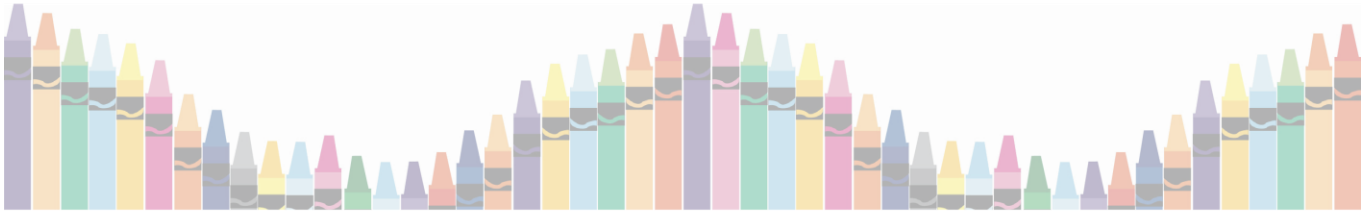
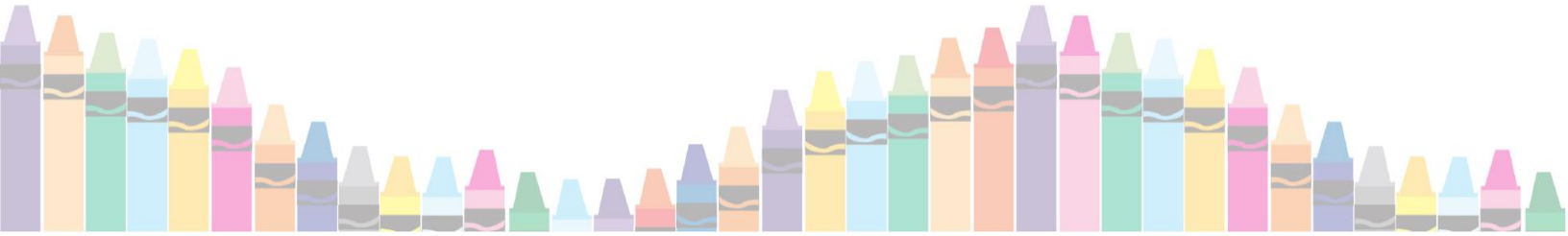


FULL-DAY KINDERGARTEN IN NEVADA

A Health Impact Assessment

UNLV School of COMMUNITY HEALTH SCIENCES



Contents

Acknowledgments and Disclaimers

During this project, the HIA team received input from various stakeholders and partners (Please see below). The University of Nevada, Las Vegas (UNLV) Health Impact Assessment (HIA) team consists of the following members (in alphabetical order):

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The UNLV HIA Team is extremely grateful for the invaluable feedback, input, and analysis from the following Steering Committee members and affiliates (in alphabetical order):

- Dr. Nancy E. Brune, Kenny Guinn Center for Policy Priorities
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- Denise Tanata-Ashby, JD, Children's Advocacy Alliance
- Deborah Williams, MPA, MPH, CHES, Southern Nevada Health District

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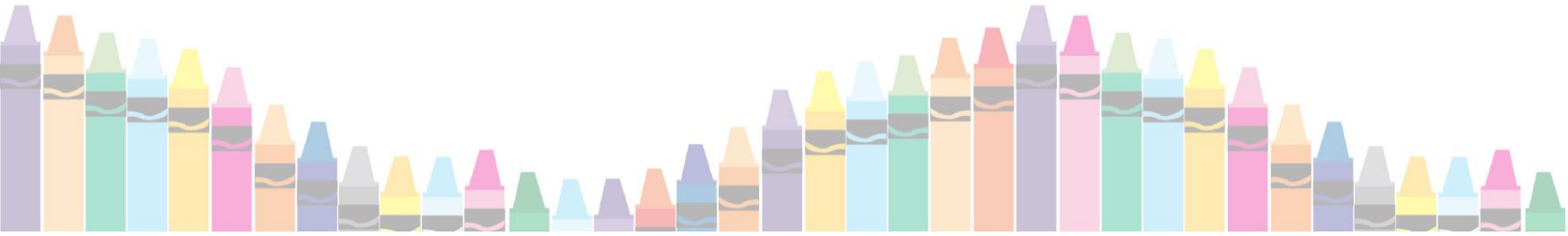
- Amber Lenhart, MPH, Health Impact Project
- Tatiana Lin, MA, Kansas Health Institute
- Sheena Smith, MPP, Kansas Health Institute

The HIA team would like to thank the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts, for funding to conduct this health impact assessment.

The HIA team would also like to thank the UNLV School of Community Health Sciences for an opportunity to conduct this health impact assessment.



This health impact assessment uses a systematic process to consider how changes to kindergarten in Nevada could affect health. The estimates and assessments are based on information best available to the team. There are limitations inherent in the assessment. They are discussed in the report.

Acknowledgement: *This project is supported by a grant from the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts.*

Disclaimer: *The views expressed are those of the authors and do not necessarily reflect the views of the Health Impact Project, The Pew Charitable Trusts, and the Robert Wood Johnson Foundation.*

Executive Summary

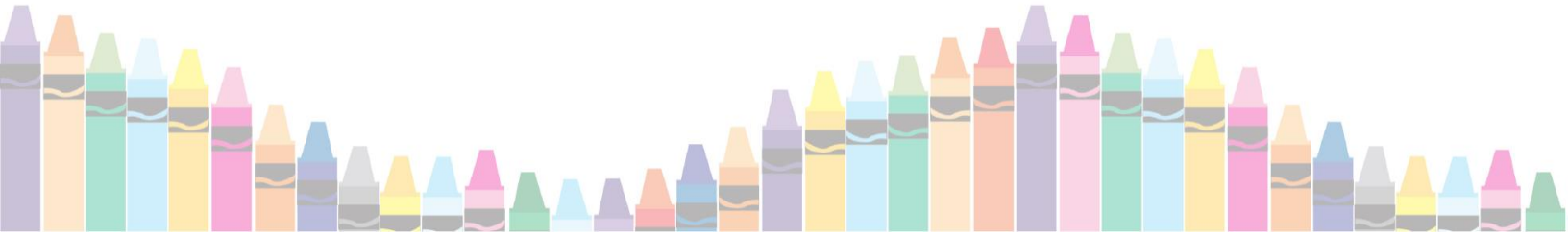
There have been multiple efforts across Nevada to improve education, including improving high school graduation rates. As stakeholders and the community consider ways to bolster education, one issue being explored is modifying the availability of full-day kindergarten (FDK). Currently, some students in public school in Nevada have access to publicly funded FDK; some have access to tuition-based FDK; and others have access to publicly funded half-day kindergarten (HDK).

As Nevada considers ways to improve its education system, there is an opportunity to think about the connection between education and health. This connection is well established by research: people with higher levels of education live healthier and longer lives. They tend to engage in healthier behaviors, have lower rates of illness, and higher life expectancies. This health impact assessment (HIA) considers how expansion of FDK in Nevada could affect health.

HIA provides a systematic process that uses available data to consider how decisions could affect health and, through recommendations, highlights opportunities to enhance health. An HIA consists of 6 steps: (1) screening, (2) scoping, (3) assessment, (4) recommendations, (5) reporting, and (6) monitoring and evaluation.

With funding from the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts, and guidance from stakeholders, including HIA Steering Committee members, and the Kansas Health Institute, the HIA team conducted an HIA to determine how changing access to FDK in Nevada could impact health in the state.

With additional input from community members through a survey and focus group, the team studied how modifications to FDK access could potentially affect health through possible changes to: (1) educational attainment, (2) physical development (nutrition and physical activity), and (3) availability of school-based services (school meals and vision and hearing screenings). In order to do this, the team collected publicly available data, studied existing literature, and obtained data from school districts in Nevada. The HIA used that information, along with feedback from stakeholders, to assess how changes to FDK could possibly impact health in these areas. With additional feedback from the Steering Committee and a community survey, the team produced FDK-related recommendations that have the potential to improve health in Nevada.



The team found that enhancing access to FDK has the potential to contribute to improved educational attainment in Nevada, particularly for students who are English-Language Learners and/or come from low-income households. In turn, improved educational attainment has the potential to improve the health of adults through healthier behaviors and lower rates of disease. Access to FDK also may improve students' access to school breakfast and lunch and to vision and hearing screenings, both of which can impact child and adult health by, for example, affecting eating behavior and learning abilities. By increasing time spent in school, access to FDK could also improve physical development through school-based nutrition education and physical activity. Detailed findings and projections are provided and explained in this HIA report.

These findings are based on the best available information, including data, research findings, and qualitative findings. However, the information and the assessment have limitations. For example, estimates were used to determine how many students are currently enrolled in publicly funded FDK. In addition, projections rely on research from the literature and each of these studies has its own set of limitations. Furthermore, the projections are based on informed assumptions that certain factors impact health and education outcomes. Many of the issues considered in this HIA, like high school graduation rates, are complicated and are affected by multiple, interacting factors.

Based on the HIA process, this report makes the following recommendations related to FDK:

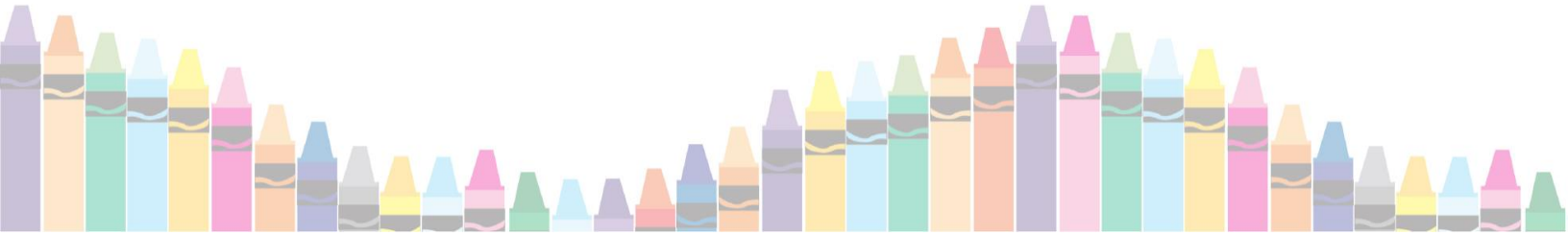
Summary of Findings and Recommendations related to FDK in Nevada

Findings	Recommendations
Educational Attainment and Health	
• **Students who attend FDK have higher test scores in the <u>short-term</u> when compared to students who attend HDK.** • **Low socio-economic status, minority, English Language Learner (ELL) and inner city students who attend FDK have significantly higher <u>long-term</u> math and reading scores in 3rd and 5th grades compared to HDK students.** • **Some students currently enrolled in HDK are eligible for Free and Reduced Lunch (FRL) and are ELL.**	Policymakers could consider continuing to make FDK available to ELL and lower-income students.
• **Regression analysis shows that the percentage of FRL students in a school is the strongest predictor of school wide**	Policymakers could prioritize allocation of funds to schools with the highest levels FRL and ELL students.

reading proficiency rates for elementary, middle, and high schools. • **Based on literature review, it appears likely that the 3rd grade math and reading scores could most drastically improve for Black, Hispanic, ELL, and FRL students with increased FDK access for these groups.**	
• **As of 2015, Nevada begins statewide standardized testing of students at grade three, so data are not currently available to compare outcomes for kindergarten students in full- vs half-day programs.**	Nevada Department of Education and school districts could evaluate the effectiveness of FDK through the following measures: ○ Consider implementing a statewide assessment to measure academic proficiency at both the beginning and end of kindergarten. Given the importance of early childhood education, data could also be tracked by whether the student attended Pre-Kindergarten (Pre-K) and the type of Pre-K program attended. ○ Consider conducting an evaluation of FDK through third grade. ○ Consider continuing to evaluate FDK students through high school to assess the impact on high school graduation rates. Note: For each measure, consider comparing the impact of full-day vs. half-day separately for ELL and FRL students, if applicable.
School-based services (school meals and vision and hearing screenings)	
• **Evidence suggests that food security, which can be bolstered through school-based meals, is associated with positive academic performance for students.** • **Evidence is mixed about the relationship between access to school-based meal programs and overweight and obesity.** • **Additional data is needed to better understand child obesity in Nevada and its distribution within the state.** • **Kindergarten students in both full and half-day programs in the state have access to school breakfast and lunch. However, kindergarten students in half-day programs may not have access to one of these meals because they are not on campus when the meal is served.**	School districts could implement initiatives to: ○ Ensure kindergarten students in full-day programs receive access to both school breakfast and lunch. ○ Increase school meal participation, as recommended by the Centers for Disease Control and Prevention (CDC) by using evidence-informed strategies such as Breakfast after the Bell and universal free breakfast/lunch for all students eligible for reduced price meals. ○ Encourage school districts to work with community organizations to provide meals to students in need that remain in half-day programs and do not have access to breakfast or lunch.

• **School districts in Nevada are currently implementing several initiatives to increase participation in school meal programs.** • **Access to full-day kindergarten could provide access to additional school-based meals.**	School districts, the Nevada Division of Public and Behavioral Health, and local health departments could consider collaborating to measure height and weight annually and to track data over time by using unique student identification numbers to maintain the confidentiality of personally identifiable information and make the data publicly available for monitoring purposes. School Districts could: ○ Collect a representative sample of height and weight information of all students, including kindergarteners. ○ Track changes for individual students over time. ○ Report results to the Chief Medical Officer and the local health authority.
• **Evidence suggests that vision and hearing issues can affect academic achievement.** • **Evidence suggests that detecting vision and hearing issues for students can – when coupled with corrective treatment – lead to improved academic achievement.** • **Most students in half and full-day kindergarten in the school districts studied have access to school-based vision and hearing screening.** • **Access to kindergarten by students who are not currently enrolled could potentially improve detection of hearing and vision issues.**	The Nevada Division of Public and Behavioral Health could consider making the results of the hearing and vision screening data collected by the Chief Medical Officer publicly available, while protecting personally identifying information, for monitoring purposes.
Nutrition Education	
• **Nevada does not require a specific number of minutes for nutrition education. Nutrition education is included in the Nevada Health Standards for Pre-K through 2nd grade (NAC 389.2423), which require students to receive instruction based on specific standards before they finish 2nd grade.**	School districts could begin teaching nutrition education in kindergarten, which is consistent with Nevada health standards for grades K-2 and guidelines of the CDC.
• **Research shows that school-based nutrition education in early elementary school can have a positive effect on knowledge and attitudes about nutrition and physical activity into adolescence.** • **Nutrition education programs that are longer in duration, have a physical activity**	School districts could: ○ Provide professional development to kindergarten teachers on nutrition education strategies, consistent with CDC guidelines. ○ Combine nutrition education with physical activity.

component, hands-on approaches, and parental involvement appear to be the most successful in educating students about nutrition.	○ Work with community partners to obtain grants to promote nutrition education and to support professional development. The Nevada Department of Education could use its website to post resources for a nutrition education curriculum that is appropriate for kindergarten students and is aligned with health standards.
Physical Activity	
• **Nevada does not require a specific number of minutes for physical education (PE) instruction statewide; each Nevada school district's Wellness Policy includes a minimum number of minutes per day for physical activity for students.**	School districts could ensure that kindergarten students receive the minimum minutes of physical activity included in each school district's Wellness Policy through a combination of recess, PE, and physical activity integrated into academic instruction (for example, integrating physical activity within kindergarten classrooms as part of planned lessons that teach mathematics, language arts, social studies, and other academic subjects). School Wellness Policies could meet Healthy People 2020 recommendations for PE and recess.
• **School-based physical activity is effective in increasing overall levels of physical activity, improving physical fitness, and some health indicators.** • **School-based interventions are associated with greater school-time physical activity and less time spent watching television.** • **Regular physical activity helps reduce the risk of developing heart disease, stroke, diabetes, obesity, some forms of cancer, high blood pressure and high cholesterol. It has also been shown to have a positive impact on pulmonary function.** • **Adolescents who are physically active have greater bone density, less obesity, and fewer cardiovascular disease risk factors than adolescents who are sedentary.**	Each school district could develop a comprehensive school physical activity program as recommended by the CDC, with an emphasis on programs for kindergarten students. Each plan could: ○ Take into account different approaches necessary for full-day vs. half-day kindergarten programs. ○ As recommended by the Centers for Disease Control and Prevention, implement strategies to ensure that kindergarten students maximize recess for physical activity, including: providing age-appropriate equipment for students, having adult recess supervisors encourage students to be physically active, and providing semi-structured activity that involves activity stations (e.g., jump rope, four square, hopscotch stations). ○ Integrate physical activity within kindergarten classrooms as part of planned lessons that teach mathematics, language arts, social studies, and other academic subjects.



I. Introduction

While most people agree that medical care and healthy behaviors impact health, the environmental and social determinants of health are equally, if not more, important. For example, the environment around us and how our communities are built can impact injury, safety, and physical activity. Ultimately, decisions made in sectors usually considered outside of health, such as transportation and planning, can have important intended and unintended impacts on health. Education, too, is connected to health (Marmot & Wilkinson, 2006). This HIA assesses how modifying access to full-day kindergarten (FDK) in Nevada could potentially impact health.

Nevada Context

Nevada consistently ranks low on assessments of educational outcomes based on test scores, graduation rates, and other educational metrics. Decision-makers and stakeholders are considering ways to improve the K-12 education system and several education-oriented initiatives are currently in progress throughout the state to address this issue. They include initiatives such as the Las Vegas Healthy Communities Coalition (led by community stakeholders and the United Way of Southern Nevada), which uses the "collective impact model" to encourage concerted action across agencies and organizations to address educational needs. Decision-makers in Nevada have debated ways to address the educational needs of the state's children. Discussions have included expanding access to FDK.

At the same time, Nevada ranks low on several chronic and acute health-related measures. Evidence suggests that FDK may be associated with improved educational attainment and improved health outcomes, particularly in lower-income and minority communities (Hahn et al., 2014). Through this HIA, the team considers the relationship between FDK and health and assesses how FDK could potentially impact health in Nevada. This HIA is intended to study the relationship between health and education. It also seeks to introduce the HIA tool to the community and build capacity to engage in collaborative analysis among partners.

Connection between education and health in both children and adults

The relationship between education and health is well documented. Education impacts the health of children through a number of mechanisms, including access to school-based meals, access to school-based health screenings, and access to nutrition education and physical education. Additionally, early childhood education and overall educational attainment are correlated to lifetime health outcomes. The relationship between lifetime educational attainment (e.g. high school graduation and college education) and health in

adulthood is established by research (Braveman, Egerter & Mockenhaupt, 2011; Braveman, Egerter & Williams, 2011; Bravemen & Gottlieb, 2014; Marmot & Wilkinson, 2006). Adults with higher lifetime educational attainment have lower rates of disease and live longer lives (National Longitudinal Mortality Study, 2010).

Relationship of kindergarten to education and health

This HIA examines the connection between access to kindergarten and health—directly and through educational attainment. As discussed in this HIA, in the short-term (at the end of kindergarten or beginning of 1st grade), kindergarteners that attend FDK have higher test scores when compared to those that attend HDK (Hahn et. al., 2014).

Conclusions about the long-term educational benefits of FDK are less definitive. However, research suggests that certain students who attend FDK—particularly low socio-economic status, minority, English Language Learner (ELL), and inner-city students—maintain significant differences in math and reading scores on 3rd and 5th grade standardized tests when compared with students in HDK (Chang, 2012; Cooper, Allen, Patall, & Dent, 2010). A longitudinal study conducted by Nevada's Clark County School District (CCSD) suggests that FDK students may outperform their HDK peers on reading and math tests in the 3rd and 4th grades (Importantly, the generalizability of this study may be limited due to: differences between the types of students with access to FDK during the study and now; because the study considered student performance only through 4th grade; and because of the importance of other factors.) (See Table G, Appendix 2). As discussed in this HIA, proficiency on 3rd grade reading and math scores is associated with high school graduation—which in turn is connected to multiple measures of adult health, including healthy eating, exercise, smoking, heart disease, high blood pressure, diabetes, and cancer.

II. Background

To better understand the status of kindergarten in Nevada and how changing access to FDK could impact health, the HIA team examined current access to kindergarten in Nevada as well as some key indicators for children in the state.

Education in Nevada

The HIA team obtained student enrollment and test score data from publicly available government sources. In the 2013-2014 school year, Nevada schools had a total enrollment of 451,730 students across 17 public school districts, state charter schools, and state university schools (Demographic Profile in Nevada Report Card, 2013-2014).

While it is difficult to compare educational outcomes from state to state due to the available data, on the National Assessment of Educational Progress (NAEP), a uniform test administered throughout the country to measure student subject-matter knowledge, Nevada's 4th and 8th graders tend to be less proficient (meaning they are less likely to demonstrate subject-matter knowledge, application of the knowledge, and related analytical skills) than similar students in the nation as a whole (See Table 1).

Table 1. Nevada Student Test Scores

National Exam: NAEP, 2011 [1]	**Nevada**	**USA**
Grade 4 Math, % proficient or above	32	38
Grade 4 Reading, % proficient or above	24	32
Grade 8 Math, % proficient or above	25	33
Grade 8 Reading, % proficient or above	22	29
Nevada State Exam: CRT, 2014 [2]	**Nevada**	
Grade 3 Math, % proficient or above	65.4	
Grade 3 Reading, % proficient or above	61.1	
Grade 5 Math, % proficient or above	66.7	
Grade 5 Reading, % proficient or above	67.6	
Grade 5 Science, % proficient or above	64	
Grade 8 Math, % proficient or above	36.7	
Grade 8 Reading, % proficient or above	52.6	
Grade 8 Science, % proficient or above	57.2	

Sources:
1. National Assessment of Educational Progress, from http://nces.ed.gov/programs/stateprofiles
2. Nevada Report Card, from http://www.nevadareportcard.com/di/main/assessment

In addition, although past estimates have varied, Nevada's high school graduation rate tends to be lower than the national average, with differences by race, ethnicity, English-language status, and geography. In Nevada, about 70.7% of students graduated high school on time compared to 81.4% in the nation as a whole in 2012-2013(U.S. Department of Education, 2014). Certain groups of students have lower rates of graduation than others. For example, on-time high school graduation rates vary by race and ethnicity: 59.0% for American Indian/Alaskan Native students; 81.0% for Asian/Pacific Islander students; 64.4% for Hispanic students; 56.7% for Black students; and 77.2% for White students (U.S. Department of Education, 2014). They also vary by economic status (64% for low income students), English language knowledge (24% for Limited English Proficiency), and disability status (26.4% for students with disabilities)(U.S. Department of Education, 2014).

Compared to the nation as a whole, the measures of education-related indicators for Nevada's children are mixed. Nevada outperforms the national average on some indicators, such as having a smaller percentage of children age 6 to 17 who repeat a grade (8.2% for Nevada vs. 9.1% for the U.S. as a whole). However, on other important education-related indicators, children across the nation outperform children in Nevada. For example, compared to the U.S. as a whole, in 2012, Nevada had greater percentages of 3 to 4 year-old children who were not in preschool and who were below 200% of the poverty level. At the same time, approximately 25% of Nevada's children live in poverty and over half qualify for free/reduced lunch, which is comparable to the national average (See Table 2).

Table 2. Education-related indicators

Demographic indicators	Measure	Nevada (%)	USA (%)
Poverty[2]	% of children ages 0-5 living in poverty (2012)	25	25
Preschool and Poverty[2]	% of children ages 3-4 below 200% poverty level not in preschool (2012)	78	63
Free and Reduced Lunch[3]	Students qualifying for Free and Reduced Lunch Program as a percent of total population (2010-2011)	50.3	48.1
Preschool attendance[2]	% of children ages 3-4 not in preschool (2012)	69	54
School engagement[1]	% of children age 6-17 who are consistently engaged in school (2011-2012)	81.3	80.4
Repeating a grade[1]	% of children age 6-17 who have repeated at least one grade (2011-2012)	8.2	9.1
Activities outside of school[1]	% of children age 6-17 who participate in activities outside of school (2011-2012)	77.5	80.8

Sources:
(1) Nevada Report from the National Survey of Children's Health. NSCH 2011/2012. Child and Adolescent Health Measurement Initiative, Data Resource Center for Children and Adolescent Health website. Retrieved [02/24/15] from www.childhealthdata.org.
(2) KIDS COUNT Data Center from the Annie E. Casey Foundation. Retrieved [02/26/15] from http://datacenter.kidscount.org.
(3) Public School Students Eligible for Free and Reduced Lunch. National Center for Education Statistics. Retrieved [4/30/15] from https://nces.ed.gov

Kindergarten in Nevada: Methodology and Findings

The HIA team accessed publicly available information, engaged community stakeholders, studied current polices, and reached out to school districts to determine the current status of kindergarten in Nevada. Based on this research, the team determined that FDK is not universally available in the state. Nevada's public schools currently may, but are not required to offer FDK. In some schools, FDK is available free-of charge to parents. In other schools, a combination of HDK and tuition-funded FDK are available. Yet in others, only HDK is available to students, with no FDK option.

Based on the information collected, the team estimates that approximately 87% of Nevada's students who are enrolled in public schools currently have access to FDK while 13% have access to HDK, with variation by school district. Additional information on the availability of FDK in the state is provided in Table 3. Importantly, these are estimates based on the best information available to the team. Because there is substantial variability, not only by district but also by school, actual enrollment in different types of kindergarten may vary.

To determine the breakdown of kindergarten enrollment for a baseline, six school districts, representing 87% of the state's population, were selected. The six counties were selected due to their relative size, relative diversity, and data availability. Through outreach to representatives at these six school districts, the HIA team gathered county-specific kindergarten enrollment data. These data were used to estimate county-specific enrollment in: (1) fully-funded public FDK, (2) tuition-based public FDK, and (3) HDK. To supplement data provided by the school districts, the HIA team used data from a publicly available data source maintained by the Nevada Department of Education (NDE).

To estimate the total number of children not attending public kindergarten and not attending kindergarten of any kind, the same state-level kindergarten enrollment data from the NDE were used. The team calculated the difference between 2014 Grade 1 and 2013 Kindergarten enrollment numbers for each selected county and for the state overall.

Statewide estimates of the number of students in public FDK and the number of students in HDK were based on projections from the known enrollment numbers for these six counties, which were based on information available through the NDE website and information obtained from school districts. These estimates indicate that 13% of the kindergartners attending ***public*** school in the state attend HDK while 87% of them attend FDK – either fully-funded or tuition-based (see Table 3). Because this estimate is only for children who attend public school, it does not include kindergarten-aged children who are homeschooled or enrolled in kindergarten in private schools.

