

**BIOGRAPHICAL SKETCH**

NAME: Patrick, Stephen Willard

eRA COMMONS USER NAME: PATRICSW

POSITION TITLE: Director, Vanderbilt Center for Child Health Policy

**EDUCATION/TRAINING**

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Florida, Gainesville, FL	BS	05/2002	Microbiology and Cell Science
Florida State University College of Medicine, Tallahassee, FL	MD	05/2007	Medicine
Harvard University School of Public Health, Boston, MA	MPH	11/2007	Health Policy and Management
University of Michigan, Ann Arbor, MI	MS	12/2011	Health and Health Care Research

**A. Personal Statement**

As Director of the Vanderbilt Center for Child Health Policy, I value the opportunity to mentor junior faculty members like Ashley Leech, PhD. This is especially true when mentees passion for research aligns so closely to mine. My NIDA-funded research focuses on improving outcomes for pregnant women and infants affected by the opioid crisis. Specifically, my current NIDA-funded R01 focuses on treatment barriers for pregnant women attempting to obtain medications for opioid use disorder. Dr. Leech's proposal perfectly aligns with the aims of this R01, allowing her to leverage an existing highly productive research team and environment. This R01, currently in the field with data collection anticipated to be completed in July, is a patient audit study of more than 10,000 women and pregnant women attempting to obtain buprenorphine or methadone treatment for opioid use disorder. Data from this study, coupled with our Center's data, analytic, and dissemination resources, provide an optimal atmosphere for Dr. Leech's aims. In addition, Dr. Leech will benefit from our robust clinical environment, including the clinical program that I lead, Team Hope, which has cared for more than 200 opioid-exposed infants and their families in the last 18 months. I have been fortunate to benefit from exceptional mentors and, along with her mentorship team, I look forward to supporting Dr. Leech's career development and ultimate transition to an independent, federally funded researcher advancing public health research to improve outcomes for pregnant women and infants affected by the opioid crisis.

1. **Patrick SW**, Burke JF, Biel TJ, Auger KA, Goyal N, Cooper WO. Risk of Hospital Readmission Among Infants with Neonatal Abstinence Syndrome. *Hospital Pediatrics*. 2015 Oct;5(10):513-9.
2. **Patrick SW**, Dudley J, Martin PR, Harrell FE, Warren MD, Hartmann KE, Ely EW, Grijalva GC, Cooper WO. Prescription Opioid Epidemic and Infant Outcomes. *Pediatrics*. 2015 May;135(5):842-850. doi: 10.1542/peds.2014-3299. Epub 2015 April 13.
3. Krans EE, **Patrick SW**. Opioid Use Disorder in Pregnancy: Health Policy in the Midst of an Epidemic. *Obstetrics & Gynecology*. 2016 Jul;128(1):4-10.
4. Villapiano NLC, Winkelmann TNA, Kozhimannil KB, Davis MM, **Patrick SW**. Rural and Urban Differences in Neonatal Abstinence Syndrome and Maternal Opioid Use, 2004 to 2013. *JAMA Pediatrics*. 2017 Feb 1;171(2):194-196.

**B. Positions and Honors**  
**Positions and Employment**

2007-2010 Pediatrics Residency, University of Michigan Health System and C.S. Mott Children's Hospital, Ann Arbor, MI

- 2010-2012 Robert Wood Johnson Foundation Clinical Scholar, University of Michigan Health System, Ann Arbor, MI
- 2010-2013 Fellowship in Neonatal-Perinatal Medicine, University of Michigan Health System and C.S. Mott Children's Hospital, Ann Arbor, MI
- 2013-present Assistant Professor of Pediatrics and Health Policy, Division of Neonatology, Vanderbilt University and Monroe Carell Jr. Children's Hospital, Nashville, TN
- 2013-2015 Senior Science Policy Advisor, Office of National Drug Control Policy, Executive Office of the President, The White House, Washington, D.C.
- 2014-2016 Advisor, Division of Family Health and Wellness, Tennessee Department of Health, Nashville, TN
- 2018-present Director, Vanderbilt Center for Child Health Policy
- 2018-present Adjunct Physician Policy Researcher, RAND Corporation, Santa Monica, CA
- 2018-present Guest Researcher, Centers for Disease Control and Prevention, Division of Reproductive Health, Atlanta, GA.

