




David M. Axelrod, MD

Clinical Associate Professor, Pediatrics - Cardiology

 NIH Biosketch available Online

 Curriculum Vitae available Online

CLINICAL OFFICES

- **Pediatric Cardiology**

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ACADEMIC CONTACT INFORMATION

- **Alternate Emergency Contact**

Jessica Axelrod - Wife

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Bio

BIO

I am a Clinical Associate Professor at Stanford University School of Medicine an attending physician in the Cardiovascular Intensive Care Unit at LPCH Stanford where I care for children with critical congenital and acquired cardiac disease. I have a passion for educating and training nurses, students, and residents/fellows, especially with advanced educational programs in virtual reality. I am the lead medical advisor at Lighthouse, Inc. and co-created The Stanford Virtual Heart, a congenital heart disease virtual reality educational experience, and I'm now collaborating with Stanford's engineers and educators to develop the next generation of VR/AR based cardiovascular educational and clinical tools.

CLINICAL FOCUS

- Pediatric Cardiology
- Pediatric Cardiac Intensive Care
- Virtual Reality

ACADEMIC APPOINTMENTS

- Clinical Associate Professor, Pediatrics - Cardiology

HONORS AND AWARDS

- Stanford "Stole of Gratitude" for faculty member most influential, Stanford Pediatric Cardiology fellows' training (2015)
- Clinical Award of Excellence: Junior Faculty, Lucile Packard Children's Hospital, Stanford Department of Pediatrics (2015)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Executive Board Member, Barth Syndrome Foundation (2011 - present)

PROFESSIONAL EDUCATION

- Fellowship: Stanford University Pediatric Critical Care Fellowship (2011) CA
- Fellowship: Stanford University Pediatric Cardiology Fellowship (2009) CA

- Residency: UCSF Pediatric Residency (2005) CA
- Internship: UCSF Pediatric Residency (2003) CA
- Board Certification: Pediatric Critical Care Medicine, American Board of Pediatrics (2012)
- Board Certification: Pediatric Cardiology, American Board of Pediatrics (2010)
- Medical Education: Ohio State University (2002) OH

COMMUNITY AND INTERNATIONAL WORK

- Standing Rock North Dakota Medic Healers Council, Standing Rock, ND

LINKS

- The Stanford Virtual Heart: <https://vimeo.com/208092586/2e9b21f939/>
- CeBIT 2017: The Stanford Virtual Heart: Training Medical Professionals in the 21st Century: <https://youtu.be/6N5vy0hCvj0>
- 2018 Stanford Symposium: Pulmonary Artery Reconstruction and Right Ventricular Reconstruction: https://med.stanford.edu/cme/courses/2018/pa_std.html
- Discovery Channel's Seeker Media Documentary: <https://youtu.be/x9D9eIWZNgM>
- The New York Times features The Stanford Virtual Heart: <https://www.nytimes.com/video/science/10000005594706/brains-hearts-and-heroin-addiction-medicine-in-vr.html?playlistId=100000004687548>
- Facebook CEO Mark Zuckerberg and The Stanford Virtual Heart: <https://vimeo.com/245309396>
- LinkedIn page: <https://www.linkedin.com/in/davidaxelrodmd/>

Research & Scholarship

RESEARCH INTERESTS

- Technology and Education

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Virtual Reality Congenital Heart Disease experience: The Stanford Virtual Heart. Currently engaged with 19 academic medical centers across the globe using our Stanford Virtual Heart to educate students and trainees, and research our VR experience as a means for training and education. Also developing next generation modeling and image interaction with Stanford engineers and educators, to promote personalized surgical training in VR and advanced educational programs in congenital heart disease.

CLINICAL TRIALS

- Aminophylline to Prevent Acute Kidney Injury in Children After Cardiac Surgery, Not Recruiting
- Heparin and the Reduction of Thrombosis (HART) Trial, Not Recruiting

PROJECTS

- The Stanford Virtual Heart - Stanford/Lighthaus Inc.

