THE ECONOMIC IMPACT OF INVESTING IN EARLY CHILDHOOD EDUCATION IN INDIANA

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Technical Advisory Board

W. Steven Barnett, Board of Governors Professor of Education and Director of the National Institute for Early Education Research (NIEER) at Rutgers University
Dr. Barnett earned his Ph.D. in economics at the University of Michigan. His research interests include the economics of human development and practical policies for translating research findings into effective public investments. Dr. Barnett leads the Center for Enhancing Early Learning Outcomes, a federally funded technical assistance center. His best known works include benefit-cost analyses of the Perry Preschool and Abecedarian programs and research on alternative approaches to early education including monolingual versus dual-language immersion. He is lead author of the series of *State Preschool Yearbooks* that have provided annual state-by-state analyses of progress in public pre-K for over a decade. Recent publications include "Effectiveness of early educational interventions" in the journal *Science*, and "Four reasons the United States should offer every child a preschool education" in *The pre-k debates: current controversies and issues*.

Daphna Bassok, Assistant Professor of Education and Public Policy at the University of Virginia and Associate Director of EdPolicyWorks
Dr. Bassok's research addresses early childhood education policy, particularly the impacts of policy interventions on the academic and social well-being of low-income children. Recent projects examine changes in the early childhood teacher labor force over time, the impacts of Florida's Voluntary Pre-Kindergarten program, and the increasingly academic focus of kindergarten classrooms. She has received funding from the Institute of Education Sciences (IES), the Spencer Foundation, the AERA Grants Board, the Smith Richardson Foundation, the Foundation for Child Development and the Annie E. Casey Foundation. Her work has appeared in education policy and early childhood outlets including Educational Evaluation and Policy Analysis and Child Development, among others. She holds a Ph.D. in the Economics of Education, a M.A. in Economics and a M.A. in Policy Analysis and Evaluation, all from Stanford University.

William T. Gormley, Jr., University Professor of Public Policy and Government and Co-Director of the Center for Research on Children in the U.S. (CROCUS) at Georgetown University
Dr. Gormley is the author or co-author of several books, including *Everybody's Children: Child Care as a Public Problem* (Brookings 1995), *Organizational Report Cards* (Harvard University Press, 1999), and *Bureaucracy and Democracy* (Congressional Quarterly Press, 2003, 2007, 2011). His latest book, *Voices for Children: Rhetoric and Public Policy*, was published by the Brookings Institution Press in 2012. Dr. Gormley is a Fellow of the National Academy of Public Administration and a past president of the Public Policy Section of the American Political Science Association. For the past decade, Dr. Gormley has directed the Oklahoma pre-K project, which has evaluated the state-funded pre-K program in Tulsa, Oklahoma. He and his research team have documented substantial gains in pre-reading, pre-writing, and pre-math skills for children enrolled in the school-based pre-K program in Tulsa. These findings have appeared in *The Journal of Human Resources*, *Policy Studies Journal*, *Developmental Psychology*, *Social Science Quarterly*, *Child Development, Science,* and elsewhere. The successes of Oklahoma's pre-K program have been featured in the *New York Times*, the *Wall Street Journal,* NPR, and the CBS Evening

News. At Georgetown, Dr. Gormley served as Interim Dean of Public Policy for two years and was one of the founding members of Georgetown's day care center, Hoya Kids. He teaches courses on the policymaking process, federalism and intergovernmental relations, and children and public policy. His center's website is: http://www.crocus.georgetown.edu

Cynthia Guy, Director of Research and Evaluation at the Annie E. Casey Foundation
Cynthia Guy supervises evaluations of Casey program and policy reform initiatives, commissions social policy research, promotes the development of innovative research methodologies and data resources, and supports efforts to build local capacity to produce and use research and data for program, planning, and policy reform. She currently leads research and evaluation activities related to the development and testing of the Foundation's "Two-Generation" program and policy initiatives, which combine economic, educational, and human services in a comprehensive family-focused effort to improve child and parent well-being. In addition, Cindy heads up a cross-foundation effort to promote development of multi-agency integrated data systems (IDS) as an efficient and sustainable information resource for policy reform, program management, and research.

Andrew McKenzie, Assistant to the Superintendent for Early Childhood Services, Tulsa Public Schools
Andrew McKenzie is one of eight children. Janet, his wife of 33 years is a Pre Kindergarten, Kindergarten and Special Education teacher in Tulsa Public Schools. They have two children, Patrick and Emily. Andrew has 3 sisters that have taught and worked for Tulsa Public Schools. He is a product of Tulsa Public Schools: Whittier Elementary, Cleveland Jr. High School and Will Rogers High School. He received his Early Childhood and Elementary Education B.S. from The University of Tulsa and his master's in Public School Administration from Northeastern State University. He has served as a teacher and administrator with the district for 33 years. He started his teaching career at Emerson Elementary teaching 1st and 2nd grade for 13 years before moving to ESC as a teacher consultant working in schools across the district. He was a member of the instructional staff that started Mayo Demonstration School in 1992, a professional development training site for the district. His administrative duties include principal at Eugene Field Elementary, Marshall Elementary and Mayo Demonstration School. He has also been in the position of Elementary Director of School Improvement and a Lead Principal for Area 1 Schools.

Christine Ross, Senior Researcher, Mathematica Policy Research and the Institute of Education Sciences (IES)
Dr. Ross has conducted program evaluation and policy analysis on early childhood education, K-12 education, and child welfare programs. Dr. Ross has designed and conducted rigorous evaluations of early childhood education programs, including the national evaluation of Early Head Start and the national evaluation of the Early Reading First program. Dr. Ross was Principal Investigator for the U.S. Department of Education's What Works Clearinghouse – Early Childhood area, leading reviews of the research basis for more than a dozen early childhood program curricula. She directed a descriptive study of classroom quality and children's outcomes in Head Start programs and pre-kindergarten programs in Chicago, and contributed to the Head Start Family and Child Experiences Study (FACES). She is providing technical assistance on evaluation design and implementation for 21 Children's Bureau grantees across the country that are developing innovative programs to support families and youth involved with child welfare and evaluations of those programs.

Diane Whitmore Schanzenbach, Associate Professor in the School of Education and Social Policy at Northwestern University and faculty research fellow at the National Bureau of Economic Research (NBER)

Dr. Schanzenbach studies education policy, child health, and food consumption. Her most recent work investigates the impact of school accountability policies (like the Federal No Child Left Behind Act) and school reform policies (such as small schools and charter schools) on student performance and other outcomes. In addition, she has used the Project STAR experiment to study the impact of classroom composition and class size on student outcomes. In current projects, she is studying the impact of school policies such as school lunches and availability of recess and gym class on child obesity. Her work on food stamps has measured how households alter their consumption of food, leisure and other goods when they receive food stamp benefits, and whether the benefits improve the health of recipients. She graduated magna cum laude from Wellesley College in 1995 with a BA in economics and religion, and received a PhD in economics in 2002 from Princeton University. For more information, see: http://www.sesp.northwestern.edu/profile/?p=21447

Community Advisory Board

Connie Bond Stuart, Regional President, PNC Bank, Central and Southern Indiana
Chair, Community Advisory Board
Connie Bond Stuart began her career with PNC in 1980 and was named to her current role in June 2011. Prior to this role Stuart served as the regional president for PNC's Delaware market where she worked to distinguish PNC in the marketplace through client-focused growth and exceptional service. Stuart currently serves as a member of the board for the Greater Indianapolis Chamber of Commerce, the Central Indiana Corporate Partnership and United Way of Central Indiana where she is chairman of the Ready to Learn Ready to Earn education committee. As a socially concerned business leader, Stuart served on various community organizations in Delaware with a focus on early childhood education. In July 2011, the governor of Delaware conferred on Stuart the "Order of the First State," the highest honor for meritorious service. In 2013, she was named *Indianapolis Business Journal* Women of Influence Honoree. Stuart is a graduate of Indiana University School of Business with a bachelor degree in marketing and advertising and an MBA in finance and accounting.

Kevin Bain, Executive Director and CEO, Welborn Baptist Foundation and Chairman, Indiana Early Learning Advisory Committee
Kevin Bain is Executive Director and CEO of the Welborn Baptist Foundation in Evansville, Indiana. Welborn Baptist Foundation is the not-for-profit, private foundation created in 1999 from the sale of Welborn Baptist Hospital to St. Mary's Medical Center and from additional assets of the hospital. The Foundation provides grants to not-for profit organizations that significantly contribute to community health in a fourteen county area of Southeastern Illinois, Southwestern Indiana and Western Kentucky. Since its inception, the Foundation has granted over $6 million to support early childhood initiatives. In September, 2013, Mr. Bain was named by Governor Pence as Chairman of Indiana's Early Learning Advisory Committee (ELAC). ELAC's vision focuses on the achievement of accessible, affordable, high quality early childhood experiences, particularly for at-risk Hoosier families. ELAC's work is accomplished via 7 multi-disciplinary workgroups involving more than 120 volunteers across the state, addressing specific aspects of this work.

Stephanie Bothun, Director of Regional Workforce Development, Central Indiana Workforce Development Initiative
Stephanie Bothun joined the Central Indiana Workforce Development Initiative, which is part of CICP, in July 2015 as the Director of Regional Workforce Development. Previously, Bothun served as the Director of Education Initiatives for the City of Indianapolis – Office of Education Innovation. While in that role, she developed and executed the team's yearly strategic plan, created a financial performance framework for charter schools, led the country's largest citywide VEX Robotics Championship with over 800 students and 135 schools from Indianapolis participating, and supported a coalition in the creation of a Polytechnic High School. Prior to joining the Mayor's office, Bothun served as a Human Capital Analyst with Deloitte Consulting LLP in Chicago. In addition, Bothun was an eighth grade math teacher for the Indianapolis Public Schools, where she led her students to 32% growth on the ISTEP+, and was

named Teach For America's Indianapolis Teacher of the Year. Bothun received her Bachelor of Science in Finance from Indiana University and a Masters of Arts in Education from Marian University.

Ryan Brady, Director of Stewardship & Anniversary Campaigns, Central Indiana Community Foundation
Ryan is Director of Stewardship & Anniversary Campaigns for Central Indiana Community Foundation (CICF). Ryan helps advance CICF's internal and external work in the areas of philanthropic advising services, community leadership, technology, strategic planning, impact measurement and community partnerships. Ryan also leads donor services for The Glick Fund. Prior to joining CICF staff, Ryan worked in the private, government, and not-for-profit sectors. For six years, Ryan served with the YMCA of Greater Indianapolis where he helped create youth enrichment programs that focused on preparing urban youth for college. Most recently, he served as the Executive Director of the YMCA at the Athenaeum. Previous professional experiences include volunteering as an AmeriCorps member and working as a business consultant with Crowe Horwath LLP.

Tim Brown, Director of Policy and Legislative Affairs, Indy Chamber
Tim started with the Indy Chamber in the winter of 2016. Prior to joining the Business Advocacy Team Tim served as The Managing Director of Instructional Operations for ITT Technical Institute's School of Criminal Justice. There he managed the School of Criminal Justice in the areas of curriculum development, faculty evaluations and advising regulatory issues. Tim has over 10 years of experience working in the state house, most recently as the Director of Legislative and Policy Services for the Indiana Department of Correction. Tim received his Bachelor's Degree from Fisk University, earned his Juris Doctorate Degree from Indiana University Robert H. McKinney School of Law and his Masters in Public Affairs Degree from IU School of Public and Environmental Affairs Program in Indianapolis.

John M. Burnett, President and Chief Executive Officer of the Community Education Coalition
John M. Burnett serves as President and Chief Executive Officer of the Community Education Coalition (CEC), a nationally recognized not-for-profit organization committed to development of an aligned, high quality community and regional learning system supporting learners of all ages. Burnett serves as special advisor to the Governor's Early Learning Advisory Committee (ELAC), and serves as co-chair of the ELAC's workforce and professional development committee. Locally, Burnett served on a 2009 community team focused on barriers to early learning in Columbus, Indiana. Since 2010, CEC and its partners have raised $3 million to support a public pre-k program for four year olds, launched in 2010 by the Bartholomew Consolidated School Corporation (BCSC). BCSC's program is now in its fifth year, and along with private and faith based early learning providers, the pre-k program seeks to ensure all children have access to high quality pre-k experiences and are fully prepared to enter kindergarten.

Mark Fisher, Vice President for Government Relations & Policy Development, Indy Chamber
Mark Fisher serves as the Vice President for Government Relations & Policy Development for the Indy Chamber. In this role, Mark is responsible for the overall public policy activities of the Chamber, while focusing his efforts on Economic & Community Development, Transportation, Local Government and Fiscal Policy Matters. Prior to joining the Chamber as Vice President, Mark served as Director of Engagement and Interim President of Develop Indy through its merger with the Indy Chamber and

served in various roles within the Chamber's public policy team. A native of Bloomington, Indiana, Mark has a Bachelor's degree in Sociology, and a certificate in Business and Economics from Indiana University-Bloomington and a Master's of Public Affairs from Indiana University-Indianapolis. Mark currently lives in the Butler-Tarkington neighborhood of Indianapolis with his wife and three sons and stays active in a variety of community-based initiatives including Lacy Leadership Association. He also serves as a member of the board for Employ Indy, Midtown Indy, Indiana INTERNnet and the Central Indiana Regional Transportation Authority.

Charlie Geier, Director of Evaluation, Indiana Youth Institute
Charlie Geier serves the Indiana Youth Institute as the Director of Evaluation. He is responsible for designing and conducting evaluation protocols, providing evaluation services, and managing and overseeing special research projects. Prior to joining IYI, Charlie served as Director of Early Learning and Intervention for the Indiana Department of Education. He led the agency's efforts in the state and federal programs for English language learning, migrant education, school improvement grants, and early learning. In addition, he has worked as a teacher, instructional coach, department chair, and district administrator. Currently, he serves on the board for Indiana Teachers of English to Speakers of Other Languages (INTESOL) and co-chairs the statewide data coordination workgroup for Indiana's Early Learning Advisory Committee (ELAC). In all of his work, he places a deep emphasis on issues of equity for all youth.

Jay Geshay, Senior Vice President of Community Impact and Fundraising, United Way of Central Indiana
Jay Geshay has served as Sr. Vice President of Community Impact and Fundraising at United Way of Central Indiana since November 2006. Jay works within a collaborative community based culture building relationships between corporations, foundations, government, agencies, communities, and individuals to achieve United Way's mission. Jay oversees the relationship with 90+ non-profit agencies serving the human service needs of our community and leads the Community Impact and Fundraising teams. Before joining United Way, Jay worked with Eastman Kodak, IBM, and the Dodson Group. As a cofounder of the Dodson Group, Jay was an Entrepreneur of the Year Finalist as the company achieved Inc. 500 ranking for two consecutive years. Jay received a Bachelor of Science in Engineering from Purdue University in West Lafayette, Indiana, a Master of Management from the Kellogg Graduate School at Northwestern University in Evanston, Illinois, and a Master of Divinity from Christian Theological Seminary in Indianapolis, Indiana.

Marianne Glick, President and Owner, GlickArt, and Chairman of the Board, Eugene & Marilyn Glick Family Foundation
Marianne Glick is the President and Owner of GlickArt and a Chairman of the Board for the Eugene & Marilyn Glick Family Foundation. An Indianapolis native, she has a deep connection to the community and to philanthropy in the city. In recognition of her commitment to the community, Marianne was named a Sagamore of the Wabash in 2014, received the Michael Carroll award and the first honorary alumni award from Ball State University in 2013, the Making a Difference in the World award from Girl Scouts in 2012, a Woman of Influence award from the IBJ in 2012 and a Touchstone Award from Girls Inc. in 2011. Glick also serves on the Board of Directors for the Gene Glick Company, Central Indiana

Community Foundation, Community Health Network Foundation, TeenWorks and the Board of Trustees for Ball State University. She also serves on the board of the United Way of Central Indiana and was the campaign chairman in 2011 and co-chairman in 2012. She received her Bachelor's Degree in Elementary Education and Master's Degree in Educational Psychology from Butler University.

Angela Smith Jones, **Deputy Mayor of Economic Development at City of Indianapolis**

Angela Smith Jones is Deputy Mayor of Economic Development at the City of Indianapolis. In her prior position Angela served as Director of Public Policy with the Indy Chamber. As a lobbyist for the Chamber, she worked on the following issues: Education, Workforce, Mass Transit, Environment and Immigration along with other lobbying duties. Angela also is the staff liaison to several Chamber Councils and Committees which work year round in developing policies and positions of the Chamber, as well as creating the Chamber's legislative agenda. Angela works with the Mayor's office, City-County Council and the State Legislature as a resource of information and to ensure that the Chamber's voice was represented as decisions are being made that affect business in the Greater Indianapolis area. Formerly, Angela was a Director with the Indiana Professional Licensing Agency (IPLA). Prior to the merger of IPLA and the Health Professions Bureau, Ms. Smith Jones was the Deputy Director of the Health Professions Bureau and the Director of the Medical Licensing Board of Indiana. Angela, a native of Indianapolis, is a graduate of DePaul University College of Law in Chicago, Illinois and she completed her undergraduate studies at Miami University, in Oxford, Ohio, where she studied Broadcast/Journalism.

Shannon Kiely-Heider, Director of State Government Relations, Cummins Inc.
Shannon Kiely Heider is the Director of State Government Relations for Cummins Inc. In her role at Cummins, Ms. Heider leads government relations at the state and local level in the United States with a focus on education and workforce development issues. Previously, she served as a Government Relations Consultant at Krieg DeVault LLP and as Deputy Legislative Director to former Indiana Governor Mitchell E. Daniels Jr. Ms. Heider is a member of the United Way Ready to Learn, Ready to Earn Board, Vice President of the Richard G. Lugar Excellence in Public Service Series, and serves as a mentor for the Big Brothers Big Sisters of Central Indiana organization. Ms. Heider holds a Bachelor of Science Degree in Policy Analysis from Indiana University and a Juris Doctorate from the Robert H. McKinney Indiana University School of Law.

Jason Kloth, Executive Director, Central Indiana Workforce Development Initiative
Jason Kloth joined the Central Indiana Corporate Partnership (CICP) in July 2015 and serves as Executive Director of the Central Indiana Workforce Development Initiative. The initiative is focused on creating a stronger alignment between the supply of skilled talent and demand from employers in Central Indiana. Prior to joining CICP, Kloth led the City of Indianapolis Office of Education Innovation (OEI) as the Deputy Mayor of Education under Mayor Greg Ballard. Before joining the Mayor's office, Kloth held a variety of senior positions at Teach For America.
Kloth began his career teaching 6th grade in the Rio Grande Valley of Texas, where his peers elected him Teacher of the Year. Kloth holds a Bachelor of Arts degree from the University of Illinois at Urbana-Champaign.

Amanda Lopez, President, Transform Consulting Group

President of Transform Consulting Group, Amanda leads her consulting firm to help non-profits and government agencies accelerate their impact. Specific to the early learning industry, Amanda leads the firm's project management support team for the Indiana Early Learning Advisory Council and provides technical support to the state for implementation of the pre-k pilot programs. Previous professional experiences include volunteering as an AmeriCorps*VISTA member and working for the U.S. Department of Health and Human Services' Office of the Budget, the Children's Bureau and the Head Start Bureau in Washington, DC. Amanda received her Master of Social Work Degree with a concentration in public policy from the University of Michigan and bachelor's in Law and Society from Purdue University.

Ted Maple, President and CEO, Early Learning Indiana
Ted Maple is President and CEO of Early Learning Indiana. Early Learning Indiana, formerly Day Nursery Association, operates 10 high-quality early learning centers and outreach services to parents and child care providers across central Indiana. Ted has worked in early childhood education for over 17 years. Prior to joining Early Learning Indiana in 2013, he directed early childhood education efforts for United Way of Central Indiana and St. Mary's Child Center and taught kindergarten and first grade in Pike Township (Indianapolis). Ted earned his Ph.D. in early childhood from Ball State University, his master's from Butler University and bachelor's from University of Indianapolis. He is past president of the board of the Indiana Association for the Education of Young Children and currently serves on the board of the Indianapolis Public Library Foundation. Ted lives on the northeast side of Indianapolis with his wife, Johanna, and three sons.

Michael O'Connor, Director of State Government Affairs, Eli Lilly and Company
Michael O'Connor is the Director of State Government Affairs for Eli Lilly and Company. He has primary responsibility for developing and implementing Lilly Corporate strategy as it involves Indiana government at every level and is responsible for managing Lilly's interaction with all governmental entities in the state. O'Connor is also the Indiana task force chair of PhRMA, overseeing the pharmaceutical industry's extensive investment in the State of Indiana. Previously, O'Connor was a principal with Bose Public Affairs Group, Indiana's largest Lobbying and Public Affairs agency. O'Connor has served in various capacities at all levels of the government, most recently serving as former Indianapolis Mayor Bart Peterson's Chief Deputy Mayor and Chief of Staff. O'Connor is a member of the United Way of Central Indiana's Executive Committee and is currently Co-Chairing the agency's Early Learning Business Roundtable with Connie Stuart of PNC Bank. O'Connor also serves on the Board of Goodwill Industries of Central Indiana and the Goodwill Educational Initiatives Board of Directors. O'Connor is a 1986 graduate of Indiana University with a BA in Political Science. He and his wife, Anne, are the proud parents of Mary Catherine and Eileen Marie O'Connor.

