Executive Summary: Health Impact Review of HB 1508

Promoting Student Health and Readiness through Meal and Nutrition Programs
(2017-2018 Legislative Sessions)

Evidence indicates that HB 1508 has potential to increase the number of low-income students and students of color who eat breakfast and lunch, which in turn has potential to improve students' diet quality, to improve educational outcomes, to improve earning potential, and to decrease health disparities.

BILL INFORMATION

Sponsors: Stonier, Dolan, Ortiz-Self, Riccelli, Orwall, Peterson, Sawyer, Doglio, Gregerson, Slatter, Frame, Macri, Bergquist, Senn, Ryu, Kloba, Stanford, Sells, Farrell, Lovick, McBride, Pollet, Hudgins, Jinkins, Kagi, Appleton, Goodman, Tharinger, Clibborn, Ormsby, Cody, Santos, Fey, Pettigrew

Summary of Bill:

- Requires high-needs schools that have not reached target participation (70% of free or reduced-price eligible students) in both the School Lunch and Breakfast Programs to offer Breakfast after the Bell and provide adequate time for students to eat. All breakfasts served under these programs must comply with federal meal patterns and nutrition standards.
- Requires the state to provide financial assistance to support implementation of Breakfast after the Bell programs.
- Requires the Office of the Superintendent of Public Instruction (OSPI) to develop and distribute procedures and guidelines and to offer training and technical and marketing assistance to schools to implement Breakfast after the Bell.
- Directs OSPI and schools to partner with nonprofits, philanthropic organizations, and communities to implement these programs.
- Establishes the Breakfast after the Bell lighthouse pilot project to promote best practices for designing, implementing, and operating Breakfast after the Bell programs.
- Eliminates the reduced-price lunch copay for students in prekindergarten through twelfth grade beginning with schools with the highest percentages of students qualifying for free and reduced-price lunch. All lunch copays are to be completely eliminated in the 2020-2021 school year.

HEALTH IMPACT REVIEW

Summary of Findings:

This Health Impact Review found the following evidence regarding the provisions in HB 1508:

- Strong evidence that Breakfast after the Bell programs would likely increase the number of low-income students participating in the School Breakfast Program and eating breakfast.
- Strong evidence that eating breakfast would likely improve health outcomes for these students and decrease health disparities.
- Strong evidence that eating breakfast would likely improve educational outcomes.
- A fair amount of evidence that eliminating school lunch copays for reduced-price lunches would likely increase the number of low-income students who eat lunch as a part of the National School Lunch Program (NSLP).
- Strong evidence that increasing the number of low-income students who participate in the NSLP and eat lunch in Washington would likely improve nutrition and diet quality for these students.
- Very strong evidence that improving nutrition and diet quality for students would likely improve educational outcomes.
- Very strong evidence that improving nutrition and diet quality for students would likely improve health outcomes for these students and decrease health disparities.
- Very strong evidence that improving educational outcomes would likely improve educational attainment.
- Very strong evidence that improving educational attainment would likely improve earning potential.
- Very strong evidence that improving educational attainment would likely decrease health disparities.
- Very strong evidence that improving earning potential would likely decrease health disparities.

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(2017-2018 Legislative Sessions)

February 1, 2017

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Contents

Introduction and Methods

A Health Impact Review is an analysis of how a proposed legislative or budgetary change will likely impact health and health disparities in Washington state (RCW 43.20.285). For the purpose of this review 'health disparities' have been defined as the differences in disease, death, and other adverse health conditions that exist between populations (RCW 43.20.270). This document provides summaries of the evidence analyzed by State Board of Health staff during the Health Impact Review of House Bill 1508 (HB 1508) from the 2017-2018 legislative sessions.

Staff analyzed the content of HB 1508 and created a logic model depicting possible pathways leading from the provisions of the bill to health outcomes. We consulted with experts and contacted stakeholders with diverse perspectives on the bill. State Board of Health staff can be contacted for more information on which stakeholders were consulted on this review. We conducted objective reviews of the literature for each pathway using databases including PubMed and Google Scholar.

The following pages provide a detailed analysis of the bill including the logic model, summaries of evidence, and annotated references. The logic model is presented both in text and through a flowchart (Figure 1). The logic model includes information on the strength of the evidence for each relationship. The strength-of-evidence has been defined using the following criteria:

- **Not well researched:** the literature review yielded few if any studies or only yielded studies that were poorly designed or executed or had high risk of bias.
- **A fair amount of evidence:** the literature review yielded several studies supporting the association, but a large body of evidence was not established; or the review yielded a large body of evidence but findings were inconsistent with only a slightly larger percent of the studies supporting the association; or the research did not incorporate the most robust study designs or execution or had a higher than average risk of bias.
- **Strong evidence:** the literature review yielded a large body of evidence on the relationship (a vast majority of which supported the association) but the body of evidence did contain some contradictory findings or studies that did not incorporate the most robust study designs or execution or had a higher than average risk of bias; or there were too few studies to reach the rigor of 'very strong evidence'; or some combination of these.
- **Very strong evidence:** the literature review yielded a very large body of robust evidence supporting the association with few if any contradictory findings. The evidence indicates that the scientific community largely accepts the existence of the association.

This review was subject to time constraints, which influenced the scope of work for this review. The annotated references are only a representation of the evidence and provide examples of current research. In some cases only a few review articles or meta-analyses are referenced. One article may cite or provide analysis of dozens of other articles. Therefore the number of references included in the bibliography does not necessarily reflect the strength-of-evidence. In addition, some articles provide evidence for more than one research question so they are referenced multiple times.

Analysis of HB 1508 and the Scientific Evidence

Summary of relevant background information

- All public schools, nonprofit private schools, and Residential Child Care Institutions in the United States can participate in the federally funded National School Lunch and School Breakfast Programs.[1]
- Children from families with incomes at or below 130% of the federal poverty level receive free school meals and children from families with incomes between 130% and 185% of the poverty level receive school meals at a reduced-price of no more than 40 cents per lunch.[1]

Summary of HB 1508

- Requires high-needs schools that have not reached target participation (70% of free or reduced-price eligible students) in both the School Lunch and Breakfast Programs to offer Breakfast after the Bell and provide adequate time for students to eat. All breakfasts served under these programs must comply with federal meal patterns and nutrition standards.
- Requires the state to provide financial assistance to support implementation of Breakfast after the Bell programs.
- Requires the Office of the Superintendent of Public Instruction (OSPI) to develop and distribute procedures and guidelines and to offer training and technical and marketing assistance to schools to implement Breakfast after the Bell.
- Directs OSPI and schools to partner with nonprofits, philanthropic organizations, and communities to implement these programs.
- Establishes the Breakfast after the Bell lighthouse pilot project to promote best practices for designing, implementing, and operating Breakfast after the Bell programs.
- Eliminates the reduced-price lunch copay for students in prekindergarten through twelfth grade beginning with schools with the highest percentages of students qualifying for free and reduced-price lunch. All lunch copays are to be completely eliminated in the 2020-2021 school year.