Teaching

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Bioengineering (Phd Program)
- Cardiothoracic Surgery (Fellowship Program)
- Cardiovascular Medicine (Fellowship Program)
- Pediatric Cardiology (Fellowship Program)
- Pediatric Critical Care Medicine (Fellowship Program)

Publications

PUBLICATIONS

- **"Echo pause" for postoperative transthoracic echocardiographic surveillance.** *Echocardiography (Mount Kisco, N.Y.)*
Cox, K., Arunamata, A., Krawczeski, C. D., Reddy, C., Kipps, A. K., Long, J., Roth, S. J., Axelrod, D. M., Hanley, F., Shin, A., Selamet Tierney, E. S.
2019
- **Rasburicase versus intravenous allopurinol for non-malignancy-associated acute hyperuricemia in paediatric cardiology patients.** *Cardiology in the young*
Moss, J. D., Wu, M., Axelrod, D. M., Kwiatkowski, D. M.
2019: 1–5
- **Chronic antepartum maternal hyperoxygenation in a case of severe fetal Ebstein's anomaly with circular shunt physiology.** *Annals of pediatric cardiology*
Arunamata, A., Axelrod, D. M., Bianco, K., Balasubramanian, S., Quirin, A., Tacy, T. A.
; 10 (3): 284–87
- **Birth Location of Infants with Critical Congenital Heart Disease in California** *PEDIATRIC CARDIOLOGY*
Purkey, N. J., Axelrod, D. M., McElhinney, D. B., Rigdon, J., Qin, F., Desai, M., Shin, A. Y., Chock, V. Y., Lee, H. C.
2019; 40 (2): 310–18
- **Virtual reality in pediatric cardiology: hype or hope for the future?** *Current opinion in cardiology*
Sacks, L. D., Axelrod, D. M.
2019
- **Birth Location of Infants with Critical Congenital Heart Disease in California.** *Pediatric cardiology*
Purkey, N. J., Axelrod, D. M., McElhinney, D. B., Rigdon, J., Qin, F., Desai, M., Shin, A. Y., Chock, V. Y., Lee, H. C.
2018
- **Hypoplastic left heart syndrome: from fetus to fontan** *CARDIOLOGY IN THE YOUNG*
Roeleveld, P. P., Axelrod, D. M., Klugman, D., Jones, M. B., Chanani, N. K., Rossano, J. W., Costello, J. M.
2018; 28 (11): 1275–88
- **THE DEVELOPMENT AND EFFICACY OF A PEDIATRIC CARDIOLOGY FELLOWSHIP ONLINE PREPARATORY COURSE**
Motonaga, K., Sacks, L., Olson, I., Balasubramanian, S., Chen, S., Peng, L., Feinstein, J., Silverman, N., Hanley, F., Axelrod, D., Krawczeski, C., Ceresnak, S.
ELSEVIER SCIENCE INC.2018: 2622
- **UTILITY OF RASBURICASE VS. INTRAVENOUS ALLOPURINOL FOR NONMALIGNANCY-ASSOCIATED ACUTE HYPERURICEMIA**
Moss, J., Wu, M., Axelrod, D., Kwiatkowski, D.
LIPPINCOTT WILLIAMS & WILKINS.2018: 96
- **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*
Kortz, T., Axelrod, D. M., Chisti, M. J., Kache, S.
2017; 12 (7): e0181160
- **Institution of Veno-arterial Extracorporeal Membrane Oxygenation Does Not Lead to Increased Wall Stress in Patients with Impaired Myocardial Function** *PEDIATRIC CARDIOLOGY*
Koth, A. M., Axelrod, D. M., Reddy, S., Roth, S. J., Tacy, T. A., Punn, R.
2017; 38 (3): 539-546
- **Advances in Pediatric Cardiology Boot Camp: Boot Camp Training Promotes Fellowship Readiness and Enables Retention of Knowledge.** *Pediatric cardiology*
Ceresnak, S. R., Axelrod, D. M., Sacks, L. D., Motonaga, K. S., Johnson, E. R., Krawczeski, C. D.
2017
- **Acute Kidney Injury in Patients Undergoing the Extracardiac Fontan Operation With and Without the Use of Cardiopulmonary Bypass** *PEDIATRIC CRITICAL CARE MEDICINE*
Algaze, C. A., Koth, A. M., Faberowski, L. W., Hanley, F. L., Krawczeski, C. D., Axelrod, D. M.
2017; 18 (1): 34-43

