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| BIOGRAPHICAL SKETCH | | | | |
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| NAME  Axelrod, David Michael | | POSITION TITLE  Clinical Associate Professor, Department of Pediatrics (Cardiology), Stanford University Medical Center | | |
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| EDUCATION/TRAINING | | | | |
| INSTITUTION AND LOCATION | DEGREE  *(if applicable)* | | MM/YY | FIELD OF STUDY |
| Dartmouth College | B.A. | | 06/1998 | Psychology |
| The Ohio State University College of Medicine | M.D. | | 06/2002 | Medicine |
| University of California at San Francisco |  | | 06/2005 | Pediatric Residency |
| Lucile Packard Children’s Hospital/Stanford University Medical Center |  | | 06/2009 | Pediatric Cardiology Fellowship |
| Lucile Packard Children’s Hospital/Stanford University Medical Center |  | | 06/2011 | Pediatric Critical Care Medicine Fellowship |

**A. Personal Statement**

I am energized by the study and practice of pediatric cardiology. As one of the most complex and challenging medical subjects, pediatric cardiology requires a unique understanding of cardiac embryology, anatomy, and physiology while also requiring the clinician to integrate cardiopulmonary interactions and the understanding of complex surgical repairs and palliations. The training in pediatric cardiology is a daunting challenge that often represents the steepest learning curve of a physicians’ academic and educational development. Understanding complex congenital heart defects is not only challenging but also critically important to the management of these medically fragile patients. For this reason, I have dedicated a significant portion of my career to the training and education of pediatric residents and pediatric cardiology fellows.

My past experience and leadership in education has been recognized in the division of pediatric cardiology and the department of pediatrics. I have co-developed the Pediatric Cardiology Fellows’ Boot Camp, a novel and successful program currently in its fourth year. In recognition of these efforts, I was awarded the highest honor from the pediatric cardiology fellows in 2015, the Stanford Stole of Gratitude, and I also was honored with the clinical excellence award in the Stanford Department of Pediatrics in 2015.

The development of The Stanford Virtual Heart (see: https://www.youtube.com/watch?v=xW1EMBVmAW4) a comprehensive congenital heart disease experience in a virtual reality (VR) platform, has launched the Stanford Children’s Heart Center into the next generation of medical education. We are using this VR congenital heart disease experience to educate families, students, and trainees, with a goal to eventually assist cardiothoracic surgeons and cardiologists with procedural planning. The Stanford Virtual Heart is revolutionizing how we learn and understand congenital heart disease, and Stanford will be the leader in this exciting new field of virtual and augmented reality in medicine.

I am also the Lead Medical Advisor (and a shareholder) at Lighthaus Inc., a virtual reality company that builds experiences for education in healthcare and the sciences. Recognized as an industry leader and having received distinctions from the US Department of Education and others, Lighthaus has the ability to develop the premiere VR educational content in medicine. Collaborating with Stanford’s Cardiothoracic Surgery Department and serving as a liaison to Lighthaus, I am confident that developing The Stanford Virtual Lung will yield a groundbreaking development in thoracic surgical training.

B. Positions and Honors

Positions and Employment

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| --- | --- |
| 2005-2006 | Clinical Instructor, University of California, San Francisco,  Neonatal Intensive Care Unit |
| 2005-2006 | Clinical Instructor, University of California, San Francisco, Critical Care Transport Services, Neonatal and Pediatric Intensive Care Units |
| 2005-2006 | Alta Bates Medical Center Neonatal Intensive Care Unit, Berkeley, CA |
| 2005-2006 | Pediatric Hospitalist, Kaiser Permanente Medical Center, San Francisco and Redwood City, CA |
| 2008-2014 | Astellas Pharmaceuticals, Consultant |
| 2011-present  2015-2018  2015-present | Clinical Assistant Professor, Stanford University, Department of Pediatrics, Division of Pediatric Cardiology  Medical Director, Pediatric Cardiovascular Intensive Care Unit Consult Service  Co-developer: Stanford Pediatric Cardiology Fellow’s Boot Camp |
| 2015-2018 | CVICU Liaison to the Fetal Heart Center at Stanford |
| 2014-2017  2016-present | Pediatric Residency Program Coach  Lead Medical Advisor and Partner, Lighthaus Inc. |

