07-26-14

STATE OF TENNESSEE
DEPARTMENT OF HEALTH

IN THE MATTER OF:	)	**BEFORE THE TENNESSEE BOARD OF MEDICAL EXAMINERS**
MATTHEW ROBERT DANTER, M.D.	)	**DOCKET NO.: 17.18-127074A**
PETITIONER	)	
BRENTWOOD, TN	)	
PETITION FOR DECLARATORY ORDER	)	

NOTICE OF HEARING

Comes now the Department of Health, Division of Health Related Boards, by and through counsel and gives notice that a Petition for Declaratory Order filed on behalf of Matthew Robert Danter, M.D. (and attached hereto as Exhibit A) shall be heard on September 17, 2014, at 10:00 a.m. or as soon thereafter as the Board may take this matter up. This case shall determine whether Dr. Danter ("Petitioner") qualifies for the issuance of his Tennessee medical license.

By agreement of Petitioner, the costs of this cause shall be taxed to the Petitioner.

PREPARED BY:

Andrea Huddleston, BPR # 016155
Office of General Counsel
Chief Deputy General Counsel
665 Mainstream Drive
Nashville, Tennessee 37243
(615) 741-1611

7-29-14
DATE

2014 JUL 29 PM 3:29
SECRETARY OF STATE

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true and correct copy of this document has been served upon Matthew Robert Danter, M.D. by and through his attorney by delivering same in the United States certified mail number 7014 1200 0001 0707 9548 and United States first class mail with sufficient postage thereon to reach its destination.

J. Blake Carter, Esq.
Gideon Cooper and Essary, PLLC
315 Deaderick Street, Suite 1100
Nashville, TN 37238

This 22nd day of July, 2014.

Andrea Huddleston
Chief Deputy General Counsel

GIDEON, COOPER & ESSARY

A PROFESSIONAL LIMITED LIABILITY COMPANY

315 DEADERICK STREET, SUITE 1100

NASHVILLE, TENNESSEE 37238

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MARK A. HAMMERVOLD [1]
MATT H. CLINE
SPENCER C. THOMAS [6]

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[3] LICENSED IN TN & GA
[4] LICENSED IN TN & KY
[5] LICENSED IN TN & WI
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July 14, 2014

RECEIVED
JUL 16 2014
By

VIA FEDERAL EXPRESS
Tennessee Board of Medical Examiners
665 Mainstream Drive, 2nd Floor
Nashville, TN 37243

Re: Robert Matthew Danter, M.D.

To whom it may concern:

Enclosed please find Matthew Robert Danter, M.D.'s Petition for Declaratory Order. If at all possible, we ask that this item be placed on the July 22, 2014 agenda. Dr. Danter has the opportunity to fill a true community need at Vanderbilt. Expediting this petition will permit this need to be met as soon as possible.

If you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

J. Blake Carter

JBC/lad

Enclosure

cc: Andrea Huddleston (via e-mail w/ enclosure)
Julia Morris (via e-mail w/ enclosure)
Matthew Robert Danter, M.D. (via e-mail w / enclosure)
Joan Lorber (via e-mail w/ enclosure)

EXHIBIT
A
tabbies

MATTHEW ROBERT DANTER, M.D.'S PETITION FOR DECLARATORY ORDER

1. **Petitioner's Name:** Matthew Robert Danter, M.D.
   Address: 9753 Jupiter Forest Drive, Brentwood, TN 37027
   Telephone Number: 289-776-7109

2. **Petitioner Attorney's Name:** Dixie Cooper and J. Blake Carter, Esq.
   Gideon Cooper and Essary, PLLC
   Address: 315 Deaderick Street, Suite 1100, Nashville, TN 37238
   Phone Number: 615-254-0400

3. **Organization, if any that Petitioner Represents:** Not applicable
   Organization Name: Not applicable
   Address: Not applicable
   Telephone Number: Not applicable

4. **Provide a statement of the facts which led to the filing of this petition. Include all facts you believe necessary for the agency to make a decision in this matter.**

PROFESSIONAL BACKGROUND[1]

Matthew Robert Danter, M.D. attended the Schulich School of Medicine and Dentistry at the University of Western Ontario in London, Ontario, Canada from 1999 to 2003,[2] during which time he obtained a Doctor of Medicine degree.[3] From 2003 to 2010, Dr. Danter completed his Cardiac Surgical Residency Training at the Mazankowski Alberta Heart Institute at the University of Alberta, Edmonton, Alberta, Canada.[4] During residency training, Dr. Danter was awarded the University of Alberta, Division of Cardiac Surgery Book Prize, which is awarded to the Resident with the

[1] Dr. Danter's Curriculum Vitae is attached as Exhibit A.
[2] The Schulich School of Medicine and Dentistry at the University of Western Ontario is accredited by the Liaison Committee on Medical Education (LCME). http://www.lcme.org/directory.htm.
[3] Ex. B.
[4] Ex. C; *See also* Ex. N, Letter of Simon Maltais, M.D., PhD, p. 2, noting that the University of Alberta is western Canada's largest cardiac transplant center.

highest marks on the in-training exam. In 2010, Dr. Danter scored in the 99th percentile of all residents who wrote for the exam, and was in the 100th percentile among those residents in their sixth year. Dr. Danter's supervisor during his residency at the University of Alberta Hospital, Dr. Roderick MacArthur, describes Dr. Danter as reliable and extremely hardworking.[5]

Simultaneously with his Cardiac Surgical Residency Training, Dr. Danter became a Master of Science Candidate in Clinical Epidemiology at the School of Public Health at the at the University of Alberta. While currently on hold because of his move to Nashville, he proposed dual thesis projects, including a comparison of the quality of life of high risk versus low risk patients undergoing coronary artery bypass grafting.

After completing his residency, Dr. Danter began a Clinical Cardiac Surgical Fellowship at the University of British Columbia in the Division of Cardiac Surgery at St. Paul's Hospital in Vancouver, British Columbia, Canada.[6] From 2010 to 2011, the focus of Dr. Danter's fellowship was General Adult Cardiac Surgery; Complex Lead Management; and Laser Lead Extraction. From 2011 to 2012, his major clinical focus was Cardiac Transplantation; Left Ventricular Assist Device ("VAD") management; and Transcatheter Valve Implantation. He completed the fellowship in 2012. In all, Dr. Danter has completed over 1,000 cardiac surgery cases during his educational training.

Dr. Danter passed the Licensure of the Medical Council of Canada, Part I in 2003, and the Licensure of the Medical Council of Canada, Part II in 2005. In 2010, Dr. Danter successfully completed his Royal College certification exam in Cardiac Surgery and obtained the Full Practice Licensure exam in Cardiac Surgery by the College of

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[5] Ex. J.

[6] Ex. D; *See also* Ex. N, Letter of Senator Frist, confirming that St. Paul's Hospital is a pioneer in complex lead management, and is the western North American training center for this technology.

Physician and Surgeons (RCPS) of British Columbia in 2010. He has been a fellow of the RCPS of Canada in Cardiac Surgery since May 2011[7] and he obtained a Certificate in Cardiac Surgery from the RCPS of Canada in June 2010.[8] Dr. Danter received a full practice license in Cardiac Surgery from the College of Physicians Surgeons of Ontario in June 2012.[9] On July 1, 2014, Dr. Danter received a medical license from the state of New Mexico.[10] He is a member of the Ontario Medical Association, the Canadian Medical Association, the British Columbia Medical Association, and is a Member at Large in the Professional Association of Residents of Alberta, where he was an Executive Board Member. Over thirty (30) states currently recognize Canadian training as equivalent to that in the United States.[11]

After completing thirteen (13) years of training, Dr. Danter began private practice as a cardiac surgeon at Hamilton General Hospital in Hamilton, Ontario, Canada. At Hamilton General, he served as the Surgical Liaison for the Left Ventricular Device Clinic, and was the Surgical Director of the Laser Lead Extraction and Complex Lead Management Program. Dr. Danter was instrumental in developing this program, which did not exist at Hamilton General Hospital prior to his arrival. Dr. Danter resigned from Hamilton General in March 2014 to accept a position on the clinical faculty at Vanderbilt, but became aware that he would be unable to obtain a Tennessee medical license. For the next few months, Dr. Danter practiced as a Cardiac Surgeon at Southlake Regional Hospital in Newmarket, Ontario, Canada, before completing his move to Vanderbilt University Medical Center in July 2014. Before completing the move, Dr. Danter

[7] Ex. H.
[8] Ex. G.
[9] Ex. E.
[10] Ex. L.
[11] For example, the 2014 president of the American Association of Thoracic Surgery is Canadian-trained.

successfully applied for a Visa, relying on letters of recommendation from Dr. Michael Petracek and Senator William H. Frist, in addition to letters of recommendation from medical education supervisors.[12]

In addition to being exceptionally well-trained, Dr. Danter is an extraordinary educator in the field of cardiac surgery. During his fellowship, he served as an Instructor in Professors Rounds and Cardiac Surgery Training Rounds, teaching the following topics: (1) management of surgical coronary disease, (2) management of aortic valve disease, (3) management of valvular endocarditis, (4) surgical techniques of pacemaker and defibrillator implantation, (5) surgical approaches to complex lead management, (6) indication / management related to left ventricular assist device implantation, (7) treatment options for end stage heart failure, (8) management of combined coronary and valvular heart disease, (9) management of pericardial disease, (10) cardiac tumors, and (11) management of acute aortic dissection. From 2012 to 2014, Dr. Danter also served as a Faculty Instructor of the Cardiac Surgical Residency Program at McMaster University, where he taught many of the same topics.

In addition to private practice and teaching responsibilities, Dr. Danter is heavily involved in groundbreaking research. He was a co-author of the world's first laser lead extraction risk score, presented at Cardiostim in 2012 in Nice, France.[13] In addition, Dr. Danter has co-authored the following articles: "Predictors of Early and Late Stroke Following Cardiac Surgery," accepted in June 2014 for publication in the Canadian Medical Association Journal,[14] "A cost-effectiveness analysis of alternative management

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[12] Ex. N.
[13] Bashier et al, Canadian Lead Extraction Risk (CLEAR) Score: a proposal for a novel risk scoring system for lead extraction. Cardiostim, 2012. Nice, France. (available online).
[14] Ex. I.

strategies for the Sprint Fidelis recall," submitted to Circulation; and "Non-pharmacological approaches to stroke prevention in atrial fibrillation" accepted in 2013 for publication in the Canadian Journal of Cardiology.[15] Dr. Danter has also given multiple presentations regarding lead extraction and ventricular assist devices, and assisted with a variety of important and novel research projects.[16]

Dr. Danter was recruited to join the Vanderbilt University Medical Center medical staff because he has unique skills that meet an urgent need at Vanderbilt.[17] Cardiac surgery training programs in the United States are decreasing, having dropped from over 120 programs in the past to less than 70 today. Dr. Danter is trained in (1) laser lead extraction and complex lead management, (2) ventricular assist device and cardiac transplantation, and (3) transcatheter valve procedures. To the best of our knowledge, there are approximately five (5) physicians in North America who are trained in all three (3) areas, and Dr. Danter is one of them.[18] If given a Tennessee medical license, Dr. Danter will give Vanderbilt a unique cardiac surgeon proficient in three technical areas that are traditionally confined to multiple cardiac specialists.[19]

Dr. Danter is currently serving as an Instructor of Cardiac Surgery and Ventricular Assist Device Transplant Fellow.[20] As an Instructor, Dr. Danter may only work under the supervision of an attending who is a member of the cardiac surgery

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[15] Ex. Q.
[16] *See* Ex. A.
[17] Vanderbilt's Transplant and Ventricular Assist Device program is one (1) of only two (2) in Tennessee, and is the only program that is nationally and internationally-ranked. The Vanderbilt program has grown in the last three (3) years to become the second largest in the United States by volume. The program has been consistently rated in the top five (5) programs based on clinical results; *see also* Ex. N.
[18] *See* Ex. N, Letter of Senator Frist, p. 2 ("Dr. Danter is an outstanding young clinician, scientist, and educator, who possess a unique skill set and experience placing him among very few unique individuals able to combine exemplary clinical practice with cutting edge highly specialized skills...").
[19] *Id.*, Letter of Dr. Petracek. ("Dr. Danter has a unique set of skills that we have been unable to find in any other candidate."); Letter of Senator Frist, p. 2 ("He is clearly an extraordinary young cardiac surgeon with a unique combination of important surgical skills that will support multiple programs with Vanderbilt...").
[20] Ex. K.

faculty at Vanderbilt University Medical Center. He may take call and see patients, but he cannot do so independently. However, if Dr. Danter is awarded a Tennessee medical license, he will be eligible to become an Assistant Professor of Cardiac Surgery, with independent responsibilities for providing patient care, teaching future clinicians, and continuing to assist with groundbreaking research.[21]

In addition, if given a Tennessee license, Dr. Danter plans to assist the Nashville VA establish a ventricular assist device and trans-catheter aortic valve program at the VA. This would create the third such program in the entire VA system, and would be the only VA hospital in the entire state of Tennessee offering these services.

GENERAL PURPOSE OF PETITION

Dr. Danter anticipates an appointment to the Vanderbilt University Medical Center medical staff and wishes to confine his practice in Tennessee, academically and clinically, to the field of cardiac surgery at Vanderbilt University Medical Center.

He files this Petition pursuant to T.C.A. §63-6-209(b), which states the Board:

> [h]as the authority to issue locum tenens and/***or conditional licenses as it deems appropriate after reviewing the qualifications of the applications*** [emphasis added].

RELIEF REQUESTED

T.C.A. §63-6-209(b) grants the Tennessee Board of Medical Examiners ("the Board") expansive authority to issue and condition licenses as it deems appropriate. At this time, Dr. Danter seeks an opinion as to whether on formal submission of his application to practice medicine, the Board would grant or deny his license with the conditions he has proposed. Specifically, Dr. Danter asks the Board to find that:

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[21] Ex. M.

- his education, training, experience, professional talents, and specialized skills can benefit the health, safety, and welfare of the people of this State;
- he has shown evidence of good moral character and professional ethics;
- he is qualified for conditional licensure.

He seeks relief from the Board in the form of a prospective order which states:

1. If Dr. Danter submits a formal application to the Board, a conditional license to practice medicine shall be granted based on the authority of T.C.A. §63-6-209(b);

2. That Dr. Danter's thirteen (13) years of postgraduate education, including seven (7) year residency program in cardiac surgery and two (2) year fellowship program in Canada, meets or exceeds the requirements of Rule 0880-02-.03(3) and/or T.C.A. §63-6-207(a)(1)(C);

3. When issued, Dr. Danter's conditional license shall be based on the following conditions:

    a. Dr. Danter must maintain medical staff privileges at Vanderbilt.

    b. Dr. Danter is authorized only to practice medicine in Tennessee in conjunction with the exercise of medical staff privileges at Vanderbilt and the VA. This practice is limited to the field of cardiac surgery, or care incidental to that specialty. He cannot engage in private practice in Tennessee outside the scope of his appointment at Vanderbilt.

    c. Dr. Danter will notify the Board if his reappointment at Vanderbilt is terminated or in the event he is not in good standing. If his appointment ends, his license shall expire, thereby terminating his right to practice medicine in Tennessee. He will need to either re-petition or apply to the Board for licensure, if he wishes to continue to practice medicine in Tennessee.

    d. Dr. Danter's license is subject to renewal and discipline for the same causes and pursuant to the same procedures as other unconditional licenses to practice medicine in Tennessee.

    e. Dr. Danter's license is subject to the Board rules governing continuing medical education as provided by Rule 0880-2.19.

    f. Dr. Danter's license is subject to immediate termination by the Board if he fails to comply with any of its conditions.

5. **Citation to the statute, rule or order which is the subject of the petition:**

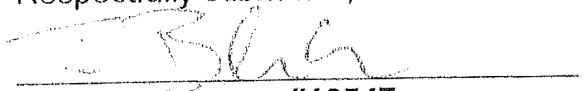
T.C.A. §63-6-209(b)
T.C.A. §63-6-207(a)(1)(C)
Rule 0880-02-.03(3)

6. **State how the statute, rule and/or order cited above specifically and directly produces an effect or result upon you:**

Dr. Danter previously submitted an application to the Board, which was denied based on his failure to meet the technical requirements of §63-6-207(a)(1)(C).[22] Dr. Danter now recognizes that under T.C.A. §63-6-207(a)(1)(C) and Rule 0880-02-.03(3), a full license to practice medicine is not available to him. As such, based on his qualifications and training, Dr. Danter intends to apply, pursuant to T.C.A. §63-6-209(b), for a "conditional license" to practice medicine in Tennessee. However, an application which allows for the specific conditions he seeks is not available from the Board.

In conclusion, Dr. Danter is asking the Board to review his qualifications under the authority of T.C.A. §63-6-209(b), and determine whether, on subsequent application, a license, with the conditions specified herein, would be appropriate and granted. For these reasons, Dr. Danter respectfully requests that the Tennessee Board of Medical Examiners afford him the relief requested herein.

Respectfully submitted,



7/14/14
Date

Dixie W. Cooper, #16547
J. Blake Carter, #30098
GIDEON, COOPER & ESSARY, PLLC
315 Deaderick Street, Suite 1100
Nashville, TN 37238 | (615) 254-0400
Attorneys for Matthew Danter, M.D.

[22] Exs. O and P.

Curriculum Vitae

Section 1: Personal Information (confidential)

Name:	Matthew Robert Danter
Date of Birth:	07/21/1976
Home Address:	9753 Jupiter Forrest Brentwood, TN 37027
Business Address:	1215 21st Avenue South Medical Center East, Suite 5025 Nashville, TN 37232
Email:	matthew.r.danter@vanderbilt.edu
Business Phone Number: Business Fax Number:	(615) 343-9195 (615) 343-5234
City of Birth:	London, Ontario, Canada
Citizenship:	Canadian
Languages spoken, read and written:	English
Specialty:	Cardiac Surgeon, Hamilton General Hospital Surgical liason, Left Ventricular Assist Device Clinic, Hamilton Health Region Surgical Director, Laser Lead Extraction and Complex Lead Management Program, Hamilton General Hospital. (program in development)
Principle Site of Practice:	Hamilton General Hospital, 237 Barton St., E., Hamilton, Ontario, Canada L8L 2X2

Signature: _____ Dr. M. R. Danter, BSc(hon), MD, FRCSC.

EXHIBIT
A

Section 2: Education and Credentials

Date:	Credential(s) Obtained
1/07/2011 – 1/7/2012	Clinical Cardiac Surgical Fellowship, The University of British Columbia, Division of Cardiac Surgery, St. Paul's Hospital, Vancouver, British Columbia, Canada. Dr. Anson Cheung, Dr. Jamil Bashir, Dr. Jian Ye, Dr. Samuel Lichtenstein, Dr. James Abel Major Clinical Focus: Cardiac Transplantation; Left Ventricular Assist Device management: ECMO, Impella, Heartmate II, Heartware; Transcatheter Valve Implantation. Minor Clinical Focus: General Adult Cardiac Surgery; Complex Lead Management; Laser Lead Extraction.
1/7/2010 – 1/7/2011	Clinical Cardiac Surgical Fellowship, The University of British Columbia, Division of Cardiac Surgery, St. Paul's Hospital, Vancouver, British Columbia, Canada. Dr. James Abel, Dr. Samuel Lichtenstein, Dr. Jamil Bashir, Dr. Anson Cheung, Dr. Jian Ye Major Clinical Focus: General Adult Cardiac Surgery, Complex Lead Management, Laser Lead Extraction. Minor Clinical Focus: Cardiac Transplantation, Left Ventricular Device Management, Transcatheter Valve Implantation.
1/7/2003 – 1/7/2010	Cardiac Surgical Residency Training, Mazankowski Alberta Heart Institute. Program Director: Dr. Roderick MacArthur The University of Alberta, Edmonton, Alberta, Canada.
1/9/2007 – Present	Masters of Science Candidate, Clinical Epidemiology, The School of Public Health, The University of Alberta, Edmonton, Alberta, Canada.

1/9/1999 – 1/5/2003	Doctor of Medicine (MD), The University of Western Ontario, London, Ontario, Canada
1/9/1995 – 1/5/1999	Honours Bachelors of Science in Physiology with Distinction (BSc(hon), The University of Western Ontario, London, Ontario, Canada

Medical Licensure and Credentialing:

1. July 1, 2014:	New Mexico Board of Medical Practice License Number: MD2014-0603
2. June 21, 2013:	HeartMate II, Surgical Training Program, Toronto General Hospital, Course Director: Dr. Vivek Rao
3. August, 2012 – present:	Full practice licensure, Cardiac Surgery, The College of Physicians and Surgeons of Ontario.
4. 2011:	Laser Lead Extraction Simulator Training, Spectranetics Inc.,
5. June, 2010:	Certificate of the Royal College of Physicians and Surgeons of Canada, Cardiac Surgery.
6. July, 2010:	Fellow of the Royal College of Physicians and Surgeons of Canada, Cardiac Surgery.
7. July, 2010 – January, 2013	Full Practice Licensure, Cardiac Surgery, The College of Physicians and Surgeons of British Columbia.
8. July, 2007 – July 2009	Physician Extender License (conditional practice license), The College of Physicians and Surgeons of Alberta.
9. 2005:	Licensure of the Medical Council of Canada, Part II (LMCC part II).
10. 2003:	Licensure of the Medial Council of Canada, Part I (LMCC part I)
11. 2005:	Principles of Surgery Exam.
12. 2004:	Advanced Trauma Life Support certificate
13. 2003:	Advanced Cardiac Life Support certificate

14. 2003: Pediatric Advanced Life Support certificate

Research in Training:

2010 – present: Co-Investigator, The Canadian Lead Extraction Risk (CLEAR) Score: a proposal for anovel risk scoring system for lead extration. (Dr. Jamil Bashir, Principal Investigator)

Co-principle Investigator, A Randomized controlled trial of the TORQ sternal closure device.

Co-principle Investigator, A novel device for securing suture wires during sternal approximation after median sternotomy: A technical overview and clinical assessment.

Co-investigator, Cost-effectiveness of the impella left ventricular assist device compared to extracorporeal membrane oxygenation in patients with cardiogenic shock. (Dr. Anson Cheung, Principle Investigator)

Co-investigator, A Cost-effectiveness analysis of alternative management strategies for the Sprint Fidelis recal. (Dr. Jamil Bashir, Principle Investigator)

2009: Systematic review of the efficacy of pulsatile left ventricular assist devices (LVAD) in patients with end stage heart failure.

1/9/2007 – present: Masters of Science, Clinical Epidemiology, The School of Public Health, The University of Alberta, Edmonton, Alberta, Canada
Supervisors: Dr. Duncan Saunders, Dr. Colleen. Norris, Dr. Jayan Nagendran.

Thesis Projects:

i. Quality of Life in Aboriginal patients undergoing coronary artery bypass grafting.

ii. Comparison of the quality of life of high risk versus low risk patients undergoing coronary artery bypass grafting.

Continuing Medical Education:

Date:	Meeting	Location
June, 2013	HeartMate II Surgical Training Program	Torontò, Canada
June, 2012	Cardiostim Conference	Nice, France
May, 2012	Heart Rhythm Society, Annual Meeting	Boston, MA
April, 2012	Cardiac Surgical Rounds, Vanderbilt University.	Nashville, TN
October, 2011	Canadian Cardiovascular Congress Annual Meeting	Vancouver, Canada
January, 2010	The Society of Thoracic Surgeons, Annual Meeting	Ft. Lauderdale, FL
October, 2009	Canadian Cardiovascular Congress, Annual Meeting	Edmonton, Canada
October, 2008.	Canadian Cardiovascular Congress, Annual Meeting	Toronto, Canada
May, 2008	Tom Williams Surgical Research Day	Edmonton, Canada
May, 2005	Terrence Donnelly Resident Research Day, Annual Meeting	Toronto, Canada
May 2004	Terrence Donnelly Resident Research Day, Annual Meeting	Toronto, Canada
2004	Medtronic Valve Symposium	Newport Beach, CA

Academic Awards

2010: Thoracic Surgery Directors Association In-Training Exam:

99th Percentile: Adult and Congenital Cardiac Surgery
100th Percentile: Adult and Congenital Cardiac Surgery (6th year residents)

The University of Alberta, Division of Cardiac Surgery Book Prize: awarded to the resident with the highest marks on the in-training exam.

The Wilensky Prize in Physiology, the University of Western Ontario

G. F. England Family Award, The University of Western Ontario

Maude Gordon Educational Award, The University of Western Ontario

Deans Honours List, The University of Western Ontario

Medical and Scientific Societies:

Ontario Medical Association

Canadian Medical Association

Member At Large, Professional Association of Residents of Alberta, Executive Board member

British Columbia Medical Association

Section 3: Employment and Administrative Experience

July 1, 2014 – present:	Vanderbilt University Medical Center Instructor, Department of Cardiac Surgery Nashville, TN USA
February 1, 2014 – May 12, 2014:	Cardiac Surgeon, Southlake Regional Hospital, Newmarket Ontario Canada
August 2012 – March 31, 2014:	Cardiac Surgeon, Hamilton General Hospital
	Surgical Liaison, Left Ventricular Assist Device Clinic.

	Surgical Director, Complex Lead Management and Laser Lead Extraction Program.
	Clinical Instructor, Cardiac Surgery Academic Half-day, Hamilton General Hospital.
April 2013:	Faculty Interviewer, Resident application interviews, Cardiac Surgery Division, Department of Surgery, McMaster University.
July, 2010 – July, 2012	Lecturer, Weekly Resident Education Rounds, Cardiac Surgery Residency program, The University of British Columbia
July, 2007 – July, 2009	Physician Extender, Intensive Care Physician, Grey Nuns Hospital, Edmonton, Alberta, Canada
July, 1999 – September, 2001	Research Student, Cardiac Surgery Research Lab, London Health Sciences Centre, The University of Western Ontario.