John Peirce, **Peirce Consulting LLC**
John Peirce currently works as a consultant on early childhood and "collective impact" initiatives in Indiana. This includes work with the Big Goal Collaborative of Northeast Indiana as leader of the Age 0-8 Action Team. He also serves as co-chair of the Family Engagement Workgroup of the Indiana Early Learning Advisory Committee. His focus on early childhood development and collective impact are outcomes of his year in 2011 as a Fellow in the Advanced Leadership Initiative at Harvard University. Previously, John was co-owner and vice president of marketing and administration of Indiana Stamp

Company, human resources and communications manager for GE, and a newspaper editor. John earned a Master of Business Administration degree from Indiana University – Purdue University Fort Wayne in 1980 and received the IPFW Richard T. Doermer School of Business Distinguished Alumni Award in 2011. John served on the Board of Trustees of Fort Wayne Community Schools from 2008-2012.

Tina Petersonn, President & CEO, Community Foundation of Bloomington and Monroe County
Tina began her tenure at the Community Foundation of Bloomington and Monroe County in 2011. During her tenure at the Community Foundation, Tina's focus has been on growing the impact of the organization, seeking more opportunities for collaborative engagement with other community organizations, addressing specific community needs in the areas of early childhood education and charitable economic development, and growing the Community Foundation's endowment for the long term benefit of the community. From 2001 to 2011, Tina served as the Executive Director of the Foundation of Monroe County Community Schools during a period of great change in public education funding. In her 20 years in this community, Tina has served many organizations in a volunteer or civic capacity including terms on the United Way Vision Council, the Monroe County Board of Zoning Appeals, the Bloomington New Tech High School Advisory Board, Community Leaders for Education, the Bloomington Life Science's Human Capital Committee, and more parent-teacher organizations than she cares to think about. Tina considers herself a Texan but after 23 years now calls Bloomington home. She is the daughter of a career military officer and, while growing up, attended ten schools in twelve years. She graduated from an American high school in Germany and received a Bachelor's of Business Administration from Texas A&M University. She continues to be a proud and loyal supporter of the Aggies but holds great affinity for the Hoosiers. Tina and her husband, Dan, are the parents of four children ranging in ages from sixteen to twenty-five.

Connie Sherman, Executive Director, St. Mary's Child Center
Connie has spent 35 years working in the field of early childhood education. She holds a B.S. from Purdue University and a M.S. in Education from Butler University. Connie has studied the Reggio philosophy in Reggio Emilia, Italy. She is the Executive Director at St. Mary's Child Center, having served as an Educator and the Director of the Early Childhood program at St. Mary's. Connie serves on the Board of the Indiana Association for the Education of Young Children, and is a member of the Indianapolis Reggio Collaborative and the North American Reggio Emilia Alliance. She currently is serving as a Special Advisor to Indiana's Early Learning Advisory Committee. Connie was the recipient of the Early Care and Education Award (2004) and the Legislative Award (2009) from the Indiana Association for the Education of Young Children.

Rich Spisak, Program Officer, Ball Brothers Foundation
A native of Cleveland, Ohio, Ball Brothers Foundation program officer Rich Spisak holds degrees from Miami University at Oxford, Ohio, and the University of Colorado. He joined Ball Brothers Foundation staff in 2008 after successfully serving on the football coaching staffs at four universities and on the development staff at Ball State University. His responsibilities at BBF includes researching program areas, reviewing grant requests, conducting site visits and tracking project results.

Dianna Wallace, Executive Director, Indiana Association for the Education of Young Children
Dianna Wallace has served as Executive Director of the Indiana Association for the Education of Young Children (AEYC), Inc. for the last 10 years. As the state affiliate of the National Association for the Education of Young Children (NAEYC), Indiana AEYC is a statewide, nonprofit 501(c)3 organization with 16 chapters and 2,200 members. Indiana AEYC has a 51-year history of promoting and supporting quality care and education for all young children, birth through age eight, in Indiana. The mission of Indiana AEYC is accomplished by offering professional development for people in the early care and education profession, improving program quality, and championing public policy pertinent to young children. Dianna earned a bachelor's degree in Elementary Education and a master's degree in Early Childhood Education. She has completed extensive training and education in administration, business and adult education. Her experience includes working as a kindergarten teacher, Head Start Director, public school administrator, State administrator, T.E.A.C.H. Early Childhood® INDIANA Coordinator and education consultant and evaluator.

Introduction

Purpose of Economic Impact Study

The purpose of this economic impact report is to present information, based on the best research to date, on the costs and benefits of high-quality early childhood education programs, and present estimates of the costs and benefits of providing similar programs in Indiana. High quality early childhood education programs have the potential to produce positive and long-lasting academic, socioeconomic, behavioral, and health outcomes—especially among children from low-income families—and may save government and taxpayers costs in the long run. Children in Indiana utilize early childhood education at relatively low rates in comparison to national averages, but affordable early childhood education is in high demand. The early childhood education industry has the capacity to expand if supplemental funding is made available.

Our goal is to help policymakers and the general public better understand the costs and benefits of investing in high quality early childhood education, and identify how early childhood education affects Indiana's short- and long-term economic wellbeing.

Currently, a variety of licensed centers, licensed homes, unlicensed registered ministries, Head Start/Early Head Start, public school corporations, and private schools comprise Indiana's early childhood care and education (ECCE) system. When ECCE programs are of high quality, they have the potential to prepare children for academic, social, and economic success later in life. Further, early childhood education providers comprise an important industry in the Indiana economy by employing workers and purchasing goods and services.

Outline of Economic Impact Study

Five sections comprise this report:

- The Demand for Early Childhood Education
- Defining High Quality Early Childhood Education
- Assessing the Costs of Early Childhood Education
- The Early Childhood Education Industry
- Economic Impacts of Investing in Early Childhood Education

The Demand for Early Childhood Education

In Indiana, there are approximately 505,090 children ages birth to five; about 169,200 of those children are three or four years old and of preschool/pre-kindergarten age.[1] Approximately 111,672 Hoosier children ages three or four require access to some type of nonparental early childhood care or education due to parental labor force participation. Despite this need for early childhood care and education, only 36 percent of Hoosier children ages three or four are enrolled in public or private preschool or pre-kindergarten, as compared to 46 percent of children nationally. In addition, there are sizable income-based gaps in preschool/pre-kindergarten utilization: only 31 percent of low-income Hoosier children ages three or four are enrolled in public or private preschool/pre-kindergarten, as compared to 41 percent of relatively high-income Hoosier children.

Although the total number of slots available in formal, center-based care environments is insufficient to accommodate all preschool-aged Hoosier children, there are over 21,000 known vacancies in formal care environments. The low utilization of center-based care and the oversupply of formal care slots indicate that Hoosier families are unable to access and/or unable to afford center-based early childhood care and education. This is unsurprising given the high cost of early childhood care and education, which averages $7,498 annually for children under the age of five (ELAC annual report, 2016).

This chapter summarizes the best available information on demand for early childhood education, both nationally and in Indiana.

Number of Preschool-Aged Children

Nationwide, there are approximately 20 million children under the age of five. Among those children, about 8 million children are three or four years old and of preschool/pre-kindergarten age. In Indiana, there are approximately 505,090 children ages birth to five; 169,200 of those children are three or four years old and of preschool/pre-kindergarten age. In Marion County, there are an estimated 83,550 children ages birth to five; about 27,270 of those children are three or four years old and of preschool/pre-kindergarten age. According to the 2016 annual report from Indiana's Early Learning Advisory Committee, 66 percent of children ages 0-5 live in households where all parents participate in the labor force. Therefore, approximately 111,672 Hoosier children ages three and four require access to some type of early childhood care or education due to parental labor force participation.

[1] There is no standard definition distinguishing "preschool" from "pre-kindergarten," and these terms often are used interchangeably. Pre-kindergarten tends to refer primarily to early childhood education provided in the year preceding kindergarten, while preschool often refers to early childhood education (including pre-kindergarten) serving children ages three or four (and sometimes as young as two). Most states that provide publicly-funded preschool typically provide education for four-year-olds, although some states also extend services to three-year-olds as well. This report uses the term "preschool" to refer to any early childhood education program serving children ages three or four.

Despite this sizable potential need for early childhood care and education, three- and four- year old children participate in/are enrolled in preschool and pre-kindergarten at relatively low rates. As of 2013, only 36 percent of Hoosier children ages three or four were enrolled in public or private preschool or pre-kindergarten—formal care environments—as compared to 46 percent of children nationally. In fact, the preschool/pre-kindergarten utilization rate in Indiana is lower than the utilization rate for low-income children nationally, which was 39 percent in 2013. In addition, there are sizable income-based gaps in preschool/pre-kindergarten utilization: only 31 percent of low-income Hoosier children ages three and four are enrolled in public or private preschool/pre-kindergarten, as compared to 41 percent of relatively high-income Hoosier children.[2] These low enrollment rates in formal care environments imply that a sizable share of Hoosier children receive child care in informal environments (e.g., with relatives or friends) because all of their parents participate in the labor force. As we discuss in subsequent chapters, early childhood education programs must provide high-quality instruction in order to produce improvements in child outcomes. Informal care environments that focus primarily on child care rather than education are unlikely to provide higher quality instruction than more formal center-based care environments.

Many preschool-aged children belong to low-income households. This report defines low-income households as those whose total household income falls at or below 185 percent of the federal poverty level (FPL). Several means-tested public programs use this income threshold for determining program eligibility – for example, several states use the 185 percent FPL threshold for determining Medicaid eligibility. Nationally, almost half (47 percent) of all children ages 0-5 are from low-income families; 47 percent of children ages three and four are from low-income families. In Indiana, the share of children from low-income families is higher: 62 percent of children ages 0-5 are from low-income families, while 51 percent of preschool-aged children are from low-income families. In Marion County, 57 percent of children ages 0-5 are from low-income families; 61 percent of children ages three and four are from low-income families. **Table 1** summarizes these figures.

Table 1. Number of Children, by Age, Poverty Status, and Geography.
Source: American Community Survey IPUMS estimates, 2015.

	Indiana	Marion County
Total number of children aged 0-5	505,090	83,550
Total number of children aged 3-4	169,200	27,270
Total number of children under 185% FPL aged 0-5	313,156	47,624
Total number of children under 185% FPL aged 3-4	86,292	16,635

[2] This report defines low-income households as those whose total household income falls at or below 185% of the federal poverty level (FPL).

Preschool Capacity and Utilization

The 2014 annual report of the Indiana Early Learning Advisory Committee (ELAC) found that Indiana early childhood care and education providers currently have the capacity to provide a total of 139,379 slots for children ages 0-5. The 2016 update to that report found that Indiana has a total of 4,254 ECE providers who enrolled 113,393 children ages 0-5. The total number of slots in these formal, center-based care environments is insufficient to enroll Hoosier children ages 0-5 in need of childcare, and cannot even accommodate enrollment of all preschool-aged Hoosier children. Yet despite the limited number of slots in formal care environments, formal care in Indiana is undersubscribed. The 2014 ELAC annual report stated that there are 21,571 known vacancies in formal care environments throughout Indiana.

There are several potential explanations for both the excess demand for and excess supply of early childhood care and education in Indiana. One explanation is that Hoosier families are either unable to access or unable to afford formal early childhood care and education. The 2014 ELAC annual report highlights this issue, suggesting that under-utilization of formal care is due to a lack of information regarding and access to affordable early childhood care and education. Families may not know what their child care options are, and many are unaware of free services provided by resource and referral agencies in their community. In addition, available slots may not meet the needs of some families. For instance, programs offering affordable half-day programs may be undersubscribed if the families they aim to serve work full time and find no use in partial care. Childcare for children under the age of five often is prohibitively expensive, especially among moderate- and low-income families. A nationwide study recently determined that childcare and preschool cost the average family more than rent and more than college tuition, and that rising costs of childcare have outpaced wage growth (Child Care Aware, 2013). As a result, families are spending an increasing share of their income on childcare and early childhood education: on average, full-time formal programs serving children ages 0-5 cost $7,498 per child annually in Indiana (ELAC annual report, 2016). Recent empirical evidence also suggests that Hoosier families—and especially moderate to low-income families—spend a higher share of their incomes on early childhood care and education than do families in other states. The U.S. Department of Health and Human Services considers childcare to be affordable if it does not exceed 10 percent of family income. A June 2014 report issued by the Hamilton Project shows that on average, Indiana single mothers spend 27 percent of their income on childcare—a figure that is the second-highest in the country.

Another explanation for low utilization of formal care is that families may prefer for their preschool-aged children to receive care from informal providers, such as relatives or friends. For example, some families may choose to forgo earning additional income in order to allow a parent to stay home and provide in-home care for young children as an alternative to preschool or pre-kindergarten. A third explanation for under-utilization of formal care is that the distribution of formal care providers may be uneven across geographies, leading to an over- or under-supply of childcare slots in particular locations. Finally, families may be unaware of the benefits associated with enrolling their children in high-quality early childhood education.

Given these complex market dynamics, the under-subscription of formal care should not be interpreted as reflecting family preferences for informal and alternative early childhood care and education. All else equal, demand for formal childcare and education will increase with improved access and affordability of early childhood care and education. Note, however, that even the provision of free, universal preschool does not shift demand to the point where utilization rates approach 100 percent among three- and four-year old children. For example, the utilization rate is 74 percent in Oklahoma, a state that provides free, voluntary universal preschool.[3]

Recent data from the 2013 American Community Survey indicates substantial gaps in preschool and pre-kindergarten enrollment between low-income children and their relatively high-income peers. Nationally, about 46 percent of children ages three and four are enrolled in public or private preschool/pre-kindergarten. However, the preschool/pre-kindergarten utilization rate is only 39 percent among low-income children, as compared to a utilization rate of 52 percent among children whose household income exceeds the 185 percent FPL threshold. Indiana lags behind the national average in terms of preschool and pre-kindergarten enrollment, with only 36 percent of all three- and four-year-olds enrolled in public or private preschool/pre-kindergarten – a utilization rate that is lower than the utilization rate among low-income three- and four-year-olds nationally. Only 31 percent of low-income Hoosier children ages three and four are enrolled in public or private preschool/pre-kindergarten, as compared to 41 percent of Hoosier children whose household income exceeds the 185 percent FPL threshold. In Marion County, preschool/pre-kindergarten utilization rates are even lower among low-income children, with only 25 percent of children ages three and four participating in a public or private preschool/pre-kindergarten option, as compared to 39 percent of children whose household income exceeds 185 percent FPL. **Table 2** summarizes these preschool/pre-kindergarten utilization rates, by poverty status and geography.

[3] The utilization rate is 88 percent when including all children enrolled in Head Start programs.

Table 2. Preschool/Pre-kindergarten Enrollment and Utilization Rate, by Poverty Status and Geography. Source: American Community Survey IPUMS estimates, 2013.

	Unenrolled	Enrolled, Public	Enrolled, Private	Utilization Rate
	United States			
Total number of children ages 3-4	4,444,384	2,223,169	1,598,487	46.23%
Total number of children ages 3-4 below 185% FPL	2,313,616	1,178,296	296,324	38.93%
Total number of children ages 3-4 above 185% FPL	2,130,768	1,044,873	1,302,163	52.41%
	Indiana			
Total number of children ages 3-4	112,643	35,580	27,860	36.03%
Total number of children ages 3-4 below 185% FPL	59,683	19,539	7,003	30.78%
Total number of children ages 3-4 above 185% FPL	52,960	16,041	20,857	41.06%
	Marion County			
Total number of children ages 3-4	20,614	3,922	5,180	30.63%
Total number of children ages 3-4 below 185% FPL	13,497	2,261	2,282	25.18%
Total number of children ages 3-4 above 185% FPL	7,117	1,661	2,898	39.05%

Defining High Quality Early Childhood Education

This chapter describes the features of high-quality early childhood education systems that lead to positive child outcomes and produce positive returns on investment. Unsurprisingly, the best available evidence indicates that high quality programs produce the largest gains in child outcomes. In general, the available research base suggests that measures capturing the quality of instruction and teacher-child interactions in early childhood care and education environments better predict child outcomes than do structural measures of quality such as teacher education levels, class size, and spending per student. In this section, we first review available research linking measures of early childhood care and education quality to children's outcomes. Second, we describe different measures of early childhood education quality, including measures used within Indiana and nationally.

Linking Early Childhood Education Quality to Children's Outcomes

A large body of research examines the relationship between early childhood education (ECE) participation and children's outcomes. And, several high-quality program evaluations of ECE programs document large and persistent impacts on child outcomes. These programs generally exhibit a comprehensive set of quality features—such as higher spending per child, more educated teachers, and evidence-based curricula—that, as a bundled set of services, lead to improved child outcomes. However, there is less evidence that specifically disentangles which aspects of ECE program features matter most for improving children's outcomes. In many studies evaluating the long-term effects of early childhood education, it is impossible to disentangle the specific program elements that are most important for

achieving the desired outcomes. Ideally, ECE program quality would be assessed based on alignment with the program elements that best predict the child outcomes that matter to families and communities – for example, physical safety and care, and progress toward cognitive (i.e., academic) and non-cognitive (i.e., socio-emotional and behavioral) goals.

Note that the studies described in this section do not include many well-known studies examining the benefits of high-quality preschool interventions—such as those examining the Perry Preschool and Abecedarian programs—because those studies do not examine the relationship between particular aspects of program quality and children's outcomes. We discuss those programs in the following chapters. This section focuses specifically on a review of available research linking particular aspects of program quality with children's outcomes. The available research base largely examines the relationship between early childhood program quality and children's academic, socio-emotional, behavioral, and health outcomes in early childhood (and in some cases, adolescence) but does not generally track children over substantial periods of time. Thus, the relationship between specific aspects of early childhood program quality and later life outcomes (e.g., employment, income, and criminal behavior) is largely unmeasured.

In 2010, the Office of Planning, Research, and Evaluation within the Administration for Children and Families in the U.S. Department of Health and Human Services released a policy brief summarizing existing research linking aspects of quality to children's outcomes (Burchinal, 2010).[4]

Research Linking Structural Quality to Children's Outcomes

Burchinal (2010) first summarizes research on the link between structural aspects of early childhood care and education and children's outcomes. Structural aspects of early childhood care and education are easily measured, easily regulated aspects of the early childhood environment and include safety of the early childhood facility, staffing ratios, and the wages, benefits, and qualifications of administrators, teachers, and staff. Observational studies generally find that child-caregiver ratios have "modest, but significant" positive associations with children's outcomes (Howes, 1997; NICHD ECCRN, 1999, 2000; Phillipsen, Burchinal, Howes, & Cryer, 1997; Pianta et al., 2005) and are associated with measures of caregiver sensitivity (NICHD ECCRN, 2002; Phillipsen et al., 1997).

However, there is mixed evidence regarding whether caregiver education levels and training lead to better outcomes for children. For example, some studies (e.g., Burchinal, Howes, & Kontos, 2002; Clarke-Stewart, Vandell, Burchinal, O'Brien & McCartney, 2002) find that caregiver education levels predict child outcomes in home-based care, but the link between caregiver education levels and children's outcomes is weaker in center-based care (Phillipsen et al., 1997; Lamb, 1998; NICHD ECCRN, 2000). In a landmark study examining data across seven major studies of early care and education, Early et al. (2007) found that caregiver education levels were not related to quality measures or child outcomes in Head Start and other pre-kindergarten programs (Early et al., 2007). This seminal study was

[4] The report, titled *Differentiating among Measures of Quality: Key Characteristics and their Coverage in Existing Measures*, is available online at the following web address: http://www.acf.hhs.gov/sites/default/files/opre/differ_measures.pdf.

highly influential and led to the widespread belief among many early childhood education policymakers that teacher degrees by themselves do not seem to matter much for producing gains in child outcomes.

Still other studies find that caregiver training is positively associated with child outcomes (e.g., Howes, 1997; NICHD ECCRN, 1999; Burchinal, Cryer, Clifford & Howes, 2002; Clarke-Stewart et al., 2002; Fukkink and Lont, 2007), but other studies find no link between caregiver and teacher training and the quality of the early childhood care and education environment (Phillipsen et al., 1997; Pianta et al., 2005). Phillips, Gormley, and Lowenstein (2009) find a curvilinear relationship between years of experience and early childhood quality, with initial years of experience positively predicting quality but then leveling off in subsequent years. Pianta et al. (2005) find a positive relationship between caregiver and teacher years of prior experience working with young children and early childhood quality, but Phillipsen et al. (1997) find a negative relationship. Further, while several studies find evidence that higher caregiver wages and lower turnover are positively associated with some measures of process quality (e.g., Helburn, 1995; Howes, 1997; Pianta et al., 2005), they do not appear to be associated with children's outcomes. Burchinal (2010) states: "In summary, only a few classroom and caregiver background characteristics show consistent modest associations with child outcomes, and these associations are believed to be through their impact on process quality measures" (Burchinal, 2010, p. 4).

Research Linking Process Quality to Children's Outcomes

Process quality is more difficult to assess than structural quality, and refers to the quality of care and interactions in the early childhood setting. Trained, independent observers typically rate classroom process quality by observing classrooms and rating child-teacher interactions and time spent in various activities using a variety of classroom observation tools. Program administrators and/or regulatory agencies select observational tools based on the age of the observed children, the type of setting, and whether the observation aims to examine interactions between the teacher and the entire classroom versus the teacher and an individual child.