Other Experience and Professional Memberships

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| --- | --- | --- | --- | --- |
| 2002-present | Alpha Omega Alpha | | | |
| 2004-2005 | University of California, San Francisco, Pediatric Resident Chair, Curriculum Committee | | | |
| 2005-present | American Academy of Pediatrics | | | |
| 2006-present | American College of Cardiology | | | |
| 2008-present | Pediatric Cardiac Intensive Care Society Member | | | |
| 2008-2009 | Lucile Packard Children’s Hospital Heart Center Education Committee  Fellow Representative | | | |
| 2009 | Lucile Packard Children’s Hospital Heart Center Simulation Program  Fellow Representative | | | |
| 2010-2013 | Liaison to the Board, Pediatric Cardiac Intensive Care Society | | | |
| 2011-present | Assistant Director, LPCH CVICU Simulation Program | | | |
| 2013-present | Western Society of Pediatric Cardiology | | | |
| 2013-present | Board Member, Barth Syndrome Foundation | | | |
| 2014-2017 | Member, Program Committee for PCICS Conference | | | |
| Honors |  |  | |
| 2002 | The Ohio State University College of Medicine Clerkship Letters of Commendation: Neonatal Intensive Care Unit, Family Medicine, Psychiatry | |  |
| 2002 | The Ohio State University College of Medicine Clerkship Honors: Pediatrics, Internal Medicine, Surgery, Emergency Medicine, Obstetrics/Gynecology, Pulmonology, Adolescent Medicine, Physical Examination | |  |
| 2002 | Elected to Alpha Omega Alpha, The Ohio State University College of Medicine | |  |
| 2002 | Columbus Children’s Hospital Award for “Outstanding Performance in the Study and Care of Children” | |  |
| 2003 | Awarded Attendance to Baylor College of Medicine International Conference on Heart Failure in Children and Young Adults | |  |
| 2002-2005 | Received Top Rank in Patient Satisfaction in Pediatric Continuity Clinic | | | |
| 2009 | American College of Cardiology Scientific Sessions, Fellows In Training Travel Award | | | |
| 2012  2015  2015 | Stanford Pediatric Cardiology Fellows’ Very Important Person (VIP) in Fellow Education  Stanford Pediatric Cardiology Fellows’ Awardee: Stanford Stole of Gratitude  Stanford Department of Pediatrics Clinical Excellence Award | | | |