Section 4: Teaching Experience

Residency Teaching:

2004 – 2007:	Classroom Lecturer, The University of Alberta Medical School: Introduction to Surgical Clerkship
2003 – 2004:	Clinical Skills Instructor, The University of Alberta Medical School: Cardiovascular and Thoracic Physical Exam Skills

Fellowship Teaching:

2010 – 2012	Instructor, Professors Rounds, Cardiac Surgery Residency Training rounds: Topics Included: - Management of Surgical Coronary Disease - Management of Aortic Valve Disease - Management of Valvular Endocarditis

- Indications and surgical techniques of pacemaker and defibrillator implantation
- Surgical Approaches to Complex lead management
- Indications and management decisions related to left ventricular assist device implantation
- Treatment options for end stage heart failure
- Management of combined coronary and valvular heart disease
- Management of pericardial disease
- Cardiac tumours
- Atrial septal defects
- Management of acute aortic dissection

Faculty Teaching:

August 2012 – present

Faculty Instructor, Cardiac Surgical Residency Academic half day, McMaster Univerity.

Educational Topics:

- Management of Surgical Coronary Disease
- Management of Aortic Valve Disease
- Management of Valvular Endocarditis
- Indications and surgical techniques of pacemaker and defibrillator implantation
- Surgical Approaches to Complex lead management
- Indications and management decisions related to left ventricular assist device implantation
- Treatment options for end stage heart failure

- Management of combined coronary and valvular heart disease
- Management of pericardial disease
- Cardiac tumours
- Atrial septal defects

Written and Oral Exam Invigilator, Cardiac Surgical residency training program, McMaster University. Constructed and administered oral and written exams to the residents with evaluation and feedback.

Section 5: Research and Academics

Current Research Projects:	Status
1. Development of a regional heart failure database	- in progress
2. Development of a regional laser lead extraction database	- in progress
3. Predictors of Early and Late Stroke following cardiac surgery	- under revision
4. The Canadian Lead Extraction Risk Score: a proposal for a novel risk scoring system for lead extraction	- in progress
5. Cost effectiveness anlaysis of alternative management strategies for the Sprint Fidelis recall.	- under review
6. Non-pharmacological approaches to stroke prevention in atrial fibrillation	- In press
7. Randomized controlled trial of the TORQ sternal closure device	- under revision
8. Cost-effectiveness of the Impella left ventricular assist device compared to extracorporeal membrane oxygenation in patients with cardiogenic shock	- under revision

Publications:

Manuscripts:

1. Whitlock R, et al. Predictors of Early and Late Stroke Following Cardiac Surgery. CMAJ 2013. Accepted June, 2014

2. Bashir J, Cowan S, Raymakers A, Yamashita M, Danter M, Lynd L,. A cost-effectiveness analysis of alternative management strategies for the Sprint Fidelis recall. Circulation (in submission)

3. Hasib H, Danter M, Whitlock R. Non-pharmacological approaches to stroke prevention in atrial fibrillation. Canadian Journal of Cardiology, 2013. (Accepted)

4. Whitlock R, Danter MD, Response to 12-2305. Chest, 2013. (Accepted)

Abstracts:

Podium Presentations:

1. Bashir et al, Canadian Lead Extraction Risk (CLEAR) Score: a proposal for a novel risk scoring system for lead extraction. Heart Rhythm Society, 2012. Boston, MA.

2. Bashir et al, Canadian Lead Extraction Risk (CLEAR) Score: a proposal for a novel risk scoring system for lead extraction. Cardiostim, 2012. Nice, France

3. Danter M, Nagendran J, Dorgan M, Johnson JA, McAlister F, MacArthur R. Systematic Review of the Efficacy of Pulsatile Left Ventricular Assist Devices (LVAD's) in Patients with End Stage Heart Failure. University of Alberta Surgical Research Day. © 2009.

4. Danter MR, Oreopolous A, Johnson JA, Kanji HD, Shihata M, Norris C, McAlister F,. Quality of life in Aboriginal patients with coronary artery disease. Canadian Cardiovascular Society Meeting. © 2008.

5. Danter MR, Oreopolous A, Johnson JA, Kanji HD, Shihata M, Norris C, McAlister F,. Quality of life in Aboriginal patients with coronary artery disease. Tom Williams Surgical Research Day, The University of Alberta. © 2008.

The UNIVERSITY of WESTERN ONTARIO

The Senate on the recommendation of the Faculty of Medicine & Dentistry has conferred upon

MATTHEW ROBERT DANTER

the degree of

DOCTOR OF MEDICINE

with all its rights, privileges and obligations

Given at London, Canada, on the sixteenth day of May, two thousand and three, in the one hundred and twenty fifth year of the University

EXHIBIT

B

University of Alberta

Faculty of Medicine & Dentistry
Postgraduate Medical Education

hereby certifies that

Matthew Danter

has completed the educational requirements of the residency training program in

Cardiac Surgery

from 1 July 2003 to 30 June 2010

Program Director

Associate Dean
Postgraduate Medical Education

EXHIBIT
C

UBC

The University of British Columbia

Department of Surgery
Division of Cardiovascular Surgery

This is to certify that Dr. Matthew Danter has successfully completed a Clinical Fellowship at the Division of Cardiovascular Surgery of the University of British Columbia from July 1st, 2010 to June 30th, 2012.

EXHIBIT

College of Physicians and Surgeons

British Columbia

This is to certify that

Matthew Robert Vanter

was entered into the Full Specialty Class of Registration under the Health Professions Act of British Columbia on the 13th day of July, 2010 by the College of Physicians and Surgeons of British Columbia and is entitled to practice

Cardiac Surgery

within the said Division

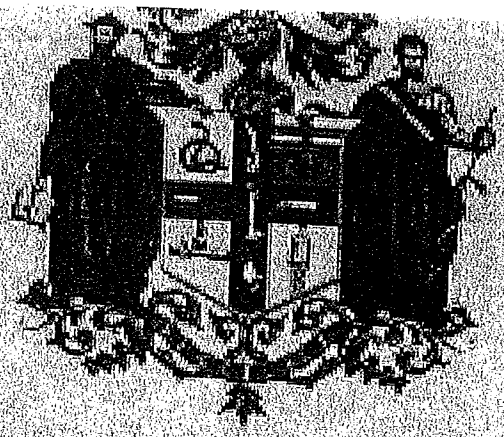
Registration Number 20055

REGISTRAR

REGISTRAR

EXHIBIT

E



The College of Physicians and Surgeons of Ontario

Be it known to all that

Matthew Robert Danter

has satisfied all requirements of the Council of the College of Physicians and Surgeons of Ontario and is hereby admitted a Member of the said College and is thereby entitled to practice Medicine in the Province of Ontario.

In testimony whereof we have hereunto affixed our signatures and the Seal of the said College

Dated this 26th day of June 2012

President

Registrar

EXHIBIT

F

The Royal College of Physicians and Surgeons of Canada

Le Collège royal des médecins et chirurgiens du Canada

Specialist Certificate

Certificat de spécialiste

Dr. Matthew Robert Danter

Cardiac Surgery

Chirurgie cardiaque

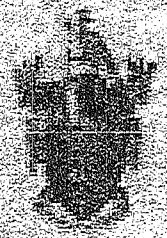
Given at Ottawa this 30th day of June 2010.

Donné à Ottawa le 30e jour de juin 2010.

EXHIBIT

6

The Royal College of Physicians and Surgeons of Canada



Le Collège royal des médecins et chirurgiens du Canada

Dr. Matthew Robert Danter, FRCSC

Fellow

d'Associé

Given at Ottawa this 24th day of May 2011.

Remis à Ottawa ce 24e jour de mai 2011.

EXHIBIT

H

Predictors of Early and Late Stroke Following Cardiac Surgery

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Abstract:

Background: While much is known about the short-term risks of stroke following cardiac surgery, little is known about the long-term risks and its predictors.

Methods: A cohort study of patients undergoing cardiac surgery between1996 and 2006 was assembled with linked clinical and administrative databases. Data on stroke and death up to 2 years post-operative was analyzed with Cox modeling. Of 108,722 patients, 3.6% (95% CI 3.5% -3.7%) suffered a stroke over the next 2 years, with half occurring in the peri-operative period.

Results: The strongest predictors of both early and late stroke were history of transient ischemic attack or stroke (HR 2.0, $p<0.001$), advanced age (HR 1.9, $p<0.001$), combined surgery (HR 1.7, $p<0.001$) or valve surgery (HR 1.5, $p<0.001$), and peripheral vascular disease (HR 1.6, $p<0.001$). New post-operative atrial fibrillation (OR 1.5, $p<0.001$), and preoperative dialysis dependence (OR 1.9, $p<0.001$) only predicted early strokes.

A $CHADS_2$ score ≥ 2 increased the risk of stroke and death at 2 years from 9.9% to 18.4% in individuals with pre or post-operative AF (n=27,600) and from 6.2% to 12.5% in those without this condition (n=81,102).

Interpretation: Cardiac surgery patients are a highest risk of stroke in the early post-operative period and have ongoing hazard over the ensuing 2 years with similar risk predictors over these periods. New post-operative atrial fibrillation increases early stroke risk, particularly with elevated $CHADS_2$ score. Finally, the $CHADS_2$ score predicts the 2 year stroke risk in patients with and without atrial fibrillation.

Keywords: cardiovascular diseases, cardiac surgery, stroke, risk factors

Background

Stroke remains a devastating complication following cardiac surgery, with substantial functional and economic impact (1-3.) Stroke research in cardiac surgery has focused on the immediate post-operative period (4-9); however, most patients having cardiac surgery have conditions such as hypertension, diabetes and atrial fibrillation (AF) which place them at long-term risk of stroke.

Early and late outcomes among patients having cardiac surgery could be improved if the risk of post-operative stroke was defined and predictors of stroke identified. With this information, clinicians could optimize medical therapy for stroke risk factors like hypertension (10,11), improve the evidence-based use of empiric oral anticoagulation in patients with AF, and evaluate intra-operative surgical strategies, such as removal of the left atrial appendage (12), in patients whose clinical characteristics predict an increased risk of stroke. This study seeks to describe the rate and predictors of stroke from the two years following cardiac surgery.

Methods

Patients:

All patients 18 years of age and older who underwent coronary artery bypass grafting (CABG), isolated valve surgery, or combined CABG and valve surgery in the province of Ontario from 1996 until 2006 were identified with the Cardiac Care Network (CCN) database.

Databases

Three linked databases were examined: the CCN of Ontario, the Canadian Institute of Health Information database for patients' discharge disposition, and the Registered Person Database were used to identify deaths that occurred outside of hospitals. These databases have been used extensively to examine health outcomes as anonymised healthcare records can be analyzed using encrypted identifiers to track individuals over time (13-15). The database is anonymised by having all patients' health card numbers in the CCN and other Institute for Clinical Evaluative Sciences (ICES) databases encrypted into unique ICES key numbers before databases are linked. Available patient characteristics, surgery characteristics, and outcomes were captured prospectively in the CCN clinical registry, which is reliable compared to chart review. The history of AF and hypertension were poorly captured within the CCN database, thus the presence of these two conditions was ascertained by reviewing the corresponding ICD-9 (before 2002, AF = 4273, hypertension = 401, 402, 403, 404, 405) or ICD 10 (after 2002, AF = I480, I481, hypertension = I10, I11, I12, I13, I15) codes for the preceding 10 years in all patients. Post-operative AF (POAF) was defined by an absence of a history of AF and the appearance of AF diagnosis code during the cardiac surgical admission. Definitions for the variables can be found at the CCN website (16).

Outcomes:

The primary outcome was stroke occurring up to 2 years post-operative. Secondary outcomes were peri-operative stroke or death (occurring during the same index hospitalization) and late stroke or death (from time of discharge from surgical admission to 2 years post-operative).

Statistical Analysis

The prevalence of plausible stroke risk factors (17,18) was compared between: 1) patients with a history of AF (group HAF) versus those with no history of AF (group noHAF) and 2) patients with no history of AF but new onset post-operative AF (group noHAF/POAF) versus those with no history of AF and no post-operative AF (group noHAF/noPOAF). Plausible risk factors that were available for analysis included: age, gender, diabetes mellitus, congestive heart failure, left ventricular systolic function, cerebrovascular disease, valvular surgery, CABG surgery, creatinine, dialysis, hypertension, prior transient ischemic attack/Stroke, hyperlipidemia, peripheral vascular disease, reoperation, history of myocardial infarction, left main disease, history of AF, and new post-operative AF. In addition to the above analysis, the CHADS-2 composite variable was evaluated as a predictor of stroke, independent of rhythm.

Risk factors with a $p<0.2$ from a univariate analysis were entered into multivariable analysis with no further selection. A multivariable Cox model was used for the primary outcome as well as for late stroke. The precise timing of stroke events that occurred during the same hospital admission as the surgery was not available. Therefore, it was assumed that all of these strokes occurring in the first 48 hours post-operatively based on previous findings (9,17). The outcome of early stroke was analyzed with logistic regression. This study was approved by the research ethics review board of Sunnybrook Health Sciences center, which supervises all ICES studies.

Results:

Population Characteristics

A total of 108,722 patients were identified and the prevalence of risk factors in the cohort divided by the presence of history of AF and post-operative AF (Table 1). Isolated CABG was performed in 77% of patients; isolated valve procedures in 13% and combined CABG/valve surgery in 10%. Patients with a history of AF (8.8%) were older, more likely to be female, and more likely to have valvular or re-operative surgery than those without a history of AF (Table 1). Post-operative AF developed in 18.2% of those without a prior history of AF. These patients were older, had more congestive heart failure and stroke disease or peripheral vascular disease in their history, and were more likely to have undergone valvular surgery than those who did not develop postoperative AF (Table 1).

Crude Rates of Stroke and Death

The in-hospital risk of stroke is 1.8% (95% CI 1.7%-1.9%) and 2.8% (95% CI 2.7% to 2.9%) for death. Over the next 2 years, the hazard decreases, with a 3.6% (95% CI 3.5% to 3.7%) risk of stroke and 6.8% (95% CI 6.6% to 7.0%) risk of death.

Predictors of Stroke

Table 2 presents the adjusted odds ratios and hazard ratios for the predictors of stroke at any time from surgical admission to 2 years post-operative with their respective 95% confidence intervals. The strongest predictor of stroke at any time is a history of stroke or transient ischemic attack (OR 2.0, 95% CI 1.8-2.2) and age ≥ 65 years (OR 1.9,

95% CI 1.7-2.0). Other predictors include dialysis dependence, peripheral vascular disease, and valvular surgery.

Comparing peri-operative to late stroke, the risk factors are similar with a few exceptions. The strongest independent predictors of peri-operative stroke are: advanced age (OR 2.1, 95% CI 1.9-2.3), history of transient ischemic attack or stroke (OR 2.0, 95% CI 1.7-2.4), preoperative dialysis dependence (OR 1.9, 95% CI 1.4-2.5), combined surgery (OR 1.7, 95% CI 1.6-2.3) or valve surgery (1.4, 95% CI 1.2-1.7), peripheral vascular disease (OR 1.6, 95% CI 1.4-1.7), and new onset post-operative AF (OR 1.5, 95% CI 1.3-1.6). For late stroke occurring up to 2 years post-operative, several important predictors are shared with peri-operative stroke such as prior stroke/transient ischemic attack (HR 2.1, 95% CI 1.8-2.4), advanced age (HR 1.7, 95% CI 1.6-1.9), combined surgery (HR 1.6, 95% CI 1.4-1.8) or valve surgery (and 1.5, 95% CI 1.3-1.7), peripheral vascular disease (HR 1.5, 95% CI 1.4-1.7), and a pre-operative history of AF (HR 1.4, 95% CI 1.2-1.6). However, post-operative AF and dialysis are not associated with later stroke once a patient is discharged stroke free and alive. The variables of prior stroke/transient ischemic attack and cerebrovascular disease were found to be collinear, and thus cerebrovascular disease was dropped from the final model, without altering the results.

The Impact of $CHADS_2$ and Atrial Fibrillation on Stroke and Death

An increasing $CHADS_2$ score predicts for higher risk of stroke in patients with any AF (preoperative or new postoperative AF) and in patients with no preoperative or post-operative AF (Figure 1). The rate of stroke or death in the absence of any AF is

5.8% for patients with a $CHADS_2$ of 0 or 1 compared to 20.3% for those with a $CHADS_2$ score of greater than 3. If a patient has a history of AF, the rate of stroke or death at 2 years is 13.0% for a $CHADS_2$ of 0 or 1 compared to 28.8% for those with a $CHADS_2$ score of greater than 3. Finally, if a patient suffers from new post-operative AF, the rate of stroke or death at 2 years is 7.8% for a $CHADS_2$ of 0 or 1 compared to 21.2% for those with a $CHADS_2$ score of greater than 3.

Interpretation:

Main Findings

This study has three key findings. First, patients undergoing cardiac surgery are a highest risk of stroke in the early post-operative period, but are also at risk over the ensuing 2 years. Second, the risk factors predicting a peri-operative and late stroke are similar, except for new post-operative AF which only predicts early stroke. Third, in the cardiac surgical population, the $CHADS_2$ score predicts the 2 year risk of stroke and stroke or death in patients with AF and without AF.

Comparison with other Studies

This study presents the largest cohort data used to examine longer-term stroke risk in this population. It defines the risk of stroke and its predisposing characteristics in cardiac surgical patients over the first 2 post-operative years. The strongest predictors of in-hospital stroke are similar to those of later stroke (advanced age, history of stroke, peripheral vascular disease, and valvular surgery). The results extend the observations made by others who have described similar predictors in the risk of early stroke (5-

8,18,19). Bucerius et al. studied 16,184 patients and found that cerebrovascular disease, preoperative infection, and high transfusion requirement were the strongest independent predictors of peri-operative stroke (20). Similarly, Roach et al. found proximal aortic atherosclerosis, history of neurologic disease, use of intra-aortic balloon pump, and age (amongst others) to be strong predictors of early adverse cerebral outcomes amongst 2108 patients(7). However, the current study is the first to demonstrate that risk factors for peri-operative stroke continue to predict later stroke risk.

The finding that new onset post-operative AF is an independent predictor of early stroke (OR 1.5) but not of late stroke suggests that patients with post-operative AF should be considered for a short course of anticoagulation. Post-operative AF as a predictor of post-operative stroke has been debated within the literature. In a study of 2972 cardiac surgery patients, Hogue et al. found that post-operative AF had no impact in postoperative stroke rate unless it was accompanied by low cardiac output syndrome, with a resultant OR of 1.7 (1.0-2.9)(6). Creswell et al., on the other hand, found that post operative AF was associated with an increased incidence of postoperative stroke (3.3% versus 1.4%, $p<0.0005$) in their study of 4,507 adult patients (4). Most recently, Tarakji et al. in a prospective cohort study of 45,432 CABG patients found that post-operative AF did not increase the risk of post-operative stroke but actually lowered it(9). The authors suggest that this is the result of an aggressive anticoagulation strategy that is followed at the single center where the patients were recruited. The current study adds over 100,000 patients to this literature; with 18, 046 (18.2%) developing post-operative AF in whom there is strong signal that this arrhythmia is associated with an increased

early stroke risk. Prospective studies are needed to define the use of antithrombotics in these patients.

The $CHADS_2$ score is a validated clinical prediction rule for stroke risk in non-rheumatic AF (21) who were not prescribed warfarin and now is used to guide when antithrombotic therapy in AF patients. Figure 1 highlights that the $CHADS_2$ score is an important predictor of stroke or death even in the absence of any known AF, with a RR of 3.5 for $CHADS_2 \geq 3$ versus $CHADS_2$=0,1(22). This finding extends the findings of Welles et al. who demonstrated the $CHADS_2$ score predicts ischemic stroke in the absence of AF(22) This raises the question of stroke source in the non-AF patients: is the elevated $CHADS_2$ score a marker of vascular disease and the strokes are all thrombotic, or are these patients having occult AF and resultant embolic events? It is likely that what we are observing is a combination of the both. A prospective observational study of cardiac surgery patients that closely tracks these events is needed to determine the relative frequencies of stroke subtypes and assist in planned therapies to reduce the stroke risk. Possible therapeutic approaches to be examined include optimization of antihypertensive therapy, optimization of antithrombotic therapy, and intraoperative strategies such as left atrial appendage occlusion.

Limitations

This study has several limitations. First, the history of hypertension and AF were not validated within the CCN database. We used the approach of administrative claims data to identify rates of hypertension in a large population living in a single-payer health care system, which has been validated(23). To our knowledge, as yet this has not been

validated for AF. However, the authors assert that coding for AF would be very specific and thus be accurately captured within this population. Furthermore, our method of looking back 10 years for ICD 9 or 10 codes for these diagnoses did yield incidences that one would expect to see in this population. Other variables, such as smoking status, were not available. Second, intra-operative variables such as cardiopulmonary bypass time, cross clamp time and on pump versus off pump procedures were not captured. This does not allow for the interpretation of the influence of intra-operative variables on the rate of stroke. Third, the incidence of post-operative AF is likely under-captured within the dataset. However, it is likely that this dataset captured the postoperative AF that is clinically significant and prolonged. Fourth, the dataset contained no information on post-operative anticoagulation use, in-hospital or on discharge. Fifth, the timing of the in-hospital postoperative strokes was not available. The precise timing of postoperative stroke related to the onset and duration of the postoperative AF would better elucidate the causal relationship between these two disease entities. To further investigate this relationship a prospective cohort study would be optimal. Finally, loss to follow up was not available; however the loss to follow up would be limited to those people who left the province of Ontario, which occurs at less than 1%(24).

Conclusions

Patients undergoing cardiac surgery are at significant risk of stroke, both peri-operatively and in the ensuing 2 years. The predictors of stroke are similar for these two time periods and include previous stroke, peripheral vascular disease, and advanced age. New onset postoperative AF, however, predicts early but not late stroke and thus, early initiation of a

short course of anticoagulation should be considered, particularly in the presence of elevated $CHADS_2$ score. Finally, elevated $CHADS_2$ score also predicts for increased risk of stroke or death in patients with AF and in patients without. Patients with elevated $CHADS_2$ score should be a focus for preventive strategies in future research irrespective of heart rhythm.

Acknowledgements:

The authors acknowledge that the data used in this publication are from the Cardiac Care Network of Ontario and its member hospitals. The Cardiac Care Network of Ontario serves as a support to the Ontario healthcare system, including the Ministry of Health and Long-Term Care and is dedicated to improving the quality, efficiency, access, and equity of adult cardiovascular services in Ontario, Canada. The Cardiac Care Network of Ontario is funded by the Ministry of Health and Long-Term Care.

Funding Sources: Canadian Network and Centre for Trials Internationally (CANNeCTIN)

Disclosures: None

Table 1: Baseline Characteristics of Patients (n=108,722) by History of Atrial Fibrillation and by New Post-Operative Atrial Fibrillation

VARIABLE	History of AF	No History of AF	New Post-operative AF	No AF*
	N=9,574	N=99,148	N=18,046	N=81,102
Patient Demographics				
Age ≥ 65	72.7%	51.7%	68.1%	48.0%
Female	35.7%	25.2%	26.4%	24.9%
Risk Factors				
Congestive Heart Failure	47.0%	18.2%	23.9%	17.0%
Creatinine	93.75 ± 32.43	91.66 ± 25.37	92.41 ± 22.82	91.50 ± 25.91
Stroke/Transient Ischemic Attack	7.4%	3.6%	4.6%	3.4%
Cerebrovascular Disease	16.9%	10.3%	12.5%	9.7%
Diabetes	27.9%	30.2%	29.3%	30.4%
Dialysis	1.8%	1.1%	1.0%	1.1%
Hypertension	47.3%	33.7%	35.4%	33.3%
Left Main Disease	13.1%	19.7%	19.9%	19.7%
Prev MI	19.3%	23.0%	22.7%	23.1%
LV grade 2-4	51.8%	49.6%	48.3%	49.9%
Reoperation	7.5%	3.3%	3.5%	3.2%
Peripheral Vascular Disease	16.6%	14.0%	16.5%	13.5%
$CHADS_2$	1.63 ± 1.17	1.03 ± 1.02	1.20 ± 1.08	0.99 ± 1.01
Surgery type				
CABG	48.1%	79.6%	71.0%	81.5%
Valve	31.8%	11.2%	14.8%	10.4%
CABG + Valve	20.1%	9.2%	14.2%	8.1%

*No history of atrial fibrillation (HAF) and no postoperative atrial fibrillation (POAF)

Table 2: Multivariable predictors of stroke by time period for all patients

Variable	Early Stroke* OR (95% CI,)	Late Stroke¶ HR (95% CI)	All Stroke HR (95% CI)
Age>=65	2.1 (1.9-2.3)	1.7 (1.6-1.9)	1.9 (1.7-2.0)
Previous CVA or TIA	2.0 (1.7-2.4)	2.1 (1.8-2.4)	2.0 (1.8-2.2)
Dialysis	1.9 (1.4-2.5)	1.2 (0.8-1.6)	1.5 (1.2-1.9)
Peripheral vascular disease	1.6 (1.4-1.7)	1.5 (1.4-1.7)	1.6 (1.4-1.7)
Post-operative AF	1.5 (1.3-1.6)	1.0 (0.9-1.1)	1.2 (1.1-1.3)
Valve†	1.4 (1.2-1.7)	1.5 (1.3-1.7)	1.5 (1.4-1.7)
CABG and Valve†	1.7 (1.6-2.3)	1.6 (1.4-1.8)	1.7 (1.6-1.9)
Congestive heart failure	1.3 (1.2-1.5)	1.1 (1.0-1.2)	1.2 (1.1-1.3)
Diabetes	1.3 (1.1-1.4)	1.3 (1.2-1.5)	1.3 (1.2-1.4)
Hypertension	1.2 (1.1-1.3)	1.4 (1.2-1.5)	1.3 (1.2-1.3)
Left main disease	1.2 (1.1-1.4)	1.0 (0.9-1.1)	1.2 (1.1-1.3)
History of AF	1.2 (1.0-1.4)	1.4 (1.2-1.6)	1.3 (1.2-1.4)
Female	1.1 (1.0-1.2)	1.3 (1.2-1.4)	1.2 (1.1-1.3)
LV dysfunction	1.1 (1.0-1.2)	1.2 (1.1-1.3)	1.2 (1.1-1.6)

*Stroke occurring during surgical admission

¶Stroke occurring between discharge from surgical admission to 2 years post-operative

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ALBERTA HEART INSTITUTE

Roderick MacArthur, MD, MSc, FRCSC(C)
Associate Clinical Professor, Cardiovascular Surgery & Thoracic Surgery
Division of Cardiac Surgery

July 9, 2014

Dr. Michael Petracek
Chairman, Department of Cardiac Surgery
Vanderbilt Medical Center East
Suite 5025, 1215 – 21st Avenue South
Nashville, TN 37232

Dear Dr. Petracek:

RE: Reference letter – Dr. Matthew Danter

This letter serves as a reference for Dr. Matthew Danter. Dr. Danter was a resident in excellent standing within our Cardiac Surgery Training Program from July, 2003 – June, 2010. Dr. Danter was extremely reliable and hardworking throughout his training at the Mazankowski Alberta Heart Institute. He managed to develop into a strong clinical cardiac surgeon with additional expertise in Heart & Lung Transplantation. In addition to the expected rotational and routine cardiac surgery responsibilities, Dr. Danter participated in our Thoracic Transplant Program during the entire seven years of his training. He was the primary surgeon in 25 heart retrievals, 15 heart/lung retrievals and 15 isolated lung retrievals during his training. This does not include the numerous cases where he participated as the first assistant in either a learning or teaching capacity. Dr. Danter has extensive experience in thoracic transplantation and has my full recommendation as a strong addition to your surgical group at the Vanderbilt.

