

The Paediatric Cardiology Hall of Fame

Donald Charles Fyler: 1924–2011

Jane W. Newburger,¹ Jennifer Fyler,² Steven D. Colan¹

¹*Department of Cardiology, Children's Hospital Boston, and the Department of Pediatrics, Harvard Medical School, Boston, Massachusetts;* ²*The Uniformed Services Program, Brattleboro Retreat, Brattleboro, Vermont, United States of America*

Abstract We are honoured to provide a tribute to Dr Donald Fyler in *Cardiology in the Young* on the occasion of his induction into the Paediatric Cardiology Hall of Fame. Among his extraordinary contributions to paediatric cardiovascular disease, he described the epidemiology of congenital heart disease; created the framework for regionalised data collection, collaboration, and care in New England; and designed a standardised system of codes for congenital heart disease in wide use today.

Keywords: Donald Charles Fyler; history of medicine; paediatric cardiology

Received: 27 May 2011; Accepted: 12 June 2011

DONALD CHARLES FYLER, SR WAS BORN IN 1924 in Newington, Connecticut. The son of Ethel Adelaide Plank and Oliver Fyler, he grew up in a rural area, the Connecticut River Valley (Fig 1). Many of the men in Don's family were carpenters, including his father. Don's mother was the first in his family to complete high school, and she became a teacher in the community's one-room schoolhouse. The land of his great-grandparents' farm was divided up among the next generation, so aunts and uncles lived nearby. His extended family members were farmers, and Don spoke of his childhood with warmth. There were gatherings around the piano and the family sang together in the evenings. Don always attributed the strength in his hands to his long experience in milking.

After graduating from high school, Don was an Arthur Miller dance instructor for a while. His mother encouraged him to further his education, and he attended the University of Maryland for

2 years before leaving school to find work as a welder building warships in Bath, Maine, during World War II. While working in the shipyard, he slipped and nearly fell from a great height, rousing him to leave this work and join the Navy (Fig 2).

Education and training

The United States Navy sent Don to Princeton University to complete college. There, he was told that, as there was a space for him in the pre-med dorm, he would be a doctor. He frequently spoke of his great good fortune in becoming a doctor, and felt it came to him entirely by chance. He attended Princeton through the auspices of the United States Navy, and thus he was not awarded a degree. Strictly speaking, he never graduated from college, but the Navy sent him to Harvard Medical School. Partway through his training there, the war ended, and the military abruptly stopped paying for his education. Don and his buddies, Willie Kiyasu and Peter Peterson, who were also attending Harvard Medical School through the military, moved out of Vanderbilt Hall to Children's Hospital Boston, where they supported themselves by drawing blood and completing lab tests overnight, each of

Correspondence to: Dr J. W. Newburger, MD, MPH, Commonwealth Professor of Pediatrics, Harvard Medical School, Associate Cardiologist-in-Chief for Academic Affairs, Department of Cardiology, Children's Hospital Boston, 300 Longwood Avenue, Boston, Massachusetts 02115, United States of America. Tel: +1 617 355 5427; Fax: +1 617 739 3784; E-mail: jane.newburger@cardio.chboston.org



Figure 1.
Don Fyler and his brother Richard.



Figure 2.
Don Fyler in the Navy.

them working one night of three. He often credited this experience with fostering his growth as a clinician.

Family

Don performed his medical internship at Bellevue Hospital in New York City. There, he was the first doctor to work on ambulances (Fig 3) and was appreciated publicly for his work. On one occasion, he saw a young nurse, Carol Walcutt, working hard to keep an elderly man clothed and in his bed, and he appreciated her feistiness. He stood in the doorway of the room and laughed, initially infuriating her. He then asked Carol on a date, and because he was renowned from his ambulance work, they were served



Figure 3.
Don Fyler was the first doctor in New York City to work in ambulances.



Figure 4.
Don and Carol in older age.

free drinks in all the bars. Don and Carol later married and had five children: Kristen, Deborah, Don Jr, Jennifer, and Silas (Fig 4). Don was a wonderful and warm parent, fostering love of camping and fishing. He was a great practical joker. When climbing a mountain, he instructed his small children that it was their duty to carry heavy rocks up the mountain to counter erosion. Later, he acknowledged that this was because he had trouble keeping up with them and wanted to tire them out! He sang, played the piano, accordion, and ukulele, and fostered a love of music in his children. He enjoyed sailing. He became interested in genealogy and articulated the ancestry of his family, some of the original settlers of Windsor, Connecticut. He often impressed his grandchildren with colourful stories of his family



Figure 5.
Don Fyler as a young physician.

history. He loved to cook and eat excellent food, and he approached life as a great adventure.

Return to Boston Children's Hospital

Don continued his earlier relationship with Children's Hospital Boston when he returned there in 1950 to take the position of Assistant Resident in Pediatrics (Fig 5). After active duty in the Navy, he embarked on his career in paediatric cardiology, formally training in rheumatic fever with Dr Benedict Massell at the House of the Good Samaritan during the first year, and then training in general paediatric cardiology with Dr Alexander Nadas. After completing his fellowship in 1957, he left for Children's Hospital Los Angeles, where he spent 10 years and directed the Division of Cardiology (Fig 6). In 1967, at the urging of Drs. Nadas and Gross, he returned to Boston, rising to Associate Chief of Cardiology in 1970 and then to Professor of Pediatrics at Harvard Medical School in 1981.

