

# **Economic Analysis of the Warren County Imagination Library**

**December 15, 2021**

*Final Report*

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## Executive Summary

The Warren County Imagination Library (WCIL) is a book distribution program operated in partnership with the Ohio Governor’s Imagination Library and the Dolly Parton Imagination Library. All Warren County children under the age of five are eligible to enroll in and receive a free, age-appropriate children’s book once per month.

This report illustrates the lifetime economic impact that the Warren County Imagination Library provides to its participants and the Warren County community. The report summarizes existing literature regarding the effects of shared reading and other Imagination Library programs in the United States and estimates potential benefits accruing to WCIL participants over their lifetimes.

During the early childhood period, when children are between the ages of zero and five, shared reading between parents and children is particularly important for vocabulary exposure as it has the most linguistic complexity of any shared activity between parent and child. Parents with children enrolled in the Imagination Library report significant increases in time spent reading together.<sup>1</sup> Further, multiple studies have found that participation in the Imagination Library is associated with significant improvement on kindergarten reading scores.<sup>2</sup> Additional research has found that differences in participation persist until at least third grade.<sup>3</sup>

As of May 2021, the Warren County Imagination Library had 6,395 active enrollees, representing 48.7 percent of eligible children in Warren County.<sup>4</sup> The Economics Center estimated the lifetime impacts conferred by the Warren County Imagination Library to the current cohort of enrolled children.

At baseline, 3,274 of the 6,395 enrollees (51.2 percent) would display the core skills and behaviors necessary for kindergarten instruction by performing as Demonstrating Readiness on the State of Ohio’s Kindergarten Readiness Assessment (KRA).<sup>5</sup> However, by participating in the WCIL, the Economics Center estimates that 4,339 students will achieve Demonstrating Readiness on the KRA, an increase of 1,065 students.<sup>6</sup>

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<sup>1</sup> (Bondt, Willenberg, & Bus, 2020; Funge, Sullivan, & Tarter, 2017; Gordon, 2010; Harvey, 2016; Ridzi, Sylvia, & Singh, 2014; Samiei, Bush, Sell, & Imig, 2016; Skibbe & Foster, 2019; Waldron, 2018)

<sup>2</sup> (Beckett, 2013; Ridzi, Sylvia, Qiao, & Craig, 2017; Ridzi, Sylvia, & Singh, 2014; Samiei, Bush, Sell, & Imig, 2016; Waldron, 2018)

<sup>3</sup> (Beckett, 2012; Sell, 2015)

<sup>4</sup> Source: Warren County Foundation and Emsi

<sup>5</sup> (Ohio Department of Education, 2020)

<sup>6</sup> (Ridzi, Sylvia, Qiao, & Craig, 2017)

**Table 1: Performance on the Kindergarten Readiness Assessment**

<b>Treatment</b>	<b>Demonstrating Readiness</b>	<b>Approaching Readiness</b>	<b>Emerging Readiness</b>
Baseline	3,274	2,044	1,078
Imagination Library	4,339	1,346	710
<b>Change from Baseline</b>	<b>1,065</b>	<b>(698)</b>	<b>(368)</b>

*Source: Economics Center analysis using data from the Ohio Department of Education and Ridzi et al., 2017.*

Kindergarten readiness is a significant predictor of third grade reading.<sup>7</sup> Third grade reading, in turn, represents an important milestone for students, as students advance from learning to read and instead read to learn. At baseline, 3,741 of the 6,395 enrollees (58.5 percent) are estimated to pass the Grade 3 English Language Arts (ELA) test in the fall of third grade. With participation in the WCIL, however, the Economics Center estimates that 4,145 students will pass the assessment in the fall of third grade, an increase of 404 students.

**Table 2: Performance on Grade 3 ELA Assessment**

<b>Treatment</b>	<b>Pass Exam</b>	<b>Fail Exam</b>
Baseline	3,741	2,654
Imagination Library	4,145	2,250
<b>Change from Baseline</b>	<b>404</b>	<b>(404)</b>

*Source: Economics Center analysis using data from the Ohio Department of Education, Ridzi et al., 2017, and Justice, Koury, & Logan, 2019.*

Children who are not reading at grade level by third grade are four times more likely to drop out of high school.<sup>8</sup> By increasing the number of children reading at grade level by the fall of third grade, the Economics Center estimates that due to participation in the Imagination Library, an additional 48 children from the current WCIL cohort will graduate high school, who otherwise would not have graduated. Annually, this translates to an additional 9.6 students graduating high school, increasing Warren County's graduation rate from 96.5 percent to 96.9 percent.<sup>9</sup> Of the 48 additional students graduating high school, the Economics Center estimates that these individuals will ultimately attain the following levels of education:

- 14 students will receive a high school diploma,
- 11 students will receive some college or an associate's degree,
- 14 students will receive a bachelor's degree, and
- 9 students will receive a graduate or professional degree.<sup>10</sup>

<sup>7</sup> (Justice, Koury, & Logan, 2019)

<sup>8</sup> (Hernandez, 2011)

<sup>9</sup> (Ohio Department of Education, 2020)

<sup>10</sup> (U.S. Census Bureau, 2019)

At baseline, the Economics Center estimates, due to labor force participation and unemployment rates (by educational attainment) for Warren County, that 27 of the 48 children who would not have graduated high school without the WCIL will become employed regardless of treatment through WCIL. However, given the expected increase in educational attainment, 38 of the 48 children are expected to become employed as a result of participation in the WCIL, a 40.7 percent increase.<sup>11</sup>

Further, at baseline, the Economics Center estimates that the 48 children who would not have graduated high school without the WCIL would have earned a total \$896,411 in annual income. However, given the expected increase in educational attainment and therefore increased productivity, the 48 children are estimated to earn a total \$2,310,653 in annual income, a 157.8 percent increase.<sup>12</sup>

As graduates of the WCIL will pay taxes on and spend their increased wages, local and state governments benefit through income and sales tax collections. Annually, the increased wages earned by the participants that will now graduate due to the WCIL are expected to support an additional:

- \$40,282 in income tax revenue for the State of Ohio,
- \$17,112 in income tax revenue for local municipalities,
- \$14,543 in sales tax revenue for Ohio, Kentucky, and Indiana state governments, and
- \$3,701 in sales tax revenue for local counties.