I trust that this information is helpful in your assessment of Dr. Matthew Danter and please do not hesitate to contact me for further information.

Kindest regards,

Dr. Roderick MacArthur, MD, FRCS(C)
RMA/nm

4E2.11 Walter Mackenzie Health Sciences Centre, 8440 – 112 Street
Edmonton, AB Canada T6G 2B7
Phone: 780-407-2186 Fax: 780-407-2184
Email:

ALBERTA Alberta Health Services Capital Health

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VANDERBILT UNIVERSITY MEDICAL CENTER

Department of Cardiac Surgery
Vanderbilt Heart and Vascular Institute

April 9, 2014

Matthew R. Danter, M.D., F.R.C.S.
Unit 4, 97 Sunvale Place
Stoney Creek, Ontario
L8E4Z7

CONFIDENTIAL

Dear Dr. Danter:

I enjoyed meeting with you at Vanderbilt and talking with you over the past several months and discussing our mutual interest in building world-class ventricular assist device (VAD) and heart transplant programs here at Vanderbilt. The leadership at Vanderbilt shares with me a high level of enthusiasm over your recruitment to the Cardiac Surgery Faculty. We are delighted to offer you a position with the Department of Cardiac Surgery within the Section of Surgical Sciences and the Vanderbilt University School of Medicine. Nothing in this letter is intended to override the terms of your employment as established by the By-laws of the Vanderbilt Medical Group (VMG), the Medical Staff by-laws of Vanderbilt University Hospital (VUH), any other hospital owned by or affiliated with the Vanderbilt University Medical Center (VUMC), or the Vanderbilt University Faculty Manual (http://vanderbilt.edu/faculty-manual/).

Appointment Terms

You will be recommended for appointment for an initial term of one (1) year beginning May 15, 2014. The term of your employment will be commensurate with the term of your faculty appointment. In the event you elect not to continue your employment for any reason, you must provide written notice not less than 4 months before the requested date upon which your employment/faculty appointment will conclude.

You will be recommended for appointment as an Instructor of Cardiac Surgery and VAD Transplant Fellow. Your appointment will be in the Department of Cardiac Surgery within the Section of Surgical Sciences under the direction of Michael Petracek, M.D.

Your faculty appointment, including your title and the term of appointment, is subject to approval by the appropriate School of Medicine committees and the Dean of the School of Medicine. Your employment in the Department of Cardiac Surgery and as a member of the Vanderbilt Medical Group (VMG) is contingent upon your maintaining this appointment in good standing at all times. Copies of the Delineation of Privileges in Cardiac Surgery are attached. During the term of your employment, you will be subject to the terms of the Vanderbilt Faculty Manual and other applicable University and VUMC policies and procedures. You also will be subject to the by-laws of the VMG and the VUMC Medical Staff By-laws rules and regulations. As a University employee, you will also be subject to all applicable University policies, as they

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Nashville, TN 37232-8802
tel 615.34
fax 615.34
www.vande

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may exist from time to time, including without limitation the Conflict of Interest Policy, Standards of Conduct, the Policy on Technology and Literary and Artistic Works, the Policy Guidelines for Sponsored Research, each of which is contained in the Faculty Manual (http://vanderbilt.edu/faculty-manual/). Your acceptance of this offer will affirm that you have reviewed and agreed to be bound by these policies.

Credentialing and Licensure

As an Instructor and Clinical Fellow, we will apply for a licensure exemption with the Tennessee Medical Licensing Board (as is customary for residents and clinical fellows) when you have accepted and received your faculty appointment. During your first year as a Clinical Fellow you will not be able to function as an independent billing provider and will not be a member of the Vanderbilt Medical Group (VMG). As soon as you have completed your first year, and provided all requirements for full and unrestricted medical licensure, DEA registration, and medical staff credentials and clinical privileges are fulfilled, we will request your medical staff appointment. This will require your timely completion and cooperation in processing the relevant forms and applications. It takes approximately 120 days after the requests are submitted before you become fully credentialed. In addition, as a compensated faculty member who will provide patient care services, you must also be a member of the VMG, which requires you to enter into a member practice agreement. We will also request this privilege as soon as you have completed your first year of employment. Your continued employment is subject to your maintaining and keeping current and in good standing all necessary clinical practice privileges, licensure exemption, and DEA requirements.

Prior to commencement of your employment, you will be required to provide proof of U.S. citizenship, permanent resident status, or documentation of a valid visa that permits your employment at Vanderbilt. Maintenance of appropriate work authorization is required as a condition of your continued employment at Vanderbilt. We commit to covering the financial costs associated with your Visa application and have the necessary resources to assist you in submitting the appropriate documents necessary to complete and expedite this process.

In addition to review and approval by the appropriate academic bodies, your clinical fellowship and faculty appointment will be contingent upon your meeting Vanderbilt's requirements for and upon Vanderbilt's decision that the results of a mandatory pre-employment background check are acceptable. This pre-employment background check is required by Vanderbilt for all prospective faculty members. This will be performed at no expense to you, and the results will be reviewed only by those persons specified under Vanderbilt's policy governing pre-employment background testing for prospective faculty. Should you accept this offer of employment, you will be provided specific instructions on how to proceed with this mandatory background check. Failure to submit to this background check may result in rescission of your offer in accordance with applicable Vanderbilt policies.

Clinical Responsibilities

As an Instructor and Fellow in our Cardiac Surgery Department, your primary responsibility is to partner with Dr. Simon Maltais, Surgical Director of the Heart Transplantation and VAD

Programs in growing these programs and maintaining excellent clinical outcomes. You will participate in the selection of patients for these procedures and assist in the preoperative, intra-operative, and the postoperative care of the transplant/VAD patients. Other responsibilities include participation in quality improvement efforts, contracting activities, cost effectiveness analysis and outreach efforts for the Heart Transplantation and VAD Programs. You will also perform organ procurement.

We support your participation in VAD and Heart Transplant clinical trials and participation in ongoing development of the VAD database.

With your unique interest in cardiac lead extraction, we would like you to organize and help build, in collaboration with our Electrophysiology Faculty, a lead extraction program for high-risk patients based on the standardization of complex hybrid procedures and establishment of safety protocols at Vanderbilt University Medical Center under our faculty supervision.

We support your involvement in our percutaneous and transapical valve program under the supervision of Dr. Steve Ball.

We anticipate that you will share general on call duties with our cardiac surgeons for general cardiac surgery as well as transplant call, including donor and recipient operations. Naturally, you will be invited to participate in, and co-author subsequent publications and national presentations, as appropriate.

Full participation in education and clinical activities of the Department is expected. These activities include, but are not limited to, Grand Rounds, Valve Conference, Journal Club, and M & M. We expect each faculty member to be committed to the Residency Education program in Thoracic Surgery as well as to teaching General Surgery residents and medical students rotating on service.

Compensation and Benefits

In consideration of the satisfactory performance of your professional and other responsibilities and satisfactory discharge of your administrative duties, your salary during the initial term of your faculty appointment will be [redacted]. Among other criteria, this methodology will be determined in accordance with all applicable regulatory requirements. In no event shall compensation include any payment of Accounts Receivable upon or following the departure of a Participating Member from the VMG or from Vanderbilt. Your compensation will be paid in accordance with standard Vanderbilt Medical Center payroll procedures and will be subject to all applicable withholdings.

Benefits

As a full-time faculty member, you will be eligible to participate in the Vanderbilt benefits package. These benefits currently include health insurance, life insurance, accidental death and dismemberment insurance, retirement benefits and tuition benefits for college-bound dependents. The University retains the right to modify or rescind any portion of the benefits package in effect at any time. You will be eligible for benefits according to the terms of applicable plans as they

may exist from time to time. If you have any benefit questions that you wish to discuss while considering this offer, you may contact the Vanderbilt Benefits Office for further information.

Professional Liability Coverage

Your professional liability coverage will be provided through the Vanderbilt Office of Risk and Insurance Management during the term of your Vanderbilt employment. If you have been engaged in medical practice for compensation outside of and/or subsequent to completing your formal training, you will be expected to provide, at no cost to Vanderbilt, evidence of tail coverage acceptable to Vanderbilt with regard to any medical practice activities over the past three years.

Time Away

As a Clinical Fellow, you will be allowed 120 hours of vacation time at the beginning of your appointment period. Vacation must be used within the appointment period and will not carry over to the next appointment period.

Requests for time off must be submitted at least three months in advance so coverage of clinical duties is assured. Requests are on a first come, first serve basis unless a compelling reason is provided. It is the Chairman's responsibility to ensure that the clinical requirements for the service are always met; therefore the Chairman reserves the right to refuse time off based on coverage of clinical duties.

Confidentiality

Unless otherwise required by law, you shall not, without obtaining the prior written consent of the Chairman of the Section of Surgical Sciences, disclose information related to the business affairs, strategies, or operations of the Section of Surgical Sciences.

Term and Termination

As mentioned above, your initial term of employment will commence May 15, 2014 and end May 14, 2015. The offer described in this letter is subject to and made in reliance on the accuracy and completeness of information you have provided regarding your prior education, training, and employment history and medical staff history. If you agree with the terms of this offer, please sign below and return the signed offer by April 16, 2014. This offer is withdrawn and is no longer valid after that date. If you modify the terms of the offer, this will be considered a counteroffer that the Department may accept or decline in writing at its sole discretion.

Summary

Matt, if you have any questions about this offer, please contact me as soon as possible. I am very enthusiastic about your recruitment to Vanderbilt. If I can answer any questions, please call me anytime.

With warmest personal regards,

Michael R. Petracek, M.D.
Professor of Clinical Cardiac Surgery
Chairman
Department of Cardiac Surgery

R. Daniel Beauchamp, M.D.
J. C. Foshee Distinguished Professor and Chairman
Section of Surgical Sciences

Please indicate your acceptance of this offer by signing and dating this letter and returning to us no later than April ~~10~~ 16, 2014.

Accepted:

Matthew R. Danter, M.D. Date April 10, 2014

New Mexico Medical Board
2055 S. Pacheco, Building 400
Santa Fe, NM 87505
505-476-7220 fax 505-476-7237
(toll free within New Mexico 800-945-5845)

General Information

Licensee	Matthew Danter	License Type	Medical Doctor
Business address	1215 21st Ave South	License Number	MD2014-0603
Business address		License Status	Active
Business city state zip	Nashville TN 37232	License Date	06/27/2014
Business phone	615-343-9195	**License Expires	07/01/2016

* The Board does not verify current specialties. For more information please see the American Board of Medical Specialties website at: www.abms.org to determine if the physician has earned a specialty certification from this private agency.

** A New Mexico medical license that has not been renewed by July 1 of the renewal year will remain temporarily active with respect to medical practice until September 30 of the renewal year at which time, the status will be changed to lapsed.A lapsed license is not valid for practice in New Mexico.

PUBLIC ACTIONS:None
(while licensed in New Mexico)

New Search

This Board's data has been searched 38415 times since 05/08/2001
Date information last updated: 07/11/14

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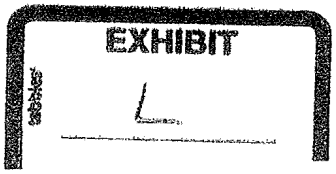

VANDERBILT UNIVERSITY School of Medicine

John G. Byrne, M.D.
William S. Stoney Professor and Chairman
Department of Cardiac Surgery
Professor of Medicine in Cardiology

July 1, 2014

Matthew R. Danter, M.D., F.R.C.S.
Unit 4, 97 Sunvale Place
Stoney Creek, Ontario
L8E4Z7

CONFIDENTIAL

Dear Dr. Danter:

We are pleased to extend an offer to you to join the Department of Cardiac Surgery, within the Section of Surgical Sciences and the School of Medicine at Vanderbilt University. This offer letter supersedes and cancels the offer letter dated November 21, 2013. This letter sets forth the terms, which we have agreed will govern your employment and your income with the Trustees of Vanderbilt University during the initial appointment term. Nothing in this letter is intended to override the terms of your employment as established by the By-laws of the Vanderbilt Medical Group (VMG), the Medical Staff by-laws of Vanderbilt University Hospital (VUH), any other hospital owned by or affiliated with the Vanderbilt University Medical Center (VUMC), or the Vanderbilt University Faculty Manual (http://vanderbilt.edu/faculty-manual/).

Appointment Terms

You will be recommended for appointment for an initial term of three (3) years beginning July 1, 2015. The term of your employment will be commensurate with the term of your faculty appointment. Your faculty appointment may be renewed at the discretion of the Department Chair and Dean. Procedures for renewal are set forth in the Vanderbilt *Faculty Manual* (http://vanderbilt.edu/faculty-manual/). In the event you elect not to continue your employment for any reason, you must provide written notice not less than 4 months before the requested date upon which your employment/faculty appointment will conclude.

You will be recommended for appointment as an Assistant Professor of Cardiac Surgery to the full-time faculty on the clinician educator track. Your appointment will be in the Department of Cardiac Surgery within the Section of Surgical Sciences under the direction of Dr. Michael Petracek.

Your faculty appointment, including your title and the term of appointment, is subject to approval by the appropriate School of Medicine committees and the Dean of the School of Medicine. Your employment in the Department of Cardiac Surgery and as a member of the Vanderbilt Medical Group (VMG) is contingent upon your maintaining this appointment in good standing at all times.

VANDERBILT UNIVERSITY
Medical Center East, North Tower
1215 21st Avenue South, Suite 5025
Nashville, Tennessee 37232-8802
john.b
tel 61
fax 61

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During the term of your employment, you will be subject to the terms of the Vanderbilt *Faculty Manual* and other applicable University and VUMC policies and procedures. You will also be subject to the by-laws of the Vanderbilt Medical Group and the VUMC Medical Staff by-laws and Rules & Regulations. As a University employee, you are subject to all applicable University policies, as they may exist from time to time, including without limitation the Conflict of Interest Policy, Standards of Conduct, the Policy on Technology and Literary and Artistic Works, and the Policy Guidelines for Sponsored Research, each of which is contained in the *Faculty Manual* (http://vanderbilt.edu/faculty-manual/). Your acceptance of this offer will affirm that you have reviewed and agree to be bound by these policies.

Credentialing and Licensure

Your medical staff appointment cannot be finalized until all requirements for medical licensure, DEA registration and medical staff credentials and clinical privileges are fulfilled. This will require your timely completion and cooperation in processing the relevant forms and applications. It is expected that you will complete and submit all relevant forms not later than 120 days before beginning your faculty appointment and employment. As a compensated faculty member who will provide patient care services, you must also be a member of the Vanderbilt Medical Group (VMG), which requires you to enter into a member practice agreement. Your employment and your salary and benefits will not commence until these medical staff and VMG appointments have been made and all relevant licensure for practice has been completed. Your continued employment is subject to your maintaining and keeping current all licensure and DEA requirements and remaining eligible to participate as a Medicare provider.

Prior to commencement of your employment, you will be required to provide proof of U.S. citizenship, permanent resident status, or documentation of a valid visa that permits your employment at Vanderbilt. Maintenance of appropriate work authorization is required as a condition of your continued employment at Vanderbilt.

In addition to review and approval by the appropriate academic bodies, your faculty appointment will be contingent upon your meeting Vanderbilt's requirements for and upon Vanderbilt's decision that the results of a mandatory pre-employment background check are acceptable. This pre-employment background check is required by Vanderbilt for all prospective faculty members. This will be performed at no expense to you, and the results will be reviewed only by those persons specified under Vanderbilt's policy governing pre-employment background testing for prospective faculty. Should you accept this offer of employment, you will be provided specific instructions on how to proceed with this mandatory background check. Failure to submit to this background check may result in rescission of your offer in accordance with applicable Vanderbilt policies.

Clinical Responsibilities

As an Assistant Professor in our Cardiac Surgery Department, your primary responsibility is to partner with Dr. Simon Maltais, Surgical Director of the Heart Transplantation and VAD Programs in growing these programs and maintaining excellent clinical outcomes. You will participate in the selection of patients for these procedures and assist in the preoperative, intra-operative, and the postoperative care of the transplant/VAD patients. Other responsibilities

include participation in quality improvement efforts, contracting activities, cost effectiveness analysis and outreach efforts for the Heart Transplantation and VAD Programs. We support your participation in VAD and Heart Transplant clinical trials and participation in ongoing development of the VAD database.

With your unique interest in cardiac lead extraction, we would like you to organize and help build, in collaboration with our Electrophysiology Faculty, a lead extraction program for high-risk patients based on the standardization of complex hybrid procedures and establishment of safety protocols at Vanderbilt University Medical Center. We support your inclusion in developing and improving our percutaneous and transapical valve program.

With your Master's Degree in epidemiology, we would like you to foster a collaboration with Dr. Thomas Wang, Chief of Cardiovascular Medicine in academic research. This is a unique opportunity to create and promote collaboration with our cardiology department and increase our clinical research in the Department of Cardiac Surgery. We support protected research time as long as our clinical coverage can meet this need.

We anticipate that you will share general on call duties with other cardiac surgeons for general cardiac surgery as well as transplant call, including donor and recipient operations. Furthermore, we anticipate your full participation in our patient registry. Naturally, you will be invited to participate in, and co-author subsequent publications and national presentations, as appropriate.

Full participation in education and clinical activities of the Department is expected. These activities include, but are not limited to, Grand Rounds, Valve Conference, Journal Club, and M & M. We expect each faculty member to be committed to the Residency Education program in Thoracic Surgery as well as to teaching General Surgery residents and medical students rotating on service. All members of the Departmental faculty who provide patient care services must also accumulate at least 40 hours of continuing medical education credit each year for reappointment, which minimum is subject to increase at the discretion of the Department Chair. You must keep a record of CME hours and report them to the Department Chair as a condition of your employment and reappointment

Compensation

In consideration of the satisfactory performance of your professional and other responsibilities and satisfactory discharge of your administrative duties, your annual base salary during the initial term of your faculty appointment will be [redacted]. In addition to your compensation, the Department will pay you a one-time signing bonus of [redacted]. The signing bonus will be paid to you upon receipt of the signed offer letter. This bonus does not increase base salary. Because of the considerable length of time prior to your start date and the unique circumstance of your fellowship, we will provide you with the full signing bonus at the start of your fellowship.

You will also be eligible for additional compensation in compliance with the Department of Cardiac Surgery Physician Compensation plan. Among other criteria, this methodology will be determined in accordance with all applicable regulatory requirements. In no event shall compensation include any payment of Accounts Receivable upon or following the departure of a Participating Member from the VMG or from Vanderbilt.

Your compensation will be paid in accordance with standard Vanderbilt Medical Center payroll procedures and will be subject to all applicable withholdings.

Benefits

As a full-time faculty member, you will be eligible to participate in the Vanderbilt benefits package. These benefits currently include health insurance, life insurance, accidental death and dismemberment insurance, retirement benefits and tuition benefits for college-bound dependents. The University retains the right to modify or rescind any portion of the benefits package in effect at any time. You will be eligible for benefits according to the terms of applicable plans as they may exist from time to time. If you have any benefit questions that you wish to discuss while considering this offer, you may contact the Vanderbilt Benefits Office for further information.

Relocation Expenses

The Department will also pay your reasonable, documented moving expenses up to a maximum of [redacted] You are expected to obtain estimates from movers, and accept the lowest reasonable bid. Copies of estimates and reasonably detailed invoices must be submitted to the Department in order to obtain reimbursement. Alternatively, you may use a Vanderbilt preferred vendor and we will coordinate this with you if you prefer. Relocation expenses must be reported as taxable income to you in accordance with applicable law. Again, because of the considerable length of time prior to your start date and the unique circumstance of your fellowship, we will provide you with moving expenses at the start of your fellowship.

Cost Recovery

In the event that you withdraw this agreement or are terminated by Vanderbilt before July 1, 2015, you will be expected to repay Vanderbilt the full amount of the sign-on bonus and moving expenses paid to you.

Time Away

Faculty members in the Section receive 22 vacation days annually, as well as the standard holidays. Vacation time cannot be accrued from fiscal year to fiscal year. The goal is for faculty members to be able to take sufficient vacation and time away to accomplish those personal things they need to accomplish on an annual basis, as well as to refresh and rejuvenate themselves.

Requests for time off must be submitted at least three months in advance so coverage of clinical duties is assured. Requests are on a first come, first serve basis unless a compelling reason is provided. It is the Chairman's responsibility to ensure that the clinical requirements for the service are always met; therefore the Chairman reserves the right to refuse time off based on coverage of clinical duties.

Professional Liability Coverage

Your professional liability coverage will be provided through the Vanderbilt Office of Risk and Insurance Management during the term of your Vanderbilt employment. If you have been engaged in medical practice for compensation outside of and/or subsequent to completing your formal training, you will be expected to provide, at no cost to Vanderbilt, evidence of tail coverage acceptable to Vanderbilt with regard to any medical practice activities over the past three years.

Non-Compete

During the period of your employment by Vanderbilt and for a period of two (2) years following: (i) any early termination of such employment by you for convenience; (ii) any non-renewal of your continued employment by Vanderbilt for cause; or (iii) early termination by Vanderbilt for your breach, you will not, without the prior written consent of the Chair of the Department and the Chief Medical Officer of the Vanderbilt Medical Group, practice medicine, maintain an office for the practice of medicine, or otherwise engage in any business or activity that competes, directly or indirectly, with the medical services in which Vanderbilt engages within an area defined, at Vanderbilt's sole discretion, to be comprised of Davidson, Williamson, Wilson, Sumner, and Rutherford counties or the portions of any other county within a ten (10) mile radius of your primary office location. This non-compete applies solely to the practice of cardiac surgery.

Non-solicitation of Employees

By your acceptance of this offer, you hereby covenant and agree that you shall not, following any termination of your employment, induce or attempt to influence any employee or independent contractor of Vanderbilt or its affiliates to terminate his/her relationship with Vanderbilt or its affiliates or to enter into an employment or other contractual relationship with you or an entity affiliated with you, or solicit any person or entity having a patient service contractual arrangement with Vanderbilt or its affiliates for the purpose of soliciting any then current patients of Vanderbilt or its affiliates.

Non-interference

You hereby covenant and agree that you shall not, following any termination of your employment, induce or attempt to influence any hospital or health care facility or physician, medical professional, or other individual with a referring relationship to Vanderbilt or its affiliates to terminate such a relationship.

Confidentiality

Unless otherwise required by law, you shall not, without obtaining the prior written consent of the Chairman of the Section of Surgical Sciences, disclose information related to the business affairs, strategies, or operations of the Section of Surgical Sciences.

Term and Termination

As mentioned above, your initial term of employment will commence July 1, 2015 and end June 30, 2018.

The offer described in this letter is subject to and made in reliance on the accuracy and completeness of information you have provided regarding your prior education, training, and employment history and medical staff history. If you agree with the terms of this offer, please sign below and return the signed offer by July 7, 2014. This offer is withdrawn and is no longer valid after that date. If you modify the terms of the offer, this will be considered a counteroffer that the Department may accept or decline in writing at its sole discretion.

Summary

Matt, If you have any questions about this offer, please contact me as soon as possible. I am very enthusiastic about your recruitment to Vanderbilt. If I can answer any questions, please call me anytime.

With warmest personal regards,

Michael R. Petracek, M.D.
Professor of Clinical Cardiac Surgery
Interim Chairman
Department of Cardiac Surgery

R Daniel Beauchamp, M.D., F.A.C.S.
J.C. Foshee Distinguished Professor of Surgery
Chair, Section of Surgical Sciences

I accept this offer as outlined above and agree that it represents the entire agreement of the parties with respect to my employment and supersedes all prior agreements, whether written or oral.

Accepted:

Matthew R. Danter, M.D., F.R.C.S.

Date: July 3, 2014

VANDERBILT UNIVERSITY MEDICAL CENTER

Department of Cardiac Surgery
Vanderbilt Heart and Vascular Institute

April 11, 2014

US Department of Homeland Security
Citizenship and Immigration Services

RE: H-1B Petition, Matthew R. Danter, M.D.

I am writing in support of an H1B Visa for Matthew R. Danter MD, FRCSC.

