

HEALTH NOTE: State Funding For Full-Day Kindergarten House Bill 19-1262 2019 Colorado General Assembly

Prime Sponsors:

Representative James Wilson,
Representative Barbara
McLachlan, Senator Jeff
Bridges, Senator Rhonda Fields

Bill Provisions Examined:^a

The bill provides funding through the school finance formula for full-day kindergarten educational programs. After passage of the bill, a school district or a charter school that provides a full-day kindergarten educational program shall not charge fees for attending kindergarten other than those fees that are routinely charged to parents of students enrolled in other grades.

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What is the goal of this health note?

Decisions made in sectors outside of public health and health care, such as in education, housing, and employment, can affect health and well-being. Health notes are intended to provide objective, nonpartisan information to help legislators understand the connections between these various sectors and health. This document provides summaries of evidence analyzed by the Health Impact Project while creating a health note for Colorado House Bill (HB) 19-1262. Health notes are not intended to make definitive or causal predictions about how a proposed bill will affect health and well-being of constituents. Rather, legislators can use a health note as one additional source of information to consider during policy-making. The analysis does not consider the fiscal impacts of this bill.

How and why was this bill selected?

This bill was identified as one of several policy issues being considered by the Colorado General Assembly in 2019 that has the potential to affect health. The health note screening criteria were used to confirm the bill was appropriate for analysis. (See Methodology Appendix on Page 7.) One of the Health Impact Project's focus areas for health notes is education.

What is the relationship between education and health?

There is a strong and robust evidence base linking education and health over a lifetime. Research has consistently demonstrated that people with more education live longer, healthier lives than those with fewer years of education.¹ Completing more years of education leads to better jobs with higher earnings that can provide access to healthy food, safer homes and neighborhoods, and better benefits and medical care.² Due to the strong ties between educational attainment and higher income, people with more education are less likely to experience stress related to social and economic hardship.³ Education matters even in the earliest years of life, with research showing associations between early care and learning programs and short- and long-term health benefits, including better eating habits, reduced cigarette smoking, and lower instances of teen pregnancy.⁴

SUMMARY OF HEALTH NOTE FINDINGS

Full-day kindergarten (FDK) is a formal education program offered in a school or school-like setting for children ages four to six in the year before they enter first grade.⁵ Approximately 81 percent of kindergarten students in Colorado are enrolled in FDK.⁶ HB 19-1262 would provide funding through Colorado's school finance formula for FDK programs, and would prohibit public school districts and charter schools from funding FDK through fees that are not routinely charged for students in other grades.⁷ This health note explores the evidence base regarding FDK and its effects on children's educational outcomes and short-and long-term health and well-being.

^a Summary as described by the Colorado General Assembly, <https://leg.colorado.gov/bills/hb19-1262>. The Health Impact Project conducted this health note based on the bill as introduced.

^b The Health Impact Project is committed to conducting non-partisan research and analysis.

This review found that, while there is strong evidence demonstrating short-term benefits of FDK for students’ educational outcomes and social and emotional well-being, the evidence on longer-term effects, and their implications for health, is mixed. Research suggests this may be due to the inability to sustain the benefits of FDK if students attend lower-quality educational programs or programs that are not aligned with FDK curriculum and instruction following FDK. Since the bill would not require students in Colorado to enroll in FDK, the number of children affected by the proposed changes, if implemented, would depend on the number of students that enroll. Below is a summary of the key findings:

- There is **strong evidence**^c that children who participate in FDK have higher academic achievement going into first grade compared with children who attend half-day kindergarten (HDK),^d and that FDK is particularly beneficial for lower-income students and students of color.⁸
- There is **mixed evidence** about the effects of FDK on academic achievement over time. Some studies show that the academic advantage provided by FDK begins to fade in subsequent years of schooling.⁹ Other studies suggest that certain subgroups of students who attend FDK—specifically low-income students, students of color, English Language Learners, and students in urban areas—maintain significant differences in their math and reading scores in third and fifth grades compared to students who attended HDK.¹⁰ Research has consistently demonstrated the connections between academic achievement and health over a lifetime, however, given the mixed evidence about the ability to sustain the benefits of FDK versus HDK on academic achievement over time, it is uncertain if Colorado kindergarteners’ health would be affected over the long term.¹¹
- There is **strong evidence** that FDK positively affects students’ social skills and emotional well-being. Research on FDK has documented its benefits to students’ self-confidence, ability to work or play with others, and independence.¹²
- There is a **fair amount of evidence** that FDK can benefit students’ health and well-being while they are in kindergarten by improving access to school-based physical activity, nutrition education, breakfast and lunch programs, and vision and hearing screenings.¹³ For example, one study found that children in FDK programs have lower body mass index scores and spend more time being physically active during the week than their HDK counterparts.¹⁴
- The extent to which access to free FDK affects families’ incomes—a strong predictor of health—is **not well researched**. Research for this analysis did not yield any studies specifically examining this relationship.