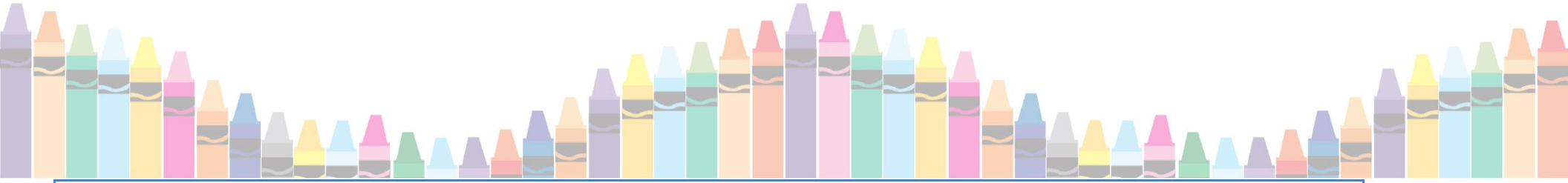
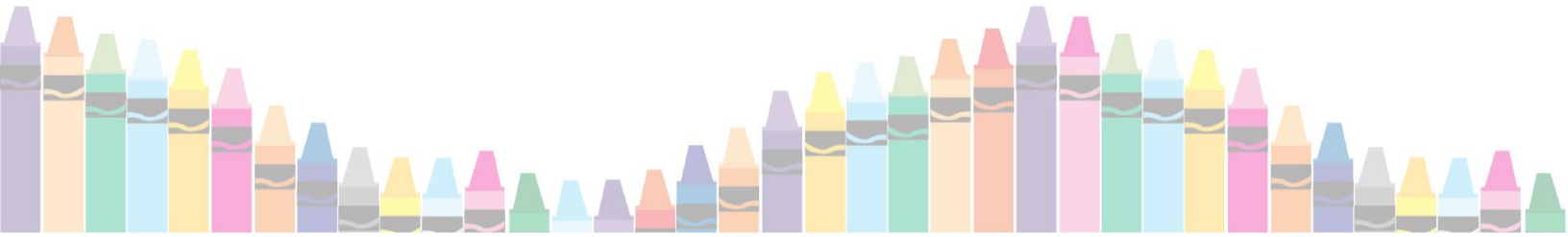


Table 3. Estimated Current Status of Kindergarten in Nevada and Select Nevada Counties

	Nevada		Clark County		Douglas County		Lincoln County		Lyon County		Nye County		Washoe County	
Students in public kindergarten	35,028[a,e]		23,977[d]		402[b]		50[a]		639[a]		372[b]		4692[c]	
Children in private kindergarten or not in kindergarten	2,124*		1,332*		45*		9*		19*		3*		377*	
Students in fully-funded public FDK	29,209[+]	87%	19,221[d]	80%	402[b]	100%	None	n/a	639[a]	100%	372[b]	100%	3,845[#]	82%
Students in tuition-based public FDK			1,225[d]	5%	None	n/a	None	n/a	None	n/a	None	n/a	496[b]	11%
Students in HDK	4,468[+]	13%	3,531[d]	15%	None	n/a	50[a]	100%	None	n/a	None	n/a	351[b]	7%

Estimate methods:
None: No students in the type of kindergarten indicated.
n/a: Not applicable.
*** Based on difference between 2014 Grade 1 and 2013 Kindergarten enrollment per Data Source a.**
[#] Based on subtracting tuition-based and half-day numbers provided in data source b from total provided in data source c.
+ Per Data Source a, these 6 counties represent approximately 88% of all NV kindergartner population. Divided sum of given counties by 88%.

Sources:
a. **State of Nevada Department of Education, All NV Counties Enrollment in Kindergarten 2013 http://www.doe.nv.gov/Business_Support_Services/Reports/**
b. Responses from contacts at respective School District regarding Fall 2014 enrollment. On file with the HIA team.
c. Washoe County School District Count Day, October 2014.
d. Response from CCSD regarding enrollment as of Feb. 2015. On file with the HIA team.
e. This number includes 33,123 students in 17 school districts and 1,905 in public charter schools in 2013.



Information collected from the school districts was also used to inform the team about the availability of school-based nutrition education and physical activity for kindergartners in public FDK and HDK. The school districts provided information on the minutes per week students spend receiving nutrition education, engaging in physical education, and in recess. In general, there is some indication that there are differences in the time spent in general recess, physical education, and nutrition education by district and in some cases by school (see Table 4).

School district information was also used to determine access to school breakfast and school lunch as well as access to health screenings for kindergartners in public FDK and HDK. Based on this information, in general, there appears to be no substantial difference in access to the school-based services considered, particularly for school breakfast and school lunch (see Table 5). However, students in HDK may not have access to school breakfast and school lunch. There also appear to be some differences in access to vision and hearing screening.

Full-day Kindergarten Policies in Nevada

In Nevada, students are required to start attending school at age seven. In addition, a formula for state funding of education allocates money at a lower rate for kindergarten than for grades 1 through 12. Public schools in Nevada may but are not required to provide FDK. Some public schools have publicly funded FDK, others have a combination of tuition-based FDK and HDK, and others only have HDK. Since 2005, some funding has been available for FDK in public schools. It has been prioritized for schools with the greatest proportion of students eligible for Free and Reduced Lunch (FRL). In the 2013-2015 biennium, $98.7 million of state funding was allocated to FDK in schools with a higher proportion of FRL students, an increase of $32 million from previous years. Nevada has been considering expanding FDK access state-wide.

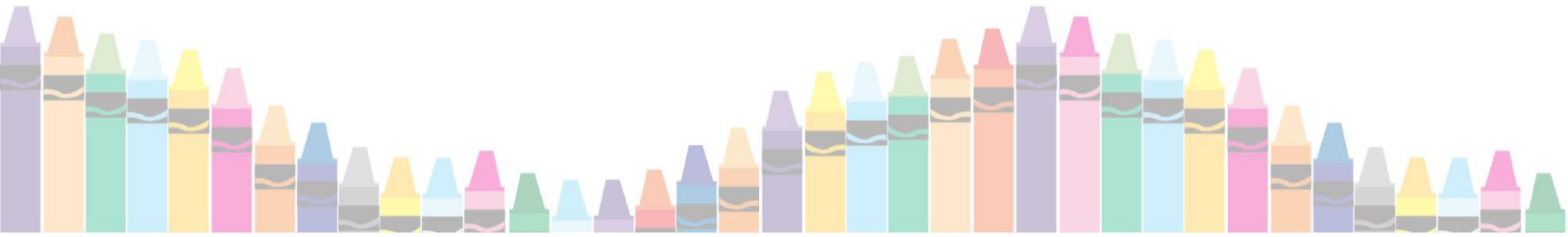


Table 4. Status of Nutrition Education & Physical Activity in Kindergarten Classes in Select Nevada Counties

Minutes per week	Clark County	Douglas County	Lincoln County	Lyon County	Nye County	Washoe County
Nutrition Education in FDK	75*	No formal	N/A	Data not available	No formal	No formal
Nutrition Education in HDK	35*	N/A	No formal	N/A	N/A	No formal
Physical Education in FDK	100	Varies	N/A	Data not available	Varies	60
Physical Education in HDK	50	N/A	Varies	N/A	N/A	30
General Recess in FDK	≤150	225	N/A	225	150	300
General Recess in HDK	≤50	N/A	75	N/A	N/A	0

*** = Minutes allocated for health/science curriculum, which includes nutrition**
N/A = No current kindergarten of that type
No formal = Could be discussed in certain classes, but no district-wide level
Varies = Dependent on the school and class
Data not available = This information was not available to the HIA team.

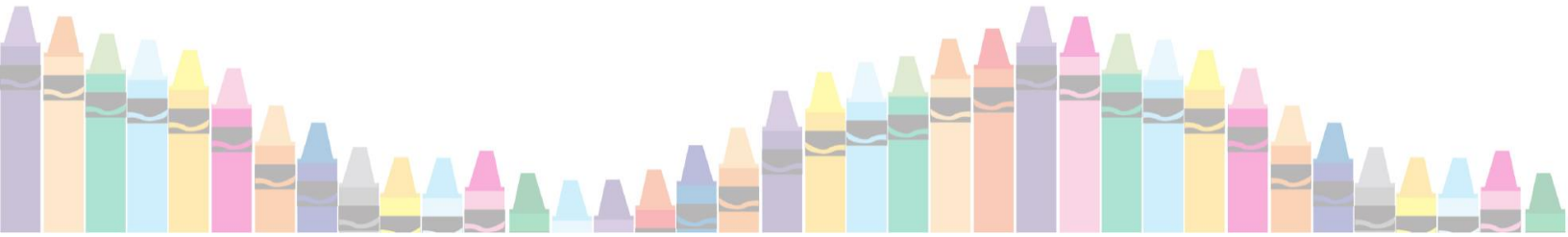
Sources: Responses from contacts at respective School District. On file with the HIA team.

Table 5. Access of Kindergarten Students to School-Based Services in Select Nevada Counties

	Clark County	Douglas County	Lincoln County	Lyon County	Nye County	Washoe County
School breakfast access in FDK	Yes	Yes*	N/A	Yes	Yes	Yes
School breakfast access in HDK	Yes	N/A	Yes	N/A	N/A	Yes
School lunch access in FDK	Yes	Yes	N/A	Yes	Yes	Yes
School lunch access in HDK	Yes	N/A	Yes	N/A	N/A	Yes
Health Screenings access in FDK	Hearing/ Vision	Hearing/ Vision	N/A	Hearing/ Vision	Hearing/ Vision	None
Health Screenings access in HDK	Hearing/ Vision	N/A	Hearing/ Vision	N/A	N/A	None

Key:
*** = Breakfast available at 6 out of 7 schools**
N/A = Not applicable given the kindergarten makeup in the county
None – Not available in the county
Hearing/Vision = Screening for hearing and vision

Sources: Responses from contacts at respective School District. Personal communication; information on file with HIA team. [January through March, 2015]



III. Screening

The HIA team engaged in a screening process to determine whether conducting an HIA would be appropriate and feasible. Based on research and discussions with stakeholders, the HIA team concluded that conducting an HIA on changes to FDK was appropriate.

Selection of Issue

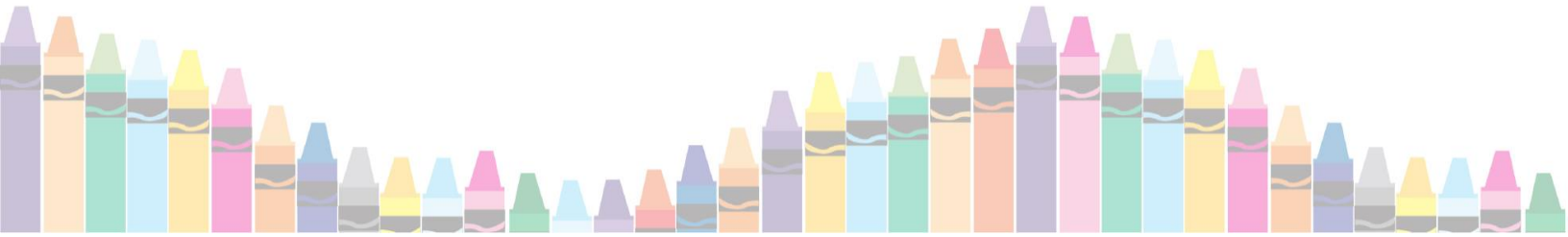
UNLV and members of the Steering Committee decided to assess potential changes to FDK as the subject of the HIA for several reasons. UNLV and partners recognized the current attention on improving the K-12 public education system in Nevada and that there was an opportunity to add value by demonstrating the connections between health and education for decision-makers, stakeholders, and community members and providing additional information for on-going discussions regarding FDK and education in general. Conducting an HIA related to FDK was also determined to be appropriate because available evidence, including a systematic review conducted by the Community Preventive Services Task Force (*The Community Guide*), suggested that – under certain circumstances – FDK is associated with improved educational attainment and health.

In addition, UNLV and several Steering Committee members were interested in learning about the HIA process, participating in an HIA, and bringing the first HIA to Nevada in order to build capacity in this field. The team also determined that the HIA could strengthen relationships among stakeholders by providing an opportunity to work together on an issue of mutual interest.

The Screening Process

This HIA required the following expertise: (1) understanding of the policy process in Nevada; (2) understanding the design and implementation of educational policy in local schools; (3) relationships with community members and stakeholders; (4) an ability to study the relationship between FDK and health outcomes; (5) an ability to model projected impacts; (6) qualitative and quantitative research; and (7) communications expertise. The HIA also required resources such as: (1) staff time; (2) demographic, health, education, and socio-economic data; (3) physical space; and (4) resources for direct expenses, including travel.

Due to the generous support of the Health Impact Project and the commitment from our Steering Committee, the HIA team obtained the necessary resources and expertise. The



HIA team set up a Steering Committee, which met monthly, to guide and inform the research design and all aspects of the HIA. The Steering Committee included key representatives from: (1) Southern Nevada Health District (SNHD); (2) Kenny Guinn Center for Policy Priorities (Guinn Center); (3) Children's Advocacy Alliance (CAA); (4) Honoring our Public Education (HOPE); and (5) an elementary school in Clark County. The Guinn Center, CAA, HOPE, and UNLV team members had experience with policy analysis, communications, and outreach. UNLV team members, including a statistician, also had the necessary quantitative and qualitative research expertise. UNLV, SNHD, CAA, and the Guinn Center also brought an understanding of the connection between education and health, and the ability to project impacts. With grant funding, the group secured the staff and space to conduct the HIA, and worked with state and local health and education agencies to try to obtain requisite data.

IV. Scoping

The Scoping Process

The HIA team worked with stakeholders, including Steering Committee members, parents, community members, health professionals and education officials, for approximately three months to determine the scope of this HIA. These activities are summarized in Table 6.

Table 6: Stakeholder Engagement

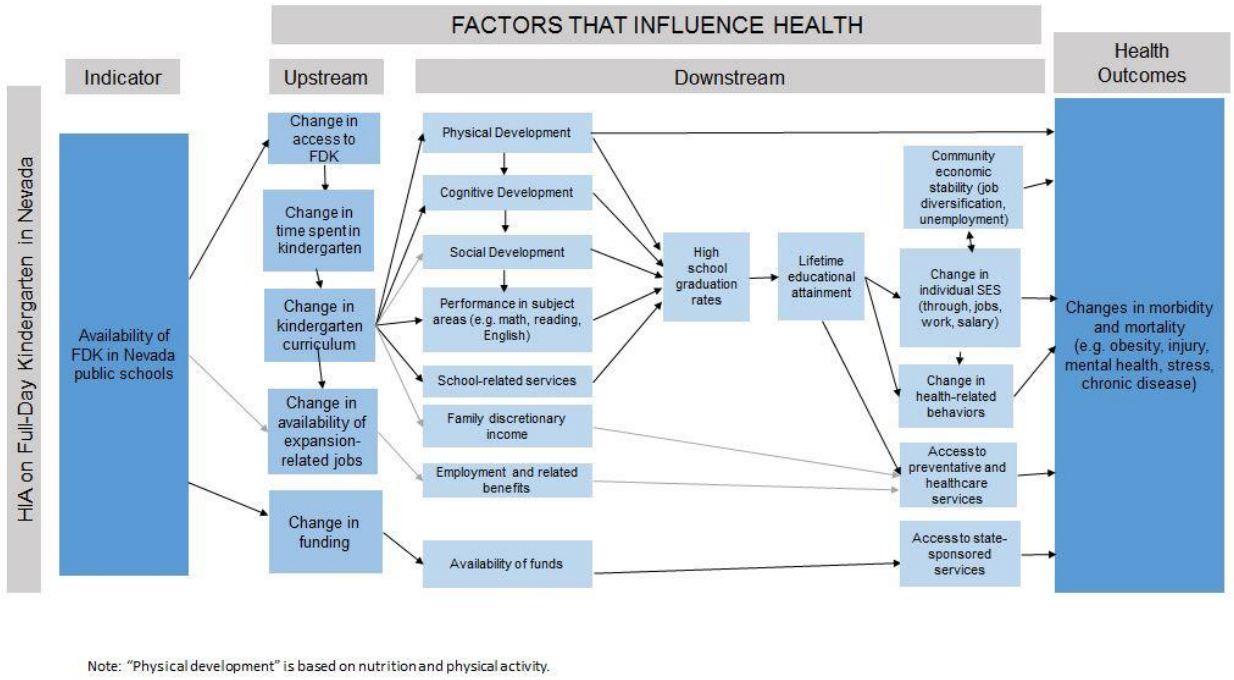
Engagement activity	Summary of details
Steering Committee meetings	• Purpose: To obtain feedback on HIA issues, priorities, relevant data, and methods. • Conducted monthly meetings with Steering Committee members and followed up as necessary. • Obtained assistance in connecting with the community. • Obtained assistance to engage with other key stakeholders including decision-makers and school districts. • Obtained feedback on relevant health issues, including feedback on a draft pathway diagram.
Kick-off event	• Purpose: To introduce stakeholders to concept of HIA, inform them about the FDK HIA, and obtain feedback on priorities. • Attended by state and local decision-makers, health department officials, state and local education officials, parents and community members. • Led to news story in the Las Vegas Review Journal.
Scoping training	• Purpose: To begin constructing a pathway diagram to start brainstorming research questions and methods. • Led by Kansas Health Institute and attended by the HIA team and Steering Committee. • Resulted in a first draft of a pathway diagram and ideas for how to formulate research questions.
Key stakeholder outreach	• Purpose: Inform stakeholders about the project and assess data availability. • Relied on Steering Committee members to inform additional stakeholders about the HIA. • Met with one local school district to discuss research questions and data needs and availability. • Communicated with other school districts on data needed and the availability of the data. • Led to better understanding of data sources.
Scoping	• Purpose: To obtain feedback on community priorities to help focus HIA

survey	efforts.
	• 91 survey participants (surveys were sent to parents and community members through organizations such as the PTA, HOPE).
	  • Participants' top priorities for inclusion in the HIA were: (1) cognitive development and educational attainment (standardized test scores, high school graduation rates); (2) access to school-related services; and (3) physical development.
	  • Survey participants overwhelmingly value FDK. ("Overall, I feel that there is value in full-day kindergarten." 87% strongly agree; 11% agree; 0% disagree; 1% strongly disagree [n=87])
	  • Survey participants overwhelmingly valued equal access to FDK. ("I feel that all kids should have the same access to full-day kindergarten." 88% strongly agree; 10% agree; 0% disagree; 2% strongly disagree [n=88]).
	• Led to feedback on HIA priority areas.

Scoping focus group	• Purpose: Obtain feedback on community priorities to help focus HIA efforts. • 14 focus group participants (included parents, teachers, and community members). • Participants' top priorities were: (1) access to school-related services; (2) cognitive development and educational attainment (standardized test scores, high school graduation rates); and (3) physical development. • Participants were also interested in the relationship between access to FDK and the quality of education. • Participants flagged the need for sufficient facilities and teachers to address FDK needs. • Participants highlighted equity concerns. • Led to feedback on HIA priority areas.

Selected Pathways

Figure 1: Key Areas for Assessment of FDK Changes



Black arrows indicate links that were assessed and gray arrows indicate links that were identified but not assessed in this HIA

During the scoping process, the team developed the initial pathway above (Figure 1). The HIA's pathway diagram provides the visual links between changes to FDK and the potential resulting health effects. However, it is important to note that changes in access to FDK could directly and indirectly impact several other areas beyond the ones described in the pathway diagram. The diagram also illustrates indicators, upstream and downstream factors, and health outcomes. An "indicator" is a direct change that could occur. These indicators could then lead to impacts that can be considered either more "upstream" or "downstream," depending on how directly they would be linked to the ultimate health outcomes. Upstream factors are likely further removed from health outcomes than downstream factors.

Based on feedback collected from stakeholders (including a survey and focus group) and an initial review of the relevant literature, the team determined that this HIA should focus on three major health issues related to FDK: (1) educational attainment – cognitive

development and performance in subject areas; (2) physical development; and (3) access to school-based services. The hypothesized connections described below are covered in more detail in the assessment section of this report.

1. **Educational attainment.** Changes in access to FDK could impact the number of Nevada's children who attend FDK. In turn, the amount of time students spend in kindergarten and—critically—how that time is spent (i.e. the FDK curricula) could impact educational attainment. Given the effect of educational attainment on socio-economic status, health-related behaviors, and access to preventive and healthcare services, changes to FDK could eventually change rates of health-related behaviors (e.g. healthy eating and exercise), morbidity, and mortality.

2. **Physical development.** If changes to FDK affect availability of FDK for Nevada's children, time spent in kindergarten and the kindergarten curriculum could also impact the physical development of children. Changes to physical development, which includes nutrition and physical activity, could directly impact morbidity and mortality rates. In addition, changes to physical development could affect educational attainment through impacts on socio-economic status, health-related behaviors, and access to preventive and healthcare services. This could lead to changes in rates of health-related behaviors (e.g. healthy eating and exercise) morbidity, and mortality.

3. **Access to school-based services.** If changes to FDK affect access to FDK for Nevada's children, time spent in kindergarten could also impact access to school-based services like school-based health screenings and school meals. As a result, there may be changes in access to preventive services, health-related behaviors, and eventually—through changes in lifetime educational attainment—changes in adult health-related behaviors (e.g. healthy eating and exercise), morbidity, and mortality.

Research Questions

In order to complete the assessment, the HIA team researched the following questions using the data sources outlined below.

Table 7: HIA Research Questions

Research questions	Data sources
PRELIMINARY QUESTIONS	
How many children are enrolled in publicly funded FDK in Nevada's public schools?	School districts in Nevada Nevada Department of Education

How many children are enrolled in tuition-based FDK in Nevada's public schools?	School districts in Nevada Nevada Department of Education
How many children are enrolled in HDK in Nevada's public schools?	School districts in Nevada Nevada Department of Education
How many children are not enrolled in any public kindergarten in Nevada?	School districts in Nevada Nevada Department of Education
How many children would gain access to FDK if availability of FDK changed?	School districts in Nevada Nevada Department of Education
COGNITIVE DEVELOPMENT AND ACADEMIC ACHIVEMENT	
What are 3rd grade reading and math test scores for Nevada kindergartners who attended half-day kindergarten?	Clark County School District
What are 3rd grade reading and math test scores for Nevada kindergartners who attended full-day kindergarten?	National Assessment of Educational Progress Nevada Report Card Clark County School District
What are the standardized test scores for children in Nevada throughout elementary school?	National Assessment of Educational Progress
What is the relationship between 3rd grade reading and math test scores and high school graduation rates?	Literature review
What is the relationship between high school graduation rates and overall lifetime educational attainment (i.e. college graduation)?	Literature review
What is the relationship between lifetime educational attainment and morbidity and mortality in general and in Nevada? • **What is the relationship between lifetime educational attainment and socioeconomic status?** • **What is the relationship between lifetime educational attainment and health-related behaviors? (smoking, healthy eating, exercise)** • **What is the relationship between lifetime educational attainment and access to healthcare and preventive services? (health insurance)** • **What is the relationship between lifetime educational attainment and heart disease, obesity, diabetes, asthma, and mortality?**	BRFSS Literature review
PHYSICAL DEVELOPMENT	
How much physical activity do Nevada children in FDK participate in?	School districts in Nevada
How much physical activity do Nevada children in HDK	School districts in Nevada

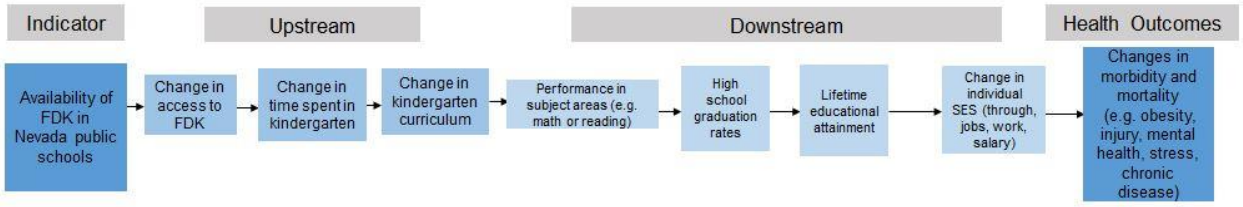
participate in?	
How much nutritional education do Nevada children in FDK receive?	School districts in Nevada
How much nutritional education do Nevada children in HDK receive?	School districts in Nevada
What is the relationship between physical activity and morbidity and mortality? • **What is the relationship between physical activity and health-related behaviors?** • **What is the relationship between physical activity and heart disease, obesity, diabetes, asthma, and mortality?**	Literature review
What is the relationship between healthy eating and morbidity and mortality? • **What is the relationship between healthy eating and health-related behaviors?** • **What is the relationship between nutrition and heart disease, obesity, diabetes, asthma, and mortality?**	Literature review
SCHOOL-BASED SERVICES	
What school-based services (e.g. school meals, health screenings) are available to children in FDK?	School districts in Nevada
What school-based services (e.g. school meals, health screenings) are available to children in HDK?	School districts in Nevada
What is the relationship between school-based services (e.g. school meals, hearing screenings, vision screenings) and lifetime educational attainment?	Literature review
What is the relationship between school-based services (e.g. school meals, hearing screenings, vision screenings) and health?	Literature review

V. Assessment and Recommendations

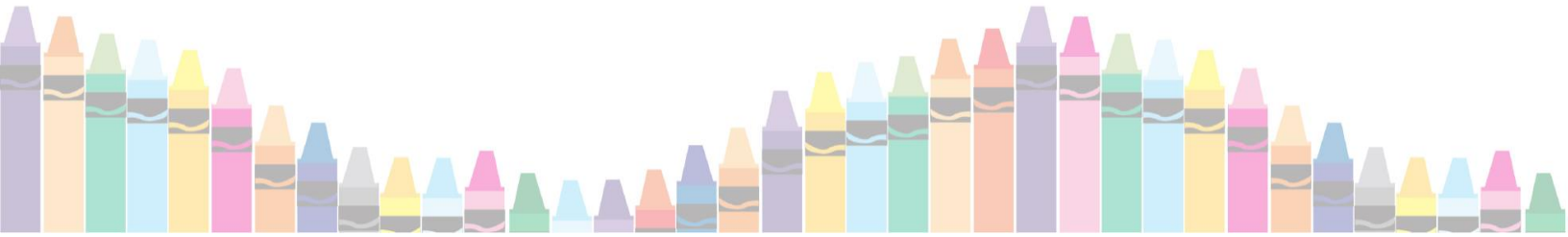
Data analysis and literature reviews were conducted for each issue studied. The team also assessed the likely impacts of expanded FDK and, with substantial involvement from the Steering Committee, produced recommendations to enhance health. Draft recommendations were discussed with the Steering Committee and further modified according to Steering Committee input. In addition, the team conducted a survey of community members to determine the perception of the importance of the draft recommendations. 147 people completed the on-line survey. The overwhelming majority of participants indicated that it was very or moderately important for children to access FDK and for Nevada to learn more about the connection between FDK and educational attainment (at least 80%). The overwhelming majority of participants also indicated that students should have access to school breakfast and lunch, nutrition education, and physical activity (at least 78%). Approximately half of the participants indicated that it was very to moderately important to screen students for height, weight, vision and hearing. Survey findings are provided in Table A, Appendix 5.

Full-Day Kindergarten and Educational Attainment

Figure 2: Pathway Diagram for Full-Day Kindergarten, educational attainment, and Health Outcomes



Changing access to FDK for Nevada's children could affect the time students spend in kindergarten. In turn, a change in the amount of time spent in kindergarten could affect performance on standardized math and reading tests (Hahn et. al., 2014). A change in early academic performance may change high school graduation rates and lifetime educational attainment. In-turn, lifetime educational attainment may lead to changes in individual socioeconomic status (e.g. jobs, work, and salary), which could affect morbidity (e.g. obesity, injury, mental health, stress, and chronic diseases) and mortality (death).



To study the relationship between FDK and health, the HIA team assessed the relationship between FDK and 3rd and 5th grade standardized test scores, standardized test scores and high school graduation rates, high school graduation rates and socioeconomic status, and socioeconomic status and health indicators.