Health impact HB 1508

Evidence indicates that HB 1508 has potential to increase the number of low-income students and students of color who eat breakfast and lunch, which in turn has potential to improve students' diet quality, to improve educational outcomes, to improve earning potential, and to decrease health disparities.

Scope of this Health Impact Review

Due to time limitations this Health Impact Review does not focus on potential pathways leading from the provisions outlined in section 8 or section 10 of HB 1508. Section 8 relates to grants that may be awarded for activities such as increasing awareness of and participation in school breakfast and lunch programs, improving the nutritional content of food, and promoting programs such as organic gardens that provide produce for school meals. Section 10 discusses promoting and facilitating farm-to-school programs and small direct marketing farm programs within school districts. Because this Health Impact Review had a short turnaround time and reviews of the literature had already been done for sections of this bill, the scope of this review was limited to focus on the impacts of Breakfast after the Bell and eliminating the reduced-price lunch copay.

Pathways to health impacts

The potential pathways leading from the provisions of HB 1508 to decreased health disparities are depicted in Figure 1. There is strong evidence that Breakfast after the Bell programs increase participation in the School Breakfast Program and increase the number of students who eat breakfast, particularly among low-income students and students of color who are more likely to skip breakfast than their peers.[2-13] There is also strong evidence that eating breakfast is directly associated with improved education[7,14,15] and health outcomes.[12,16-19] There is a fair amount of evidence that eliminating the reduced-price lunch copay for prekindergarten through twelfth grade would likely increase the number of low-income students who eat lunch as a part of the National School Lunch Program (NSLP).[1,5,20,21] There is strong evidence that increasing the number of low-income students who participate in NSLP and eat lunch would likely improve nutrition and diet quality for these students,[22-26] which is very strongly associated with improved educational[1,27-31] and health outcomes.[32-34] In addition, the literature indicates that increased educational opportunities and outcomes are very strongly linked to increased educational attainment,[35-38] which in turn is very strongly associated with both improved health[39-51] and increased income[40,52] (which is also very strongly linked to improved health).[19,39-41,43,48,49,53-58] Because this bill specifically applies to students who are eligible for reduced-price lunch and to schools with large populations of students eligible for free and reduced-price meals it would likely have the greatest impact among low-income students. In addition, because schools in Washington with high percentages of low-income students also have higher percentages of students of color,[9] this bill could help increase the number of students of color who participate in school breakfast and lunch programs as well. Low-income students and students of color are more likely to experience health disparities[9,32-34,59] and therefore, increasing participation in school meals among these students has potential to decrease these disparities.

Due to time limitations we only researched the most direct connections between the provisions of the bill and decreased health disparities and did not explore the evidence for all possible pathways. For example, potential pathways that were not researched include:

- Evidence of how breakfast consumption impacts student behavior and discipline incidence and how discipline incidence relates to educational outcomes.
- Evidence for how students eating school lunch impacts the food security and nutrition of their family members.
- Evidence for how eating breakfast at school and eliminating the reduced-price lunch copay impacts a family's financial stability.

Magnitude of Impact- Breakfast after the Bell

This legislation could impact a large number of students in Washington as more than 20% of 6th grade students, more than 30% of 8th grade students, more than 37% of 10th grade students, and nearly 39% of 12th grade students reported skipping breakfast that morning on the 2012 Healthy Youth Survey.[11] In addition, evidence indicates that Breakfast after the Bell models have increased the participation of students in the School Breakfast Program by between 28 and 53%. One school which added a mobile breakfast cart and extended the morning cafeteria hours saw the average daily School Breakfast Participation increase by nearly 400% and the number of students who skipped breakfast at least once per week decrease by 8.7% following implementation of these programs.[10]

Magnitude of Impact- Eliminating the reduced-price lunch copay

The number of students that would be impacted by this provision is unclear as specific data on the number of students eligible for reduced-price lunch was not able to be obtained. However, the Office of Superintendent of Public Instruction (OSPI) Washington State Report Card for the 2015-2016 school year indicates that there are 477,828 students eligible to receive free or reduced-price meals, which is 44% of students. Because this estimate includes students eligible for either free or reduced-price lunch, and this provision only impacts students eligible for reduced-price lunch, it is an overestimate of the actual impact. From a financial perspective, the fiscal note for the previous version of this bill, HB 2964 (2015-2016 legislative session) prepared in February 2016 indicates that in the 2014-2015 school year approximately 8,385,539 reduced-price school lunches were served and of these, 2,893,452 were served to students in K-3. It is important to note that funding to eliminate the reduced-price lunch copay for kindergarten through third grade was included as a proviso in the 2007-2008 OSPI budget and this bill further expands the provision to students in prekindergarten and students in grades 4-12. Therefore, at a price of 40 cents per reduced-price lunch, and subtracting the lunches served to students in K-3, the total impact of this bill would be approximately $2,196,955 annually (5,492,087 lunches in grades 4-12 multiplied by 40 cents per lunch). However, this estimate does not include lunches served to students in prekindergarten so the actual cost would likely be higher.