I am the Professor and Chairman of the Department of Cardiac Surgery at Vanderbilt University Medical Center, one of the leading institutions in the field of cardiovascular medicine performing over 1,800 adult and pediatric cardiac surgery procedures a year. I am the Surgeon-in-Chief and Co-director of the Vanderbilt Heart and Vascular Institute. My major field of interest in valve surgery and mitral valve surgery in the failing heart in particular. I have been a leader in the development of minimally invasive techniques for mitral valve repair or replacement in heart failure patients. I have directed numerous post-doctoral educational programs on techniques for valve surgery. I have authored numerous peer reviewed scientific articles on cardiac surgery and related areas and have authored several book chapters in cardiac surgery texts including Cardiac Surgery in the Adult – the most referenced text book in cardiac surgery today. I received my undergraduate degree from Baylor University and my medical degree from Johns Hopkins Medical School in 1971. I have been associated with Vanderbilt University for over thirty years during which I have performed over 10,000 cardiac surgical procedures.

As Chairman of the Department of Cardiac Surgery, I began recruitment for a surgeon to assist our director of heart failure surgery and to work with our arrhythmia surgical service. The transplant and ventricular assist device program is among the top five in the country for volume with the best one year survival rate. Our advanced heart failure research is internationally recognized and is actively involved in numerous important innovations in cardiac surgery. Our arrhythmia service is also very strong and is very active in developing new techniques for lead extraction and hybrid approaches for treatment of atrial fibrillation. Finding a surgeon that is trained to do

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both is very difficult and Dr. Danter was highly recommended by several top surgeons in the US and Canada. During multiple rigorous interviews at Vanderbilt it became apparent that he was the only candidate that was trained in both fields. In addition he has had a fellowship in percutaneous aortic valve replacement which is another of our major fields of interest. He also has a masters degree in cardiac epidemiology which will help us evaluate the long term benefit of these procedures and establish which patients should have them. He is obviously the top candidate for our position and the only one that will make a major difference in our heart failure and arrhythmia program at Vanderbilt.

Dr. Danter's expertise in the medical and surgical management of end-stage heart failure is extensive. He has shown an interest in this field throughout his residency and fellowship training. After completing his residency at the University of Alberta which is one of Canada's largest transplant centers, he did a fellowship in heart failure and mechanical circulatory support in Vancouver under the direction of Dr. Anson Cheung one of the leading physicians in that field. His significant research contributions include a systematic review of the efficacy of pulsatile left ventricular assist devices which was presented at the University of Alberta. While at Vancouver he was able to correlate the cost-effectiveness of the Impella left ventricular assist device compared to extracorporeal membrane oxygenation in patients with cardiogenic shock which has been accepted for publication. He also preformed independent cardiac organ procurement and transplant.

Dr. Danter has also published and presented research both nationally and internationally in other fields. He is the co-principle investigator for a new sternal closure technique that has been especially useful for patients with healing problems. His extensive bench top scientific biomechanical analysis and analysis of device safety resulted in an ongoing randomized controlled trial of the device in comparison to conventional sternal closure techniques. This significant patient benefiting work was presented at the Canadian Cardiovascular Society Conference in 2011. One of his most important contributions outside of heart failure has been in arrhythmia surgery. Lead extraction has become a common problem and carries significant morbidity and mortality. His research in laser lead extraction resulted in the first laser lead extraction risk score that enables the physician to predict which patients are most likely to have an adverse clinical outcome. This critical paper was one of the most important papers presented at the 2012 Cardiostim Conference in Nice, France and is to be published in Circulation – one of our most prestigious journals. His work has earned him international recognition as a major contributor to the field of complex laser lead extraction and benefited a large number of patients. This is of great interest to us since our arrhythmia department has a large laser lead extraction service and the addition of his expertise would greatly improve our patient care.

One of the Vanderbilt Heart and Vascular Institute's most important commitments is to the education of its staff, medical students, and future cardiovascular physicians. Dr. Danter has shown a high level of knowledge in our specialty by ranking in the 99th percentile on the American Board of Thoracic in-training exam in adult and congenital surgery. He has been active and very dedicated to resident training in his present position. He is completing a Masters of Sciences in clinical epidemiology in adult cardiac surgery patients. This will be of great value in evaluating the outcomes in our patients and determining future therapy at Vanderbilt.

In summary, Dr. Danter has a unique set of skills that we have been unable to find in any other candidate. He has shown extreme commitment to research and patient care in the fields of heart failure, laser lead extraction, percutaneous aortic valve surgery, and education. He has shown the ability to provide superb patient care while doing innovative and novel research that has provided great benefit to a large number of patients.

Bringing him to Vanderbilt University Medical Center will help us continue to develop new and innovative therapies that will be of great value to patients throughout the United States and enable Vanderbilt to continue to be one of the premier institutions in the country. I therefore offer my unconditional support and appeal for the approval of this O-1 petition.

Sincerely,

Michael R. Petracek, M.D.
Professor and Chairman
Department of Cardiac Surgery

SENATOR WILLIAM H. FRIST, M.D.
U. S. SENATE (1995 - 2007)
MAJORITY LEADER (2002 - 2007)

January 28, 2014

U.S. Department of Homeland Security
Citizenship and Immigration Services

Re : O-1 Petition Letter, Dr. Matthew R. Danter BSc (Hon) MD, FRCSC

Dear Sir/Madam:

Dr. Matthew Danter is a talented and dedicated young surgeon, researcher and educator in the fields of cardiovascular surgery, laser lead extraction, transcatheter valve implantation and advanced heart failure management, and I strongly support his petition for an O-1 Visa. I believe that he is exactly the type of physician-scientist that the USCIS should support and permit to remain in the United States as Assistant Surgical Director of Heart Transplantation and Mechanical Assist Devices Program at the distinguished Department of Cardiovascular Surgery at Vanderbilt University.

Dr. Danter represents a combination of surgical skills that only a handful of people in the world possess. He is a dedicated clinical researcher involved in the evaluation of surgical outcomes, novel surgical technologies, as well as development and evaluation of risk assessment tools in lead extraction.

I am the former Majority Leader of the United States Senate. More importantly for the purpose of this petition letter, I am the founder of the Vanderbilt Multi-Organ Transplant Center and its first surgical director. I have performed over 150 heart and lung transplantations, have written over 100 peer-reviewed papers, and been active in health policy at the federal level serving on both the Finance Committee and the HELP Committees in the U.S. Senate, both of which oversee health policy and financing for the country. I am currently active in the cardiac surgical program as an Adjunct Professor of Cardiac Surgery and teaching this semester at the Vanderbilt Owen School for Management.

He came highly recommended from his residency program at the University of Alberta, where, in his final year of residency training he ranked in the 99th percentile of all trainees who wrote the of the ABTS in training exam in the adult and congenital cardiac surgery sections; and astonishingly was the 100th percentile among final year trainees. Dr. Danter has demonstrated surgical skills far above his level of training, however, it was his commitment to patient care that was most impressive. Dr. Danter was a clinical fellow at St. Paul's Hospital for two years, and in addition to full general adult cardiac surgery, he excelled at laser lead extraction and complex lead management. St. Paul's Hospital is a pioneer in complex lead management, and is the western North American training center for this technology. Dr. Danter, as I understand, has taken these skills and developed a new laser lead extraction program in just over a year's time. In his final year of fellowship, he obtained further training and experience in transcatheter valve implantation used in the management of patients with aortic valve stenosis and who are not conventional surgical candidates.

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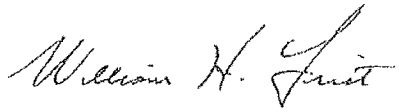
Dr. Danter is an outstanding young clinician, scientist and educator, who possesses a unique skill set and experience placing him among very few unique individuals able to combine exemplary clinical practice with cutting edge highly specialized skills and innovative collaborative research potential. He is clearly an extraordinary young cardiac surgeon with a unique combination of important surgical skills that will support multiple programs within Vanderbilt University, and no doubt further the innovation and reputation of that institution. He will help Vanderbilt and the USA, make significant advances and contributions to the field of advanced heart failure therapies and heart transplantation, and complex lead management. He is a part of a small cadre of extraordinary physicians with training and devotion to this highly demanding field.

I offer my strongest endorsement for approval of this O-1 petition, and recommend Dr. Danter with unrestricted support.

Sincerely yours,



Senator William H. Frist, M.D.
Former Majority Leader
US Senate

WHF/syr

THE UNIVERSITY OF BRITISH COLUMBIA
DIVISION OF CARDIOVASCULAR SURGERY

Dr. J.G. Abel
Dr. J.G. Bashir
Dr. A.J.M. Campbell
Dr. A.W.C. Cheung
Dr. R.C. Cook
Dr. G. Fradet
Dr. V.M. Gudas
Dr. R.L. Hayden
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Dr. P.L. Skarsgard
Dr. J. Ye
Senior Associate Staff
Dr. A. Poostizadeh
Associate Staff
Dr. P. Bai
Dr. C. Wan

February 19, 2014

U.S. Department of Homeland Security
Citizenship and Immigration Services

RE: O-1 Petition Letter, Dr. Matthew R. Danter BSc (Hon) MD, FRCSC

Dear Sir/Madam,

This letter is written in strong support of Dr. Danter's petition for an O-1 visa.

Dr. Danter did his general cardiac surgical training in Edmonton and was highly recommended as the top graduate from that program for fellowship at St. Paul's Hospital in Vancouver. I worked intimately with him from July of 2010 to August 2012. He spent more time clinically with me in the operating room than any other surgeon during that fellowship. I must say, he came superbly well trained from Edmonton and was unusually ahead of technical skills at that point in time. He also had a very impressive knowledge base, which is the substrate for his superb clinical, academic, and teaching skills which will be detailed below. During the two years, he evidenced extraordinary technical skills and was certainly capable of independent practice. He performed virtually all of my operations skin to skin, with myself assisting him during that time. He is efficient in the operating room, has mature intraoperative judgement, and manages the team well. He has a high level of personal professional responsibility for all the cases that he has been involved with. He carried this responsibility through in the postoperative period and even after discharge, often phoning complex patients at home to ensure that they were doing well. I have never seen this before in a post graduate trainee, which attests to his superlative character. Although I did not personally train him in all of our subspecialty areas, with myself and other surgeons he experienced the full breadth of fellowship training, including pacemaker and AICD device implantation, laser lead extraction, transcatheter valve implantation procedures, aortic surgery, ventricular assist device insertion and cardiac transplantation. The unique fellowship opportunity he experienced and his ongoing clinical experiences subsequently, give him a wide and unusual skill set for recruitment to Vanderbilt University in a subspecialty role in heart transplantation and mechanical assist devices.

From an academic point of view, he has been unusually active in clinical research, given his fellowship position. He was the primary driver in setting up a randomized trial of a sternal closure device. He executed a large retrospective review of sternal closure techniques, which resulted in a manuscript in submission. He was involved in numerous other clinical research projects with other surgical staff. He has excellent knowledge of research application processes and data analysis and manuscript preparation, which will serve him well in an academic position.

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THE UNIVERSITY OF BRITISH COLUMBIA
DIVISION OF CARDIOVASCULAR SURGERY

Dr. J.G. Abel
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Associate Staff
Dr. P. Bui
Dr. C. Wan

Dr. Danter also proved himself exceptional in his teaching efforts. He went out of his way to prepare didactic and exam practice sessions for academic resident half days, and the feedback from the residents was that the sessions were extremely useful. This dedication to teaching at this stage of his career is special. He also served as an intraoperative mentor and demonstrator of junior residents and medical students in basic and more advanced cardiac surgical technique.

Dr. Danter has a dynamic and enthusiastic personality, which is important in the team relationships that excellent outcomes in cardiac surgery require. He constantly demonstrated the highest professional and ethical standards in the care of his patients and in his professional relationships with peers and members of the team at all levels. I have been training fellows for the last 20 years, and Dr. Danter is at the top of that list in all of his skills and attributes. I have no doubt that with his unusual superlative skill set that he will have an innovative, productive, and highly successful career.

Yours sincerely

James G. Abel, MD, MSc, FRCSC
Lead Physician and Head, PHC Division of Cardiovascular and Thoracic Surgery
Clinical Associate Professor of Surgery, UBC
Associate Head, UBC Division of Cardiovascular Surgery
St. Paul's Hospital, Room 492, 1081 Burrard Street, Vancouver, B.C. V6Z 1Y6
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JA/cmd

VANDERBILT UNIVERSITY MEDICAL CENTER

Department of Cardiac Surgery
Vanderbilt Heart and Vascular Institute

January 13, 2014

U.S. Department of Homeland Security
Citizenship and Immigration Services

Re: O-1 Petition Letter, Matthew R. Danter BSc (Hon) MD, FRCSC

Dear Sir/Madam:

This is a letter of support for Dr. Matthew Danter's O-1 Visa application. Dr. Danter is a highly skilled physician-scientist, and is dedicated to clinical work and studies in relation to heart failure, end-stage cardiomyopathy, transcatheter aortic valve insertion and complex surgical lead extraction. Throughout this letter, I hope to demonstrate Dr. Danter's extraordinary and unique talents, which easily merit his appointment as an Assistant Professor of the Department of Cardiac Surgery and Assistant Director of the Heart Transplantation and Mechanical Circulatory Support Program at the distinguished Department of Cardiovascular Surgery at Vanderbilt University Medical Center. His combination of skills and experience will unanimously be an enormous service to our cardiac surgical population in Tennessee, and to a larger extent, benefit the people of the United States.

I am an Assistant Professor of Surgery in the Department of Cardiac Surgery, and an Assistant Professor of Medicine in Cardiology at Vanderbilt University Medical Center. I am the Surgical Director of the Heart Transplantation and the Mechanical Circulatory Support programs. Dr. Hartzell V. Schaff, of the Mayo Clinic in Rochester, Minnesota, highly recommended me to the Vanderbilt Heart and Vascular Institute after my completion of advanced training in complex advanced heart failure interventions. I completed my medical training in 2003, and obtained my adult cardiac surgery degree in Montreal, Canada in 2009, at the renowned Montreal Heart Institute. I was able to successfully pursue and defend a doctorate degree (Ph.D.) in translational and clinical research. Subsequently, I have successfully developed the mechanical circulatory support and the heart transplantation programs at Vanderbilt University, surpassing expectations with clinical outcomes and research accomplishments in the field of advanced heart failure. I have authored several scientific articles on cardiac surgery and heart failure management. Additionally, I have published multiple book chapters in major heart failure texts, and am considered a pioneer in minimally-invasive implantation of left ventricular assist devices. My memberships include the Royal College of Surgeons and Physicians of Canada, the American Heart Association, the Southern Thoracic Surgery Society, The Society of Thoracic Surgeons, and the International Society of Heart and Lung Transplantation. I serve on several committees for the major national cardiovascular organizations, and I act as a reviewer for over 15 peer-reviewed scientific journals.

As the Surgical Director of the Heart Transplantation and Mechanical circulatory Support programs at Vanderbilt University Medical Center over the past three years, I have had the opportunity to evaluate several candidates for Dr. Danter's position and he is highly recommended by nationally-recognized advanced heart failure surgeons. Dr. Danter

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underwent a rigorous recruitment process at Vanderbilt, and it became very clear to all that he would be an excellent addition to our department. He is an extremely talented, young clinician-scientist and has performed groundbreaking studies in very unique subspecialty areas of adult cardiac surgery, such as laser lead extraction complex lead management, left ventricular assist devices, cardiac transplantation, and transcatheter valve implantation. His incomparable clinician abilities combined with his exceptional attributes are essential to the progress of our specialty.

Dr. Danter has published and presented his research studies at many national and international conferences, and he has received multiple awards for his accomplishments. As an example, I worked with him as a co-principal investigator on the evaluation of a novel sternal closure device. This involved complex bench top basic science biomechanical analysis of device performance, as well as a retrospective analysis of device safety. The results have culminated in an ongoing randomized controlled trial of the device in comparison to conventional sternal closure. His outstanding work was presented at the Canadian Cardiovascular Society Conference in 2011. Additionally, his research focuses on the management of complex lead extraction that has also produced the first laser lead extraction risk score, using a combination of clinical and demographic variables to predict major adverse clinical outcomes in patients undergoing complex laser lead extraction. This seminal paper was a keynote presentation at the 2012 *Cardiostim Conference* in Nice, France, and is under revision for publication in the prestigious journal, *Circulation*. This international recognition has allowed him to establish himself as a pioneer in complex hybrid laser lead extraction, an evolving subspecialty of adult cardiac surgery. His recent research work therefore provides an enormous service to cardiac surgery patients and would greatly benefit the population of the United States.

Dr. Danter is distinghished in the management of complex end-stage heart failure. I followed his progress in this field through his residency, and I was very impressed with his experience in advanced heart failure management. He completed his residency at the University of Alberta which is western Canada's largest cardiac transplant center. Futhermore, he successfully completed a fellowship training in Vancouver, British Columbia, Canada under the supervision of Dr. Anson Cheung, an internationally recognized figure in mechanical circulatory support. His work correlated the cost-effectiveness of the Impella left ventricular assist device compared to extracorporeal membrane oxygenation in patients with cardiogenic shock. It was successfully completed and is currently under revision for publication. He has also performed a systematic review of the efficacy of pulsatile left ventricular assist devices in patients with advanced heart failure. This work was presented at the University of Alberta during a special research day. He possesses a very unique experience in left ventricular assist devices, extra-corporeal membrane oxygenator implants, and has performed independent cardiac and thoracic transplantations. He has a constellation of surgical skills rarely found in one person, and his exemplary skills are matched by his commitment to clinical excellence. Dr Danter also demonstrates a constant dedication to surgical and medical education. He has a unique

capability to help residents progress. His ability to understand the learning processes was demontrated as he ranked in the 99th percentile of all trainees who wrote the American Board of Thoracic Surgery in-training exam in the adult and congenital cardiac surgery sections. He is completing a Masters of Sciences focusing on clinical epidemiology in adult cardiac surgery patients. This enterprise has led him to present the results of his findings on outcomes in Aboriginal patients undergoing coronary artery bypass surgery in well-recognized national podiums. I am certain that Dr. Danter will continue this commitment to education at Vanderbilt University Medical Center.

In summary, Dr. Danter is an outstanding physician-scientist and is in a group of very few, unique individuals committed to the advances in clinical technology and education. He possesses a unique skill set and experience. Dr. Danter is able to combine exemplary clinical practice and specialized skills to excellent innovative and collaborative research studies. He will most certainly help Vanderbilt make significant progress in the fields of advanced heart failure, complex lead extractions, and medical education. Furthermore, he will help our group better understand the epidemiology of heart failure disease and other disease processes. He is a part of a small cadre of physician-scientists devoted to development of novel technology and state-of-the art clinical outcomes. He is an exceptional cardiac surgeon possessing extraordinarily unique surgical skills that will enable Vanderbilt University Medical Center to continue to innovate and to rank among the premier medical institutions in the United States. I offer my unconditional support and endorsement for the approval of this O-1 petition.

Sincerely yours,

Simon Maltais, MD, PhD
Assistant Professor of Surgery and Assistant Professor in Medicine (Cardiology)
Surgical Director, Heart Transplantation and Mechanical Support Devices
Vanderbilt University Medical Center

BRIGHAM AND WOMEN'S HOSPITAL

HARVARD MEDICAL SCHOOL

John G. Byrne, MD, MBA, FACC
Lawrence H. Cohn Professor of Cardiac Surgery
Harvard Medical School
Chief, Division of Cardiac Surgery
Co-Director Heart & Vascular Center
Brigham and Women's Hospital

January 14, 2014

U.S. Department of Homeland Security
Citizenship and Immigration Services

Re : O-1 Petition Letter, Dr Matthew R. Danter BSc (Hon) MD, FRCSC

Dear Sir/Madam,

Dr Matthew Danter is a talented and dedicated young surgeon, researcher and educator in the fields of cardiovascular surgery, laser lead extraction, transcathcter valve implantation and advanced heart failure management for these reasons I strongly support his petition for an O-1 Visa. Dr Danter is a clinician-scientist who has been developing cutting edge complex surgical skills throughout his clinical and academic development. His unique combination of surgical skills and experience will provide an enormous service to the cardiac surgical population and in particular the heart failure population, greatly benefitting the people of the United States. I believe that he is exactly the type of physician-scientist that the USCIS should support and permit to remain in the United States as Assistant Surgical Director of Heart Transplantation and Mechanical Assist Devices Program at the distinguished Department of Cardiovascular Surgery at Vanderbilt University.

Within the last several years, Dr Danter has achieved one of the most impressive and unique clinical skill sets in cardiac surgery. In addition to being an exemplary general adult cardiac surgeon, he has obtained fellowship level training in the surgical subspecialty areas of laser lead extraction and complex lead management, left ventricular assist devices and cardiac transplantation in the management of end stage heart failure, and trans-catheter valve implantation. This represents a combination of surgical skills that only a handful of people in the world possess. He is also a dedicated clinical researcher involved in the evaluation of surgical outcomes, novel surgical technologies, as well as development and evaluation of risk assessment tools in lead extraction. Dr. Danter is also a talented and committed surgical educator dedicated to supporting the unbroken chain of surgical mentorship through didactic teaching, intra-operative instruction and support of trainee research.

Division of Cardiac Surgery
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Email: jbyrne@partners.org

I am the Chief of the Division of Cardiovascular Surgery at the Brigham and Women's Hospital and a Professor of Cardiac Surgery at the Harvard Medical School, Boston, MA USA. The Brigham and Women's Hospital is a leading institution in the field of cardiac surgery and heart failure therapies, performing more than 2500 cardiac surgery cases every year. I have trained multiple cardiothoracic residents who have gone on to become leaders in our field. Our leading institution invests in many different problems in the management of patients with advanced heart failure, and we are actively involved in numerous groundbreaking innovations in cardiac surgery. I am considered an international leader in the field of cardiac surgery, and I have served as a Principal Investigator or Co-Investigator on several NIH-funded studies. I have published over 200 research articles in peer-reviewed journals, with a particular focus on valve surgery and hybrid approach to cardiac surgery. I am a member of the Editorial Boards of numerous journals such as the Journal of Thoracic and Cardiovascular Surgery and I am a section Editor of Circulation. I have been published in the highest impact peer-reviewed scientific journals including Circulation, Annals of Thoracic Surgery and the Journal of Thoracic and Cardiovascular Surgery. Given my background and my position as the Division Chief of Cardiac Surgery at the Brigham, I am qualified to understand the caliber of Dr. Danter's work. I am extremely impressed with his research performance and already significant contributions in the field of advanced heart failure and cardiac-based stem cell therapies.

Dr. Danter's diverse experience makes him an unusual and exceptional person to fill the much needed position at Vanderbilt Medical Center. The ability to perform both clinical and bench research is uncommon, especially in a busy cardiac surgery practice. He has the capacity to do so and it makes him a gifted-physician-scientist who will certainly continue to use his unique insight to advance the field of cardiovascular surgery.

Dr. Danter has obtained a tremendous amount of experience related to the management of complex end stage heart failure. His residency training was completed at the University of Alberta which is western Canada's largest cardiac transplant center, and does both complex congenital heart surgery and pediatric transplantation. During his residency alone he performed over 50 heart, lung or heart lung procurements, performing six single lung transplants, and five heart transplants as a resident. He also was exposed to mechanical assist devices ranging from extracorporeal membrane oxygenation, thoratec devices, Berlin heart devices for pediatrics, and the evolution of the axial flow pumps the Heartmate II and Heartware devices. From the beginning of his fellowship training he was heavily involved in the cardiac transplantation program and left ventricular assist device program. He was involved with virtually every heart transplant, LVAD or extra-corporeal membrane oxygenator implant over the two years and was an independent cardiac and thoracic transplant retrieval surgeon in the province of British Columbia. In short, Dr. Danter possesses a constellation of surgical skills that are rarely found within one person, and his exemplary skills are matched by his commitment to clinical excellence. He, and his skills, would be an asset to any surgical division.

Dr. Danter's research interests are as varied as his clinical interests. As a resident his research was primarily related to assessing quality of life in patients with coronary artery disease and his work has been presented at the Canadian Cardiovascular Society meetings and other national venues. He is currently a co-principal investigator, with myself, in the evaluation of a novel sternal closure device. This involved bench top basic science biomechanical analysis of device performance, as well as a retrospective analysis of device safety. This has culminated in an ongoing randomized controlled trial of this device in comparison to conventional sternal closure. Dr. Danter was, and continues to be, instrumental in these projects. Also, during his fellowship, he was a co-author on the world's first laser lead extraction risk score which used clinical and demographic variables to predict major adverse clinical outcomes in patients undergoing laser lead extraction. This seminal paper was a keynote presentation at the 2012 Cardiostim conference. Currently, Dr. Danter is developing another randomized controlled trial to evaluate the efficacy of topical antibiotics on preventing sternal wound infections which is an extremely costly and morbid complication. Furthermore, his general attitude and ethos of bringing people together in collaboration would be an asset to any research division.

Dr. Danter also possesses skills in the often overlooked and underappreciated areas of medical education that are worthy of note. Physicians and surgeons have a commitment to the trainees that are to follow them, and Dr. Danter consistently has demonstrated a commitment to surgical and medical education which should not be diminished. As a resident he was a class room

lecturer at the University of Alberta Medical School for three years, which is quite impressive for a cardiac surgery trainee. During his fellowship at St. Paul's he spearheaded the "professors rounds" resident education sessions where practical surgical management is the focus. Intra-operatively he was directly involved with training our residents in the operating room and he possesses a calm and confident demeanor that is essential to fostering an environment for young surgeons to progress. I am certain that Dr. Danter will continue this commitment to education and the future surgeons and patients of Vanderbilt, Tennessee and the United States of America will benefit from it.

In summary, Dr. Danter is an outstanding young clinician, scientist and educator, who possesses a unique skill set and experience placing him among very few unique individuals able to combine exemplary clinical practice with cutting edge highly specialized skills and innovative collaborative research potential . Dr Matthew Danter is clearly an extraordinary young cardiac surgeon with a unique combination of important surgical skills that will support multiple programs within Vanderbilt University, and no doubt further the innovation and reputation of that institution.