Methods Summary: To complete this health note, Health Impact Project staff conducted an expedited literature review using a systematic approach to minimize bias and identify studies to answer each of the identified research questions. In this note, “health impacts” refer to effects on determinants of health, such as education, employment, and housing, as well as effects on health outcomes, such as injury, asthma, chronic disease, and mental health. The strength of the evidence is qualitatively described and categorized as: not well researched, mixed evidence, a fair amount of evidence, strong evidence, or very strong evidence. It was beyond the scope of analysis to consider the fiscal impacts of this bill or the effects any funds dedicated to implementing the bill may have on other programs or initiatives in the state. To the extent that this bill requires funds to be shifted away from other purposes or would result in other initiatives not being funded, policymakers may want to consider additional research to understand the effect of devoting funds for this bill compared to another purpose. A detailed description of the methods is provided in the Methodology Appendix on Page 7.

^c See definitions of strength of evidence ratings on Page 8.

^d Some studies identified in this review use the term “part-day kindergarten.” For clarity, the Health Impact Project uses the term “half-day kindergarten” throughout this health note.

WHY DO THESE FINDINGS MATTER FOR COLORADO?

The proportion of Colorado kindergarteners enrolled in FDK has increased substantially over the past two decades. In 2001, only 14 percent of Colorado kindergarteners were in FDK programs.¹⁵ Now 81 percent of children enrolled in kindergarten in Colorado participate in FDK.¹⁶ Out of the state's 178 school districts, 140 have all kindergarteners enrolled in FDK.¹⁷ The proportion of kindergarteners in FDK varies substantially by county, with San Juan, Mesa, and Arapahoe counties having the lowest proportion.¹⁸ Under current law, Colorado does not provide funding for all districts to cover the cost of full-day kindergarten. School districts either charge tuition or seek local funding sources to supplement the gap.¹⁹ Cost of full-day kindergarten can vary by district. For example, the cost of FDK in one school district in Colorado is \$2,835 per year.²⁰ Paying for FDK or child care can place a financial burden on low-income families. In 2017, 13 percent of children under age five in Colorado lived below the poverty line.²¹

WHAT ARE THE POTENTIAL EFFECTS OF FULL-DAY KINDERGARTEN ON CHILDREN'S ACADEMIC PERFORMANCE?

- **Children enrolled in full-day kindergarten programs perform slightly better academically—including in math and verbal achievement—going into first grade than children participating in half-day kindergarten. One systematic review from the Community Preventive Services Task Force's Community Guide found this association disappears by third grade and highlighted the need for ongoing, high-quality education to sustain benefits from FDK.**²²
 - The Community Guide systematic review found that FDK improves academic achievement compared to HDK, controlling for family income level and race and ethnicity, and that the benefits of FDK are greater for lower-income students and students of color compared with middle-or upper-income and white students.²³ The review estimates that, in a group of children where half attend FDK and half attend HDK, 59 percent of the students in FDK would have test scores above the median, compared with 41 percent of the students in HDK.²⁴ The review also found that, compared to HDK, FDK is effective in reducing grade retention—where a child is kept in the same grade for more than one year—and referrals for special education.²⁵ Evidence suggests that grade retention is a strong predictor of dropping out of high school.²⁶
 - One study examined if participation in FDK, as opposed to HDK, contributes to greater growth in reading and math skills when considering characteristics such as poverty status, parental level of education, and quality of child care received outside of kindergarten and in the year before starting kindergarten.²⁷ The study results showed that considering family and child characteristics diminished the achievement gap in reading and math skills between FDK and HDK children. In addition, the advantage of FDK faded out at approximately 36 months after the spring of kindergarten.
 - Most studies examining FDK have compared its effectiveness with HDK or alternating-day full-day kindergarten (where children attend kindergarten for a full day, every other weekday). However, the few studies examining FDK separately indicate large benefits in math and reading achievement scores for students—measured by comparing scores from the fall and spring of the kindergarten year—compared with students who are not in kindergarten.²⁸
- **Research suggests the academic benefits of FDK participation can fade over time, but the evidence is inconsistent.**
 - Most studies examining the effects of FDK on children's outcomes have found associations between FDK participation and improved academic performance at the end of kindergarten