Logic Model

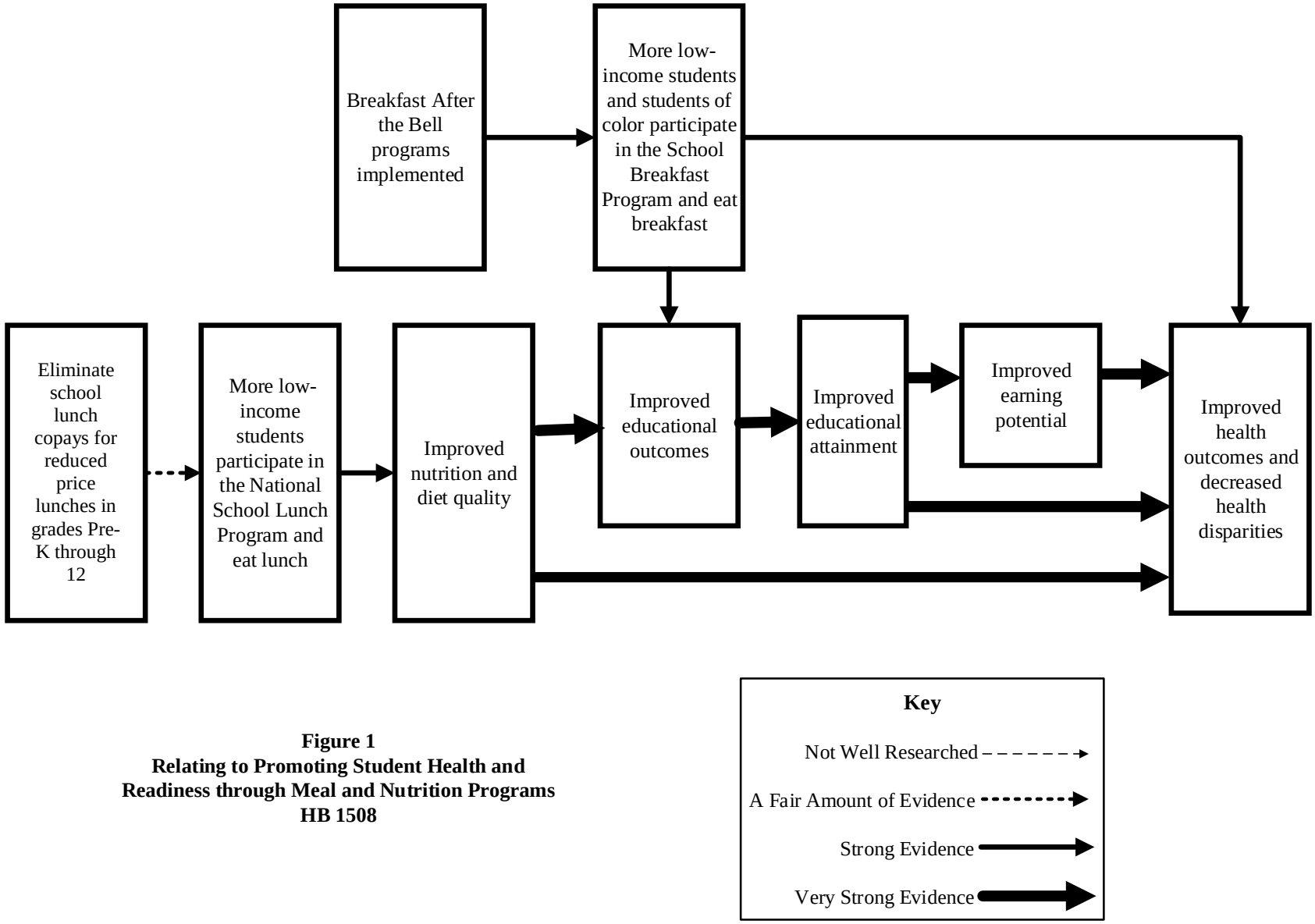

Figure 1
Relating to Promoting Student Health and Readiness through Meal and Nutrition Programs
HB 1508

Summaries of Findings

Will implementing Breakfast after the Bell programs increase the number of low-income students and students of color who participate in the School Breakfast Program and who eat breakfast in Washington state?

There is strong evidence that Breakfast after the Bell models such as Grab-and-Go, extended breakfast hours, and Breakfast in the Classroom increase participation in the School Breakfast Program and decrease the number of students who skip breakfast.[2,4-8,10,12,13] The language of HB 1508 specifically requires that schools with large populations of students eligible for free and reduced-price meals and with low percentages of these students participating in school meals must offer Breakfast after the Bell, therefore this bill is more likely to increase breakfast participation among low-income students. In addition, evidence indicates that Breakfast after the Bell programs are more likely to increase breakfast participation for low-income students than for their higher income peers even within the same school,[8] so it is likely that this positive effect will be enhanced for low-income students in the schools where these programs are implemented. In addition, because schools in Washington with high percentages of low-income students also have higher percentages of students of color,[3,9] this bill could help decrease the number of students of color who skip breakfast as well. This is important because Washington state data indicate that students of color and American Indian/Alaska Native students were more likely than their white peers to report having skipped breakfast on the day of the Healthy Youth Survey.[11] HB 1508 also requires the state to provide financial assistance to support Breakfast after the Bell programs, reducing the risk of an unfunded mandate on low-income schools.

Will increasing the number of low-income students who participate in the School Breakfast Program and eat breakfast in Washington improve health outcomes and decrease health disparities?

There is strong evidence that eating breakfast is directly associated with improved health outcomes. We found evidence that eating breakfast is positively associated with a number of beneficial health outcomes such as healthy weight, lower fasting insulin, lower cholesterol, increased daily nutrient intake, and decreased hunger related health symptoms.[12,16-18] One review article found that the literature overall supports an association between eating breakfast and decreased rates of obesity, but that the literature yields inconsistent results.[16] In contrast the evidence shows a strong consistent link between eating breakfast and other health indicators such as adequate daily nutrient intake.[17,18] Due to time limitations we focused this literature search specifically on the impacts of eating breakfast on health outcomes and did not expand the scope to include evidence on the impacts of food insecurity in general on health outcomes. Including publications on these additional aspects would likely further bolster the evidence for the link between eating breakfast and positive health impacts. Because the same students who experience disparities in access to breakfast are also experiencing health disparities,[19] improved health outcomes for these students has potential to decrease health disparities.

Will increasing the number of low-income students who participate in the School Breakfast Program and eat breakfast in Washington improve educational outcomes?

There is strong evidence that eating breakfast is associated with improved educational and cognitive outcomes such as better grades, achievement test scores, memory, punctuality, readiness to learn, classroom behavior, reading scores, fewer errors on attention tasks, and decreased dropout rates. The literature also indicates that these positive effects are more apparent

in nutritionally vulnerable children, indicating that increasing access to breakfast may have a greater positive impact on low-income students. Access to breakfast may therefore work to narrow the opportunity gaps experienced by low-income students and students of color. There is also evidence that School Breakfast Programs are associated with improved attendance which may at least partially account for improvements in academic outcomes.[7,14,15]

Will eliminating school lunch copays for reduced-price lunches in grades Pre-K through 12 increase the number of low-income students eat lunch as a part of the National School Lunch Program in Washington state?

There is a fair amount of evidence that eliminating school lunch copays for reduced-price lunch in grades Pre-K through 12 would likely increase the number of low-income students who participate in NSLP and eat lunch. While the success of alternative models such as universal free school meals and eliminating reduced-price breakfast have been studied, very little literature exists that examines the association between eliminating reduced-price lunch and student participation. The Government Accountability Office issued a report that identified 5 states and 35 school districts across 19 states that have eliminated the reduced-price fee for school meals in the 2008-2009 school year.[20] Of these, the authors found that 20 of the 23 school districts that specifically eliminated reduced-price fees for lunch reported increased participation in the school lunch program.[20] Further, the average change in participation for lunch among reduced-price-eligible students in these districts was an 11 percentage point increase, which was greater than the national change in this rate over the same year.[20] Although less generalizable to this particular bill, additional research has demonstrated that schools that have implemented universal free school meals have seen striking increases in participation in the school meal programs compared to other non-participating schools.[1,21] For example, participation in school lunch programs was 47% higher in implementing schools than non-implementing schools across Illinois, Kentucky, and Michigan.[1] Further, schools that have eliminated the reduced-price breakfast and implemented universal free breakfast for all students have also seen increased participation in school breakfast participation.[5] These studies provide a basis for understanding the potential success of an alternative model for providing school meals to students. Finally, it is unclear if existing literature includes outcomes for pre-kindergarten students, however it is likely that findings would be generalizable to these students as well.