Dr. Danter will help Vanderbilt, and the USA, make significant advances and contributions to the field of advanced heart failure therapies and heart transplantation, and complex lead management. He is a part of a small cadre of extraordinary physicians with training and devotion to this highly demanding field. I offer my strongest endorsement for approval of this O-1 petition, and recommend Dr. Danter with unrestricted support.

Sincerely yours,

John G. Byrne, MD, MBA, FACC
Cohn Professor of Cardiac Surgery
Harvard Medical School
Chief, Division of Cardiac Surgery
Brigham and Women's Hospital
Boston, MA

THE UNIVERSITY OF BRITISH COLUMBIA
DIVISION OF CARDIOVASCULAR SURGERY

Dr. J.G. Abel
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Dr. C. Wan

January 23, 2014

U.S. Department of Homeland Security
Citizenship and Immigration Services

Re : O-1 Petition Letter, Dr Matthew R. Danter BSc (Hon) MD, FRCSC

Dear Sir/Madam,

Dr. Matthew Danter is a very talented and dedicated young surgeon, researcher and educator in the fields of cardiovascular surgery, laser lead extraction, transcatheter valve implantation and advanced heart failure management, and I strongly support his petition for an O-1 Visa. Dr. Danter is a clinician-scientist who has been developing cutting edge complex surgical skills throughout his clinical and academic development. His unique combination of surgical skills and experience will provide an enormous service to the cardiac surgical population and in particular the heart failure population; and greatly benefit the people of the United States. I believe that he is exactly the type of physician-scientist that the USCIS should support and permit to remain in the United States as Assistant Surgical Director of Heart Transplantation and Mechanical Assist Devices Program at the distinguished Department of Cardiovascular Surgery at Vanderbilt University.

Within the last several years, Dr. Danter has achieved one of the most impressive and unique clinical skill sets in cardiac surgery. In addition to being an exemplary general adult cardiac surgeon, he has obtained fellowship level training in the surgical subspecialty areas of laser lead extraction and complex lead management, left ventricular assist devices and cardiac transplantation in the management of end stage heart failure, and transcatheter valve implantation. This represents a combination of surgical skills that only a handful of people in the world possess. He is also a dedicated clinical researcher involved in the evaluation of surgical outcomes, novel surgical technologies, as well as development and evaluation of risk assessment tools in lead extraction. Dr. Danter is also a talented and committed surgical educator dedicated to supporting the unbroken chain of surgical mentorship through didactic teaching, intra-operative instruction and support of trainee research. These attributes are essential to the progress and preservation of cardiac surgery as a specialty.

I am the University Head in the Division of Cardiovascular Surgery at the University of British Columbia. The University of British Columbia and associated teaching hospitals is a leading institution in the field of cardiac surgery and heart failure therapies, performing more than 2,000 cardiac

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surgery cases every year. Our leading institution invests in many different problems in the management of patients with advanced heart failure, and we are actively involved in numerous groundbreaking innovations in cardiac surgery. I am considered an international leader in the field of myocardial protection and transapical transcatheter aortic valve implantation, having introduced normothermic heart surgery and performed the first transapical valve implantation. I have served as a Principal investigator or Co-investigator on several Canadian Institute of Health Research (CIHR) studies. I have published over 80 research articles in peer-reviewed journals, with a particular focus on warm heart surgery and transcatheter valves. Given my background and my position as the division chief of cardiovascular surgery, I am qualified to understand the caliber of Dr. Danter's work. I am extremely impressed with his research performance and already significant contributions in the field of advanced heart failure and cardiac-based stem cell therapies.

I became acquainted with Dr. Danter's professional performance as he distinguished himself as an exceptionally productive cardiac surgery fellow at our institution. He came highly recommended from his residency program at the University of Alberta, where, in his final year of residency training he ranked in the 99th percentile of all trainees who wrote the equivalent of the ABTS in training exam in the adult and congenital cardiac surgery sections; and astonishingly was the 100th percentile among final year trainees. Upon arriving at St. Paul's Hospital he already demonstrated surgical skills far above his level of training, however, it was his commitment to patient care that was most impressive. Dr. Danter was a clinical fellow at St. Paul's Hospital for two years, and in addition to full general adult cardiac surgery, he excelled at laser lead extraction and complex lead management. St. Paul's Hospital is a pioneer in complex lead management, and is the western North American training center for this technology. Dr. Danter, as I understand, has taken these skills and developed a new laser lead extraction program at his current institution, Hamilton General Hospital, in just over a year's time. In his final year of fellowship, he obtained further training and experience in transcatheter valve implantation used in the management of patients with aortic valve stenosis and who are not conventional surgical candidates. St. Paul's Hospital is a world leader in transcatheter valve technology and has performed over 300 cases to date.

Dr. Danter has obtained a tremendous amount of experience related to the management of complex end stage heart failure. His residency training was completed at the University of Alberta which is western Canada's largest cardiac transplant center, and does both complex congenital heart surgery and pediatric transplantation. During his residency alone he performed over 50 heart, lung or heart lung procurements, performing six single lung transplants, and five heart transplants as a resident. He also was exposed to mechanical assist devices ranging from extracorporeal membrane oxygenation, thoratec devices, Berlin heart devices for pediatrics, and the evolution of the axial flow pumps the Heartmate II and Heartware devices.

From the beginning of his fellowship training he was heavily involved in the cardiac transplantation program and left ventricular assist device program. He was involved with virtually every heart transplant, LVAD or extra-corporeal membrane oxygenator implant over the two years and was an independent cardiac and thoracic transplant retrieval surgeon in the province of British Columbia. In short, Dr. Danter possesses a constellation of surgical skills that are rarely found within one person, and his exemplary skills are matched by his commitment to clinical excellence. He, and his skills, would be an asset to any surgical division.

Dr. Danter's research interests are as varied as his clinical interests. As a resident his research was primarily related to assessing quality of life in patients with coronary artery disease and his work has been presented at the Canadian Cardiovascular Society meetings and other national venues. He is currently a co-principal investigator, in the evaluation of a novel sternal closure device. This involved bench top basic science biomechanical analysis of device performance, as well as a retrospective analysis of device safety. This has culminated in an ongoing randomized controlled trial of this device in comparison to conventional sternal closure. Dr. Danter was, and continues to be, instrumental in these projects. Also, during his fellowship, he was a co-author on the world's first laser lead extraction risk score which used clinical and demographic variables to predict major adverse clinical outcomes in patients undergoing laser lead extraction. This seminal paper was a keynote presentation at the 2012 Cardiostim conference. Currently, Dr. Danter is developing another randomized controlled trial to evaluate the efficacy of topical antibiotics on preventing sternal wound infections which is an extremely costly and morbid complication. Furthermore, his general attitude and ethos of bringing people together in collaboration would be an asset to any research division.

Dr. Danter also possesses skills in the often overlooked and underappreciated areas of medical education that are worthy of note. Physicians and surgeons have a commitment to the trainees that are to follow them, and Dr. Danter consistently has demonstrated a commitment to surgical and medical education which should not be diminished. As a resident he was a class room lecturer at the University of Alberta Medical School for three years, a feat I do not believe I have heard of ever from a cardiac surgery trainee. During his fellowship at St. Paul's he spear-headed the "professors rounds" resident education sessions where practical surgical management is the focus. Intra-operatively he was directly involved with training our residents in the operating room and he possesses a calm and confident demeanor that is essential to fostering an environment for young surgeons to progress. I am certain that Dr. Danter will continue this commitment to education and the future surgeons and patients of Vanderbilt, Tennessee and the United States of America will benefit from it.

In summary, Dr. Danter is an outstanding young clinician, scientist and educator, who possesses a unique skill set and experience placing him among very few unique individuals able to combine exemplary clinical practice with cutting edge highly specialized skills and innovative collaborative research potential . Dr Matthew Danter is clearly an extraordinary young cardiac surgeon with a unique combination of important surgical skills that will support multiple programs within Vanderbilt University, and no doubt further the innovation and reputation of that institution.

Dr. Danter will help Vanderbilt, and the USA, make significant advances and contributions to the field of advanced heart failure therapies and heart transplantation, and complex lead management. He is a part of a small cadre of extraordinary physicians with training and devotion to this highly demanding field. I offer my strongest endorsement for approval of this O-1 petition, and recommend Dr. Danter with unrestricted support.

Sincerely yours,

Samuel V. Lichtenstein, MD, PhD, FRCSC
Head, Division of Cardiovascular Surgery, University of British Columbia
Regional Cardiac Program Medical Director,
Providence Health Care and Vancouver Coastal Health

Richard Whitlock, MD, MSc, FRCS(C)
Cardiac Surgery and Critical Care Medicine
Associate Professor, Department of Surgery
Faculty of Health Sciences, McMaster University

February 4, 2014

U.S. Department of Homeland Security
Citizenship and Immigration Services

Re : O-1 Petition Letter, Dr Matthew R. Danter BSc (Hon) MD, FRCSC

Dear Sir/Madam,

I am pleased to write this letter in support of this O1 visa petitiion filed by Vanderbilt University on behalf of Dr. Matthew Danter. I have known Dr. Danter for the last 2 years haivng worked with him as a colleague in cardiac surgery. (I am an active cardiac surgeon and critical care physician in the Division of Cardiovascular Surgery at McMaster University in Hamilton, Ontario, Canada. Further, I lead a large research group in cardiac surgery at McMaster University/Population Health Research Institute, and have just completed the largest clinical trial ever performed in Cardiac Surgery. I am considered an international leader in the field of academic cardiac surgery; I have served as a Principal investigator or Co-investigator on many CIHR-funded studies. I have published over 30 articles in peer-reviewed journals, with a particular focus on outcomes in cardaic surgery. I have been published in the highest impact peer-reviewed scientific journals, such as New England of Medicine, Circulation, Chest, and JACC. Given my academic background and my clinical roles, I am qualified to understand the caliber of Danters' work. I am extremely impressed with his research performance and already significant contributions in the field of cardiac surgery.

Dr. Matthew Danter is a talented and dedicated young surgeon, researcher and educator in the fields of cardiovascular surgery, laser lead extraction, transcatheter valve implantation and advanced heart failure management, and I strongly support his petition for an O-1 Visa. Dr Danter has developed complex surgical skills in unique combination that will provide an enormous service to the cardiac surgical population and in particular the heart failure population; and greatly benefit the people of the United States. I believe that he is exactly the type of physician-scientist that the USCIS should support and permit to remain in the United States as Assistant Surgical Director of Heart Transplantation and Mechanical Assist Devices Program at the distinguished Department of Cardiovascular Surgery at Vanderbilt University.

In addition to being an exemplary general adult cardiac surgeon, Dr. Danter has obtained fellowship level training in the surgical subspecialty areas of laser lead extraction and complex lead management, left ventricular assist devices and cardiac transplantation in the management of end stage heart failure, and transcatheter valve

Hamilton General Hospital · DBCVSRI C1-104 · 237 Barton Street East · Hamilton, ON · L8L 2X2
Telephone: 905-521-2100 ext. 40306 · Fax: 905-577-8017 · Email: richard.whitlock@phri.ca · www.hamiltonhealthsciences.ca

Affiliated with the Faculty of Health Sciences, McMaster University

CHEDOKE · CHEDOKEE · HDI · GENERAL · JUDGEVIEW · McMASTER · ST. JOSEPH'S

Richard Whitlock, MD, MSc, FRCS(C)
Cardiac Surgery and Critical Care Medicine
Associate Professor, Department of Surgery
Faculty of Health Sciences, McMaster University

Hamilton
Health Sciences

McMaster
University

implantation. Dr. Danter is also a talented and committed surgical educator dedicated to supporting the unbroken chain of surgical mentorship through didactic teaching, intra-operative instruction and support of trainee research. These attributes are essential to the progress and preservation of cardiac surgery as a specialty.

I became acquainted with Dr Danter's professional performance as he distinguished himself as an exeptionally productive cardiac surgeon at our institution. He came highly recommended from his felllowship training program at St. Pauls hospital. He rapidly gained the respect of the cardiologists in our region and established a large cardiac surgery practice with a varied selction of cases. Further, Dr. Danter took the skills he acquired at St. Pauls hospital and developed a new laser lead extraction program at Hamilton General Hospital, McMaster University.

Dr. Danter has obtained a tremendous amount of experience related to the management of complex end stage heart failure. His residency training was completed at the University of Alberta which is western Canada's largest cardiac transplant center, and does both complex congenital heart surgery and pediatric transplantation. During his residency alone he performed over 50 heart, lung or heart lung procurements, performing six single lung transplants, and five heart transplants as a resident. He also was exposed to mechanical assist devices ranging from extracorporeal membrane oxygenation, thoratec devices, Berlin heart devices for pediatrics, and the evolution of the axial flow pumps the Heartmate II and Heartware devices. In Hamilton, Dr, Danter was instrumental in establishing a clinic in which patients on transplant waiting list and on ventricular assist devices are followed locally. In short, Dr. Danter possesses a constellation of surgical skills that are rarely found within one person, and his exemplary skills are matched by his commitment to clinical excellence. He, and his skills, would be an asset to any surgical division.

Dr. Danter has been involved in a variety of research endeavours linked to his clinical interests. As a resident his research was primarily related to assessing quality of life in patients with coronary artery disease and his work has been presented at the Canadian Cardiovascular Society meetings and other national venues. He is currently a co-principal investigator in the evaluation of a novel sternal closure device. During his fellowship, he was a co-author on the world's first laser lead extraction risk score which used clinical and demographic variables to predict major adverse clinical outcomes in patients undergoing laser lead extraction. Currently, Dr. Danter is developing another randomized controlled trial to evaluate the efficacy of topical antibiotics on preventing sternal wound infections which is an extremely costly and morbid complication. Furthermore, his general attitude and ethos of bringing people together in collaboration would be an asset to any research division.

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Richard Whitlock, MD, MSc, FRCS(C)
Cardiac Surgery and Critical Care Medicine
Associate Professor, Department of Surgery
Faculty of Health Sciences, McMaster University

Hamilton
Health Sciences

McMaster
University

Dr. Danter has consistently demonstrated a commitment to surgical and medical education. As a resident he was a class room lecturer at the University of Alberta Medical school. During his fellowship at St. Paul's he spearheaded the "professors rounds" resident education sessions where practical surgical management is the focus. Intra-operatively he was directly involved with training our residents in the operating room and he possesses a calm and confident demeanor that is essential to fostering an environment for young surgeons to progress. I am certain that Dr. Danter will continue this commitment to education and the future surgeons and patients of Vanderbilt, Tennessee and the United States of America will benefit from it.

Dr. Matthew Danter is clearly an extraordinary young cardiac surgeon with a unique combination of important surgical skills that will support multiple programs within Vanderbilt University, and no doubt further the innovation and reputation of that institution. Dr. Danter will help Vanderbilt, and the USA, make significant advances and contributions to the field of advanced heart failure therapies and heart transplantation, and complex lead management. He is a part of a small cadre of extraordinary physicians with training and devotion to this highly demanding field. I offer my strongest endorsement for approval of this O-1 petition, and recommend Dr. Danter with unrestricted support.

Sincerely yours,

Richard Whitlock MD PhD FRCSC

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Affiliated with the Faculty of Health Sciences, McMaster University

WHITLOCK, RICHARD - GENERAL - UNIVERSITY MCMASTER - SUPPORT LETTER

For Office Use Only

06-001 $400
06-006 $ 10

STATE OF TENNESSEE
DEPARTMENT OF HEALTH
HEALTH RELATED BOARDS
665 Mainstream Drive
NASHVILLE, TENNESSEE 37243

TENNESSEE BOARD OF MEDICAL EXAMINERS
(800) 778-4123, ext. 532-4384 or (615) 532-3202, ext. 532-4384

APPLICATION FOR LICENSURE AS A MEDICAL DOCTOR

READ INSTRUCTIONS PRIOR TO COMPLETING APPLICATION. APPLICANTS MUST COMPLY WITH ALL INSTRUCTIONS.

FILL IN ALL BLANKS; IF NOT APPLICABLE, STATE N/A

Attach to this application a check or money order in the amount of $410, payable in U.S. funds to the Tennessee Board of Medical Examiners.

PERSONAL INFORMATION

Name as it will appear on license: Matthew (First) Robert (Middle) Danter (Last)

Have you been known by any other name? Y (N) If yes, list names: _____

Date of Birth: Mo. 07 Day 21 Yr. 1976 Place of Birth London, Ontario CANADA (City) (State or Country)

Social Security Number: [redacted] U.S. Citizen: Y (N) Sex: (M) F

Entitled to Live and Work in U.S.: (Y) N

Present Mailing Address: Unit 4, 97 Sunvale Place, Hamilton, Ontario Canada L8E 4Z7

Home Phone: (289) 656 - 0564

Work Phone: (289) 776 - 7109

Email address: mdanter@ualberta.ca

Do you wish to receive notification, including renewal notification, from the Department of Health via email? (Y) N

Type of intended primary specialty practice in Tennessee Cardiac Surgery

EXHIBIT

EDUCATIONAL AND EXAMINATION INFORMATION

PRE-MEDICAL EDUCATION

From: 09/1995 To: 05/1999 — The University of Western Ontario — London, Ontario CANADA
Mo/Yr *Mo/Yr* *Educational Institution* *Location*

From: _____ To: _____ — _____ — _____
Mo/Yr *Mo/Yr* *Educational Institution* *Location*

From: _____ To: _____ — _____ — _____
Mo/Yr *Mo/Yr* *Educational Institution* *Location*

MEDICAL EDUCATION

I have spent 4 years in the study of medicine in the medical educational institutions below:

From: 09/1999 To: 05/2003 — The University of Western Ontario — London, Ontario CANADA
Mo/Yr *Mo/Yr* *Educational Institution* *Location*

From: _____ To: _____ — _____ — _____
Mo/Yr *Mo/Yr* *Educational Institution* *Location*

Complete Attachment 1 and mail to the school which granted your medical degree

POST-GRADUATE TRAINING

I have spent 9 years in medical training in the medical educational institutions below:

From: 07/2003 To: 06/2010 — The University of Alberta — Edmonton, Alberta CANADA
Mo/Yr *Mo/Yr* *Educational Institution* *Location*

From: 09/2007 To: present — The University of Alberta School of Public Health — Edmonton, Alberta CANADA
Mo/Yr *Mo/Yr* *Educational Institution* *Location*

From: 07/2010 To: 06/2012 — The University of British Columbia — St. Pauls Hospital, Vanouver BC, Canada
Mo/Yr *Mo/Yr* *Educational Institution* *Location*

I have taken the following medical licensure examinations: (Check all applicable)

1. ____ National Boards (NBME) Certificate Number
2. ____ FLEX examination administered by the State of _____ on _____.
(Date(s))
3. √ Licensure by the Medical Council of Canada (LMCC)
4. USMLE
5. ____ State Board administered by _____ prior to 1972.
(State)

Are you Board eligible: (Y) N Are you Board certified: Y (N)

If so, identify specialty: _____

I intend to perform Level II Office Based Surgery which is integral to a planned treatment regiment and not performed on an urgent or emergent basis. Y (N)

PRACTICE AND LICENSURE INFORMATION

Describe in chronological order your professional practice experience and medical activities since graduating from Medical School. Include dates and locations. Additional pages may be attached to this form if necessary. **Any gaps in this chronology must be explained.**

[illegible]	[illegible]	ACTIVITY
07/2003 (Mo/Yr)	Edmonton, Alberta CANADA (City) (State)	Cardiac Surgery Residency training
07/2010 (Mo/Yr)	Vancouver, British Columbia CANADA (City) (State)	Advanced Cardiac Surgical Fellowship training General adult cardiac surgery, Laser lead extraction Left ventricular assist devices, cardiac transplantation
07/2011 (Mo/Yr)	Vancouver, British Columbia CANADA (City) (State)	Advanced Cardiac Surgical Fellowship: left ventricular assist devices, cardiac transplantation Laser lead extraction and general adult cardiac Surgery
08/2012 - present (Mo/Yr)	Hamilton, Ontario CANADA (City) (State)	Adult Cardiac Surgeon, Hamilton General Hospital
(Mo/Yr)	(City) (State)	
(Mo/Yr)	(City) (State)	

List below and submit a copy of attachment #3 to **ALL STATES, COUNTRIES, OR PROVINCES IN WHICH YOU HAVE EVER BEEN OR ARE CURRENTLY LICENSED AS A MEDICAL DOCTOR.** Additional pages may be added if necessary.

STATE	LICENSE NUMBER	DATE ISSUED	CURRENT STATUS
Ontario	99168	08/2012	full practice license
British Columbia		07/2010 – 2012	full practice license - inactive
Alberta		07/2003 – 2010	educational license - inactive
Alberta		08/2007 – 2008	Physician Extender license

List below ALL state, countries, or provinces in which you hold or have ever held a license as a health professional other than a Medical Doctor. Submit a copy of attachment #3 to all such state, country, or province regarding such licensure. Additional pages may be added if necessary.

STATE	PROFESSION	LICENSE NUMBER	DATE ISSUED	CURRENT STATUS

COMPETENCY INFORMATION

PLEASE ANSWER THE FOLLOWING QUESTIONS. If any answers to the questions in this part are in the affirmative, attach an explanation on a separate sheet. *IN SUPPORT OF YOUR EXPLANATION, THE FINAL DOCUMENTS OR ORDERS FROM THE ISSUING STATES, COURTS, AND/OR AGENCIES MUST BE SUBMITTED ALONG WITH THIS APPLICATION.*

For the purposes of these questions, the following phrases or words have the following meanings:

1. **"Ability to practice medicine"** is to be construed to include all of the following:

   a. The cognitive capacity to make appropriate clinical diagnosis, exercise reasoned medical judgments, to learn, and keep abreast of medical developments;

   b. The ability to communicate those judgments and medical information to patients and other health care providers, with or without the use of aids or devices, such as voice amplifiers; and

   c. The physical capability to perform medical tasks suchas physical examination and surgical procedures, with or without the use of aids or devices, such as corrective lenses or hearing aids.

2. **"Medical Condition"** includes physiological, mental or psychological conditions or disorders, such as, but not limited to; orthopedic, visual, speech and/or hearing impairments, cerebral palsy, epilepsy, muscular dystrophy, multiple sclerosis, cancer, heart disease, diabetes, mental retardation, emotional or mental illness, specific learning disabilities, HIV, tuberculosis, drug addiction, and alcoholism.

3. **"Chemical substances"** is to be construed to include alcohol, drugs, or medications, including those taken pursuant to a valid prescription for legitimate medical purposes and in accordance with the prescriber's direction, as well as those used illegally.

4. **"Currently"** does not mean on the day of or even in the weeks or months preceding the completion of this application. Rather it means recently enough so that the use of drugs or alcohol may have an ongoing impact on one's functioning as a licensee or within the past two (2) years.

5. **"Illegal use of controlled substances"** means the use of controlled substances obtained illegally (e.g., heroin, or cocaine) as well as the use of controlled substances that are not obtained pursuant to a valid prescription or not taken in accordance with the directions of a licensed health care practitioner.

QUESTIONS:

	YES	NO
1. Do you currently have a medical condition, which in any way impairs or limits your ability to practice medicine with reasonable skill and safety?	____	√
a. If yes, are they reduced or ameliorated because you receive ongoing treatment (with or without medications) or participate in a monitoring program?	____	____
b. If you have any limitations or impairments caused by an existing medical condition, are they reduced or ameliorated because of the field of practice, the setting, or the manner in which you have chosen to practice?	____	

[If you receive such ongoing treatment or participate in such a monitoring program, the Board will make an individual assessment of the nature, the severity, and the duration of the risks associated with an ongoing medical condition so as to determine whether an unrestricted license should be issued, whether conditions should be imposed, or whether you are not eligible for licensure.]

COMPETENCY INFORMATION CONTINUED

QUESTIONS:	YES	NO
2. Do you currently use chemical substances?	___	√
If yes, do they in any way impair or limit your ability to practice medicine with reasonable skill and safety?	___	___
Please list: _____		
3. Are you currently engaged in the illegal use of controlled substances?	___	√
If yes, are you currently participating in a supervised rehabilitation program or professional assistance program that monitors you in order to assure that you are not engaged in the illegal use of controlled substances?	___	√
Have you ever been diagnosed as having or have you ever been treated for pedophilia, exhibitionism, or voyeurism?	___	√
4. If you have ever held or applied for a license or certificate to practice medicine in any state, country, or province, has or was it ever been denied, reprimanded, suspended, restricted, revoked, otherwise disciplined, curtailed, or voluntarily surrendered under threat of investigation or disciplinary action?	___	√
5. If you have ever had staff privileges at any hospital or health care facility have they ever been revoked, suspended, curtailed, restricted, limited, otherwise disciplined, or voluntarily surrendered under threat of restriction or disciplinary action?	___	√
6. Have you ever applied for and been denied a state or federal controlled substance certificate?	___	√
If you have possessed such a certificate has it ever been revoked, suspended, restricted, otherwise disciplined, or voluntarily surrendered under threat of investigation or disciplinary action?	___	√
7. Have you ever been convicted of a felony or a misdemeanor other than a minor traffic offense?	___	√
8. Have you ever been rejected or censured by a medical society?	___	√
9. In relation to the performance of your professional services in any profession:		
a. Have you ever had a final judgment rendered <u>against</u> you;	___	√
b. Have you ever had settlement of any legal action rendered <u>against</u> you; or	___	√
c. Are there any legal actions pending <u>against</u> you or to which you are a party?	___	√
10. If you have ever held a license or certificate in any health care profession, has it ever been reprimanded, suspended, restricted, revoked, otherwise disciplined, curtailed, or voluntarily surrendered under threat of investigation or disciplinary action?	___	√

Affirmative response <u>requires</u> final documents or orders from the issuing states, courts, and/or agencies.