The increased income earned by the 48 participants who would not have graduated high school without the WCIL is estimated to generate an additional \$77,758 in income and sales tax revenue, a 191.5 percent increase. These individuals are also estimated to spend an additional \$433,520 annually on retail industry purchases within the Cincinnati Metropolitan Statistical Area, or MSA, supporting the employment of 6.8 individuals with earnings of \$275,193.<sup>13</sup>

Additionally, as individuals with at least some college education are less likely to enroll in Medicaid, participation in the Warren County Imagination Library is estimated to result in 2 fewer individuals enrolling in Medicaid.<sup>14</sup> This reduction in enrollment translates to \$12,621 in annual Medicaid expenditure savings for the State of Ohio.<sup>15</sup>

Finally, increased educational attainment reduces the likelihood of involvement with the criminal justice system.<sup>16</sup> Having 48 additional high school graduates is estimated to yield

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<sup>11</sup> (U.S. Census Bureau, 2020)

<sup>12</sup> (U.S. Census Bureau, 2019)

<sup>13</sup> The Cincinnati Metropolitan Statistical Area consists of 15 counties in the States of Ohio, Kentucky, and Indiana. In Ohio, the included counties are Brown, Butler, Clermont, Hamilton, and Warren. In Indiana, the MSA includes the counties of Ohio, Dearborn, and Franklin. In Kentucky, the included counties are Boone, Bracken, Campbell, Gallatin, Grant, Kenton, and Pendleton.

<sup>14</sup> (Ohio Medicaid Assessment Survey, 2021)

<sup>15</sup> (Centers for Medicare & Medicaid Services, 2019)

<sup>16</sup> (Schweinhart, 2007)

\$519,250 in lifetime savings associated with reduced involvement with the criminal justice system.

In total, these benefits sum to \$1,938,741 in annual economic impact.<sup>17</sup> Compared with the total \$498,810 cost assumed by the Warren County Foundation to sustain the 6,395 active enrollees for five years, every \$1.00 spent by the WCIL yields an additional \$2.89 in net annual economic benefits, or \$3.89 in total each year.

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<sup>17</sup> Lifetime criminal justice savings have been annualized over a 40-year period.

## Introduction

The Warren County Imagination Library (WCIL) provides free age-appropriate books monthly to young children with the aim of improving children’s reading capabilities. To be eligible for the program, families must reside in Warren County and have a child under the age of five. By the time a child “graduates,” or turns five, s/he will have had the opportunity to receive sixty books from the Warren County Imagination Library. The WCIL operates in partnership with the Dolly Parton Imagination Library (DPIL) and the Ohio Governor’s Imagination Library (OGIL). The DPIL is an international program that began more than 25 years ago and has since provided 163 million books to children.<sup>18</sup> The Ohio Governor’s Imagination Library program was established in 2019 and provides matching funds to community partners in Ohio’s 88 counties.<sup>19</sup>

This report illustrates the lifetime economic impact that the Warren County Imagination Library provides to its participants and the surrounding community. The report summarizes existing literature regarding the effects of shared reading and other Imagination Library programs in the United States and estimates potential lifetime benefits accruing to WCIL participants.

## Methodology

The Economics Center estimated the lifetime economic impact that will be generated as a result of the Warren County Imagination Library. Estimated benefits were calculated using data from the Warren County Foundation and a literature review regarding early reading and the Imagination Library program. The Warren County Foundation provided the Economics Center with 2021 enrollment in the Warren County Imagination Library as of June 2021. From this, the Economics Center estimated the economic impact generated as a result of the current 6,395 active enrollees in the WCIL. This report presents all monetary values in 2020 dollars.

The literature collected emphasized the impacts of shared reading between parents and children, kindergarten readiness as a result of the Imagination Library, the association between kindergarten readiness and third grade reading, and longitudinal outcomes as a result of third grade reading. Based upon findings from the literature review, the Economics Center applied a 34.1 percent projected increase in kindergarten readiness to current rates of kindergarten readiness in Warren County.<sup>20</sup> The State of Ohio’s Kindergarten Readiness Assessment classifies students into one of three categories of readiness: Demonstrating Readiness, Approaching Readiness, and Emerging Readiness. Children categorized as Demonstrating Readiness display the core skills and behaviors necessary for kindergarten instruction. Children who are Approaching Readiness display some core skills and behaviors necessary for instruction and need some support to be able to engage in the classroom. Children who are categorized as Emerging Readiness display minimal core skills and behaviors necessary for instruction and need significant support to be able to engage in the classroom.<sup>21</sup> The projected increase in kindergarten readiness was therefore understood as

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<sup>18</sup> (Dolly Parton's Imagination Library, 2021)

<sup>19</sup> (Ohio Governor's Imagination Library, 2021)

<sup>20</sup> (Ridzi, Sylvia, Qiao, & Craig, 2017)

<sup>21</sup> (Ohio Department of Education, 2019)

children advancing from the Approaching Readiness and Emerging Readiness categories to Demonstrating Readiness.

The Economics Center additionally estimated the Warren County Imagination Library's impacts on third grade reading based on findings from the literature review, which correlated students' performance on the Kindergarten Readiness Assessment with third grade fall reading scores passing promotion level.<sup>22</sup> The literature review was further utilized to estimate the effect of third grade reading on high school graduation.<sup>23</sup>

Given the increase in high school graduates, the Economics Center estimated further educational attainment by applying the current rate of educational attainment in Warren County to the 48 estimated additional high school graduates.<sup>24</sup> Employment rates relative to educational attainment were then estimated using national data.<sup>25</sup> Expected earnings were calculated using median wages in Warren County by educational attainment and excluding unemployed individuals.<sup>26</sup>

For fiscal impact calculations, the Economics Center gathered income and sales tax rate data from the appropriate state and local tax departments. Tax rates were applied to employee earnings and taxable purchases to calculate tax revenues accruing to local and state entities. Employees were assumed to reside within the State of Ohio; therefore, estimated state income tax revenue was estimated by applying earnings to the appropriate Ohio state income tax rate.<sup>27</sup> A weighted local tax rate, based upon local tax rates and distribution of employment, was applied to calculate local income tax revenues for employees. To calculate sales tax impact revenues, earnings were first adjusted downwards to account for percent of income spent towards expenditures, spending subject to sales tax, and spending occurring within the region before being applied to a weighted state sales tax rate and a weighted local sales tax rate.