C. Selected Peer-reviewed Publications

**Peer Reviewed Articles (Original Work)**

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| |  | | --- | | 1. Mah KE, Hao S, Sutherland SM, Kwiatkowski DM, **Axelrod DM**, Almond CS, Krawczeski CD, Shin AY. Fluid overload independent of acute kidney injury predicts poor outcomes in neonates following congenital heart surgery. *Pediatr Nephrol*. 2017 Nov 11. | | 1. Arunamata A, **Axelrod DM**, Bianco K, Balasubramanian S, Quirin A, Tacy T. Chronic antepartum maternal hyperoxygenation in a case of severe fetal Ebstein’s anomaly with circular shunt physiology. *Ann Ped Card*. Aug 2017;10(3):284-287. | | 1. Kortz TB, **Axelrod DM**, Chisti MJ, Kache S. Clinical outcomes and mortality before and after implementation of a pediatric sepsis protocol in a limited resource setting: A retrospective cohort study in Bangladesh. *PLoS One*. 2017 Jul 28;12(7):e0181160. doi: 10.1371/journal.pone.0181160. eCollection 2017. | | 1. Ceresnak SR, **Axelrod DM**, Sacks LD, Motonaga KS, Johnson ER, Krawczeski CD. Advances in Pediatric Cardiology Boot Camp: Boot Camp Training Promotes Fellowship Readiness and Enables Retention of Knowledge. *Pediatr Cardiol*. 2017 Feb 4. doi: 10.1007/s00246-016-1560-y. | | 1. Algaze CA, Koth AM, Faberowski LW, Hanley FL, Krawczeski CD, **Axelrod DM**. Acute Kidney Injury in Patients Undergoing the Extracardiac Fontan Operation With and Without the use of Cardiopulmonary Bypass. *Pediatr Crit Care Med.* 2017, Jan 18(1):34-43. 2. Arunamata A, **Axelrod DM,** Kipps AK, McElhinney DB, Shin AY, Hanley FL, Olson IL, Roth SJ, Selamet Tierney ES. Practice Patterns in Postoperative Echocardiographic Surveillance after Congenital Heart Surgery in Children: A Single Center Experience. *J Pediatr*. 2016 Oct 28. |  1. Koth AM, **Axelrod DM**, Reddy S, Roth SJ, Tacy TA, Punn R. Institution of Veno-arterial Extracorporeal Membrane Oxygenation Does Not Lead to Increased Wall Stress in Patients with Impaired Myocardial Function. *Pediatr Cardiol.* 2016, Dec 22. |
| 1. Kwiatkowski DM, Price E, **Axelrod DM**, Romfh AW, Han BS, Sutherland SM, Krawczeski CD. Incidence, risk factors, and outcomes of acute kidney injury in adults undergoing surgery for congenital heart disease. *Cardiol Young.* 2016 Nov 21:1-8. |
| 1. **Axelrod DM**, Anglemyer A, Sutherland SM. The authors reply. *Pediatr Crit Care Med*. 2016 Aug; 17(8): 814-5. Reply to Editorial by McMahon and Zappitelli, *Pediatr Crit Care Med*. 2016 Feb; 17(2):170-1. 2. **Axelrod DM**, Frymoyer AR, Sutherland SM. Letter to the Editor regarding "Arrhythmias in the paediatric ICU: a prospective study of the rates and predictors of arrhythmias in children without underlying cardiac disease" by Cassel-Choudhury et al. *Cardiol Young.* 2016 Jul. 15:1-2. |
| 1. Hollander SA, **Axelrod DM**, Bernstein D, Cohen HJ, Sourkes B, Reddy S, Magnus D, Rosenthal DN, Kaufman BD. Compassionate Deactivation of Ventricular Assist Devices in Pediatric Patients. *J Heart Lung Transplant.* 2016 May;35(5):564-7. |
| 1. Hollander SA, Montez-Rath ME, **Axelrod DM**, Krawczeski CD, May LJ, Maeda K, Rosenthal DN, Sutherland SM. Recovery from Acute Kidney Injury and CKD Following Heart Transplantation in Children, Adolescents, and Young Adults: A Retrospective Cohort Study. *Am J Kidney Dis*. 2016 Aug;68(2):212-8. |
| 1. Ceresnak SR, **Axelrod** **DM**, Motonaga KS, Johnson ER, Krawczeski CD. Pediatric Cardiology Boot Camp: Description and Evaluation of a Novel Intensive Training Program for Pediatric Cardiology Trainees. *Pediatr Cardiol*. 2016 Jun;37(5):834-44. |
| 1. **Axelrod DM**, Chock VY, Reddy VM. Management of the Preterm Infant with Congenital Heart Disease. *Clin Perinatol*. 2016 Mar;43(1):157-71. |
| 1. McCammond AN, **Axelrod** **DM**, Bailly DK, Ramsey EZ, Costello JM. Pediatric Cardiac Intensive Care Society 2014 Consensus Statement: Pharmacotherapies in Cardiac Critical Care Fluid Management. *Pediatr Crit Care Med*. 2016 Mar;17(3 Suppl 1):S35-48. |
| 1. Kwiatkowski DM, **Axelrod DM**, Sutherland SM, Tesoro TM, Krawczeski CD. Dexmedetomidine Is Associated With Lower Incidence of Acute Kidney Injury After Congenital Heart Surgery. *Pediatr Crit Care Med.* 2016 Feb; 17(2):128-134. |
| 1. Frymoyer A, Su F, Grimm PC, Sutherland SM, **Axelrod DM**. Theophylline Population Pharmacokinetics and Dosing in Children Following Congenital Heart Surgery with Cardiopulmonary Bypass. *J Clin Pharmacol*. 2016 Sept; 56(9):1084-93 |
| 1. **Axelrod DM,** Sutherland SM, Anglemyer A, Grimm PC, Roth SJ. A Double-Blinded, Randomized, Placebo-Controlled Clinical Trial of Aminophylline to Prevent Acute Kidney Injury in Children Following Congenital Heart Surgery With Cardiopulmonary Bypass. *Pediatr Crit Care Med*. 2015 Dec 11. Note: see related Editorial by McMahon and Zappitelli, *Pediatr Crit Care Med*. 2016 Feb;17(2):135-43. |
| 1. May LJ, Montez-Rath MD, Yeh J, **Axelrod DM**, Chen S, Maeda K, Almond CS, Rosenthal DN, Hollander SA, Sutherland SM. Impact of ventricular assist device placement on longitudinal renal function in children with end-stage heart failure. *J Heart Lung Transplant.* 2016; 35 (4): 449-456. |
| 1. Motonaga KS, Punn R, **Axelrod DM**, Ceresnak SR, Hanisch D, Kazmucha JA, Dubin AM. Diminished Exercise Capacity and Chronotropic Incompetence in Pediatric Patients with Congenital Complete Heart Block and Chronic Right Ventricular Pacing. *Heart Rhythm*. 2015 Mar;12(3):560-5. |
| 1. Shin AY, Jin B, Hao S, Zhongkai H, Sutherland S, McCammond A, **Axelrod D**, Sharek PJ, Roth SJ, Ling XB. Utility of Clinical Biomarkers to Predict Central Line Associated Bloodstream Infections After Congenital Heart Surgery. *Pediatr Infect Dis J*. 2015 Mar;34(3):251-4. |
| 1. Bauser-Heaton H, Nguyen C, Tacy T, **Axelrod DM**. A novel approach to the management of critically ill neonatal Ebstein's anomaly: Veno-venous extra corporeal membrane oxygenation to promote right ventricular recovery. *Ann Pediatr Cardiology*, 2015 Jan-Apr;8(1):67-70. |
| 1. Punn R, **Axelrod DM**, Sherman-Levine S, Roth S, Tacy T. Predictors of Mortality in Pediatric Patients on Venoarterial Extracorporeal Membrane Oxygenation. *Pediatr Crit Care Med*. 2014 Nov;15(9):870-7. |
| 1. Siehr S, Martin MH, **Axelrod D**, Efron B, Peng L, Roth SJ, Perry S, Shin A. Outcomes Following Cardiac Catheterization After Congenital Heart Surgery. *Catheter Cardiovasc Interv*. 2014 Oct 1;84(4):622-8. |
| 1. **Axelrod DM**, Anglemyer AT, Sherman-Levine SF, Zhu A, Grimm PC, Roth SJ, Sutherland SM. Initial Experience Using Aminophylline to Improve Renal Dysfunction in the Pediatric Cardiovascular Intensive Care Unit. *Pediatric Critical Care Medicine*. 2014 Jan;15(1):21-7. |
| 1. **Axelrod DM** andKlugman DK, Wright GE, Chang A, Bronicki R, Roth SJ, Board Members of the Pediatric Cardiac Intensive Care Society. One Hundred Useful References in Pediatric Cardiac Intensive Care: The 2012 Update.*Pediatric Critical Care Medicine*. 2013 Oct;14(8):770-785. 2. **Axelrod DM**, Roth SJ. Pulmonary Atresia with Intact Ventricular Septum. In: UpToDate, Basow, DS (Ed), *UpToDate*, Waltham, MA, 2013. 3. Schroeder AR, **Axelrod DM**, Silverman NH, Rubesova E, Merkel E, Roth SJ. A Continuous Heparin Infusion Does Not Prevent Catheter-Related Thrombosis in Infants Following Cardiac Surgery. *Pediatric Critical Care Medicine*, 2010 Jul;11(4):489-95. |