and first grade, but that the advantage begins to fade in subsequent years.²⁹ For example, one study found that FDK students' literacy and mathematics advantages—particularly among minority children—diminished at the end of first grade.³⁰ Another study found that the academic benefits of FDK subsided by 36 months after the spring of kindergarten.³¹ Other studies found that the academic advantages of FDK participation fade by the time children enter third or fifth grade, respectively.³²

- Other studies suggest that certain subgroups of students who attend FDK—specifically low-income students, students of color, English Language Learners, and students in urban areas—maintain significant differences in their math and reading scores in third and fifth grades compared to students who attended HDK.³³
- **Improving the structure and quality of FDK programs and subsequent elementary school education may help to sustain the academic advantages of FDK attendance.**
 - Research highlights the importance of high-quality elementary school education in sustaining the benefits of FDK over time.³⁴ Some study authors have posited that coordinating curricula for first grade onward to reflect progress made in FDK programs can help to prolong the positive effects of FDK participation.³⁵
 - Research has also demonstrated the importance of teacher training, low student-teacher ratios, and other aspects of FDK programs that can reduce fading effects.³⁶ Evidence shows the importance of the structure of FDK programs to academic benefits. For example, a study using nationally representative data from the Early Childhood Longitudinal Study found that children's gains in reading over the school year can be affected by the portion of the school day devoted to reading instruction, class size, and type of instruction.³⁷
 - Another study found that the structure of classroom environments plays a critical role in improving students' academic performance.³⁸ Classrooms where most of the time was spent in either teacher-directed whole group or teacher-directed small group activities showed the largest gains in academic achievement. However, classrooms that spent more time in child-selected activities reported the greatest improvements in cognitive flexibility, a measure of children's ability to govern their behavior. On average, children in FDK spend more time per day in self-selected and child-initiated learning activities than students in HDK.³⁹ These findings highlight the importance of not only examining HDK versus FDK, but also the structure of and quality of instruction in classroom environments.
 - One study examined in the Community Guide systematic review used analytic modeling to estimate the potential economic benefit of FDK in Washington state. The study found that, if appropriate programs and policies were in place to sustain the benefits of FDK to the end of high school, the potential economic value from lifetime gains in earnings, reduced healthcare costs and crime, and other benefits would be \$5,958 per student.⁴⁰

WHAT ARE THE POTENTIAL EFFECTS OF FULL-DAY KINDERGARTEN ON CHILDREN'S SOCIAL SKILLS AND EMOTIONAL WELL-BEING?

- **Research on FDK has documented significant benefits to students' ability to work or play with others, a measure of social-emotional health.⁴¹**
 - Children participating in FDK programs have more social interactions than HDK pupils, and one study found that teachers perceived their FDK pupils—including children with and without disabilities—to have better social skills than children in HDK programs.⁴²
 - The benefits of FDK in nurturing social and emotional development of students in kindergarten may have added benefits for students' health and well-being over their life course. One study using longitudinal data from three cities and one rural area found statistically significant associations between kindergarten teachers' ratings of students'

social competence and several outcomes in young adulthood related to education, employment, criminal justice, substance use, and mental health.⁴³ Specifically, for example, the study found that children’s prosocial skills—positive actions that benefit others, such as helping or sharing—were significantly predictive of whether the students graduated from high school on time, completed a college degree, and obtained stable employment as young adults, even after controlling for variables such as socioeconomic status, neighborhood quality, and measures of children’s early academic ability. Findings also showed that children’s prosocial skills in kindergarten reduced the likelihood that they would become involved with the police as youth and receive public assistance as young adults.⁴⁴