Will increasing the number of low-income students who participate in the National School Lunch Program and eat lunch in Washington state improve nutrition and diet quality for these students?

There is strong evidence that increasing the number of low-income students who participate in the National School Lunch Program and eat lunch in Washington state would likely improve nutrition and diet quality for these students. Data indicate that NSLP participants are more likely than nonparticipants to have adequate vitamin and mineral uptake;[22] more likely to consume vegetables, fluid milk, flavored milk, and fruit or 100% fruit juice; and less likely to consume salty snacks, and sweets and desserts at lunch.[23,24] Another study found that compared to lunches that were brought from home, lunches from the NSLP were lower in calories, fat, saturated fat, sugar, vitamin C, and iron but were higher in protein, sodium, fiber, vitamin A, and calcium.[24] Based on these findings, the authors concluded that school lunches were more likely to meet nutrition standards than packed lunches.[24] Further, NSLP participants from families who were income-eligible to receive free or reduced-price meals had a higher Healthy Eating Index-2005 (HEI-2005) score than nonparticipants, which indicates a higher quality diet.[23,25] Finally, the

importance of consuming lunch is highlighted by research that has demonstrated that children and adolescents who miss lunch have lower overall micronutrient intakes and lower intakes of fiber, calories, and sodium.[26]

Will improving nutrition and diet quality for students improve educational outcomes?
There is very strong evidence that improving nutrition and diet quality for students would likely improve educational outcomes. One review article found that the relationship between nutrition and cognition has been well researched and a consensus exists among the scientific community that normal brain function is impacted by dietary building blocks such as amino acids, iron, zinc, protein, carbohydrates, and various vitamins and minerals that we derive from our food.[30] Further, data indicate that students with poorer diet quality are more likely to perform worse on assessments and that students who reported higher academic performance were more likely to consume milk, vegetables, fruit, and lower intakes of fat on a daily basis.[28,29] By increasing the number of students who participate in the school lunch program, it can be expected that students are also less likely to go hungry during the school day. Given this hypothesis, a number of studies have examined the impacts of food insecurity, inadequate intakes of nutrients and energy, and hunger on school performance and have demonstrated outcomes such as lower mean grade point average, lower scores on academic achievement tests, behavior problems, worse school attendance, increased likelihood of repeating a grade, and more disciplinary action.[1,27,30,31] Many of these associations persisted after controlling for factors such as race/ethnicity, poverty index, age, and gender.[27] Therefore, increasing the number of students who participate in the National School lunch program and have access to nutritious meals at school would likely improve students' educational outcomes.

Will improving nutrition and diet quality for students improve health outcomes and decrease health disparities?
There is very strong evidence that improving nutrition and diet quality for students would likely improve health outcomes and decrease health disparities among low-income students and students of color. There is a consensus in the scientific literature that poor nutrition and diet quality contribute to poor health outcomes such as obesity, cardiovascular disease, and diabetes both in adults and children and these outcomes vary by race/ethnicity and income.[9,33,59] Data show that in 2012, close to 10% of Washington students in grades 8, 10, and 12 were obese and another 13-14% were overweight.[32] Among 10th grade students, American Indian/Alaska Natives, Blacks, Hispanics, and Pacific Islanders were more likely than their white counterparts to be overweight or obese.[32] There also appears to be a disproportionately higher incidence of type 2 diabetes among minority children nationally with the highest incidence found among Navajo Indian females (38.42 cases per 100,000 people compared to 3.7 cases per 100,000 white females).[34] Further, data indicate that children from lower income households have more than two times the odds of being obese than children from higher income households and the rates of severe obesity are 1.7 times higher among poor children.[59] One review article examined extensive literature that demonstrates an association between childhood obesity and outcomes such as hypertension, high blood lipids, chronic inflammation, increased blood clotting tendency, endothelial dysfunction, hyperinsulinaemia, sleep apnea, asthma, and type 2 diabetes.[33] Further, type 2 diabetes presents additional risks such as heart disease, stroke, kidney failure, and blindness.[33] In addition to the physical health risks from childhood obesity, many studies have indicated substantial psychosocial consequences such as negative self-image and stereotyping.[33] Because the same students who are eligible for reduced-price lunch are also experiencing health

disparities, improved health outcomes for these students has potential to decrease health disparities.

Will improving educational outcomes improve educational attainment?
There is very strong evidence that improved educational outcomes such as those linked to eating breakfast and lunch (e.g. higher grades and increased readiness to learn) are associated with higher educational attainment.[35-38] For example, one study found that low grades during primary school were predictive of not having completed a secondary education by age 20 or 21.[38] These links are well documented and because this connection is widely accepted, less time was dedicated to researching this relationship. In addition several measures of educational outcomes are innately indicative of education attainment (e.g. specific grades are required as a prerequisite for high school graduation—one measure of educational attainment) further supporting the strength-of-evidence for this relationship.

Will improving educational attainment improve earning potential?
There is very strong evidence for the connections between increasing educational attainment and increasing income as well as decreasing rates of unemployment. These links are well documented globally, and data indicate that these trends do exist in Washington state as well.[40,52] Because this connection is widely accepted, less time was dedicated to researching this relationship.