### **Professional Memberships**

- 2003-present American Academy of Pediatrics, Section on Perinatal Pediatrics
- 2008-2009 American Academy of Pediatrics, Member, Executive Committee Member, Section on Medical Students, Residents and Fellowship Trainees
- 2010-2011 American Academy of Pediatrics Liaison, Committee on Federal Government Affairs; Subcommittee on Access
- 2014-present AcademyHealth
- 2015-present Member, American Academy of Pediatrics Committee on Substance Use and Prevention
- 2015-present Member, Society for Pediatric Research

### **Other Experience**

- 2012-2015 Vermont Oxford Network, Burlington, VT. International collaborative involving approximately 200 neonatal intensive care units entitled, "Controversies in Caring for Infants and Families Impacted by Neonatal Abstinence Syndrome"; Member, Scientific Steering Committee, Faculty member, Co-Author Improvement Toolkit
- 2015-present Substance Abuse and Mental Health Services Administration, Expert consultant, *A Guide to the Management of Opioid-Dependent Pregnant and Parenting Women and Their Children*
- 6/2016-present Special Government Employee, Analgesic Drug Products Advisory Committee, Division of Anesthesia, Analgesia and Addiction Products, U.S. Food and Drug Administration, Department of Health and Human Services, Silver Spring, MD.

### **Academic and Professional Honors**

- 2004 American Medical Association Foundation Excellence in Medicine Leadership Award
- 2004 Florida Medical Association Mullen Award for Outstanding Community Service
- 2006 Florida Medical Foundation Scholarship
- 2010 Top Presentation, Research Day, University of Michigan Department of Pediatrics (Medicaid: A Program for Children? Trends From 1991-2005)
- 2011 Pediatric Academic Societies Young Investigator's Travel Award (Regional Variation in Lumbar Punctures for Early Onset Neonatal Sepsis)
- 2012 Academic Pediatric Association Research Award; Best Abstract by a Fellow – Pediatric Academic Societies (Federal Medical Assistance Percentage Policy and Medicaid/CHIP Enrollment for Children)
- 2013 Top 20 most influential articles published in 2012 - RWJF *Year in Research* poll (Neonatal Abstinence Syndrome and Associated Healthcare Expenditures – United States, 2000-2009)
- 2013 National Finalist – White House Fellows Program
- 2013 NIH Loan Repayment Award for Pediatric Research – National Institute on Drug Abuse
- 2015 Burroughs-Wellcome Fund Trainee Travel Award, Translational Science 2015 Meeting
- 2016 Tennessee Chapter of the American Academy of Pediatrics Early Career Physician of the Year
- 2017 Nemours Child Health Services Research Award
- 2019 Society for Pediatric Research Young Investigator Award

## C. Contribution to Science

1. Over the past two decades, prescriptions for opioid pain relievers more than quadrupled in the US. Concurrent with this increase was an increase in population-wide opioid-related complications including neonatal opioid withdrawal, also known as neonatal abstinence syndrome. My research has focused on understanding how the opioid crisis is affecting infants. This work includes multiple collaborations from several other institutions, non-profit organizations, federal, and state governments. This funded research resulted in publications describing a near seven-fold increase in infants with neonatal abstinence syndrome over the last decade, implementation of a state-wide surveillance system for the syndrome, adverse maternal and infant outcomes from opioid pain reliever exposures, and analyses determining factors associated with infant development of neonatal abstinence syndrome.

- a. **Patrick SW**, Schumacher RE, Benneyworth BD, Krans EE, McAllister JM, Davis MM. Neonatal Abstinence Syndrome and Associated Healthcare Expenditures – United States, 2000-2009. *JAMA*. 2012 May 9;307(18):1934-40. Epub 2012 Apr 30.
- b. **Patrick SW**, Schumacher RE, Horbar JD, Buss-Frank ME, Morrow KA, Ferrelli KR, Picarillo AP, Gupta M, Soll RF. Improving Care for Infants with Neonatal Abstinence Syndrome. *Pediatrics*. 2016 May;137(5).
- c. Tolia V, **Patrick SW**, Bennett M, Sousa J, Smith PB, Clark R, Spitzer AR. Increasing Neonatal Abstinence Syndrome in US Neonatal Intensive Care Units. *The New England Journal of Medicine*. 2015 May 28;372(22):2118-26. doi: 10.1056/NEJMsa1500439. Epub 2015 Apr 26.
- d. **Patrick SW**, Faherty LJ, Dick A, Scott TA, Dudley J, Stein BD. Association Among County-Level Economic Factors, Clinician Supply, Metropolitan or Rural Location, and Neonatal Abstinence Syndrome. *JAMA*. 2019 Jan 29;321(4):385-393.