- **The effects of changing federal academic standards on kindergarteners’ social and emotional health and well-being have not been well researched.**
 - Many studies analyzing the effects of FDK on children’s social skills were conducted prior to the implementation of No Child Left Behind (NCLB), which resulted in more academically-rigorous kindergarten curricula and shifted the focus away from subjects such as art and music in favor of math and reading. In 2015, the Every Student Succeeds Act amended NCLB, retaining the law’s focus on academic accountability but providing more flexibility and control to states, and placing emphasis on addressing achievement gaps instead of on standardized testing.⁴⁵ The effects of these changes on HDK participants’ fatigue and attitudes toward school have not been studied, although many child advocates contend that a long school day focused on academics can lead to fatigue, frustration, or acting out behaviors in children.⁴⁶ One meta-analysis found that children in FDK were less likely to have a positive attitude toward school, despite higher rates of self-confidence and better social skills than their half-day peers.⁴⁷
- **Research suggests that parents and teachers generally tend to prefer full-day kindergarten over half-day kindergarten, in part due to the benefits to students’ social skills, mental health, and emotional well-being.**
 - The majority of parents surveyed during an evaluation of the Delaware FDK pilot program, including parents of children enrolled in HDK, reported a preference for FDK programs.⁴⁸ Findings from focus groups with parents, current and former teachers, and community members conducted in southern Nevada as part of a health impact assessment on a FDK policy had similar findings, with participants expressing a desire for FDK to be mandatory for all students and perceiving the FDK schedule to be less stressful for children compared to the half-day schedule.⁴⁹ Another study reported parental concerns that the full-day schedule could be stressful for children and increase “burnout” of students: However, research has not substantiated a relationship between participation in FDK and burnout among kindergarteners.⁵⁰
 - One study examining teachers’ perspectives on the implementation of a FDK program found that teachers perceive FDK to be beneficial to children and families by helping ease the transition to first grade, providing more time for a range of academic, social, and creative activities, enabling children with developmental delays to have additional time for project completion and socialization, and assisting families with child care.⁵¹ Teachers also perceived personal benefits, including more time to get to know children and their families, more opportunities to work with children and families one-on-one, and the opportunity to cover each educational unit in depth.⁵²

WHAT ARE THE POTENTIAL EFFECTS OF FULL-DAY KINDERGARTEN ON CHILDREN’S PHYSICAL HEALTH?

- **There is some evidence that children in FDK are more active and less sedentary than children in HDK, though a causal relationship cannot be determined.**
 - Research suggests that FDK could improve students' access to school breakfast and lunch programs, vision and hearing screenings, and school-based nutrition education and physical activity that can benefit students' health and well-being.⁵³
 - One study that analyzed the relationship between FDK participation and physical activity found that teachers of children in FDK programs across the country reported more hours of physical education and more outdoor play time at school than HDK teachers, one benefit of a longer school day.⁵⁴ Data analyzed in the same study suggest that children enrolled in FDK programs watch fewer hours of weekday television—a key contributor to sedentary behavior among children—than their HDK counterparts, although there is no statistically significant difference between the two groups of children in hours of television watched on the weekend.⁵⁵ It is important to note that the families of children attending FDK exhibited different characteristics from those of HDK families, though the study controlled for those differences. Because of the nature of the study, causality could not be determined.⁵⁶ Among other factors, lack of physical activity and sedentary behaviors have contributed to the epidemic of childhood overweight and obesity in the U.S.⁵⁷

WHICH POPULATIONS ARE MOST LIKELY TO BE AFFECTED BY THIS BILL?

Evidence shows that FDK is particularly beneficial for lower-income students, children of color, and English language learners.⁵⁸ A systematic review from the Community Preventive Services Task Force's Community Guide found that lower-income students and students of color experienced greater benefits from FDK compared with middle- or upper-income and white students.⁵⁹ However, research also suggests that the risk of FDK benefits fading over time may be particularly high among low-income children and children of color because they are more likely to attend lower-quality elementary schools and, since they are less likely to have difficulty learning than their peers who did not attend FDK, may receive less individualized attention in elementary school.⁶⁰ One study found that the academic advantages of FDK participation generally faded by the end of first grade, with this trend most keenly observed for minority children.⁶¹ Research has also found mixed effects for children with disabilities who participate in FDK. Several studies have found that children with speech or language impairments can benefit from FDK, whereas the cognitive demands and increased time allotted for child-initiated activities of a full-day program can prove taxing for children with learning disabilities and autism.⁶²

HOW LARGE MIGHT THE IMPACT BE?

Where possible, the Health Impact Project describes how large the impact may be based on the bill language and literature, such as describing the size, extent, and population distribution of an effect. The Legislative Council Staff's fiscal note for HB 19-1262 assumes 85 percent of eligible children in Colorado would enroll in FDK in fiscal year 2019-20 under the proposed bill, and that 90 percent would enroll in FY 2020-21.⁶³ Since the bill would not require students in Colorado to enroll in FDK, the number of children affected by the proposed changes, if implemented, would depend on the number of students that enroll.