New England Regional Infant Cardiac Program

Don's contributions to our field were remarkable. In 1968, he founded the New England Regional Infant Cardiac Program in an effort to improve the recognition and management of all infants with congenital heart disease in New England.¹ Federal funding for his programme paid for a regional



Figure 6.
Don Fyler as Director of the Division of Pediatric Cardiology at Children's Hospital of Los Angeles.

educational programme, as well as for the transportation and hospitalisation of infants with critical congenital heart disease. All 10 centres in New England that accepted referrals of infants with congenital heart disease were participants. Don was particularly suited to lead this pioneering consortium because of his personal attributes of intellectual zeal, personal integrity, and leadership. Indeed, in October, 1982, Don was subjected to a hearing in Federal Court for his refusal to respond to a subpoena demanding that a wide variety of New England Regional Infant Cardiac Program records be produced. He averred that general results from the New England Regional Infant Cardiac Program were already published and that release of data identifying hospitals or individual patients would not be allowed. He was victorious. The landmark programme helped in defining the incidence of severe congenital heart disease, possible aetiologic factors, 5-year mortality, and physical and emotional assessment of survivors. During its 10-year tenure, the activities of the New England Regional Cardiac Program served as a model of regional care and cooperation for other regions in the United States of America. Its findings have been cited by over 500 subsequent publications. Moreover, the trust established by Don Fyler among members of the paediatric cardiology community in New England continues today in the New England Congenital Cardiology Association, whose purpose is to improve care in paediatric and congenital heart disease through

quality improvement, research, advocacy, communication, and education.

Research computing

Don founded and developed Cardiology Research Computing at Boston Children's Hospital, an extraordinary asset for data collection and reporting. In 1969, a Programmed Data Processor-9 computer and a digitising table were purchased for the purpose of calculating ventricular volumes from biplane angiograms. This was a bulky, awkward, frontier apparatus that nevertheless worked well. It was soon realised that this computer could also be used for tabulation of data being collected by the New England Regional Infant Cardiac Program. Over the next few years, various agencies requested permission to use this equipment to the point that all available time, nights and weekends, was scheduled. This prompted the purchase of a Programmed Data Processor-15 computer. This too was soon being used to the maximum. After consultation with the Sloan School at Massachusetts Institute of Technology, a Prime computer with greater capacity was purchased. It was the first commercially available multi-user, mini-computer and could accommodate up to 100 users simultaneously. A cardiology computing unit with space for three programmers was established, and funds for these purchases were accumulated from charges collected by users. Because no attempt was made to make a profit, the charges were minimal and the demand was great. Later, the cardiology computing equipment was moved from a sub-basement to the hospital computing unit, and the desktop terminals were available soon thereafter to provide access to the databases. Cardiology Research Computing maintained the codes describing diagnoses and surgical procedures of patients (see below). The Prime computer remained an integral part of the cardiology data repository until the department-wide implementation of a microcomputer-based network allowed it to be shut down, just in time to avoid the approaching millennium and the widespread concerns about an impending Y2K computing meltdown!

Fyler codes

Don also was one of the first, if not the first, to develop the concept of using a standardised naming convention based on a systematic, hierarchical classification of congenital heart disease, now called the "Fyler codes". In contrast to the dominant practice at most centres of restricting code use to administrative and research databases, patient classification based on Fyler codes was implemented



Figure 7.
Don Fyler demonstrating an early cathode ray oscilloscope.

at the point of clinical care. By placing the Fyler classification description prominently on the clinical reports, the clinicians used the codes for purposes of clinical communication rather than purely for purposes of data retrieval. As a consequence of the integration of coding into the reporting process, the clinicians became invested in the accuracy of the coding process, dramatically improving the accuracy of code capture. The Fyler codes have been systematically expanded over the years – greater than 3000 and counting! – to accommodate increasing levels of details, newly recognised diseases, and the continuing introduction of new interventions and surgical procedures.

Cardiac catheterisation

In 1967, Don assumed leadership of the cardiac catheterization laboratory at Boston Children's Hospital, replacing Paul Hugenholtz, who had assumed a position as Professor of Cardiology in Rotterdam. In 1968, the cardiology division was declared a department, permitting reinvestment of the fruits of its labour into projects directly beneficial to cardiology (Fig 7). By 1980, three new laboratories had been constructed: an infant lab, an older child lab, and a room for special angiograms. By 1970, approximately 500 angiograms were performed annually, increasing to 800 per year by 1980, and 1000 per year in 1990, when Dr Fyler retired. In his capacity as a director of the cardiac catheterization laboratory, Don trained a generation of paediatric cardiologists in the science



Figure 8.