Will improving earning potential improve health outcomes and decrease health disparities?
There is very strong evidence that improving earning potential will improve health outcomes and decrease health disparities. There is a large body of robust evidence that supports the association between income, or socioeconomic position, and health.[19,39-41,43,48,49,53-58] Significant correlations exist between lower income and a number of health indicators including worse overall self-reported health, depression, stress, asthma, arthritis, stroke, oral health, tobacco use, women's health indicators, health screening rates, physical activity, and diabetes.[40,41,53,56,58] Further, 2015 data indicate that age-adjusted death rates were higher in Washington census tracks with higher poverty rates.[48] Household income was also the strongest predictor of self-reported health status in Washington in 2016, even after accounting for age, education, and race/ethnicity.[49] Among children, evidence indicates that low socioeconomic status in the first five years of life has negative health outcomes in later childhood and adolescence including activity-limiting illness, parent-reported poor health status, acute and recurrent infections, increasing body mass index (BMI), dental caries, and higher rates of hospitalization.[57] Finally, financial stress is also associated with adverse outcomes for families such as problem behavior in adolescents, interparental conflict, and parental depression.[55]

Will improving educational attainment improve health and decrease health disparities?
There is very strong evidence that higher educational attainment is associated with better health. Data collected nationally and in Washington state indicate a correlation between higher educational attainment and positive health outcomes such as decreased rates of diabetes, oral health problems, tobacco use, inactivity, obesity, depression, and coronary heart disease. The correlation between health and education is observed even after controlling for income, which can also serve as a mediating factor.[39-51]

Annotated References

1. **Levin Madeleine, Hewins Jessie.** ***Universal Free School Meals: Ensuring that All Children Are Able to Learn.*** **Sargent Shriver National Center on Poverty Law 2014.**

Levin et al. present an overview of the school meal participation, the importance of nutrition on academic achievement, and success stories from districts and states across the country that have implemented alternative meal delivery programs. The authors discuss research that indicates that nourished children are not only better test-takers and participants in school but they are also more likely to arrive on time, behave, have better attendance and be alert in class. Further, hungry children and teens are more likely to have lower math scores, repeat a grade, be suspended from school, and have altercations with their peers. School meal participants are more likely to consume fruit, vegetables, and milk and when meals are offered at no charge to students, a growing body of evidence indicates that school meal participation increases. The report continues on to discuss the various ways that schools have been able to implement universal free meals to their students, including through the community eligibility provision, and the success these schools have seen in increased participation. The authors conclude that school meal programs often help families stretch their limited resources further to ensure that their children can succeed in school and further efforts are needed to expand the uptake of free meal models and the use of community eligibility.

2. **Anzman-Frasca Stephanie, Djang Holly Carmichael, Halmo Megan M., et al. Estimating Impacts of a Breakfast in the Classroom Program on School Outcomes.** ***JAMA Pediatrics.*** **2015;169(1):71.**

Anzman-Frasca et al. conducted a quasi-experimental study to estimate the impact of Breakfast in the Classroom (BIC) programs on School Breakfast Program participation, school attendance, and academic outcomes. The authors analyzed data from 257 schools implementing BIC programs and 189 schools without BIC programs within one large urban school district in the United States. Over 80% of students in the district were eligible for free or reduced-price school meals, and more than 70% of the students were Hispanic/Latino. After controlling for potential confounding factors, the authors found that schools with BIC programs had significantly higher rates of participation/higher meal counts in the School Breakfast Program and greater overall student attendance than schools without these programs. On average 73.3% of students in BIC schools participated in the School Breakfast Program compared to 42.9% of students in non-BIC schools. BIC programs were implemented in different months in each school with some schools having their programs operational by November and other schools having their programs running by March. As more BIC programs were implemented participation in the breakfast program increased, with 41.9% participation in the BIC schools in August 2012 increasing to 94.6% participation in May 2013. The respective rates for non-BIC schools were 46.4% and 43.4%. BIC schools also had attendance rates of 95.5% versus rates of 95.3% for non-BIC schools. This difference represents an additional 76 attended days per grade per month. The data did not reveal significantly different outcomes for BIC versus non-BIC schools in relation to achievement test scores. The measure of test scores may not have been timely as some of the schools did not implement their BIC programs until March.

3. **Aud S, Fox MA, KewalRamani A.** ***Status of Trends in the Education of Racial and Ethnic Groups.*** **Washington DC: National Center for Education Statistics; U.S. Department of Education;2010.**

This report compiled national level school data and survey data from 2007, and was analyzed by US Department of Education staff. They found that nationally, Hispanic, Native American/Alaska Native, Native Hawaiian and other Pacific Islander, and African American children under 18 are more likely to be living in poverty than White, Asian, or mixed race children.

4. **Bartfeld J., Kim M. Participation in the School Breakfast Program: new evidence from the ECLS-K.** ***The Social service review.*** **2010;84(4):541-562.**

Bartfeld and Kim analyzed data from the Early Childhood Longitudinal Study—Kindergarten Cohort in order to determine predictors of participation in the School Breakfast Program. They analyzed parent survey data from wave 5 (third grade) collected in 2002. The primary analysis includes 6,680 children who attended schools with a School Breakfast Program. The authors found that the probability of participating in the School Breakfast Program increases if breakfast is served in the classroom or if the duration of the breakfast period increases. They also found that for students who ride the bus, as the length of time increases between when their bus arrives at school and their first class, participation in the School Breakfast Program also increases. The authors conclude that the "results strongly support the hypothesis that increasing the convenience of the School Breakfast Program leads to greater participation."

5. **Bernstein LS, McLaughlin JE, Crepinsek MK, et al.** ***Evaluation of the school breakfast program pilot project: Final report. Special nutrition programs. Report number cn-04-sbp. Nutrition assistance program report series.*** **Alexandria, VA USDA, Food and Nutrition Service;2004.**

In 1998 Congress authorized a three year (2000-2003) School Breakfast Program Pilot Project to evaluate the effects of providing universal free school breakfast in six districts across the United States. Control schools continued to offer the regular School Breakfast Program. Bernstein et al. found that schools offering universal free school breakfast saw an increase in participation in the School Breakfast Program in the first year of the pilot. However, schools that also offered breakfast in the classroom saw significantly larger increases in participation (from 27% in the base year to 66% the following year) compared to schools that did not offer breakfast in the classroom (from 17% in the base year to 28% the following year). The rate of participation in the control schools stayed relatively constant increasing from 20% to 21%.

6. **Morris Chad T., Courtney Anita, Bryant Carol A., et al. Grab 'N' Go Breakfast at School: Observations from a Pilot Program.** ***Journal of Nutrition Education & Behavior.*** **2010;42(3).**

Morris et al. evaluated a two week Grab 'N' Go pilot program in a middle school where 48% of the student body qualified for free or reduced-price lunches. For this program school nutrition staff prepared sack breakfasts that were available in the cafeteria prior to the first class of the day. The first week these were provided free to all students while in the second week they were priced at the regular breakfast prices for free, reduced ($0.30), and full price breakfast ($1.10). The evaluation included field notes, focus groups, interviews with school staff, and student and

teacher surveys. Forty-nine percent of the students surveyed who 'rarely ate breakfast' indicated that they had participate in the Grab 'N' Go meals. Sixty-six percent of surveyed students reported participating in the program, with 27% participating for all 10 days.