Table 8: Findings and Recommendations for Full-Day Kindergarten and Educational Attainment

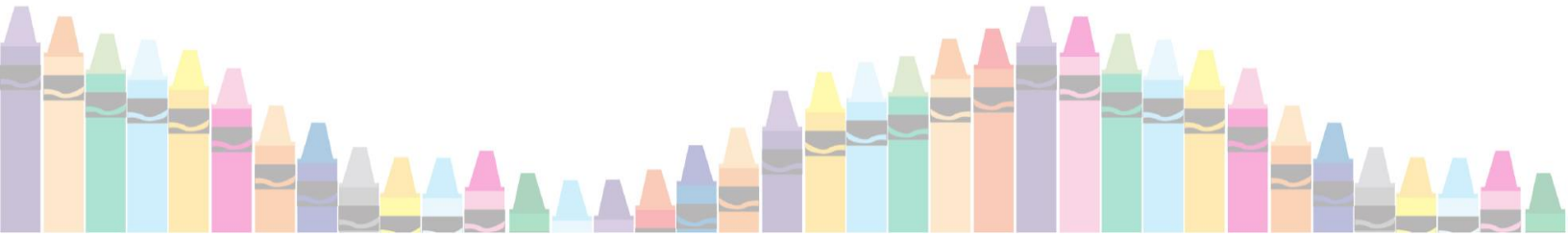
Findings	Recommendations
• Students who attend FDK have higher test scores in the short-term when compared to students who attend HDK. • Low socio-economic status, minority, English Language Learner (ELL) and inner city students who attend FDK have significantly higher long-term math and reading scores in 3rd and 5th grades compared to HDK students. • Some students currently enrolled in HDK are eligible for Free and Reduced Lunch (FRL) and are ELL.	• Policymakers could continue to make FDK available to English Language Learners (ELL) and low-income students.
• Regression analysis shows that the percentage of FRL students in a school is the strongest predictor of school wide reading proficiency rates for elementary, middle, and high schools. • Based on literature review, it appears likely that the 3rd grade math and reading scores could most drastically improve for Black, Hispanic, ELL, and FRL students with increased FDK access for these groups.	• Policy-makers could prioritize allocation of funds to schools with the highest levels of FRL and ELL students.

• As of 2015, Nevada begins statewide standardized testing of students at grade three, so data are not currently available to compare outcomes for kindergarten students in full- vs half-day programs.	• Nevada Department of Education and school district leaders could evaluate the effectiveness of FDK through the following measures.
	  ○ Consider implementing a statewide assessment to measure academic proficiency at both the beginning and end of kindergarten. Given the importance of early childhood education, data could also be tracked by whether the student attended Pre-Kindergarten (Pre-K) and the type of Pre-K program attended.
	  ○ Consider conducting an evaluation of FDK through third grade.
	  ○ Consider continuing to evaluate FDK students through high school to assess the impact on high school graduation rates.
	Note: For each measure, consider comparing the impact of full-day vs. half-day separately for ELL and FRL students, if applicable.

Educational Attainment and Health

The team studied the question: What is the relationship between FDK and health?

The relationship between educational attainment (e.g. high school graduation and college education) and morbidity (disease) and mortality (death) is well documented (Braveman, Egerter & Mockenhaupt, 2011; Braveman, Egerter & Williams, 2011; Bravemen & Gottlieb, 2014; Marmot & Wilkinson, 2006). People with higher educational attainment have lower rates of disease and higher rates of life expectancy (National Longitudinal Mortality Study, 2010). They have greater access to higher paying jobs, jobs in healthier physical environments, and jobs that provide health insurance (Braveman, Egerter & Williams, 2011). Additionally, they are able to afford healthy food, live in communities that support physical activity, and pay for preventive care. People with higher educational attainment are less likely to engage in health-related risk behaviors such as smoking and are more likely to participate in healthy behaviors such as engaging in regular physical activity and



eating fruits and vegetables (CDC, BRFSS, 2013). All of these factors contribute to people with higher educational attainment having lower rates of chronic diseases, including cardiovascular disease, diabetes, and hypertension (CDC, BRFSS, 2013).

What We Have Learned: Full-day Kindergarten and Health

To understand the relationship between education and health and how changes to FDK could impact it, the HIA team conducted a literature review examining several specific research questions, assessed existing, relevant current policies in Nevada, and examined the relevant baseline conditions.

Findings from the literature

A. Is there a relationship between full-day kindergarten and test scores? Research findings consistently demonstrate that students who attend FDK have higher test scores in the short-term (at the end of kindergarten or beginning of first grade) when compared to those who attend HDK. These short-term benefits are realized by all students, regardless of race/ethnicity, income, or knowledge of English (Chang, 2012; Cooper, Allen, Patall & Dent, 2010). Increased access to FDK may result in overall short-term increases in academic achievement.

Findings about long-term educational benefits of FDK are less consistent. Research does indicate that low socio-economic status, minority, English Language Learners (ELL) and inner-city students maintain significant differences in math and reading test scores in the 3rd and 5th grades (Chang, 2012; Cooper, Allen, Patall, & Dent, 2010). This may hold true for at least some parts of Nevada. A longitudinal study conducted by Nevada's Clark County School District (CCSD) tracked the test scores of students who attended FDK vs. HDK in the district. Its findings suggest that full-day students outperform their half-day peers. It is important to note that the findings from this study may not be fully applicable today because of difference in students with access to FDK. Given the findings from the literature, it appears likely that with FDK, 3rd grade math and reading scores could most drastically improve for Black, Hispanic, ELL, and FRL students.

B. Is there a relationship between test scores and high school graduation (educational attainment)? Research findings show that proficiency on reading and math tests in the 3rd grade are a relatively accurate predictor of high school graduation (Barrington et al., 1989). The Annie E Casey Foundation (2011) supported a comprehensive, nationally representative research study of the link between 3rd grade reading skills and high school graduation rates. This research found that approximately one-third of children score as 'not proficient' on 3rd grade reading tests nationally (see

Figure 3). These children account for 63% of all children who do not graduate from high school (see Figure 3).

The relationship between low 3rd grade reading scores and graduation is more pronounced for children living in poverty and for minority students: the risk of dropping out is even greater for minority students and children living in poverty with low test scores (see Figure 4) (Hernandez, 2011). Given the consistent findings that FDK is associated with increased test scores for children living in poverty and minority students, increased access to FDK may result in more students graduating from high school on time.

Figure 3. a. Third-Grade Reading Test Scores, All Children
b. Children Not Graduating High School by Third-Grade Reading Test Scores
***Source: Annie E. Casey Foundation Hernandez, 2011**

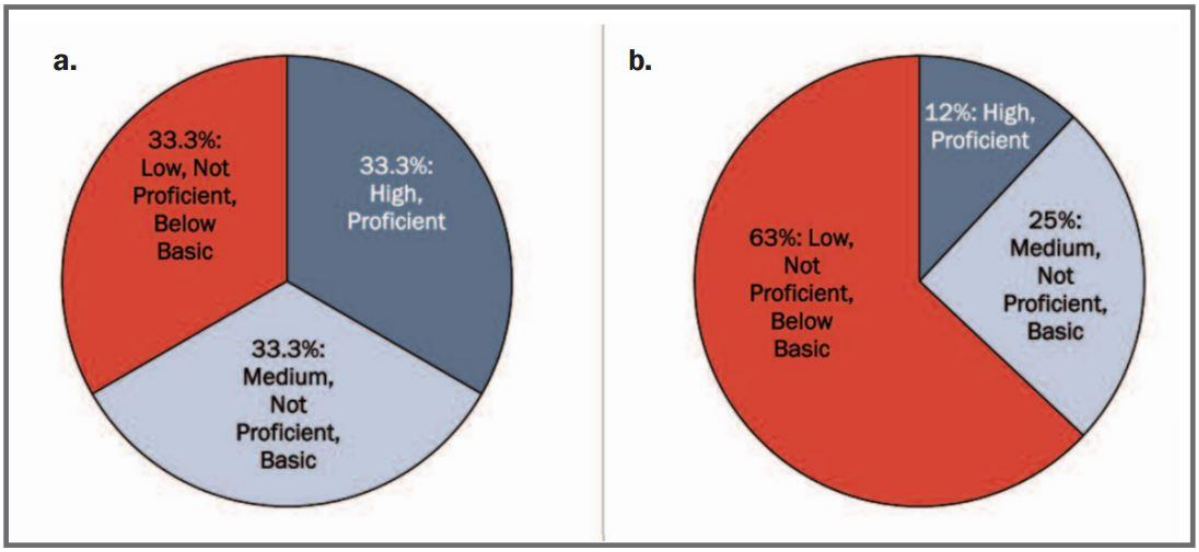
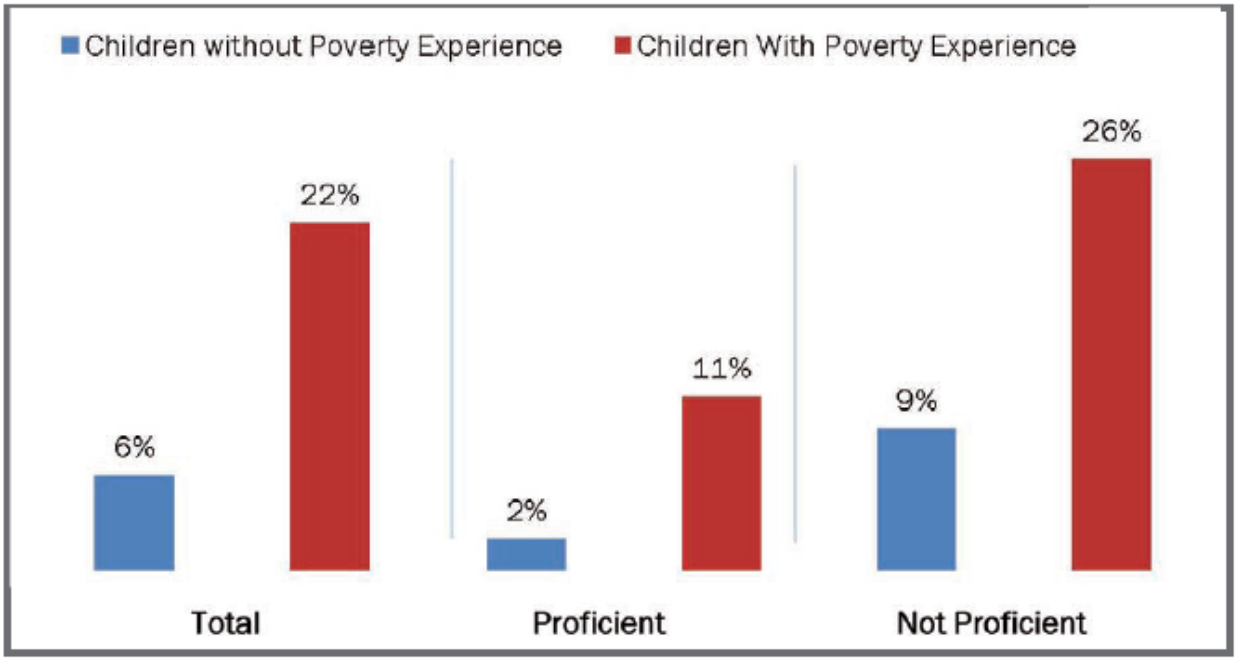


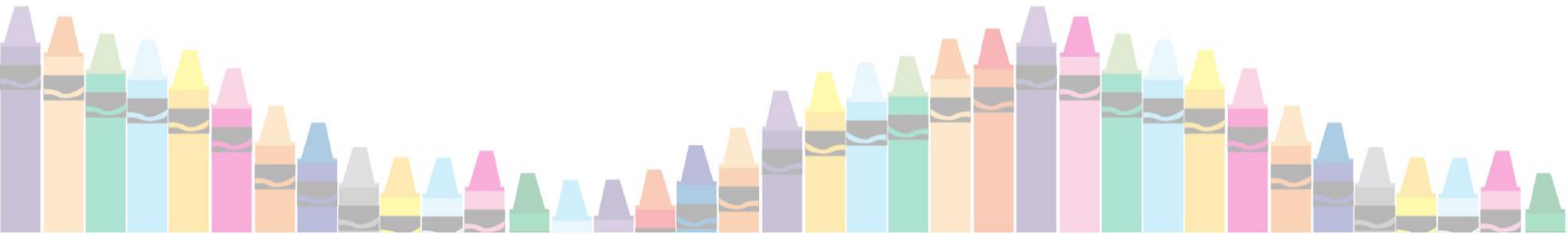
Figure 4. Children not graduating from high school by age 19, by poverty experience and reading proficiency. *Source: Annie E. Casey Foundation Hernandez, 2011



C. **Is there a relationship between educational attainment and employment/economic benefits?** Data from the Bureau of Labor Statistics indicate that those with a high school diploma are more likely to be employed than those without a high school diploma. In February 2015, the national unemployment rate for those without a high school diploma was 8.4% compared to 5.4% for those with a high school diploma (U.S. Bureau of Labor Statistics, 2015). If high school graduation rates increase, a related increase in employment rates could occur.

D. **Is there a relationship between educational attainment and economic benefits?** Adults with a high school diploma have increased earnings compared to those who do not. Weekly earnings are $179 more for adults with a diploma compared to adults without a high school diploma ($651 and $472, respectively) (U.S. Bureau of Labor Statistics, 2015). If high school graduation rates increase and lead to increased employment, it is likely that an increase in individual earnings could occur.

E. **Is there a relationship between educational attainment, socioeconomic status, and health?** Improved educational attainment is consistently associated with improved health outcomes, reduced rates of chronic disease, and prolonged life expectancy. More education is associated with a higher socioeconomic status (i.e. better jobs and higher income) that facilitates access to quality housing in health-promoting neighborhoods,



greater access to safe and secure employment, and increased access to health insurance. Adults with higher levels of educational attainment live healthier lifestyles and have lower rates of mortality (Marmot & Wilkinson, 2006).

Picture of Nevada

Nevada currently begins administering statewide standardized tests to students in 3rd grade, so statewide data are not currently available to compare outcomes for kindergarten students in full- vs half-day programs. However, a longitudinal study conducted by Nevada's Clark County School District (CCSD) tracked the test scores of students who attended FDK vs. HDK in CCSD through 4th grade. This study suggested that full-day students outperformed their half-day peers on reading and math standardized tests (Pitch & Campbell, 2011). Importantly, the information on student performance in this study is only available through 4th grade and may not be generalizable to longer-term impacts. It may also not apply to other parts of the state. In addition, there may be differences in the population of children who had access to FDK at the time of the study and students who are more likely to access FDK today.

As discussed above, FDK may be associated with positive academic outcomes. However, state testing data reveals that 3rd through 5th grade students in schools with state-funded FDK programs have significantly lower standardized test proficiency scores than students in tuition-funded FDK and HDK programs. As Table 9 illustrates, in Clark and Washoe Counties, the average proficiency rates in both reading and math are lower in schools with state-funded FDK than other schools.

A key factor contributing to this difference is that currently, state funding for FDK is prioritized for schools with the highest rates of students eligible for free and reduced price lunch (FRL). Regression analysis shows that the percentage of FRL students in a school is the strongest predictor of school wide reading proficiency rates for elementary, middle, and high schools. Children from low-income families and those living in poverty generally have poorer academic achievement than those in families who have never been poor (McLoyd, 1998).

Table 9 provides the average FRL rates for elementary schools with FDK (76% in Clark and 67% in Washoe County). The rate is higher than the FRL rate for schools with tuition-funded FDK and HDK programs. Table 9 also shows that elementary schools receiving funding for FDK have significantly higher ELL rates (32% in Clark and 29% in Washoe Counties) than other schools.

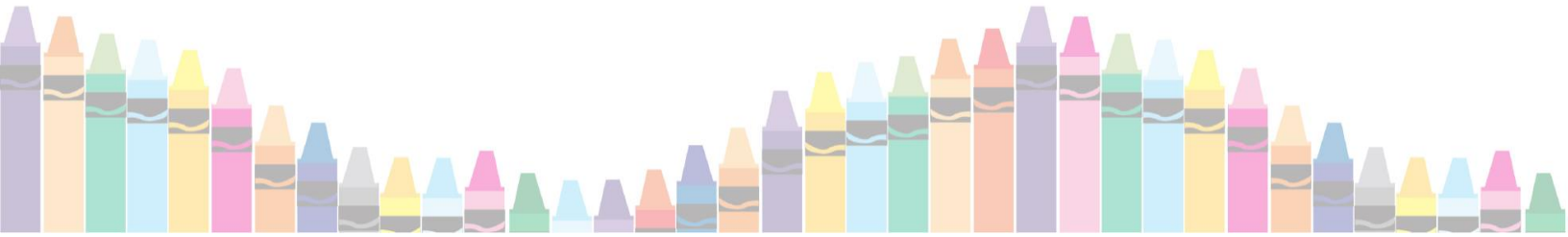


Table 9: Academic Proficiency and Percent FRL and ELL Students in Elementary Schools by Type of Kindergarten Program, 2014. (Nevada Report Card)

District	Program	Number of Elementary Schools	Average % Proficient in Reading	Average % Proficient in Math	Average FRL %	Average ELL %
Clark	Full-Day	150	59.22	61.58	76.06	32.17
	Tuition/ Half-Day	42	81.07	81.82	28.88	7.04
	Half-Day	30	65.12	65.96	46.22	6.24
Clark Total		**222**	**64.07**	**65.93**	**63.33**	**24.37**
Washoe	Full-Day	51	63.84	66.14	67.08	28.93
	Tuition/ Half-Day	11	86.11	87.36	16.04	5.35
Washoe Total		**62**	**67.79**	**69.91**	**58.02**	**25.62**

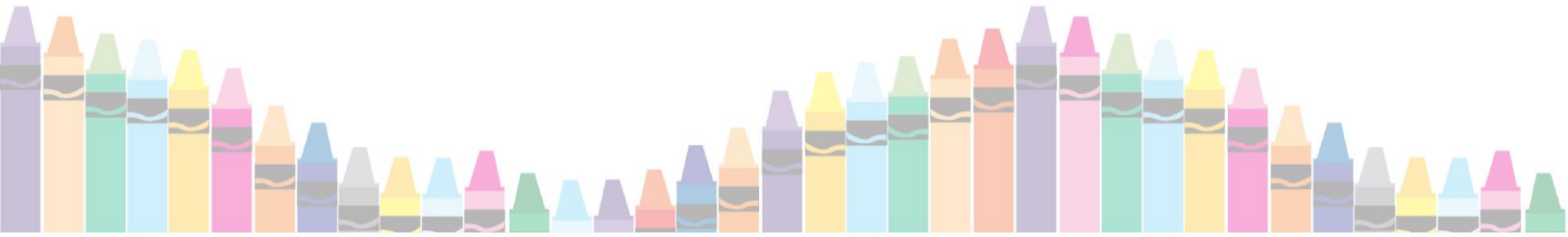


Table 10 compares proficiency rates and race/ethnicity data for different types of kindergarten programs in Clark and Washoe Counties. Schools with state-funded FDK programs have higher rates of Hispanic students than other programs.

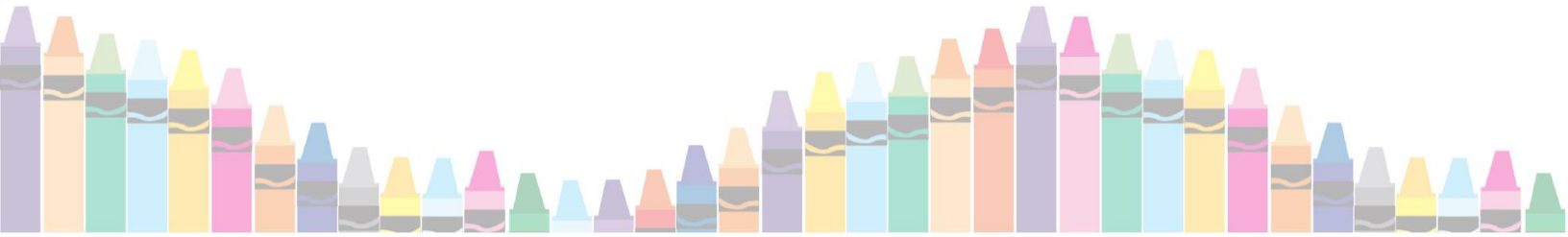
Table 10: Academic Proficiency and Race/Ethnicity in Elementary Schools by Type of Kindergarten Program, 2014. (Nevada Report Card)

District	Program	Number of Elementary Schools	Average % Proficient in Reading	Average % Proficient in Math	Average Hispanic %	Average White %	Average Black %	Average Asian %
Clark	Full-Day	150	59.22	61.58	56.07	18.49	15.04	5.16
	Tuition/ Half-Day	42	81.07	81.82	20.12	50.67	8.30	9.31
	Half-Day	30	65.12	65.96	25.36	52.80	9.03	6.76
Clark Total		**222**	**64.07**	**65.93**	**45.67**	**28.94**	**13.09**	**6.34**
Washoe	Full-Day	51	63.84	66.14	47.81	37.05	3.52	4.47
	Tuition/ Half-Day	11	86.11	87.36	14.83	70.12	4.58	6.38
Washoe Total		**62**	**67.79**	**69.91**	**41.96**	**43.01**	**3.65**	**4.83**

Compared to other states, Nevada students score low on national reading and math assessments. According to the 2011 National Center for Educational Statistics study entitled "National Assessment of Educational Progress," Nevada's 8th grade average scores ranked 41st in math, 44th in reading, and 44th in science. Fourth grade average scores showed Nevada ranking 39th in math and 44th in reading in 2011 (National Center for Educational Statistics, 2012).

In addition, Nevada high school graduation rates are among the lowest in the nation. Nevada public high school 4-year adjusted cohort graduation rate was 71% in 2012-2013, compared to the 81% national rate (US Department of Education, 2014). Failure to complete high school has a direct impact on a person's income potential and quality of life (Tyler & Owens, 2010).

When it comes to health, lower educational attainment is linked to chronic disease risk factors such as high cholesterol, high blood pressure, being overweight, being physically inactive, and smoking. Overall, Nevada residents who have lower educational attainment are more likely to have chronic diseases such as coronary heart disease, diabetes, cancer and obesity (CDC, 2013). Nevada ranks 35th among the 50 states in life expectancy (Lewis & Burd-Sharps, 2015). Nevada residents who have lower educational attainment are also more likely to have lower life expectancy (CDC, 2013).



Projections for Nevada:

Potential Impacts of Full-Day Kindergarten

Estimates from enrollment data from the Nevada Department of Education indicate that the number of students who are currently not enrolled in kindergarten is 2,124, and the number of students who are enrolled in HDK is 4,520 compared to 29,687 enrolled in FDK (both state-funded and tuition-based). This section uses information from the literature to assess the economic and health benefits of increasing access to FDK for two different groups (a) Group I: The 4,520 students currently enrolled in HDK and (b) Group II: The 6,644 students enrolled in HDK or not enrolled in kindergarten at all (NoKG/HDK). These calculations are shown below.

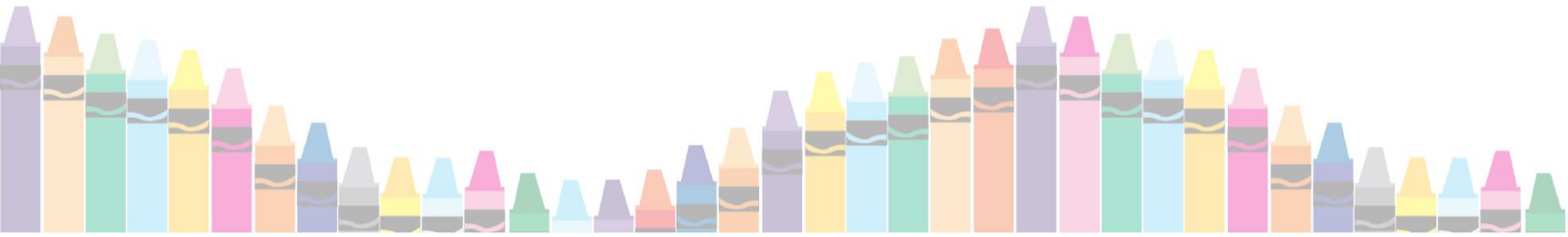
Academic Impacts

A CCSD study of 12 cohorts found that 3rd grade reading proficiency for students in HDK was 71.3%, compared to students in FDK at 84.1%, suggesting that the reading proficiency level of an HDK student could increase by 12.86 percentage points if that student was enrolled in FDK (Pitch & Campbell, 2011). The estimated increase in the number of 3rd grade students proficient in reading for Groups I and II is shown in Table 11. Thus, if more children in Nevada attended FDK, it is estimated that between 581 and 854 additional students could be proficient in reading in the 3rd grade. It is important to note that these projections are based on rates when FDK was available to fewer students than it is currently and the demographics of such students may not be the same. Furthermore, factors other than FDK are likely relevant to 3rd grade reading proficiency. Finally, these projections are based on current estimates of kindergarten enrollment. The actual numbers fluctuate.

Table 11: Estimated Increase in the Number of 3rd Grade Students Proficient in Reading for Students in HDK and Students Enrolled in HDK or Not Enrolled in Kindergarten at All (NoKG/HDK)

Group I: students in HDK	Group II: students in NoKG/HDK
4520 × 0.1286 = 581	6644 × 0.1286 = 854

One longitudinal study of 3,975 US students estimates that by age 19, 88% of children graduate from high school; the graduation rate for children who are proficient in reading in 3rd grade is higher, at 96% (Hernandez et al., 2011). Table 12 relies on this study to estimate the amount of additional high school graduates in Nevada if children in HDK or



those not enrolled in any kindergarten have access to FDK in two scenarios: (a) assuming the national high school graduation rate reported in Hernandez et al. (2011) applies to Nevada students and (b) using Nevada's high school graduation rate, estimated from information available in the literature.

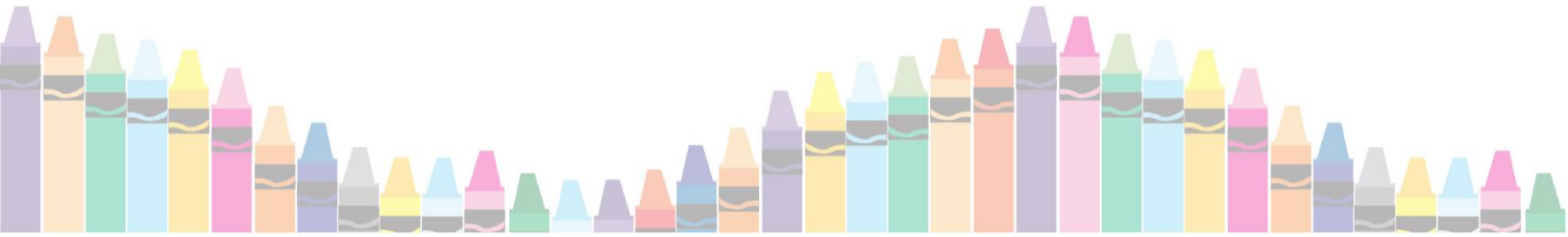
The percentage of ELL students in Nevada who graduate from high school on-time is 24.0% (U.S. Department of Education, 2014), and the overall high school graduation rate is 70.7% (U.S. Department of Education, 2014a). The theorem of total probability expresses the total probability of an outcome given several distinct events (Scheaffer & Young, 2009). Using this theory, we determined the probability of changes in high school graduation rates for children who are 'reading proficient' and 'less than reading proficient.' Thus, we estimate that access to FDK could increase high school graduation in Nevada by 499 to 820 students (see Table 12). These estimates are based on assumed graduation rates and that the relationship between 3rd grade reading proficiency and high school graduation holds as indicated in the literature (See Appendix 3 for probability calculations).