The Economics Center also estimated the economic impact of crime savings over individuals' lifetimes given the expected increase in educational attainment based on findings from the literature review.<sup>28</sup> For the purposes of a cost-benefit analysis, lifetime crime savings were estimated over a 40-year period.

Medicaid savings for the State of Ohio were estimated using Ohio Medicaid enrollment rates by educational attainment, Medicaid enrollment in Warren County as compared to the State of Ohio, and per capita Medicaid expenditures for the State of Ohio.<sup>29</sup> The Economics Center further examined potential impacts related to cash public assistance and Supplemental

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<sup>22</sup> (Justice, Koury, & Logan, 2019)

<sup>23</sup> (Hernandez, 2011)

<sup>24</sup> (U.S. Census Bureau, 2019)

<sup>25</sup> (U.S. Census Bureau, 2020)

<sup>26</sup> (U.S. Census Bureau, 2019)

<sup>27</sup> The State of Ohio assesses income tax based on a taxpayer's earnings bracket. Taxpayers in higher-earning brackets pay a higher rate. Individual income tax rates are provided by the Ohio Department of Taxation:

[https://www.tax.ohio.gov/ohio\\_individual/individual/annual\\_tax\\_rates.aspx](https://www.tax.ohio.gov/ohio_individual/individual/annual_tax_rates.aspx).

<sup>28</sup> (Schweinhart, 2007)

<sup>29</sup> (Ohio Medicaid Assessment Survey, 2021; U.S. Census Bureau, 2019; Centers for Medicare & Medicaid Services, 2019)



Nutrition Assistance Program benefits, but ultimately chose to not include an estimation of such impacts due to the relatively low utilization of these public assistance programs in Warren County.<sup>30,31</sup>

## **Dolly Parton Imagination Library**

The Dolly Parton Imagination Library (DPIL) was launched in 1995 in Sevier County, Tennessee with the aim of inspiring children's interest in reading by providing free books monthly to children aged zero to five. Since its founding, the DPIL has provided more than 163 million books to nearly 1.9 million children across the United States, United Kingdom, Canada, Australia, and Republic of Ireland.<sup>32</sup> Book selection in the United States is guided by a selected panel of early childhood literacy experts who select high quality, age-appropriate books for participants. By the time a child "graduates" from the DPIL, or turns five, s/he will have had the opportunity to receive sixty books from the Imagination Library. The DPIL has no eligibility requirement other than age of the child. Therefore, families of all income levels are eligible to participate and receive age-appropriate books at no cost to the participants. Additionally, multiple children from the same family may participate, meaning families enrolling more than one child in the DPIL have the opportunity to receive more than sixty books from the Dolly Parton Imagination Library.

The DPIL works with established community partners to bring the Imagination Library to local communities. The Dolly Parton Imagination Library provides partners with a Book Order System (BOS) database and coordinates book selection as well as order fulfillment for its partners. The DPIL assumes overhead and administrative expenses, while the community partner assumes \$2.10 per child per month towards the wholesale price of books and mailing, or \$25.20 annually.<sup>33</sup> If a regional partner were to assume the full retail cost of books in addition to mailing and administrative costs, the program is estimated to cost \$18.35 per child per month.<sup>34</sup> Because of its low staffing needs, DPIL costs are much lower than other children's literacy programs such as Reach Out and Read.<sup>35</sup>

The Dolly Parton Imagination Library first appeared in Ohio in 2005 in the counties of Williams and Putnam. The program became established statewide in July 2019, when the Ohio Legislature allocated \$5.0 million to establish the Ohio Governor's Imagination Library (OGIL) and provide matching funds to community partners. Imagination Library partnerships and funding have since been established in all 88 Ohio counties. As of June 2021, 286,751 Ohio children were enrolled in the Ohio Governor's Imagination Library, representing 41.8 percent of eligible children in Ohio.<sup>36,37</sup>

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<sup>30</sup> (U.S. Census Bureau, 2019)

<sup>31</sup> In 2019, 0.8 percent and 3.7 percent of Warren County households received cash public assistance and Supplemental Nutrition Assistance Program benefits, respectively. In comparison, 2.4 percent and 12.0 percent of Ohio households received cash public assistance and Supplemental Nutrition Assistance Program benefits in 2019, respectively.

<sup>32</sup> (Dolly Parton's Imagination Library, 2021)

<sup>33</sup> Ibid.

<sup>34</sup> (Ohio Governor's Imagination Library, 2021)

<sup>35</sup> (Skibbe & Foster, 2019)

<sup>36</sup> (Ohio Governor's Imagination Library, 2021)

<sup>37</sup> (U.S. Census Bureau, 2019)

The Warren County Imagination Library (WCIL) was established in February 2020 in partnership with the Ohio Governor’s Imagination Library and the Dolly Parton Imagination Library. The five libraries located in Warren County have pledged to fund the WCIL for the first three years, with Warren County Foundation as the fiscal agent. The current locally assumed monthly funding cost per child is \$1.30 per child, which includes administrative overhead. This locally assumed cost represents approximately 25 percent of the total program cost, with the remaining cost assumed by the OGIL and DPIL. In June 2021, 6,395 children were enrolled in the WCIL, representing 48.7 percent of eligible children in Warren County.<sup>38</sup> Ultimately, the WCIL aims to enroll between 60.0 and 70.0 percent of eligible children, or between 7,876 and 9,188 children currently living in Warren County.

## Literature Review

The Economics Center estimated potential benefits that the Warren County Imagination Library confers to participants utilizing existing literature regarding the importance of shared reading and measured impacts of various community programs operated in partnership with the Dolly Parton Imagination Library. Additionally, the Economics Center estimated extended benefits across participants’ lifetimes by examining potential longitudinal impacts of WCIL programming. Analyses of the impact of shared reading and Imagination Library programs consistently find significant positive effects on children’s language acquisition and reading abilities, which aid in kindergarten readiness. Preparing children for kindergarten and beyond ultimately improves individuals’ educational attainment, in turn increasing individuals’ rates of employment, annual earnings, and tax revenue and decreasing Medicaid enrollment rates and involvement with the criminal justice system.