7. **Mosehauer K et al.** ***The Future of School Breakfast: An Analysis of Evidence-Based Practices to Improve School Breakfast Participation in Washington State.*** **Washington Appleseed;2013.**

Mosehauer et al. analyzed 2013 Washington student School Breakfast Program participation data and found that districts with some schools using Breakfast after the Bell models had higher average participation rates among the target population (students eligible for free and reduced-price lunch) in the School Breakfast Program than districts only using traditional cafeteria models. For example, the districts using traditional models had participation rates for the target population of 49.85% while districts with some schools using traditional cafeteria models and some using Second Chance Breakfast had rates of 50.97%, districts with some schools using traditional models and some using Second Chance Breakfast or Grab 'N' Go had rates of 55.46%, and districts with some schools using traditional models and some using Second Chance Breakfast, Grab 'N' Go, and Universal Breakfast had rates of 77.47%. The report does not indicate if these rates are statistically significantly different. These data also indicate that low-income students missed more days of school than their high-income counterparts, but that schools with higher participation in the School Breakfast Program by students eligible for free and reduced-price meals had smaller disparities in attendance between low and high-income students. Schools meeting national breakfast participation goals saw 40% fewer absences for low-income students than schools not meeting these goals. For example, in Auburn School District, low-income students at schools serving breakfast to 70% or more of the students eligible for free or reduced-price meals missed 1.7 more days of school each year than their higher-income peers, while free and reduced-price eligible students at schools serving less than 70% of the target population missed 3.62 days more than their peers. These are descriptive data only and do not account for potential confounding factors, however the authors did exclude students who were not enrolled in the same school for the entire year which reduces the risk of cross-over. This report also indicates that in Washington, low-income students who experience greater food insecurity missed 1 to 5 more days of school per year than their counterparts.

8. **Nanney Marilyn S., Olaleye Temitope M., Wang Qi, et al. A pilot study to expand the school breakfast program in one middle school.** ***Behav. Med. Pract. Policy Res. Translational Behavioral Medicine : Practice, Policy, Research.*** **2011;1(3):436-442.**

Nanney et al. conducted a cohort study to evaluate the impact of a Grab 'N' Go School Breakfast Program meal that was delivered in the hallway and eaten in the classroom. The program was implemented in a classroom in Minneapolis, Minnesota with sixth grade students (n=239) for six weeks in 2010. The researchers analyzed School Breakfast Program participation data and pre-intervention BMI as well as data from post intervention student and teacher surveys and researcher observations. The response rate for the student survey was 83.9% and the teacher survey response rate was not reported. One hundred percent of teacher respondents indicated that the meals were not messy or disruptive and that the student behavior was overall excellent or good. The authors found a significant increase in School Breakfast Program participation during the intervention—with an average increase in participation of 0.47 days per week. This increase

was stronger for students who received fee and reduced price lunches (increase of 0.63 days per week) compared to full paid students (increase of 0.29 days per week).

9. **Student Enrollment Demographic Data 2014; http://reportcard.ospi.k12.wa.us/DataDownload.aspx. Accessed November 13, 2016.**

These recent Washington state data indicate that school districts that serve high percentages of students eligible for free and reduced-price lunch also tend to serve high percentages of students of color. Although the relationship is not true for every district, the trend is apparent when looking at data for all of the districts combined.

10. **Olsta Julia. Bringing Breakfast to Our Students: A Program to Increase School Breakfast Participation. *Journal of School Nursing.* 2013;29(4):263-270.**

Olsta evaluated the impact of a program extending breakfast cafeteria hours and providing a mobile cart that served a complete school breakfast during students' morning study hall classes. This study was conducted in a public high school in a Midwestern suburban area in the 2010-2011 school year. This school held a morning study hall in the cafeteria. The student body was made up of approximately 28% low-income students and 43% students of color. Before implementing the program the school's Wellness Team collected a baseline survey as a needs assessment from students enrolled in physical education (PE) classes (n=1,405) which had a response rate of 86%. Following implementation of both the food cart and the extended breakfast hours the school saw an increase in average daily school breakfast participation of nearly 400% by the end of the school year. The school Wellness Team conducted a follow-up survey in the spring of 2011 with current students enrolled in PE classes (n=826) with a response rate of 49%. These were not the same students who took the baseline survey. The survey data indicated that the percentage of students who reported that they had skipped breakfast at least once per week was 8.7% lower when compared to the baseline survey. This research did not include a comparison group. This study was partially supported by a grant from the Midwest Dairy Council so there is potential for a conflict of interest.

11. **QxQ Analysis. 2012; http://www.askhys.net/Analyzer.**

Washington State Healthy Youth Survey data from 2012 indicate that among 6th , 8th, 10th, and 12th grade respondents students of color and American Indian/Alaska Native (AI/AN) students were more likely to report having gone without breakfast on the day of the survey than their white peers. Although these disparities did not reach significance in every grade for each race/ethnicity classification, the rates of skipping breakfast were significantly higher than those for white students for the following: 6th grade AI/AN and Hispanic students as well as those that self-reported their race/ethnicity as "multiple" or "other"; 8th AI/AN, black, and Hispanic students as well as those reporting their race/ethnicity as "multiple" or "other"; and 10th grade AI/AN and Hispanic students; and 12th grade black and Hispanic students. High percentages of students from every grade reported skipping breakfast. These rates reached as high as 49.5% (95% CI 39.5-59.5%) for AI/AN 10th graders. The percentage of students who skipped breakfast in 6th, 8th, 10th, and 12th grade (all racial ethnic groups combined) were 20.2% ± 2.0%, 31.7% ± 2.0%, 37.1%± 2.3%, and 38.5% ± 2.5% respectively.

12. **Sweeney Nancy M., Tucker Joanne, Reynosa Brenda, et al. Reducing Hunger-Associated Symptoms: The Midmorning Nutrition Break. *The Journal of School Nursing.* 2006;22(1):32-39.**

Sweeney et al. evaluated the impact of a 9:00 AM Nutritional Break one academic year after its implementation in an inner-city high school. A baseline survey of the high school students (n=846) indicated that 57% of the respondents had not eaten breakfast on the day of the survey despite the universal free breakfast program offered at the school (response rate not noted). Following the intervention researchers collected 590 student surveys (71% response rate) and 46 staff surveys (33% response rate). Students reported a 36% participation rate in the before-school on campus breakfast while 69% of students reported participating at least one day per week in the Nutrition Break. The authors also found that as participation in the Nutrition Break increased, students reported a significant decrease in several huger-related symptoms (i.e. inability to focus, tiredness, stomachache, and midmorning hunger), although participation in the Nutrition Break only accounted for small percentages in the variation. Seventy-four percent of the staff members who responded to the survey indicated that the Nutrition Breaks had a positive effect on students such as improved performance, students being more alert, energetic, motivated and refreshed after the Break and that hunger was no longer an issue during class. Thirty-five percent of staff responded that the Break had negative impacts such as sugar rushes following the Break and sugar crashes later in the day.