Table 12: Estimated Annual Increase in the Number of HS Graduates if Children in Half-day Kindergarten (HDK) and Children Enrolled in Half-day Kindergarten or Not Enrolled in Kindergarten at All (NoKG/HDK) Were Provided Access to Full-day Kindergarten

	Group I: students in HDK	**Group II: students in NoKG/HDK**
(a) Using US high school graduation rates for 3rd grade reading proficient students	581 × 0.96 = 558	854 × 0.96 = 820
(b) Using Nevada high school graduation rates for 3rd grade reading proficient students	581 × 0.86 = 499	854 × 0.86 = 734

Economic Impacts

According to the U.S. Bureau of Labor Statistics Economic News Release (2015), the unemployment rate for those 25 years and above is 8.4% for people with less than a high school diploma, and 5.4% for high school graduates without a college degree. Assuming that the relationship between FDK, high school graduation, and employment holds as predicted, there would likely be an increase of at least 3 percentage points in the number of persons employed if children currently not in FDK attended FDK. If all additional high school graduates actively seek employment and labor demands exists – two critical



assumptions – the number of individuals employed would likely increase by the amounts shown in Table 13.

Table 13: Estimated Increase in Number of Employed Adults if Children Enrolled in Half-day Kindergarten (HDK) and Children Enrolled in Half-day Kindergarten or Not Enrolled in Kindergarten at All (NoKG/HDK) Attended FDK

	Group I: students in HDK	Group II: students in NoKG/HDK
(a) Using US high school graduation rates for 3rd grade reading proficient students	558 × 0.946 = 528	820 × 0.946 = 776
(b) Using Nevada high school graduation rates for 3rd grade reading proficient students	499 × 0.946 = 472	734× 0.946 = 694

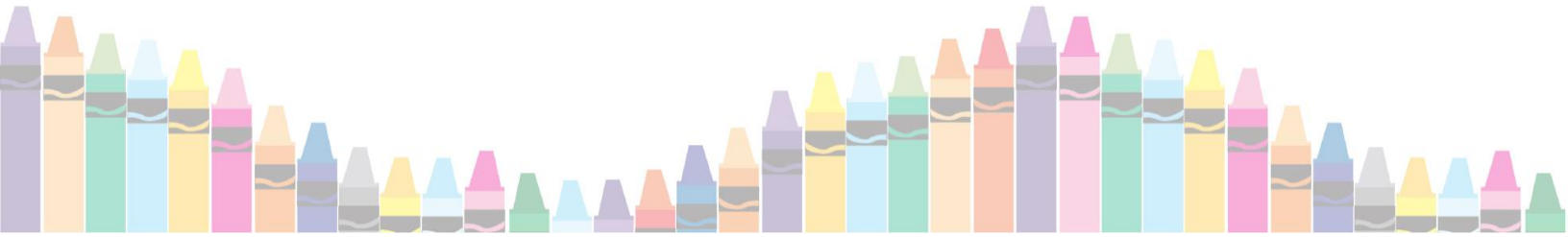
According to the Employment Projections of the U.S. Bureau of Labor Statistics, the median weekly earning of a high school graduate is $651, and that of a person with less than a high school diploma is $472. In other words, a person with at least a high school diploma will make at least $179 more ($651 - $472) per week on average. Table 14 shows the projected statewide increase in annual earnings of this additional work force.

Table 14: Estimated Statewide Increase in Annual Earnings if Children Enrolled in Half-day Kindergarten (HDK) and Children Enrolled in Half-day Kindergarten or Not Enrolled in Kindergarten at All (NoKG/HDK) were Provided Access to FDK

	Group I: students in HDK	Group II: students in NoKG/HDK
(a) Using US high school graduation rates for 3rd grade reading proficient students	52 × 528 × $179 = $4,914,624	52 × 776 × $179 = $7,223,008
(b) Using Nevada high school graduation rates for 3rd grade reading proficient students	52 × 472 × $179 = $4,393,376	52 × 694 × $179 = $6,459,752

Morbidity

Vaughn et al. (2014) used data on individuals 18 years and older from the National Survey on Drug Use and Health (NSDUH) to conduct a stratified logistic regression that estimates the effect of high school education on chronic health conditions. Table 15 (from Vaughn et



al., 2014) demonstrates that those who do not graduate high school have significantly higher rates of chronic disease.

Table 15 Associations Between High School Dropout Status and Chronic Disease
***Source: Vaughn et al, 2014**

Chronic illnesses	AOR	95% CI
Asthma	1.27	(1.15, 1.41)
Diabetes	1.32	(1.19, 1.46)
Heart disease	1.18	(1.04, 1.33)
Stroke	1.55	(1.09, 2.20)
Ulcer	1.34	(1.09, 1.64)
AOR= adjusted odds ratio; CI=confidence interval		

Mortality

A study conducted by Wong et al. (2002) estimated risks of death from major diseases using data from the National Health Interview Survey (1986 – 1994) and from linked vital statistics. These risk estimates were used to calculate potential years of life. One of the main findings of this study was that a person without a high school diploma lost 12.8 potential life years, and a high school graduate lost 3.6 potential life years. In other words, graduation from high school appears to increase 12.8 – 3.6 = 9.2 potential life years per person.

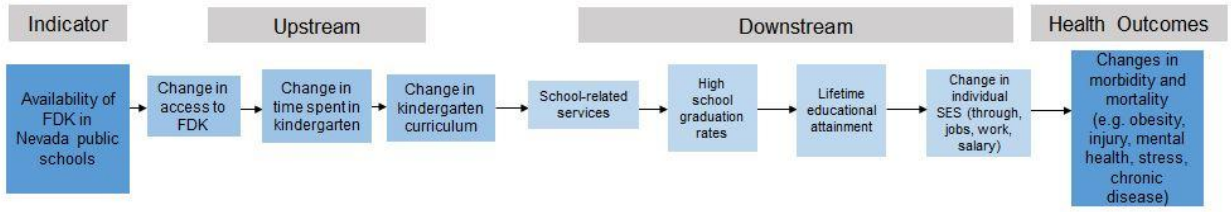
Table 16 shows the estimated total increase in potential life years if children in HDK or NoKG/HDK attended FDK. These estimates indicate that if more children in Nevada attended FDK, there would likely be an increase in the potential life years for them ranging from 5,133.6 to 7,544 years. Importantly, these numbers are based on assumptions about the relationship between FDK and high school graduation and, in turn, high school graduation and potential life years.

Table 16: Estimated Annual In Potential Life Years if Children Enrolled in Half-day Kindergarten (HDK) and Children Enrolled in Half-day Kindergarten or Not Enrolled in Kindergarten at All (NoKG/HDK) Attended FDK.

Group I: students in HDK	Group II: students in NoKG/HDK
558 × 9.2 = 5,133.6 years	820 × 9.2 = 7,544 years

Full-day Kindergarten and School-Related Services

Figure 5: Pathway Diagram for Full-Day Kindergarten, School-Based Services, and health

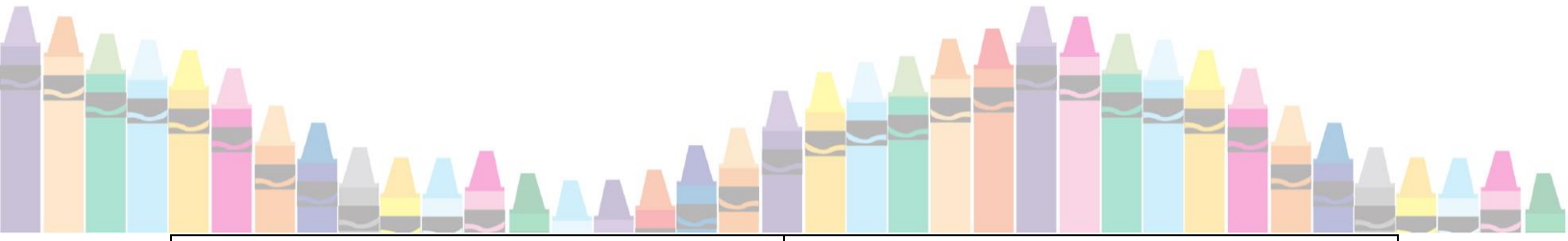


Changing access to FDK for Nevada's children could affect the amount time (i.e., length of school day) some children spend in kindergarten. As a result, there could be a change in access to school-based services, including school-based breakfast and lunch and school-based vision and hearing screenings. Changing access to these school-based services could change access to healthcare and preventive services (i.e. through access to vision and hearing screenings), health-related behaviors (i.e. through access to breakfast and lunch), and eventually changes to health.

To study the connection between FDK and school-based services, the HIA team assessed the relationship between health and school breakfast and lunch as well as health and hearing and vision screenings. It also assessed the relationship between these school-based services and educational attainment, which is connected to adult health.

Table 17 Findings and Recommendations for Full-Day Kindergarten and School-Based Services

Findings	Recommendations
• Evidence suggests that food security, which can be bolstered through school-based meals, is associated with positive academic performance for students. • Evidence is mixed about the relationship between access to school-based meal programs and overweight and obesity. • Additional data is needed to better understand child obesity in Nevada and	• School districts could implement initiatives to: ○ Ensure kindergarten students in full-day programs receive access to both school breakfast and lunch. ○ Increase school meal participation, as recommended by CDC, by using evidence-informed strategies such as Breakfast after the Bell and universal



its distribution within the state. • Kindergarten students in both full and half-day programs in the state have access to school breakfast and lunch. However, kindergarten students in half-day programs may not have access to one of these meals because they are not on campus when the meal is served. • School districts in Nevada are currently implementing several initiatives to increase participation in school meal programs. • Access to full-day kindergarten could provide access to additional school-based meals.	free breakfast/lunch for all students eligible for reduced price meals. ○ Encourage school districts to work with community organizations to provide meals to students in need that remain in half-day programs and do not have access to breakfast or lunch. • School districts, the Nevada Division of Public and Behavioral Health, and local health departments could consider collaborating to measure height and weight annually and to track data over time by using unique student identification numbers to maintain the confidentiality of personally identifiable information and make the data publicly available for monitoring purposes. School Districts could: ○ Collect a representative sample of height and weight information of all students, including kindergarteners. ○ Track changes for individual students over time. ○ Report results to the Chief Medical Officer and the local health authority.
• Evidence suggests that vision and hearing issues can affect academic achievement. • Evidence suggests that detecting vision and hearing issues for students can – when coupled with corrective treatment – lead to improved academic achievement. • Most students in half and full-day kindergarten in the school districts studied have access to school-based vision and hearing screening. • Access to kindergarten by students who	• The Nevada Division of Public and Behavioral Health could consider making the results of the hearing and vision screening data collected by the Chief Medical Officer publicly available for monitoring purposes, while protecting personally identifying information.

are not currently enrolled could potentially improve detection of hearing and vision issues.	

School-Based Services: School Meals and Health

What We Have Learned

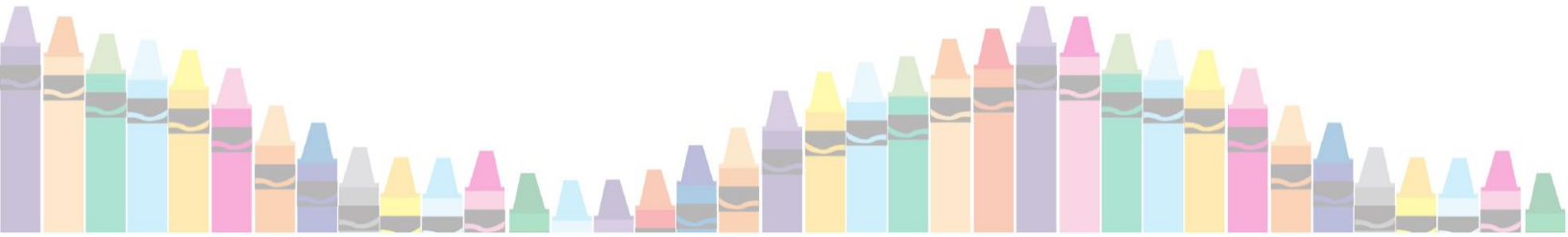
To understand the relationship between school meals and health and how changes to FDK could impact it, the HIA team conducted a literature review, assessed relevant current policies in Nevada, and examined relevant baseline conditions.

Findings from the literature

A. Is there a relationship between school meal programs and health? Overall, findings about whether school meal programs impact students' rates of overweight and obesity are ***mixed***. For example, one study demonstrated that access to school breakfast was positively associated with a lower body mass index (BMI) but found no statistically significant relationship between participation in the school lunch program and any measure of weight (Gleason & Dodd, 2009). Another recent study indicated that school lunches were more nutritious than lunches brought from home (Farris et al., 2014). Yet another study used modeling to suggest an association between participation in the National School Lunch Program and increased BMI, particularly for girls (Mirtcheva & Powell, 2013).

Importantly, some of the results of these studies may have limited applicability moving forward because of recently implemented changes to nutrition standards in school-meal programs. Nutrition standards for the National School Lunch and School Breakfast Programs were modified in 2012 with the Healthy, Hunger-Free Kids Act in order to make school meals healthier. For example, most schools are now required to increase the availability of fruits, vegetables, whole grains, and fat free and low-fat milk in school meals; reduce the levels of sodium, saturated fat and trans fat in meals; and meet the nutrition needs of school children within their calorie requirements.

B. Is there a relationship between school meal programs and educational attainment? The relationship between healthy eating and academic performance is well established in the literature. Generally, research suggests that being either overweight or underweight is associated with lower academic performance. Additionally, an in-depth review of studies considering the association between school breakfast and cognitive performance found that children who skip breakfast could have



issues with alertness, attention, memory, processing complex visual displays, problem-solving, and solving mathematical problems (Basch, 2011). Universal school breakfast programs, in which free breakfast is offered to all students, increase school breakfast participation. In turn, participating in school breakfast programs appears associated with lower rates of school absenteeism (Basch, 2011). Evidence also indicates that failing to consume certain foods, such as fruits and vegetables, is associated with lower student grades. Hunger is associated with an inability to focus, repeating a grade, and being absent from school (CDC, 2014).

Picture of Nevada

All Nevada school districts participate in the National School Lunch Program and the School Breakfast Program. A review of selected school districts shows that kindergarten students in both full and half-day programs have access to school breakfast and lunch. However, kindergarten students in half-day programs may not have access to one of these meals because they are not on campus when the meal is served. Stakeholder input suggests that in rural areas, long bus rides may make it difficult for kindergarten students to arrive at school in time to eat breakfast.

Table 18. School Meals in Nevada

	Clark County	Douglas County	Lincoln County	Lyon County	Nye County	Washoe County
School breakfast access in FDK	Yes	Yes*	N/A	Yes	Yes	Yes
School breakfast access in HDK	Yes	N/A	Yes	N/A	N/A	Yes
School lunch access in FDK	Yes	Yes	N/A	Yes	Yes	Yes
School lunch access in HDK	Yes	N/A	Yes	N/A	N/A	Yes

Key:
*** = Breakfast available at 6 out of 7 schools**
N/A = Not applicable given the kindergarten makeup in the county

Sources: Responses from contacts at respective School District. Personal communication; information on file with HIA team. [January through March, 2015]

Nevada's participation in both National School Breakfast and National School Lunch Program participation rate in 2012-13 was 21.79 percent, which lags the national average of 27.3%. In Nevada 31% of schools have a National School Breakfast Program participation rate below the national average. In addition, 19% of schools have a National School Lunch Program participation rate below the national average (see Table 19) (Nevada Food Security Task Force, 2014).

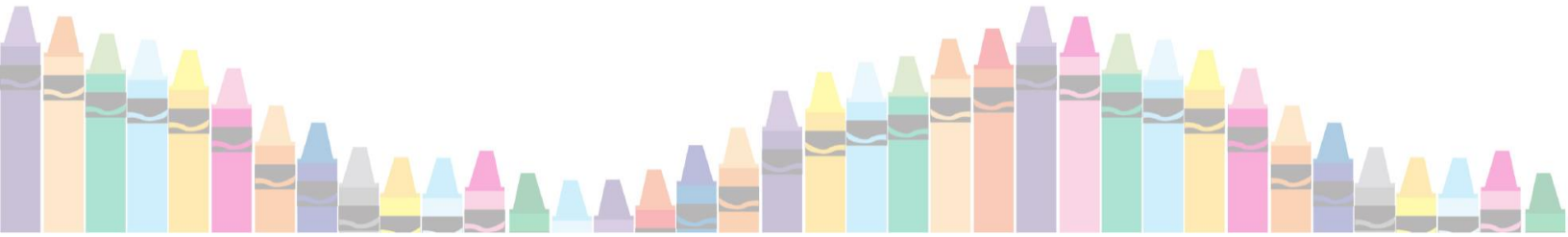
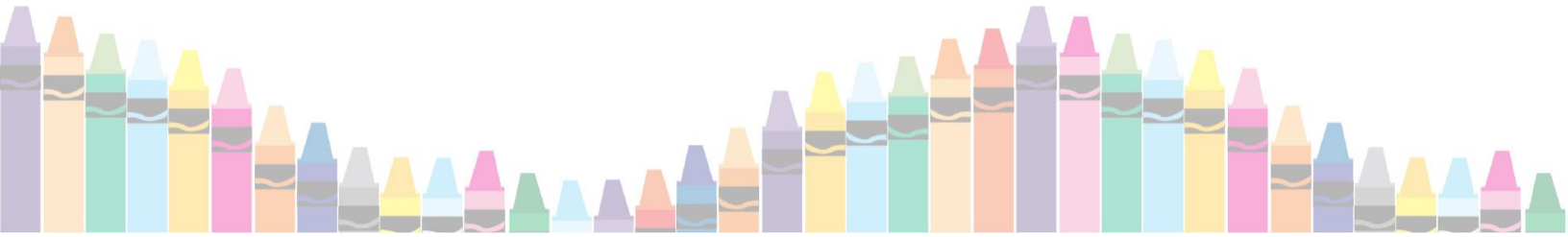


Table 19: Schools with Meal Participation Rate Less than National Average, 2012-2013 *Source: Nevada Food Security Task Force, 2014

District	Schools with School Breakfast Program Participation below the 2012/2013 National Average		Schools with National School Lunch Participation below the 2012/2013 National Average		Total Schools
Carson City	5	42%	2	17%	12
Churchill	1	17%	3	50%	6
Clark	148	41%	86	24%	363
Douglas	2	14%	2	14%	14
Elko	9	29%	4	13%	31
Esmeralda	0	0%	0	0%	3
Eureka	0	0%	0	0%	3
Humboldt	2	14%	2	14%	14
Lander	0	0%	0	0%	5
Lincoln	1	11%	1	11%	9
Lyon	5	28%	2	11%	18
Mineral	1	20%	1	20%	5
Nye	6	25%	2	8%	24
Pershing	2	50%	2	50%	4
Storey	0	0%	0	0%	4
Washoe	20	19%	13	12%	105
White Pine	0	0%	0	0%	9
State Charters	Not available		Not available		18
Total	**202**	**31%**	**120**	**19%**	**647**

School districts in Nevada are currently implementing several initiatives to increase school breakfast participation, including: universal free breakfast (63 schools), universal breakfast at Title I schools (76 schools in CCSD), free breakfast to students eligible for reduced price meals (438 schools), Breakfast after the Bell (73 schools), and Breakfast in the Classroom (32 schools).

In addition, every school district in Nevada has a Wellness Policy that impacts school breakfast and lunch. Each school district's Wellness Policy requires schools to provide 15 minutes for students to eat breakfast and 20 minutes for students to eat lunch. These policies also require that recess occur before lunch (Nevada Department of Agriculture, n.d).



Finally, of relevance, Clark and Washoe School Districts currently must conduct a sample of height and weight for grades 4, 7 and 10. This program is currently set to expire on June 30, 2015.

Projections for Nevada: Potential changes in access to school meals from full-day kindergarten expansion

By increasing access to FDK, students who are either not currently enrolled in kindergarten (about 2,124 students) or enrolled in HDK (about 4,520 students) could gain access to additional school-based meals. Although it is not clear whether additional access to school breakfast and lunch would lead to lower rates of students who are overweight or underweight, it would likely increase the food security for children. Gaining access to school meals would be especially beneficial for children whose families are food insecure; they comprise 15.8% of Nevada families. (Feeding America, 2013). Food security is associated with improved academic performance and, in turn, and over the course of a lifetime, healthier behaviors and lower rates of adult morbidity and mortality (See discussion of FDK and educational attainment).

School-Based Services: Vision and Hearing Screenings

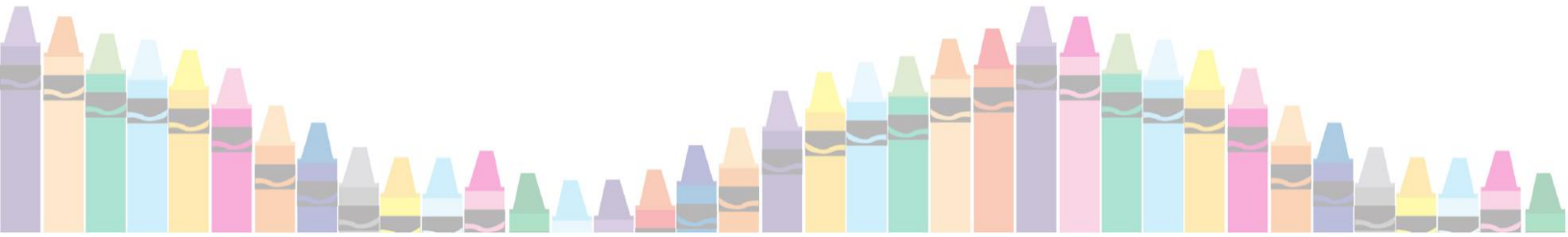
What We Have Learned

To understand the relationship between vision and hearing screenings and health, as well as how changes to FDK could impact this relationship, the HIA team conducted a literature review, assessed relevant current policies in Nevada, and examined the relevant baseline conditions.

Findings from the literature

A. **Is there a relationship between other school services (i.e. hearing and vision screening) and health**? Research suggests that hearing and vision screenings at an early age provide opportunities to detect unrecognized hearing loss or vision problems in students. They can lead to interventions that provide correction and limit further loss. However, screening alone does not correct hearing or vision deficits; follow-up care is necessary. Evidence suggests that screening and treating students with uncorrected vision defects and hearing loss can improve educational outcomes (Basch, 2011; Centers for Disease Control and Prevention (CDC), 2013; Mathers, Keyes, & Wright, 2010).

   Early detection of a student's hearing loss provides an opportunity to limit further loss and improve learning. Hearing screening and subsequent interventions to improve hearing can result in improved learning (CDC, 2013).



B. **Is there a relationship between other school services (i.e. hearing and vision screening) and educational attainment?** Most studies that examine the relationship between vision defects in children and educational outcomes have found a negative association (Mathers et al., 2010). Vision deficits are associated with reading problems and lower scores on achievement tests (Atkinson et al., 2002; Goldstand, Koslowe, & Parush, 2005; Krumholtz, 2000; KULP & Schmidt, 1996; Roch-Levecq, Brody, Thomas, & Brown, 2008; Williams, Latif, Hannington, & Watkins, 2005). Once vision problems are identified and treated, improvements in reading can occur (Johnson, Nottingham, Strutton, & Zaba, 1996; Roch-Levecq et al., 2008). Additionally, identifying and providing early treatment for children with uncorrected refractive error (i.e. blurred vision, nearsighted- and far-sightedness) can improve educational outcomes (Mathers et al, 2010).

   Follow-up care to correct vision and hearing problems is essential in order to realize the improved academic outcomes.

Picture of Nevada

Schools currently must conduct hearing and vision screening "before the completion of the first year of initial enrollment in elementary school" (NRS 392.420). Almost all of the school districts studied report conducting vision and hearing screening for kindergarten students. Beginning in July 2015, screening data must be reported to the child's parent and the Chief Medical Officer in the Nevada Department of Health and Human Services. The Chief Medical Officer must then compile this information to monitor the health status of children (NRS 392.420). Importantly, follow-up care is not currently part of school vision screening programs.

Table 20. Access of Kindergarten Students to School-Based Health Screenings

	Clark County	Douglas County	Lincoln County	Lyon County	Nye County	Washoe County
Health screenings access in FDK	Hearing/ Vision	Hearing/ Vision	N/A	Hearing/ Vision	Hearing/ Vision	None
Health screenings access in HDK	Hearing/ Vision	N/A	Hearing/ Vision	N/A	N/A	None

Key:
N/A = Not applicable given the kindergarten makeup in the county
None – Not available in the county
Hearing/Vision = Screening for hearing and vision

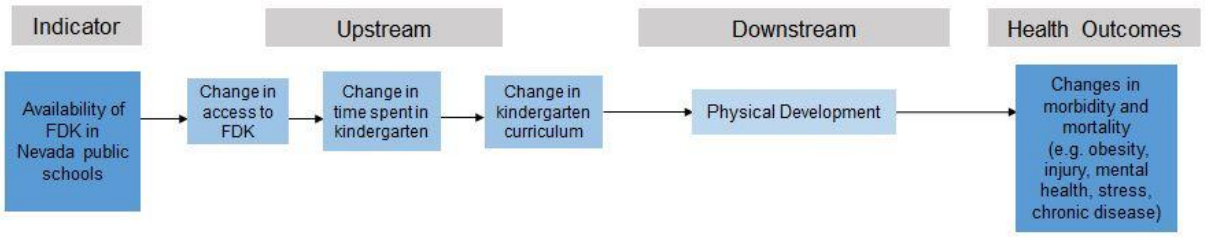
Sources: Responses from contacts at respective School District. Personal communication; information on file with HIA team. [January through March, 2015]

Projections for Nevada: Potential changes in access to health screening from full-day kindergarten expansion

By increasing access to kindergarten, students who are not currently enrolled in public kindergarten (2,124) could gain access to school-based vision and hearing screenings. If any hearing and vision issues are detected via the screenings, they may be treated. As a result, students may achieve academic improvement and, over time through higher educational attainment, improved health-related behaviors and lower rates of mortality and morbidity.

Nutrition Education in School

Figure 6: Pathway Diagram for Full-Day Kindergarten, nutrition education, and health outcomes



Changing access to FDK for Nevada's children could affect how much time children spend in kindergarten. In turn, a change in the amount of time spent in kindergarten could affect the kindergarten curriculum that students are exposed to, including modifying the amount of time students spend on nutrition education. Nutrition education can include dedicated nutrition units and units about general health that incorporate nutrition education. If modified nutrition education leads to different eating patterns, it can affect physical development, health related behaviors, and eventually morbidity and mortality.

To study the connection between FDK and nutrition education, the HIA team assessed the relationship between nutrition education in schools, health behaviors, and health outcomes.