- **Fluid overload independent of acute kidney injury predicts poor outcomes in neonates following congenital heart surgery.** *Pediatric nephrology (Berlin, Germany)*
Mah, K. E., Hao, S., Sutherland, S. M., Kwiatkowski, D. M., Axelrod, D. M., Almond, C. S., Krawczeski, C. D., Shin, A. Y.
2017
- **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.** *CARDIOLOGY IN THE YOUNG*
Axelrod, D. M., Frymoyer, A. R., Sutherland, S. M.
2017; 27 (1): 203-4
- **Practice Patterns in Postoperative Echocardiographic Surveillance after Congenital Heart Surgery in Children: A Single Center Experience** *JOURNAL OF PEDIATRICS*
Arunamata, A., Axelrod, D. M., Kipps, A. K., McElhinney, D. B., Shin, A. Y., Hanley, F. L., Olson, I. L., Roth, S. J., Tierney, E. S.
2017; 180: 87-?
- **Institution of Venous-arterial Extracorporeal Membrane Oxygenation Does Not Lead to Increased Wall Stress in Patients with Impaired Myocardial Function.** *Pediatric cardiology*
Koth, A. M., Axelrod, D. M., Reddy, S., Roth, S. J., Tacy, T. A., Punn, R.
2016
- **Incidence, risk factors, and outcomes of acute kidney injury in adults undergoing surgery for congenital heart disease.** *Cardiology in the young*
Kwiatkowski, D. M., Price, E., Axelrod, D. M., Romfh, A. W., Han, B. S., Sutherland, S. M., Krawczeski, C. D.
2016: 1-8
- **Practice Patterns in Postoperative Echocardiographic Surveillance after Congenital Heart Surgery in Children: A Single Center Experience.** *journal of pediatrics*
Arunamata, A., Axelrod, D. M., Kipps, A. K., McElhinney, D. B., Shin, A. Y., Hanley, F. L., Olson, I. L., Roth, S. J., Selamet Tierney, E. S.
2016
- **Acute Kidney Injury in Patients Undergoing the Extracardiac Fontan Operation With and Without the Use of Cardiopulmonary Bypass.** *Pediatric critical care medicine*
Algaze, C. A., Koth, A. M., Faberowski, L. W., Hanley, F. L., Krawczeski, C. D., Axelrod, D. M.
2016: -?
- **Theophylline Population Pharmacokinetics and Dosing in Children Following Congenital Heart Surgery With Cardiopulmonary Bypass.** *Journal of clinical pharmacology*
Frymoyer, A., Su, F., Grimm, P. C., Sutherland, S. M., Axelrod, D. M.
2016; 56 (9): 1084-1093
- **The authors reply.** *Pediatric critical care medicine*
Axelrod, D. M., Anglemyer, A., Sutherland, S. M.
2016; 17 (8): 814-815
- **Maternal Hyperoxia Use in a Case of Severe Fetal Ebstein's Anomaly**
Arunamata, A., Axelrod, D., Balasubramanian, S., Quirin, A., Tacy, T.
SPRINGER.2016: 1191
- **Recovery From Acute Kidney Injury and CKD Following Heart Transplantation in Children, Adolescents, and Young Adults: A Retrospective Cohort Study.** *American journal of kidney diseases*
Hollander, S. A., Montez-Rath, M. E., Axelrod, D. M., Krawczeski, C. D., May, L. J., Maeda, K., Rosenthal, D. N., Sutherland, S. M.
2016; 68 (2): 212-218
- **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.** *Cardiology in the young*
Axelrod, D. M., Frymoyer, A. R., Sutherland, S. M.
2016: 1-2
- **Pediatric Cardiology Boot Camp: Description and Evaluation of a Novel Intensive Training Program for Pediatric Cardiology Trainees** *PEDIATRIC CARDIOLOGY*
Ceresnak, S. R., Axelrod, D. M., Motonaga, K. S., Johnson, E. R., Krawczeski, C. D.
2016; 37 (5): 834-844