Some common observational tools include the Caregiver Interaction Scale (CIS) and Environmental Rating Scales such as the Early Childhood Environment Rating Scale-Revised (ECERS-R), the Infant-Toddler Environment Rating Scale (ITERS), the Family Day Care Environment Rating Scale (FDCRS), the Classroom Assessment Scoring System (CLASS), and the Early Language and Literacy Classroom Observation (ELLCO) (Burchinal et al., 2010). We review some of these observational measures below. Additional classroom observation tools are designed to assess instructional quality in specific academic content areas such as literacy and math.[5]

Burchinal (2010) reviews the research on the relationship between each of these process quality measures and children's outcomes. Importantly, each classroom observation tool measures different

[5] For a comprehensive review of several observational measures, we refer readers to the report Observational Measures of Quality in Center-Based Early Care and Education Programs, also published by the Office of Planning, Research, and Evaluation within the Administration for Children and Families in the U.S. Department of Health and Human Services (Bryant, 2010). The report is available online at the following web address: http://www.acf.hhs.gov/sites/default/files/opre/observe_measures.pdf.

aspects of quality in the early childhood care and education environment; accordingly, each tool is best-suited to measure outcomes aligned with its design. Burchinal et al. (2009) find that measures of classroom practice better predict children's academic and behavioral outcomes than do structural quality measures such as class size or staffing ratios.

For instance, two commonly-used measures of early childhood education quality based on classroom observation—the CLASS Instructional Climate subscale and the CLASS Emotional Climate subscale—better predict differences in children's academic and language skills and social skills, respectively, than do other quality measures that do not align directly with academic and social outcomes. The CLASS observation metric assesses the quality of the early childhood environment using measures of instructional quality, classroom management, and caregiver responsiveness and sensitivity. Some studies (e.g., Burchinal et al., 2008, Howes et al., 2008, and Mashburn et al., 2008) find that instructional quality and caregiver sensitivity modestly predict child outcomes, and that instructional quality better predicts language and literacy outcomes (Burchinal, 2010). CLASS items related to "productivity, teacher sensitivity, negative climate, and positive climate showed the strongest associations with all outcomes, while the items describing behavioral management also predicted social outcomes as rated by the teacher" (Burchinal et al., 2009, p. 3).

Similarly, another measure of early childhood education quality—the Early Childhood Environment Rating Scale (ECERS)—emphasizes age-appropriate activities, sensitive instruction designed to accommodate children's developmental stages, and individualized and small-group activities. Items related to the quality of teacher-child interactions and program structure more strongly predicted children's academic and behavioral outcomes than did other ECERS items. Vandell (2004) finds that the ECERS-R ratings scale positively predicts language and social skills. However, Burchinal et al. (2009) and Burchinal (2010) conclude that the associations between the ECERS-R quality measures and children's academic and non-academic outcomes are modest and that the "magnitude of the relationships between quality and child outcomes tended to be small by statistical standards" (Burchinal et al., 2009, p. 3). A more recent study by Sabol and Pianta (2014) finds little evidence that items on the ECERS-R are associated with children's academic, language and socioemotional functioning, and that even highly-rated early childhood environments were not associated with growth in academic, language, or non-cognitive (i.e., behavioral, emotional, and social) outcomes among low-income and other high-risk children. Gordon et al. (2013) also strongly critique the use of the ECERS-R by demonstrating that the measurement scale used in the ECERS-R leads to incorrect ordering of quality ratings, and that several of its measures lack structural and criterion validity.

The Observational Record of the Caregiving Environment (OCRE) observation metric emphasizes positive and sensitive caregiving. These process quality measures are associated with "modest to moderate" effects on children's language development, but are "inconsistent" and "modest" predictors of children's social skills (Burchinal 2010, p. 6).

Several studies also find that classroom observation tools aimed at assessing instructional quality in a particular content area—such as literacy or math—perform better in predicting children's outcomes in those subjects than do more global quality measures (Dickinson and Smith, 1994; Dickinson and Tabors, 2001; Sarama and Clements, 2004; Jackson et al., 2007).

Major Studies Linking Early Childhood Care and Quality to Children's Outcomes

The Burchinal (2010) policy brief relied in part on results of a major meta-analysis in 2009 of 97 peer-reviewed studies examining the link between particular child care and education quality measures and children's outcomes (Burchinal et al., 2009). Results from that study found that children in higher-quality early childhood care and education settings had "modestly higher academic and language outcomes and better social skills," after accounting for differences in children's background characteristics (Burchinal et al., 2009, p. 3). The observed effects were larger on average for academic and language outcomes than for social outcomes. Effects were also larger on average among two- and three-year old children than among four-year-old children.

Burchinal et al. (2009) also conducted a secondary data analysis focusing on the effect of childcare and education quality on low-income preschoolers' outcomes. They re-analyzed data from the following major studies:

1. NICHD study of Early Child Care – a prospective study of 1,364 children conducted in ten U.S. sites, from birth through high school
2. The Cost, Quality, and Child Outcomes Project – a longitudinal study of 700 children ages three and four who attended child care centers in four regions throughout the U.S.
3. National Center for Early Learning and Development Pre-Kindergarten Evaluation – an evaluation of 1,500 children attending state-funded pre-kindergarten programs in eleven states
4. Head Start Family and Child Experiences Study – a longitudinal study conducted in 1997 and 2000 of a nationally representative sample of Head Start children ages three and four and their families

They found that various measures of early childhood care and education quality have "modest, but mostly statistically significant, associations with achievement, language, and social skills for low-income children" after accounting for differences in children's background characteristics (Burchinal et al., 2009, p. 3).

One of the major studies re-analyzed in Burchinal et al. (2009)—the Cost, Quality, and Child Outcomes Project—found that "children's cognitive and social development are positively related to the quality of their child care experience" (Helburn, 1995). That study measured early childhood education quality using two classroom observation metrics: the Early Childhood Environment Rating Scale (ECERS) and the Caregiver Interaction Scale. Helburn (1995) found that the quality of child care is positively correlated with staff education levels, specialized training, administrators' years of experience, and higher staffing ratios. In addition, Helburn (1995) found that higher teacher wages among staff with the lowest levels of formal education are positively associated with quality. However, higher wages among teaching staff with college degrees do not appear to be associated with quality measures on the ECERS or the Caregiver Interaction Scale.

Another major study re-analyzed in Burchinal et al. (2009) is the NICHD study of Early Child Care, a prospective study of 1,364 children conducted in ten U.S. sites, from birth through high school. That study examines the relationship between "regulable" quality features of early child care and education—adult-to-child ratios, group size, and caregivers' education levels—and "process" quality

features that measure the quality of interactions in the early childhood setting. The NICHD study finds that regulatable quality features—those regulated by state government agencies or accreditation organizations—are associated with positive school readiness, language comprehension, and behavioral outcomes at age three. These differences were observed when comparing outcomes for children receiving care at an accredited child care center to those for children who did not. Further, the NICHD study found a positive association between each additional regulatable quality standard met and children's outcomes, even after accounting for differences in children's family income characteristics and the sensitivity of mother-child interactions.

The NICHD study also found a positive relationship between "process" quality features—which measure the quality of interactions in the early childhood setting—and children's outcomes. The study identified positive caregiving as one of the most important components of classroom practice that predicted children's developmental outcomes. Positive caregiving behaviors measured in the NICHD study included the following (NICHD, 2006, p. 10): showing a positive attitude, having positive physical contact, responding to vocalizations, asking questions, talking in other ways (praising or encouraging, teaching, telling and singing), encouraging development, advancing behavior, reading, and eliminating negative interactions.

The NICHD study also documented a positive correlation between "process" quality features such as positive caregiving and "regulatable" quality features. For example, caregivers in centers that exhibited higher-quality "regulatable" features—such as higher staffing ratios and higher education levels among caregivers—also exhibited more positive caregiving, a "process" feature that is positively associated with children's outcomes.

Selection Bias in Observational Studies

A major challenge in interpreting results from these studies is that they are observational studies; that is, the studies are not able to distinguish whether particular quality measures cause differences in children's outcomes, or whether children who receive early childhood care and education from providers with higher-quality features are more likely to have better academic and behavioral outcomes than children who do not, irrespective of their participation in a particular program. While many of these studies employ statistical techniques to account for some of the differences between children in low- versus high-quality environments, many differences are unaccounted for due to a lack of data availability. For example, Burchinal et al. (2009) are able to account for cross-site differences and for differences in children's ethnicity and maternal education, but they are unable to account for other important family background characteristics—such as family income, family structure, and family care quality—that also may explain differences in both the selection of children into early childhood care environments with varying quality and children's outcomes. The bias arising from an inability to distinguish whether differences in child outcomes arise from differences in family and background characteristics versus early childhood care and education characteristics is referred to as selection bias.

Accordingly, Glantz and Layzer (2000) critique Helburn's (1995) Cost, Quality, and Child Outcomes Project for advancing strong claims regarding the relationship between child care quality and children's outcomes when relying on observational data: "There are two major problems with the developmental outcomes component of the study. The first, and most serious, is that the CQO study (in common with many previous studies of the relationship between child care quality and developmental outcomes) does not adequately control for the factors that influence parents' selection of child care arrangements for their children. Without adequate controls for the selection of children into child care arrangements, the CQO study estimates of the effects of child care quality on developmental outcomes are subject to selection bias. As Blau (1999) has noted, "parents who provide a home environment that fosters positive child outcomes would plausibly select child care arrangements that do so as well"" (Glantz and Layzer, 2000, p. 16).

Similarly, the NICHD study of Early Child Care carefully couches its discussion of findings by stating the following: "The Study examined naturally occurring patterns of child care over time. The researchers did not assign children to different kinds of child care, nor did they determine how early in life children would enter child care or for how many hours each week. As a result, the study cannot reveal whether child care features, such as number of hours in child care, the type of child care, or the quality of child care are the direct causes of individual differences among children's health, cognitive, or social outcomes. The Study can describe only associations between child care experiences and children's development: in other words, it can explain if child care experiences co-occur with differences in children's outcomes, but it cannot say that "experience A causes outcome B." This summary booklet doesn't use words such as cause to describe findings. Instead, it uses such words as relates, associates, and predicts to describe the links between child care or the family and children's development" (NICHD, 2006, p. 7).

Interpreting the Research Findings

In summary, existing research finds modest, positive associations between isolated measures of early childhood care and education quality and child outcomes. Generally, process indicators capturing the

quality of instruction and teacher-child interactions better predict child outcomes than do structural, easily regulated measures of quality. While the evidence linking structural quality measures to child outcomes is more mixed, structural measures often predict process quality measures.

The evidentiary base linking aspects of early childhood care and education quality to child outcomes is limited because many of the positive cognitive and non-cognitive effects on children in higher-quality settings may be driven by the selection of children with positive cognitive and non-cognitive traits into those higher-quality settings. Unfortunately, the observational studies linking early childhood care and education quality with child outcomes do not fully address these concerns. Further, most observational studies of early childhood care and education—including those analyzed in Burchinal et al. (2010)—find modest effects of quality on child outcomes that do not meet the typical standard for distinguishing an educationally or practically meaningful intervention. The typical standard for defining an educationally meaningful intervention is an effect size of 0.3, interpreted to mean that the intervention is associated with a 0.3 standard deviation change in the outcome measure of interest (Slavin, 1989). In other words, standalone measures of early childhood education quality have relatively small effects on child outcomes; note, however, that early childhood education programs that combine several aspects of high-quality programs tend to produce relatively large gains in child outcomes.

Burchinal et al. (2009) provide three possible explanations for these small observed effect sizes: (1) that the true effect of quality on child outcomes is so small that it is inconsequential; (2) that programs observed in many of these studies are of insufficiently high quality—or do not provide strong enough exposure to high quality—to produce the desired outcomes; and (3) that existing quality measures fail to capture adequately the components of program quality that produce the highest outcomes. The first explanation is unlikely given that the best available causal evidence—discussed in the economic impact portion of this study—shows that very high quality early childhood interventions had strong, positive, statistically significant, and long-term effects on children's outcomes. A more plausible explanation is that the programs included in these observational studies are not of sufficiently high quality to produce meaningful improvements in children's cognitive and non-cognitive outcomes. In addition, many of the programs included in these observational studies did not vary significantly in terms of either structural or process quality measures. For example, many of the studies included in the Burchinal et al. (2009) meta-analysis are of regulated, state-funded pre-kindergarten programs with limited variation in program quality. Given the lack of variation across these programs, is it unsurprising that small differences in program quality would predict only null or modest differences in student outcomes. Burchinal et al. (2009) do not mention another plausible explanation, which is that both the outcome and quality measures are subject to potentially high levels of measurement error. Young children are not easily assessed with accuracy, and observations that take place on a random day of the school year may fail to capture true differences in quality.

Another way to examine the link between program quality and children's outcomes is to evaluate whether program quality produces larger gains among particular types of children. Several studies suggest that children who are low-income and/or racial minorities benefit disproportionately from high-quality early childhood interventions. In addition to evidence from the Perry Preschool and Abecedarian Project programs—discussed in the economic impact analysis portion of this study—that specifically targeted low-income children, several studies find that low-income children enrolled in pre-kindergarten

experience substantive gains in cognitive and non-cognitive skills (Gormley et al., 2005; Loeb et al., 2007; Magnuson et al., 2004; Howes et al., 2008; Mashburn, 2008; Burchinal et al., 2009); on average, gains are larger in higher-quality programs (Howes et al., 2008; Mashburn, 2008). Relative to higher-income peers, low-income children experience greater short-term and long-term gains on average in both pre-kindergarten (see Gormley et al., 2005) and in community care programs (see Burchinal, Peisner-Feinberg, Bryant, & Clifford, 2000; Peisner-Feinberg et al., 2001; Votruba-Drzal, Coley, & Chase-Lansdale, 2004; and Burchinal, Roberts, Zeisel, Hannon, & Hooper, 2006). Importantly, however, pre-kindergarten programs appear to benefit middle-income children as well—though not as much as poor children. In their evaluation of the Tulsa pre-kindergarten program, Gormley, Kitchens, and Adelstein (2013) find meaningful positive effects of pre-kindergarten on children's pre-reading, pre-writing, and pre-math score across the income distribution. Similarly, Weiland and Yoshikawa (2013) find positive effects of Boston's pre-kindergarten program on middle-class children.

Early childhood education researchers also have examined the presence of "threshold effects" in early childhood care and education – that is, whether there are particular quality thresholds beyond which additional quality investments do not produce additional gains in children's outcomes. Burchinal, Vandergrift, Pianta and Mashburn (2010) examined threshold effects in 11 state-funded pre-kindergarten programs and found no evidence that there are quality thresholds—as measured by the CLASS observational tool—beyond which gains in low-income children's outcomes level off. In fact, the researchers found the opposite: that "the magnitude of association between quality and outcomes at the higher levels of quality were larger than at the lower levels of quality for Instructional Support and academic outcomes and for Emotional Support and social outcomes" (Burchinal et al., 2010, p. 174). In other words, higher quality measures are associated with positive effects on low-income children, and these positive effects become larger and do not taper off at higher levels of quality.

Perhaps most importantly, the same study found some evidence of minimum quality thresholds – that is, thresholds at or below which there was no relationship between quality and low-income children's outcomes. The authors found no association between quality—as measured by the CLASS observational tool—and low-income children's reading and socioemotional outcomes until quality reached a minimum level. After surpassing that minimum level, low-income children's outcomes increased with increases in quality and did not taper off. The minimum quality level for realizing gains in children's outcomes is quite high: the study finds that children's socioemotional outcomes were associated with the quality of teacher-child interactions only if they fell within the 5-7 range on the CLASS Emotional Support Scale, and that children's academic outcomes were associated with instructional quality only if the classroom received a score of 3.25 or higher on the CLASS Instructional Quality Dimension scale. Below those thresholds, it is unlikely that the quality of caregiver interactions and instruction are of sufficiently high quality to modify low-income children's socioemotional and behavioral outcomes and to improve their academic skills acquisition.

One very recent study by World Bank economists—currently a working paper and under review at the *Quarterly Journal of Economics*—provides perhaps the most convincing causal evidence to date regarding the importance of instructional quality in producing gains in child outcomes. In that study, Araujo et al. (2014) randomly assigned 23,000 kindergarten students in Ecuador to different classrooms with varying levels of teacher quality. This random assignment design alleviates the concern that the

types of students taught by teachers exhibiting high instructional quality might also have better outcomes, regardless of their teacher assignment. Araujo et al. (2014) collected a variety of measures of teacher instructional quality and found that the CLASS instructional quality was the "strongest predictor of child learning outcomes" (p. 4). In fact, they find that "a one-point increase in the CLASS (on a 7-point scale) is associated with 0.6 standard deviation higher test scores at the end of the year" (p. 4). This study provides reliable and convincing evidence that teacher instructional quality is the single most important factor in producing child outcomes.

For context, the next section summarizes several measures of early childhood quality used nationally and within Indiana. When applicable, we discuss the link between the quality measure and children's outcomes.

Summary: Measures of Early Childhood Education Quality

There are many potential measures that may be used to indicate the quality of early childhood education providers. These measures include licensure status, accreditation status, and quality ratings—which may be characterized as composite measures of provider quality—as well as individual measures of provider quality that may be combined with other measures to determine licensure and/or accreditation status and quality ratings. Examples of these individual measures include teacher education requirements, staffing ratios, classroom size, teacher observation ratings, facility soundness and safety ratings, and student outcome measures (for example, performance on kindergarten readiness assessments).[6]

This section summarizes the set of measures identified by this study's Technical Advisory Board and Community Advisory Board as the best-known composite measures used to assess early childhood education provider quality: licensure and registration status, accreditation status, the National Institute for Early Education Research (NIEER) Quality Benchmarks, the National Center on Quality Teaching and Learning's Framework for Effective Practice, the Classroom Assessment Scoring System™ (CLASS™), and Quality Rating and Improvement Systems (QRIS) ratings.

Licensure and Registration

One measure of ECE quality is the provider's licensure and/or registration status. ECE providers in Indiana include unlicensed and licensed child care centers and family child care homes, as well unlicensed registered ministries. Indiana Code 12-17.2-2-8 exempts several types of providers from licensure requirements, including providers that register as child care ministries under Indiana Code 12-17.2-6, providers serving fewer than six children, and providers offering childcare for fewer than four hours per day. Early childhood education programs funded under Section 619 of Part B of IDEA, funded

[6] For an exhaustive listing of quality measures developed or proposed for assessing the quality of early care and education settings, please refer to the *Quality in Early Childhood Care and Education Settings: A Compendium of Measures, Second Edition*, developed by Mathematica Policy Research, Inc. for the federal Office of Planning, Research and Evaluation within the Administration for Children and Families. The document is available online at the following link: http://www.acf.hhs.gov/sites/default/files/opre/complete_compendium_full.pdf

under Title I of the ESEA, public preschools, and some Head Start and private school programs also are exempt (Early Learning Advisory Committee annual report, 2014).[7]

The total number of unlicensed ECE providers in Indiana is unknown, in part due to a lack of regulation requiring ECE providers to register with the state. Unlicensed ECE providers do not face the same requirements as licensed ECE providers.[8] Because unlicensed ECE providers remain unregulated, the extent to which they may have voluntarily adopted some of the above-listed licensure requirements is unknown.

To become a licensed child care home, ECE providers must attend orientation training sessions, undergo a home inspection, pass a well water test (if water is drawn from a private well), and comply with relevant zoning ordinances. To become a licensed child care center, ECE providers must attend orientation training sessions, abide by local zoning and building code ordinances, meet E-3 occupancy standards, provide written plans for food service and health programs, and pass a site inspection. To become an unlicensed registered child care ministry, ECE providers must be registered as child care ministries under Indiana Code 12-17.2-6, attend orientation training sessions, complete an application with the Department of Homeland Security (DHS) Fire and Building Safety Division, obtain State Department of Health approval if relying on private septic, pass a well water test (if water is drawn from a private well), submit a copy of their 501(c)(3) IRS ruling as a church or religious organization, and pass site inspections by DHS and the Indiana Department of Family Resources. Unlicensed registered ministries also must pass a site inspection prior to accepting CCDF vouchers.[9]

Note that Indiana's licensure and registration requirements relate only to structural quality measures and do not relate to process (i.e., instructional) quality measures. Licensure and registration requirements intend to ensure that ECE providers offer a basic level of health and safety, but do not regulate the process measures that predict children's academic or behavioral outcomes. ECE providers also must provide high-quality processes in order to produce measurable gains in child outcomes. Despite this, licensure status is correlated with some measures of provider quality in family day care homes, either because licensure improves quality and/or because it signals to parents which family day care homes are of higher quality (Galinsky, 1994).

[7] Additional details regarding licensure exemptions are available at the following website: http://www.in.gov/fssa/files/BCC_exemptions_from_licensure.pdf

[8] Unlicensed ECE providers are not required to (1) maintain staff/child ratios ensuring that the number of children per staffperson does not exceed a particular number; (2) maintain a minimum square footage or group size; (3) meet fire code regulations regarding building capacity, unblocked exits, fire detection and suppression; or to (4) employ age-appropriate programming or curricula (Fact Sheet about Child Care in Indiana, 2014). Further, unlicensed ECE providers that do not accept funding from the federal Child Care Development Fund (CCDF) are not subject to requirements for staff to complete training on the subjects of child abuse and neglect, child development, universal precautions, or first aid and CPR (Fact Sheet about Child Care in Indiana, 2014).