*Don Fyler and Alexander Nadas at the signing of their textbook in 1992 in the Countway Library of Medicine. (Previously published in the Hall of Fame article on Dr Alexander Nadas, Newburger JW and Fyler DC, *Cardiology in the Young*, 2004; 14: 75–82).*

and art of invasive cardiology, including his successor John Finbarr (Barry) Keane.

Scholarly contributions

Among his many contributions, Don described ventricular septal defects in a manuscript that became a classic in the field.² A series of subsequent papers also became standard references, and included studies on the natural history of tricuspid atresia,³ transposition of the great vessels,^{4,5} Ebstein's malformation,⁶ aspects of cardiac catheterisation,⁷ and the clinical profiles and prognosis of infants with critical cardiac disease.⁸ From the database of the New England Regional Cardiac Program, he described the epidemiology of congenital heart disease,^{1,9–12} extracardiac anomalies in infants with congenital heart disease,¹³ results of pulmonary artery banding,¹⁴ assessment of cognitive function at 5 years of age,¹⁵ and effects of congenital heart disease on marital stability.¹⁶ He wrote many chapters, and, together with Dr Alexander Nadas, a classic textbook aimed at residents and fellows (Fig 8).¹⁷ He found opportunities to teach and work in other countries, including Grenada and Russia, long before “global health” became a popular field.

Finale

Carol died in late 2009, a few days before their 60th wedding anniversary. Don never really recovered from her loss and died just over a year later, at the age of 86 years, after a long illness. They left five children, two sons-in-law, two daughters-in-law, eight grandchildren, and one great-grandchild.

Don was a natural optimist; his glass was always half full. He was never heard complaining and considered himself a lucky man, even when old age took its toll on his health. Always choosing the high road, he valued the simple pleasures in life rather than material possessions. Don's buoyancy and warmth, decency, generosity, humility, and love of life serve as a model for all who were privileged to be his trainees and colleagues.

References

1. Fyler DC. Report of the New England Regional Infant Cardiac Program. *Pediatrics* 1980; 65: S375–S461.
2. Fyler DC, Rudolph AM, Wittenborg MH, Nadas AS. Ventricular septal defect in infants and children; a correlation of clinical, physiologic, and autopsy data. *Circulation* 1958; 18: 833–851.
3. Dick M, Fyler DC, Nadas AS. Tricuspid atresia: clinical course in 101 patients. *Am J Cardiol* 1975; 36: 327–337.
4. Gallaher ME, Fyler DC, Lindesmith GG. Transposition with intact ventricular septum. Its diagnosis and management in the small infant. *Am J Dis Child* 1966; 111: 248–255.
5. Marx GR, Hougen TJ, Norwood WI, Fyler DC, Castaneda AR, Nadas AS. Transposition of the great arteries with intact ventricular septum: results of mustard and senning operations in 123 consecutive patients. *J Am Coll Cardiol* 1983; 1: 476–483.
6. Kumar AE, Fyler DC, Miettinen OS, Nadas AS. Ebstein's anomaly. Clinical profile and natural history. *Am J Cardiol* 1971; 28: 84–95.
7. Cohn HE, Freed MD, Hellenbrand WF, Fyler DC. Complications and mortality associated with cardiac catheterization in infants under one year: a prospective study. *Pediatr Cardiol* 1985; 6: 123–131.
8. Fyler DC. Long term prognosis of the surgical treatment of congenital heart disease. *Trans Assoc Life Insur Med Dir Am* 1982; 65: 101–118.
9. Fyler DC, Rothman KJ, Buckley LP, Cohn HE, Hellenbrand WE, Castaneda A. The determinants of five year survival of infants with critical congenital heart disease. *Cardiovasc Clin* 1981; 11: 393–405.
10. Rothman KJ, Fyler DC, Goldblatt A, Kreidberg MB. Exogenous hormones and other drug exposures of children with congenital heart disease. *Am J Epidemiol* 1979; 109: 433–439.
11. Rothman KJ, Fyler DC. Association of congenital heart defects with season and population density. *Teratology* 1976; 13: 29–34.
12. Rothman KJ, Fyler DC. Sex, birth order, and maternal age characteristics of infants with congenital heart defects. *Am J Epidemiol* 1976; 104: 527–534.
13. Greenwood RD, Rosenthal A, Parisi L, Fyler DC, Nadas AS. Extracardiac abnormalities in infants with congenital heart disease. *Pediatrics* 1975; 55: 485–492.
14. Dooley KJ, Parisi-Buckley L, Fyler DC, Nadas AS. Results of pulmonary arterial banding in infancy. Survey of 5 years' experience in the New England Regional Infant Cardiac Program. *Am J Cardiol* 1975; 36: 484–488.
15. Newburger JW, Silbert AR, Buckley LP, Fyler DC. Cognitive function and age at repair of transposition of the great arteries in children. *N Engl J Med* 1984; 310: 1495–1499.
16. Silbert AR, Newburger JW, Fyler DC. Marital stability and congenital heart disease. *Pediatrics* 1982; 69: 747–750.
17. Keane JF, Lock JE, Fyler DC. (eds.). *Nadas' Pediatric Cardiology*, 2nd edn. Saunders Elsevier, Philadelphia, PA, 2006.