13. **Van Wye G., Seoh H., Adjoian T., et al. Evaluation of the New York City breakfast in the classroom program. *American journal of public health.* 2013;103(10):59-64.**

Van Wye et al. conducted a cross-sectional survey of third through fifth grade students attending schools in New York City in nine schools providing Breakfast in the Classroom (BIC) programs and in seven geographically and demographically matched randomly selected control schools. All students in the BIC and control classrooms were surveyed on what and where they had eaten that morning (n=2,289) with a 98% response rate. Both control and intervention schools offered universal free breakfast. Students in BIC classrooms were significantly less likely to report having skipped breakfast (8.7%) compared to students in the control classrooms (15.0%). While BIC students were more likely to report eating in more than one location (e.g. home and in the classroom) than control students, there were no significant differences between the two groups in consumption of fruits and vegetables, candy, doughnuts, chips, or sugary drinks. BIC students ate an estimated 95 calories more in the morning compared to control students. Among students offered BIC, those actually eating BIC consumed an estimated 151 more calories than students in control schools. The authors indicate that while the data support that BIC decreased the number of students skipping breakfast, it was also associated with an increase in caloric consumption that may be above what is needed. They also note that because the BIC programs were relatively new it is possible that as they are normalized students will be less likely to eat breakfast at more than one location.

14. **Adolphus K., Lawton C. L., Dye L. The effects of breakfast on behavior and academic performance in children and adolescents. *Frontiers in human neuroscience.* 2013;7.**

Adolphus et al. conducted a systematic review of the literature to determine the effects of breakfast on school behavior and on academic performance. The authors included articles and reviews published between 1950 and 2013. Thirty-six studies met their inclusion criteria with 14

including behavior measures, 17 including academic performance measures, and five studies including both behavior and academic outcomes. Of the 19 studies which evaluated the effects of breakfast on behavior 11 found a positive effect on behavior such as being on-task in the classroom. This effect was found in both well-nourished and undernourished children as well as those with low socioeconomic position. Most of these studies are evaluations of School Breakfast Programs, which both lack scientific rigor and are looking at the connection between having a School Breakfast Program and behavior irrespective of how many students were actually participating in the program or eating breakfast. The authors indicate that in order for the School Breakfast Program to impact behavior barriers to accessing the program must be minimized. The review identified 21 studies evaluating the effect of habitual breakfast and School Breakfast Programs on academic performance. The authors found that increased frequency of habitual breakfast was consistently and positively associated with improved school performance such as school grades and achievement test scores. The evidence also supports that School Breakfast Programs have positive effects on school performance, particularly math grades and arithmetic scores. The evidence indicates that these positive effects may be more pronounced in schools with more undernourished children and worse academic outcomes—where studies carried out with these populations showed consistent positive effects of breakfast on school performance. The researchers highlight studies which have found School Breakfast Programs to be associated with increased attendance, punctuality, readiness to learn, decreased dropout rates, and better classroom behavior.

15. **Hoyland A., Dye L., Lawton C. L. A systematic review of the effect of breakfast on the cognitive performance of children and adolescents. *Nutrition research reviews.* 2009;22(2):220-243.**

Hoyland et al. conducted a systematic review of the literature on the effects of breakfast on cognitive function in children and adolescents. The authors included studies published between 1950 and 2009. Forty-two articles consisting of 45 studies met their inclusion criteria. The authors provided a quality rating score for each study using pre-defined criteria. The researchers conclude that overall the evidence supports that eating breakfast has positive effects on cognitive performance compared to skipping breakfast. This finding was apparent in both acute studies and evaluations of longer-term School Breakfast Programs. They also found that these positive effects were more apparent in nutritionally vulnerable children, indicating that increasing access to breakfast may have a greater positive impact on low-income students. The authors also highlight evidence that School Breakfast Programs are associated with improved attendance and indicate that this may at least partially account for the benefits observed as part of the breakfast programs. They cite studies which found that breakfast was associated with improvements in, for example, memory, fewer errors on attention tasks, achievement tests, math grades, and reading scores. Although there was not complete consensus among the 45 studies, and some publications found no association between breakfast and some measure of cognition, six of the seven highest quality studies (receiving at least a 16 out of 18 possible points for quality), found a positive association between breakfast and at least one measure of cognitive performance. One of the authors of this study was supported by a grant from Kellogg Company UK, which could introduce a conflict of interest. The authors also note that many of the "studies reviewed were sponsored in whole or in part by industry."

16. **Mesas A. E., Muñoz-Pareja M., López-García E., et al. Selected eating behaviours and excess body weight: a systematic review.** ***Obesity reviews : an official journal of the International Association for the Study of Obesity.*** **2012;13(2):106-135.**

Mesas et al. conducted a systematic review of the literature on the connection between skipping breakfast and obesity. They included studies in English, Spanish, and Portuguese that had been published through the end of 2010. The authors excluded studies that only included subjects with excess weight. This exclusion may mask any effects primarily or exclusively impacting individuals with high BMI. The authors identified 63 cross sectional and 10 longitudinal studies that fit their inclusion criteria. Of the publications focusing on children and/or adolescents 35 of the 48 cross sectional studies found that skipping breakfast was associated with overweight or obesity. This association between skipping breakfast and obesity was observed even by studies that controlled for confounding factors. Seven of the longitudinal studies focused on children and/or adolescents and these found conflicting results. In three of these seven studies skipping breakfast was associated with excess weight. The cross-sectional studies on adults were conflicting, though a slightly higher percentage of the studies found that skipping breakfast was associated with increased BMI. However, the two longitudinal studies in adults that controlled for confounders (higher quality studies) found that skipping breakfast was associated with an increase in BMI of at least 5% after one year of follow-up.

17. **O'Neil C. E., Nicklas T. A., Fulgoni V. L., et al. Nutrient Intake, Diet Quality, and Weight/Adiposity Parameters in Breakfast Patterns Compared with No Breakfast in Adults: National Health and Nutrition Examination Survey 2001-2008.** ***Journal of the Academy of Nutrition and Dietetics.*** **2014;114(12):S27-S43.**

O'Neil et al. cite eleven studies in their introduction which indicate that breakfast consumption among adults is associated with improved daily nutrient intake, food group selection, dietary adequacy, diet quality, and intake of micronutrients. The authors also cite evidence that breakfast consumption is associated with positive measures of BMI and cardiovascular risk factors but note that the literature addressing these measures has been inconsistent. O'Neil et al. analyzed 2001-2008 National Health and Nutrition Examination Survey data for respondents 19 years of age or older (N=18,988). They found eleven different meal patterns among respondents. The data indicate that individuals who ate quality breakfasts (e.g. grains, 100% fruit juice, lower-fat milk, whole fruit) had higher daily intakes of nutrients and lower BMI and waist circumference than breakfast skippers. Note that individuals with meal patterns that included, for example, doughnuts, muffins, etc., did not have higher nutrient intake or lower BMI than breakfast skippers. O'Neil was a member of the Kellogg's Breakfast Council at the time this article was written, and publication of this article was supported by an unrestricted education grant from the Kellogg Company, both of which may introduce a conflict of interest.