[9] Additional information regarding licensure requirements may be found at the following website: http://www.in.gov/fssa/carefinder/2736.htm

Accreditation

ECE providers also may pursue accreditation on a voluntary basis to demonstrate and improve their quality. Accreditation involves a separate and independent process from licensure—for example, unlicensed child care ministries often are accredited—and may be obtained from several national accreditation associations. Though the accreditation process typically involves the assessment of ECE provider quality along process (i.e., instructional quality) measures, Indiana does not require that ECE providers be accredited in order to receive funding from the federal Child Care Development Fund (CCDF). Indiana's State Board of Education currently recognizes ECE provider accreditation by the following national accreditation agencies:

1. National Association for the Education of Young Children
2. National Association for Family Child Care
3. National Early Childhood Program Accreditation
4. Council on Accreditation
5. Association of Christian Schools International
6. Accrediting Association of Seventh-day Adventist Schools, Colleges, and Universities
7. American Association of Christian Schools
8. Christian Schools International
9. Independent Schools Association of the Central States
10. International Christian Accrediting Association
11. National Lutheran Schools Accreditation
12. North Central Association/AdvancED

Accreditation requirements vary across accreditation agencies, but each accreditation agency aims to evaluate ECE providers on the basis of a holistic set of quality indicators including facility safety and soundness, staff and teacher qualifications, and curriculum and programming. As described above, the NICHD study of Early Child Care (2006) found that on average, children receiving early childhood care and education in an accredited child care center had modestly higher cognitive and non-cognitive outcomes compared to children who did not, even after accounting for differences in children's family income characteristics and the sensitivity of mother-child interactions.

The National Association for the Education of Young Children (NAEYC) is the most widely recognized accreditation agency. Currently, there are 179 programs in Indiana with NAEYC accreditation; 31 of those programs are located in Indianapolis. NAEYC accreditation involves a four-step process. In the first step, ECE providers align program standards with early childhood program standards. In the second step, ECE providers provide evidence of meeting these standards. In the third and fourth steps, ECE providers provide evidence of high-quality programming and preparedness for a site visit and then receive a site visit, respectively. These steps are detailed below.

Step 1: Enrollment/Self-Study involves aligning program standards with ten early childhood program standards identified by NAEYC:

1. Relationships: The program promotes positive relationships among all children and adults to encourage each child's sense of individual worth and belonging as part of a community and to foster each child's ability to contribute as a responsible community member.

2. Curriculum: The program implements a curriculum that is consistent with its goals for children and promotes learning and development in each of the following areas: social, emotional, physical, language, and cognitive.
3. Teaching: The program uses developmentally, culturally, and linguistically appropriate and effective teaching approaches that enhance each child's learning and development in the context of the program's curriculum goals.
4. Assessment of Child Progress: The program is informed by ongoing systematic, formal, and informal assessment approaches to provide information on children's learning and development. These assessments occur within the context of reciprocal communications with families and with sensitivity to the cultural contexts in which children develop. Assessment results are used to benefit children by informing sound decisions about children, teaching, and program improvement.
5. Health: The program promotes the nutrition and health of children and protects children and staff from illness and injury.
6. Teachers: The program employs and supports a teaching staff that has the educational qualifications, knowledge, and professional commitment necessary to promote children's learning and development and to support families' diverse needs and interests.
7. Families: The program establishes and maintains collaborative relationships with each child's family to foster children's development in all settings. These relationships are sensitive to family composition, language, and culture.
8. Community Relationships: The program establishes relationships with and uses the resources of the children's communities to support the achievement of program goals.
9. Physical Environment: The program has a safe and healthful environment that provides appropriate and well-maintained indoor and outdoor physical environments. The environment includes facilities, equipment, and materials to facilitate child and staff learning and development.
10. Leadership and Management: The program effectively implements policies, procedures, and systems that support stable staff and strong personnel, fiscal, and program management so all children, families, and staff have high quality experiences.

Source: Overview of the NAEYC Early Childhood Program Standards: http://www.naeyc.org/files/academy/file/OverviewStandards.pdf

Step 2: Application/Self-Assessment involves compiling evidence on meeting each of the ten NAEYC program standards, submitting an application and fee, and completing NAEYC candidacy materials.

Step 3: Candidacy involves demonstrating key components of high quality programming and preparedness for a site visit. Step 4: Meeting the Standards involves demonstrating how the program meets standards. A NAEYC Assessor reviews evidence that the program meets the ten program standards and conducts a site visit. Early childhood education programs that meet those standards become NAEYC-accredited. To maintain accreditation status, early childhood education programs must "demonstrate continued compliance" with the program standards by submitting annual reports, updating NAEYC with new information on program changes, and submitting to "additional verification or random unannounced visits to demonstrate continued compliance with the program standards"

(Overview of the NAEYC Early Childhood Program Standards, http://www.naeyc.org/files/academy/file/OverviewStandards.pdf).

National Institute for Early Education Research (NIEER) Quality Benchmarks

The National Institute for Early Education Research (NIEER) quality benchmarks rank state-funded pre-kindergarten programs. A team of researchers at Rutgers University compiles annually a comprehensive report that benchmarks state pre-kindergarten programs according to ten program characteristics that identify minimum criteria for addressing children's cognitive and non-cognitive (i.e., socio-emotional and physical) development and well-being:

1. Comprehensive early learning standards
2. Lead teachers possess a bachelor's degree
3. Lead teachers have specialized training in pre-kindergarten instruction
4. Assistant teachers possess a Child Development Associate (CDA) degree or equivalent
5. Teachers receive in-service training for a minimum of 15 hours per year
6. Maximum class sizes of 20 for four-year-old children
7. Staff-child ratios are 1:10 or better
8. Program provides screening, referral, and support services for vision, hearing, health, and at least one other family support service
9. Program provides at least one meal per day
10. Program undertakes ongoing site monitoring—at least once every five years—to ensure programs meet state standards

Source: Barnett, Carolan, Squires, & Clarke Brown (2013).

Indiana's pre-kindergarten pilot program has not yet been ranked according to the NIEER quality benchmarks because prior to this year, Indiana was one of only ten states without a state-funded pre-kindergarten program. Though the NIEER quality benchmarks overlap with some national accreditation standards, NIEER quality benchmarks are not required for accreditation, and vice versa; because the NIEER quality benchmarks establish minimum standards for pre-kindergarten programs, a program that meets NIEER standards is not necessarily considered "high quality" unless it also meets accreditation or other quality standards. Note also that NIEER standards do not account for classroom and teacher practices, elements often considered important for evaluating ECE provider quality. **Table 3** reports the State of Preschool Yearbook NIEER quality benchmark rankings for state-funded pre-kindergarten programs. In a recent evaluation, Mashburn (2008) found that the NIEER quality benchmarks do not predict differences in student learning outcomes.

National Center on Quality Teaching and Learning's Framework for Effective Practice

The Framework for Effective Practice emphasizes engaging interactions and environments, including "well-organized and managed classrooms, social and emotional support, and instructional interactions that stimulate children's thinking," research-based curricula and teaching practices, ongoing child assessment, and individualized teaching and learning designed to reach diverse students at all levels (Spradlin, Conn-Powers, & Wodicka, 2013, p. 4). A recent evaluation of 81 early childhood classrooms in Indiana revealed that only two classrooms used a curriculum demonstrated to be linked to children's school readiness outcomes (Conn-Powers, Cross, & Dixon, 2013). Note that national accreditation

standards do not require the use of curricula that have been demonstrated to improve children's school readiness outcomes.

Additional Measures of Early Childhood Education Quality

The first section in this chapter describes several measures of structural and process quality and discusses their relationship to child outcomes. Another method by which to assess ECE provider quality is by assessing child outcomes, such as kindergarten readiness, directly.

Indiana assesses kindergarten readiness using the Indiana Standards Tool for Alternate Reporting of Kindergarten Readiness (ISTAR-KR), developed by the Indiana Department of Education. The purpose of ISTAR-KR is to "measure skills in children from infancy to kindergarten."[10] ISTAR-KR assessments are aligned with Indiana State Standards for kindergarten in English/Language Arts and Mathematics, and "include three functional areas: physical, personal care and social-emotional skills."[11] ISTAR-KR reporting is mandatory for pre-kindergarten students receiving special education services, and may be adopted voluntarily among local education agencies to assess kindergarten readiness. The assessment is a web-based instrument used by teachers to assess children via ongoing observations, and is available to all public and private early childhood education programs in Indiana at no cost. Teachers assess which skills children have mastered in their daily routines and activities, and identify which skills additionally should be mastered for kindergarten readiness.

Table 3. State Pre-Kindergarten Quality Standards Benchmarking, National Institute for Early Education Research (NIEER) Quality Benchmarks. Source: Barnett, Carolan, Squires, & Clarke-Brown (2013).

State/Program	Early Learning Standards	BA	Specialized Training	Assistant	15 hours	Class Size 20	Ratio 1:10	Screening Referral	Meal	Site Visits	Total
Alabama	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Alaska	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Arizona	✓				✓	✓	✓			✓	**5**
Arkansas	✓		✓	✓	✓	✓	✓	✓	✓	✓	**9**
California	✓		✓		✓		✓				**4**
Colorado	✓		✓		✓	✓	✓			✓	**6**
Connecticut	✓		✓			✓	✓	✓		✓	**6**
Delaware	✓		✓		✓	✓	✓	✓	✓	✓	**8**
D.C	✓	✓	✓		✓	✓	✓	✓	✓		**8**
Florida	✓					✓				✓	**3**
Georgia	✓	✓	✓	✓	✓			✓	✓	✓	**8**

[10] Source: http://www.doe.in.gov/assessment/istar-kr
[11] Source: http://www.doe.in.gov/assessment/istar-kr

Illinois	✓	✓	✓		✓	✓	✓	✓		✓	**8**
Iowa Shared Visions	✓		✓			✓	✓	✓	✓		**6**
Iowa SVPP	✓	✓	✓			✓	✓	✓		✓	**7**
Kansas At-Risk	✓	✓		✓	✓	✓	✓				**6**
Kansas Pilot Pre-K	✓	✓		✓	✓	✓	✓				**6**
Kentucky	✓	✓	✓		✓	✓	✓	✓	✓	✓	**9**
LA 8(g)	✓	✓	✓		✓	✓	✓		✓		**7**
LA 4	✓	✓	✓		✓	✓	✓	✓	✓		**8**
LA NSECD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Maine	✓	✓	✓	✓	✓			✓			**6**
Maryland	✓	✓	✓		✓		✓	✓	✓	✓	**8**
Massachusetts	✓				✓	✓	✓	✓		✓	**6**
Michigan	✓	✓	✓	✓		✓	✓	✓			**7**
Minnesota	✓		✓	✓	✓	✓	✓	✓	✓	✓	**9**
Missouri	✓	✓	✓	✓		✓	✓	✓			**7**
Nebraska	✓	✓	✓	✓		✓	✓				**6**
Nevada	✓	✓	✓		✓	✓	✓			✓	**7**
New Jersey Abbott	✓	✓	✓		✓	✓	✓	✓	✓	✓	**9**
New Jersey ECPA	✓	✓	✓		✓	✓	✓	✓		✓	**8**
New Jersey ELLI	✓	✓	✓		✓	✓	✓	✓		✓	**8**
New Mexico	✓		✓		✓	✓	✓	✓	✓	✓	**8**
New York	✓	✓	✓		✓	✓	✓	✓			**7**
North Carolina	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
Ohio ECE	✓		✓					✓		✓	**4**
Oklahoma	✓	✓	✓		✓	✓	✓	✓	✓	✓	**9**
Oregon	✓		✓		✓	✓	✓	✓	✓	✓	**8**
Pennsylvania EABG	✓		✓			✓	✓				**4**
Pennsylvania HSSAP	✓		✓		✓	✓	✓	✓	✓	✓	**8**
Pennsylvania K4	✓	✓									**2**
Pennsylvania Pre-K Counts	✓	✓	✓		✓	✓	✓			✓	**7**
Rhode Island	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	**10**
South Carolina 4K	✓	✓	✓		✓	✓	✓				**6**
South Carolina CDEPP	✓		✓		✓	✓	✓	✓	✓		**7**
Tennessee	✓	✓	✓		✓	✓	✓	✓	✓	✓	**9**
Texas	✓				✓						**2**
Vermont Act 62	✓				✓	✓	✓				**4**
Vermont EEI	✓		✓			✓	✓				**4**
Virginia	✓		✓		✓	✓	✓	✓			**6**
Washington	✓		✓	✓	✓	✓	✓	✓	✓	✓	**9**

West Virginia	✓		✓		✓	✓	✓	✓	✓	✓	**8**
WI 4K	✓	✓	✓		✓					✓	**5**
WI HdSt	✓		✓		✓	✓	✓	✓	✓		**7**
Total	53	30	45	15	42	45	46	36	25	32	

Quality Rating and Improvement Systems (QRIS)

A Quality Rating and Improvement System (QRIS) is "a method to assess, improve, and communicate the level of quality in early care and education settings" (Mitchell, 2005). A QRIS is "a consumer guide, a benchmark for program improvement, and an accountability measure for funding" (Mitchell, 2005). The first QRIS systems began in 1998 with Oklahoma's state-sponsored QRIS system for its early childhood education initiatives. More than half of all states—including Indiana—now have a QRIS system in place, and nearly all states are piloting or planning to implement QRIS. Each public or private QRIS system may implement its own standards, but QRIS systems in general aim to impact early childhood education via the following:

1. Quality assurance: Though there is wide variability in quality standards rating scales, many QRISs employ quality standards ratings along a 3-5 point scale. The quality standards ratings are based on ongoing monitoring and assessment to determine whether ECE providers meet these standards.
2. Supply-side interventions: ECE programs receive technical assistance to improve their quality standards ratings, as well as professional development support to enhance their qualifications, knowledge, and skills. ECE providers receive financial incentives to encourage improvement in and maintenance of quality standards ratings.
3. Demand-side interventions: QRISs employ a comprehensible rating system intended to communicate quality ratings to consumers. These ratings are available publicly, and families choosing ECE programs with higher quality ratings sometimes receive financial incentives.

Source: http://www.earlychildhoodfinance.org/qris

Sabol, Hong, Pianta, and Burchinal (2013) evaluated how well QRIS ratings predicted child learning outcomes. In a study of 2,419 children in 673 public pre-kindergarten classrooms across the country, they found that "programs rated high by QRISs produce outcomes that are not significantly better than those of low-rated programs" for most measures of children's learning outcomes (p. 845).

Assessing the Costs of Early Childhood Education

This chapter summarizes information on the costs associated with providing early childhood care and education programs, both nationally and in Indiana. The reported cost ranges reflect regional differences, variation in program features, and differences in program standards and quality. On average in Indiana, full-time formal early childhood care and education for programs serving children ages 0-5 costs $7,498 annually (ELAC annual report, 2016). However, reported per-child spending on state-funded preschool programs ranges from $1,300 in South Carolina to $16,853 in the District of Columbia. The three programs we highlight in this report—state-funded pre-kindergarten programs in Georgia, Oklahoma, and Massachusetts—spend $3,622, $7,597, and $4,259 per child, respectively.

Early childhood education costs fall into three categories: operating costs, capital costs, and administrative costs. Operating costs represent the largest share, comprising salaries, benefits, and employer-paid taxes for instructional staff (Barnett, 1996). We first provide information comparing costs of state-funded pre-kindergarten programs across states. Second, we summarize the costs of city-led initiatives aimed at providing early childhood education at the preschool and pre-kindergarten levels. Third, we summarize the costs of providing preschool via the federally funded Head Start program. Fourth, we provide information comparing costs of providing center-based and family childcare—often considered alternatives to more formal early childhood education—for children of different ages. Fifth, we summarize available information on the costs of early childhood education in Indiana.

Note that we obtain the majority of information on early childhood education costs from reports comparing per-child spending for state-funded pre-kindergarten programs, Head Start and for child care. The vast majority of state-funded pre-kindergarten programs serve four-year old children, though some state-funded pre-kindergarten programs—in Washington DC, Vermont, West Virginia, Iowa, Texas, South Carolina, Maryland, Arkansas, Kentucky, New Jersey, Illinois, Nebraska, Colorado, California, Massachusetts, Connecticut, Pennsylvania, and Oregon—also serve some three-year old children on a voluntary basis. There is no comprehensive data source that compares the average cost of providing preschool (rather than child care) to three-year old children in each state, except for through the federal Head Start program. However, the National Institute of Early Education Research (NIEER) at Rutgers University assumes that the cost of providing early childhood education programs—in other words, state-funded preschool and pre-kindergarten programs—is the same for both three- and four-year old children.[12]

[12] For more information, please see the NIEER research summary available at the Pew Charitable Trusts website: http://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2005/06/15/cost-of-providing-quality-preschool-education-to-americas-3-and-4year-olds.

Cross-State Comparison of State-Funded Pre-Kindergarten Programs

The most authoritative source of information on the cost of providing early childhood education is the State of Preschool Yearbook, published annually by the National Institute for Early Education Research (NIEER) at Rutgers University. In general, the State of Preschool Yearbook consistently reports a positive relationship between the cost of providing preschool and the number of quality benchmarks met in each state. The report publishes information on all state-funded pre-kindergarten programs, including state spending per pupil, the number of NIEER quality benchmarks met for each program, and an estimate of additional funding needed to meet all ten NIEER quality benchmarks.[13] NIEER provides the most reliable estimates of spending on state-funded pre-kindergarten programs, and we use those figures to estimate program costs in the benefit-cost analysis.

The below table reports rankings of state spending per child for state-funded pre-kindergarten programs and the number of NIEER benchmarks met in each state. In addition, Barnett et al. (2013) calculate the additional cost associated with meeting all ten NIEER benchmarks. For states without a state-funded pre-kindergarten program (e.g., Indiana), cost estimates reported are for part-day pre-kindergarten. There is wide variability in state spending for pre-kindergarten programs, ranging from a maximum of $16,853 per child in the District of Columbia to a minimum of $1,300 per child in South Carolina. Further, some states with relatively low program costs per child meet more benchmarks than states with relatively high program costs per child. For example, the District of Columbia spends an average of $16,853 per child and meets eight NIEER quality benchmarks, while New Mexico spends an average of $3,604 per child to meet eight NIEER quality benchmarks. These cross-state cost differences reflect regional variation in the cost of living, variation in program features (e.g., the provision of full-day versus half-day care), and differences in program standards and quality. The table also reports the estimated additional cost per child associated with meeting all ten NIEER benchmarks. Note that even in states meeting all ten benchmarks, NIEER reports that additional spending is needed to meet all benchmarks. This is because the additional amount of spending is reported as the difference between an *estimate* of the total cost per child required to meet all NIEER benchmarks and actual state spending per child. Note that spending by states do not match actual cost for several reasons, including a reliance on parents, private philanthropy, local government, and federal funding to make up the difference.

The following table illustrates the relationship between the number of NIEER benchmarks met and state spending per child. There is a positive relationship between benchmarks met and spending per child, but there is wide variability in the level of spending for a given number of NIEER benchmarks met.

[13] See the preceding chapter on early childhood education quality measures for a comprehensive description of each NIEER quality benchmark. Note also that the preceding chapter discusses in detail the limitations of these benchmarks, which largely align with structural quality features of ECE programs. Process (instructional) quality measures better predict children's outcomes than do structural/regulable quality features.

Table 4. Rankings of State Spending Per Child and NIEER Benchmarks Met for State-Funded Pre-Kindergarten Programs. Source: Barnett, Carolan, Squires, & Clarke-Brown (2013).