2. Pregnant women have been deeply affected by the opioid crisis. Medications for opioid use disorder improve outcomes for pregnant women, including reducing maternal risk of relapse and overdose death, and infants, improving birth weights and the likelihood of a term delivery. Still, nationwide, most pregnant women with opioid use disorder are not obtaining these medications. My research focuses on understanding and improving barriers to medications for opioid use disorder for pregnant women. This research has found insurance, financial and geographic barriers to obtaining these lifesaving medications.

- a. Krans EE, **Patrick SW**. Opioid Use Disorder in Pregnancy: Health Policy in the Midst of an Epidemic. *Obstetrics & Gynecology*. 2016 Jul;128(1):4-10.
- b. **Patrick SW**, Buntin MB, Martin PR, Scott TA, Dupont W, Richards M, Cooper WO. Barriers to Accessing Treatment for Pregnant Women with Opioid Use Disorder in Appalachian States. *Substance Abuse*. 2018 Jun 27:1-18.
- c. Osmundson SS, Wiese AD, Min JY, Hawley RE, **Patrick SW**, Griffin MR, Grijalva CG. Delivery Type, Opioid Prescribing, and the Risk of Persistent Opioid Use after Delivery. *American Journal of Obstetrics & Gynecology*. 2019 Apr;220(4):405-407

3. States play a critical role in improving the health of vulnerable populations. States vary substantially in approaches to public health problems, highlighting the need for rigorous evaluations of state policy decisions on population health. Our recent work found that higher state cigarette tax reduced infant mortality within a state. In addition, we found state implementation of prescription drug monitoring programs (PDMPs) reduced opioid-related overdose deaths.

- a. **Patrick SW**, Warner KE, Pordes E, Davis MM. Cigarette Tax Increase and Infant Mortality. *Pediatrics*. 2016 Jan;137(1):1-8. doi: 10.1542/peds.2015-2901. Epub 2015 Dec 1.
- b. **Patrick SW**, Fry CE, Jones TF, Buntin MB. Implementation Of Prescription Drug Monitoring Programs Associated With Reductions In Opioid-Related Death Rates. *Health Affairs*. 2016 Jul 1;35(7):1324-32. doi: 10.1377/hlthaff.2015.1496. Epub 2016 Jun 22.
- c. Whitmore C, White MN, Buntin MB, Fry CE, Calamari K, **Patrick SW**. State Laws and Policies to Reduce Opioid-Related Harm: A Qualitative Assessment of PDMPs and Naloxone Programs in Ten U.S. States. *Preventive Medicine Reports*. 2018 Dec 30;13:249-255.

4. Medicaid and the Children's Health Insurance Program (CHIP) are the single largest insurers for newborns and children in the US. Today, these programs are financially responsible for half of US births. The body of work that follows analyzed the impact of federal and state policy changes (e.g. implementation

of Children's Health Insurance Program and the American Recovery and Reinvestment Act of 2009) on children. This research found that increases in federal funding for Medicaid during the "great recession" were effective in bolstering Medicaid enrollment for children and that coverage expansions for adolescents were effective in increasing non-emergency department utilization.

- a. **Patrick SW**, Choi H, Davis MM. Increase In Federal Match Associated With Significant Gains In Coverage For Children Through Medicaid And CHIP. *Health Affairs*. 2012 Aug;31(8):1796-802.
- b. **Patrick SW**, Freed GL. Intergenerational Enrollment and Expenditure Changes in Medicaid: Trends from 1991 to 2005. *BMC Health Services Research*. 2012, 12:327. DOI: 10.1186/1472-6963-12-327.
- c. **Patrick SW**, Davis MM. Reformulating the Federal Match as a Key to the Sustainability of Medicaid. *JAMA Pediatrics*. 2013-03-01;167:218-20.
- d. Haggins A, **Patrick SW**, Demonner S, Davis MM. When Coverage Expands: CHIP as a Natural Experiment in Utilization of Healthcare Services. *Academic Emergency Medicine*. 2013 Oct;20(10):1026-32. doi: 10.1111/acem.12236.

