in cardiology. In addition to their patient care responsibilities, fellows are expected to become involved in a clinical research project during the core rotations, under the guidance of the faculty. Such projects, either new or ongoing, are often of the chart review type, and may form the basis for a future prospective study for those fellows interested in clinical research. Fellows should identify a clinical or basic science research mentor from among the faculty by the end of the first year. Each fellow has a Scholarship Oversight Committee that assists the fellow in identifying projects, resources, and monitors progress throughout fellowship training.

Approximately half of the second 18 months of fellowship is dedicated to ongoing research training. It is expected that each fellow will, with appropriate guidance, write and submit a proposal for a research project that addresses an important question, applies available state-of-the-art techniques to answering that question, and is practical within the time and

other constraints of the fellowship. The project may be either basic science or clinical.

Fellowship training in the Department beyond the third year is predicated on the identification of a suitable mentor and appropriate research project(s). The Department has an institutional National Institutes of Health training grant (T32), which supports eight trainees per year. The T32 grant permits selected fellows to train in basic research laboratories throughout the Harvard Medical Area, as well as in clinical research. Fellows are also encouraged to write individual grant applications, but fellowship funding is not dependent upon such grants being funded. Fellows interested in higher-level training in clinical research may be considered for participation in the Program in Clinical Effectiveness at the Harvard School of Public Health or the Scholars in Clinical Science Program at Harvard Medical School.

The Training Program emphasises the importance of *quality* of research. Wherever possible, fellows are encouraged to publish research results as a definitive manuscript in a first-rate journal, rather than as multiple smaller reports – that is, trainees are taught to avoid “the least publishable unit”. The Program values basic laboratory research, clinical research, and translational research. The training paths for each of these tracks are summarised below.

Basic laboratory research. After selecting a preceptor and project, each trainee performs a literature search of the field and meets with the preceptor to discuss the material. Less experienced trainees start on projects for which the preceptor has already determined a reasonable likelihood of early success, so that the trainee has positive reinforcement. In addition, projects are chosen to provide wide experience with the basic techniques of a discipline, as well as avenues that may allow the trainee to develop an independent area of expertise. As trainees become increasingly competent, they undertake more demanding projects. As our primary goal is to teach trainees to ask and answer important research questions, trainees frequently present their work at lab meetings. In addition, advanced trainees present their work annually to all faculty and trainees at Cardiovascular Program Work-in-Progress meetings. To achieve broad exposure to major concepts in molecular cardiology, trainees may take specific courses that emphasise the biology as well as clinical aspects of cardiovascular disease. In addition to the Core Curriculum, trainees also attend seminars and lectures within the Department, within the hospital, and at neighbouring centres and universities.

Clinical research. Trainees pursuing clinical research projects require in-depth training in study design, pharmacokinetics, biostatistics and epidemiology, and clinical trials. In addition, some clinical research trainees

pursue further education in bioengineering, whereas others focus on health services research and clinical effectiveness methodologies. Clinical research trainees meet frequently with their mentors to review their progress and present their work in progress at seminars at which the trainee can receive suggestions from a group of experienced clinical researchers. Thus, clinical research fellows have an experience similar to that of laboratory meetings that occur with basic research groups. For didactic research training, all fellows take a mandatory departmental two-semester clinical research methods course. In addition, many trainees participate in extramural course work – for example, Harvard’s Catalyst, funded by its Clinical and Translational Science Award (<http://catalyst.harvard.edu/>), offers a broad array of clinical and translational research courses. For those fellows who contemplate a career involving extramural funding, the Program in Clinical Effectiveness at the Harvard School of Public Health provides quantitative and analytic skills needed for clinical research (<http://www.hsph.harvard.edu/clinical-effectiveness/>). The Biomedical Informatics Research Training Program (<http://catalyst.harvard.edu/programs/informatics/>) provides a 2-year postdoctoral MMSc in Biomedical Informatics at Harvard Medical School for those seeking to strengthen their skills in informatics through research and didactic training

Translational research. We have increasingly encouraged trainees to participate in translational research, linked in part to the development of a translational research programme at Boston Children’s Hospital under the leadership of Dr David Williams, and to course offerings of the Harvard’s Clinical and Translational Science Award Program. This enhanced focus on translational research has yielded important opportunities for the Department of Cardiology faculty and trainees. Furthermore, the hospital-wide “Translational Investigator Service” identifies and supports the development of faculty scientists who will become national and international leaders in the translational research paradigm. The goals of this highly successful programme are to facilitate the rapid translation of discovery sciences into human trials, facilitate the utilisation of human patient resources for the purpose of advancing scientific discovery, and position Boston Children’s Hospital for successful competition for funding from National Institutes of Health, industry, and philanthropic sources.

Evaluation and feedback

Formative or Feedback Evaluations are designed primarily to assist fellows in achieving educational and professional development goals and must be provided, in writing, within 2 weeks of the completion of each scheduled rotation. These evaluations

will be given to the Program Director and are intended to serve as the primary basis for the summative evaluations.

A summative evaluation of each fellow's professional growth, progress, and competence, including knowledge, skills, and performance, will be conducted at the end of each 6 months of training. This evaluation will be in writing, and will be provided to and discussed with the fellow. The fellow must sign the evaluation, which will be placed in the fellow's file.

A written final evaluation is completed for each fellow who completes the Program. This evaluation includes a review of the fellow's performance during the final period of training and verifies that the fellow has demonstrated sufficient professional ability to practise medicine competently and independently. This final evaluation is part of the fellow's permanent record that is maintained by the department.

Faculty members evaluate the performance of each fellow for each rotation on the basis of competence, using evaluations that have been developed to assess the various sub-competencies of that rotation and carefully mapped to inform the assessment of paediatric subspecialty Milestones. For clinical rotation, components of the evaluation include gathering data by history, gathering data by physical evaluation, technical skills, assessing data and arriving at a diagnosis, managing problems and monitoring health, interpersonal relationships with patients and families, interpersonal relationships with other members of the health team, and work habits and competence.

In addition, clinical trainees appointed to Cardiology are provided an opportunity to submit written, confidential evaluations of the programme, including evaluation of the faculty and all aspects of the curriculum. Within 2 weeks after completion of each required rotation, each fellow has the opportunity to submit written confidential evaluations of the faculty and the educational effectiveness of the rotation. The fellows also meet at least once every quarter to evaluate faculty. In addition, an Annual Evaluation of the faculty and of the educational effectiveness of the programme is completed by the fellows in writing and in a confidential manner.

The Department of Cardiology at Boston Children's Hospital uses a confidential web-based evaluation system to evaluate its faculty, fellows, and programmes.

Summary

The first six and a half decades of cardiology at Boston Children's Hospital have witnessed the creation of an outstanding and highly productive clinical and research training environment. The department holds a fundamental and unwavering commitment to outstanding clinical care, as well as clinical, translational, and basic investigation, and to the training of outstanding young clinical cardiologist and investigators.

Acknowledgement

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