It was beyond the scope of this analysis to consider the fiscal impacts of this bill or the effects any funds dedicated to implementing the bill may have on other programs or initiatives in the state. To the extent that this bill requires funds to be shifted away from other purposes or would result in other initiatives not being funded, policymakers may want to consider additional research to understand the effect of devoting funds for this bill instead of another purpose.

APPENDIX: METHODOLOGY

Once the bill was selected, a research team from the Health Impact Project hypothesized a pathway between the bill, health determinants, and health outcomes. The hypothesized pathway was developed using research team expertise and a preliminary review of the literature. The bill components were mapped to steps on this pathway and the team developed research questions and a list of keywords to search. The research team reached consensus on the final conceptual model, research questions, contextual background questions, keywords, and keyword combinations. The conceptual model, research questions, search terms, and list of literature sources were peer-reviewed by an external subject matter expert. The external subject matter expert also reviewed a draft of the note. A copy of the conceptual model is available upon request.

The Health Impact Project developed and prioritized 11 research questions related to the bill components examined:

- To what extent does full-day kindergarten affect educational attainment?
- To what extent does full-day kindergarten affect educational performance among children with special needs (i.e., learning)?
- To what extent does full-day kindergarten affect literacy?
- To what extent does full-day kindergarten affect English language skills among children from families that do not speak English?
- To what extent does full-day kindergarten affect children's social skills?
- To what extent does free full-day kindergarten affect the cost of childcare?
- To what extent does free full-day kindergarten affect household employment, particularly among mothers?
- To what extent does free full-day kindergarten affect child nutrition?
- To what extent does free full-day kindergarten affect food insecurity and hunger?
- To what extent does free full-day kindergarten affect child physical activity?
- To what extent does free full-day kindergarten affect teacher employment?

Next the research team conducted an expedited literature review using a systematic approach to minimize bias and answer each of the identified research questions.^e The team limited the search to systematic reviews and meta-analyses of studies first, since they provide analyses of multiple studies or address multiple research questions. If no appropriate systematic reviews or meta-analyses were found for a specific question, the team searched for nonsystematic research reviews, original articles, and research reports from U.S. agencies and nonpartisan organizations. The team limited the search to electronically available sources published between January 2014 and January 2019.

The research team searched PubMed and EBSCO databases along with the following leading journals in public health, education, and child development to explore each research question: American Journal of Public Health, Social Science & Medicine, Health Affairs, Children and Youth Services Review, The Review of

^e Expedited reviews streamline traditional literature review methods to synthesize evidence within a shortened timeframe. Prior research has demonstrated that conclusions of a rapid review versus a full systematic review did not vary greatly. Cameron A. et al., "Rapid versus full systematic reviews: an inventory of current methods and practice in Health Technology Assessment," (Australia: ASERNIP-S, 2007): 1-105, https://www.surgeons.org/media/297941/rapidvsfull2007_systematicreview.pdf.

Educational Research, and Early Childhood Research Quarterly.^f For all searches, the team used the following key terms: full-day kindergarten, educational attainment, learning disabilities, special needs, literacy, English language skills, social skills, childcare costs, employment, teacher employment, food insecurity, food security, hunger, and physical activity. The team also searched American Educational Research Journal, AERA Open, Education Resources Information Center, the National Education Association, Child Trends, RAND Corporation, and Urban Institute.

After following the above protocol, the team screened 8,479 titles and abstracts,^g identified 99 abstracts for potential inclusion, and, after reviewing each of these abstracts, identified 12 articles for full-text review. After applying the inclusion criteria, 5 articles were excluded. In addition, the team identified 7 peer-reviewed articles through the original articles and identified 3 resources with relevant research outside of the peer-reviewed literature. A final sample of 17 resources was used to create the health note. In addition, the team used 4 references to provide contextual information.

This research did not yield any information about effects of FDK implementation on teacher employment.

Of the studies included, the strength of the evidence was qualitatively described and categorized as: not well researched, mixed evidence, a fair amount of evidence, strong evidence, or very strong evidence. The evidence categories were adapted from a similar approach from another state.⁶⁴

Very strong evidence: the literature review yielded robust evidence supporting a causal relationship with few if any contradictory findings. The evidence indicates that the scientific community largely accepts the existence of the relationship.