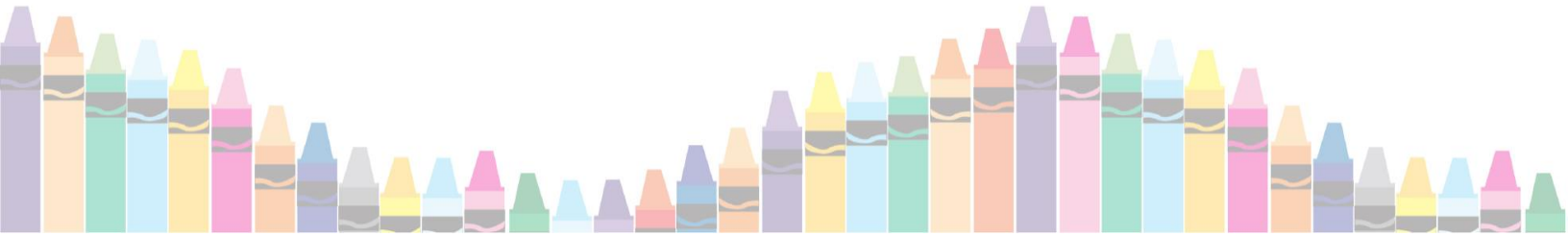


Table 21: Findings and Recommendations for Full-Day Kindergarten and Nutrition Education

Findings	Recommendations
• Nevada does not require a specific number of minutes for nutrition education. Nutrition education is included in the Nevada Health Standards for Pre-K through 2nd grade (NAC 389.2423), which require students to receive instruction based on specific standards before they finish 2nd grade.	• School districts schools could begin teaching nutrition education in kindergarten, which is consistent with Nevada health standards for grades K-2 and guidelines of the CDC.
• Research shows that school-based nutrition education in early elementary school can have a positive effect on knowledge and attitudes about nutrition and physical activity into adolescence. • Nutrition education programs that are longer in duration, have a physical activity component, hands-on approaches, and parental involvement appear to be the most successful in educating students about nutrition.	• School districts could: ○ Provide professional development to kindergarten teachers on nutrition education strategies. ○ Combine nutrition education with physical activity. ○ Work with community partners to obtain grants to promote nutrition education and to support professional development. • The Nevada Department of Education could use its website to post resources for a nutrition education curriculum that is appropriate for kindergarten students and is aligned with health standards.

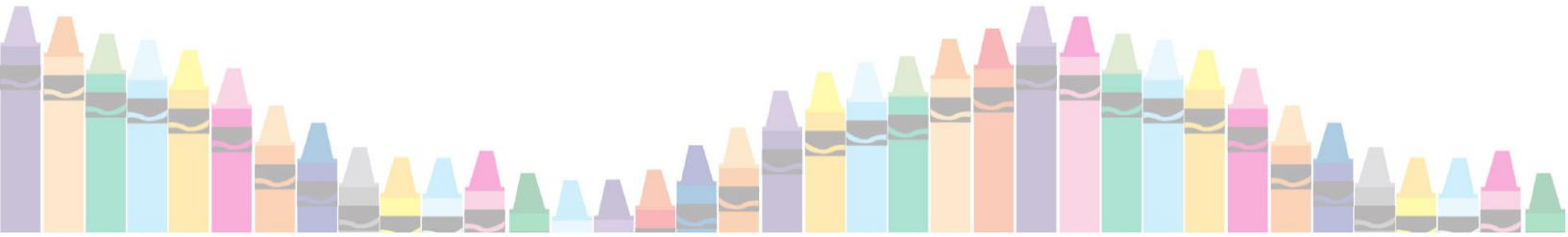
School-based Nutrition Education and Health

What We Have Learned

To understand the relationship between school-based nutrition education and health and how changes to FDK could impact it, the HIA team conducted a literature review, assessed relevant current policies in Nevada, and examined the relevant baseline conditions.

Findings from the literature

A. Is there a relationship between school-based nutrition education and health? Research shows that school-based nutrition education is effective, at least in the short



term, at improving body composition, chronic disease risk factors, and improved nutritional intake (Flynn et al., 2006). Additionally, nutrition education in early elementary school can have a positive effect on knowledge and attitudes about nutrition and physical activity into adolescence (Puma et al., 2013). Nutrition education programs that are longer in duration, have a physical activity component, offer hands-on approaches, and encourage parental involvement appear to be the most successful (Flynn et al., 2006).

Picture of Nevada

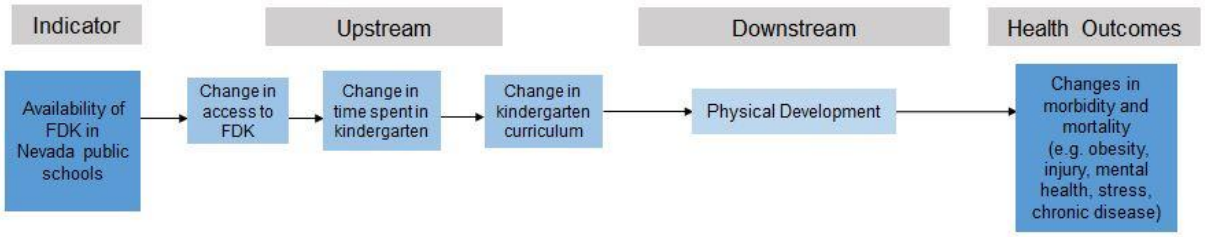
Of the school districts reviewed, only the Clark County School District provides a specified number of minutes per week for health/science curriculum, which includes nutrition. CCSD provides 75 minutes per week for students in FDK and 35 minutes per week for students in HDK. The other school districts (Douglas, Lyon, Nye, Washoe Counties) reviewed do not have formal requirements to provide nutrition education for kindergarten students. However, they may provide nutrition education in kindergarten nonetheless on a school-by-school basis.

Projections for Nevada

Increased class time in kindergarten could enable more time to be spent on nutrition education. By increasing access to FDK, students who are either not currently enrolled in kindergarten (2,124) or enrolled in half-day kindergarten (4,520) would spend more time in the classroom. If some of that time is spent on nutrition education, assuming that the literature findings hold true, these students could potentially have improvements in body composition, chronic disease risk factors, improved nutritional intake, and greater knowledge and attitudes about nutrition and physical activity in Nevada, particularly if these programs are tailored to be more effective by having, for example a physical activity component. Over time, through improved nutrition behavior, these students may have lower rates of morbidity and mortality.

Physical Activity in School

Figure 7: Pathway Diagram for Full-Day Kindergarten, school based physical activity, behavior, and health outcomes



Changing access to FDK for Nevada's children could affect the amount of time that children spend in kindergarten. In turn, altering the amount of time spent in kindergarten could affect changes in kindergarten curriculum, modifying the amount of time students spend in physical education classes as well as the overall amount of time allotted for physical activity in general, including recess and other school-based physical activities. Changing the amount of time spent on physical education and other physical activity may enable changes to physical development, health related behaviors, and eventually changes to health.

To study the connection between full-day kindergarten and school-based physical activity, the HIA team assessed the relationship between amount of physical activity in school (i.e. PE classes, recess), health behaviors, and health outcomes. Table 22 describes findings and recommendations.

Table 22: Findings and recommendations on school based physical activity, behavior, and health outcomes

Findings	Recommendations
• Nevada does not require a specific number of minutes for PE instruction statewide; each Nevada school district's Wellness Policy includes a minimum number of minutes per day for physical activity for students.	• School districts could ensure that kindergarten students receive the minimum minutes of physical activity included in each school district's Wellness Policy through a combination of recess, PE, and physical activity integrated into academic instruction (for example, integrating physical activity within

	kindergarten classrooms as part of planned lessons that teach mathematics, language arts, social studies, and other academic subjects). School Wellness Policies could meet Healthy People 2020 recommendations for PE and recess.
• School-based physical activity is effective in increasing overall levels of physical activity, improving physical fitness, and some health indicators. • School-based interventions are associated with greater school-time physical activity and less time spent watching television. • Regular physical activity helps reduce the risk of developing heart disease, stroke, diabetes, obesity, some forms of cancer, high blood pressure and high cholesterol. It has also been shown to have a positive impact on pulmonary function. • Adolescents who are physically active have greater bone density, less obesity, and fewer cardiovascular disease risk factors than adolescents who are sedentary.	• Each school district could develop a comprehensive school physical activity program as recommended by the CDC, with an emphasis on programs for kindergarten students. Each plan could: ○ Take into account different approaches necessary for full-day vs. half-day kindergarten programs. ○ As recommended by the CDC, implement strategies to ensure that kindergarten students maximize recess for physical activity, including: providing age-appropriate equipment for students, having adult recess supervisors encourage students to be physically active, and providing semi-structured activity that involves activity stations (e.g., jump rope, four square, hopscotch stations). ○ Integrate physical activity within kindergarten classrooms as part of planned lessons that teach mathematics, language arts, social studies, and other academic subjects.

School-Based Physical Activity and Health

What We Have Learned

To understand the relationship between school-based physical activity and health and how changes to full-day kindergarten could impact it, the HIA team conducted a literature review, assessed relevant current policies in Nevada, and examined the relevant baseline conditions.

Findings from the literature

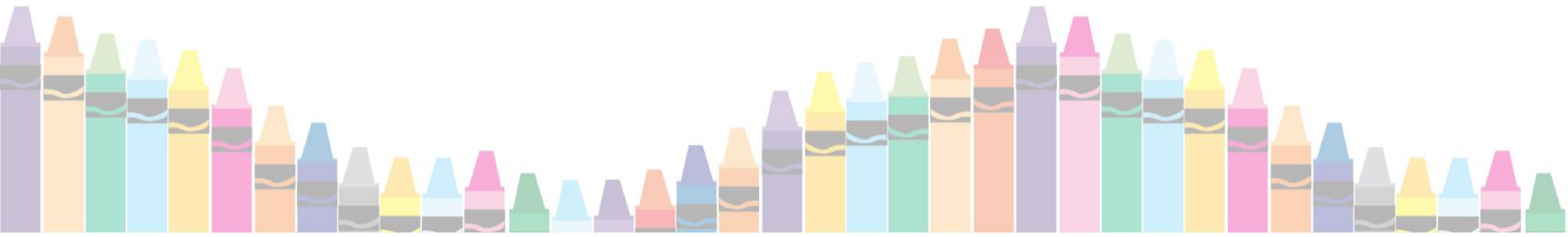
A. **Is there a relationship between physical activity in school and health?** The U.S. Department of Health and Human Services recommends that children and adolescents participate in 60 minutes (1 hour) or more of physical activity each day. Evidence indicates that school-based physical activity is effective in increasing overall levels of physical activity, improving physical fitness and some health indicators. School-based interventions are associated with greater school-time physical activity and less time spent watching TV, but school-based interventions do not appear to increase leisure time physical activity. School-based physical activity interventions are effective in reducing mean blood cholesterol and improving fitness levels among children and adolescents. However, school-based physical activity interventions do not appear effective in reducing mean systolic and diastolic blood pressure, BMI, and pulse rates (DeCorby, Robeson, Husson, Tirilis, 2009).

   Research also demonstrates that regular physical activity reduces the risk for chronic disease, improves overall health and health behaviors, and prolongs life expectancy (O'Donovan et al., 2010; Vuori, 2010; Warburton, Nicol & Bredin, 2006; Myers et al., 2004). Specifically, regular physical activity helps reduce the risk of developing heart disease, stroke, diabetes, obesity, some forms of cancer, high blood pressure and high cholesterol and has been shown to have a positive impact on pulmonary function (O'Donovan et al., 2010; Sothern, Loftin, Suskind, Udall, & Blecker, 1999).

   The importance of physical activity in children and adolescents has also been well studied. Adolescents who are physically active have greater bone density, less obesity, and fewer cardiovascular disease risk factors than adolescents who are sedentary (Andersen et al., 2006; Ferreira et al., 2007; Hind & Burrows, 2007). Adolescent athletes more consistently engage in vigorous physical activity, consume more fruits and vegetables, are less likely to be overweight, are more likely to use a condom and are less likely to use marijuana or cocaine compared to adolescents who are not athletes (Baumert, Henderson, & Thompson, 1998; Dowda, Ainsworth, Addy, Saunders, & Riner, 2001; Pate, Trost, Levin, & Dowda, 2000; Taliaferro, Rienzo, & Donovan, 2010). Additionally, adolescents who participate in sports are more likely to be physically active as adults (Perkins, Jacobs, Barber, & Eccles, 2004).

Picture of Nevada

Nevada's statewide physical education (PE) standards were updated in 2014 to include kindergarten and first grade. Prior to this time, statewide PE standards did not apply to students until second grade. The standards specify that PE must be designed so that pupils



meet performance standards by the end of 2nd grade. Statewide PE does not appear to be specifically required at the kindergarten-level. However, individual schools and districts can have their own requirements.

In addition, state requirements do not specify a specific number of minutes of PE that must be provided. However, each school district's Wellness Policy includes a minimum number of minutes per day for physical activity for students. Fourteen out of 17 school district policies require schools to provide 30 minutes per day for physical activity, which can include recess. Two districts do not specify an amount of time for physical activity (Elko and Lander County) and Mineral County School District requires 20 minutes per day.

Two of the school districts reviewed, the largest two, indicated that they require a specific number of minutes for PE each week for kindergarten students. CCSD requires 100 minutes of PE per week for full-day students and 50 minutes per week for half-day students. Washoe County School District indicated that it provides 60 minutes of PE per week for full-day students and 30 minutes per week for half-day students. The other schools districts reviewed do not have minimum PE minute requirements and the amount of PE provided varies by school (Douglas, Lincoln, Lyon, and Nye County). As indicated by stakeholders, in some school districts, particularly in rural areas, it may be difficult to provide a formal PE class for kindergarten students because the school does not have a PE teacher. All school districts reviewed provide at least 150 minutes of recess per week for FDK students. Clark and Nye provide 150 minutes per week, Douglas and Lyon provide 225 minutes per week, and Washoe provides 300 minutes per week. Half-day students received at least 50 minutes of recess per week in Clark, 75 minutes per week in Lincoln, and no recess in Washoe.

For Nevada's adults, the percentage of people reporting that they meet the physical activity requirements (150 minutes of moderate physical activity and two days of strength training per week) varies by educational attainment. About 19% of those without a high school diploma meet the physical activity requirements, 21.1% of those with a high school diploma meet them, while 23.8% of those with some post high school and 32.2% of college graduates report meeting these requirements (CDC, BRFSS, 2013).

Projections for Nevada: Potential changes in access to school-based physical activity from full-day kindergarten expansion

Increased time in school would likely enable more time to be spent on PE and school-based physical activity. By increasing access to FDK, students who are either not currently

enrolled in kindergarten (about 2,124 students) or enrolled in HDK (about 4,520 students) will potentially increase the time spent in PE, recess, and other school based-physical activities. This of course assumes consistent requirements. Additionally, if the number of Nevadans who graduate high school increases, the number of adults who meet the physical activity requirements could also potentially increase.

Assessment and Projections Summary Table

The assessment and projection findings discussed in this HIA are summarized in Table 23 below. Detailed information leading to these conclusions is provided in the Assessment Section of this HIA. Importantly, this summary is based on the data and literature best available to the HIA team. There are inherent limitations in these projections, as discussed in this HIA.

Table 23: Health Impact Assessment impact analysis summary of findings

HIA Impact Analysis Summary of Findings				
Health outcome/ determinant	**Direction**	**Magnitude**	**Likelihood**	**Distribution**
Test scores, short term	Beneficial	High	Likely	All students, and especially low income, ELL, minority students
Test scores, long term	Beneficial	Low to medium	Possible	Low income, ELL, minority students
High school graduation rates	Beneficial	Low to medium	Possible	Low income, ELL, minority students
Employment status	Beneficial	Low to medium	Possible	Low income, lower level of educational attainment, minority populations
Earned income	Beneficial	Low to medium	Possible	Low income, lower level of educational attainment, minority

HIA Impact Analysis Summary of Findings				
Health outcome/ determinant	**Direction**	**Magnitude**	**Likelihood**	**Distribution**
				populations
Social benefit/crime	Beneficial	High	Possible	State-wide
Child Overweight/obesity	Beneficial	Low	Possible	All students
Child Nutrition knowledge and attitude	Beneficial	Medium	Likely	All students
Child Nutrition behavior and health outcomes	Beneficial	Medium	Possible	All students
Child Physical activity behavior and health outcomes	Beneficial	Medium	Possible	All students
School-based Health services	Beneficial	Medium	Likely	All students
Health behaviors (e.g.: being physically active, not smoking)	Beneficial	Medium to high	Possible	Low income, lower level of educational attainment, minority populations
Adult Morbidity	Beneficial	Medium to high	Possible	Low income, lower level of educational attainment, minority populations
Adult Mortality	Beneficial	Medium to high	Possible	Low income, lower level of educational attainment,

HIA Impact Analysis Summary of Findings				
Health outcome/ determinant	**Direction**	**Magnitude**	**Likelihood**	**Distribution**
				minority populations

KEY:

Direction—indicates whether the effect is adverse or beneficial based on data assessed.

-Beneficial = Changes that may improve health

-Adverse = Changes that may detract from health

Magnitude—refers to the expected size of the effect and can be described by the number of people affected or by expected changes in amount based on data assessed.

-Low = Causes impacts to no or very few people

-Medium = Causes impacts to wider number of people

-High = Causes impacts to many people

Likelihood—refers to the chance or probability that the effect will occur based on data assessed.

-Likely = it is likely that impacts will occur as a result of the proposal

-Possible = it is possible that impacts will occur as a result of the proposal

-Unlikely = it is unlikely that impacts will occur as a result of the proposal

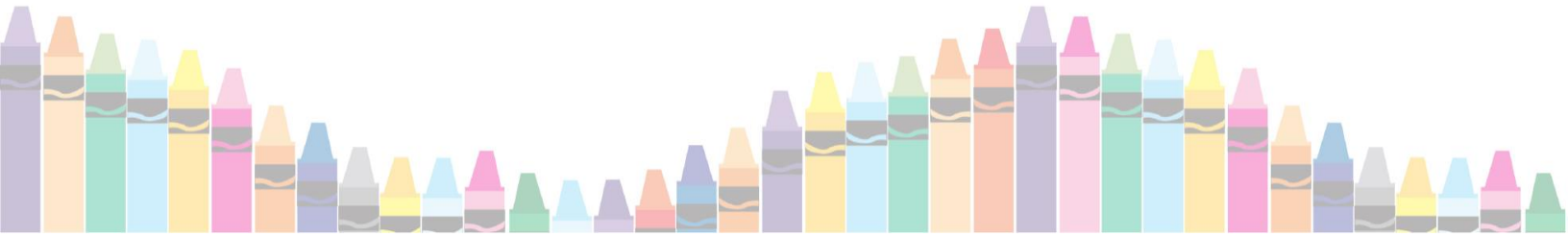
-Uncertain = it is unclear if impacts will occur as a result of the proposal

Distribution—delineates the spatial and temporal boundaries of the effect and identifies various groups or communities that are likely to bear differential effects based on data assessed.

- The subpopulation impacted more

Limitations of data, literature, projections, and recommendations

To assess the potential health impacts of changes to FDK in Nevada, the HIA team collected secondary data on certain measures of education, school activity, health, and family indicators from publicly available databases and sources. However, there are limitations to these data and there is some room for error. For example, the survey data from Behavioral Risk Factor Surveillance Survey (BRFSS) used to understand adult health in Nevada is relatively robust, but its generalizability may be limited partly because is self-reported.

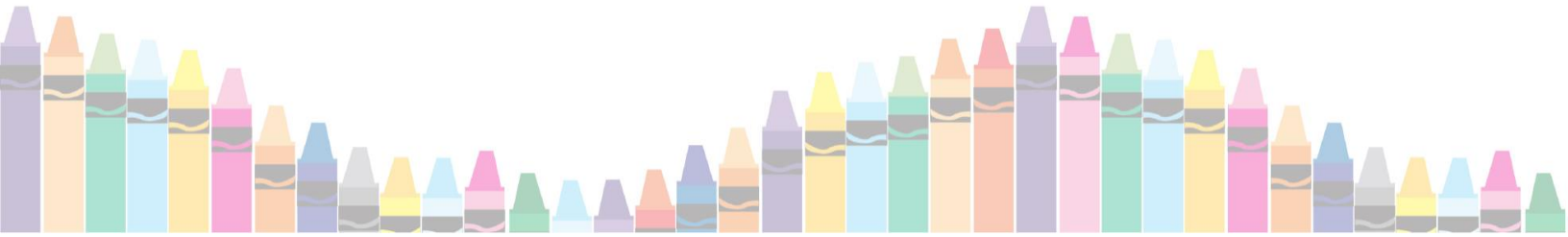


Much of the school-district data were self-reported as well. Although the team attempted to obtain the best possible information, there were no data available for certain indicators, and, in some cases, while the data collected was at the district-level, the indicators may actually be different within each district and may vary by school or even by class.

In addition, the baseline figures for statewide kindergarten enrollment were based on collected data and estimates. To estimate the number of students enrolled in half-day, full-day, and non-public kindergarten as well as the number of students not attending kindergarten of any kind, the team used enrollment data from the Nevada Department of Education and from school districts. The team used the available district-specific information to make statewide projections. To estimate the total number of children not attending public kindergarten and not attending kindergarten of any kind, the team calculated the difference between 2014 Grade 1 and 2013 Kindergarten enrollment numbers for each select county and for the state overall. This does not account for potential differences due to attrition or additional enrolled students. Additionally, no data are available for the students not in public kindergarten. These children could be enrolled in private kindergarten or no kindergarten. For purposes of projections all children not in public kindergarten were grouped together as not attending any kindergarten. As such, projections based on total number of students not attending any kindergarten are subject to some sources of potential error.

To calculate potential changes to health associated with FDK, the team used data from peer-reviewed literature and reports published by government and private entities such as the U.S. Department of Education, the Centers for Disease Control and Prevention, and the Annie E. Casey Foundation. Importantly, each of those studies comes with its own set of limitations that may affect how much can be generalized from them when effects of FDK changes in Nevada are considered. In order to calculate the increase in the number of high school graduates we used information available from research studies found in the literature. However, because the HIA team did not collect the actual data, we cannot estimate uncertainties in these calculations. Moreover, we applied estimates for the U.S. available in the literature to the State of Nevada when Nevada specific data were unavailable. It is unknown if these findings would replicate differently in the State of Nevada.

Furthermore, there are important limitations to the generalizability of the data and literature we used because of the complexity of many of the issues analyzed. For instance,



multiple factors affect high school graduation rates, morbidity, and mortality. Changes to any of these factors could impact the likelihood that the projections are accurate.

VI. Evaluation and monitoring

Evaluation

Evaluation is a key component of public health endeavors. It provides a record of a project's results and allows future researchers to learn from the methods and experiences of previous projects. In a developing field, such as HIA, evaluation plays an especially important role in improving the state of the art by documenting both successes and obstacles encountered by HIA project teams. Finally, evaluation is necessary to provide accountability to both project stakeholders and community partners about the disposition of resources and degree of success of the HIA.

The team will evaluate this HIA of FDK in Nevada on several levels. These levels of evaluation will include:

- **Process** – These measures will describe how and why the HIA was conducted, what resources were used, what evidence was used, how recommendations were made, and how stakeholders and decision-makers were engaged.
- **Impact** – These measures will consider whether and how well the HIA worked, including whether the recommendations were implemented or potential reasons why they were rejected, whether the objectives of the HIA were met, and what other impacts, such as coalition and capacity building, organizational development, and raising the profile of health needs, were accomplished.
- **Outcome** – Outcome measures related to FDK may include increased educational attainment and its potential health effects, such as changes in morbidity and mortality linked to obesity, injury, mental health, and chronic disease. Although monitoring these long-term outcomes is beyond the scope of this HIA, the team will suggest a strategy for monitoring these measures.

Monitoring

Based on feedback from the Steering Committee and community members, the pathway diagram created for this HIA prioritized several immediate effects of the availability of FDK in Nevada. Those upstream measures are identified in Table 24 below, along with a suggested agency.