### Benefits of Shared Reading

Early childhood experiences, when children are under the age of five, serve as a particularly important foundation for children. As toddlers, children form more than 1 million neural connections per second, which allows significant capacity for changes in the brain’s development. As children age, the brain begins to specialize by reducing these neural connections through pruning.<sup>39</sup> When young children acquire skills at an early age, these skills build upon each other to create a foundation for future capabilities. Because of this early capability for change, of interventions aimed at disparate age groups, interventions targeted towards children under the age of five have been shown to yield the greatest return on investment.<sup>40</sup>

In the early childhood period, shared reading between parents and children is particularly important for children’s development, as it represents the shared activity with the most linguistic complexity in terms of vocabulary diversity and syntactic complexity.<sup>41</sup> Reading provides an important opportunity for children’s learning, as reading aloud to children enables them to experience decontextualized language, allowing them to understand ideas divorced from an immediate environmental context. The idea of decontextualized language

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<sup>38</sup> Source: Warren County Foundation and Emsi

<sup>39</sup> (Center on the Developing Child, 2007)

<sup>40</sup> (Heckman, 2008)

<sup>41</sup> (Demir-Lira, Applebaum, Goldin-Meadow, & Levine, 2019)

is particularly important in preparing children for school, where children learn to think and reason in disembedded contexts.<sup>42</sup> Even after controlling for language outside of shared book reading, family socioeconomic status, and children's early language skill, shared book reading is significantly predictive of children's elementary school language and literacy outcomes, including elementary school receptive vocabulary, reading comprehension, and internal motivation to read.<sup>43</sup>

Children's books are lexical reservoirs as they contain more rare and sophisticated language than children would otherwise encounter in spoken conversation as they contain 50 percent more rare words than conversations in prime-time television or between college students.<sup>44</sup> In concert with the vocabulary present in books themselves, parents tend to use more complex language when speaking with their children about the book being read.<sup>45</sup>

Disparities in the frequency with which caregivers read to children can quickly yield enormous inequality in exposure to vocabulary at an early age. One study examining vocabulary in popular children's books found that regularly reading five books a day to children exposes them to 1.5 million more words by kindergarten entry than if caregivers rarely read to their children. Even a single-year intervention at age 4 in which parents read aloud daily to children would expose children to 75,000 more words than they would otherwise encounter by kindergarten.<sup>46</sup>

Dialogic reading occurs when parents involve children in shared book reading, and such reading is particularly effective in promoting children's language development. Even without a conscious effort, parents reading aloud to children often naturally promote awareness of sound patterns by emphasizing patterns or rhymes as well as stressing initial sounds in words. In turn, such actions assist children in recognizing patterns, rhyming words, and initial phonemes, allowing children to learn to read more quickly.<sup>47</sup>

Reading is further associated with improved attention spans in children. Promotion of shared reading and related play has been shown to significantly reduce attention difficulties, aggression, and hyperactivity. Further, encouragement of these behaviors at an early age, when children are between the ages of zero and three, leads to significant changes in children's behaviors that persist at least until a child reaches school age.<sup>48</sup>

Students from low-income families, in particular, are most likely to benefit from reading interventions, as these students tend to have more limited access to reading materials than other children and enter school already behind students from middle- and upper-income families. These early differences magnify over time and become reciprocal as better-read children outperform their peers and continue to read more books.<sup>49</sup>

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<sup>42</sup> (Beck & McKeown, 2001)

<sup>43</sup> (Demir-Lira, Applebaum, Goldin-Meadow, & Levine, 2019)

<sup>44</sup> (Hayes & Ahrens, 1988)

<sup>45</sup> (Duursma, Augustyn, & Zuckerman, 2008)

<sup>46</sup> (Logan, Justice, Yumus, & Chaparro-Moreno, 2019)

<sup>47</sup> (Duursma, Augustyn, & Zuckerman, 2008)

<sup>48</sup> (Mendelsohn et al., 2018)

<sup>49</sup> (Bridges, 2013)

## Imagination Library Impacts

A variety of studies examining the effect of the Dolly Parton Imagination Library programs in various locales within the United States confirm that the DPIL is associated with increased frequency of shared reading, high levels of parent satisfaction, and improved reading outcomes at kindergarten and beyond.

By providing children with high quality, age-appropriate books on a regular basis and cuing the importance of reading to children, research regarding Imagination Library programs consistently find an increase in parents' reported frequency of shared reading. One survey of 93 parents in rural New Mexico found that the proportion of families who engaged in shared reading daily rose from 46 percent to 78 percent, while the proportion of families who seldom read to their children decreased from 9.3 percent to zero percent.<sup>50</sup> In Syracuse, a survey of 170 families found that participation in the Imagination Library for five or more months doubled the rate of daily shared reading, from 29.0 percent of families to 59.3 percent. This positive association remained significant even after controlling for age, race, gender, income, age of child, and parental education. Additionally, there was a positive significant correlation between participation in the Imagination Library for five or more months and the use of dialogic reading practices in shared reading.<sup>51</sup> A third Imagination Library program in Middletown, Ohio found that 81.8 percent of parents reported reading more to children after enrolling in the program and 75.3 percent of parents reported reading to their child one or multiple times per day. No parent of a DPIL participant indicated reading to their children once a week or less. Changes in reading frequency were most prominent in low-income households.<sup>52</sup> Several additional studies confirm a general increase in frequency of shared reading following enrollment in the Dolly Parton Imagination Library.<sup>53</sup>

Surveys of DPIL participants' parents have regularly found high levels of satisfaction with the program.<sup>54</sup> In Middletown, Ohio, 100.0 percent of parents indicated that they were satisfied with the program, with 94.4 percent reporting being "very satisfied." Parents have also indicated that participation in the DPIL has increased the frequency with which their children ask to engage in shared reading.<sup>55</sup> Parent surveys also highlight the DPIL's positive effect on children's excitement and enthusiasm about books, reported vocabulary and listening skills of enrollees, and likelihood to visit the public library.<sup>56</sup> Further, parents have expressed that they rely on the DPIL for their children's library, as 93.0 percent of parents in one Midwestern program indicated that the DPIL is one of the primary places they receive books.<sup>57</sup> In Middletown, Ohio, the average home of DPIL participants surveyed reported having approximately 100 books, of which 19 were from the Imagination Library.<sup>58</sup>

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<sup>50</sup> (Harvey, 2016)

<sup>51</sup> (Ridzi, Sylvia, & Singh, 2014).