- **Compassionate deactivation of ventricular assist devices in pediatric patients** *JOURNAL OF HEART AND LUNG TRANSPLANTATION*
Hollander, S. A., Axelrod, D. M., Bernstein, D., Cohen, H. J., Sourkes, B., Reddy, S., Magnus, D., Rosenthal, D. N., Kaufman, B. D.
2016; 35 (5): 564-567
- **Impact of ventricular assist device placement on longitudinal renal function in children with end-stage heart failure.** *journal of heart and lung transplantation*
May, L. J., Montez-Rath, M. E., Yeh, J., Axelrod, D. M., Chen, S., Maeda, K., Almond, C. S., Rosenthal, D. N., Hollander, S. A., Sutherland, S. M.
2016; 35 (4): 449-456
- **Management of the Preterm Infant with Congenital Heart Disease** *CLINICS IN PERINATOLOGY*
Axelrod, D. M., Chock, V. Y., Reddy, V. M.
2016; 43 (1): 157-?
- **Management of the Preterm Infant with Congenital Heart Disease.** *Clinics in perinatology*
Axelrod, D. M., Chock, V. Y., Reddy, V. M.
2016; 43 (1): 157-171
- **Pediatric Cardiac Intensive Care Society 2014 Consensus Statement: Pharmacotherapies in Cardiac Critical Care Fluid Management** *PEDIATRIC CRITICAL CARE MEDICINE*
McCammond, A. N., Axelrod, D. M., Bailly, D. K., Ramsey, E. Z., Costello, J. M.
2016; 17 (3): S35-S48
- **Dexmedetomidine Is Associated With Lower Incidence of Acute Kidney Injury After Congenital Heart Surgery.** *Pediatric critical care medicine*
Kwiatkowski, D. M., Axelrod, D. M., Sutherland, S. M., Tesoro, T. M., Krawczeski, C. D.
2016; 17 (2): 128-134
- **A Double-Blinded, Randomized, Placebo-Controlled Clinical Trial of Aminophylline to Prevent Acute Kidney Injury in Children Following Congenital Heart Surgery With Cardiopulmonary Bypass.** *Pediatric critical care medicine*
Axelrod, D. M., Sutherland, S. M., Anglemyer, A., Grimm, P. C., Roth, S. J.
2016; 17 (2): 135-143
- **Training Pathways in Pediatric Cardiac Intensive Care: Proceedings From the 10th International Conference of the Pediatric Cardiac Intensive Care Society.** *World journal for pediatric & congenital heart surgery*
Anand, V., Kwiatkowski, D. M., Ghanayem, N. S., Axelrod, D. M., DiNardo, J., Klugman, D., Krishnamurthy, G., Siehr, S., Stromberg, D., Yates, A. R., Roth, S. J., Cooper, D. S.
2016; 7 (1): 81-88
- **Immunologic and Infectious Diseases in Pediatric Cardiac Critical Care: Proceedings of the 10th International Pediatric Cardiac Intensive Care Society Conference.** *World journal for pediatric & congenital heart surgery*
Axelrod, D. M., Alten, J. A., Berger, J. T., Hall, M. W., Thiagarajan, R., Bronicki, R. A.
2015; 6 (4): 575-587
- **Isolation of the right subclavian artery in a patient with d-transposition of the great arteries.** *Annals of pediatric cardiology*
Arunamata, A., Perry, S. B., Kipps, A. K., Vasanaawala, S. S., Axelrod, D. M.
2015; 8 (2): 161-163
- **Diminished exercise capacity and chronotropic incompetence in pediatric patients with congenital complete heart block and chronic right ventricular pacing.** *Heart rhythm*
Motonaga, K. S., Pun, R., Axelrod, D. M., Ceresnak, S. R., Hanisch, D., Kazmucha, J. A., Dubin, A. M.
2015; 12 (3): 560-565
- **Utility of Clinical Biomarkers to Predict Central Line-associated Bloodstream Infections After Congenital Heart Surgery.** *Pediatric infectious disease journal*
Shin, A. Y., Jin, B., Hao, S., Hu, Z., Sutherland, S., McCammond, A., Axelrod, D., Sharek, P., Roth, S. J., Ling, X. B.
2015; 34 (3): 251-254
- **A novel approach to the management of critically ill neonatal Ebstein's anomaly: Veno-venous extracorporeal membrane oxygenation to promote right ventricular recovery.** *Annals of pediatric cardiology*
Bauser-Heaton, H., Nguyen, C., Tacy, T., Axelrod, D.
2015; 8 (1): 67-70