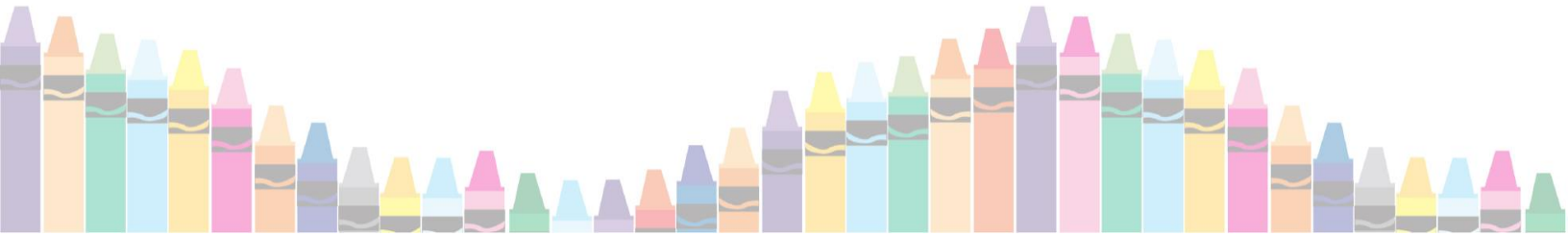


Table 24. Priority upstream outcomes for FDK HIA

Indicator: Upstream Measures	Agency	Data source
Change in access to FDK	School districts Nevada Department of Education	Enrollment records
Change in time spent in kindergarten	School districts Nevada Department of Education	Enrollment records

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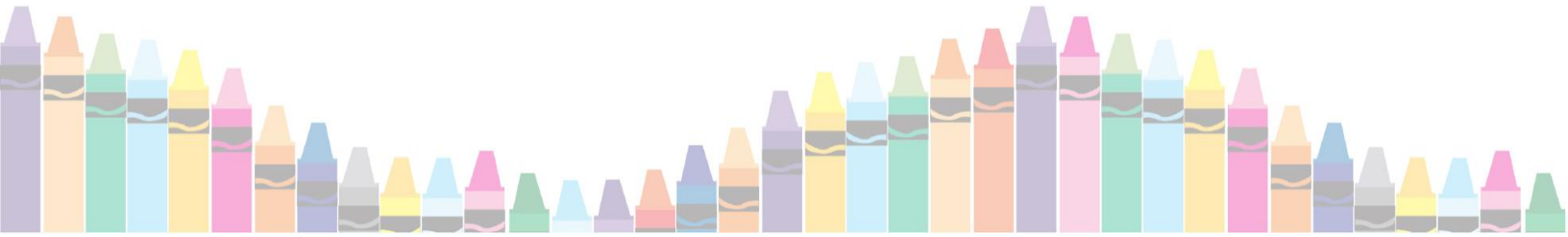

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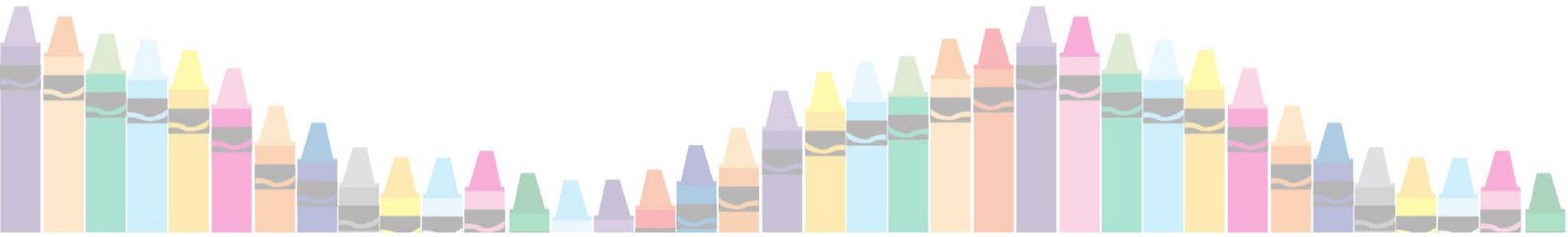

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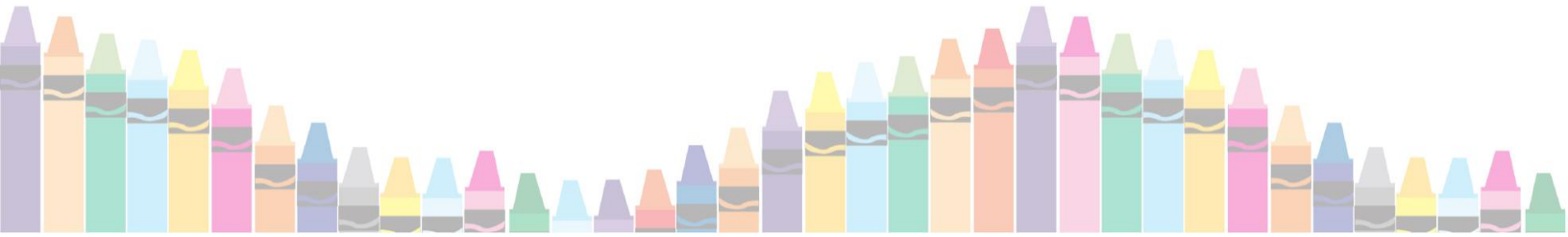

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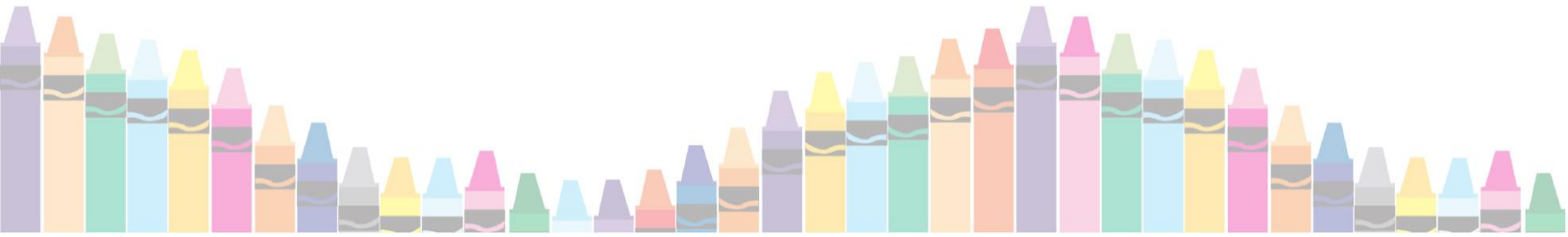

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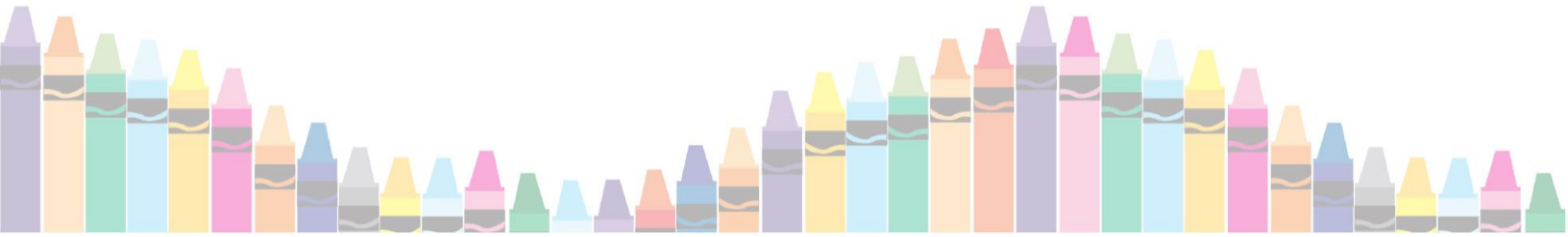

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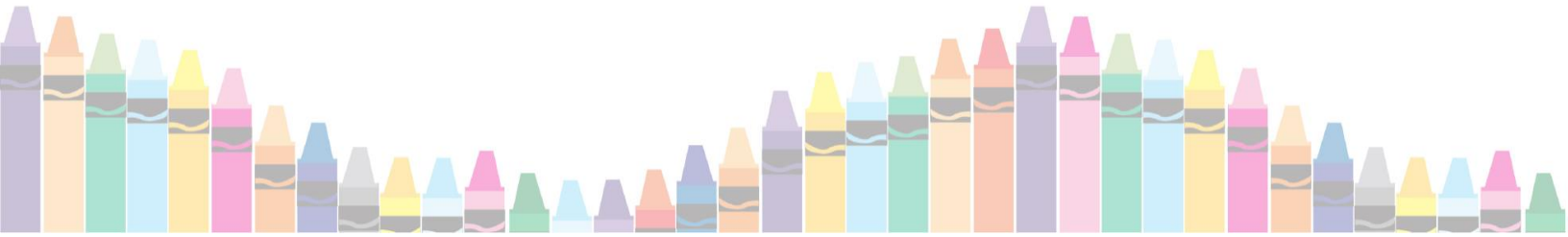

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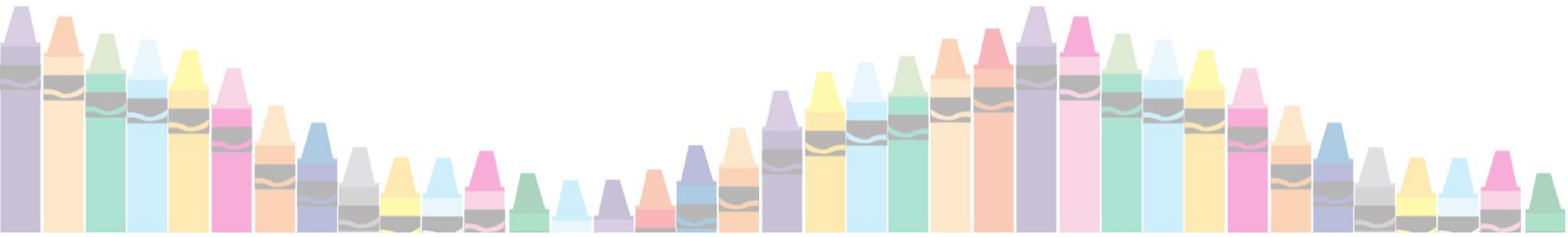

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VII. Appendices

Appendix 1: Key Terms

BMI – Body mass index

CAA – Children's Advocacy Alliance

CCSD – Clark County School District

CDC – Centers for Disease Control and Prevention

ELL – English Language Learners

FDK – Full-day kindergarten

FRL – Free and reduced price lunch

HDK – Half-day kindergarten

HIA – Health Impact Assessment

HOPE – Honoring our Public Education

NAEP - National Assessment of Educational Progress

NDE – Nevada Department of Education

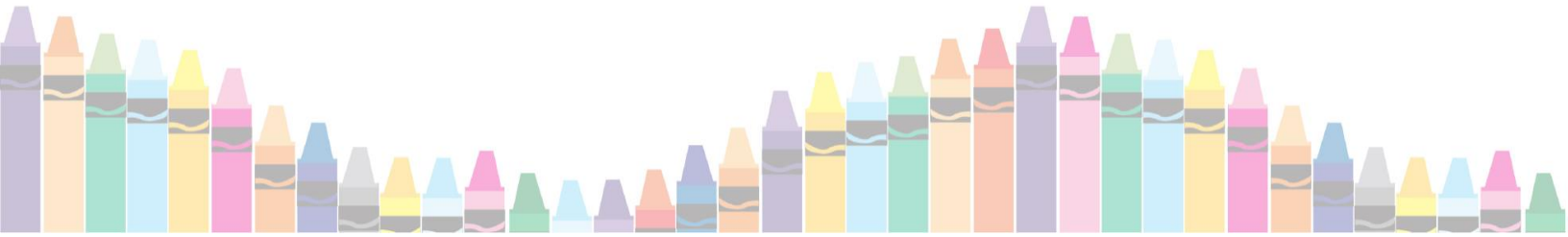
NoKG – Not enrolled in kindergarten

PTA – Parent-Teacher Association

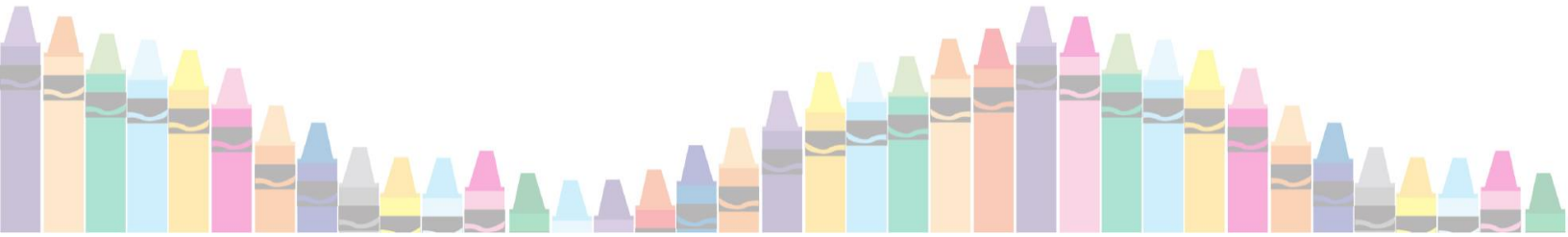
PE – Physical education

SNHD – Southern Nevada Health District

SC – Steering Committee



UNLV – University of Nevada, Las Vegas



Appendix 2: Baseline Data

Table A. Nevada Population and Demographics

	Nevada	USA
Population [1]		
Population, 2014 estimate	2,839,099	318,857,056
Population, percent change - April 1, 2010 to July 1, 2014	5.1%	3.3%
Persons under 5 years, percent, 2013	6.4%	6.3%
Persons under 18 years, percent, 2013	23.7%	23.3%
Persons 65 years and over, percent, 2013	13.7%	14.1%
Female persons, percent, 2013	49.6%	50.8%
Race and Ethnicity [1]		
White alone, percent, 2013 (a)	76.7%	77.7%
Black or African American alone, percent, 2013 (a)	9.0%	13.2%
American Indian and Alaska Native alone, percent, 2013 (a)	1.6%	1.2%
Asian alone, percent, 2013 (a)	8.1%	5.3%
Native Hawaiian and Other Pacific Islander alone, percent, 2013 (a)	0.7%	0.2%
Two or More Races, percent, 2013	3.9%	2.4%
Hispanic or Latino, percent, 2013 (b)	27.5%	17.1%
White alone, not Hispanic or Latino, percent, 2013	52.2%	62.6%
Foreign born persons, percent, 2009-2013	19.1%	12.9%
Language other than English spoken at home, age 5+, 2009-2013	29.3%	20.7%
Educational Attainment [1]		
High school graduate or higher, percent of persons age 25+, 2009-2013	84.6%	86.0%
Bachelor's degree or higher, percent of persons age 25+, 2009-2013	22.4%	28.8%
Income [1]		
Median household income, 2009-2013	$52,800	$53,046
Persons below poverty level, percent, 2009-2013	15.0%	15.4%

(a) Includes persons reporting only one race.
(b) Hispanics may be of any race, so also are included in applicable race categories.

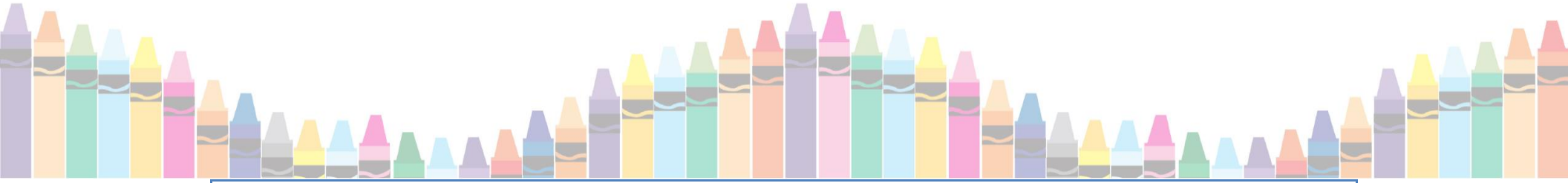
Source:
(1) US Census Bureau State & County QuickFacts, http://quickfacts.census.gov/qfd/states/32000.html

Table B. Key Measures for Nevada and Select Nevada Counties

	Nevada	Clark County	Douglas County	Lincoln County	Lyon County	Nye County	Washoe County
General Demographics/ Social and Economic Factors							
Total Population, 2013[2]	2,775,216	2,008,315	47,714	5,151	52,446	44,340	431,035
White[3]	1,518,746 (54%)	973,992 (47.7%)	39,784 (82.5%)	4,320 (90.4%)	42,431 (79.6%)	36,259 (81%)	285,701 (65.5%)
Black[3]	230,767 (8.2%)	217,154 (10.6%)	260 (0.5%)	28 (0.6%)	495 (0.9%)	691 (1.5%)	10,643 (2.4%)
Native American[3]	32,056 (1.1%)	13,379 (0.7%)	1,111 (2.3%)	89 (1.9%)	1,550 (2.9%)	753 (1.7%)	7,126 (1.6%)
Asian Pacific Islander[3]	246,518 (8.8%)	211,300 (10.4%)	1,260 (2.6%)	17 (0.4%)	856 (1.6%)	767 (1.7%)	29,191 (6.7%)
Hispanic[3]	781,886 (27.8%)	624,522 (30.6%)	5,793 (12.0%)	325 (6.8%)	7,999 (15.0%)	6,301 (14%)	103,738 (23.8%)
Projected population in 2018[3]	2,937,738	2,120,173	47,847	5,188	56,755	45,680	467,565
Total Children 19 and younger in population, 2013[2]	776,452	569,959	8,790	1,297	12,856	9,234	115,186
Population age 0 – 5 years old in 2013[4]	220,580	164,955	2,509	244	3,468	2,405	33,213
Median Annual Household Income, 2012[2]	$49,905	$49,583	$60,869	$43,617	$48,035	$41,426	$49,449
High School Graduation, % completion in 4 years[1,2]	61%,70.7%	59%,71.5%	83%, 85%	ND,76.8%	73%,78.6%	64%,70.2%	70%,72.6%
Some College[1]	55%	55%	70%	54%	53%	39%	61%
Unemployment[1]	11.1%	11.2%	12.0%	12.8%	14.8%	13.50%	10.9%

Children in Poverty, 2012[1]	23%	24%	16%	19%	22%	29%	25%
Students qualifying for Free and Reduced Lunch Program as a percent of total population[3]	54.7%	57.9%	33.5%	37.9%	45.9%	61.90%	47.2%
Health Outcomes/Factors							
Infant Mortality, 2010-2012, per 1,000 live births[2]	5.3	5.2	*	*	3.6	4.3	6
Child Deaths ages 1-14, 2010-2012, per 100,000[2]	16.3	15.2	*	*	*	*	15.1
Premature Death, Years Potential Life Lost, per 100,000[1]	7,252	7,168	6,125	5,317	7,103	12,332	7,100
Poor or Fair Health, as reported by adults[1]	17%	18%	15%	12%	16%	20%	15%
Low Birth weight[1,2 (2010-2012)]	8.2%, 8.1%	8.3%, 8.3%	8.4%, 7.5%	ND, 11%	7.7%, 6.4%	9.8%,11.3%	8.4%, 8.0%
Adult Smoking[1]	21%	21%	18%	15%	25%	26%	18%
Adult Obesity[1]	25%	25%	23%	27%	31%	30%	23%
Physical Inactivity, adults reporting no leisure time activity[1]	22%	24%	17%	23%	26%	29%	16%
Access to Exercise Opportunities[1]	87%	91%	88%	67%	66%	6%	89%
Excessive Drinking[1]	18%	17%	21%	15%	21%	14%	21%
Alcohol-Impaired Driving Deaths/Total Driving Deaths[1]	34%	37%	53%	46%	29%	35%	33%
Sexually Transmitted Infection, Chlamydia, per 100,000[1]	386	423	139	ND	247	132	350
Teen Births, ages 15-19, per 1,000[1,2 (2012)]	46, 34.7	48, 35.3	19, 15.4	12, *	39, 32.4	45,33.5	41, 32.1
Violent Crime, per 100,000[1]	642	752	163	115	223	570	439
Injury Death, per 100,000[1]	70	66	81	135	81	129	73

Key:
**** = Data is suppressed due to the small number.***
ND = No reliable data



Sources:

1. 2014 County Health Rankings and Roadmaps, Retrieved [02/26/2015] from http://www.countyhealthrankings.org/

2. KIDS Count Data Center from the Annie E. Casey Foundation. Year indicated in table. Retrieved February 26, 2015, from http://datacenter.kidscount.org/

3.Griswold T, Packham J, Etchegoyhen L, and Marchand C, Nevada Rural and Frontier Health Data Book, 7th Ed. Jan. 2015. Retrieved [03/03/2015] from http://medicine.nevada.edu/Documents/unsom/statewide/rural/data-book-2015/Nevada_Rural_and_Frontier_Health_Data_Book_2015DraftEmbedOpt.pdf

4. Nevada State Demographer's Office. Personal communication; information on file with HIA team.

Table C. Estimated Current Status of Kindergarten in Nevada and Select Nevada Counties

	Nevada		Clark County		Douglas County		Lincoln County		Lyon County		Nye County		Washoe County	
Students in public kindergarten	35028[a,e]		23977[d]		402[b]		50[a]		639[a]		372[b]		4692[c]	
Children in private kindergarten or not in kindergarten	2124*		1332*		45*		9*		19*		3*		377*	
Students in fully-funded public FDK	29209[+]	87%	19221[d]	80%	402[b]	100%	None	n/a	639[a]	100%	372[b]	100%	3845[#]	82%
Students in tuition-based public FDK			1225[d]	5%	None	n/a	None	n/a	None	n/a	None	n/a	496[b]	11%
Students in HDK	4468[+]	13%	3531[d]	15%	None	n/a	50[a]	100%	None	n/a	None	n/a	351[b]	7%

Estimate methods:

None: No students in the type of kindergarten indicated.

n/a: Not applicable.

*** Based on difference between 2014 Grade 1 and 2013 Kindergarten enrollment per Data Source a.**

Based on subtracting tuition-based and half-day numbers provided in data source b from total provided in data source c.
+ Per Data Source a, these 6 counties represent approximately 88% of all NV kindergartner population. Divided sum of given counties by 88%.

Sources:

a. State of Nevada Department of Education, All NV Counties Enrollment in Kindergarten 2013
http://www.doe.nv.gov/Business_Support_Services/Reports/

b. Responses from contacts at respective School District regarding Fall 2014 enrollment. On file with the HIA team.

c. Washoe County School District Count Day, October 2014.

d. Response from CCSD Director of demographics regarding enrollment as of Feb. 2015. On file with the HIA team.

e. This number includes 33,123 students in 17 school districts and 1,905 in public charter schools in 2013.

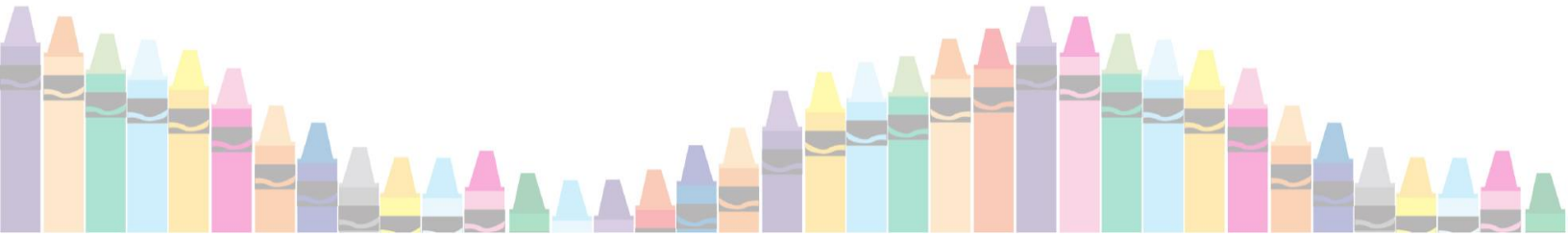


Table D. Status of Nutrition Education & Physical Activity in Kindergarten Classes in Six Nevada Counties

Minutes per week	Clark County	Douglas County	Lincoln County	Lyon County	Nye County	Washoe County
Nutrition education in FDK	75*	No formal	N/A	Data not available	No formal	No formal
Nutrition education in HDK	35*	N/A	No formal	N/A	N/A	No formal
Physical education in FDK	100	Varies	N/A	Data not available	Varies	60
Physical education in HDK	50	N/A	Varies	N/A	N/A	30
General recess in FDK	≤150	225	N/A	225	150	300
General recess in HDK	≤50	N/A	75	N/A	N/A	0

*** = Minutes allocated for health/science curriculum, which includes nutrition**
N/A = No current kindergarten of that type
No formal = Could be discussed in certain classes, but no district-wide level
Varies = Dependent on the school and class
Data not available = This information was not available to the HIA team.

Sources: Responses from contacts at respective School District. On file with the HIA team.

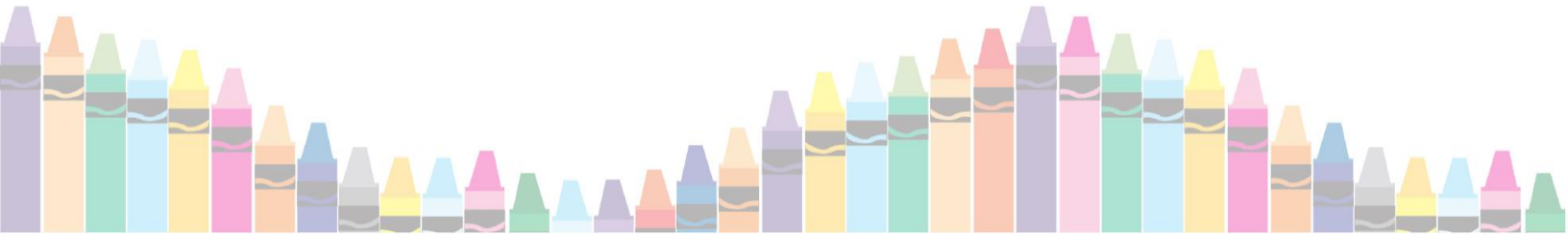


Table E. Access of Kindergarten Students to School-Based Services

	Clark County	Douglas County	Lincoln County	Lyon County	Nye County	Washoe County
School breakfast access in FDK	Yes	Yes*	N/A	Yes	Yes	Yes
School breakfast access in HDK	Yes	N/A	Yes	N/A	N/A	Yes
School lunch access in FDK	Yes	Yes	N/A	Yes	Yes	Yes
School lunch access in HDK	Yes	N/A	Yes	N/A	N/A	Yes
Health screenings access in FDK	Hearing/ Vision	Hearing/ Vision	N/A	Hearing/ Vision	Hearing/ Vision	None
Health screenings access in HDK	Hearing/ Vision	N/A	Hearing/ Vision	N/A	N/A	None

Key:
*** = Breakfast available at 6 out of 7 schools**
N/A = Not applicable given the kindergarten makeup in the county
None – Not available in the county
Hearing/Vision = Screening for hearing and vision

Sources: Responses from contacts at respective School District. Personal communication; information on file with HIA team. [January through March, 2015]

Table F. Nevada Student Test Scores

National Exam: NAEP, 2011 [1]	Nevada	USA
Grade 4 Math, % proficient or above	32	38
Grade 4 Reading, % proficient or above	24	32
Grade 8 Math, % proficient or above	25	33
Grade 8 Reading, % proficient or above	22	29
Nevada State Exam: CRT, 2014 [2]	**Nevada**	
Grade 3 Math, % proficient or above	65.4	
Grade 3 Reading, % proficient or above	61.1	
Grade 5 Math, % proficient or above	66.7	
Grade 5 Reading, % proficient or above	67.6	
Grade 5 Science, % proficient or above	64	
Grade 8 Math, % proficient or above	36.7	
Grade 8 Reading, % proficient or above	52.6	
Grade 8 Science, % proficient or above	57.2	

Sources:
1. National Assessment of Educational Progress, from http://nces.ed.gov/programs/stateprofiles
2. Nevada Report Card, from http://www.nevadareportcard.com/di/main/assessment

Table G. 2005 – 2006 FDK v. HDK Clark County School District Cohort, Math and Reading CRT Mean Scores in 2009 -2010

Grade & CRT Test Mean	HDK	FDK	FDK v. HDK
3rd Grade Math	331.99	360.02	28.03*
3rd Grade Reading	332.04	351.80	19.76*
4th Grade Math	325.58	347.68	22.10*
4th Grade Reading	337.61	366.91	29.30*

*** = Significance, p <.000 (using T- tests)**

Source:
This data and calculations were obtained from Table 4 in: L. Pitch and B. Campbell. 2011. Long-term effects

of full-day kindergarten in third and fourth grades (FEDS~L4). Clark County School District Department of Research. http://www.ccsd.net/resources/assessment-accountabilityresearch-school-improvement-division/long-term-effects-of-full-day-kindergarten-2011.pdf

Table H. Measures of School Activity for Children in Nevada

School & Activities Indicator	Measure	Nevada (%)	USA (%)
Preschool attendance[2]	% of children ages 3-4 not in preschool	69	54
Preschool and Poverty[2]	% of children ages 3-4 below 200% poverty level not in preschool	78	63
School engagement[1]	% of children age 6-17 who are consistently engaged in school	81.3	80.4
Repeating a grade[1]	% of children age 6-17 who have repeated at least one grade	8.2	9.1
Activities outside of school[1]	% of children age 6-17 who participate in activities outside of school	77.5	80.8

Sources:
(1) Nevada Report from the National Survey of Children's Health. NSCH 2011/2012. Child and Adolescent Health Measurement Initiative, Data Resource Center for Children and Adolescent Health website. Retrieved [02/24/15] from www.childhealthdata.org.
(2) KIDS COUNT Data Center from the Annie E. Casey Foundation. Retrieved [02/26/15} from http://datacenter.kidscount.org.

Table I. Measures of Health for Children in Nevada

Indicator	Measure	Nevada (%)	USA (%)
Health Status			
Child health status[1]	% of children in excellent or very good health	79.0	84.2
Oral health status[1]	% of children in excellent or very good oral health	61.4	71.3
Premature birth[1]	% of children who were born premature (3 or more weeks early)	12.8	11.6
Risk of developmental or behavioral problems[1]	% of children age 4 months to 5 years determined to be at moderate or high risk based on parents' specific concerns	26.6	26.3
Child weight status[1]	% of children age 10-17 years who are overweight or obese (BMI-of-age at or above 85th percentile)	33.2	31.3
Missed school days[1]	% of children age 6-17 who missed 11 or more days of school in the past year	5.8	6.2
Food Insecurity[2]	% of children living in a household with food insecurity last year	25	22
Health Care			
Current health insurance[1]	% of children currently insured	86.7	94.5
Insurance coverage consistency[1]	% of children lacking constant insurance coverage in the past year	21.8	11.3
Preventative health care[1]	% of children with a preventive medical visit in the last year	74.8	84.4
Preventative dental care[1]	% of children with preventive dental visit in the last year	67.4	77.2
Developmental screenings[1]	% of children of children age 10 months to 5 years who received a standardized screening for developmental or behavioral problems	21.9	30.8
Mental health care[1]	% of children age 2-17 with problems requiring counseling who received mental health care	49.3	61.0
Medical home[1]	% of children who receive care within a medical home	44.6	54.4

Sources:
(1) Nevada Report from the National Survey of Children's Health. NSCH 2011/2012. Child and Adolescent Health Measurement Initiative, Data Resource Center for Children and Adolescent Health website. Retrieved [02/24/15] from www.childhealthdata.org.
(2) KIDS COUNT Data Center from the Annie E. Casey Foundation. Retrieved [02/26/15} from http://datacenter.kidscount.org.