<sup>52</sup> (Gordon, 2010)

<sup>53</sup> (Bondt, Willenberg, & Bus, 2020; Funge, Sullivan, & Tarter, 2017; Samiei, Bush, Sell, & Imig, 2016; Skibbe & Foster, 2019; Waldron, 2018).

<sup>54</sup> (Funge, Sullivan, & Tarter, 2017; Gordon, 2010)

<sup>55</sup> (Gordon, 2010; Harvey, 2016)

<sup>56</sup> (Funge, Sullivan, & Tarter, 2017; Gordon, 2010; Harvey, 2016)

<sup>57</sup> (Skibbe & Foster, 2019)

<sup>58</sup> (Gordon, 2010)

Research concerning the Dolly Parton Imagination Library additionally indicates that participation is significantly associated with improved reading outcomes in kindergarten. A meta-analysis of 15 studies regarding DPIL programs found that participation had a significant positive effect on children's literacy-related behavior and skills, including children's interest in shared book reading, vocabulary, literacy skills, and school results. These effects were generally greater when the participants were primarily from families of low socioeconomic status.<sup>59</sup> Moreover, a study of all kindergarten enrollees in one county in a Midwestern state over a three-year period found that Imagination Library participation was associated with a significant positive increase on Phonological Awareness Literacy Screening-Kindergarten (PALS-K) scores. Even after controlling for gender, ethnicity, free lunch status, preschool experience, and enrollment in developmental kindergarten and special education, children who had participated in the Imagination Library performed better on the PALS-K overall, including on rhyme awareness, letter knowledge, letter-sound knowledge, and beginner sound awareness. The only PALS-K section in which participants did not differ in scores was spelling. Further, children who participated longer in the Imagination Library had higher scores than those who only participated in the Library for one year or less, even after introducing controls. Each additional year of enrollment was associated with a 1.2 score increase on the PALS-K composite, in which children can score a maximum 92 points.<sup>60</sup> Another DPIL study of kindergarteners in northwestern Pennsylvania found that Imagination Library participants performed better on Clay's Letter Identification Task as well as on composite variables of early literacy skills and strategies after controlling for gender and pre-kindergarten experience.<sup>61</sup> In Middletown Ohio, students who indicated participating in the Imagination Library performed marginally better than non-DPIL students on the Kindergarten Readiness Assessment.<sup>62</sup> Additional studies have confirmed that Imagination Library participation is associated with a significant improvement on participants' kindergarten reading scores.<sup>63</sup> Further research has indicated that the benefits conferred by the Imagination Library do not cease at kindergarten, as some studies have shown that benefits received persist until at least third grade.<sup>64</sup>

In addition to increased frequency of shared reading, high levels of parent satisfaction, and improved reading outcomes, Imagination Library literature has indicated there may be more benefits conferred by the DPIL that have yet to be quantified. For example, participation in the Imagination Library may yield spillover effects to slightly older siblings. If receiving DPIL books affects parent behavior by increasing the frequency of family reading, then parents of older siblings may also read more often with sibling non-participants. Older siblings may also benefit from reading DPIL books themselves or reading DPIL books to their younger siblings. Further, parents learning English as a new language could benefit in English language acquisition from reading to their children.<sup>65</sup>

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<sup>59</sup> (Bondt, Willenberg, & Bus, 2020)

<sup>60</sup> (Skibbe & Foster, 2019)

<sup>61</sup> (Waldron, 2018)

<sup>62</sup> (Gordon, 2010)

<sup>63</sup> (Beckett, 2013; Ridzi, Sylvia, Qiao, & Craig, 2017; Ridzi, Sylvia, & Singh, 2014; Samiei, Bush, Sell, & Imig, 2016; Waldron, 2018).

<sup>64</sup> (Beckett, 2013; Sell, 2015)

<sup>65</sup> (Ridzi, Sylvia, Qiao, & Craig, 2017; Neyer, Szumlas, & Vaughn, 2021)

## Longitudinal Impacts

Third grade reading represents a significant milestone in a child's development, as children at this point progress from learning to read to reading to learn. As such, third grade reading performance is a significant predictor of high school graduation.<sup>66</sup> In turn, high school graduation is linked to a variety of lifetime outcomes for individuals, including attainment of advanced education, annual earnings, employment status, and utilization of public assistance.<sup>67</sup> Furthermore, increased educational attainment is also associated with lower Medicaid enrollment rates and decreased involvement with the criminal justice system.<sup>68</sup>

## Estimated Benefits

The Economics Center utilized existing literature regarding the benefits of shared reading and Imagination Library programs to estimate lifetime benefits conferred by the Warren County Imagination Library to participants. Estimated benefits were calculated for the 6,395 enrollees who were active in the WCIL as of June 2021. From existing literature, the Economics Center estimated potential program benefits regarding kindergarten readiness, third grade reading, educational attainment, employment status, annual earnings, tax revenue, Medicaid enrollment, and involvement with the criminal justice system.

## Kindergarten Readiness

Several studies have confirmed that by enrolling in the Imagination Library, participants improve their readiness for kindergarten.<sup>69</sup> In order to estimate the effect of the WCIL on participants' kindergarten readiness, the Economics Center utilized a recent study examining 2,731 incoming kindergartners in the Syracuse City School District which assessed the effect of the Imagination Library program on the number of children ready for kindergarten. After controlling for race, gender, ESL status, special education status, and receipt of free- and reduced-lunch, the study found a 34.1 percent increase in the number of children ready for kindergarten for those who were enrolled in the Imagination Library for three or more years, compared with children who were not enrolled in the Imagination Library.<sup>70</sup>

The State of Ohio measures kindergarten readiness using the Kindergarten Readiness Assessment (KRA) administered to students during the first several months of kindergarten.<sup>71</sup> The assessment includes 50 questions consisting of student responses and teachers' observations of children's classroom activities. Children are assessed across four content areas: Language and Literacy, Social Foundations, Mathematics, and Physical Well-Being and Motor Development. Based on students' scaled scores, children are categorized