- **Predictors of Mortality in Pediatric Patients on Venoarterial Extracorporeal Membrane Oxygenation** *PEDIATRIC CRITICAL CARE MEDICINE*
Punn, R., Axelrod, D. M., Sherman-Levine, S., Roth, S. J., Tacy, T. A.
2014; 15 (9): 870-877
- **Outcomes Following Cardiac Catheterization After Congenital Heart Surgery** *CATHETERIZATION AND CARDIOVASCULAR INTERVENTIONS*
Siehr, S. L., Martin, M. H., Axelrod, D., Efron, B., Peng, L., Roth, S. J., Perry, S., Shin, A. Y.
2014; 84 (4): 622-628
- **Outcomes following cardiac catheterization after congenital heart surgery.** *Catheterization and cardiovascular interventions*
Siehr, S. L., Martin, M. H., Axelrod, D., Efron, B., Peng, L., Roth, S. J., Perry, S., Shin, A. Y.
2014; 84 (4): 622-628
- **Acute kidney injury in the pediatric cardiac patient** *PEDIATRIC ANESTHESIA*
Axelrod, D. M., Sutherland, S. M.
2014; 24 (9): 899-901
- **A child with purulent pericarditis and Streptococcus intermedius in the presence of a pericardial teratoma: an unusual presentation.** *journal of thoracic and cardiovascular surgery*
Presnell, L., Maeda, K., Griffin, M., Axelrod, D.
2014; 147 (3): e23-4
- **Initial Experience Using Aminophylline to Improve Renal Dysfunction in the Pediatric Cardiovascular ICU** *PEDIATRIC CRITICAL CARE MEDICINE*
Axelrod, D. M., Anglemeyer, A. T., Sherman-Levine, S. F., Zhu, A., Grimm, P. C., Roth, S. J., Sutherland, S. M.
2014; 15 (1): 21-27
- **One hundred useful references in pediatric cardiac intensive care: the 2012 update.** *Pediatric critical care medicine*
Axelrod, D. M., Klugman, D., Wright, G. E., Chang, A., Bronicki, R., Roth, S. J.
2013; 14 (8): 770-785
- **A continuous heparin infusion does not prevent catheter-related thrombosis in infants after cardiac surgery** *PEDIATRIC CRITICAL CARE MEDICINE*
Schroeder, A. R., Axelrod, D. M., Silverman, N. H., Rubesova, E., Merkel, E., Roth, S. J.
2010; 11 (4): 489-495

PRESENTATIONS

- Pediatric Cardiac Emergencies - Pediatric Grand Rounds, Kaiser Permanente Medical Center (2015)
- Cardiac Critical Care: Single Ventricle Norwood Management - 8th World Congress on Pediatric Intensive and Critical Care (2016)
- Caring for the Resistance: Experiences at Standing Rock, North Dakota - Pediatric Grand Rounds, University of California San Francisco, Benioff Children's Hospital Department of Pediatrics (2017)
- The Stanford Virtual Heart: Educating Medical Professionals in the 21st Century - CeBIT (International European Technology Conference) (2017)
- The Stanford Virtual Heart, Educating Medical Professionals in the 21st Century - Stanford MedX: Workshop (2017)
- Pediatric Cardiology, a career with science, technology, and taking care of kids - Johns Hopkins Center for Talented Youth Science (2017)
- The Stanford Virtual Heart: Educating Medical Professionals in the 21st Century - Stanford Big Data in Biomedicine Conference (2017)
- Caring for the Resistance: Experiences at Standing Rock, North Dakota - Pediatric Grand Rounds, Zuckerberg San Francisco General Hospital Department of Pediatrics (2017)
- The Stanford Virtual Heart: Educating Medical Professionals in the 21st Century - Pediatric Academic Society Meeting (2017)
- Caring for the Resistance: Experiences at Standing Rock, North Dakota - Department of Pediatrics, Lucile Packard Children's Hospital Stanford (2017)
- Hands-on Demo: The Stanford Virtual Heart - Western Society of Pediatric Cardiology Conference (2017)
- The Stanford Virtual Heart: Educating Medical Professionals in the 21st Century - W2O Group (Healthcare Consulting) (2017)
- The Stanford Virtual Heart: Educating Medical Professionals in the 21st Century (2017)
- Improving Healthcare Education Through Virtual Reality - Expert Panelist, Oculus Connect 4 (2017)
- I wish I had that in med school: Virtual Reality Learning in Healthcare and the Sciences - Wearable Tech + Digital Health + Neurotech Silicon Valley (2018)
- Virtual Reality and Surgery (2018)

- Workshop Facilitator: Surgical Training and Virtual Reality, VR in Healthcare Symposium - Harvard Medical School (2018)
- I wish they had that when I was in med school: VR education and the future of healthcare - Harvard Medical School (2018)
- Cost of Pediatric Cardiac Care: Return on investment? - Neoheart (2018)
- VR, Healthcare, and Education (2018)
- The Stanford Virtual Heart - The Stanford Center for Image System Engineering (SCIEN) (2018)
- I wish I had that when I was in med school (2018)
- I wish I had that when I was in med school - University of Nebraska Medical Center (2018)
- Engineering and Computer Science Developments - Stanford (2018)
- I wish I had that when I was in med school - Medical Center of Wisconsin/Herma Heart Institute (2018)