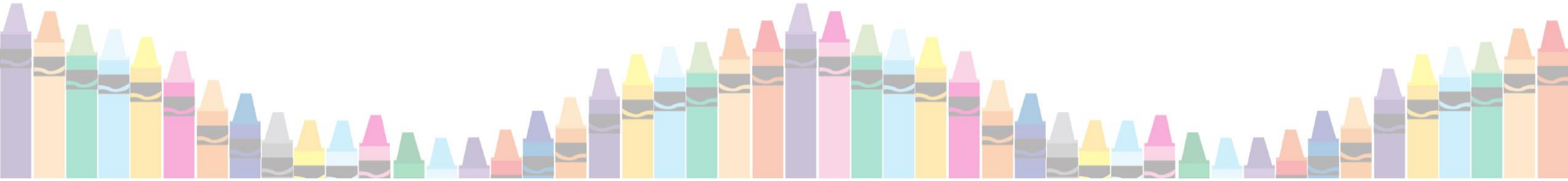


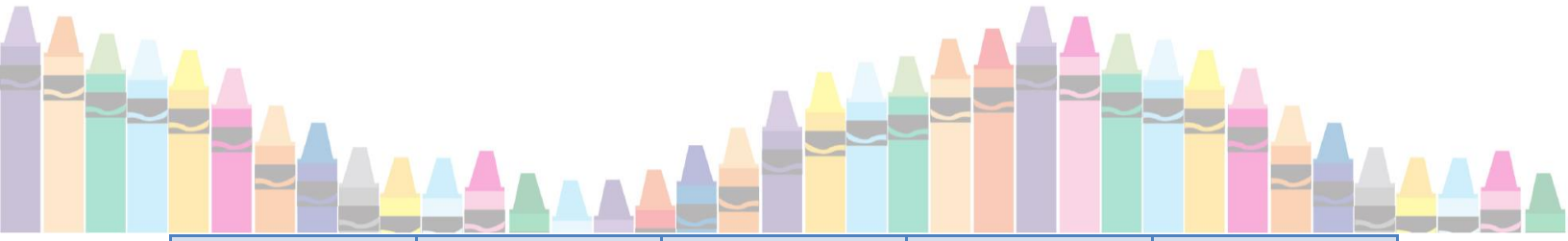
Table J. Measures of Family Indicators for Nevada's Children

Indicator	Measure	Nevada (%)	USA (%)
Poverty[2]	% of children ages 0-5 living in poverty	25	25
Language spoken at home[2]	% of children speaking a language other than English at home	33	22
Reading to young children[1]	% of children age 0-5 whose families read to them everyday	40.2	47.9
Mother's health[1]	of the children who live with their mothers, the % of children whose mothers are in excellent or very good physical and emotional health	50.5	56.7
Father's health[1]	of the children who live with their fathers, the % of children whose fathers are in excellent or very good physical and emotional health	57.3	62.0
Smoking in household[1]	% of children who live in households where someone smokes	25.9	24.1
Adverse childhood experiences[1]	% of children who have had 2 or more adverse childhood experiences	25.8	22.6
Educational status of head of Household[2]	% of children under 18 living in household where head of household is not a HS graduate	20	14
	% of children under 18 living in household where head of household is a HS graduate or has GED	53	46
	% of children under 18 living in household where head of household has an Associate's degree	8	9
	% of children under 18 living in household where head of household has a Bachelor's degree	13	19
	% of children under 18 living in household where head of household has a Master's degree	7	12

Sources:
(1) Nevada Report from the National Survey of Children's Health. NSCH 2011/2012. Child and Adolescent Health Measurement Initiative, Data Resource Center for Children and Adolescent Health website. Retrieved [02/24/15] from www.childhealthdata.org.
(2) KIDS COUNT Data Center from the Annie E. Casey Foundation. Retrieved [02/26/15} from http://datacenter.kidscount.org.

Table K. Adult Health & Educational Attainment

	Less than High School (%)	High School Graduate or GED (%)	Some Post-High School but not a College Graduate (%)	At least a College Graduate (%)
Health Indicator or Risk Factor				
Yes to ever told you had a heart attack (n = 314)	**5.4** (2.4 – 8.3 CI) (n = 33)	**3.9** (2.7 – 5.1 CI) (n = 91)	**5.1** (3.5 – 6.6 CI) (n =108)	**3.5** (2.2 – 4.8 CI) (n = 82)
Yes to ever told you had angina or coronary heart disease (n = 281)	**3.6** (1.5-5.6 CI) (n = 23)	**2.8** (1.9-3.8 CI) (n = 74)	**3.2** (2.2-4.2 CI) (n =98)	**4.4** (2.7-6.1 CI) (n = 86)
Yes to ever told they had a stroke (n = 218)	**N/A**	**2.5** (1.6 – 3.4 CI) (n = 67)	**3.6** (2.3 – 5.0 CI) (n = 86)	**2.7** (1.5 – 3.8 CI) (n = 50)
Yes to ever told you have high cholesterol (n = 1798)	**45.4** (35.0-55.8 CI) (n = 111)	**40.3** (35.3-45.3 CI) (n = 456)	**37.2** (32.9-41.5 CI) (n = 636)	**35.5** (31.3-39.7) (n = 592)
Yes to ever told you have high blood pressure (n = 1886)	**38.4** (30.4 - 46.3 CI) (n = 159)	**27.7** (23.9 - 31.5 CI) (n = 533)	**30.8** (27.2 - 34.5 CI) (n = 643)	**27.6** (24.1 – 31.1) (n = 544)
Yes to ever told you have high diabetes (n = 514)	**12.3** (6.9 – 17.6 CI) (n = 50)	**8.1** (6.0 – 10.2 CI) (n =140)	**11** (8.3 – 13.6 CI) (n = 140)	**7.4** (5.2 – 9.7 CI) (n = 127)
Yes to ever told you had cancer (n = 483)	**7.1** (3.2 – 11.0 CI) (n = 27)	**5.9** (4.3 – 7.6 CI) (n = 128)	**5.8** (4.3 – 7.3 CI) (n = 163)	**7.2** (5.4 – 9.0 CI) (n = 164)



Yes to ever told you were overweight (n = 1805)	**39.6** (30.9 – 48.2 CI) (n = 120)	**37.4** (32.5 – 42.3 CI) (n = 467)	**40.1** (36.0 – 44.3 CI) (n = 614)	**37.2** (33.2 – 41.2 CI) (n = 600)
Yes to ever told you were obese (n = 1239)	**27.7** (19.9 – 35.6 CI) (n = 90)	**29** (24.8 – 33.2 CI) (n = 390)	**25.8** (22.3 – 29.3 CI) (n = 446)	**21.4** (17.8 – 25.1 CI) (n = 600)
Yes to are a current smoker (n = 888)	**29.4** (21.7 – 37.0 CI) (n = 90)	**23.2** (19.3 – 27.1 CI) (n = 302)	**17.3** (14.3 – 20.3 CI) (n = 348)	**9.2** (6.9 – 11.6 CI) (n = 146)
Health Status				
Excellent (n = 939)	**N/A**	**16.9** (13.3 – 20.6 CI) (n = 200)	**19.6** (16.2 – 23.1 CI) (n = 280)	**26.8** (23.2 – 30.5 CI) (n = 436)
Very Good (n = 1707)	**22.7** (15.5 –29.8 CI) (n = 76)	**28.6** (24.3 - 32.8 CI) (n = 381)	**36.7** (32.8 – 40.7 CI) (n = 613)	**41.2** (37.1 – 45.2 CI) (n = 631)
Good (n = 1537)	**36.9** (28.6 – 45.1 CI) (n = 126)	**37.7** (32.8 – 42.5 CI) (n = 487)	**27.9** (24.4 – 31.4 CI) (n = 514)	**26.3** (22.4 – 30.3 CI) (n = 407)
Fair (n = 633)	**25.2** (18.3 – 32.0 CI) (n = 92)	**12.6** (9.7 – 15.5 CI) (n = 208)	**12.1** (9.5 – 14.7 CI) (n = 220)	**4.4** (3.0 – 5.8 CI) (n = 111)
Poor (n = 271)	**9.5** (4.9 – 14.2 CI) (n = 42)	**4.3** (2.9 – 5.7 CI) (n = 94)	**3.7** (2.4 – 5.0 CI) (n = 96)	**1.3** (0.6 – 2.0 CI) (n = 38)
Access to healthcare				
Yes to adult aged	**46.8**	**70.5**	**77.8**	**88.8**

18 – 64 who have any kind of health coverage (n = 3427)	(37.2 – 56.4 CI) (n = 117)	(65.5 – 75.5 CI) (n = 659)	(73.9 – 81.8 CI) (n = 913)	(85.9 – 91.7 CI) (n = 980)
Physical Activity				
Yes to participated in 150 minutes or more per week (n = 2624)	**44.3** (35.4 – 53.1 CI) (n = 139)	**50** (44.9 – 55.2 CI) (n = 605)	**56.1** (51..9 – 60.3 CI) (n = 887)	**62.2** (58.0 – 66.3 CI) (n = 987)
Yes to participated in muscle strengthening more than twice per week (n = 1776)	**24.4** (16.9 – 37.8 CI) (n = 75)	**31.7** (26.9 – 36.4 CI) (n = 325)	**33.8** (29.8 – 37.8 CI) (n = 487)	**40.4** (36.2 – 44.6 CI) (n = 584)
Yes to participated in enough aerobic and strength training to meet guidelines (n = 1087)	**19** (11.7 – 26.3 CI) (n = 46)	**21.1** (17.0 – 25.2 CI) (n = 229)	**23.8** (20.2 – 27.4 CI) (n = 345)	**32.2** (28.1 – 36.3 CI) (n = 465)
Nutrition				
Consumed fruit one or more times per day (n = 3172)	**54.4** (15.5 – 63.2 CI) (n = 170)	**65** (60.5 – 69.5 CI) (n = 786)	**64.5** (60.5 – 68.5 CI) (n = 1078)	**71.4** (67.4 – 75.4 CI) (n = 1125)
Consumed vegetables one or more times per day (n = 3818)	**70.2** (61.4 – 79.0 CI) (n = 223)	**76.9** (72.7 – 81.0 CI) (n = 937)	**81** (77.4 – 84.6 CI) (n = 1310)	**86.9** (83.9 – 89.9 CI) (n = 1336)
Consumed fruit and vegetables 5 or more times per day (n = 3818)	**N/A**	**19.9** (14.9 – 25.0 CI) (n = 192)	**23.3** (18.7 – 27.9 CI) (n = 279)	**25.4** (21.5 – 29.3 CI) (n = 349)

Key:
CI = Confidence Interval
n = Number of responses

Source:
Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, Prevalence Data and Data Analysis Tools, Nevada 2013, Retrieved [030/4/15] from http://www.cdc.gov/brfss/data_tools.htm.

Appendix 3: Probability Calculation: Estimated high school graduation rates for 3rd grade reading proficient students in Nevada

The following expression relates the probability of high school graduation to the conditional graduation rates from high school for children who are 'reading proficient' and 'less than reading proficient':

P(HS Graduation) = P(HS Grad|Reading Proficiency) x P(Reading Proficiency)
+ P(HS Grad|Less Than Reading Prof) x P(Less Than Reading Prof)

which yields

0.707 = 0.7541 x P(HS Grad|Reading Proficiency) + 0.24 x 0.2496

from which we can calculate

P(HS Grad|Reading Proficiency) = (0.707 - 0.24 x 0.2496)/0.7451 = 0.86

	Group I: students in HDK	**Group II: students in NoKG/HDK**
(a) Using US high school graduation rates for 3rd grade reading proficient students	558 × 0.946 = 528	820 × 0.946 = 776
(b) Using Nevada high school graduation rates for 3rd grade reading proficient students	499 × 0.946 = 472	734× 0.946 = 694

Appendix 4: Literature review summary tables

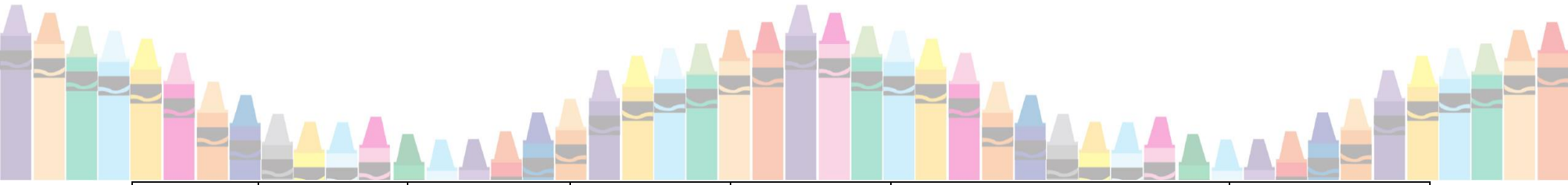
Table A: Full-Day Kindergarten and Test Score

Authors and Database	Population Sample	Years & Data Source	Study Design	Limitations	Findings	Recommendations
Chang, M. (2012) Google Scholar	Kindergarteners = 21,399 1st grade= 16,635, 3rd grade = 14,374, 5th grade = 11,237	National Center for Education Statistics. The four waves represented spring 1998 kindergarten, spring 1999 first grade, spring 2001 third grade, and spring 2003 fifth grade	Longitudinal Item Response Theory in reading and math	Selection effect Large error variance for Caucasian ELL students	Caucasian English-only students in FDK had higher math and reading score at the end of kindergarten compared to their HDF peers, but these differences did not remain through 5th grade. Hispanic dual-language students who attended FDK has higher reading performance at the end of kindergarten than their HDK peer and maintained their higher performance until fifth grade. FDK for English only Asian and Hispanic student showed no significant results when compared to their peers.	

					"Asian English-only students from low-SES families who attended all-day increased their mathematics and reading scores at a slower pace than their half-day counterparts". FDK Asian ELL and dual-language students from low-SES families maintained a significant gain in both reading and mathematics until fifth grade and Black dual-language FDK students had positive growth rate in reading	
Cirigliano, B. W., Summers, K. H., & Crawford, J. G (2014) Google Scholar	Children who attended FDK (N = 301); children who attended HDK (N = 296) in the same school district	1999-2009. standardized testing data in both reading and math 3rd, 5th and 8th grades	Longitudinal	Groups lacked random assignment; no data were collected at the onset of the study to determine whether the groups were academically	Reading composite scores at third, fifth, and eighth grades were not significantly different Math composite scores at third, fifth, and eighth grades. Results of the MANOVA were not significant Participation in full-day kindergarten does not appear to be a predictor of student academic success in later	

				similar; limited to one school district	grades.	
Cooper, H., Allen, A., Patall, E. A., & Dent, A. L. (2010) Google Scholar	Meta-analysis, 40 research reports included	1979-2009. The 40 reports provided 254 separate effect sizes (152 unadjusted and 102 adjusted) based on 55 separate samples. The sample sizes ranged from 7 to 12,79	Meta-analysis of 40 research reports comparing full-day with half-day kindergarten programs on measure of academic achievement	Did not report effects of FDK on assignment to special education and grade retention. Differential effects according to SES and race/ ethnicity were only partly reported. Urbanicity as a proxy for low income Meta-analysis results stratified by	At end of kindergarten year, full-day students have higher achievement scores than half-day. Their scores range from one-fifth to one-third of a standard deviation higher. The association between full-day kindergarten and achievement was stronger in urban areas, which may be indirect evidence of a stronger impact on poor children. Half-day kindergarten students showed a stronger growth trajectory from first through third grades than full-day students and seemed to have made up any early FDK advantage by the end of 3rd grade.	Full-day kindergarten may be an interventions needed to assist disadvantages children FDK has short term positive effects that seem to fade out by 3rd grade

				race/ ethnicity were not reported		
Hahn, R. A., Rammohan, V., Truman, B. I., Milstein, B., Johnson, R. L., Muntañer, C. et al. (2014) Google Scholar	Review of Cooper et al (2010) article		Review of Cooper et al (2010) article	Focused on an earlier review but did not present much new information	Short term academic impact of FDK: • FDK improved academic achievement by an average of 0.35 standard deviation • Effect of FDK among urban populations was substantially greater than in nonurban Long term academic impact FDK: • Findings are inconsistent, some show increased achievement while others show no difference.	Better designed studies are needed to truly assess the impact of FDK on long-term educational attainment. To sustain early benefits, intensive elementary school education is needed
Milligan, C. (2012) Google Scholar	A total of 208 students from a school district in southern	California Standardized Testing and Reporting (STAR) assessment	Longitudinal Students' test scores were assessed in 2nd grade	Different sample sizes. Small sample size for full day kindergarten	No significant differences in the language arts or math scores of 2nd grade students who attended an all-day kindergarten and those who did not. These results remained the same for	



	California. Half day kindergarten N=165, full day kindergarten N=43	and the California Achievement Test 6th Edition (CAT 6) survey exams (language arts and math) in 2nd grade, 2006		(N=43). One school district in California	males and females as well as for each subgroup of students (ELL and free and reduced lunch). All day kindergarten was not among the predictors for the MLR. Free and reduced lunch status proved to be the most useful tool when predicting student reading success.	
Nowak, J. A., Nichols, J. D., & Coutts, D. (2010) Google Scholar	773 low-SES minority inner-city third-grade students from a large urban school in Indiana. FDK N=530, HDK N=243	3rd grade Indiana State Testing Equivalency Proficiency (ISTEP+) test - English and math	Longitudinal Students' test scores were assessed in 3rd grade	One school district in Indiana	For English/language arts achievement, full-day attendees scored significantly higher when compared to half-day attendees. For math achievement full-day attendees scored significantly higher than half-day attendees. For combined English and math score, full-day had significantly higher scores	Low-SES inner-city minority students are better served by FDK programs than HDK programs in terms of academic achievement up through at least the third grade.

Zvoch, K. (2009) Google Scholar	FDK N=494 HDK N=74 Large school district in Southwestern US	Standardized literacy assessments during the kindergarten (2004–2005) and first grade (2005–2006) school years.	Longitudinal Students' test scores were assessed in 1st grade	One school district. Over sampling of FDK students	This study revealed that economically disadvantaged full-day kindergartners gained literacy skills at a relatively faster rate than their more economically advantaged half-day peers during kindergarten. The accelerated gain experienced by full-day kindergartners was sufficient to enable a reversal of the initial performance deficit observed upon entry to kindergarten. However, over the summer between kindergarten and first grade, full-day alumni experienced a literacy fallback, whereas their half-day peers maintained the majority of the literacy gains acquired during the kindergarten year, leading to a second performance reversal by the beginning of the first grade. The gap in performance (half-day advantage) then remained constant as the literacy growth of full- and half-day alumni was equivalent over the first grade school year.	Summer programs are needed between kindergarten and 1st grade to continue advantages gained in FDK.

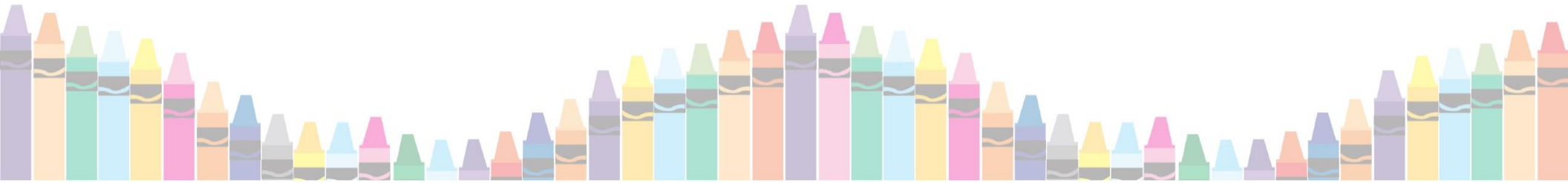
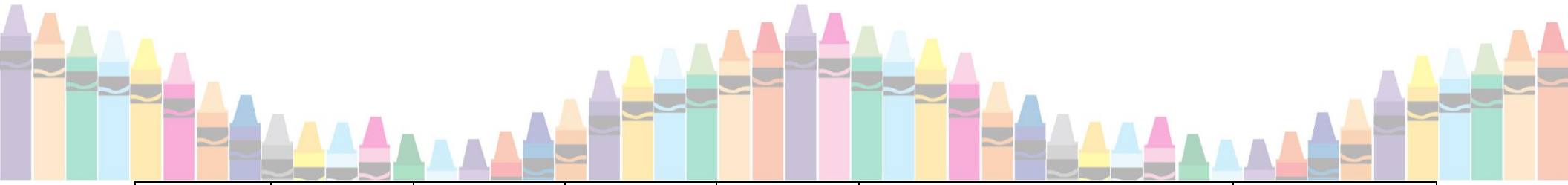


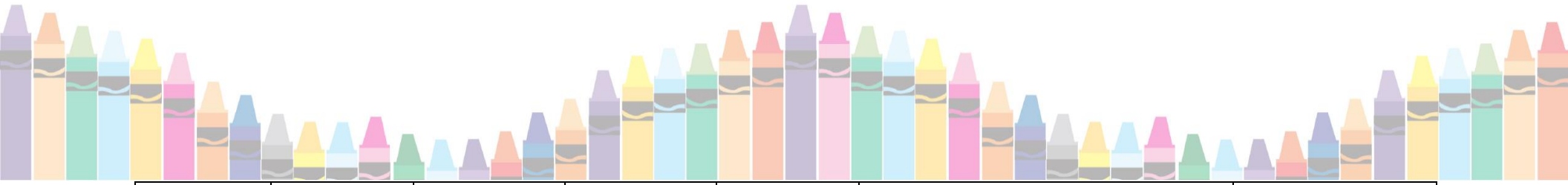
Table B: Access to school-based food and obesity

Authors & Database	Population Sample	Years & Data Source	Study Design	Limitations	Findings	Recommendations
Gleason, P. M., & Dodd, A. H (2009) Google Scholar	Nationally representative sample from School Nutrition Dietary Assessment Study of 2,228 students in grades 1-12 in the 2004-05 school year for	Survey data from parents and students BMI data 2004-05 school year	Cross-sectional design using multivariate regression models	Selection bias – participants in school meal programs may differ in other ways from non-participants Cross-sectional	No relationship between participation in national school lunch program and any measures of weight status. For every additional lunch-per-week increase in usual national school lunch program participation, BMI increased by 0.043 points (P>p.05; not statistically significant). School breakfast participation associated with significantly lower BMI, particularly among non-Hispanic, white students. For every	



	whom height and weight measurements were obtained			data	additional breakfast-per-week increase in usual school breakfast program participation, BMI declined by 0.15 points (P<0.05.) No evidence that school lunch or breakfast programs contribute to obesity; some evidence that school breakfast programs may be protective.	
Prelip, M., Kinsler, J., Le Thai, C., Erausquin, J. T., & Slusser, W. (2012). Google Scholar	399 low income (at least half of students in the school qualify for free or reduced lunch) 3rd, 4th, and 5th grade students at	Questionnaire completed by students (pre-test/post-test) 2008-09 school year	Quasi-experimental 3 study conditions: (1) intervention (traditional Network–LAUSD program and teacher	Not clear if all were receiving the appropriate amount of nutrition education Limited parental participatio	Intervention+ → positive change in knowledge (P < .05), attitudes and beliefs toward vegetables (P < .01), and teacher influence on students' fruit and vegetable attitudes (P < .05). Intervention+ influenced knowledge and attitudes regarding fruits & vegetables but no significant increase to *observed* consumption of fruits & vegetables.	To improve the chances of success at increasing consumption of fruits and vegetables, school-based nutrition education "should focus on culturally and geographically appropriate,

	Los Angeles Unified School District (LAUSD) in the 2008-09 school year		training workshops) [n=185], (2) intervention + (traditional Network–LAUSD program, new standardized nutrition curriculum, teacher training workshops [n=53], and (3) parent nutrition education workshops), and comparison [n=161].	n in nutrition workshop		multicomponent approaches that actively involve family members, schools and teachers, community members, and health and nutrition experts." Focus on school environments



			Linear-mixed model			
Farris, A. R., Misyak, S., Duffey, K. J., Davis, G. C., Hosig, K., Atzaba-Poria, N., . . . Serrano, E. L. (2014) Google Scholar	1,314 observed lunches: 42.8% packed and 57.2% school lunches	Contents of packed lunches and school lunches for pre-K and K students on 5 consecutive school days in 3 rural Virginia schools	Observational data and nutrition analysis	Small, rural population may not be generalizable Consumption of food items not measured – just of the contents of lunch	Packed lunches were less nutritious than school lunches (post 2012-13 National School Lunch Program standards implementation). "Energy, fat, saturated fat, sugar, vitamin C, and iron were significantly higher whereas protein, sodium, fiber, vitamin A, and calcium were significantly lower for packed lunches than school lunches."(P<.001). Differences among schools were not statistically significant.	Encourage participation in school lunch program and school policies that encourage healthier packed lunches
Mirtcheva, D. M., & Powell, L. M. (2013) Google	3,204 observations of children ages 6–18 (grades 1-12) participatio	Nationally representative, longitudinal data: 1997 and 2003 data from	Modeling using longitudinal data	Number of times a child eats a school lunch per week unknown.	Although National School Lunch Program participation is associated with an increase in weight by 3.4 BMI percentiles (associated with a 4.7 BMI percentile increase for girls but no statistically significant association for boys), there is no	

Scholar	n in National School Lunch Program in public school	the Child Development Supplements (CDS) to the Panel Study of Income Dynamics (PSID)		Does not take into account data on dietary intake and consumption patterns Unknown family food consumption Time-varying heterogeneity Does not take into account implementation of the	evidence that school lunches are casually related to higher weight (overall or by sex) when accounting for time-invariant unobserved heterogeneity using individual-level fixed effects models.	

				2012-2013 National School Lunch Program standards		
Capogrossi, K., & You, W. (2013) Google Scholar		Longitudinal data from nationally-representative Early Childhood Longitudinal Study-Kindergarten Class (ECLS-K); cohort of 21,260 kindergartners beginning in the 1998–1999 school year who	Modeling using longitudinal data; Instrumental Variable Quantile Regression	Data does not go beyond 8th grade	Child weight may affect academic performance but this varies by grade and demographics. Weight affects the academic performance of lower performing students more than of other students. "Weight has a more significant impact on academic performance for those healthy weight students compared to those who are overweight/obese or underweight." Generally, literature assessing the relationship between	"Results indicate that programs and policies targeting child weight could potentially have positive spillover effects on academic performance particularly if aimed at the lower performing and misnourished students. Policies should advocate maintaining a healthy weight

		were followed through 8th grade (2006–2007 school year).			overweight/underweight and academic achievement is mixed but generally suggest that either is associated with lower academic performance.	and an active lifestyle as to include underweight children rather than only focusing on overweight/ obese students.”