4. Healthcare cost in the US are higher per capita than any other nation in the world, accounting for more than 17 percent of the gross domestic product. Despite the cost of US healthcare, care delivery is uneven and yields variable outcomes. My research aims to improve neonatal care delivery and value by understanding variations in practice and outcomes. The studies that follow found substantial variation in practice and cost among selected procedures and medical management for children:

- a. **Patrick SW**, Schumacher RE, Davis MM. Variation in Lumbar Punctures for Early Onset Neonatal Sepsis: A Nationally Representative Serial Cross-Sectional Analysis, 2003–2009. *BMC Pediatrics*. 2012, 12:134. DOI: 10.1186/1471-2431-12-134
- b. **Patrick SW**, Schumacher RE, Davis MM. Methods of Mortality Risk Adjustment in the Neonatal Intensive Care Unit: A 20-Year Review. *Pediatrics*. 2013-03;131 Supplement 1:S68-74.
- c. **Patrick SW**, Kaplan HC, Passarella M, Davis MM, Lorch SA. Variation in Treatment of Neonatal Abstinence Syndrome Among US Children's Hospitals, 2004-2011. *Journal of Perinatology* 2014 Nov;34(11):867-72. doi: 10.1038/jp.2014.114. Epub 2014 Jun 12.
- d. Sun GH, Auger KA, Aliu O, **Patrick SW**, Demonner S, Davis MM. Variation in Inpatient Tonsillectomy Costs Within and Between US Hospitals Attributable to Postoperative Complications. *Med Care*. 2013 Dec;51(12):1048-54.

#### Complete List of Published Work in My Bibliography:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/1jGyh-DpHPvkd/bibliography/40372731/public/?sort=date&direction=descending>

#### D. Research Support

##### Ongoing Support

**5R01DA045729-02**

Patrick (PI)

04/15/2018-01/31/2022

National Institute on Drug Abuse, National Institutes of Health

Improving Access to Treatment for Women with Opioid Use Disorder

This study seeks to identify barriers to accessing opioid agonist therapies for women of reproductive age and pregnant women with opioid use disorder. Study findings could improve access to these highly effective treatments for this vulnerable population, improving outcomes for women and infants affected by the opioid epidemic.

Role: Principal Investigator

**5K23DA038720-06**

Patrick (PI)

04/30/2016-01/31/2020

National Institute on Drug Abuse, National Institutes of Health

Neonatal Abstinence Syndrome: Risk of Drug Withdrawal in Opioid-Exposed Infants

This study seeks to understand the relationship of maternal licit and illicit drug use patterns with infant drug withdrawal. This project will create a clinically useful risk prediction tool for the development of neonatal abstinence syndrome.

Role: Principal Investigator

**P50DA046351**

Stein (PI)

07/01/2018-06/30/2023

National Institute on Drug Abuse, National Institutes of Health  
Center for Opioid Policy Research

The Center for Opioid Policy Research serves as a national resource, fostering innovative and high-quality research in the opioid policy arena and developing and disseminating methods, tools, and information to the research community, policymakers, and the general public

Role: Co-Investigator

**1R01HD097344-01**

Ray (PI)

01/01/2019-12/31/2023

National Institute on Child Health and Human Development, National Institutes of Health  
Antipsychotics and the Risk of Unexpected Death in Children and Youth

Using the national Medicaid Analytical Extract (MAX) database, we will evaluate if children and youth who are new antipsychotic are at an increased risk of unexpected death. We will determine how this risk varies by clinical diagnosis (ADHD, anxiety disorder), individual drugs and doses.

Role: Co-Investigator

**VUMC 75821**

Buntin, Heinrich (Co-PI) 11/01/2018-04/30/2021

Robert Wood Johnson Foundation

Health and Educational Outcomes of Low-Resource, Vulnerable Children in Tennessee

This project aims to combine health and education data for children in Tennessee to evaluate how state and local policies improve outcomes for at-risk children.

Role: Co-Investigator

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Patrick (PI)

01/31/2019-01/31/2020

The Boedecker Foundation

Improving Care for Infants with Neonatal Abstinence Syndrome

This project seeks to improve clinical care for women and infants affected by the opioid crisis, focusing on family-centered care, lactation and child life support.

Role: Principal Investigator

**Completed Support (last 3 years)**

**NICHM # 56912**

Patrick (PI)

01/01/2016-06/30/2017

National Institute for Health Care Management Foundation

The Prescription Opioid Epidemic: Understanding its Complications and the Effectiveness of State Policies

This study uses a mixed-methods approach to understand state opioid control policies and their impact on health outcomes.