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<sup>66</sup> (Hernandez, 2011; Lesnick, Goerge, & Smithgall, 2010)

<sup>67</sup> (U.S. Census Bureau, 2019; U.S. Census Bureau, 2020)

<sup>68</sup> (Lee, et al., 2016; Lochner & Moretti, 2001; Schweinhart, 2007)

<sup>69</sup> (Beckett, 2013; Ridzi, Sylvia, Qiao, & Craig, 2017; Ridzi, Sylvia, & Singh, 2014; Samiei, Bush, Sell, & Imig, 2016; Waldron, 2018)

<sup>70</sup> (Ridzi, Sylvia, Qiao, & Craig, 2017)

<sup>71</sup> Beginning in fall 2020, the Ohio Department of Education replaced the KRA with the Kindergarten Readiness Assessment Revised (KRA-R). However, given the recency of this implementation, data regarding students' KRA-R performance and its correlation with students' third grade reading performance is limited. Therefore, the Economics Center chose to analyze students' performance on the KRA, which was administered in Ohio from 2014 through 2019.

into one of three groups: Demonstrating Readiness, Approaching Readiness, and Emerging Readiness. Children categorized as Demonstrating Readiness display the core skills and behaviors necessary for kindergarten instruction. Children who are Approaching Readiness display some core skills and behaviors necessary for instruction and need some support to be able to engage in the classroom. Children who are categorized as Emerging Readiness display minimal core skills and behaviors necessary for instruction and need significant support to be able to engage in the classroom.<sup>72</sup>

In fall 2019, 51.2 percent of kindergartners in Warren County tested as Demonstrating Readiness, 32.0 percent of kindergartners were Approaching Readiness, and 16.9 percent of students were categorized as Emerging Readiness. Statewide, 41.2 percent of kindergartners in Ohio were assessed as Demonstrating Readiness in fall 2019, 36.2 percent of kindergartners were Approaching Readiness, and 22.5 percent of kindergartners were categorized as Emerging Readiness.<sup>73</sup>

Assuming the cohort of Imagination Library enrollees will have consistently participated in the Imagination Library for three or more years, the Economics Center estimates a 34.1 percent increase in the cohort’s kindergarten readiness.<sup>74</sup> Enrollee’s performance at baseline is estimated using Kindergarten Readiness Assessment performance data for Warren County schools from the Ohio Department of Education.<sup>75</sup> With consistent participation, the number of children demonstrating readiness in kindergarten is expected to increase by 1,065 students.

**Table 3: Performance on Kindergarten Readiness Assessment, Baseline to Treatment**

Treatment	Demonstrating Readiness	Approaching Readiness	Emerging Readiness
Baseline	3,274	2,044	1,078
Imagination Library	4,339	1,346	710
<b>Change from Baseline</b>	<b>1,065</b>	<b>(698)</b>	<b>(368)</b>

*Source: Economics Center analysis using data from the Ohio Department of Education and Ridzi et al., 2017.*

### Third Grade Reading

Third grade reading performance represents a significant milestone as at third grade, students are assumed to advance from learning to read to reading to learn. Multiple studies have shown that effects from Imagination Library participation persist until at least the third grade.<sup>76</sup> Given that kindergarten readiness is a significant predictor of third grade reading, the Economics Center estimated the associated improvement on enrollees’ reading

<sup>72</sup> (Ohio Department of Education, 2019)

<sup>73</sup> (Ohio Department of Education, 2020)

<sup>74</sup> (Ridzi, Sylvia, Qiao, & Craig, 2017)

<sup>75</sup> (Ohio Department of Education, 2020)

<sup>76</sup> (Beckett, 2013; Sell, 2015)

performances in third grade as a result of their participation in the Warren County Imagination Library.

The State of Ohio assesses students’ third grade reading proficiency using the Grade 3 English Language Arts (ELA) test in the fall and spring of third grade. In 2012, the Ohio legislature passed the Third Grade Reading Guarantee (TGRG), which required that school districts test students annually between kindergarten and third grade, identify and assist students in need of reading support, and retain non-proficient readers rather than promoting them to the fourth grade. Reading proficiency is assessed using a cut-point score on the Grade 3 ELA assessment set by the Ohio Department of Education at which students are deemed proficient in language arts. Students who do not meet the cut-point on the ELA assessment can be eligible for promotion to fourth grade if they meet the cut-point score on the ELA’s reading subscale.<sup>77</sup>

Researchers at the Crane Center for Early Childhood Research and Policy at the Ohio State University analyzed 2,221 students who completed the KRA in 2014 and the Grade 3 English Language Arts assessment in 2017. Students with an Individualized Education Program (IEP) or who were identified as having limited English proficiency (LEP) were excluded from analysis. As Grade 3 ELA scores evaluated reflect students’ performance in the fall of third grade, students who had not met the Third Grade Reading Guarantee’s cut-point score were not necessarily precluded from promotion to fourth grade, as they may have demonstrated reading proficiency on the spring administration of the assessment. The researchers found a significant, positive correlation between overall KRA scores at kindergarten entry and fall Grade 3 ELA test scores: 77 percent of children who scored as Demonstrating Readiness on the Kindergarten Readiness Assessment met the TGRG by the fall of third grade, either by performance on the overall ELA or the reading subscale. In contrast, only 46 percent of children Approaching Readiness and 26 percent of children Emerging Readiness at kindergarten achieved the ELA promotion score in the fall of their third-grade year.<sup>78</sup>

Applying these estimates to Warren County, at baseline, 3,741 Warren County students would be predicted to pass Ohio’s third grade reading exam in the fall of third grade. However, following participation in the Warren County Imagination Library, the Economics Center estimates that 4,145 students will pass Ohio’s third grade reading exam in the fall, an increase of 404 students.

**Table 4: Performance on Grade 3 ELA Assessment, Baseline to Treatment**

<b>Treatment</b>	<b>Pass Exam</b>	<b>Fail Exam</b>
Baseline	3,741	2,654
Imagination Library	4,145	2,250
<b>Change from Baseline</b>	<b>404</b>	<b>(404)</b>

<sup>77</sup> (Justice, Koury, & Logan, 2019)

<sup>78</sup> Ibid.