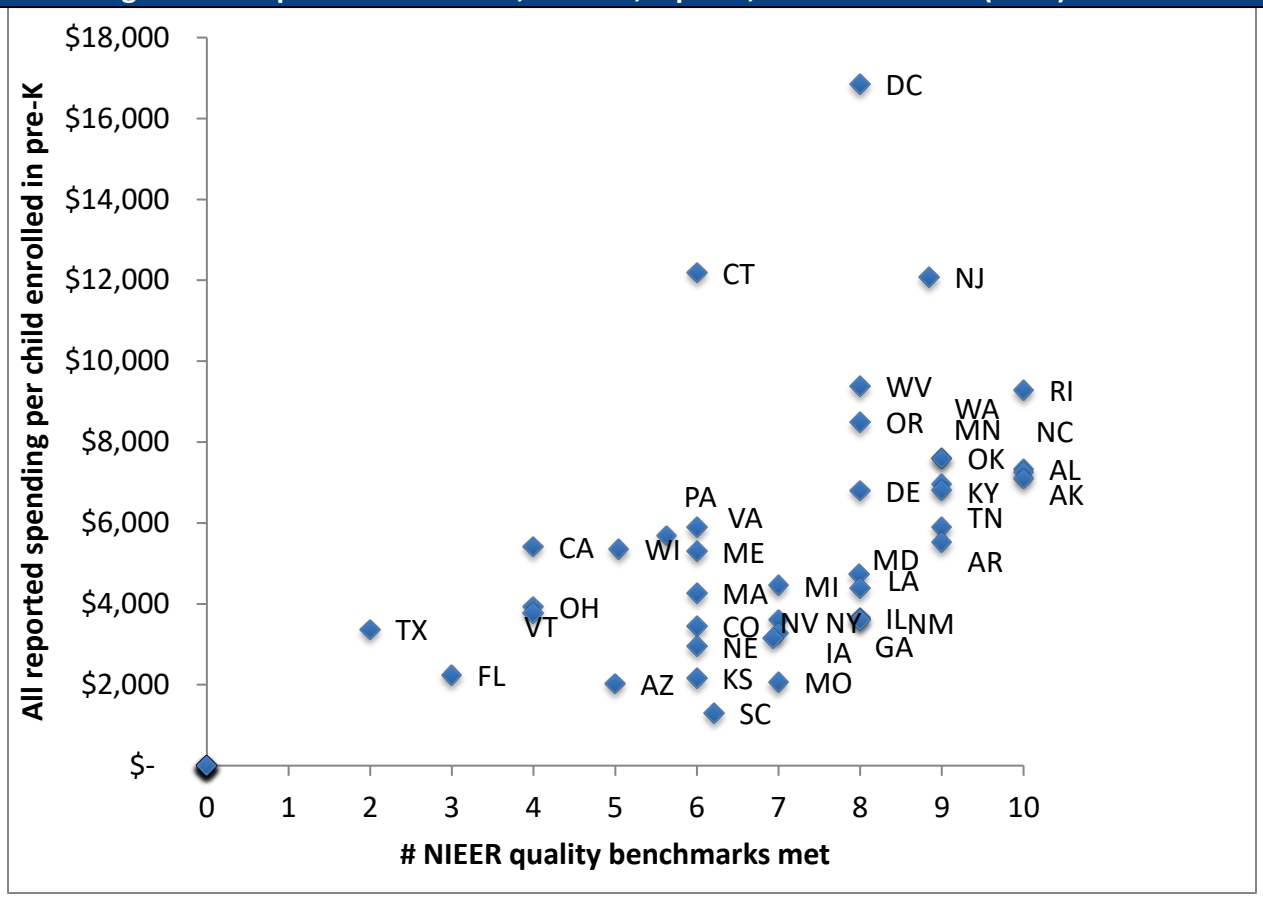
Resource rank based on all reported spending	State	All reported $ per child enrolled in pre-K	Estimate of per-child spending needed to meet NIEER benchmarks†	Is the reported funding sufficient to meet the NIEER benchmarks?	Additional per child funding needed	Quality benchmark total
1	District of Columbia	$16,853	$10,998	Yes	$0	**8**
2	Connecticut*	$12,184	$9,035	Yes	$0	**6**
3	New Jersey*	$12,070	$9,615	Yes	$0	**8.8**
4	West Virginia*	$9,380	$7,029	Yes	$0	**8**
5	Rhode Island	$9,278	$9,046	Yes	$0	**10**
6	Oregon*	$8,491	$7,792	Yes	$0	**8**
7	Oklahoma*	$7,597	$6,563	Yes	$0	**9**
8	Minnesota	$7,592	$4,726	Yes	$0	**9**
9	Alabama	$7,327	$7,844	No	$517	**10**
10	Alaska	$7,246	$4,641	Yes	$0	**10**
11	North Carolina	$7,086	$8,450	No	$1,364	**10**
12	Kentucky	$6,961	$4,319	Yes	$0	**9**
13	Washington*	$6,806	$5,877	Yes	$0	**9**
14	Delaware	$6,795	$4,973	Yes	$0	**8**
15	Tennessee	$5,895	$8,229	No	$2,334	**9**
16	Virginia*	$5,886	$9,524	No	$3,638	**6**
17	Pennsylvania*	$5,680	$5,519	Yes	$0	**5.6**
18	Arkansas	$5,514	$7,369	No	$1,854	**9**
19	California*	$5,411	$6,716	No	$1,305	**4**
20	Wisconsin	$5,359	$4,640	Yes	$0	**5.0**
21	Maine	$5,292	$4,082	Yes	$0	**6**
22	Louisiana	$4,721	$7,762	No	$3,042	**8.0**
23	Michigan*	$4,452	$6,131	No	$1,679	**7**
24	Maryland*	$4,386	$6,595	No	$2,208	**8**
25	Massachusetts*	$4,259	$9,680	No	$5,421	**6**
26	Ohio	$3,927	$4,683	No	$756	**4**
27	Vermont	$3,778	$4,135	No	$358	**4**
28	Illinois	$3,660	$5,047	No	$1,387	**8**
29	Georgia	$3,622	$8,790	No	$5,168	**8**
30	New York*	$3,609	$6,573	No	$2,963	**7**
31	New Mexico	$3,604	$4,288	No	$684	**8**
32	Colorado	$3,441	$4,690	No	$1,248	**6**
33	Texas	$3,366	$4,837	No	$1,471	**2**
34	Nevada	$3,280	$4,864	No	$1,584	**7**
35	Iowa*	$3,150	$4,310	No	$1,161	**6.9**
36	Nebraska	$2,943	$4,135	No	$1,192	**6**
37	Florida	$2,242	$4,527	No	$2,285	**3**

38	Kansas	$2,163	$4,137	No	$1,974	**6**
39	Missouri*	$2,067	$6,880	No	$4,813	**7**
40	Arizona	$2,028	$4,479	No	$2,451	**5**
41	South Carolina*	$1,300	$5,178	No	$3,878	**6.2**
No program	Hawaii	$0	$4,631	No	$4,631	NA
No program	Idaho	$0	$3,937	No	$3,937	NA
No program	Indiana	$0	$4,343	No	$4,343	NA
No program	Mississippi	$0	$4,061	No	$4,061	NA
No program	Montana	$0	$3,617	No	$3,617	NA
No program	New Hampshire	$0	$4,551	No	$4,551	NA
No program	North Dakota	$0	$3,920	No	$3,920	NA
No program	South Dakota	$0	$3,719	No	$3,719	NA
No program	Utah	$0	$4,479	No	$4,479	NA
No program	Wyoming	$0	$3,958	No	$3,958	NA
	United States	$4,629	$8,387	No	$3,758	

† For each state, a school-day, program-day, or weighted estimate of per-child spending was used, based on the operating schedule of the state pre-K program and the percent of children served in each type of operating schedule. Estimates for no-program states are for part-day programs. State estimates were constructed from a national estimate adjusted for state cost of education differences. The national estimate was obtained from Gault, B., Mitchell, A., & Williams, E. (2008). *Meaningful Investments in Pre-K: Estimating the Per-Child Costs of Quality Programs.* Washington, DC: Institute for Women's Policy Research. The state cost index was obtained from: Taylor, L. & Fowler, W. (2006). *A comparable wage approach to geographic cost adjustment.* Washington DC: IES, US Department of Education.

* This state serves preschoolers in both school- and part-day programs and therefore a weighted estimate of per-child spending was calculated.

Table 5. Relationship between NIEER Quality Benchmarks Met and State Spending Per Child in Pre-Kindergarten. Adapted from Barnett, Carolan, Squires, & Clarke-Brown (2013).



Unfortunately, no national dataset compiles information on cross-state differences in the average cost of early childhood education (preschool and pre-kindergarten) for programs that are not state-funded. Further, no other national dataset compares the cost of early childhood education programs using measures of quality besides the NIEER benchmarks. For example, no cross-state cost comparisons provide information on the average cost of early childhood education offered through accredited versus unaccredited providers. However, one NIEER study does examine the relationship between the cost of state-funded pre-kindergarten programs and various program features (Barnett and Robin, 2006). That study finds that hours of operation, teacher qualification requirements, the type of program funding model, and higher levels of K-12 spending per student in the state are associated with higher costs per child in state funded pre-kindergarten programs.

City-Led Early Childhood Education Initiatives

Several major cities throughout the nation also have begun to invest in early childhood education initiatives, potentially due to the underprovision of state-funded pre-kindergarten programs. We summarize several of these city-based initiatives below, detailing program features, funding mechanisms, eligibility criteria, and program costs. We include Washington, DC in these descriptions. As noted in the prior section, Washington, DC spends more per child ($16,853) than any other state on early childhood education. Again, differences in program costs reflect regional variation in the cost of living, variation in program features (e.g., the provision of full-day versus half-day care), and differences in program standards and quality.

Table 6 summarizes these programs.

Table 6. Sample of City-Based Early Childhood Education Programs and Costs Per Pupil

Program	Date Started	Program Elements	Funding Mechanism	Eligibility Criteria	Ages Served	Program Cost per pupil
Boston Public Schools K1 Program	2005	Preschool and pre-K programs operate on the same calendar and for the same length of day as other grades in Boston Public Schools. Programs must use an evidence-based literacy and math curriculum. Preschool teachers receive direct classroom coaching and targeted professional development and receive support for pursuing NAEYC accreditation. All early childhood staff are required to hold a bachelor's degree and to earn a master's degree within five years.	City taxes, Head Start, public-private partnerships.	Boston resident	3- and 4-year-olds	$17,387
DC Public Schools Early Childhood Programs	2008	Preschool and pre-K programs operate on the same calendar and for the same length of day as other grades in DC Public Schools. Early childhood grade levels also feature an Early Childhood Transition Week the first	DC taxes, same as funding for other public school grade levels. Head Start provides additional funding for	DC resident (with limited tuition-funded spots for non-residents)	3- and 4-year-olds	$16,853

		week of school, which includes home visits by teachers and small groups. Title I schools offer wraparound services including family support services, developmental screening, assistance accessing social services, and health screening. These services are provided with Head Start funding. DCPS early childhood programs also offer before- and after-school care services, which include supper. Families pay according to a sliding scale.	wraparound services.			
Los Angeles Universal Preschool (LAUP)	2005	Program elements vary because LAUP is a mixed-delivery system. LAUP preschools include private, public, charter, faith-based and family home child care programs.	Tobacco tax (50 cents per pack)	All families in Los Angeles County are eligible, regardless of income	4-year-olds	unknown
Denver Preschool Program	2007	Program elements vary because DPP is a mixed-delivery system. Children may attend part-day, full-day, or extended-day preschool programs of varying type and quality.	Local sales tax (12 cents per $100 of taxable sales)	All families receive tuition credits via sliding scale, must be Denver residents	Age 4 / one grade prior to Kindergarten	$3,864 (DPP funds are structured to be last-dollar-in after families have exhausted other public funding sources (e.g. Colorado Preschool Program, which spends approx. $3,441/child)
San Antonio (Pre-K 4 SA)	2013	Program is situated in 4 centers 20:2 student-teacher ratio per class Full-day pre-K plus free after-school care until 6pm Program provides breakfast, lunch, snacks, and transportation	Local sales tax ($0.00125 cents per $1 taxable purchase)	Enrollment is free for students meeting at least one of the following criteria: -eligible for free/reduced lunch (below 185 percent FPL) -English language learner -in foster care (currently or previously)	4-year-olds	$6,540

				-homeless -child whose parent is active duty member of U.S. military or parent was injured or killed in active duty Limited slots are available to children not meeting the above criteria at a cost based on a sliding scale.		
Seattle Preschool Program	Ballot measure approved in Nov. 2014	Preschool classes will be on a full day schedule: 6 hours x 5 days /week, 180 days per year 20:2 student-teacher ratio per classroom	Families and Education Levy (property tax) which would raise $58 M over four years (2015-2018)	Program will be open to Seattle residents who are age 4 or are age 3 and are below 300 percent FPL	3- and 4-year-olds	$10,700

Boston Public Schools K1 Program - Boston, Massachusetts

In 2005, the Mayor of Boston announced a universal preschool program that would operate pre-kindergarten classes for four-year-olds (with some limited slots available for three-year-olds) through the Boston Public Schools. The program currently serves approximately 2,300 four-year-olds and is considered a national model for public preschool education due to the high rate of return on investment associated with its program. Boston spends approximately $17,387 per child to deliver an evidence-based curriculum and comprehensive professional development, and pays its teachers salaries on par with K-12 teachers in Boston Public Schools. All teachers must hold a bachelor's degree and earn a master's degree within five years. The Boston Public Schools early childhood programs operate on the same calendar and daily schedule as other grade levels in the district.

Washington, District of Columbia

The District of Columbia has had publicly funded prekindergarten education since the 1960s. Since the passage of the Pre-Kindergarten Enhancement and Expansion Amendment Act of 2008, the DC Public Pre-Kindergarten Program has grown[14] to serve a higher proportion of three- and four-year-olds (80 percent and 94 percent, respectively) and spend more per child ($16,853) than any other state. The DC Public Pre-Kindergarten Program is a mixed-delivery system, so families have early learning options including DC Public Schools (DCPS), DC Public Charter Schools and participating community-based organizations (CBOs). Children who are residents of the District of Columbia are eligible for free preschool and prekindergarten programs in DC Public Schools (DCPS), but non-residents may also pay

[14] In 2007, only 49 percent of four-year-olds and 27 percent of three-year-olds were enrolled in public pre-K (source: http://www.dcactionforchildren.org/node/874).

tuition to access programs with available space. The DCPS early childhood programs operate on the same calendar and daily schedule as other grade levels in the district.

Los Angeles Universal Preschool (LAUP) – Los Angeles, California

Los Angeles Universal Preschool (LAUP) is a non-profit organization committed to increasing preschool access, affordability, and quality improvement in Los Angeles County. The primary funding for LAUP comes from First 5 LA, a local agency derived from First 5 California. First 5 California serves all counties in California and is funded by a $0.50 per pack tax on cigarettes and other tobacco products approved by California voters in 1998.[15] LAUP funds preschool classrooms in public and charter schools, private schools, centers, and home-based programs, so particular program characteristics vary by provider. All families in Los Angeles County are eligible for LAUP, regardless of income. In the last ten years, LAUP has provided early childhood education for about 100,000 eligible four-year-olds, serving between 5 and 7 percent of eligible children per cohort.

Denver Preschool Program – Denver, Colorado

The Denver Preschool Program (DPP) is an independent nonprofit organization that oversees a universal, voluntary pre-kindergarten program available to all four-year-old Denver residents. All families who live in Denver may choose among over 250 programs that partner with DPP, including school-based, community-based, faith-based, and home-based preschool and childcare programs.[16] DPP is funded by a local sales tax ($0.12 per $100 of taxable sales) approved by voters in 2006, which raises approximately $11.8 million per year. Seventy percent of these funds support tuition credits, while remaining funds cover quality improvement grants, evaluation costs, and administrative expenses. DPP tuition credits are structured to be last-dollar-in after Colorado Preschool Program and other public funding sources; the average expenditure per pupil is $3,864. Tuition credits follow the eligible child to the program of choice, and vary according to program quality (as measured by quality rating) and household income.

Pre-K 4 SA – San Antonio, Texas

Pre-K 4 SA is a new city-based pre-K initiative that began serving children in 2013. The program is funded through a local sales tax of $0.125 cents per $100 of taxable sales, approved by voters in November 2012. When the program is fully implemented, it will serve 500 four-year-olds annually in each of four model centers and another 1,700 four-year-olds across local independent school district programs through a competitive grant process. The target population for Pre-K 4 SA is at-risk four-year-olds who are not currently enrolled in full-day pre-K programs, which the City estimates to be 5,700 children (at full implementation, the program will not fully close this gap). Program eligibility criteria are aligned with those of the State of Texas Pre-K Program: children who are at or below 185 percent FPL, are English language learners, are homeless, are currently or previously in foster care, or have a parent who is either active duty in the U.S. Armed Forces or was injured or killed serving in U.S. Armed Forces. Ten percent of enrollment in model centers is reserved for children who do not fit any of the eligibility criteria, with tuition paid on a sliding scale. Pre-K 4 SA costs per child are approximately $6,540, which include full-day pre-K plus free after-school care until 6:00 pm, two teachers per class of 20 students, breakfast, lunch, snacks, and transportation.

[15] http://laup.net/history.aspx
[16] http://www.dpp.org/about-us/main

Costs of Head Start and Early Head Start

In addition to state-funded and city-led pre-kindergarten programs, federal programs exist through the Head Start program. Head Start is a federally funded pre-kindergarten program that serves low-income children ages three through five. The program intends to provide early learning programs to families whose incomes are at or below 100 percent of the Federal Poverty Level (FPL). Head Start programs are provided by nonprofit and for-profit organizations, as well as public school districts and local government agencies. The federal government funds Head Start providers through five-year renewable grants. In fiscal year 2014, Congress appropriated $6.41 billion for Head Start, or $7,886 per child (New America Foundation Federal Education Budget Project, 2014). In 2014, Head Start served 18,160 Hoosier children and 295 pregnant women and provided funds to 60 grantees (25 Early Head Start grantees and 37 Head Start grantees).

Congress recently imposed new accountability-based requirements on Head Start providers, aimed at improving early childhood education quality. As of 2013, at least half of Head Start lead teachers are required to have at least a bachelor's degree in early childhood education or a related field. Head Start program providers also must compete for grant renewal via a process called "recompetition," which evaluates Head Start providers according to program quality and financial soundness.

Early Head Start serves low-income children from birth through age three. Early Head Start programs are provided by center-based child care centers and by home visitation programs. In fiscal year 2014, Congress appropriated $1.37 billion for Early Head Start, or $11,828 per enrolled child (New America Foundation Federal Education Budget Project, 2014).

Costs of Providing Center-Based and Family Child Care

Two alternatives to early childhood education funded through federal, state, or city sources include center-based and family childcare. The national nonprofit agency Child Care Aware provides additional data on the annual cost of childcare, both nationally and by state. Each year, Child Care Aware surveys state Child Care Resource and Referral (CCR&R) agencies and other agencies to prepare an annual report on the state of child care in America. To improve reliability, CCR&R agencies coordinate their survey responses with parents, child care providers, and local and state governments. CCR&R agencies report average annual fees for full-time care in both centers and in family child care homes for infants, four-year old children, and school-aged children. For school-aged children, costs reported are based on providing both before- and after-school care for nine months. Child Care Aware defines childcare centers as "all center-based programs, including Head Start programs, state-funded prekindergarten, license exempt, school-based, etc." (Child Care Aware 2014, p. 4). While the Child Care Aware report sheds some light on the range of child care costs and how they vary by provider type (e.g., by whether the provider is a center or family child care home), the estimates provided do not distinguish between the costs of child care and the costs of providing early childhood education. Child care refers to basic programs for young children that focus on meeting basic health and safety needs; these programs do not necessarily provide early childhood education.

The below table indicates that the average annual fee for a 4-year old child in Indiana enrolled in full-time, center-based care is approximately $6,760; the average annual fee for a 4-year old child in Indiana enrolled full-time in a family child care home is $5,564.

Table 7. Average Costs of Child Care by Child Age and Provider Type, in Indiana and the U.S. Source: Child Care Aware (2015).

	Indiana	United States
Average annual fees for full-time care in a center		
Infant	$8,918	$5,747 - $14,366
4-year-old child	$6,760	$4,914 - $11,700
School-age child (before-/after=school care)	$4,719	$1,104 - $7,778
Average annual fees for full-time care in a family child care home		
Infant	$6,825	$3,972 - $16,006
4-year-old child	$5,564	$3,675 - $13,668
School-age child (before-/after=school care)	$3,057	$1,846 - $8,457

To our knowledge, there is no comprehensive national data source besides the NIEER State of Preschool Yearbook that compares how early childhood education and/or child care costs vary with the quality measures described in the preceding section. However, the NIEER figures do not provide precise information about actual quality and average cost because it relates average cost to the known state regulatory thresholds for quality features; actual quality in specific programs might be higher or lower if the state does not regulate quality features carefully. The best available studies of child care quality and costs are now outdated. For example, the Child Outcomes in Child Care Centers study (Helburn, Culkin, Morris, Mocan, Howes, Phillipsen, Bryant, Clifford, Cryer, Peisner-Feinberg, Burchinal, Kagan, Rustici, 1995) and the Economics of Family Child Care study (Kontos, Howes, Shinn, and Galinsky, 1994; Modigliani, Helburn, Morris, and Culkin, 1996) were conducted in the mid-1990s and have not been updated. Helburn and Howes (1996) summarize the findings in these studies and find only a modest positive relationship between child care costs and quality measures. The quality measures captured in those studies include measures of process, structural, and adult work environment quality. The authors state that “the modesty of this relationship [between child care costs and quality] reflects the low wages of child care staff, the availability of in-kind donations in the nonprofit sector, and the altruistic motivations of many providers that depress direct costs and the fees charged for child care” (Helburn and Howes 1996, p. 1).

Costs of Early Childhood Education in Indiana

The 2016 Indiana Early Learning Advisory Committee (ELAC) report includes results from a survey of Indiana child care and early childhood education agencies. The report states that on average, early childhood programs serving children ages 0-5 cost $7,498 for full-time care. Quality providers (rated with three or four star according to Indiana’s Paths to Quality QRIS system) charge an average of $8,473 for full-time care annually.

Table 8 reports the average annual rates for full-time child care among providers rated as a level three or four on Paths to Quality™, by program type.

Table 8. Average Costs of Full-Time High Quality Child Care In Indiana, by Provider Type. Source: Early Learning Advisory Committee Annual Report (2016).

	Average Full-Time Preschool Annual Rate
Centers	$8,983
Homes	$6,205
Registered Ministries	$7,768

Though Indiana currently does not offer a state-funded pre-kindergarten program, HEA 1004 appropriated $10 million in 2014 to create a voluntary Early Education Pilot Program that offers pre-kindergarten in five counties to children whose family income is at or below 127 percent of the Federal Poverty Level (FPL). Though the total cost per child for this program is to be determined, the statute sets the minimum and maximum amounts spent per child at $2,500 and $6,800, respectively. The range of spending is intended to accommodate both part-day and full-day options. In January 2015, Indiana Governor Pence announced Indiana's On My Way Pre-K program, which will expand further access to early childhood education. This pilot program provides a $6,800 scholarship for full-time pre-kindergarten, or $2,400 scholarship for part-time pre-kindergarten, for children whose family income level falls at or below 127 percent of the federal poverty level (FPL).

