



Early Mentoring of Medical Students and Junior Doctors on a Path to Academic Cardiothoracic Surgery

Tyson A. Fricke, MBBS, BMedSci, Melissa G. Y. Lee, MBBS, BMedSci, Johann Brink, MD, Yves d'Udekem, MD, PhD, Christian P. Brizard, MD, and Igor E. Konstantinov, MD, PhD

Department of Cardiothoracic Surgery, The Royal Children's Hospital, Melbourne; University of Melbourne, Melbourne; and Murdoch Children's Research Institute, Melbourne, Australia

Background. In 2005 the Department of Cardiothoracic Surgery at The Royal Children's Hospital started an early academic mentoring program for medical students and junior doctors with the aim of fostering an interest in academic surgery.

Methods. Between 2005 and 2015, 37 medical students and junior doctors participated in research in the Department of Cardiothoracic Surgery at The Royal Children's Hospital. Each was given an initial project on which to obtain ethics approval, perform a literature review, data collection, statistical analysis, and prepare a manuscript for publication. A search of the names of these former students and doctors was conducted on PubMed to identify publications.

Results. A total of 113 journal articles were published in peer-reviewed journals with an average impact factor of 4.1 (range, 1.1 to 19.9). Thirty (30 of 37, 81%) published at

least one article. A mean of 4.3 journal articles was published per student or junior doctor (range, 0 to 29). Eleven (11 of 37, 30%) received scholarships for their research. Nine (9 of 37, 24%) have completed or are enrolled in higher research degrees with a cardiothoracic surgery focus. Of these 9, 2 have completed doctoral degrees while in cardiothoracic surgery training. Five will complete their cardiothoracic surgery training with a doctoral degree and the other 2 are pursuing training in cardiology.

Conclusions. A successful early academic mentoring program in a busy cardiothoracic surgery unit is feasible. Mentoring of motivated individuals in academic surgery benefits not only their medical career, but also helps maintain high academic output of the unit.

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Fostering an academic interest in young doctors undergoing cardiothoracic training has long been seen as an important part of the cardiothoracic specialty. With overall interest and numbers of cardiothoracic training program applicants declining, especially in the United States [1–5], involving medical students and junior doctors through the medium of research may help to identify and support excellent candidates [6]. In addition, as modern surgery evolves, it becomes even more relevant to develop research skills to interpret evidence around new technology and innovation. Most importantly, developing surgeons capable of sustained high-quality academic excellence is vital to ensure the bright future of our specialty. With this in mind, surgeons at the Department of Cardiothoracic Surgery at The Royal Children's Hospital in Melbourne, Australia, started an early academic mentoring program for medical students and junior doctors with the aim of fostering an interest in academic surgery.

Material and Methods

Between 2005 and 2015, 37 medical students and junior doctors participated in a structured research program (Fig 1) of the Department of Cardiothoracic Surgery at The Royal Children's Hospital. In Australia, the pathway to become a cardiothoracic surgeon typically involves 6 to 7 years of study in university to obtain a medical degree, followed by 1 year of internship. After 1 to 3 years after graduation from medical school, one typically applies to the Royal Australasian College of Surgeons (RACS) for specialist training in cardiothoracic surgery. Therefore, most trainees are in their late twenties by the time they start specialist training. The length of the RACS cardiothoracic surgery training program is 6 years (Fig 2A).

The medical students of the University of Melbourne came for full-time research placement for 1 year from the advanced medical science program. From 2014, the program was transformed into the scholarly selective program of 6 months of full-time research preceded by 6 months of part-time research (Fig 2B). Seventeen students (46%, 17 of

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Address correspondence to Dr Konstantinov, The Royal Children's Hospital, Flemington Rd, Parkville, VIC 3052, Australia; email: igor.konstantinov@rch.org.au.

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Fig 1. Algorithm for academic cardiothoracic surgeon pathway. (PhD = doctor of philosophy.)

37) were female, and 32 (32 of 37, 86%) began as medical students completing research terms as part of their medical degree. After completion of either program, the student was further selected by surgeons for doctoral candidature (Fig 2B), mentored beyond graduation from medical school, and prepared for entry into cardiothoracic surgery training. Junior doctors were those who graduated from medical school, but had not yet obtained specialist qualifications.