*Source: Economics Center analysis using data from the Ohio Department of Education, Ridzi et al., 2017, and Justice, Koury, & Logan, 2019.*

## **Educational Attainment**

Children who are not reading at grade level by third grade are four times more likely to drop out of high school.<sup>79</sup> The Economics Center estimates that due to participation in the Warren County Imagination Library, an additional 48 children from the current cohort will graduate high school. Annually, this translates to an additional 9.6 students from the current cohort graduating high school, increasing Warren County's graduation rate from 96.5 percent to 96.9 percent.<sup>80</sup> Of the 48 additional students graduating high school, the Economics Center estimates that these individuals will ultimately attain the following levels of education:

- 14 students will receive a high school diploma,
- 11 students will receive some college or an associate's degree,
- 14 students will receive a bachelor's degree, and
- 9 students will receive a graduate or professional degree.<sup>81</sup>

## **Employment Impacts**

As individuals advance in educational attainment, they are more likely to be employed. As of March 2020, only 57 percent of 25- to 34-year-old individuals who had not graduated high school were employed. However, 69 percent of high school graduates, 78 percent of individuals with some college, and 86 percent of individuals with a bachelor's or higher degree were employed.<sup>82</sup> At baseline, the Economics Center estimates that 27 of the 48 children who would not have graduated high school without the Warren County Imagination Library would be employed regardless of program participation. However, given the expected increase in educational attainment, 11 additional WCIL participants are expected to be employed, a 40.7 percent increase.

## **Income Impacts**

Increased educational attainment is positively associated with higher annual earnings. In Warren County, median annual earnings by educational attainment range from \$32,450 for non-high school graduates to \$89,889 for individuals with a graduate or professional degree.<sup>83</sup> At baseline, the Economics Center estimates that the 48 children who would not have graduated high school without the WCIL, of whom 27 individuals would be employed, would have earned a total \$896,411 in annual income. However, given the expected increase in educational attainment and associated productivity gains resulting from participation in the WCIL, the 48 children, of whom 38 are expected to be employed, are estimated to earn a total \$2,310,653 in annual income. These earnings represent a 157.8 percent increase, or an additional \$1,414,242 in earnings per year.

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<sup>79</sup> (Hernandez, 2011)

<sup>80</sup> (Ohio Department of Education, 2020)

<sup>81</sup> (U.S. Census Bureau, 2019)

<sup>82</sup> (U.S. Census Bureau, 2020)

<sup>83</sup> (U.S. Census Bureau, 2019)

## Fiscal Impact

As former WCIL participants earn higher wages and are more likely to be employed, state and local governments benefit in the form of tax revenues, as individuals are taxed on their income as well as on purchases.

The Economics Center calculated state and local earnings tax revenues generated by the 48 WCIL enrollees who would not have graduated high school without the Imagination Library. All employees were assumed to reside in the State of Ohio.<sup>84</sup> A weighted local tax rate for the region, based upon tax rates and distribution of employment, was applied to calculate local income tax revenues.

To calculate sales tax revenues, earnings were first adjusted to account for the percent of income spent on purchases subject to sales tax and spending occurring within the local region. Following this adjustment, purchases were applied to a weighted state sales tax rate and a weighted local sales tax rate to calculate revenues.

Table 5 below describes the income and sales tax revenue generated by the 48 WCIL enrollees at baseline and with treatment. In total, participants' increased earnings are estimated to generate an additional \$40,282 for the State of Ohio in income tax revenue, \$17,112 to municipalities in income tax revenue, \$14,543 for the States of Ohio, Kentucky, and Indiana in sales tax revenue, and \$3,701 to local counties in sales tax revenues, for a total annual fiscal impact of \$77,758. The increase in tax revenue generated by participants who would not have graduated high school without the WCIL from baseline represents a 191.5 percent increase.

**Table 5: Fiscal Impact of Graduated Participants, Baseline to Treatment**

<b>Treatment</b>	<b>State Income Tax</b>	<b>Local Income Tax</b>	<b>State Sales Tax</b>	<b>Local Sales Tax</b>	<b>Total</b>
Baseline	\$16,843	\$10,847	\$10,289	\$2,619	<b>\$40,598</b>
Imagination Library	\$57,125	\$27,959	\$26,522	\$6,750	<b>\$118,356</b>
<b>Change from Baseline</b>	<b>\$40,282</b>	<b>\$17,112</b>	<b>\$14,543</b>	<b>\$3,701</b>	<b>\$77,758</b>

*Source: Economics Center analysis.*

## Retail Impacts

As the 48 individuals who would not have graduated high school without the Warren County Imagination Library will earn an additional \$1,414,242 annually, participants' spending of wages affects Cincinnati MSA industries. After accounting for the percentage of income spent on the retail industry, the Economics Center adjusted expenditures for economic leakage prior to applying output, earnings, and employment multipliers. Economic leakage refers to the portion of spending by a particular industry in an economy that is met by imports from companies and organizations outside the economy. Presented as percentages,

<sup>84</sup> The State of Ohio assesses income tax based on a taxpayer's earnings bracket. Taxpayers in higher-earning brackets pay a higher rate. Individual income tax rates are provided by the Ohio Department of Taxation: [https://www.tax.ohio.gov/ohio\\_individual/individual/annual\\_tax\\_rates.aspx](https://www.tax.ohio.gov/ohio_individual/individual/annual_tax_rates.aspx). The Commonwealth of Kentucky and State of Indiana assess a flat earnings tax rate.

industry leakage figures comprising capital and operating expenditures were obtained from Emsi.<sup>85</sup> The post-leakage direct expenditure figure represents estimated expenditures by the 48 high school graduates on retail goods and services sourced from firms located in the Cincinnati MSA.

As seen in Table 6, the Economics Center estimates that the 48 individuals who would not have graduated high school at baseline will spend an additional \$433,520 annually on retail industry purchases within the Cincinnati MSA. These expenditures are expected to support the employment of 6.8 individuals with earnings of \$275,193.

While the impact of direct expenditures on the Cincinnati MSA retail industry is assumed to be included in the wage impacts detailed in this report, the indirect impact of expenditures is not included in wage impacts and is additive to the total benefits conferred by the Warren County Imagination Library.