In addition, the City of Indianapolis and former Mayor Greg Ballard announced plans for the Indianapolis Preschool Program (Indy PSP) to invest up to $40 million in early childhood education over five years, beginning in 2015. An estimated $20 million will come from city funds, and an additional $20 million will be secured via matching grants from the private and philanthropic sectors. A major goal of the program is to ensure access to high quality early childhood education for all three- and four-year-old children whose family income is at or below 185 percent of the FPL. The Indianapolis Office of Education Innovation in the Office of Mayor Greg Ballard anticipates per child spending to amount to an average of $2,500 for half-day early childhood education, and to an estimated $6,800 for full-day early childhood education. Another goal of the program is to make grants to providers to improve program quality and build capacity. We estimate that this spending represents about one-quarter of the estimated $153 million in total spending needed to serve all three- and four-year-old children in Marion County, and about 43 percent of the estimated $93.5 million in total spending needed to serve three- and four-year-old children in Marion County whose family incomes fall below 185 percent of the federal poverty level (FPL).

The Early Childhood Education Industry

This section provides information regarding the role of the early childhood care and education industry in the Hoosier economy. Hoosiers spend between $498 million and $1.06 billion annually on licensed child care and/or ECE. The child care sector ranks 36th out of 95 business sectors in terms of the number of Hoosiers employed, and ranks 52nd out of 95 business sectors in terms of total payroll. The early childhood industry employs an estimated 25,227 Hoosiers who collectively earn between $188 and $633 million and generate between $6.4 and $21.5 million in state income tax revenues annually.

Despite the importance of the early childhood industry in the Hoosier economy, Indiana's early childhood workforce is characterized by low wages and high turnover: the median annual income of early childhood educators ranges from $16,680 to $19,960, and the turnover rate is four times that of K-12 educators. In Indiana, an estimated 38 percent of child care workers rely on some form of public assistance: 35 percent claim the federal Earned Income Tax Credit (EITC), 8 percent receive Medicaid, 13 percent participate in Medicaid/CHIP (Children), and 14 percent receive Supplemental Nutrition Assistance Program (SNAP/food stamp) benefits. The participation of child care workers in these programs is estimated to cost taxpayers $33.6 million annually.

In this section, we provide information on the size of the early childhood industry and its contribution to the state economy, summarize information on the supply and capacity of early childhood care and education providers throughout the state, and describe Indiana's early childhood workforce.

The Early Childhood Industry and the Hoosier Economy

Size of the Early Childhood Industry

The early childhood industry comprises an important sector in the Hoosier economy. According to the 2005 report *The Economic Dimensions of the Child Care Industry in Indiana: An Invisible Industry*, the child care sector—which includes the provision of both child care and early childhood education—ranks 36th out of 95 business sectors in terms of the number of Hoosiers employed, and ranks ahead of other notable industries including real estate. More than 25,000 Hoosiers were employed in the early childhood industry in 2004; that figure likely understates the total number of Hoosiers employed in the industry because it does not include information on those employed in informal or unlicensed child care. The *2014 State of Preschool Yearbook* uses data from the U.S. Bureau of Labor Statistics to estimate that as of 2012, 9,810 Hoosiers were employed as center-based child care workers. That figure does not include child care administrators/managers, preschool teachers, special education teachers, or self-employed workers such as individuals providing home-based care. The 2010 Indiana Early Childhood Workforce Study estimates that there are approximately 1,331 directors, 11,008 teachers, and 2,768 family child care providers employed in licensed child care centers, unlicensed registered ministries, licensed Head Start facilities, and licensed family child care programs.

Wages and Income Tax Revenues Generated by the Early Childhood Industry

The Economic Dimensions of the Child Care Industry in Indiana: An Invisible Industry reports that child care ranks 52nd of 95 business sectors in terms of total payroll – estimated by assuming payroll

constitutes 75 percent of total industry receipts. In 2004, the total estimated amount earned by Hoosiers employed in the child care industry was $633 million. The *2014 State of Preschool Yearbook* estimates that the total amount earned by center-based child care workers was about $188 million. That figure is based on an estimated 9,810 child care workers earning an average annual income of $19,190. Given the flat state income tax of 3.4 percent on adjusted gross income and assuming no tax deductions, income taxes of child care workers alone generate about $6.4 million in state income tax revenues annually. According to the *2014 State of Preschool Yearbook*, that figure does not include earnings of other child care workers—including child care administrators/managers, preschool teachers, special education teachers, or self-employed workers such as individuals providing home-based care—who do not meet the Bureau of Labor Statistics definition of center-based child care workers.

The 2010 Indiana Early Childhood Workforce Study published findings from a statewide survey collecting data on the child care workforce in Indiana. The Indiana Association for the Education of Young Children, Inc. (IAEYC) administered the survey, with funding from the Indiana Family and Social Service Administration, Division of Family Resources, Bureau of Child Care, through the federal American Recovery and Reinvestment Act (ARRA). The statewide survey sampled all directors and teachers in licensed child care centers, unlicensed registered ministries, licensed Head Start facilities, and licensed family child care programs. The original survey sample consisted of 1,331 directors, 11,008 teachers, and 2,768 family child care providers. According to the report, "survey response rates were 38 percent of directors (n=477 director surveys collected), 28 percent of teachers (n=3,228 teacher surveys collected), and 28 percent of family child care providers (n=768 family child care provider surveys collected)" (2010 Indiana Early Childhood Workforce Study, p. 1).

Across provider types, directors reported median hourly wages ranging from $14.77 to $16.91, implying a director working 40 hours per week for 50 weeks per year will earn a median annual income ranging from $29,540 to $33,820. Across provider types, teachers reported median hourly wages ranging from $8.34 to $9.98, implying a teacher working 40 hours per week for 50 weeks per year will earn a median annual income ranging from $16,680 to $19,960. Family child care providers reported a median hourly wage of $13.32, implying a median annual income of $26,640 based on a 40-hour work week and work for 50 weeks per year. Assuming that the workforce survey responses received are representative of wages earned among all directors, teachers, and family child care providers in Indiana, the total estimated amount earned by directors in 2010 ranges from $39.3 million to $45.0 million, the total estimated amount earned by teachers in 2010 ranges from $183.6 million to $219.7 million, and the total estimated amount earned by family child care providers is $73.7 million.

Given the flat state income tax of 3.4 percent on adjusted gross income and assuming no tax deductions, early childhood directors, teachers, and family child care providers are estimated to generate $10.1 million to $11.5 million in state income tax revenues annually. The amount of additional tax revenues generated from early childhood workers participating in informal care environments is unknown. If we instead assume the total estimated amount earned by Hoosiers employed in the licensed early childhood industry is closer to the less conservative estimate of $633 million reported in the 2004 *The Economic Dimensions of the Child Care Industry in Indiana: An Invisible Industry*, estimated income tax revenues generated are closer to $21.5 million. That estimate is based on the assumption that payroll constitutes 75 percent of estimated industry receipts.

Estimated Annual Spending on Early Childhood Care and Education

The 2016 Annual Report of the Indiana Early Learning Advisory Committee (ELAC) states that there are 505,090 children ages 0 to 5 in Indiana. Among those children, 111,672 three- and four-year old children live in homes where all parents participate in the workforce. As of 2014, a total of 142,004 Hoosier children ages 0-5—27.6 percent of children ages 0-5—were enrolled in some type of formal child care or early childhood education program, though many of those children live in homes where not all parents participate in the workforce. Those children receive child care and/or early childhood education administered via Indiana's 1,411 child care centers and 2,469 family child care homes (Child Care Aware 2014, p. 36). These programs enrolled a median of 52 children ages 0 to 5 per site and employ a median of six full-time and two part-time teachers (Indiana Early Childhood Workforce Study, 2010). An estimated 216,000 children—65 percent of Hoosier children ages 0-5 who are likely in need of care—are in "family, friend, neighbor, or other/unspecified care while their parents work" (ELAC Annual Report 2016, p. 8). The total number of these informal care providers is unknown.

The average annual rate for child care or early childhood education ranges from $3,507 for part-time care for 0-5 year old children in unaccredited child care, to about $7,500 for full-time care in preschool or accredited early childhood education programs. The most conservative possible estimate of the total amount paid to providers is based on the assumption that all 142,004 Hoosier children ages 0-5 who are enrolled in formal child care or early childhood education are enrolled in a part-time, unaccredited program. That assumption implies that Hoosiers spend about $498 million annually on licensed child care and/or early childhood education. The highest possible estimate of the total amount paid to providers is based on the assumption that all 142,004 Hoosier children ages 0-5 who are enrolled in formal child care or early childhood education are enrolled in a full-time preschool and/or accredited early childhood education program. That assumption implies that Hoosiers spend about $1.06 billion annually on licensed childcare and/or early childhood education. Those figures do not include the additional amount spent to provide informal care to the estimated 216,000 Hoosier children in those settings.

Supply and Capacity of the Hoosier Early Childhood Education Industry

Though the number of slots in formal care environments cannot accommodate the total number of Hoosier children ages 0-5 who require some form of child care or ECE due to parental labor force participation, the 2014 Early Learning Advisory Committee (ELAC) Annual Report states that the Indiana Association of Child Care Resources and Referral (IACCRR) reports 21,571 known vacancies in formal care for children ages 0-5 across the state. The ELAC report attributes these vacancies to a lack of program affordability and access.

As described in the preceding section, a total of 142,004 Hoosier children ages 0-5 receive child care and/or early childhood education administered via child care/early childhood education centers and in home-based child care. An estimated 216,000 additional children—65 percent of Hoosier children ages 0-5 who are likely in need of care—are in "family, friend, neighbor, or other/unspecified care while their

parents work" (ELAC Annual Report 2016, p. 8). The total number of these informal care providers is unknown.

Child Care Aware (2014) estimates that there are 1,411 child care centers—including all center-based programs, Head Start programs, state-funded prekindergarten, license exempt, and school-based centers—and 2,469 family child care homes serving Hoosier children ages 0-5. That estimate is slightly different from the estimates reported in the 2014 Early Learning Advisory Committee (ELAC) Annual Report, which reports the number of programs serving Hoosier children ages 0-5 and their total capacity, by provider. The estimates reported in the ELAC annual report are obtained from the Indiana Association of Child Care Resource and Referral (IACCRR), which likely provides more detailed data on providers than does the national Child Care Aware agency.

Table 9. Number of Programs Serving Children Ages 0-5 and Capacity in Indiana, by Provider Type. Source: Early Learning Advisory Committee Annual Report (2014).

Ages 0-5	Programs	Capacity
CCDF Exempt Homes	292	1,181
Head Start	251	2,157
Licensed Centers	457	51,718
Licensed Homes	2,814	35,920
Non-CCDF Exempt Homes	128	593
Preschools	359	2,913
Registered Ministries	676	43,571
All Others	96	1,325
Total	5,073	139,378

The 2014 Early Learning Advisory Committee (ELAC) Annual Report also analyzes separately the provision of programs to preschool age children (ages three and four). Data obtained from the American Community Survey indicates that 59.6 percent of preschool-aged children are not enrolled in formal care. If we assume that the proportion of working parents is the same for three and four year olds as it is for all children ages 0-5, approximately 26.8 percent of preschool-aged children are in "family, friend, neighbor, or other/unspecified care while their parents work" (ELAC Annual Report 2014, p. 11). An estimated 20.1 percent of three- and four-year-old Hoosier children attend a public nursery or preschool, while an additional 19.6 percent attend a private nursery or preschool (ELAC Annual Report 2014). The 2014 Early Learning Advisory Committee (ELAC) Annual Report reports the number of programs serving Hoosier children ages three and four and their total capacity, by provider.[17]

[17] Note that the 2016 Early Learning Advisory Committee (ELAC) Annual Report does not provide this level of disaggregated data, so we were unable to update these figures to reflect the most recent year of data.

Table 10. Number of Programs Serving Children Ages 3-4 and Capacity in Indiana, by Provider Type. Source: Early Learning Advisory Committee Annual Report (2014).

Ages 3-4	All Programs*	Capacity	Quality Programs*	Capacity
CCDF Exempt Homes	292	1,174	28	41
Head Starts	251	2,157	126	1,633
Licensed Centers	457	37,252	263	23,516
Licensed Homes	2,814	35,842	460	6,073
Non-CCDF Exempt Homes	128	593	2	8
Preschools	359	2,913	34	250
Registered Ministries	676	26,702	50	2,399
All Others	96	1,325	40	N/A
Total	5,073	107,958	1,003	33,920

*Includes all programs that serve children ages 0- 5

As the 2014 Early Learning Advisory Committee (ELAC) Annual Report highlights, there are only 139,378 slots in formal care arrangements statewide – far fewer than were required to accommodate the estimated 345,749 Hoosier children ages 0-5 who required some form of child care or early childhood education in that year. The 2010 Indiana Early Childhood Workforce Study found that 75 percent of formal early childhood care providers had a waitlist for enrollment, indicating excess demand for available child care and early childhood education slots. At the same time, however, the 2014 Early Learning Advisory Committee (ELAC) Annual Report states that the Indiana Association of Child Care Resources and Referral (IACCRR) reports 21,571 known vacancies in formal care for children ages 0-5 across the state. IACCRR data also reports 2,786 known vacancies in high quality programs for children ages three and four—that is, programs that are either accredited and/or enrolled in the Indiana QRIS system—for children ages three and four throughout the state, out of a total of 14,566 known vacancies in all formal care environments. The Early Learning Advisory Committee (ELAC) Annual Report attributes these vacancies to a lack of program affordability and access.

Indiana's Early Childhood Education Workforce

Wages and Benefits in the Early Childhood Industry

Indiana's early childhood workforce is characterized by low wages and high turnover. As discussed previously, the *2014 State of Preschool Yearbook* estimates that the median annual salaries for full-time work earned by child care workers and family child care providers are $19,190 and $26,640, respectively. Directors earn median annual incomes ranging from $29,540 to $33,820—a salary that is on par with the average starting salary of $31,149 for an Indiana K-12 public school teacher (2010

Indiana Early Childhood Workforce Study, 2010). **Table 11** details the distribution of self-reported earnings in the early childhood workforce, by position.

Table 11. Self-Reported Earnings of Child Care Workers in Licensed Child Care Centers and Unlicensed Registered Child Care Ministries in Indiana, by Position. Adapted from the 2010 Indiana Early Childhood Workforce Study.

	Center/Ministry Directors	Family Child Care Providers	Teachers	Lead Teachers	Assistant Teachers
Highest Hourly Earnings (90th Percentile)	$22.00	$31.17	$13.00	$13.33	$11.00
Median Hourly Earnings (50th Percentile)	$14.77	$13.32	$9.00	$9.45	$8.25
Lowest Hourly Earnings (10th Percentile)	$10.00	$2.00	$7.30	$7.50	$7.25

Table 12 details the distribution of earnings among lead teachers and assistant teachers, by provider type. Median starting wages and highest wages among lead and assistant teachers are modestly higher in accredited licensed child care centers and registered child care ministries.

Table 12. Earnings of Lead Teachers and Assistant Teachers in Indiana, by Provider Type. Source: 2010 Indiana Early Childhood Workforce Study.

	Median Starting Wage	Median Highest Wage
Lead Teachers		
Registered Child Care Ministries	$8.00	$9.65
Licensed Child Care Centers	$9.00	$11.45
Accredited Licensed Child Care Centers and Registered Child Care Ministries	$10.00	$12.00
Assistant Teachers		
Registered Child Care Ministries	$7.50	$8.50
Licensed Child Care Centers	$7.99	$9.00

Accredited Licensed Child Care Centers and Registered Child Care Ministries	$8.00	$9.50

The 2010 Indiana Early Childhood Workforce Study also found that 11 percent of directors, 52 percent of teachers, and 24 percent of family child care home providers reported total family income below $30,000. In addition, 11 percent of teachers and 9 percent of family child care providers have a second job in addition to their work in early childhood; teachers with second jobs work a median of 10 additional hours per week, while family child care providers work a median of 20 additional hours per week.

In 2010—the year in which Indiana conducted the Early Childhood Workforce Study—federal poverty guidelines were as follows:

Table 13. 2010 Federal Poverty Guidelines. Source: http://aspe.hhs.gov/poverty/10poverty.shtml

Persons in family	Poverty guideline
1	$10,830
2	14,570
3	18,310
4	22,050
5	25,790
6	29,530
7	33,270
8	37,010
For families with more than 8 persons, add $3,740 for each additional person.	

As discussed above, the median annual income of early childhood educators ranges from $16,680 to $19,960. Thus, a median early childhood educator who is the sole income earner in a household with three or more people is likely to live at or below the federal poverty threshold. In Indiana, an estimated 38 percent of child care workers rely on some form of public assistance: 35 percent claim the federal Earned Income Tax Credit (EITC), 8 percent receive Medicaid, 13 percent participate in Medicaid/CHIP (Children), and 14 percent receive Supplemental Nutrition Assistance Program (SNAP/food stamp) benefits. Collectively, the participation of child care workers in these programs is estimated to cost taxpayers $33.6 million annually.[18]

According to a 2005 wage comparison in *The Economic Dimensions of the Child Care Industry in Indiana: An Invisible Industry*—which reported average annual wages of $18,800 for child care workers, obtained by dividing annual estimated payroll (75 percent of child care receipts) by total child care employment—

[18] Source: http://www.irle.berkeley.edu/cscce/wp-content/uploads/2014/11/ReportFINAL.pdf

average child care wages rank 80th out of 95 industry sectors in Indiana. On average, child care workers earn less than those employed in nursing and residential care facilities, and less than taxi drivers and local transit bus drivers (Indiana Business Research Center, 2005). The Indiana Department of Workforce Development reports that child care teachers earn wages on par with those of general merchandise store employees and transit and ground passenger transportation service providers (Indiana Department of Workforce Development, Industry Wages Information, Quarter-1, 2011).

Indiana also lags behind national averages for early childhood worker compensation. Nationally, the U.S. Department of Labor reports higher average hourly wages for preschool teachers in 2009—about $16.61 per hour—as compared to $34.24 for kindergarten teachers and $37.02 for elementary teachers (2010 Indiana Early Childhood Workforce Study, 2010).

Further, Indiana's early childhood workforce is characterized by limited benefits. The 2010 Indiana Early Childhood Workforce Study found that among licensed child care centers and unlicensed registered ministries, 37 percent of do not provide health insurance, and 55 percent do not help employees pay for health insurance. The study also found that 41 percent of licensed child care centers and unlicensed registered ministries do not offer any paid sick leave.

Early Childhood Workforce Characteristics

The early childhood workforce in Indiana is more than 96 percent female and is characterized by relatively low incomes. The 2010 Indiana Early Childhood Workforce Study reports that among early childhood workers reporting annual incomes below $30,000, 78 percent of directors, 57 percent of teachers, and 87 percent of family child care home providers have children. A significant portion of those reporting annual incomes below $30,000 are single parents: 37 percent of directors, 39 percent of teachers, and 52 percent of family child care home providers. **Table 14** provides average demographic characteristics of the early childhood workforce in Indiana, by position.

Table 14. Demographic Profile of the Child Care Workforce in Indiana, by Position. Source: 2010 Indiana Early Childhood Workforce Study.

	Directors	Teachers	Family Child Care Providers
Median Age	45	33	46
Female	98%	98%	85%
People of Color	26%	21%	36%
Have Children	85%	66%	92%
At Least One Child 0-18	48%	46%	51%
Single Parent of Children 0-18	9%	17%	12%
Annual Family Income Below $30,000	11%	52%	24%

The median years of experience in the early childhood industry varies with position.

Table 15. Median Years of Experience in the Child Care Workforce in Indiana, by Position. Source: 2010 Indiana Early Childhood Workforce Study.

Lead Teachers	
Median Years in Current Center	3
Median Years in Child Care Field	8
Assistant Teachers	
Median Years in Current Center	2
Median Years in Child Care Field	5
Directors	
Median Years in Current Center	5
Median Years in Child Care Field	15
Family Child Care Providers	
Median Years as a Family Child Care Provider	12

The early childhood workforce also has relatively low educational attainment, especially relative to the K-12 workforce. For example, just 40 percent of center/ministry directors, 27 percent of lead teachers, 23 percent of teachers, 13 percent of assistant teachers, and 12 percent of family child care providers possess a bachelor degree or higher. Less than 40 percent of the workforce possesses a Child Development Associate (CDA) credential, regardless of position.

Table 16. Education and Certification Characteristics of the Early Childhood Workforce in Indiana. Adapted from the 2010 Indiana Early Childhood Workforce Study.