Table C: Nutrition education

Authors and Database	Population Sample	Years & Data Source	Study Design	Limitations	Findings	Recommendations
Zenzen, W., & Kridli, S. (2009) Google Scholar	Review article, 16 articles included (*n:*130-3000+)	2001-2006; Data sources vary by study and range from measured BMI to nutrition knowledge, attitudes, and behavior questionnaires	5 quasi-experimental; 9 experimental	Vary by study and include no impact on BMI, short time frames, small and homogenous *n*, use of self-reported eating habits, and a variety of data collection tools Lack of long-term	Current approaches to nutrition education lack a cohesive approach Longer durations are more successful Parental role is "crucial" 14 of 16 studies included a PA component, hands-on approaches most successful	Study durations should be longer Parent involvement should be a priority Interventions should be based on theory Researchers should develop a "cohesive, long-lasting, and reproducible approach" and use experimental

				followup		study designs Involve school food service
Roseman, M. G., Riddell, M. C., & Haynes, J. N. (2011) Google Scholar	Review article, 26 articles included (*n:*36-1700+), early elementary through high school	2000-2008; Data sources vary by study and range from measured BMI to nutrition knowledge, attitudes, and behavior questionnaires	Assessed the impact of 10 recommended strategies as implemented in the 26 studies	Vary by study and include no impact on BMI, short time frames, small and homogenous *n*, use of self-reported eating habits, and a variety of data collection tools Variation in	Studies most often used behaviorally focused components (100%) and quantitative evaluation of food behaviors (96%) 15% of the interventions included community involvement or heterogenous groups 31% included anthropometric measures 50% of the studies used the same 5 strategies	Researchers should base interventions on findings from previous studies and identify high-impact strategies

				implementation strategies and fidelity Lack of long-term followup		
Puma, J., Romaniello, C., Crane, L., Scarbro, S., Belansky, E., & Marshall, J. A. (2013) Google Scholar	363 8th grade students from a low-income rural community	1999-2005, surveys of nutrition and PA knowledge, attitudes and behaviors, BMI percentiles	Quasi-experimental	Novel assessment tool at followup without reliability and validity data Anonymous surveys and BMI data were not linked to same	School-based nutrition education in early elementary can effect knowledge and attitudes about nutrition and PA into adolescence	Different strategies should be employed for different age groups Healthy lifestyle education for adolescents should emphasize peer influence School environment should support health lifestyles

				participant pre and post Different data collection tools used pre and post due to age changes in sample Self-reported nutrition data		"School-based nutrition education should be implemented as a sequential K-12 curriculum"
Blom-Hoffman, J., Kelleher, C., Power, T. J., & Leff, S. S. (2004)	91 K-1 Af-Am students at an under-resourced urban school	N.d., nutrition knowledge, vegetable consumption from plate waste	Quasi-experimental (non-random selection, randomized	Small, homogenous *n* Possible contamination bias	Significant increase in nutrition knowledge post and at 1 month followup No increase in vegetable consumption at school lunch for experimental group, but when control group	Nutrition education programs should include both knowledge and behavior change

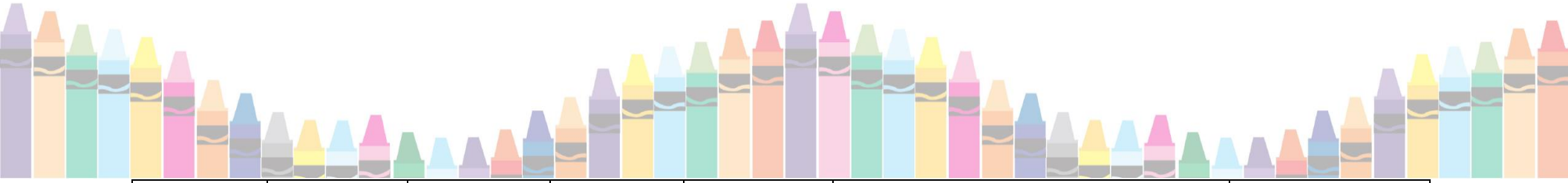
Google Scholar			experiment /control assignment , interventio n offered to control classes after experiment al)	(experiment al and control groups at same school) Variations in implementat ion fidelity Only school lunch behavior assessed	received intervention, vegetable consumption increased (higher adherence in implementation?) Much variability in implementation	School psychologists can play an important role Programs should emphasize consistency and fidelity in implementation
Flynn, M., McNeil, D., Maloff, B., Mutasingw a, D., Wu, M., Ford, C., & Tough, S.	Extensive, rigorous review of best practice approaches to reducing obesity				Of 20 programs with “mid” to “high” methodological rigor, which included nutrition components and were set in elementary schools, 17 showed improved in nutrition outcomes and 3 showed no change	“Positive nutrition outcomes in community settings may be positively influenced by combining family, behaviour

(2006) Google Scholar						modification and physical activity interventions with diet and nutrition recommendations ”

Table D: Physical Activity

Authors and Database	Population/ Sample	Years & Data Source	Study Design	Limitations	Findings	Recommendations
DeCorby, K., Robeson, P., Husson, H., Tirilis, D. (2009) Google Scholar	Review article, 26 articles included (n: 99-5,000+)	1988-2006; Data sources vary by study and range from blood pressure, duration of PA, leisure time PA, BMI, cholesterol, VO2 max, blood pressure	Prospective, randomized control trials and controlled clinical trials	Lack of long-term followup; all but 1 studied short term effects Wide variations in school setting and populations and in the type, intensity, and length of the school-based physical	There is some good evidence that school-based physical activity interventions are effective in promoting physical activity and fitness in children School-based interventions had positive impact on 2 of the 3 lifestyle behaviors: duration of PA and time spent watching TV Evidence does not suggest that school-based interventions are effective at increasing leisure time PA School-based physical activity interventions are effective in reducing mean blood cholesterol and improving fitness levels by improving VO2 max	Outcomes should be measured in the long term Additional interventions are needed in combination with school-based ones that facilitate families being more physically active during leisure time School-based physical activity interventions that are of longer

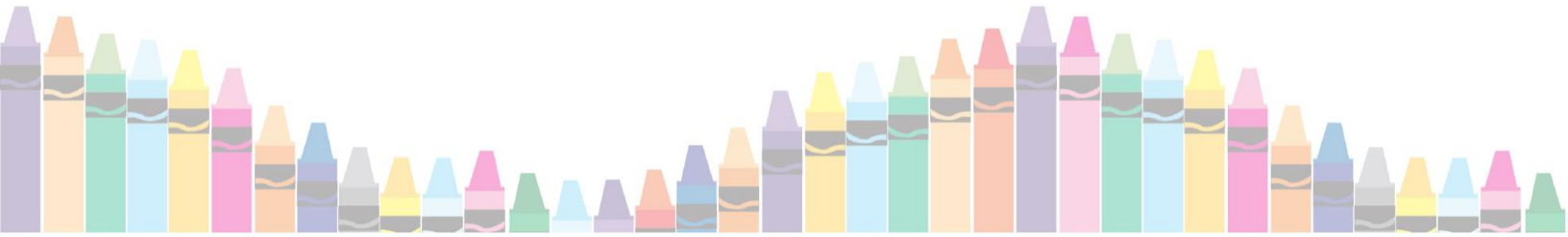
				activity interventions Inability to control for co-interventions Some self report	among children and adolescents, but not for reducing mean systolic and diastolic blood pressure, BMI, and pulse rate. There is convincing evidence that school-based interventions are effective in increasing the amount of time children and adolescents spend engaged in physical activity, particularly during school hours There is evidence from this review that school-based interventions are effective in reducing the duration of television viewing in the short term among grade school children Some convincing evidence that school-based interventions are effective in increasing the duration of physical activity and reducing television viewing, particularly in grade school children.	duration may be needed to effect change in duration of physical activity Future research needs to test various gender-specific strategies within the school setting



Community Guide's recommendations based on the following aricle: Lonsdale, C., Rosenkranz, R. R., Peralta, L. R., Bennie, A., Fahey, P., & Lubans, D. R. (2013) Google Scholar	Review article, 14 articles included	Through 2012 Data sources vary by study and range from blood pressure, duration of PA, leisure time PA, BMI, cholesterol, VO2 max, blood pressure	experimental or quasi-experimental designs	not clearly reporting or properly carrying out randomization procedures; not reporting or being adequately powered to detect changes in MVPA during PE class; and not having outcome assessors who were blinded to the intervention assignment;	Based on a systematic review, the Community Preventive Services Task Force recommends enhanced school-based physical education (PE) to increase physical activity based on strong evidence of effectiveness in increasing the amount of time students spend in moderate- or vigorous-intensity physical activity (MVPA) during PE classes. Enhanced school-based PE resulted in 10 percentage points more PE class time engaged in MVPA as compared with standard PE classes. Students who participated in enhanced PE engaged in 24% more MVPA than students who took part in standard PE classes. Students receiving their standard PE lesson (control groups) spent 43% of their lesson time in MVPA; there was an estimated difference of 10 percentage points in favor of the intervention	

				only 5 of the 14 studies measured or accounted for baseline physical activity levels in the analyses.	groups compared with the control groups. Thus, intervention groups spent a weighted mean of 53% of PE class time engaged in MVPA	
Kahn, E., Ramsey, L., Brownson, R., Health, G., Howze, E., Powell, K., Stone, E., Rajab, M., Corso, P., the Task Force on Community Preventive Services, (2002)					Changes in physical activity behavior and aerobic capacity were used to assess effectiveness. Effective information interventions: "point-of-decision" prompts to encourage stair use and community-wide campaigns Effective behavioral and social interventions: school-based physical education, social support in community settings, and individually-adapted health behavior change. Effective environmental and policy intervention: creation of or enhanced	There is strong evidence that school-based PE is effective in increasing levels of physical activity and improving physical fitness

Google Scholar					access to places for physical activity combined with informational outreach activities	



Appendix 5: Survey Questions

Scoping Survey

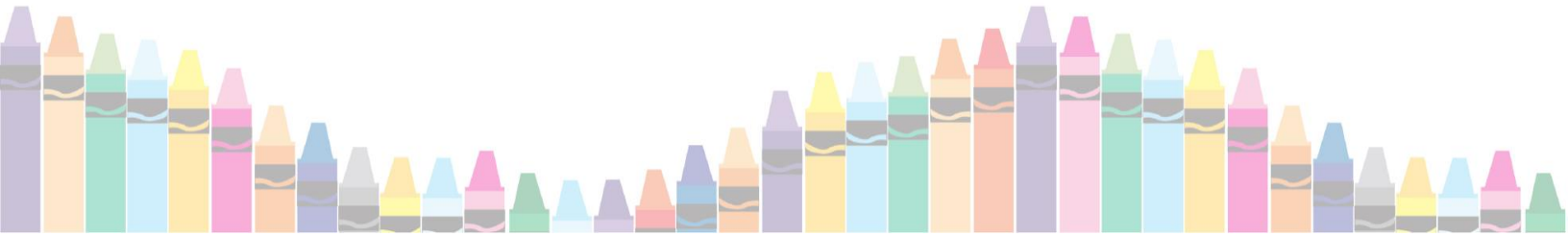
The purpose of the survey is to gain a better understanding of what parents and other community members value in terms of the link between education and specific social and health outcomes. Your responses will be used to decide which health outcomes to focus on when assessing the potential impacts of expanding full day kindergarten in Nevada.

1. Please choose up to **three** of the below factors that you think are important links between education and health in your community.

- [ ] Access to school services (school nurse, school breakfast and/or lunch)
- [ ] Cognitive development (reading level, math skills)
- [ ] Community economic stability (job diversification, unemployment)
- [ ] Crime rates
- [ ] Educational attainment (standardized test scores, graduation rates)
- [ ] In-class time
- [ ] Individual economic stability (wages and benefits, employment opportunities)
- [ ] Nutrition education
- [ ] Physical activity (recess, physical education classes)
- [ ] Physical development (motor skills)
- [ ] Social Development
- [ ] Other

Do you have a child or children?

- ( ) Yes
- ( ) No



Do you have a child who is currently or will attend regular public or public charter school in NV?

- Yes
- No

Do you have a child who is currently or will attend a private school in NV?

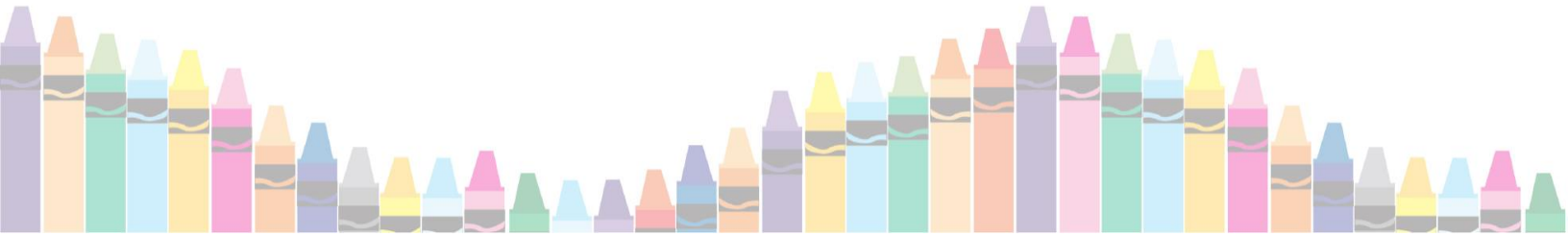
- Yes
- No

If you have a child or children currently in school in Nevada, what is the age of your child or children?

- Child/Children's ages

Do you currently or have you had a child who attended full day kindergarten in Nevada?

- Yes
- No



If yes, how was it paid for?

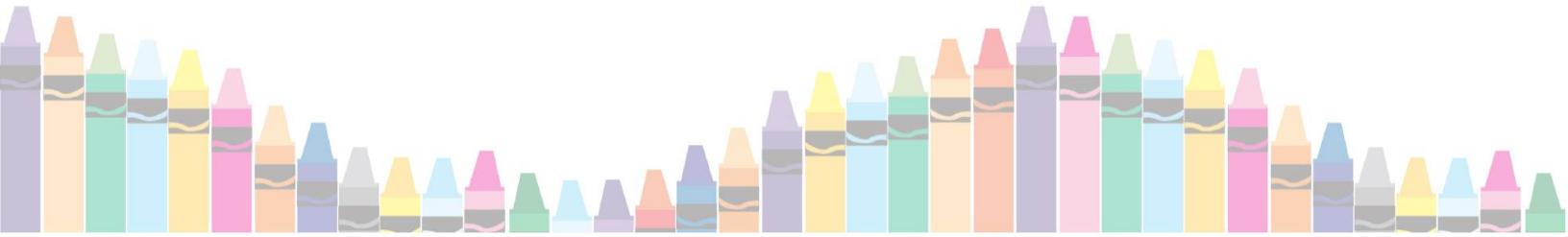
- It was provided free of charge by a public school
- I paid for it out of pocket (private)
- We received a scholarship
- Tuition based kindergarten at a public school
- Other

I would be more likely to send my child to full day kindergarten if I didn't have to pay for it out of pocket.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

If given the choice between full day kindergarten and half day kindergarten, with price being equal, I would send my child to full day kindergarten.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree



If yes, how was it paid for?

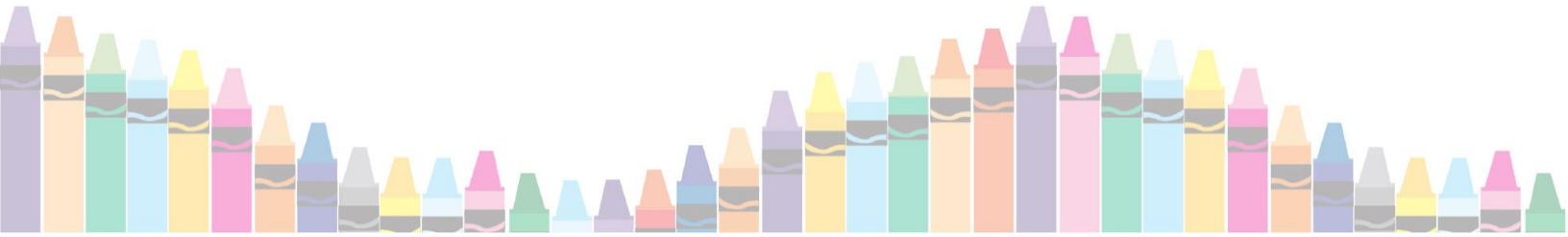
- ○ It was provided free of charge by a public school
- ○ I paid for it out of pocket (private)
- ○ We received a scholarship
- ○ Tuition based kindergarten at a public school
- ○ Other

I would be more likely to send my child to full day kindergarten if I didn't have to pay for it out of pocket.

- ○ Strongly Agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree

If given the choice between full day kindergarten and half day kindergarten, with price being equal, I would send my child to full day kindergarten.

- ○ Strongly Agree
- ○ Agree
- ○ Disagree
- ○ Strongly Disagree



Overall, I feel that there is value in full day kindergarten.

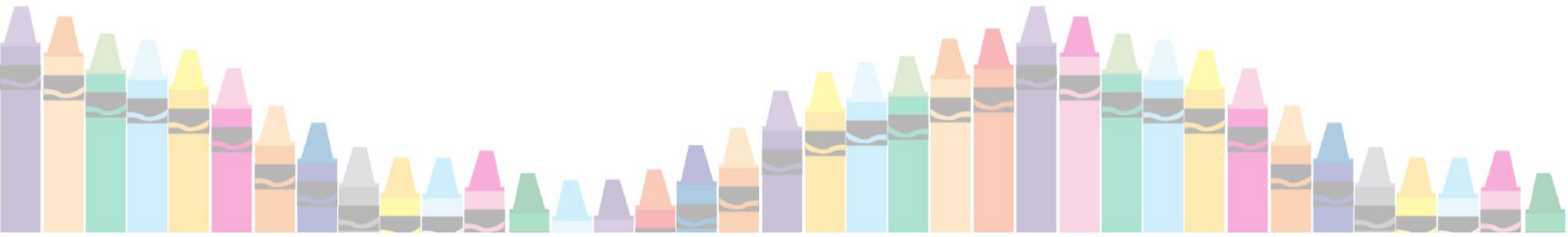
- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

I feel that all children should have the same access to full day kindergarten.

- Strongly Agree
- Agree
- Disagree
- Strongly Disagree

What is your sex?

- Male
- Female



With which race do you primarily identify? (*please mark ONE answer*)

- ○ American Indian or Alaska Native
- ○ Asian
- ○ Black or African American
- ○ Hispanic, Latino, or Spanish origin
- ○ Native Hawaiian or other Pacific Islander
- ○ White
- ○ Other race or more than 1 race

What is your age?

- ○ In years

What was your total **household** income for the past 12 months?

- ○ Less than $10,000
- ○ $10,000 – $29,999
- ○ $30,000 – $49,999
- ○ $50,000 – $69,999
- ○ $70,000 – $89,999
- ○ greater than $90,000
- ○ Prefer not to state

What is the primary language spoken in your home?

- ○ English
- ○ Spanish
- ○ Other

Recommendations survey

Right now, some children in Nevada do not go to full day kindergarten. Some children in public school go to half day kindergarten programs which may be as short as 2.5 hours. This survey will ask for your opinion about making changes to kindergarten in Nevada.

How important is it to you that all students in Nevada have access to full-day kindergarten instead of half day kindergarten?

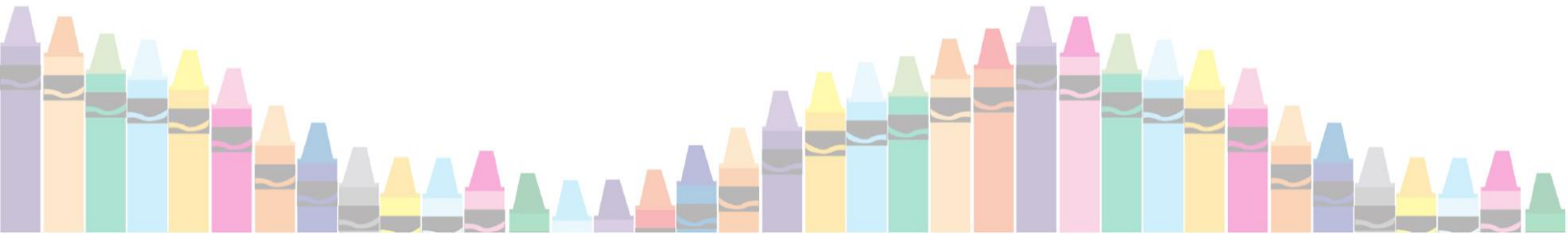
- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

How important is it to you that Nevada prioritize funding for full-day kindergarten for students most likely to benefit from it?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

How important is it to you to find out if going to preschool helps students do better in kindergarten?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know



How important is it to you to find out if going to full day kindergarten increases reading and math test scores in 3rd grade?

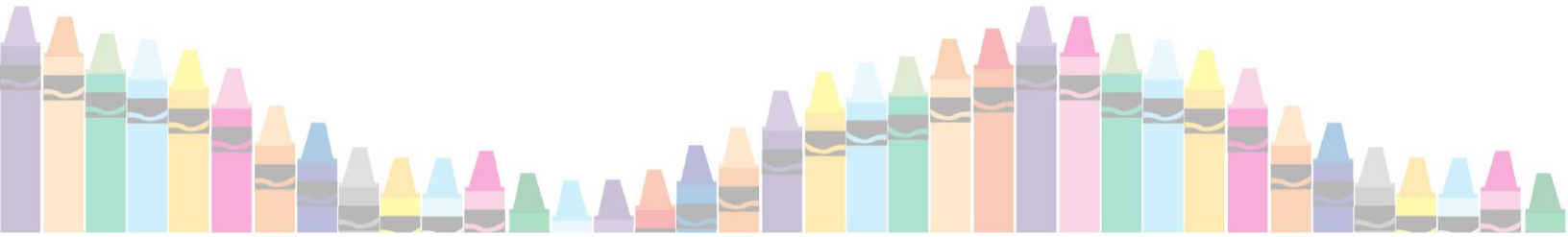
- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

How important is it to you to find out if going to full day kindergarten increases the chances that a student will graduate from high school?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

How important is it to you that Nevada high schools continue to develop programs that encourage students less likely to graduate from high school to earn a high school diploma?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know



How important is it to you that Nevada kindergartners have access to school breakfast and lunch?

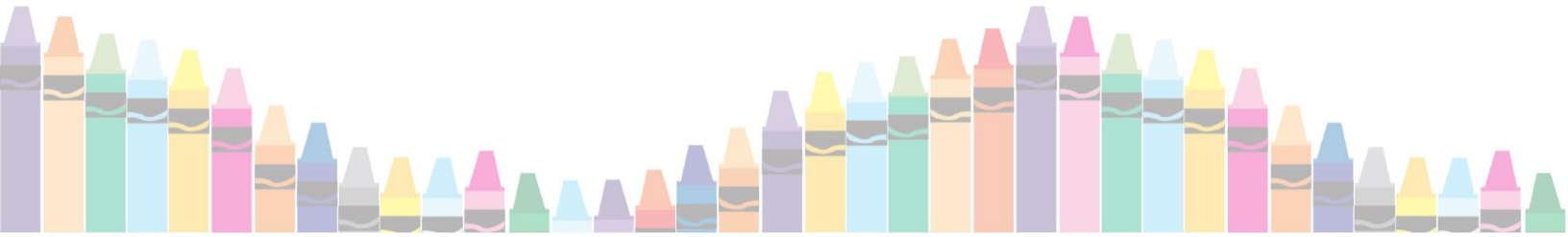
- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

How important is it to you that Nevada schools get eligible Nevada students to participate in free and reduced price school breakfast and lunch?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

How important is it to you for schools in Nevada to work with community organizations to provide meals for needy students?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know



How important is it to you that schools in Nevada teach nutrition to kindergartners?

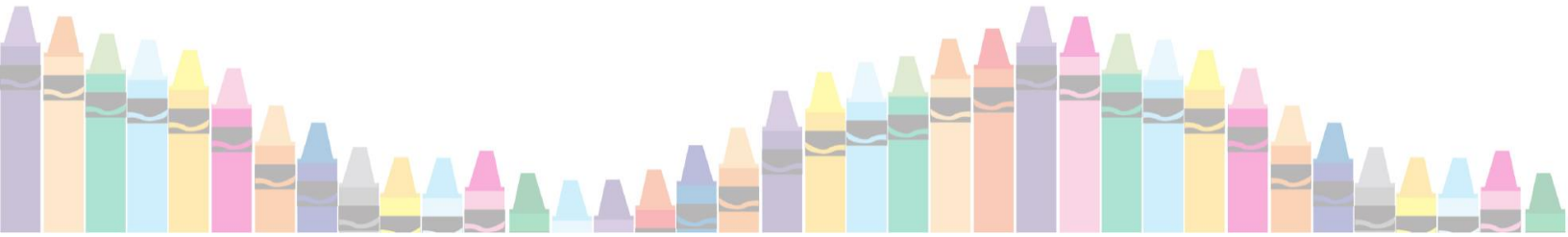
- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

How important is it to you that schools combine nutrition education with physical activity in kindergarten?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

How important is it to you that schools provide opportunities for kindergarten students to exercise a minimum number of minutes every week through recess, physical education class, and active class time?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know



How important is it to you that schools make kindergartners' vision and hearing test results and weight and measurement results (without students' names) available to researchers and the public?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

How important is it to you that schools weigh and measure kindergartners during the school year, like they do with some older students in some counties?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

How important is it to you that Nevada schools track height and weight changes for students from year to year?

- Very important
- Important
- Moderately important
- Of little importance
- Unimportant
- × Don't know

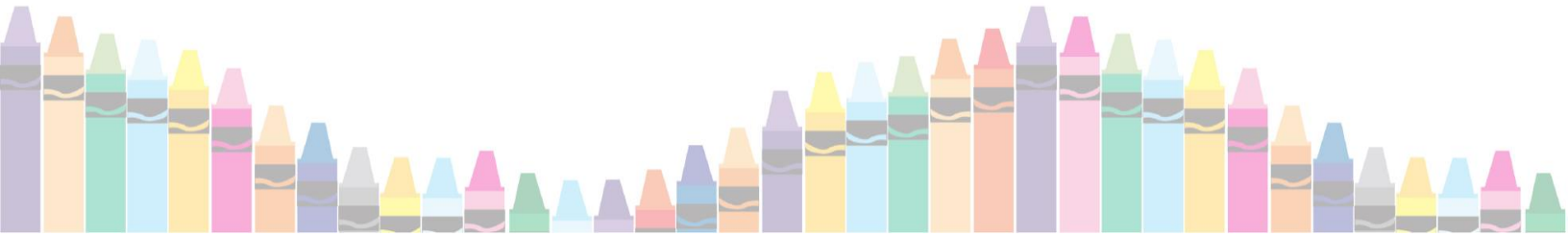


Table A: Community Member Survey Responses

	Very to moderately important	Little importance or unimportant
All Nevada children should have access to FDK rather than HDK	84%	16%
Nevada should prioritize funding for FDK for students who would most likely benefit from it	85%	15%
It is important to know if FDK increases 3rd grade reading and math scores	81%	19%
It is important to know if FDK increases high school graduation rates	83%	17%
Kindergarteners have access to school breakfast and lunch	89%	11%
Eligible students participate in free and reduced price lunch	88%	12%
Kindergarteners receive nutrition education	78%	22%
Kindergarteners receive combined nutrition education and physical activity	85%	15%
Kindergarteners receive the recommended minimum amount of physical activity	97%	3%
The need for making height/weight and vision/hearing data available to researchers and the public	54%	46%
Measuring the height/weight of kindergarteners	46%	54%
Tracking the height/weight of kindergarteners	50%	50%