APPLICANT: FILL OUT THE FOLLOWING AFFIDAVIT IN THE PRESENCE OF A NOTARY PUBLIC

AFFIDAVIT AND RELEASE

I, Dr. Matthew Robert Danter, M.D., of Hamilton Ontario, CANADA
(Applicant's Name) (City) (State)
being duly sworn and identified as the person referred to in this application attests to the truth of each statement made in said application. I further swear that I have read and understand the law and the Rules and Regulations regarding the practice of my profession, which are posted on the Board's Internet site and/or were provided to me by the Board office, and agree to abide by them in the practice of medicine in the State of Tennessee.

I HEREBY:

SIGNIFY my willingness to appear to answer such questions as the Board may find necessary, which may include a full Board interview.

RELEASE to the Board, its staff, and their representatives, any and all documentation necessary now and in the future to establish my physical and mental capabilities to safely practice medicine.

AUTHORIZE the Board, its staff, and their representatives to consult with my prior and current associates and others who may have information bearing on my professional competence, character, health status, ethical qualifications, ability to work cooperatively with others, and other qualifications.

RELEASE from liability the Board, its staff, and all their representatives and any and all organizations which provide information for their acts performed and statements made in good faith and without malice concerning my competence, ethics, character, and other qualifications for licensure.

ACKNOWLEDGE that I, as an applicant for licensure, have the burden of producing adequate information for a proper evaluation of my professional, ethical, other qualifications, and for resolving any doubts about such qualifications.

AUTHORIZE release, use and disclosure of otherwise HIPAA protected health information to the limited extent necessary for my application to receive full consideration up to and including discussion in a public forum should that become necessary.

THIS CERTIFIES THAT THE INFORMATION SUBMITTED BY ME IN THIS APPLICATION IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

SIGNATURE

14/1/13
DATE

Sworn to before me this 13 day of January 2014.

NOTARY PUBLIC

Stephen W. Peglar
Affix Seal Here Notary Public
Province of Ontario, Canada

My Commission expires:

STATE OF TENNESSEE
DEPARTMENT OF HEALTH
HEALTH RELATED BOARDS
665 Mainstream Drive
NASHVILLE, TENNESSEE 37243

TENNESSEE BOARD OF MEDICAL EXAMINERS
(800) 778-4123, ext. 532-4384 or (615) 532-3202, ext. 532-4384

APPLICANT: USE THIS FORM ONLY IF YOU HAVE TAKEN A STATE EXAM PRIOR TO DECEMBER 1972. IF YOU HAVE, COMPLETE THE INFORMATION IN THE BOX AND THEN SEND IT TO THE STATE BOARD FOR WHICH YOU TOOK THE EXAMINATION:

MB

Full Name: _____
(Last) (First) (Middle/Maiden)

Social Security Number: _____ - _____ - _____ State License Number: _____

CERTIFICATE OF SECRETARY OF STATE BOARD ISSUING ORIGINAL LICENSE

I, _____, Secretary of the _____ *(State)*

Board of Medical Examiners, certify that _____ of *(Applicant's Name)*

_____ was granted License/Certificate number _____
(City & State)

to practice Medicine in this State on the _____ day of _____, _____. I further certify that the aforesaid in the written examination before this Board, which was administered on _____, *(Date)*

obtained a general average of _____ percent and the following percentages on each subject:

Subject	Percent	Subject	Percent

Acting on behalf of the _____ Board of Medical Examiners, I hereby *(State)*

certify that the Applicant successfully completed the state licensure examination.

Seal of the Board _____ Date: _____
Board Secretary's Signature

Please return to: State of Tennessee
Board of Medical Examiners
665 Mainstream Drive
Nashville, TN 37243

ATTACHMENT 5

STATE OF TENNESSEE
DEPARTMENT OF HEALTH
HEALTH RELATED BOARDS
665 MAINSTREAM DRIVE
NASHVILLE, TN 37243

DECLARATION OF CITIZENSHIP
MUST ACCOMPANY ALL APPLICATIONS FOR INITIAL LICENSURE OR REINSTATEMENT OF LICENSURE

The "SAVE Act" requires Tennessee Department of Health (including all Boards, Commissions, and contractors), along with every local health department in the State, to verify that *every adult* applicant for a professional license is either a U.S. citizen, a "qualified alien," or a nonimmigrant who meets the requirements set out at 8 U.S.C. 1621.

I am a(n) Cardiac Surgeon_____ Ontario Canada License # 99168_____.
Healthcare Profession (Please Print) License number if applicable

Please Print Legibly

1. Name: Danter Matthew Robert
Last First Middle Maiden_
2. Mailing Address: unit 4, 97 Sunvale Place, Hamilton Ontario CANADA L8E 4Z7
3. Phone Number: Home: (289_) 656_-0564_ Office: (905_) 527_-0271_ Fax: (____)____-_____
xt14529_____
4. I am a United States Citizen: ____Yes √ No
5. I am a foreign national not physically present in the United States √ Yes_____No. If you answered yes, to this question please sign this form in the presence of a notary and return it with your application. No further documentation is required.
6. Applicants Claiming United States Citizenship **MUST** provide one of the following:
   a) Tennessee Driver's License, or photo ID issued by Department of Safety.
   b) A valid driver license or ID issued by another state, provided its issuance requirements meet Department of Safety criteria.
   c) An official birth certificate issued by a U.S. state, territory, or other jurisdiction. Puerto Rican birth certificates issued before July 1, 2010 do not count.
   d) A federally issued birth certificate.
   e) A valid, unexpired U.S. passport.
   f) A report of birth abroad of a U.S. citizen.
   g) A certificate of citizenship.
   h) A certificate of naturalization.
   i) A U.S. citizen ID card.
   j) Any successor document to #'s a-i above.
   k) SSN that the entity or local health department may verify with the Social Security Administration in accordance with federal law.
7. If you checked "No" in question 4 please indicate from the list below which category applies to you: (circle one)
   a) Permanent Residents

b) A nonimmigrant applicant for a professional or commercial license whose visa for entry into the United States is related to such employment, or a nonimmigrant under the Immigration and Nationality Act (8 U.S.C. 1101 *et seq.*).

c) Asylees who meet the qualifications set out in 8 U.S.C. 1158

d) Refugees who meet the qualifications set out in 8 U.S.C. 1157

e) Persons who have been "paroled into the United States," under 8 U.S.C. 1182(d)(5) or whose deportation has been withheld under 8 U.S.C. 1253.

f) Cuban or Haitian entrants as defined by section 501(e) of the Refugee Education Assistance Act of 1980

g) Persons granted conditional entry into the U.S. under 8 U.S.C. 1153(a)(7) before April 1, 1980, because of persecution or fear of persecution on account of race, religion, or political opinion or because of being uprooted by catastrophic national calamity.

h) An alien who has been "battered" or subjected to "extreme cruelty" by a parent or spouse as defined by 8 U.S.C. 1641(c), and also meets the qualifications set out 8 U.S.C. 1641(c)(1)(B). Under the circumstances set out in 8 U.S.C. 1641(c)(2) and (3), victims' children, or the parents of children who are victims, may also apply for benefits as qualified aliens.

Applicants claiming **qualified alien status** (question 7 above), please submit two of the following forms of "documentation of identity and immigration status" as determined by U.S. Homeland Security to be acceptable for verification through the SAVE program. Common types of documents used to verify immigration status are listed below. (Note: If you can provide only one document, your status will be verified through the U.S. Department of Homeland Security's SAVE program):

I-327 (Reentry Permit)

I-551 (Permanent Resident Card or "Green Card") I-

571 (Refugee Travel Document)

I-766 (Employment Authorization Card)

Machine Readable Immigrant Visa (with Temporary I-551 language)

Temporary I-551 stamp (on passport or I-94)

I-94 (Arrival/Departure record)

Unexpired foreign passport

WT/WB Admission Stamp in unexpired foreign passport

I-20 (Certificate of Eligibility for Nonimmigrant F(1) student status– "student visa")

DS2019 (Certificate of Eligibility for Exchange Visitor (J-1) Status)

I affirm under the penalty of perjury that the above is true and correct.

Signed this 13 day of January, 2014.

Signature

Sworn to before me this 13 day of January, 2014.

NOTARY PUBLIC

Stephen W. Peglar
Notary Public
Province of Ontario, Canada

AFFIX SEAL HERE

My Commission Expires:

If an applicant is discovered to be an unqualified alien, or otherwise ineligible for benefits under the Act, all recurring benefits provided to that applicant must be immediately terminated. Anyone who purposefully makes a false, fictitious, or fraudulent claim of U.S. citizenship or qualified alien status will be liable under the Tennessee Medicaid False Claims Act, or Tennessee's False Claims Act. Any person who conspires to defraud the state or any local health department by securing a false claim allowed or paid to another person in violation of the Act may be liable under Tennessee's False Claims Act. Upon discovery of an applicant's false, fictitious, or fraudulent claim of U.S. citizenship, state governmental entities and local health departments must also file a criminal complaint with the United States Attorney.

Practitioner's Name

License # _____

Profession _____

TENNESSEE BOARD OF *(board for your profession)*
HEALTHCARE PROVIDER INFORMATION
TENNESSEE DEPARTMENT OF HEALTH
OFFICE OF HEALTH RELATED BOARDS
665 MAINSTREAM DRIVE
NASHVILLE, TENNESSEE 37243

I. PRACTITIONER DATA

A. PROFESSION: Cardiac Surgeon _____ LICENSE NUMBER: Ontario Canada #: 99168

B. SOCIAL SECURITY NUMBER: [redacted] Canadian (This will not be published).

C. NAME (INCLUDE MAIDEN AND ON 2ND/3RD LINES ANY ALIASES, IF APPLICABLE):

CURRENT NAME: Danter (LAST) Matthew (FIRST) Robert (MIDDLE AND MAIDEN NAME) (IF APPLICABLE)

FORMER NAME(S):

(LAST) (FIRST) (MIDDLE)

(LAST) (FIRST) (MIDDLE)

D. PRIMARY PRACTICE ADDRESS (attach additional sheets if necessary):

Vanderbilt Medical Center, Cardiac Surgery
(PRACTICE NAME)

1215 21st Avenue South, Suite 5025
(STREET NUMBER AND NAME)

Nashville TN 37232
(CITY) (STATE) (ZIP CODE)

☐ Check here if your primary practice address is your home address and you want it to be published as part of the profile and on the web site.

E. E-MAIL ADDRESS: mdanter@ualberta.ca ☐
Your e-mail address will be published unless you elect not to by checking here.

F. WEB PAGE ADDRESS: _____ ☐
Your web page address will be published unless you elect not to by checking here.

G. PRACTICE TELEPHONE: (~~005~~) ~~521-2100 xt. 44529~~ 615 343-9195 ☐
Your telephone number will be published unless you elect not to by checking here.

H. LANGUAGES, OTHER THAN ENGLISH: Indicate languages other than English or translation services that may be available at your primary practice location.

1. _____ 2. _____

I. SUPERVISING PHYSICIAN: If you are required by law to be supervised by a physician (physician assistant or advanced practice nurse) indicate the name(s) and address(es) of each supervising physician. If you need more space, attach additional sheets:

1. _____

2. _____

Practitioner's Name

License # _____

Profession _____

II. GRADUATE/ POSTGRADUATE MEDICAL EDUCATION AND TRAINING

A. What school(s)/educational programs have you attended? And, what type(s) of degree(s) do you hold? Do not include coursework taken to meet the continuing education requirement for licensure renewal. (Authority: T.C.A. §63-51-105(a)(6) and (7))

PROGRAM/INSTITUTION	CITY/STATE/COUNTRY	DATE OF GRADUATION MM/DD/YYYY	TYPE OF DEGREE
1. The University of Western Ontario (now called Western University)	London, Ontario CANADA	05/16/1999	Honours Bachelors of Science (Physiology)
2. The University of Western Ontario (now called Western University)	London, Ontario CANADA	05/16/2003	Doctor of Medicine
3.			

B. List in chronological order from date of graduation to the present, all completed medical/professional graduate and/or post-graduate training (internship, residency, fellowship or other program). Do not include coursework taken to meet continuing education requirements for licensure renewal. (Authority: T.C.A. § 63-51-105(a)(6))

PROGRAM AND SPECIALTY AREA (INTERNSHIP, RESIDENCY, FELLOWSHIP, ETC.)	LOCATION OF TRAINING (CITY,STATE,COUNTRY)	FROM MM/DD/YYYY	TO MM/DD/YYYY
1. Cardiac Surgical Residency	The University of Alberta, Edmonton, Alberta CANADA	07/01/2003	06/30/2010
2. Advanced Cardiac Surgical Fellowship	St. Paul's Hospital, The University of British Columbia, Vancouver, British Columbia CANADA	07/01/2010	06/30/2012

III. SPECIALTY BOARD CERTIFICATIONS:

Do you hold a certification, specialty or subspecialty from any specialty board recognized by the board regulating the profession for which you are licensed? (see instructions) YES ■ NO ☐

(Authority: T.C.A. § 63-51-105(a)(8)) If "Yes", complete section below

CERTIFYING BODY/BOARD INSTITUTION	CERTIFICATION/SPECIALTY/SUBSPECIALTY
1. Royal College of Physicians and Surgeons of Canada	Certification in Cardiac Surgery
2. The College of Physicians and Surgeons of Ontario	Full practice licensure in cardiac surgery
3.	
4.	
5.	

Practitioner's Name

License # _____

Profession _____

IV. FACULTY APPOINTMENTS

A. Have you had the responsibility for graduate medical education within the last ten (10) years? (Authority: T.C.A. § 63-51-105(a)(10)) YES ■ NO ☐

B. Do you currently hold a faculty appointment at a medical/health related institution of higher learning? (Authority: T.C.A. § 63-51-105(a)(10)) YES ■ NO ☐

If "YES", list the title of the appointment, name(s) and city/state of institution(s). (Attach additional sheets, clearly labeled with this question number, if necessary.)

	TITLE	INSTITUTION	CITY/STATE
1.	Locum Cardiac Surgeon	Hamilton General Hospital	Hamilton, Ontario CANADA
2.			
3.			

V. STAFF PRIVILEGES

A. Do you currently hold staff privileges at a hospital? (Authority: T.C.A. §63-51-105(a)(9)) YES ■ NO ☐

If "YES", list each hospital at which you currently have staff privileges: (Attach additional sheets, clearly labeled with this question number, if necessary)

NAME OF HOSPITAL	CITY/STATE
1. Hamilton General Hospital	Hamilton, Ontario CANADA
2.	
3.	
4.	
5.	

VI. MANAGED CARE PLANS

A. Do you participate in any managed care plans? (Authority: T.C.A. §63-51-105(a)(15)) YES ☐ NO ■

If "YES", list each: (Attach additional sheets, clearly labeled with this question number, if necessary)

NAME OF MANAGED CARE PLAN
1.
2.
3.
4.
5.

Practitioner's Name

License # _____

Profession _____

B. Do you currently participate in and accept any TennCare plan(s) as a provider? YES ☐ NO ■

If "YES", list each plan in which you currently participate or accept as a provider: (Authority: T.C.A. § 63-51-105(a)(16))

NAME OF TENNCARE PLAN
1.
2.
3.
4.
5.

VII. FINAL DISCIPLINARY ACTION (See Instructions):

A. Within the previous ten (10) years, have you ever had any final disciplinary action taken against you by the agency regulating your license, in this state or any other jurisdiction? (Authority: T.C.A. § 63-51-105(a)(8)) YES ☐ NO ■

If "YES", list name(s) and address(es) of agency(s) and a brief description of the final disciplinary action(s) and stated reason(s) for taking the action. (Attach additional sheets, clearly labeled with this question number, if necessary.)

	AGENCY NAME/ADDRESS	DATE	DESCRIPTION OF VIOLATION	DESCRIPTION OF ACTION
1.				

IF "YES", is this final disciplinary action under appeal? (attach copy of notice of appeal) YES ☐ NO ☐

2.				

IF "YES", is this final disciplinary action under appeal? (attach copy of notice of appeal) YES ☐ NO ☐

Practitioner's Name

License # _____

Profession _____

B. Within the previous ten (10) years, have you ever had your hospital privileges revoked or involuntarily restricted or reasons related to competence or character by the hospital's governing body? (Authority: T.C.A. § 63-51-105(a)(4)) YES ☐ NO ☒

If "YES", list name(s) and address(es) medical institution(s) and a brief description of the final disciplinary action(s) and stated reason(s) for the action. (Attach additional sheets, clearly labeled with this question number, if necessary)

	HOSPITAL NAME/ADDRESS	DATE	DESCRIPTION OF VIOLATION	DESCRIPTION OF ACTION
1.				

IF "YES", is this final disciplinary action under appeal? (attach copy of notice of appeal) YES ☐ NO ☐

2.				

IF "YES", is this final disciplinary action under appeal? (attach copy of notice of appeal) YES ☐ NO ☐

C. Within the previous ten (10) years, have you ever been asked to or allowed to resign from or had any medical staff privileges restricted or not renewed by any hospital in lieu of or in settlement of a pending disciplinary action related to competence or character? (Authority: T.C.A.: § 63-51-105(a)(4))

YES ☐ NO ☒

If "YES", list name(s) and address(es) of the hospital(s) and a brief description of the final disciplinary action(s) and stated reason(s) for the action. (Attach additional sheets, clearly labeled with this question number, if necessary)

	HOSPITAL NAME/ADDRESS	DATE	DESCRIPTION OF ACTION
1.			

If "YES", is this final disciplinary action under appeal? (attach copy of notice of appeal) YES ☐ NO ☐

2.			

If "YES", is this final disciplinary action under appeal? (attach copy of notice of appeal) YES ☐ NO ☐

Practitioner's Name

License # _____

Profession _____

VIII. CRIMINAL OFFENSES (See Instructions)

Have you within the most recent ten (10) years, been found guilty, regardless of whether adjudication of guilt was withheld, or pled guilty or nolo contendere to a criminal misdemeanor or felony in any jurisdiction? (Authority: T.C.A. § 63-51-105(a)(1)) YES ☐ NO ■

If "YES" briefly describe the offense(s):

	DESCRIPTION OF OFFENSE(S)	DATE	JURISDICTION
1.			

If "YES", is this final disciplinary action under appeal? (attach copy of notice of appeal) YES ☐ NO ☐

2.			

If "YES", is this final disciplinary action under appeal? (attach copy of notice of appeal) YES ☐ NO ☐

3.			

If "YES", is this final disciplinary action under appeal? (attach copy of notice of appeal) YES ☐ NO ☐

IX. LIABILITY CLAIMS

Have you had a medical malpractice court judgment, arbitration award, or settlement against you since May 19, 1998? (Authority: T.C.A. § 63-51-105(a)(5)) YES ☐ NO ■

If "YES", indicate a brief description of the nature(s) of the claim, the date(s) of the claim report(s), and the amount of the judgment(s), award or settlement(s):

	ENTRY DATE OF DISPOSITION ORDER OR SETTLEMENT	AMOUNT
1.		
2.		
3.		
4.		

Practitioner's Name License # _____

Profession _____

X. OPTIONAL INFORMATION:

A. PUBLICATIONS: List any publications you have authored in peer-reviewed medical literature: (optional) (Authority: T.C.A. § 63-51-105(a)(11))

	TITLE	PUBLICATION	DATE
1.	See Attached CV		
2.			
3.			
4.			

B. PROFESSIONAL OR COMMUNITY SERVICE ACTIVITIES AWARDS: List any information regarding professional or community service associates, activities and awards: (optional) (Authority: T.C.A. § 63-51-105(a)(12))

	COMMUNITY SERVICE/AWARD/HONOR	ORGANIZATION
1.		
2.		
3.		
4.		

I affirm these statements are true and correct and recognize that providing false information may result in disciplinary action against my license pursuant to T.C.A. §§ 63-51-113 and/or 63-51-118.

_____ Date: 2013/12/09

(Signature of Provider)

REMINDER: Each practitioner who has submitted information must update that information in writing by notifying the Department of Health, Healthcare Provider Information Unit, within 30 days after the occurrence of an event or an attainment of a status that is required to be reported by the law.

ATTACHMENT 3

STATE OF TENNESSEE
DEPARTMENT OF HEALTH
HEALTH RELATED BOARDS
227 FRENCH LANDING, SUITE 300
NASHVILLE, TENNESSEE 37243

TENNESSEE BOARD OF MEDICAL EXAMINERS
(800) 778-4123, ext. 532-4384 or (615) 532-3202, ext. 532-4384

CLEARANCE FROM OTHER STATE LICENSURE BOARDS

APPLICANT: Please provide the information requested in the top box and then mail one form to the licensure board in EACH state where you hold OR HAVE EVER HELD a license to practice any profession. (You may copy this form.) **NOTE:** Some states require a fee for providing clearance information. To expedite your application, you may wish to contact the applicable state(s).

Dr. Matthew R. Danter was granted a license to practice medicine
(Name of Applicant) *(Profession)*
with license number 99168 on July 25, 2012 in the State of Ontario Canada.
(Date)

The Board of Medical Examiners of Tennessee requests that I submit evidence of the current status of that license in your state. You are hereby authorized to release any information in your files, favorable or otherwise, directly to:

State of Tennessee
Board of Medical Examiners
665 Mainstream Drive
Nashville, TN 37243

Date: 2013/12/09

Applicant's Signature

Dr. Matthew Robert Danter, MD, FRCSC
Applicant's typed or printed name

ADMINISTRATIVE OFFICE OF STATE LICENSURE BOARD, PLEASE COMPLETE:

Name In Full As It Appears On License: _____

License Number_____ Profession_____ Date Issued _____

Basis of issuance: (Check One) _____Endorsement/Reciprocity with _____ (State)

_____Written Examination _____ (Name of Exam)

The License is currently active and registered? Yes_____ No _____
Is there any derogatory information on file? Yes_____ No_____ If yes, an explanation must be attached.

Authorized Signature | Title | Date

ATTACHMENT 2

sent to

TENNESSEE BOARD OF MEDICAL EXAMINERS
(800) 778-4123, ext. 532-4384 or (615) 532-3202, ext. 532-4384

VERIFICATION OF POST GRADUATE MEDICAL TRAINING

APPLICANT: Provide the information requested in the top box and then mail this form to each institution in which you received any postgraduate medical training. If additional forms are required, copy this one.

Institution Administration: I am applying for a Tennessee medical license and hereby authorize you to release any and all information in your files concerning my medical training. I was in training at your institution as follows:

Applicant's name: Danter (Last) Matthew (First) Robert (Middle/Maiden)

Name of Institution: The University of Alberta Program Title: Cardiac Surgery

Applicant's Signature 14/1/13 Date

ADMINISTRATIVE OFFICE OF TRAINING INSTITUTION. NOTE: THIS FORM MUST BE NOTARIZED. Please complete (including questions) and return to:

State of Tennessee
Board of Medical Examiners
665 Mainstream Drive
Nashville, TN 37243

	CIRCLE ONE	
Is your training program LCME/AGCME approved?	Yes	No
Was the above program LCME/AGCME approved at the time the applicant completed training?	Yes	No
Were there any adverse charges or actions taken during the residency? If yes, please attach supporting information and/or documentation.	Yes	(No)
Would you recommend the applicant for licensure?	(Yes)	No
Did the applicant successfully complete the program?	(Yes)	No

The Applicant attended the program from 07/2003 (Mo/Yr) to 06/2010 (Mo/Yr), I certify that the information on this form is true and correct.

Program Director's/Dean's Signature Date

Subscribed and sworn before me this the_____day of_____.

Notary Public (Affix Seal Here)

My Commission Expires:

ATTACHMENT 1

STATE OF TENNESSEE
DEPARTMENT OF HEALTH
HEALTH RELATED BOARDS
665 MAINSTREAM DRIVE
NASHVILLE, TENNESSEE 37243

TENNESSEE BOARD OF MEDICAL EXAMINERS
(800) 778-4123, ext. 532-4384 or (615) 532-3202, ext. 532-4384

APPLICANT: Supply the information requested in this box and then mail this entire form to your medical school.

Full Name: Danter (Last) Matthew (First) Robert (Middle/Maiden)

Address: Unit 4, 97 Sunvale Place
Hamilton, Ontario CANADA
L8E 4Z7

Social Security Number: [redacted]

Student Identification Number: 001444033

Year of Graduation: 2003

Degree Obtained: Doctor of Medicine,

TO WHOM IT MAY CONCERN:

I am applying for a license to practice medicine in the State of Tennessee.

Please forward an original graduate transcript of courses, grades, and degree bearing the institution's official seal to:

State of Tennessee
Board of Medical Examiners
665 Mainstream Drive
Nashville, TN 37243 (37228 for courier service only)

Thank you for your cooperation and prompt response.

Applicant's Signature

14/1/13
Date

TENNESSEE DEPARTMENT OF HEALTH

MANDATORY PRACTITIONER PROFILE QUESTIONNAIRE FOR LICENSED HEALTH CARE PROVIDERS

The Health Care Consumer Right-to-Know Act of 1998, T.C.A. §§ 63-51-101, et seq., requires designated licensed health professionals to furnish certain information to the Tennessee Department of Health, and is requested in this questionnaire. From the information submitted, the Department compiles practitioner profiles which the law requires to be made available to the public via the World Wide Web and our toll-free telephone line. Each practitioner who has submitted information must update that information in writing by notifying the Department of Health, within 30 days after the occurrence of an event or an attainment of a status that is required to be reported by the law. A copy of your initial or updated profile will be furnished to you for your review prior to publication. That opportunity will allow you to make corrections, additions and helpful explanatory comments. Failure to comply with the requirement to submit and update profiling information may result in a delay or denial of your licensure application and/or may result in disciplinary action against your license. The professions required to submit a profile questionnaire are:

Advanced Practice Nurses
Alcohol and Drug Counselors
Audiologists
Chiropractic Physicians
Clinical Pastoral Therapists
Dentists
Dietitian/Nutritionists
Dispensing Opticians
Electrologists
Licensed Registered Respiratory Therapists
Licensed Certified Respiratory Therapists
Licensed Laboratory Personnel
Marital & Family Therapists
Massage Therapists
Medical Doctors
Nursing Home Administrators
Occupational Therapists
Optometrists
Orthopedic Physician Assistants
Osteopathic Physicians
Pharmacists
Physician Assistants
Physical Therapists
Podiatrists
Professional Counselors
Psychologists
Respiratory Care Assistants
Social Workers
Speech Language Pathologists
Veterinarians

A blank copy of the profile questionnaire may be obtained from the following web site address: http://health.state.tn.us/Download/MQ1.pdf .