Education	Center/ Ministry Directors	Family Child Care Providers	Teachers	Lead Teachers	Assistant Teachers
Highest Education Completed* **					
Bachelor Degree or Higher in ECE/CD*	13%	2%	5%	6%	1%
Bachelor Degree or Higher in Other Field	27%	10%	18%	21%	12%
Associate Degree in ECE/CD*	16%	7%	10%	12%	5%
Associate Degree in Other Field	2%	5%	5%	5%	6%
High School + Any College Courses	17%	49%	38%	36%	46%

High School + Workshops	5%	12%	10%	10%	13%
High School Diploma or G.E.D.	2%	10%	12%	10%	17%
Some High School	<1%	1%	1%	1%	2%
Other Educational Credits					
Child Development Associate (CDA) Credential	17%	36%	26%	30%	21%
Educational Pursuits					
Currently Taking ECE/CD* Courses	15%	15%	21%	21%	24%
Interested in Attending College to Earn a Degree**	20%	24%	36%	35%	42%

*ECE/CD=Early Childhood Education/Child Development
**Percentages were drawn from the survey respondents not currently taking courses
***Percentages do not total to 100 percent due to multiple responses possible

Hourly wages in the early childhood industry only modestly compensate early childhood workers for higher levels of education. For example, the median hourly wage earned by directors in licensed child care centers and unlicensed registered child care ministries is $12.00 among those with no college education, as compared to $16.25 (35.4 percent higher) among those with a bachelor's degree or higher. Similarly, the median hourly wage earned by family child care providers is $12.48 among those with no college education, as compared to $14.29 (14.5 percent higher) among those with a bachelor's degree or higher (2010 Indiana Early Childhood Workforce Study, 2010). The wage benefits of higher educational attainment in the early childhood education industry are low relative to the economy as a whole. National data from the Bureau of Labor Statistics indicates that median earnings in 2014 among full-time employed workers with a bachelor's degree in the U.S. were nearly 65 percent higher than median earnings among full-time employed workers with no college education.

Turnover in the Early Childhood Industry

Overall, staff and teacher turnover in the early childhood industry is high. Nationally, annual turnover rates for childcare workers are between 25 and 40 percent.[19] The 2010 Indiana Early Childhood Workforce Study found that in Indiana, the annual turnover rate is 16 percent for full-time teachers employed in licensed child care centers and in unlicensed registered ministries. That study also found that providers offering more professional support benefits—which include paid breaks, paid time off for training, paid planning or preparation time, paid education and training expenses, orientation programs, written job descriptions, and written personnel policies—have fewer teachers who plan to attrite from the profession. **Table 17** provides average annual turnover rates by profession within the early

[19] Source: http://www.naccrra.org/sites/default/files/default_site_pages/2011/the_child_care_workforce_march2011.pdf

childhood industry, and **Table 18** illustrates the negative relationship between professional support benefits offered and average planned teacher attrition rates.

Table 17. Annual Child Care Workforce Turnover. Source: 2010 Indiana Early Childhood Workforce Study.

Full Time Teacher Turnover	16%
Part-Time Teacher Turnover	20%
Teachers Planning to Leave the Field within 3 Years	18%
Lead Teachers Planning to Leave the Field within 3 Years	17%
Assistant Teachers Planning to Leave the Field within 3 Years	25%
Directors Planning to Leave the Field within 3 Years	11%
Family Child Care Providers Planning to Leave within 3 Years	9%

Table 18. Teachers Planning to Leave the Child Care Field within Three Years, by Number of Professional Support Benefits Received. Adapted from the 2010 Indiana Early Childhood Workforce Study.

Number of Professional Support Benefits	Percent of Teachers Planning to Leave the Child Care Field within Three Years
0	27%
1	31%
2	21%
3	19%
4	17%
5	17%
6	12%
7	9%

Nationally, teacher turnover in early childhood education is extraordinarily high—about four times the turnover rate of K-12 teachers. Low wages and a lack of professional development contribute to this high turnover rate. However, turnover rates are substantially lower in states with publicly funded pre-kindergarten programs such as Oklahoma, where early childhood educators possess degree qualifications that are similar to those of K-12 educators and receive similar salaries and benefits.[20]

[20] Source: http://nieer.org/publications/oklahoma-project-state's-public-pre-k-helps-kids-get-ready-school

Economic Impacts of Investing in Early Childhood Education

The purpose of this chapter is to estimate the economic costs and benefits associated with providing high quality, state-funded early childhood education to three- and four-year old children in Indiana. In particular, this chapter highlights the economic return on investment that might be expected if Indiana adopts early childhood education programs that are similar to those that currently operate at scale in Georgia and Oklahoma. The Community Stakeholder Group advising this report identified these two state programs due to their positive return on investment and because the early childhood education programs in those states are likely to be practically, politically, and economically feasible in Indiana.

This chapter begins with a summary of available research examining the economic returns per dollar invested in high quality early childhood education. Economic returns to early childhood education accrue not only to program participants in the form of greater educational and economic productivity, but also to society—including to government agencies and taxpayers—in the form of cost savings (Barnett, 1996). When ECE programs are of sufficiently high quality, states realize cost savings due because program beneficiaries are less likely to be classified into special education and less likely to need academic remediation. Further, program beneficiaries earn higher lifetime wages—thereby contributing to a larger tax base—and are less likely to commit crimes, thereby reducing state spending on the criminal justice system. The first section discusses the economic returns generated from small-scale, intensive preschool interventions, while the second section discusses the economic returns generated from large-scale, state-funded preschool interventions that operate at scale in Georgia and Oklahoma. The third section presents a benefit-cost analysis that estimates the expected economic returns that could be generated in Indiana using a similar model of state-funded early childhood education. We present benefit-cost estimates associated with providing both universal and targeted programs aimed at children from families with income falling below 185 percent of the federal poverty level. Our benefit-cost analysis relies on estimates of potential benefits/cost savings per dollar invested in early childhood education from a review of high-quality studies of early childhood education interventions in other states. These estimates are then used to calculate total benefits/cost savings using actual data from Indiana and Indianapolis on population demographics, the early childhood education industry, and actual costs whenever possible. When data specific to Indianapolis are not available, this study employs appropriate state-level averages; when data specific to Indiana are not available, this study employs appropriate national averages. **Results from the benefit-cost analysis indicate that a high quality, state-funded early childhood education program in Indiana will yield anticipated benefits of $3.83 to $4 per dollar invested.**

In general, program costs are positively related to estimated benefits: the highest-cost, most intensive interventions are associated with the largest estimated benefits per dollar invested. However, even relatively low-cost programs that operate at scale in many states yield modest benefits that pass a benefit-cost test. Further, benefit-cost ratios are highest when programs target high-need, low-income children who stand to gain more from investments in early childhood. Moreover, the return per dollar

invested in high-quality early childhood education is higher than the return associated with many alternative education interventions, such as class-size reduction at the elementary level.

Review of Findings from High-Quality Demonstration Studies

This section summarizes evidence on the economic returns generated from small-scale, intensive early childhood interventions. High-quality studies of these demonstration interventions find that they generate an economic return up to $12 for every dollar invested (Heckman, Moon, Pinto, Savelyev, & Yavitz, 2010). To date, the most-studied early childhood education programs include the High/Scope Perry Preschool, Carolina Abecedarian, and Chicago Child-Parent Centers (CPC) programs. These programs are well-known among early childhood education policymakers, practitioners, and researchers and serve as the subjects of several high-quality research evaluations because they are intensive, high-quality interventions; further, the High/Scope Perry Preschool and Abecedarian programs were implemented using a random assignment design, a method that facilitates high-quality program evaluation.

A randomized controlled experiment is considered the gold standard method for identifying the causal effects of a program on participants. Notably, a preschool intervention that assigns children to preschool *at random* avoids many evaluation challenges that arise when families and children are able to self-select themselves into a particular program intervention. In the case of interventions where children are not randomly assigned to a program, researchers are not able to discern whether changes in the children's outcomes may be attributed to the intervention, or whether they instead arise from the children's particular characteristics that are correlated with their families' decision to participate in the program. In other words, preschool interventions that allow for self-selection will limit researchers' ability to attribute changes in children's outcomes to the programmatic intervention per se. Economists and program evaluation researchers refer to this problem as self-selection bias. To date, only the High/Scope Perry Preschool, Carolina Abecedarian, and Head Start Impact Study interventions have employed a random assignment design, enabling researchers to estimate the causal impacts of the program on its beneficiaries (Heckman & Masterov, 2007).[21]

High/Scope Perry Preschool

The High/Scope Perry Preschool intervention is cited widely as the only early childhood intervention with both random assignment and participant follow-up to age 40. In 1962, researchers recruited the families of 123 low-income and predominantly African-American children with below-average IQs from Ypsilanti, Michigan. The treatment group consisted of children ages three through five, who received educational enrichment for 2.5 hours per day for 36 weeks per year at a cost of approximately $17,700 in present dollars. The preschool program also emphasized parental involvement and included home visits. Treatment group participants were surveyed at ages 19, 27, and 40 and found to have higher levels of education, higher earnings, lower rates of arrest and incarceration, and lower rates of welfare use relative to non-participants in the control group (Barnett, 1996; Barnett & Masse, 2007; Heckman &

[21] The state of Tennessee is currently conducting a randomized controlled trial experiment to evaluate its state-funded pre-kindergarten program.

Masterov, 2007; Heckman et al., 2010). These differences in life outcomes translate to an estimated return of $7 to $12 per dollar invested (Yoshikawa et al., 2013).

Carolina Abecedarian

The Carolina Abecedarian program randomly assigned 112 children born between 1972 and 1977 from Chapel Hill, North Carolina to receive year-round care (50 weeks) for ten hours per day. The program cost $16,000 per year for three-year olds and $12,000 per year for four- and five-year olds. The program targeted low-income and primarily African-American children and provided free transportation (Barnett & Masse, 2007). Children who were randomly assigned to attend the preschool program scored higher than their control-group peers on achievement tests, were less likely to be retained in-grade or placed in special education, and had higher college attendance rates (Heckman & Masterov, 2007). However, these differences in educational attainment did not translate into differences in socioeconomic outcomes as adults or into differences in criminal activity by age 30 (Campbell et al., 2012). Overall, the differences in life outcomes translate to an estimated return of about $2.50 per dollar invested (Yoshikawa et al., 2013).

Head Start Impact Study

In 1998, Congress reauthorized the federal Head Start program with the stipulation that it be evaluated rigorously for its effects on child outcomes. The Head Start Impact Study (HSIS) randomly assigned nearly 5,000 eligible children age three and four to either receive Head Start services or not. Data collection on these children commenced in 2002 and continued through 2008. The HSIS famously found that while Head Start improved children's outcomes across a variety of domains in preschool, these effects "faded out" over time and were virtually non-existent in the early elementary grades (Puma et al., 2012). These findings formed the basis of major mandated reforms to Head Start, which now include more rigorous requirements for teacher education and certification.

In addition to these random assignment studies, several high-quality studies also examine the effects of other city- and state-level early childhood interventions. While those interventions did not employ a random assignment design, several studies of these interventions employ sophisticated statistical techniques to reduce self-selection bias. The Chicago Child-Parent Centers intervention is just one example of an intervention that has been the subject of several high-quality program evaluations, despite a lack of random assignment.

Chicago Child-Parent Centers (CPC)

Founded in 1967, the Chicago CPC program provided three hours of care per day to 1,500 three- to five-year-old, predominantly African-American children. The program cost approximately $8,000 per student to provide early childhood education for 42 weeks per year. CPC children scored higher than their non-CPC peers on achievement tests, were less likely to repeat a grade or require special education, and also were more likely to graduate from high school (Heckman & Masterov, 2007). These benefits translated into higher earnings later in life, higher tax revenues, and lower rates of crime and child welfare incidents. These differences in life outcomes translate to an estimated return to the public of about $7 per dollar invested, with total returns to society estimated at $10.83 per year (Reynolds, Temple, White, Ou, & Robertson, 2011; Yoshikawa et al., 2013).

Preschool Interventions Operating At Scale

In addition to the small-scale demonstration studies listed above, several programs that currently operate at scale—such as those in Georgia and Oklahoma—have been found to lead to substantial gains for children. Because these programs are relatively new and have been operating since the 1990s or later, researchers lack direct evidence regarding the effects of the programs on children who are not yet adults. Thus, researchers often project estimated returns to these programs by using evidence on short-term benefits—such as those realized by improved kindergarten readiness—in combination with information on estimates of longer term outcomes obtained from other sources. These methods yield assessments of the return on investment ranging from $3 to $5 per dollar invested in programs that operate at scale (Yoshikawa et al., 2013).

This section specifically describes the state-funded early childhood education programs in Georgia and Oklahoma. The Community Stakeholder Group advising this report recommended a focus on these programs due to their positive return on investment and because the early childhood education programs in those states are likely to be practically, politically, and economically feasible in Indiana. For additional details on state-funded early childhood education programs in other states, please refer to the State of Preschool Yearbook, available at: http://nieer.org/yearbook.

Georgia Pre-K Program

The Georgia Pre-K Program began as a pilot in 1992, but expanded over the next several years to become the first universal state preschool program for four-year-olds by the 1995-1996 academic year. The program is funded by state lottery revenues, which supplied $312,173,630 in program funds for the 2013-2014 school year. This amount is sufficient to provide 84,000 four-year-olds (approximately 58 percent of the eligible population[22]) with a year of preschool. The actual number of children served in 2013-2014 was 81,453, at an average cost of $3,746 per child.[23]

Georgia's Pre-K Program has a mixed delivery system, and includes public schools, private childcare centers, faith-based organizations, Head Start agencies, state colleges and universities, and military facilities. The program operates 6.5 hours per day, 5 days per week, and follows the academic year calendar.

A new version of the Georgia Early Learning and Development Standards was released in June 2013, and these standards align with the Common Core Georgia Performance Standard. In the school year that followed, teachers received training in the standards, in preparation for full rollout in 2014-2015.

Implementation of the Georgia Pre-K Program's quality standards is tracked using the Classroom Assessment Scoring System (CLASS). Many pre-K teachers in Georgia receive specialized training and professional development on the CLASS through Georgia's K-12 Race to the Top grant.

Since the 2006-2007 school year, Georgia pre-K teachers have used the Georgia Pre-K Child Assessment Program to document children's progress, individualize instruction, and provide parents with progress

[22] http://decal.ga.gov/Prek/MarketDemand.aspx
[23] http://decal.ga.gov/documents/attachments/PreKFactSheet.pdf

reports on their children's work in school. This system helps to improve continuity between pre-K education and the K-16 system. An online version of the Child Assessment program has been available since 2008-2009, and by the 2011-2012 school year, 2,070 classrooms were using the online system. All classrooms used the online system by 2013-2014.

Georgia's Pre-K Program meets eight out of ten of the NIEER quality standards, the exceptions being maximum class size and student-teacher ratio. To meet the standards, these measures must be 20 and 10:1, respectively. However, the Georgia program allows for class sizes of up to 22, with 11:1 student-teacher ratios.

Oklahoma's Early Childhood Four-Year-Old Program

The Oklahoma Early Childhood Four-Year-Old Program was established in 1980 but did not serve all four-year-olds until 1998, when Oklahoma became the second state to offer universal preschool. The program is widely available, operating in 99 percent of school districts as of 2013, and serving approximately 74 percent of four-year-olds in the state.

Oklahoma school districts receive funding for preschool programs through the state's school funding formula. The per-pupil rate varies based on the age of the child and the length of the program day (districts may offer either half-day or full-day programs, for at least 175 days per year). In 2012-2013, total state pre-K spending in Oklahoma was $144,859,409, or $3,611 per enrolled child (reported enrollment that year was 40,114). After adding local and federal contributions to public preschool programs, total spending per child is $7,597. Oklahoma also supplemented Head Start programs with $2,191,700 in additional funding for extended-day and additional services.

With the state funding they receive through the school formula, districts may provide preschool in-house or support other centers by placing public school teachers in childcare centers, Head Start settings, or community-based programs. Children at these sites are considered public school enrollees and receive the same services as children in public school classrooms. The maximum allowed classroom size is 20 children, with a 10:1 student-teacher ratio.

Although three-year-olds do not have access to universal preschool in Oklahoma, certain Oklahoma school districts do feature programs for these children by combining multiple funding sources including general funds and federal funds for special education, Title I, and Head Start.

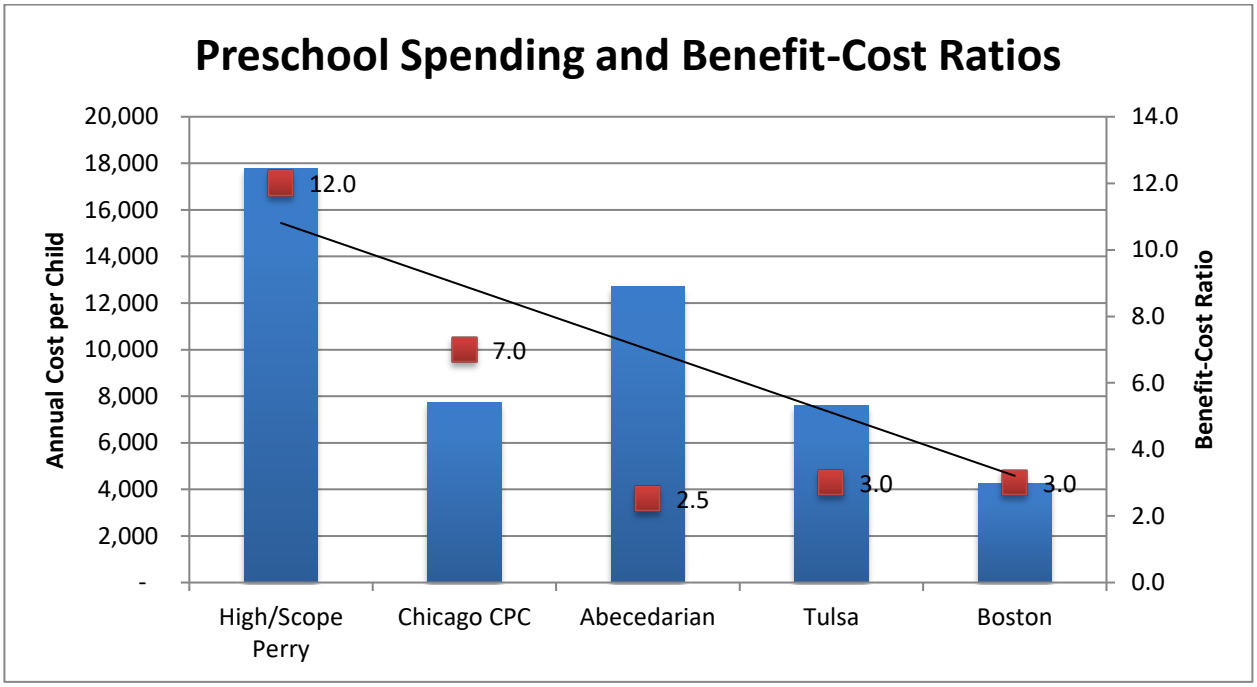
The Oklahoma Early Childhood Four-Year-Old Program meets nine of the ten NIEER quality standards, the failed standard being the degree requirements for assistant teachers. While NIEER requires a CDA or equivalent, Oklahoma requires only a high school diploma or GED, along with the FBI criminal history check. However, teachers at Title I programs must hold an associate's degree or higher, have completed equivalent coursework, or pass one of two teacher assessments endorsed by the state.

The Return on Investment to High-Quality Early Childhood Education

Table 19 below summarizes information on the benefit-cost ratios reported in high-quality evaluations of early childhood interventions. The horizontal axis lists various early childhood interventions for which we are able to locate high-quality, rigorous evaluations. These interventions range from small-scale,

highly targeted, expensive programs (e.g., the Perry Preschool and Abecedarian programs) to programs operating at the city and state levels (e.g., those in Tulsa and Boston). The left vertical axis graphs the annual cost of each program (represented by the bars), and the right vertical axis graphs the benefit-cost ratio associated with each program (displayed on the graph as points along the curve). The benefit-cost ratio is the ratio of the discounted (i.e., present value) of benefits to the discounted value of costs. In other words, we may interpret a benefit-cost ratio of 9:1 as providing evidence of $9 in benefits realized for every $1 invested in program costs.

Table 19. Preschool Spending and Benefit-Cost Ratios



The following sections outline estimates of program costs and benefits/cost savings to individuals, families, government agencies, and taxpayers. As described above, these assumptions are derived from existing evaluations of early childhood interventions and estimated using actual data from Indiana whenever possible. The final section summarizes the findings and presents estimated economic returns per dollar invested in early childhood education in Indiana.

Estimated Costs of Early Childhood Education

This section discusses anticipated costs associated with providing a system of state-funded early childhood education in Indiana. As discussed above, Georgia spends approximately $3,746 per enrolled child. Spending per child is substantially higher in Oklahoma—a total of $7,597—though the state contribution amounts to $3,611 per child. Spending estimates for the city of Tulsa are higher—an estimated $8,806 per child annually for full-day pre-kindergarten, and $4,403 per child for half-day pre-kindergarten as of the 2005-2006 academic year (Bartik, Gormley, & Adelstein, 2012).

Table 20 below details the estimated costs associated with adopting a state preschool model similar to those in Georgia and Oklahoma. The below table assumes both a 59 and 74 percent preschool utilization rate—the same utilization rates in Georgia and Oklahoma's voluntary universal preschool programs, respectively—and calculates the total amount of spending to provide full-day preschool to children ages three and four in Indiana as a whole, as well as in Marion County. The table also reports the amount of spending to provide preschool universally, as compared to only those children whose family income falls below 185 percent of the federal poverty level. As reported below, the total amount of state spending to

provide universal preschool to children ages three and four in Indiana ranges from about $360 to $373 million if we assume a 59 percent utilization rate (similar to that currently observed in Georgia), and ranges from about $452 to $469 million if we assume a 74 percent utilization rate (similar to that currently observed in Oklahoma). The total amount of state spending to provide preschool to low-income children ages three and four in Indiana would range from $184 to $239 million annually, depending on the state preschool model and utilization rate. Those numbers would be halved if Indiana opted to provide preschool to four-year old children only. Total estimated state spending to provide universal preschool to children ages three and four in Marion County ranges from $58 to $76 million annually, and ranges from $35 to $46 million annually for providing preschool to low-income children ages three and four. Again, those numbers would be halved if providing preschool to four-year old children only.