**Table 6: Retail Industry Impact of Graduated Participants**

Impact Type	Output	Employment	Earnings
Direct	\$433,520	4.5	\$134,001
Indirect	\$421,139	2.3	\$141,192
<b>Total</b>	<b>\$854,659</b>	<b>6.8</b>	<b>\$275,193</b>

*Source: Economics Center analysis using data from Emsi.*

## Medicaid Impacts

As individuals advance their education, they become less likely to enroll in Medicaid: in Ohio, 27.0 percent of individuals with a high school diploma or less are enrolled in Medicaid compared with 11.8 percent of individuals with at least some college education.<sup>86</sup> However, compared with the statewide average, Warren County residents are less likely to enroll in Medicaid.<sup>87</sup> Given these enrollment rates, at baseline, of the 48 individuals who would not have graduated high school without the WCIL, an expected 5.1 individuals would be likely to enroll in Medicaid as adults. Following participation in the Imagination Library and the associated increase in educational attainment, only 3.1 individuals would be likely to enroll in Medicaid, a decrease of 39.9 percent. This decrease translates to a total annual state savings of \$12,621.<sup>88</sup>

## Criminal Justice Impacts

Increased educational attainment reduces the likelihood of involvement with the criminal justice system. Graduating high school decreases average lifetime criminal justice costs by \$20,580 for male graduates and \$710 for female graduates.<sup>89</sup> Given the demographic makeup of Warren County, 48 additional high school graduates represent \$519,250 in

<sup>85</sup> Emsi utilizes labor market data and other publicly available sources in a proprietary methodology to allow for tailored economic analyses in a specified geographic area.

<sup>86</sup> (Ohio Medicaid Assessment Survey, 2021)

<sup>87</sup> (U.S. Census Bureau, 2019)

<sup>88</sup> (Centers for Medicare & Medicaid Services, 2019)

<sup>89</sup> (Schweinhart, 2007)

lifetime savings associated with the criminal justice system, or \$12,981 annually over a 40-year period.

## Cost-Benefit Analysis

The Economics Center conducted a cost-benefit analysis of the Warren County Imagination Library utilizing costs assumed by the Warren County Foundation for the WCIL and benefits detailed in this report. The Warren County Foundation assumes \$1.30 in costs per child per month, or \$15.60 per child per year. During the period of analysis, the Warren County Foundation did not track how long children had been enrolled in the WCIL.<sup>90</sup> Conservatively, if the 6,395 current active enrollees were enrolled in the WCIL for the maximum five years, the Warren County Foundation would assume \$498,810 in total costs for the cohort. Annually, this cohort would be expected to:

- Earn an additional \$1,414,242 in annual earnings,
- Generate an additional \$77,758 in annual income and sales tax revenue,
- Support an additional \$421,139 in indirect expenditures from retail sales,
- Yield \$12,621 in annual state Medicaid expenditure savings, and
- Save \$12,981 in annual costs associated with the criminal justice system.<sup>91</sup>

These benefits translate to a total annual benefit of \$1,938,741. Given total annual benefits and cohort size, the \$15.60 one-year cost of enrolling a child in the Imagination Library generates \$60.63 in annual benefits per child. Compared with the total costs of the cohort, this means that every \$1.00 invested into the Warren County Imagination Library generates an additional \$2.89 in net annual economic and societal benefits, or a total benefit of \$3.89 annually.

## Conclusion

The Warren County Imagination Library (WCIL) provides substantial benefits to its participants and community through its book distribution program.

By enrolling in the WCIL, the Economics Center estimates that an additional 1,065 students of its 6,395 enrollees will perform as Demonstrating Readiness on the State of Ohio's Kindergarten Readiness Assessment. Further, as kindergarten readiness is a significant predictor of third grade reading, an additional 404 participants are likely to pass the Grade 3 English Language Arts assessment in the fall of third grade.

By increasing the number of children reading at grade level in third grade, the Economics Center estimates that an additional 48 children from the current WCIL cohort will graduate high school due to their participation in the Imagination Library. Annually, this translates to an additional 9.6 students graduating high school, increasing Warren County's graduation rate from 96.5 percent to 96.9 percent.

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<sup>90</sup> The Warren County Foundation has since begun tracking participants' length of enrollment in the Warren County Imagination Library.

<sup>91</sup> Lifetime criminal justice savings have been annualized over a 40-year period.

Of the 48 additional students graduating high school, the Economics Center estimates that these individuals will ultimately attain the following levels of education:

- 14 students will receive a high school diploma,
- 11 students will receive some college or an associate's degree,
- 14 students will receive a bachelor's degree, and
- 9 students will receive a graduate or professional degree.

At baseline, the Economics Center estimates that 27 of the 48 children who would not have graduated high school without the WCIL would be employed regardless of receiving treatment through the WCIL. However, given the expected increase in educational attainment, 38 of the 48 children are expected to be employed with treatment, a 40.7 percent increase.

Further, at baseline, the Economics Center estimates that the 48 children who would not have graduated high school would have earned a total \$896,411 in annual income. However, given the expected increase in educational attainment and resulting productivity gains, the 48 children are estimated to earn a total \$1,414,242 in annual income, a 157.8 percent increase.

The increased income earned by the 48 participants who would not have graduated high school without the WCIL is estimated to generate an additional \$77,758 in income and sales tax revenue, a 191.5 percent increase. These individuals are also estimated to spend an additional \$433,520 annually on retail industry purchases within the Cincinnati MSA, supporting the employment of 6.8 individuals with earnings of \$275,193.

As individuals advance their education, they become less likely to enroll in Medicaid. Participation in the Warren County Imagination Library is expected to result in 2 fewer individuals enrolling in Medicaid, translating to an annual state savings of \$12,621.

Finally, increased educational attainment reduces the likelihood of involvement with the criminal justice system. Having 48 additional high school graduates is estimated to yield \$519,250 in lifetime savings associated with the criminal justice system.

In total, these benefits sum to \$1,938,741 in annual economic impact.<sup>92</sup> Compared with the total \$498,810 cost assumed by the Warren County Foundation to sustain the 6,395 active enrollees for five years, every \$1.00 spent by the WCIL yields an additional \$2.89 in net annual economic benefits, or \$3.89 in total annual benefits.

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<sup>92</sup> Lifetime criminal justice savings have been annualized over a 40-year period.

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