INSTRUCTIONS

QUESTIONNAIRE DEADLINE The provider must complete and submit the questionnaire before a license will be granted. Providers who have completed a similar questionnaire for another state's licensing board are, nevertheless, required to complete and submit this form. Changes to the questionnaire must be submitted within 30 days of the change.

COMPLETING THE QUESTIONNAIRE Complete the questionnaire by typing the information or by printing neatly in block letters in ball point pen. If a question does not apply to you, indicate so by checking the "Does not apply" box. **Illegible questionnaires will be returned.** If you need further instruction, contact your profession's licensing board by calling (615) 532-3202 or by calling toll free at (800) 778-4123.

SUBMITTING THE QUESTIONNAIRE Mail the completed profile questionnaire to:

Tennessee Board of *(board for your profession)*
Healthcare Provider Information
665 Mainstream Drive
Nashville, TN 37243

- **Do not return pages 1 through 4 with the questionnaire to the department.**
- **Keep a copy of the questionnaire for your records.**

The following numbered parts correspond to the matching number on the questionnaire form.

I. PRACTITIONER DATA

Complete Part I, noting the following:

- License number: Fill in your Tennessee license number and indicate your profession in the space provided. **If you have not been issued a license number, please leave this blank.**
- Social security number: **Your social security number will not be published or in any way given out to the public. It is required for in-house tracking purposes only.**
- Primary Practice Address: Complete the practice address (if applicable). If your practice address is also your home address, you should know the Department is prohibited from placing your home address on the Internet without your request to do so. There is a box to check in Part I to request this. Retirees: Write in "N/A" for practice address. If you do not have a practice address at the time of completing this questionnaire, you must report your practice address within 30 days of obtaining a practice address.
- Supervising Physician: Physician assistants and advanced practice nurses must list all supervising physicians. In addition, advanced practice nurses must also complete the Notice and Formulary if you are prescribing. The Notice and Formulary is available online at http://health.state.tn.us/boards/Nursing/applications.htm.

II. GRADUATE/POSTGRADUATE MEDICAL/PROFESSIONAL EDUCATION AND TRAINING

List chronologically medical/health professional related graduate/postgraduate education and training completed. Exclude any program or courses taken to satisfy continuing education requirements for licensure renewal. Provide information about health related degrees you have received including your licensure degree.

III. SPECIALTY BOARD CERTIFICATIONS

Provide information on any certification, specialty or subspecialty from any specialty board recognized by the American Medical Association, American Osteopathic Medical Association, American Podiatry Association, American Chiropractic Association, American Dental Association or any other specialty certifying body as determined by your Tennessee licensing board.

IV. FACULTY APPOINTMENTS

Answer ALL yes/no questions with a "yes" or "no" response. A brief statement in the space provided should follow a "yes" answer. If the space is insufficient for your response, attach an additional page, being sure to number the response to match the appropriate question.

V. STAFF PRIVILEGES

A. List all hospitals at which you hold staff privileges. The definition for "hospital" can be found at T.C.A. § 68-11-201.

VI. MANAGED CARE AND TENNCARE PLANS

A. In the spaces provided, answer information about the Managed Care plans in which you participate and accept as a provider, if any. If the space is insufficient for your response, attach an additional page, being sure to number the response to match the appropriate question.

B. In the spaces provided, answer information about the TennCare plans in which you participate and accept as a provider, if any. If the space is insufficient for your response, attach an additional page, being sure to number the response to match the appropriate question.

VII. FINAL DISCIPLINARY ACTION

These questions refer to final disciplinary or adverse actions taken within the previous **ten (10) years**, whether in this state or any other jurisdiction. The term **final** means the matter was fully adjudicated at a hearing and the appeal's period expired, or that the applicable board issued an agreed order or consent decree.

In the "Description of Violation" spaces, indicate the nature of the conduct in question such as malpractice, unethical conduct, drug-related, sex related, impairment, fraud, etc.

In the "Description of Action" spaces, indicate the type of disciplinary action imposed against your professional license such as censure, reprimand, probation, etc.

The term **disciplinary action** includes, but is not limited to:

- Probation
- Limitation/Restriction
- Suspension
- Revocation
- Voluntary relinquishment in lieu of disciplinary action
- Any other adverse action taken against a license or privilege by a medical/health related institution
- Compulsory surrender of license or privilege
- Civil or other monetary fine or penalty
- Resignation from or non-renewal of medical staff membership at a hospital in lieu of, or in settlement of, a pending disciplinary case related to competence or character
- Restriction of privileges in lieu of, or in settlement of, a pending disciplinary case related to competence or character

If you answer "yes" to any of the questions regarding Final Disciplinary Actions and/or Criminal Offenses and if the action is under appeal, you must attach a copy of the notice of appeal. Note: You must submit a copy of the final written order of disposition immediately after the appeal is disposed of by the adjudicating authority. Please read questions B and C in Part VII in their entirety before answering those questions.

VIII. CRIMINAL OFFENSES

This part requires you to report any state or federal felony criminal offense convictions. It also requires the reporting of misdemeanor offenses, regardless of classification, in which any element of the offense involves sex; alcohol or drugs; physical injury or threat of injury to any person; abuse or neglect of any minor, spouse or the elderly; fraud or theft in Tennessee or another jurisdiction; or unlicensed practice within the most recent ten (10) years. If you answer "yes" to this question and the offense is under appeal, you must submit a copy of the notice of appeal of that criminal offense. Immediately upon disposition of the appeal, you must submit a copy of the final written order of disposition. If any misdemeanor conviction reported is expunged, a copy of the order of expungement signed by the judge must be submitted to the Department before the conviction will be removed from any profile.

IX. LIABILITY CLAIMS

This section requires you to indicate all medical malpractice court judgments, arbitration awards, or settlements in which a payment was awarded to a complaining party beginning with judgments or settlements entered or executed after May 19, 1998. That means if the act or event leading to the claim occurred in, for instance, 1995, but was finally adjudicated against you after May 19, 1998, you must indicate that claim in the space provided. JUDGMENTS OR SETTLEMENTS BELOW THE FOLLOWING AMOUNTS ARE NOT REQUIRED TO BE SUBMITTED.

A) For Medical Doctors and Osteopathic Physicians, judgments or settlements below $75,000 are not required to be submitted.
B) For Chiropractors, judgments or settlements below $50,000 are not required to be submitted.
C) For Dentists, judgments or settlements below $25,000 are not required to be submitted.
D) For all other professions, judgments or settlements below $10,000 are not required to be submitted.

Pending malpractice claims are not required to be reported unless/until final adjudication against you.

X. OPTIONAL INFORMATION

This section is voluntary. You may list, briefly describe, and submit any information/documentation regarding your professional practice in the spaces provided. Attach an additional sheet labeled with the question number if additional space is required.

ATTACHMENT 4

Tennessee Requires Medical Examination Scores be Sent Directly to the Tennessee Board of Medical Examiners

In order to have medical examination scores reported to the Tennessee Board please read the following:

For FLEX, SPEX and USMLE scores contact the Federation of State Medical Boards to obtain a score reporting form at:

Federation of State Medical Boards of the U.S., Inc.
Federation Place
Suite 300
400 Fuller Wiser Road
Euless, TX 76039-3855
(800) 876-5396

or download the form from the web site at:

[illegible]

For NBME Parts I, II, and III or any COMBINATION OF NBME Parts, the request form is now available on the NBME web site at:

[illegible]

National Board of Medical Examiners
P.O. Box 48014
Newark, NJ 07101-4814

For NBME Parts I, II, and III administered by ECFMG or for information concerning FMGEMS contact:

Educational Commission for Foreign Medical Graduates
3624 Market Street
Philadelphia, PA 19104
Phone (215) 386-5900

STATE OF TENNESSEE
DEPARTMENT OF HEALTH
HEALTH RELATED BOARDS
665 MAINSTREAM DRIVE
NASHVILLE, TENNESSEE 37243
www.tennessee.gov

TENNESSEE BOARD OF MEDICAL EXAMINERS
(800) 778-4123, ext. 532-4384 or (615) 532-3202, ext. 532-4384

APPLICATION INSTRUCTIONS FOR LICENSURE AS A MEDICAL DOCTOR

Provided below is a checklist for your personal use and convenience containing all the things you must do to receive consideration for issuance of a Tennessee license to practice medicine.

ALL APPLICATION FEES ARE NON-REFUNDABLE.

		Done
1.	Complete, have notarized, and mail the application pages 1 through 6.	_____
2.	Complete and mail attachment 1 to your medical school for transcript of courses, grades, and degree. If you are an International Medical School graduate you must **also** ask that your medical school provide to this office documentation proving that they meet or exceed the accreditation requirements of the LCME (Liaison Committee on Medical Education). Documentation must be submitted in English.	_____
3.	Complete and mail attachment 2 to each institution in the U.S. at which you received postgraduate medical training. **DO NOT HAVE THIS (VERIFICATION OF POST GRADUATE MEDICAL TRAINING) FORM COMPLETED UNTIL THE APPROPRIATE NUMBER OF YEARS OF POSTGRADUATE EXPERIENCE HAVE BEEN TOTALLY COMPLETED (3 YEARS FOR INTERNATIONAL GRADUATES OR 1 YEAR FOR U.S. AND CANADIAN GRADUATES).**	_____
4.	Complete and mail attachment 3 to each state, country, or province in which you hold or have ever held a license to practice any profession.	_____
5.	Submit a clear and recognizable recently taken bust photograph of yourself that shows the full head, face forward from at least the shoulders up.	_____
6.	Submit proof of the citizenship in the United States or Canada or evidence of being legally entitled to live and work in the United States. (Notarized copies of birth certificates, naturalization papers, H-1 visas, or current passports are acceptable). License will not be issued to holders of J-1 Training Visa. Visa must allow one to hold employment in the United States.	_____
7.	Submit two (2) original letters of recommendation from licensed medical doctors on the signatory's letterhead attesting to your good moral character. The letters must contain original signatures.	_____
8.	You must have successfully completed a medical licensure examination or an approved combination of examinations. If you are submitting USMLE scores, **all three steps must be taken and passed within seven years.** Please note that for each retake of a step, the minimum passing score will be the USMLE two-digit passing score plus one point. Please refer to attachment 4 for information in obtaining scores.	_____
9.	If you are an international medical school graduate, you must submit one of the following:	
	a. A notarized copy of your original permanent E.C.F.M.G. Certificate;	_____
	b. If you graduated from a Mexican Medical School, a letter from the E.C.F.M.G. stating that all certificate requirements have been met; or	_____

c. If you cannot obtain an original certificate due to the phase out of the E.C.F.M.G., proof of successful completion of U.S.M.L.E. Steps 1 and 2 submitted directly from the testing agency to the Board Administrative Office. _____

10. Complete and mail the Mandatory Practitioner Profile Questionnaire. A Mandatory Practitioner Profile Questionnaire may be downloaded from our website. _____

11. **Attach to the application and submit a check or money order in U.S. funds in the amount of $410, payable to the Tennessee Board of Medical Examiners.** _____

12. On October 1, 2008, Public Chapter 927 will become effective requiring physicians who perform Level II office based surgery must so report at the time of initial application, reinstatement or renewal of a medical license. Level II office based surgery means "level II surgery, as defined by the board of medical examiners in its rules and regulations, that is performed outside of a hospital, an ambulatory surgical treatment center, or other medical facility licensed by the Department of Health." The board of medical examiners' rules regarding office based surgery can be found at: **http://www.state.tn.us/sos/rules/0880-0880-02.pdf**. Please review these rules carefully if you perform level II procedures in your office. Under Public Chapter 927 you are further required to report certain "unanticipated events" to the board of medical examiners within mandated time frames of the occurrence. To review Public Chapter 927 please go to **http://state.tn.us/sos/acts/105/pub/pc0927.pdf**. It is imperative that you review this new law and adhere to it strictly. _____

13. Effective June 1, 2006 applicants for initial licensure in Tennessee must obtain a criminal background check. Click here for instructions. _____

14. Complete Attachment 5 – Declaration of Citizenship _____

UNDERSTANDING THE APPLICATION PROCESS

1. **All application fees are non-refundable.**

2. All documents and fees required to be submitted by you or which must be requested from the appropriate institutions in this application process, must be mailed directly to:

   Tennessee Board of Medical Examiners
   665 Mainstream Drive
   Nashville, TN 37243 (37228 for courier service only)

3. **Allow fourteen (14) working days** for information mailed to our office to be received and placed in your file. Federal Express or special courier services will not appreciably reduce the processing time. Additionally, if Federal Express or special courier services are used, you will be responsible for charges incurred. The Board asks that you please give the Board office every consideration in this matter.

4. If necessary documentation has not been received when your application has been received by the Board office, an initial deficiency letter will be sent to you by certified mail. The supporting documentation requested in the letter must be received in the Board office ninety (90) days from the date of the initial deficiency letter. **(Files not completed within ninety (90) days will be closed.)**

5. Absent any complicating factors, the average application processing time is eight (8) weeks. Once the application is completed, your file will be reviewed and an initial licensure determination made. You will be promptly notified by letter of the initial determination.

6. **If an address change occurs at any time during the application process, you must notify the Board office, in writing, immediately.**

7. It is recommended that you do not make arrangements to accept employment as a physician in Tennessee until you are granted a license number by the Board of Medical Examiners.

Thank you for your cooperation. We will make every effort to expedite your application in an efficient manner.

VANDERBILT UNIVERSITY MEDICAL CENTER

Department of Cardiac Surgery
Vanderbilt Heart and Vascular Institute

January 23, 2014

State of Tennessee
Board of Medical Examiners
665 Mainstream Drive
Nashville, TN 37243

RE: Recommendation for Matthew R. Danter, M.D.

I am pleased to recommend Dr. Matthew Danter for full medical licensure in the State of Tennessee. Dr. Danter is an accomplished Cardiac Surgeon that we, at Vanderbilt Medical Center, have been fortunate in recruiting to our Cardiac Transplant Program.

Dr. Danter is distinguished in the management of complex end-stage heart failure, and has been practicing cardiac surgery in Hamilton, Ontario, Canada. Dr. Danter is a highly skilled physician whose combination of skills and experience will be an enormous addition to our cardiac surgical population in Tennessee.

Dr. Danter is highly regarded by his patients and his colleagues, and I can recommend him to the Board for full medical licensure without hesitation.

Sincerely,

Michael R. Petracek, M.D.
Professor and Chairman
Department of Cardiac Surgery

MPR/jl

1215 21st Avenue South
Medical Center East, Suite 5025
Nashville, TN 37232-8802

tel 615.343.9195
fax 615.343.5248
www.vanderbilthealth.com/heart/

VANDERBILT UNIVERSITY MEDICAL CENTER

Department of Cardiac Surgery
Vanderbilt Heart and Vascular Institute

January 22, 2014

Tennessee Medical Licensing Board

Re: Matthew R. Danter BSc (Hon) MD, FRCSC

To Whom It May Concern:

This is a letter of support for Dr. Matthew Danter's Tennessee medical license. Dr. Danter is a highly skilled physician-scientist, and is dedicated to clinical work and studies in relation to heart failure, end-stage cardiomyopathy, transcatheter aortic valve insertion and complex surgical lead extraction. Throughout this letter, I hope to demonstrate Dr. Danter's extraordinary and unique talents, which easily merit his appointment as an Assistant Professor of the Department of Cardiac Surgery and Assistant Director of the Heart Transplantation and Mechanical Circulatory Support Program at the distinguished Department of Cardiovascular Surgery at Vanderbilt University Medical Center. His combination of skills and experience will unanimously be an enormous service to our cardiac surgical population in Tennessee, and to a larger extent, benefit the people of the United States.

As the Surgical Director of the Heart Transplantation and Mechanical circulatory Support programs at Vanderbilt University Medical Center over the past three years, I have had the opportunity to evaluate several candidates for Dr. Danter's position and he is highly recommended by nationally-recognized advanced heart failure surgeons. Dr. Danter underwent a rigorous recruitment process at Vanderbilt, and it became very clear to all that he would be an excellent addition to our department. His incomparable clinician abilities combined with his exceptional attributes are essential to the progress of our specialty.

Dr. Danter is distinghished in the management of complex end-stage heart failure. He completed his residency at the University of Alberta which is western Canada's largest cardiac transplant center. Futhermore, he successfully completed a fellowship training in Vancouver, British Columbia, Canada under the supervision of Dr. Anson Cheung, an internationally recognized figure in mechanical circulatory support. He possesses a very unique experience in left ventricular assist devices, extra-corporeal membrane oxygenator implants, and has performed independent cardiac and thoracic transplantations. He has a constellation of surgical skills rarely found in one person, and his exemplary skills are matched by his commitment to clinical excellence. Dr. Danter also demonstrates a constant dedication to surgical and medical education. He has a unique capability to help residents progress. His ability to understand the learning processes was demontrated as he ranked in the 99th percentile of all trainees who wrote the American Board of Thoracic Surgery in-training exam in the adult and congenital cardiac surgery sections. I am certain that Dr. Danter will continue this commitment to education at Vanderbilt University Medical Center.

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In summary, Dr. Danter is an outstanding physician-scientist and is in a group of very few, unique individuals committed to the advances in clinical technology and education. He possesses a unique skill set and experience. Dr. Danter is able to combine exemplary clinical practice and specialized skills to excellent innovative and collaborative research studies. He will most certainly help Vanderbilt make significant progress in the fields of advanced heart failure, complex lead extractions, and medical education. Furthermore, he will help our group better understand the epidemiology of heart failure disease and other disease processes. He is a part of a small cadre of physician-scientists devoted to development of novel technology and state-of-the art clinical outcomes. He is an exceptional cardiac surgeon possessing extraordinarily unique surgical skills that will enable Vanderbilt University Medical Center to continue to innovate and to rank among the premier medical institutions in the United States. I offer my unconditional support and endorsement for issuance of a Tennessee medical license.

Sincerely yours,

Simon Maltais, MD, PhD
Assistant Professor of Surgery and Assistant Professor in Medicine (Cardiology)
Surgical Director, Heart Transplantation and Mechanical Support Devices
Vanderbilt University Medical Center

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Review

Nonpharmacologic Approaches to Stroke Prevention in Atrial Fibrillation

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ABSTRACT

The greatest priority in treating atrial fibrillation (AF) is stroke prevention. There are now 3 main approaches to prevention: (1) oral anticoagulation (OAC), (2) eradication of AF, and (3) exclusion of the left atrial appendage (LAA) from the systemic circulation. The goal of this article is to review these approaches, with particular emphasis on nonpharmacologic methods and their role in light of current evidence. OAC is effective but is limited by major bleeding, physician and patient reluctance to use anticoagulants, and patient noncompliance. Eradication of AF with antiarrhythmic drugs has not been effective, and suppression with ablation has not yet been properly tested for stroke prevention. Finally, occlusion of the LAA is promising, but definitive evidence of efficacy for stroke prevention is lacking. Trials such as WATCHMAN LAA System for Embolic Protection in Patients With Atrial Fibrillation (PROTECT AF) and Prospective Randomized Evaluation of the WATCHMAN LAA Closure Device in Patients With Atrial Fibrillation vs Long-Term Warfarin Therapy (PREVAIL) provide the best quality evidence for LAA device closure, with results suggesting noninferiority

RÉSUMÉ

La plus grande priorité dans le traitement de la fibrillation auriculaire (FA) est la prévention de l'accident vasculaire cérébral (AVC). Il existe maintenant 3 approches principales en matière de prévention : 1) l'anticoagulation orale (ACO); 2) l'éradication de la FA; 3) l'exclusion de l'appendice auriculaire gauche (AAG) de la grande circulation. Le but de cet article est de passer en revue ces approches, en mettant particulièrement l'accent sur les méthodes non pharmacologiques et leur rôle à la lumière des données actuelles. L'ACO est efficace, mais il est limité par les saignements majeurs, la réticence du médecin et du patient à l'utilisation d'anticoagulants, et la non-observance du patient au traitement. L'éradication de la FA à l'aide de médicaments antiarythmiques n'a pas été efficace, et la suppression par l'ablation n'a pas encore été correctement vérifiée quant à la prévention de l'AVC. Finalement, l'occlusion de l'AAG s'avère prometteuse, mais des données concluantes sur l'efficacité de la prévention de l'AVC sont actuellement manquantes. Les essais comme les études PROTECT-AF (*WATCHMAN Left Atrial Appendice System for Embolic Protection in*

Atrial fibrillation (AF) is 1 of the most common cardiac arrhythmias and has been shown to be an important cause of stroke.[1] In Canada, AF is responsible for one-sixth of all strokes[2]; the stroke rate in patients older than 75 years with AF and 1 risk factor for stroke is 8.1% per year. This risk increases to 12% per year at any age for patients with a history of thromboembolism.[3] Most strokes in AF are caused by cardioembolism, and of these the dominant source is the left atrial appendage (LAA).[4] Currently, there are 3 main approaches to stroke prevention in AF: (1) oral anticoagulation (OAC) to prevent clot formation, (2) eradication of the AF, and (3) removal or occlusion of the LAA. The purpose of this review is to summarize the interventions for stroke prevention, with a focus on nonpharmacologic approaches and the evidence behind them.

Oral Anticoagulation

OAC therapy effectively reduces the risk of stroke in AF and is currently the first line of treatment in patients with AF and 1 or more risk factors.[5] The 2012 Canadian Cardiovascular Society (CCS) updated guidelines recommend anticoagulation for all patients with high-risk AF.[6] The guidelines recommend that patients with AF be stratified using a predictive stroke risk index (such as $CHADS_2$ [Congestive Heart Failure, Hypertension, Age, Diabetes, Stroke/Transient Ischemic Attack]) and an index for risk of bleeding (Hypertension, Abnormal Renal/Liver Function, Stroke, Bleeding History or Predisposition, Labile INR, Elderly (> 65 Years), Drugs/Alcohol Concomitantly [HAS-BLED]) and that patients with a $CHADS_2$ risk of ≥ 1 receive OAC. The 2011 American Heart Association updated AF guidelines also recommend anticoagulation with a vitamin K antagonist for

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to OAC. Surgical trials have yet to show the efficacy of LAA occlusion for stroke prevention. This review highlights the evidence behind each of these approaches and concludes that to date OAC remains the standard for stroke prevention in AF. Future trials will need to address novel OAC therapy when comparing them with LAA exclusion, and large randomized trials will be required to ascertain indications for nonpharmacologic therapy in current practice.

Patients With Atrial Fibrillation) et PREVAIL (*Prospective Randomized Evaluation of the WATCHMAN LAA Closure Device in Patients With Atrial Fibrillation vs Long-Term Warfarin Therapy*) offrent les meilleures données probantes en ce qui concerne la fermeture de l'AAG par dispositif, dont des résultats suggérant sa non-infériorité comparativement à l'ACO. Les essais chirurgicaux n'ont pas encore démontré l'efficacité de l'occlusion de l'AAG en matière de prévention de l'AVC. Cette revue met en évidence les données sur lesquelles repose chacune de ces approches et conclut sur le fait qu'à ce jour l'ACO demeure la norme en matière de prévention de l'AVC lors de FA. Les essais subséquents devront tenir compte des nouveaux ACO lorsqu'on les comparera à l'exclusion de l'AAG. Des essais aléatoires d'envergure sont nécessaires pour vérifier les indications de traitement non pharmacologique de la pratique actuelle.

patients with more than 1 moderate risk factor (class I, level of evidence A).[7] One of the updated recommendations pertains to dabigatran, a novel OAC, which is recommended as a useful alternative to warfarin in patients who do not have a prosthetic heart valve, significant valve disease, or severe renal failure (class I, level of evidence B). Despite these recommendations, only two-thirds of patients who are appropriate for anticoagulation therapy actually receive the treatment.[8] Furthermore, a UK database study found that discontinuation of treatment approached nearly 50% at 3 years in those who begin OAC,[9] despite ongoing AF.

Novel oral anticoagulants

Although warfarin is the most commonly prescribed oral anticoagulant, newer drugs are now available. These include the direct thrombin inhibitor dabigatran and the factor Xa inhibitors rivaroxaban and apixaban. All 3 medications have been shown in large clinical trials to produce reductions in rates of ischemic stroke similar to those of warfarin. In the **R**andomized **E**valuation of **L**ong-term Anticoagulation Therapy (RE-LY) trial, patients with AF were randomized to low-dose (110 mg) or high-dose (150 mg) dabigatran vs warfarin.[10] The outcome rate of stroke was 1.69% per year with warfarin, 1.53% per year with low-dose dabigatran (relative risk [RR], 0.91; 95% confidence interval [CI], 0.74-1.11), and 1.11% per year with high-dose dabigatran (RR, 0.66; 95% CI, 0.53-0.82; $P < 0.001$). The study concluded that for the end point of stroke, high-dose dabigatran was superior to warfarin, with no statistically significant difference in major bleeding. Low-dose dabigatran was found not to be inferior to warfarin, with a 20% lower rate of major bleeding.[10]

The **R**ivaroxaban **O**nce Daily Oral Direct Factor Xa Inhibition Compared With Vitamin **K** Antagonist for Prevention of Stroke and **E**mbolism **T**rial in **A**trial **F**ibrillation (ROCKET-AF) trial compared rivaroxaban to warfarin in a randomized trial of patients with AF.[11] The results showed similar rates of stroke (rivaroxaban, 2.12%; warfarin, 2.42%; $P = 0.117$) with no difference in bleeding rates (3.6% vs 3.45%; $P = 0.576$).