Strong evidence: the literature review yielded a large body of evidence on the association, but the body of evidence contained some contradictory findings or studies that did not incorporate the most robust study designs or execution or had a higher than average risk of bias; or some combination of those factors.

A fair amount of evidence: the literature review yielded several studies supporting the association, but a large body of evidence was not established; or the review yielded a large body of evidence but findings were inconsistent with only a slightly larger percent of the studies supporting the association; or the research did not incorporate the most robust study designs or execution or had a higher than average risk of bias.

Mixed evidence: the literature review yielded several studies with contradictory findings regarding the association.

Not well researched: the literature review yielded few if any studies or yielded studies that were poorly designed or executed or had high risk of bias.

ACKNOWLEDGEMENTS

The Health Impact Project thanks the Colorado School of Public Health for its role in identifying an appropriate subject matter expert to review the health note and for providing insights into Colorado-specific data and the policy context of HB 19-1262.

^f These journals were selected using results from a statistical analysis completed to determine the leading health research journals between 1990 and 2014. Merigó, José M., and Alicia Núñez. "Influential Journals in Health Research: A Bibliometric Study." *Global Health* 12.1 (2016), accessed Jan. 11, 2018, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4994291/>.

^g Many of the searches produced duplicate articles. The number of sources screened does not account for duplication across searches in different databases.

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- ¹ Virginia Commonwealth University Center on Society and Health, “Education: It Matters More to Health than Ever Before,” accessed October 31, 2018, <https://societyhealth.vcu.edu/work/the-projects/education-it-matters-more-to-health-than-ever-before.html>.
- ² Emily B. Zimmerman, Steven H. Woolf, and Amber Haley, “Population Health: Behavioral and Social Science Insights” (2015), <https://www.ahrq.gov/professionals/education/curriculum-tools/population-health/zimmerman.html>.
- ³ Virginia Commonwealth University Center on Society and Health, “Education;” Zimmerman, Woolf, Amber Haley, “Population Health.”
- ⁴ Paula Braverman et al., “Early Childhood Is Critical to Health Equity” (2018), <https://www.rwjf.org/content/dam/farm/reports/reports/2018/rwjf445350>.
- ⁵ Community Preventive Services Task Force, “Recommendation for Full-Day Kindergarten for Children of Low-Income and Racial/Ethnic-Minority Families,” *American Journal of Preventive Medicine* 46, no.3 (2014): 324-326.
- ⁶ Legislative Council Staff, “Fiscal Note: HB 19-1262,” https://leg.colorado.gov/sites/default/files/documents/2019A/bills/fn/2019a_hb1262_00.pdf, accessed April 11, 2019.
- ⁷ Ibid.
- ⁸ Robert A. Hahn et al., “Effects of Full-Day Kindergarten on the Long-Term Health Prospects of Children in Low-Income and Racial/Ethnic-Minority Populations,” *American Journal of Preventive Medicine* 46, no.3 (2014): 312–323, <https://doi.org/10.1016/j.amepre.2013.12.003>; Michael A. Gottfried and Vi-Nhuan Le, “Full- Versus Part-Day Kindergarten for Children With Disabilities: Effects on Academic and Social-Emotional Outcomes,” *American Educational Research Journal* 53, no. 3 (June 2016): 708, <http://dx.doi.org/10.3102/0002831216645903>; Child Trends, “Full-day Kindergarten: Indicators on Children and Youth,” (February 2015), accessed April 11, 2019, https://www.childtrends.org/wp-content/uploads/2015/03/indicator_1427317888.916.html.
- ⁹ Philip DeCicca, “Does Full-Day Kindergarten Matter? Evidence From the First Two Years of Schooling,” *Economics of Education Review* 26, no. 1 (February 2007): 67–82, <https://doi.org/10.1016/j.econedurev.2005.04.003>; Jill S. Cannon, Alison Jackowitz, and Gary Painter, “The Effect of Attending Full-Day Kindergarten on English Learning Students,” *Journal of Policy Analysis and Management* 30, no. 2 (2011): 287–309, <https://doi.org/10.1002/pam.20560>; Elizabeth Vortruba-Drzal, Christine P. Li-Grining and Carolina Maldonado-Carreno, “A Developmental perspective on Full- Versus Part-Day Kindergarten and Children’s Academic Trajectories Through Fifth Grade,” *Child Development* 79, no. 4 (2008), <https://doi.org/10.1111/j.1467-8624.2008.01170.x>; Gottfried and Le, “Full- Versus Part-Day Kindergarten for Children With Disabilities,” 708; Child Trends, “Full-day Kindergarten;” Robert A. Hahn et al., “Effects of Full-Day Kindergarten on the Long-Term Health Prospects of Children in Low-Income and Racial/Ethnic-Minority Populations,” *American Journal of Preventive Medicine* 46, no.3 (2014): 312–323, <https://doi.org/10.1016/j.amepre.2013.12.003>.
- ¹⁰ University of Nevada Las Vegas, “Full-Day Kindergarten In Nevada: A Health Impact Assessment,” https://www.unlv.edu/sites/default/files/story_attachments/708/Full%20Day%20Kindergarten%20HIA%20FINAL%205-27-15.pdf, accessed April 11, 2019.
- ¹¹ VCU Center on Society and Health, “Education.”
- ¹² Community Preventive Services Task Force, “Recommendation for Full-Day Kindergarten,” 324–326.
- ¹³ UNLV, “Full-Day Kindergarten In Nevada”; J. Pharr et al., “Health Impact Assessment As An Instrument To Examine The Health Implications of Education Policies,” *Public Health* 145 (2017): 83–92, <https://doi.org/10.1016/j.puhe.2016.12.021>.
- ¹⁴ Michael Gottfried and Vi-Nhuan Le, “Is Full-Day Kindergarten Linked to Children’s Physical Activity?” *Early Childhood Research Quarterly* 40 (2017): 145, <https://doi.org/10.1016/j.ecresq.2017.03.003>.
- ¹⁵ Colorado Children’s Campaign, “2018 Kids Count in Colorado!”, accessed April 11, 2019, <https://www.coloradokids.org/data/publications/2018-kids-count-in-colorado/>.
- ¹⁶ Legislative Council Staff, “Fiscal Note.”
- ¹⁷ Ibid; Colorado Children’s Campaign, “2018 Kids Count in Colorado!”
- ¹⁸ Colorado Children’s Campaign, “2018 Kids Count in Colorado!”
- ¹⁹ Ibid.
- ²⁰ Poudre School District, “Full Day Kindergarten Program Tuition Frequently Asked Questions (FAQs),” (2017) accessed April 15, 2019,