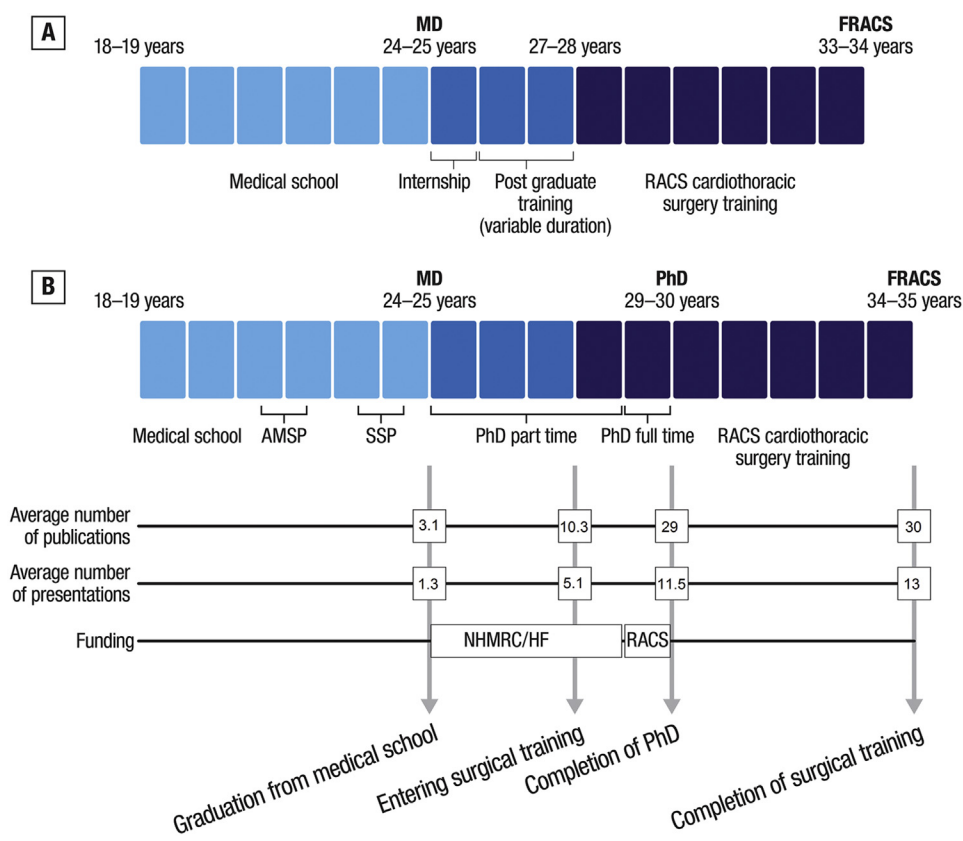
Each medical student or junior doctor was given an initial project on which to obtain ethics approval, perform a literature review, data collection, statistical analysis, and prepare a manuscript for publication. These projects were retrospective outcomes-based reviews of patients with a particular congenital heart disease. Students were posted full time to the unit with opportunity for dedicated daily meetings with surgical supervisors and clinical observation in and outside the operating theater. Medical students also received a weekly 1 hour of formal teaching by a consultant cardiothoracic surgeon on the entire curriculum of congenital cardiothoracic surgery. Junior doctors in the research program were working full time and typically met with surgical supervisors on a weekly basis. At these meetings with supervisors, the participants were educated in the collection of data, creation of a database, and statistical analysis. In addition to support from their supervisor, participants also had access to support from statisticians through the Clinical Epidemiology and Biostatistics Unit of the Murdoch Children's Research Institute. A search of the names of these former students and doctors was conducted on PubMed to identify publications.

Results

Journal Publications

A total of 113 journal articles were published in peer-reviewed journals with an average impact factor of 4.1

Fig 2. (A) Pathway of cardiothoracic surgical training in Australia. (B) Pathway of academic cardiothoracic surgical training in Australia with a doctoral component developed at The Royal Children's Hospital. (AMSP = Advanced Medical Science Program; FRACS = Fellow of Royal Australasian College of Surgeons; HF = Heart Foundation of Australia; MD = medical doctor; NHMRC = National Health and Medical Research Council; PhD = doctor of philosophy; RACS = Royal Australasian College of Surgeons; SSP = Scholarly Selective Program.)



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