In the **A**pixaban for **R**eduction in **S**troke and **O**ther **T**hromboembolic **E**vents in Atrial Fibrillation (ARISTOTLE) trial, apixaban was compared with warfarin[12] in patients with AF. This study demonstrated a significant reduction in the primary outcome of stroke with apixaban (1.60% vs 1.27%; $P < 0.01$) when compared with warfarin. Major bleeding rates were also significantly lower with apixaban ($P < 0.001$).

A meta-analysis of 50,578 patients comparing the novel OAC therapy to warfarin found decreased rates of stroke or systemic embolism (2.8% vs 3.5%; $P < 0.001$), with similar major bleeding profiles (5.0% vs 5.6%; $P = 0.14$).[13] Because of the favourable outcomes of the novel OAC therapy when compared with warfarin, some physicians have adopted the novel OAC therapy as first-line therapy for patients with AF.[14] Furthermore, the CCS now recommends using the novel OAC therapy in preference to warfarin when initiating OAC therapy in patients with AF.[6]

Limitations of OAC

Despite the advancements in medical therapy, the risk of stroke in patients with AF who undergo *optimal* anticoagulation therapy still remains between 2% and 5% per year, regardless of the agent used.[11]

The limitations of OAC include (1) patient unsuitability for OAC, (2) increased risk of bleeding, (3) need for monitoring optimal international normalized ratio (INR) levels (with warfarin), and (4) patient noncompliance.

Patient unsuitability. Despite the therapeutic benefit of anticoagulation in the prevention of stroke, many patients are unsuitable for anticoagulation because of underlying medical conditions and history of major bleeding episodes.[15] Patients with underlying hepatic dysfunction[16] may be unsuitable for warfarin therapy. Warfarin interacts with other commonly used drugs that can potentiate its effects, thus increasing bleeding risk.[17] Furthermore, some patients with AF are also unsuitable for the newer OAC therapy. These patients may have hereditary clotting disorders or mechanical valve prostheses.[18,19] The new OAC therapy have also been implicated in bleeding complications in patients with impaired renal function.[20] Further research is needed to evaluate the safety of these novel agents in these conditions.

Increased risk of overall bleeding. The benefits of anticoagulation in the prevention of stroke come at the expense of the potential risk of increased bleeding, regardless of the type of OAC used. In the RE-LY trial, the annual rates of major bleeding were 3.4% for dabigatran 110 mg BID, 2.7% for dabigatran 150 mg BID, and 3.1% for warfarin.[10] In the

ROCKET-AF trial, major bleeding rates for rivaroxaban were 3.6%.[21] In the ARISTOTLE trial, apixaban stands out as having a bleeding profile that is significantly reduced compared with warfarin (2.13 vs 3.09; $P < 0.001$).[12] Major bleeding is a serious complication and can impact mortality and morbidity.[22] In addition, once bleeding occurs, OAC therapy are typically discontinued until the episode has passed, and this places the patient at a potentially higher risk of stroke during that period.

Need for monitoring. For warfarin to be effective, the patient's INR must be maintained within a tight therapeutic range. One study demonstrated that in a community practice, patients remain in the therapeutic range as little as 50% of the time.[23] This not only places the patient at a higher risk of bleeding because of INR fluctuations but also exposes them to increased risk of stroke when the INR is in less than the therapeutic range. It should be noted that one of the most important advantages of the novel OAC therapy is the absence of monitoring required.

Noncompliance. Noncompliance is a significant issue with warfarin and is related to the burden of maintaining a strict lifestyle to ensure optimal INR levels.[24] The Canadian Cardiovascular Outcomes Research Team Atrial Fibrillation (CCORT AF) study found that less than half of patients with AF filled their prescription for warfarin within 90 days after discharge for AF hospitalization.[2] Although the burden of INR monitoring is not present in the novel OAC therapy, these drugs also face issues of noncompliance.[25] In the RE-LY trial, 15.5% of the patients receiving low-dose and 14.5% of the patients receiving high-dose dabigatran discontinued their medication at the end of follow-up (compared with 10.2% for warfarin).[10] In the ROCKET-AF trial, 23.7% of patients had discontinued rivaroxaban by the end of follow-up.[21] In ARISTOTLE, 25.3% of patients had discontinued apixaban by the end of follow-up.[12] One potential reason for this may be that gastrointestinal discomfort and bleeding was significantly increased with the novel OAC therapy.

Issues of compliance and the other limitations discussed have led investigators to explore more definitive nonpharmacologic methods for reducing stroke risk in patients with AF. These include catheter-based and surgical interventions to eradicate AF and removal or occlusion of the LAA.

Eradication of AF

Percutaneous methods of ablation are widely used to attempt to eliminate AF. The reported success rates of catheter ablations range from 70%-90%, and this can vary widely based on centre experience.[26] Currently, based on the 2012 Heart and Rhythm Society (HRS) guidelines, the only class I (level of evidence A) indication for catheter ablation of AF is for symptomatic AF that is refractory or if the patient is intolerant to antiarrhythmic medication.[27] However, limitations of ablation include the fact that patients frequently have paroxysmal AF, and complete eradication is not possible in a large number of patients.[26] One study reported that 20% of patients who underwent ablation had AF recurrence.[28] It is because of this well-demonstrated occurrence that the guidelines do not recommend discontinuation of warfarin or equivalent therapies after ablation.[27]

The surgical Maze procedure was first performed in 1987 for elimination of AF.[29] Since then, it has evolved into an elaborate series of specific lesion sets using various energy sources[26] designed to direct the electrical activity mimicking sinus rhythm. A recent systematic review examining the success rate of classic "cut-and-sew" Maze vs alternative energy sources found that the procedures were successful only 78.3% and 84.9% ($P = 0.03$) of the time, respectively.[30] Currently, the 2012 HRS guidelines recommend consideration for surgical ablation of AF only in symptomatic AF patients undergoing other cardiac surgery.[27] The task force recommends, when safely applicable, that the LAA be occluded. Admittedly, removal or occlusion of the LAA may alter a patient's stroke risk, but no quality and definitive long-term data are available to demonstrate this.

Although eradication of AF would theoretically reduce the risk of stroke, currently there are no data to support that either catheter ablation or the Maze procedure reduces the risk of early or late stroke.[26] A recent survey of electrophysiologists performing AF ablation in Canada found that 11% of physicians would discontinue OAC therapy in patients with $CHADS_2$ score ≥ 2 after successful ablation, despite guidelines recommending long-term anticoagulation.[31] The HRS recommends continued anticoagulation in either catheter or surgical ablation of AF and states that clinical trials are needed to determine the stroke risk in post-procedure patient populations and whether these patients will still benefit from anticoagulation therapy.[27] The 2010 CCS AF Guidelines Committee also published recommendations pertaining to surgical therapy. The committee recommended that OAC therapy be continued after surgical AF ablation in patients with a $CHADS_2$ score ≥ 2 (strong recommendation, moderate quality evidence).[32] The committee noted that currently there is no strong evidence to support the safety of discontinuing long-term OAC treatment, and as such opted for a more conservative approach.[32]

LAA Occlusion

The LAA is formed from the embryonic left atrium during the first trimester of gestation. In normal sinus rhythm, the trabeculated LAA exhibits organized contraction in concert with the rest of the left atrium. In AF, the atria contract irregularly, leading to disorganized contraction, dilatation, and stasis. These features result in preferential clot formation in the LAA.

Previous studies have shown that 70% of all strokes in patients with AF are cardioembolic in origin.[33,34] Of these, at least 90% of all left atrial thrombi are found within the LAA.[4] In an evaluation of 233 patients with AF who did not undergo anticoagulation, transesophageal echocardiography revealed that 34 patients (15%) had left atrial thrombus, and 33 of 34 of these thrombi were present in the LAA.[35] In another study, 272 nonrheumatic patients with AF had an 8% incidence of left atrial clot, with 100% of them being in the LAA.[36] A meta-analysis of 23 studies in which the LAA was examined by transesophageal echocardiography also found that thrombus formation was more likely to occur in the LAA.[4]

With the LAA being a dominant source of thrombus in AF, it is plausible that its occlusion will lead to a decreased risk

of stroke in patients with AF. Occlusion of the LAA is an old idea, first described in the literature in 1949 by John Madden.[37] With the limitations of OAC therapy and the increasing burden of AF, there has been renewed interest in LAA occlusion. When the risk of bleeding or other barriers to OAC therapy are encountered, occluding the LAA is a potentially viable strategy to decrease the risk of stroke. In addition, some physicians have stated that removing the LAA and continuing OAC therapy in patients may allow for a more lenient therapeutic range.[38] This synergistic effect may stem from the different mechanisms the 2 treatment modalities use to reduce stroke risk. LAA occlusion removes the dominant site of cardiac emboli in AF, whereas OAC therapy reduces the likelihood of thrombus formation systemically. Although biologically plausible, further research in this area is needed to show efficacy in combining treatments. To date, the strongest recommendation comes from the European Society of Cardiology, which recommends LAA occlusion for patients with AF undergoing mitral valve surgery (level of evidence C, class IIb) [25]. In addition, the European Society of Cardiology also recommends that percutaneous LAA closure be considered in patients with a high stroke risk and contraindications for long-term OAC administration (level of evidence B, class IIb).[25]

Methods to occlude the LAA

Percutaneous occlusion of the LAA. LAA closure can be performed percutaneously, and there are several devices designed to accomplish this. These devices include: (1) the WATCHMAN system (Aritech, Inc, Plymouth, MN) (2) the PLAATO implantation device (ev3/Covidien, Plymouth, MN; no longer available) and (3) the Amplatzer device (Amplatzer Products, Plymouth, MN) (Fig. 1).

WATCHMAN system. The WATCHMAN system is the only device currently undergoing the US Food and Drug Administration (FDA) approval process for clinical indication. The device is a self-expanding nitinol frame loaded inside a catheter and delivered trans-septally into the LAA. WATCHMAN LAA System for Embolic **Protection** in Patients With **A**trial **F**ibrillation (PROTECT AF) was a randomized noninferiority trial looking at patients with nonvalvular AF.[39] The largest study of this kind, 707 patients were randomized in a 2:1 fashion to percutaneous closure of the LAA and discontinuation of warfarin after 45 days (n = 463) or to a warfarin treatment control arm (n = 244). The primary outcome was a composite of stroke, death, and embolism. The authors reported that the primary event rate was 3.0 per 100 patient-years in the intervention group vs 4.9 per 100 patient-years in the control arm. The authors concluded that device placement was not inferior to warfarin for the primary efficacy end points of stroke, either ischemic or hemorrhagic, cardiovascular death, and systemic thromboembolism. This noninferiority finding was balanced by the increase in adverse safety events in the device group, the majority of which occurred in the first 7 days. However, the study suffered from several major criticisms, including small sample size compared with historical pharmacologic trials; the Bayesian statistical approach, which was difficult to understand; the boundaries of noninferiority used; the initial use of 45 days of warfarin in the device group, which may have contributed to improved early outcome in the device group; and the reintroduction of warfarin later during the follow-up period. Additionally, concerns were raised regarding the high proportion of patients who were screened (n = 4998) and excluded from enrollment (n = 4291), thus decreasing the external validity of the results. Despite initial US FDA panel approval, the full US FDA recommended against approval and instead requested a second pivotal trial (**P**rospective **R**andomized **Eva**luation of the WATCHMAN LAA Closure Device **i**n Patients With Atrial Fibrillation vs **L**ong-Term Warfarin Therapy [PREVAIL]) to study safety as well as efficacy. The PREVAIL trial[40] was to be presented at the 2013 American College of Cardiology conference but was pulled because of an embargo break by the sponsor. The slides, however, were made public. PREVAIL randomized 407 patients in a 2:1 fashion to a device or warfarin. The key findings were the following:

1. The success rate of implantation increased from that in the PROTECT AF trial (91%) to 95.1%.
2. The main safety end point (7-day occurrence of death, ischemic stroke, systemic embolism and procedure- or device-related complications requiring major cardiovascular or endovascular intervention) was achieved. The 95% upper CI of the main safety end point was

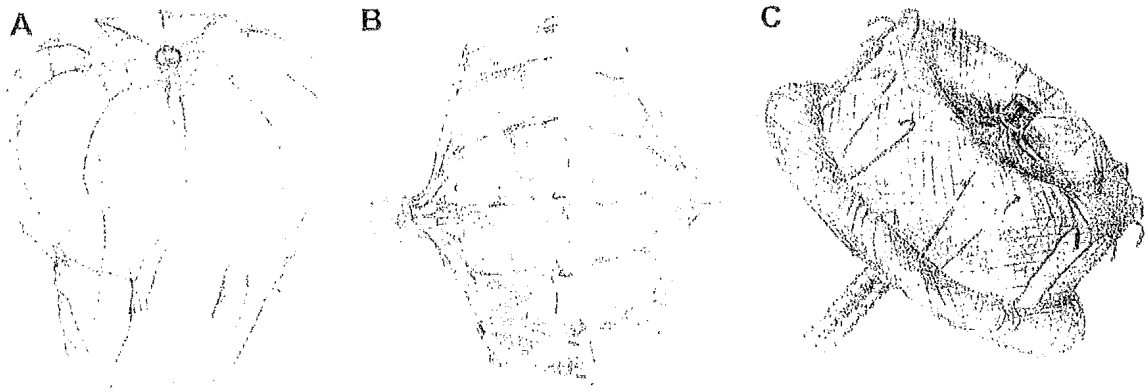

Figure 1. Percutaneous left atrium appendage (LAA) occlusion devices. **(A)** The WATCHMAN system (Aritech, Inc, Plymouth, MN). **(B)** The PLAATO device (ev3/Covidien, Plymouth, MN; no longer available). **(C)** The Amplazter device (Amplatzer Products, Plymouth, MN). Illustrated by Kelsey Chan and reproduced with permission.

2.618%, which was less than the prespecified criterion of 2.67%.

3. The first efficacy primary end point (stroke, systemic embolism, and cardiovascular or unexplained death) missed showing noninferiority, with the upper 95% confidence limit slightly higher than allowed to meet the success criterion (< 1.75%). Thus, as yet no definitive evidence exists to support the premise that LAA occlusion with the WATCHMAN device can replace OAC.

PLAATO device. The PLAATO device also uses a transcatheter approach to occlude the LAA. The largest cohort study to date was performed by Ostermayer et al.,[41] which looked at patients with AF who had a contraindication for OAC (n = 111). With an average follow-up of 9.8 months, only 2 patients experienced a stroke (1.8%; 95% CI, 0.2%-6.4%). The authors reported an annual stroke rate of 2.2%, which compared favourably to historical controls. In another study by El-Chami et al.,[42] 3-year clinical outcomes were reported after PLAATO implantation (n = 11). As a group, the patients had a predicted risk of stroke of 8.6% based on the $CHADS_2$ score. The authors reported that at follow-up, the stroke risk in their cohort was only 3% per year. This risk of stroke was comparable to patients receiving OAC, and the authors concluded that a large study was necessary to validate their results. The longest running study, however, is by Block et al.,[43] who followed 64 patients who were unsuitable for OAC for 5-year outcomes after PLAATO implantation. The investigators concluded that the annualized stroke/transient ischemic attack rate in the cohort was 3.8% per year, which was less than the predicted $CHADS_2$ scoring system. It should be noted that the PLAATO device, manufactured by Appriva Medical Inc, is no longer produced and is currently off the market.

Amplatzer device. The Amplatzer device was initially designed for the percutaneous closure of patent foramen ovale and atrial septal defect. Currently, only a case series of 16 patients using this device in the setting of LAA occlusion is available.[44] The authors reported a safe percutaneous option, with only 1 patient experiencing device embolization minutes after the procedure. Mean follow-up of 4 months showed no thromboembolic episodes pertaining to the LAA, but no long-term data are available.

All trials addressing percutaneous interventions for AF mention that such devices require an initial learning curve.[40] When performed by experienced operators, complications decrease in number and severity. It should also be noted that most LAA occlusion devices currently being tested require a minimum of 45 days of OAC to reduce the risk of thromboembolic phenomena during device endothelialization. As a result, it is difficult to extrapolate how these devices would perform in patients who have absolute contraindications to OAC therapy. Currently, if these devices gain US FDA approval, they may be suitable for patients with contraindications to long-term OAC. Table 1 provides a list of the devices and a short summary of the evidence.

LAA surgical exclusion. The exclusion of the LAA can be performed during cardiac surgery in patients with AF. There have been several published reports.[45] Surgical techniques to accomplish exclusion include simple ligation techniques, stapling techniques, and amputation with closure.[46] It has been suggested that the most effective technique to accomplish exclusion is amputation and closure.[47] Because the optimal exclusion technique has yet to be established, we will not compare techniques specifically; rather, we will discuss current evidence on surgical exclusion in general.

The evidence for the efficacy of surgical LAA exclusion is inconclusive. There are several articles that suggest no impact of LAA ligation on stroke risk. One such study by Almahameed et al.,[48] involving 136 patients undergoing LAA amputation at the time of mitral valve surgery, demonstrated that during a mean follow-up of 3.6 years, 15% of the patients who underwent LAA amputation but did not receive warfarin had thromboembolic events. In the group that underwent LAA amputation and received warfarin at discharge, only 10% had thromboembolic events. A regression analysis on this cohort revealed that warfarin, not LAA amputation, resulted in reduced stroke risk. Another study by Bando et al.[49] (n = 812) investigating the risk factors for stroke in patients undergoing mitral valve surgery demonstrated in subgroup analysis that closure of the LAA (n = 47) did not have a significant effect on the incidence of stroke in patients with AF ($P = 0.69$). Additionally, the group performed a univariate analysis on 812 patients (78% with AF), which showed that LAA closure was not significant for preventing late (8 years) stroke.

Conversely, some investigators have reported favourable outcomes after surgical LAA exclusion. In a study of 259 participants by Bakhtiary et al.,[46] patients with AF and contraindications to warfarin or a high risk of thromboembolism underwent surgical ligation of the LAA. The authors reported that the postoperative stroke rate was low (1.5%; CI not reported) compared with historical controls, but long-term data are unavailable. Blackshear et al.[3] evaluated LAA obliteration through a thoracoscopic technique in patients with high-risk AF (n = 15). Patients were followed until 60 months (mean, 42 months ± 14 months), and a total of 2 strokes was reported. A subgroup of 11 patients with a history of thromboembolism had an annualized stroke rate of 5.2% per year compared with a rate of 13% per year for historical controls from the Stroke Prevention in Atrial Fibrillation (SPAF) trial ($P = 0.15$). The authors believed that the trend toward this lower stroke risk was clinically important and recommended support for the development of LAA techniques. Garcia-Fernandez et al.[50] reported that LAA exclusion was effective in reducing thromboembolic events in patients with valvular AF (n = 58). The study showed that thromboembolism was significantly more frequent in patients without LAA ligation than in those with LAA ligation (17% vs 3.4%; $P = 0.01$). The authors went on to state that absence of LAA ligation was an independent predictor of an embolic event (odds ratio [OR], 6.7; $P = 0.02$) by multivariate analysis. When incomplete ligation was included in the model, the OR increased to 11.9 (95% CI, 1.5-93.6; $P = 0.02$). The first randomized trial of LAA occlusion (Left Atrial Appendage Occlusion Study [LAAOS]) (n = 77) by Healey et al.[51] examined patients with high-risk AF who had undergone bypass and were randomized to LAA occlusion or a control group. The authors reported that at mean follow-up of 13 months, 2 patients, both of whom were in the occlusion group, had a thromboembolic event. Although this is lower than historical controls, it should be noted that this was a pilot feasibility study and the primary outcome was not to look at

Table 1. LAA occlusion devices and current evidence

Device[*]	Study authors	Trial size (N)	Trial type and comparator	Study outcome	Present state of device development
WATCHMAN device	Holmes et al.[39] PROTECT AF trial	707	Randomized 2:1, WATCHMAN device vs warfarin	Authors reported first-degree event rate was 3.0/100 patient-years in intervention vs 4.9/100 patient-years in control; authors concluded device was not inferior to warfarin	Currently undergoing FDA approval
	Landmesser and Holmes[40] PREVAIL trial	407	Randomized 2:1, WATCHMAN device vs warfarin	Main safety end point was noninferiority; however, efficacy end point of noninferiority not met	Currently undergoing FDA approval
PLAATO device	Ostermayer et al.[41]	111	Prospective cohort	Authors reported an annual stroke rate of 2.2% for patients with device	Currently off the market
	El-Chami et al.[42]	11	Prospective cohort	At 3-y follow- up, authors reported stroke risk of 3%/y for patients with device	Currently off the market
	Block et al.[43]	64	Prospective cohort	At 5-y follow-up, authors reported stroke risk of 3.8% for patients with device	Currently off the market
Amplatzer device	Meier et al.[44]	16	Case series	Follow-up of 4 mo showed no thromboembolic episodes	Enhanced Amplatzer Amulet device being tested in Europe

FDA, US Food and Drug Administration; LAA, left atrial appendage; PREVAIL, Prospective Randomized Evaluation of the WATCHMAN LAA Closure Device in Patients With Atrial Fibrillation vs Long-Term Warfarin Therapy; PROTECT AF, WATCHMAN LAA System for Embolic Protection in Patients With Atrial Fibrillation.

[*] Device manufacturers: WATCHMAN device (Aritech, Inc, Plymouth, MN); PLAATO device (ev3/Covidien, Plymouth, MN; no longer available); Amplatzer device (Amplatzer Products, Plymouth, MN).

differences in stroke rates. A follow-up trial, LAAOS II,[52] modified the protocol and randomized patients with AF to LAA occlusion (n = 51). Results of this study are still pending. A larger (n = 4700) randomized trial (LAAOS III) is currently under way to definitively evaluate the role of LAA in patients with AF.[53]

Analysis of Available Options

According to well-established guidelines, patients with AF should undergo optimal OAC therapy. In patients who have relative contraindications to long-term OAC, percutaneous devices may be an option. For patients who have absolute contraindications to OAC, or high-risk patients undergoing other cardiac surgery, surgical ligation of the LAA may be feasible. All interventions, percutaneous or surgical, carry risks of bleeding, device embolization, and in rare cases death. The alternative treatment modalities arose primarily from the specific cohorts of patients who were included in the trials discussed, and frank discussions between the clinician and patient must take place before embarking on a treatment plan.

Table 2. Current trials investigating left atrial appendage ligation (ClinicalTrials.gov)[55]

Trial name	Study population/intervention	Primary outcomes	Start date	End date	Target enrollment
LAAOS II	Patients with AF at risk of stroke undergoing cardiac surgery	Recruitment rate into pilot trial	August 2009	October 2013	50
LAAOS III	Patients with AF at risk of stroke undergoing cardiac surgery	LAA closure using a suture and/or surgery vs no intervention	July 2012	May 2016	4700
PREVAIL	Patients with AF undergoing WATCHMAN intervention vs warfarin	Composite of stroke, embolism, and death; coprimary end point of procedure complication rates	November 2010	June 2017	407
PROTECT AF	Patients with AF receiving long-term warfarin therapy; WATCHMAN[*] device	5-y stroke rate, embolism rate, and cardiovascular death	February 2005	October 2014	707
FAST II	Mini Maze vs RF ablation in patients with AF	Freedom from AF, with secondary outcome of reduction of burden from AF	April 2011	December 2013	180
ISAR-AF	Percutaneous closure of LAA vs catheter ablation in patients with persistent AF	1-y composite end point of death, stroke, major bleeding, and rehospitalization	November 2010	November 2013	120

AF, atrial fibrillation; FAST II, Atrial Fibrillation: Ablation or Surgical Treatment II; ISAR-AF, Interventional Strategies in Treatment of Atrial Fibrillation: Percutaneous Closure of the Left Atrial Appendage vs Catheter Ablation; LAA, left atrial appendage; LAAOS, Left Atrial Appendage Occlusion Study; PREVAIL, Prospective Randomized Evaluation of the WATCHMAN LAA Closure Device in Patients With Atrial Fibrillation vs Long-Term Warfarin Therapy; PROTECT AF, WATCHMAN LAA System for Embolic Protection in Patients With Atrial Fibrillation. WATCHMAN LAA Closure Technology for Embolic Protection in Patients With Atrial Fibrillation; RF, radiofrequency ablation.

[*] Device manufacturer: WATCHMAN device (Aritech, Inc, Plymouth, MN).

There is a strong demand for high-quality large-scale randomized controlled trials to compare interventions to medical therapy. Currently, all the interventional trials have compared nonpharmacologic approaches to warfarin only. The 3 recent trials of novel OAC therapy have randomized more than 37,000 patients, with outcome events numbering 717 patients (1.9%) to claim noninferiority. With the excellent results from these studies, similar standards for evidence must be held for the replacement of OAC therapy by nonpharmacologic approaches. Additionally, newer studies will have to address the benefits, if any, of LAA occlusion when compared with the novel OAC therapy, which may become the new standard of treatment. As new evidence emerges from trials such as PREVAIL, LAAOS III, and Atrial Fibrillation: Ablation or Surgical Treatment II (FAST II) (Table 2),[54] clinicians must carefully apply the results of these trials to different patient populations.

Conclusion

This review has highlighted the main nonpharmacologic options for stroke prevention in patients with AF. To date, no nonpharmacologic approach has the strength of evidence to replace OAC therapy. Rather, in the future these evolving procedures may be an adjunct for reducing cardioembolic events originating from the LAA. In the setting of a patient unable to tolerate any OAC therapy, percutaneous LAA exclusion may be considered as an alternative therapy to reduce stroke risk. The evidence for surgical ligation is even more limited, and only patients undergoing other cardiac surgery with absolute contraindications to OAC may be considered. However, the risks and benefits of the procedure need to be clearly addressed by the physician, and procedures should be performed only in centres with experience. In the future, large randomized trials will provide more evidence for LAA occlusion.

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Disclosures

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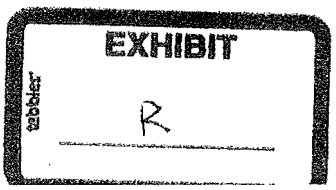
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