<https://www.psdschools.org/sites/default/files/PSD/communications/School%20Registration%2C%20Choice/2018-19%20Full-Day%20Kindergarten%20FAQ.pdf>.

²¹ The Annie E. Casey Foundation – Kids Count Data Center, “Children in Poverty by Age Group in Colorado,” accessed April 11, 2019, <https://datacenter.kidscount.org/data/tables/5650-children-in-poverty-by-age-group?loc=7&loct=2#detailed/2/7/false/871,870,573,869,36,868,867,133,38,35/17,18,36/12263,12264>.

²² Hahn et al., “Effects of Full-Day Kindergarten,” 312–323.

²³ Hahn et al., “Effects of Full-Day Kindergarten,” 312–323.

²⁴ Ibid.

²⁵ Ibid.

²⁶ Kristof De Witte et al., “A Critical Review of the Literature on School Dropout,” *Educational Research Review* 10 (2013): 13–28, <https://doi.org/10.1016/j.edurev.2013.05.002>.

²⁷ Vortruba-Drzal, Li-Grining, and Maldonado-Carreno, “A Developmental Perspective.”

²⁸ Hahn et al., “Effects of Full-Day Kindergarten,” 312–323.

²⁹ Gottfried and Le, “Full- Versus Part-Day Kindergarten for Children With Disabilities,” 708; Child Trends, “Full-day Kindergarten.”

³⁰ Gottfried and Le, “Full- Versus Part-Day Kindergarten for Children With Disabilities,” 711.

³¹ Vortruba-Drzal, Li-Grining, and Maldonado-Carreno, “A Developmental Perspective.”

³² Gottfried and Le, “Full- Versus Part-Day Kindergarten for Children With Disabilities,” 711; Community Preventive Services Task Force, “Recommendation for Full-Day Kindergarten,” 324–326.

³³ UNLV, “Full-Day Kindergarten In Nevada.”

³⁴ Hahn et al., “Effects of Full-Day Kindergarten,” 312–323.

³⁵ Gottfried and Le, “Full- Versus Part-Day Kindergarten for Children With Disabilities,” 711.

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