**Invited Peer Reviewed Articles and Case Reports**

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| 1. Anand V, Kwiatkowski DM, Ghanayem NS, **Axelrod DM**, DiNardo J, Klugman D, Krishnamurthy G, Siehr S, Stromberg D, Yates AR, Roth SJ, Cooper DS. Training Pathways in Pediatric Cardiac Intensive Care: Proceedings From the 10th International Conference of the Pediatric Cardiac Intensive Care Society. *World J Pediatr Congenit Heart Surg*. 2016 Jan;7(1):81-8. |
| 2. **Axelrod DM,** Alten JA, Berger JT, Hall MW, Thaigarajan R, Bronicki RA. Immunologic and Infectious Diseases in Pediatric Cardiac Critical Care: Proceedings of the International Pediatric Cardiac Intensive Care Society Conference. *World J Pediatr Congenit Heart Surg*. 2015 Oct;6(4):575-87 |
| 3. Arunamata A, Perry S, Kipps AK, Vasanawala S, **Axelrod DM**. Isolation of the right subclavian artery in a patient with d-transposition of the great arteries. *Ann Pediatr Cardiol*. 2015 May- Aug;8(2):161-3. |
| 4. Presnell L, Maeda K, Griffin M, **Axelrod DM**. A child with purulent pericarditis and *Strepotococcus intermedius* in the presence of a pericardial teratoma: An unusual presentation. *J Thorac Cardiovasc Surg*. 2014 Mar;147(3):e23-4 |

D. Research Support

David M. Axelrod MD (PI), David Sarno 2017-2018

The Stanford Virtual Heart: Developing an Educational Learning Framework

Teaching with Technology (TwT), Stanford Vice Provost for Teaching and Learning (VPTL) Grant: $2,150.

I am the principal investigator in the development of this learning framework for The Stanford Virtual Heart.

David M. Axelrod MD, David Sarno 2017-2018

Blending Virtual Reality and Web-based Learning for Congenital Heart Disease Education.

Stanford Vice Provost for Teaching and Learning (VPTL) Innovations Grant: $30,000 (additional $15,000 matched by Stanford Children’s Health Research Institute).

I am the principal investigator in the development of this blended Web/VR educational platform for The Stanford Virtual Heart.

David Axelrod, Stephen Roth (mentor) 2010-2015

A Randomized Placebo Controlled Trial of Aminophylline to Prevent Acute Kidney Injury in Children Following Cardiac Surgery with Cardiopulmonary Bypass. Supported by Lucile Packard Children’s Hospital Heart Center Research Grant: $47,000.

I was the principal investigator in this randomized placebo-controlled trial in the pediatric cardiovascular intensive care unit at LPCH at Stanford; the study was published in 2016.