Table 20. Estimated Costs Associated with Adopting a State Preschool Model Similar to Georgia and Oklahoma.[24]

	Total Count	Estimated Enrollment, 59% Utilization	Total state spending, GA model	Total spending, OK model	Total spending, OK model (state portion only)
Indiana					
Children ages 3-4	169,200	99,828	$373,955,688	$758,393,316	$360,478,908
Children ages 3-4 below 185% FPL	86,292	50,912	$190,717,401	$386,780,591	$183,844,243
Children ages 4	84,600	49,914	$186,977,844	$379,196,658	$180,239,454
Children ages 4 below 185% FPL	43,146	25,456	$95,358,700	$193,390,296	$91,922,122
Marion County					
Children ages 3-4	27,270	16,089	$60,270,518	$122,230,412	$58,098,462
Children ages 3-4 below 185% FPL	16,635	9,815	$36,765,679	$74,561,896	$35,440,701
Children age 4	13,635	8,045	$30,135,259	$61,115,206	$29,049,231
Children age 4 below 185% FPL	8,318	4,907	$18,382,839	$37,280,948	$17,720,351

[24] Using estimates of per-child costs in Oklahoma and Georgia, we present cost estimates associated with providing both universal and targeted programs aimed at children from families with income falling below 185 percent of the federal poverty level.

	Total Count	Estimated Enrollment, 74% utilization	Total state spending, GA model	Total spending, OK model	Total spending, OK model (state portion only)
Indiana					
Children ages 3-4	169,200	125,208	$469,029,168	$951,205,176	$452,126,088
Children ages 3-4 below 185% FPL	86,292	63,856	$239,204,876	$485,114,640	$230,584,305
Children ages 4	84,600	62,604	$234,514,584	$475,602,588	$226,063,044
Children ages 4 below 185% FPL	43,146	31,928	$119,602,438	$242,557,320	$115,292,152
Marion County					
Children ages 3-4	27,270	20,180	$75,593,531	$153,305,941	$72,869,258
Children ages 3-4 below 185% FPL	16,635	12,310	$46,112,885	$93,518,310	$44,451,049
Children age 4	13,635	10,090	$37,796,765	$76,652,970	$36,434,629
Children age 4 below 185% FPL	8,318	6,155	$23,056,443	$46,759,155	$22,225,524

Another way to reduce estimated program costs is by offering part-day rather than full-day preschool/pre-kindergarten options. The benefits associated with part-day programs are similar to those associated with full-day programs, though part-day programs typically cost about half that of full-day programs. Note, however, that there is limited demand for part-time programs—especially among low-income families in which all parents participate in the workforce. In fact, demand was so scarce for part-day pre-kindergarten programs in Tulsa, Oklahoma that all part-time programs except one have now closed. Therefore, this analysis focuses on costs associated with full-day programs.

Note that not all of the spending on a state-funded early childhood education program should be considered "new" spending. This is because state-funded early childhood programs crowd out spending by families who would have paid for early childhood education even in the absence of a publicly funded program. Cascio and Schanzenbach (2013) conservatively estimate that about 16 percent of families who would have paid for private preschool in the absence of a public option end up switching to public preschool after the implementation of universal pre-kindergarten programs in Georgia and Oklahoma. Thus, state spending on early childhood education may be considered an income transfer to relatively high-income parents because it crowds out spending on private preschool along the intensive margin (i.e., spending that would have occurred in the absence of publicly funded early childhood education). If we account for this income transfer, the total costs of state-funded ECE decrease by an estimated 16 percent.

Estimated Benefits of Early Childhood Education

This study estimates benefits based on high-quality evaluations of early childhood education programs that currently operate at scale in Georgia and Oklahoma. This section provides estimates of both the magnitude of benefits in the short- and long-term. Benefits accrue not only to program participants, but also to government agencies and taxpayers (Barnett, 1996).

Education Benefits

Children attending high-quality preschools experience significant improvements in school readiness and

academic achievement when compared to same-age peers who do not attend preschool. The most rigorous evidence available shows that attending a high-quality preschool leads to improved school readiness, higher student achievement and learning gains, decreased in-grade retention and remediation, a lower likelihood of special education placement, increased high school graduation rates, and increased college enrollment and graduation rates (Heckman et al., 2010). While these benefits primarily accrue to participants, they also represent savings for the state government, which spends tax dollars on student remediation and special education. The analysis in this section estimates that high-quality, state-funded preschool will produce total savings of approximately $67 million in lifetime spending *per cohort* on special education and remediation.

Several evaluations find evidence that each dollar invested in high-quality early childhood education is associated with reductions in spending on remediation, in-grade repetition, and special education. Indiana spends an estimated $640,614,627 annually on special education, remediation, and in-grade retention (estimates are based on data from the 2011-12 academic year, the most recent year for which disaggregated expenditure data were available from the Indiana Office of Management and Budget at the time of this initial report draft). In 2011-12, Indiana spent $11.578 billion on public education, so these costs represent an estimated 5.5 percent of annual school spending.

States realize cost savings if their early childhood education programs are sufficiently high-quality to produce the measurable gains in academic outcomes that lead to reductions in remediation, in-grade repetition, and special education. For example, Aos et al.'s (2004) meta-analysis of 48 early childhood evaluations finds evidence of an average reduction in spending on special education and in-grade retention of $0.04 per dollar invested in early childhood education. In comparison, the Chicago Child-Parent Centers (CPC) program is associated with a reduction in spending on special education and in-grade retention of about $0.73 per dollar invested.

Nationally, an estimated 20 percent of all children have special education needs, and 10 percent of those children have normative disabilities such as blindness, deafness, moderate or profound mental retardation, autism, or significant language impairment that are unlikely to be ameliorated through early childhood education (High, 2008). The remaining 90 percent of children enrolled in special education have non-normative disabilities—that is, disabilities such as speech and language delays, mild mental retardation, learning disabilities, mild hearing loss, and non-cognitive delays or impairments such as socio-emotional or behavioral problems—that may be improved through exposure to high-quality early childhood education. Karoly, Kilburn, and Cannon (2005) and Conyers, Reynolds, and Ou (2003) report that children who participated in the Perry Preschool intervention were 12 percentage points less likely to be classified as special education, and that children in the Abecedarian intervention were 23.2 percentage points less likely to be classified as special education. Note, however, that the Perry and Abecedarian interventions both took place several decades ago, during a time when the criteria for identifying special education students might have been substantially different. Though these estimates may be considered causal impacts of the preschool interventions in reducing the need for special education, large-scale statewide programs are unlikely to provide the benefits afforded in the Perry and Abecedarian programs. A meta-analysis by Aos et al. (2004) estimates a 12 percent reduction in the incidence of disability among children who attended a high quality early childhood education program.

Aos et al. (2004) estimate this reduction by averaging special education impacts across several evaluations of early childhood education programs.

In the 2011-2012 academic year, there were 1,041,602 students enrolled in Indiana public schools. Approximately 16.7 percent of these students—173,693 students in total—received special education services. In fiscal year 2012, the Indiana Department of Education (IDOE) spent $3,111 per special education student, for a total cost of $540,358,923. Note that the percent of children receiving special education services in Indiana is lower than the national average of 20 percent. However, if we assume that the percent of Hoosier special education students with non-normative disabilities is similar to national percentages, an estimated 156,324 students—90 percent of all students receiving special education services—have non-normative disabilities. A 12 percent reduction in the incidence of special education among students with non-normative disabilities would result in 18,759 fewer children receiving special education services, resulting in estimated cost savings of $58,359,249 annually.

Cost savings are even higher when considering the lifetime enrollment of children in special education programs. The Indiana Office of Management and Budget assumes that children are enrolled in special education throughout their school career, which continues until they receive a high school diploma or reach age 22. The only notable exception to this circumstance is among students with speech impairments, who often receive special education services for only a few years. In Indiana, there are approximately 37,168 students receiving special education services for a speech impediment (August 29, 2014, personal email communication). Thus, a 12 percent reduction in the incidence of special education among students with speech impediments would result in 4,460 fewer children receiving special education services for a few years, and 14,299 fewer children with non-normative disabilities unrelated to speech impediments receiving special education services throughout their K-12 school career. If we assume that the distribution of special education students is even across grades, then there are approximately 343 fewer children per cohort in K-12 public education (4,460/13) who would require special education services for speech impediments, and 1,100 fewer children per cohort (14,299/13) who would require special education services for non-normative disabilities unrelated to speech impediments.

Using a 1.25 percent discount rate—the same short-term interest rate earned on municipal bonds issued by the Indiana Bond Bank[25]—and assuming an average two-year enrollment in special education among students with speech impediments, the discounted present value of lifetime cost savings per child among children with speech impediments is $6,260.89. Using the same discount rate and assuming a 13-year enrollment in special education (from grades K through 12) among students with non-normative disabilities unrelated to speech impediments, the discounted present value of lifetime cost savings per child is $43,619.69. If we assume that both enrollment and the incidence of special education in K-12 Indiana public schools remains flat, then investment in high-quality early childhood education in Indiana is expected to result in a total discounted lifetime cost savings of $2,147,485 per cohort ($6,260.89*343) due to reduced spending on special education related to speech impediments, as well as a total

[25] We apply this discount rate to calculate present values because the municipal bond rate is the standard discount rate applied in many benefit-cost analyses of state-funded programs. Future benefits and costs may be discounted into present value terms using the interest rates charged by government entities issuing debt securities.

discounted lifetime cost savings of $47,981,659 per cohort ($43,619.69*1,100) due to reduced spending on special education for non-normative disabilities unrelated to speech impediments. Thus, total lifetime special education cost savings due to investment in high-quality early childhood education is estimated to be $50,129,144 per cohort.

Table 21. Estimated Lifetime Savings from Reduced Special Education Spending by State for Students with Speech Impediments and Non-normative Disabilities

	Lifetime savings per child (DPV)	Cohort size	Lifetime savings per cohort (DPV)
Speech impediment	$ 6,260.89	343	$ 2,147,485
Non-normative disability	$ 43,619.69	1100	$ 47,981,659
		Total	**$ 50,129,144**

Investing in high quality early childhood education also may reduce state spending on remediation and grade repetition. A meta-analysis by Aos et al. (2004) estimates that high quality early childhood education reduces the incidence of remediation and grade repetition by about 18 percent.

In the 2011-12 academic year, IDOE placed 274,256 students in preventive remediation services at a total cost of $7,846,613.21--$28.61 per student—and spent $4,958,910 via the Graduation Qualifying Examination (GQE) Grant fund to remediate students who did not pass the Algebra I and/or English 10 End of Course Assessments, at a cost of $132.68 per student content area. If we assume that investing in early childhood education will reduce preventive remediation spending by 18 percent, and that an equal number of students receive remediation in each grade (for grades K-12), then the estimated total remediation cost savings for a cohort of students is $1,296,160 in present value terms (applying a discount rate of 1.25 percent). Similarly, if we assume that investing in early childhood education will reduce GQE Grant fund remediation spending by 18 percent when students reach 10th grade, then the total estimated cost savings for a cohort of students is $778,598 in present value terms (also applying a discount rate of 1.25 percent).

IDOE also spends a significant amount on in-grade retention. Indiana state law requires that third graders pass the IREAD-3 assessment in order to matriculate into fourth grade. In 2011-12, the first year of IREAD-3 test administration, about 10 percent of Indiana's 77,865 third graders did not pass the IREAD-3. If we assume that each of these students was retained in the third grade for an additional year, Indiana spent an estimated $87,450,181.50 to educate these students for an additional year. That estimate is based on estimated annual per-pupil spending in Indiana of $11,231 in 2011 (source: Federal Education Budget Project, http://febp.newamerica.net/k12/in). Note that this figure provides a rough estimate of the annual cost of in-grade retention; students who do not pass the IREAD-3 initially may retake the test in June following the initial test administration, and it may be the case that not all students who do not pass the IREAD-3 re-enroll in third grade. Thus, the reported figure may not reflect actual third grade retention rates. Further, the reported figure does not reflect information on in-grade

retention in other grades. Unfortunately, we are unable to provide more precise estimates of in-grade retention rates for students in Indiana because IDOE data were not available at the time we originally completed this analysis. If we assume that investing in early childhood education will reduce in-grade retention by 18 percent, then estimated cost savings for in-grade retention in third grade will decrease by $15,741,033 four years after the first cohort receives high quality early childhood education. In present value terms and applying a 1.25 percent discount rate, the total cost savings amounts to $14,977,975 per cohort. Again, this estimate is likely conservative because it does not consider cost savings due to lower in-grade retention in other grades.

Table 22. Estimated Lifetime Savings from Reduced Remediation and In-grade Retention Costs

	Total cost (2011-12)	Remediation and grade repetition reduction rate	Number of remediation years	Lifetime savings per cohort (DPV)
IDOE remediation	$ 7,846,613.21	18%	12	$ 1,296,160.00
GQE Grant fund	$ 4,958,910.00	18%	11	$ 778,598.00
IREAD-3 in-grade retention	$ 87,450,181.50	18%	1	$ 14,977,975.00

One major critique of early childhood education is that the academic benefits fade out quickly and fail to persist in the long run, and so the cost savings to the state are short-lived. Fadeout has been documented in evaluations of the Perry preschool intervention, as well as in evaluations of federally-funded Head Start programs. Cascio and Schanzenbach (2013) examine medium-term academic impacts of the Oklahoma and Georgia universal pre-kindergarten programs and also find evidence of fadeout in math and reading. Specifically, they find little evidence that relatively high-income students who attended preschool show persistent academic gains past the fourth grade. They find some evidence of persistent academic gains among low-income children who attended preschool, though these effects fade significantly by eighth grade to about six percent of a standard deviation. It is important to note here that the academic benefits we list in this section relate mostly to cost savings realized in the short-term following pre-kindergarten. Therefore, our estimated benefits should be relatively unaffected by subsequent fadeout.

Socioeconomic Benefits

Several evaluations find that attending a high-quality preschool leads to improved school readiness, higher student achievement and learning gains, decreased in-grade retention and remediation, a lower likelihood of special education placement, increased high school graduation rates, and increased college enrollment and graduation rates (Heckman et al., 2010). As documented in the prior section, these positive student outcomes reduce spending on remediation, in-grade retention, and special education. In addition, positive effects on school readiness, student achievement and learning gains, high school graduation rates, and college enrollment and graduation and permanent increases in non-cognitive skills result in positive labor market outcomes: children who attend high-quality preschool are more likely to

be employed and earn more than their peers who did not attend preschool. Yet while several studies document the long-term positive effects of small-scale demonstration studies on labor market outcomes, few studies document the long-term positive effects of universal pre-k programs on labor market outcomes.

Because the first universal pre-k programs began in the mid-1990s, children who benefited from those programs are not yet old enough to document earnings throughout early adulthood. Instead, we must rely on projected future earnings to estimate the return on investment associated with early childhood education. Though no such projections exist for children attending state-funded preschool in Georgia, Bartik, Gormley, and Adelstein (2011) estimated earnings benefits associated with attending Tulsa's state-funded pre-kindergarten program. Bartik et al. (2011) use the estimated positive effects of pre-kindergarten on kindergarten test scores to project future earnings among program participants. They estimate an average lifetime earning benefit of $3.09 per dollar invested among low-income participants who qualify for free lunch, and an average lifetime earning benefit of $2.79 per dollar invested among relatively high-income participants.

Parental Labor Force Participation Benefits

Evaluations of early childhood education programs often examine increased labor force participation and earnings benefits that may accrue to mothers of children participating in early childhood education and to the beneficiaries themselves. Private labor and employment benefits also increase tax revenue—a benefit to the state—and reduce state spending on social safety net programs including unemployment insurance, Temporary Assistance for Needy Families (TANF), the Supplemental Nutrition Assistance Program (SNAP), and Medicaid.

We first examine the effects of early childhood education provision on maternal labor force participation and earnings. Campbell et al. (2002) examine the effects of the Abecedarian program on maternal labor market outcomes and report that, among mothers whose children participated in the program, every dollar invested in program costs was associated with an increase in income tax revenues of $0.44. This effect likely represents an upper bound on the effects of early childhood education on maternal labor force participation, because the Abecedarian intervention took place during the 1970s, a time during which women had fewer labor market opportunities and average maternal labor force participation rates were substantially lower.

More recent research examines whether state-funded preschool programs operating at scale in other states improve maternal labor force participation. Fitzpatrick (2010) finds no evidence that state-funded, universal early childhood programs improved maternal labor force participation among mothers of four-year-olds in Georgia or Oklahoma, despite providing a 100 percent subsidy. Cascio and Schanzenbach (2013) also examine the effects of Georgia and Oklahoma's universal pre-kindergarten programs on maternal labor force participation. They similarly find no compelling evidence that even fully-subsidized, full-time preschool programs increase maternal labor force participation. Specifically, they state: "We find some evidence of an increase in the probability that less educated mothers are working when their children are 4 years old. However, the effect appears to be confined to the first few years after the program is in place, and estimates are relatively sensitive to changes in the specification" (Cascio and

Schanzenbach, 2013, p. 4). Given these findings, there is little empirical evidence to support the argument that increased spending on early childhood education will increase maternal labor force participation and earnings. Moreover, there is no empirical evidence to suggest that expanding access to early childhood education in Indiana will yield immediate and short-term economic benefits to the state in the form of increased tax revenues or savings on social safety net programs.

Crime Reduction Benefits

Several early childhood education evaluations find that attending a high-quality preschool reduces the likelihood that participants will commit crimes later in life. For example, Heckman et al. (2010) find that in addition to decreasing incarceration time, the High/Scope Perry Preschool program decreased victimization costs, particularly for homicide and theft. State and local governments also benefit from reduced spending on law enforcement and corrections. Unfortunately, no current studies examine the effects of the Oklahoma or Georgia state preschool programs on crime reductions. However, a recent meta-analysis by Aos et al. (2004) examines 58 early childhood education programs nationally. They find that cost savings due to reductions in crime range from $0 to $11.30 per dollar invested in early childhood education, with an average cost savings of 69 cents per dollar invested.

Unmeasured Benefits

Not all benefits can be quantified and measured for children attending preschool. Estimated benefits/cost savings presented in this study are expected to be conservative due to the inability to assign monetary values to all benefits associated with publicly funded early childhood education programs. Some of these unmeasured benefits include improved parenting practices—as measured by increased time spent among less-educated mothers on reading, playing, art, and talking with their children (Cascio & Schanzenbach, 2013), as well as improved behavioral outcomes, increased civic engagement, and overall improved quality of life (Barnett & Masse, 2007).

Estimated Benefit-Cost Ratios Associated with Investing in Early Childhood Education

The estimated benefit-cost ratio associated with investing in early childhood education depends on estimated program costs, benefits, and estimated utilization rates. In summary, estimated state spending on early childhood programs resembling those operating at scale in Georgia and Oklahoma range from $3,600 to $4,000. If Indiana provided universal preschool to all four-year old children at a utilization rate of 74 percent (the current utilization rate in Oklahoma), the state could reasonably expect to save approximately $48.7 million in lifetime savings per cohort on special education, remediation, and in-grade retention. In addition, the state could expect to save approximately 69 cents per dollar invested due to crime reduction. Low-income program participants could anticipate an average lifetime earning benefit of $3.09 per dollar invested, while relatively high-income program participants could anticipate an average lifetime earning benefit of about $2.79 per dollar invested. Calculating the ratio of these estimated benefits to estimated program costs yields a positive estimated benefit-cost ratio ranging from $3.83 to $3.84. If we assume a lower utilization rate of 59 percent—the current utilization rate in Georgia—the state could reasonably expect to save about $38.8 million in lifetime savings per cohort on special education, remediation, and in-grade retention. In that case, the

ratio of estimated benefits to estimated program costs yields a positive estimated benefit-cost ratio ranging from $3.84 to $3.85.

More targeted interventions aimed at low-income program participants produce a higher benefit-cost ratio. If Indiana provided preschool to all four-year old children whose family incomes fall below the 185 percent federal poverty level—and anticipating a utilization rate of 74 percent (the current utilization rate in Oklahoma)—the state could reasonably expect to save approximately $25 million in lifetime savings per cohort on special education, remediation, and in-grade retention. In addition, the state could expect to save approximately 69 cents per dollar invested due to crime reduction. Low-income program participants could anticipate an average lifetime earning benefit of $3.09 per dollar invested. Calculating the ratio of these estimated benefits to estimated program costs yields a slightly higher estimated benefit-cost ratio due to the higher returns to lifetime earnings among low-income program participants. The estimated benefit-cost ratio ranges from $3.99 to $4.00.[26] If we assume a lower utilization rate of 59 percent—the current utilization rate in Georgia—the state could reasonably expect to save about $19.8 million in lifetime savings per cohort on special education, remediation, and in-grade retention. In that case, the ratio of estimated benefits to estimated program costs also yields a positive estimated benefit-cost ratio ranging from $3.99 to $4.00.

Finally, state-funded early childhood education programs expand an important industry in the Hoosier economy, contribute to human capital formation, and generally lead to improved wages and a larger tax base. The current analysis does not capture these general economic benefits, which also should be considered when expanding the state role in providing pre-kindergarten.

[26] A recent benefit-cost analysis performed on behalf of the Washington State Legislature estimates a benefit-cost ratio of $4.20 for early childhood education programs targeting low-income programs (Kay & Pennucci, 2014). This estimate aligns well with the estimate provided in the Indiana context.

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