18. **Smith K. J., Gall S. L., McNaughton S. A., et al. Skipping breakfast: longitudinal associations with cardiometabolic risk factors in the Childhood Determinants of Adult Health Study.** ***The American journal of clinical nutrition.*** **2010;92(6):1316-1325.**

Smith et al. cite evidence in their introduction that skipping breakfast is associated with a poorer overall diet; lower physical activity levels; higher intakes of fat, cholesterol, and energy; and lower intakes of fiber, vitamins and minerals. The authors conducted a longitudinal cohort study in Australia in order to determine the effects of skipping breakfast in both childhood and adulthood. The national cohort of 9-15 year olds were first surveyed in 1985 (67.5% response

rate). Between 2004 and 2006, participants (n=2,248) filled out a questionnaire and just over 1,720 participants had their diet quality assessed, their waists measured, and their fasting blood drawn by researchers. The data indicate that those who skipped breakfast as a child and as an adult had the least healthy eating habits. The authors also found that, after controlling for lifestyle factors, age, sex, and sociodemographic factors, participants who skipped breakfast both as a child and as an adult had significantly larger waist circumferences, higher fasting insulin, higher total cholesterol, and higher low-density lipoproteins (LDL or 'bad') cholesterol than participants who ate breakfast both as a child and in adulthood. Lifetime breakfast skippers had an average waist circumference of 4.63cm larger than their counterparts. This study was partially funded by an unrestricted grant from the Kellogg Company and support from the Kellogg's Corporate Citizenship Fund which has potential to introduce a conflict of interest.

19. **VanEenwyk J.** ***Health of Washington State Report: Socioeconomic Position in Washington.*** **Washington State Department of Health;2014.**

VanEenwyk presents data about socioeconomic position in Washington State including differences within the state as well as statewide differences compared to national data. Data indicate that compared to the United States as a whole, fewer Washington residents are living in poverty and a higher percentage of residents ages 25 and older have college degrees. However, these economic resources are not evenly distributed among all Washington residents. Females in Washington were more likely to be living in poverty than males and were also more likely to have lower wages. Further, American Indian and Alaska Native, Hispanic, and black residents had higher percentages of living in poverty and lower median household incomes compared to other groups. Data also indicated that counties in eastern Washington were more likely to have high poverty rates and high rates of unemployment than counties in western Washington.

20. ***School Meal Programs: Experiences of the States and Districts That Eliminated Reduced-price Fees.*** **United States Government Accountability Office;2009.**

In this report, the Government Accountability Office (GAO) presents information on three questions: "(1) What is known about the state and local jurisdictions that have eliminated the reduced-price fee for the school lunch or breakfast programs? (2) What have been the experiences of state and local jurisdictions that have eliminated reduced-price fees with respect to factors such as participation, errors, and costs? (3) What factors may help or hinder the establishment or continuation of programs that eliminate reduced-price fees?" In order to understand the answers to these questions, the authors identified 5 states and 35 school districts across 19 states that have eliminated the reduced-price fee for school meals in the 2008-2009 school year. Although the report also presents data related to the impacts of such programs on breakfast participation, the most relevant finding to this review is that 20 of the 23 school districts that eliminated reduced-price fees reported increased participation in school lunch. Further, the average change in participation for lunch among reduced-price-eligible students was an 11 percentage point increase. The authors note that this increase was greater than the national change in this rate over the same year.

21. **Levin Madeleine, Neuberger Zoe.** ***Community Eligibility: Making High-Poverty Schools Hunger Free*** **Food Research and Action Center and the Center on Budget and Policy Priorities;2013.**

In this report, the authors analyze participation in the seven states that have implemented community eligibility program in the 2011-2012 and 2012-2013 school years. Community eligibility is a provision of The Health, Hunger Free Kids Act that allows the highest poverty schools and school districts in the country to serve breakfast and lunch at no cost to all students. Participating schools and districts are reimbursed using a formula based on the percentage of students participating in other programs such as the Supplemental Nutrition Assistance Program (SNAP) and Temporary Assistance for Needy Families (TANF). The authors begin by discussing the benefits for this program to both students and schools, which include benefits such as increased access to healthy meals, less paperwork for families and schools, more cost-effective, and the use of innovative breakfast models. In the 2012-2013 school year, approximately 2,273 schools offered the community eligibility model in seven states including District of Columbia, Illinois, Kentucky, Michigan, New York, Ohio, and West Virginia. The most relevant finding reported in this article is that schools that have adopted community eligibility have seen striking increases in participation in the school meal programs compared to other non-participating schools and their own schools prior to implementation. For example, participation in lunch was 47% higher in community eligibility schools than non-participating schools across Illinois, Kentucky, and Michigan. Further, in these same schools that have been participating for two years, the average daily lunch participation rose 13%. The report concludes by stating that these states can serve as guides for other states and school districts that aim to utilize community eligibility to help their students succeed by providing the healthy meals that they need.

22. **Clark M. A., Fox M. K. Nutritional quality of the diets of US public school children and the role of the school meal programs.** ***Journal of the American Dietetic Association.*** **Feb 2009;109(2 Suppl):S44-56.**

Clark et al. aimed to assess the nutritional quality of diets of children enrolled in public school in the United States and to understand the association between participation in the National School Lunch Program (NSLP) and the nutritional quality of their diets. The authors analyzed data from 2,314 children in grades 1 through 12 who participated in the nationally representative School Nutrition Dietary Assessment Study (SNDA-III) from the 2004-2005 school year. Children's dietary intakes were measured using an in-person 24-hour dietary recall, which were then coded for their nutrient values. The results indicate that most school-age children in public schools in the U.S. have adequate intakes of most vitamins and minerals, although some have excessive intakes of saturated fat and sodium. Additionally, this study found that participation in the school meal program was associated with an increased likelihood of adequate vitamin and mineral uptake, but also higher sodium intake. The authors conclude that it is important to continue to improve children's food consumption patterns both at school and away through strategies such as reducing snack foods and nutrition education programs.

23. **Condon Elizabeth, Drilea Susan, Lichtenstein Carolyn, et al.** ***Diet Quality of American School Children by National School Lunch Program Participation Status: Data from the National Health and Nutrition Examination Survey, 2005-2010.*** **United States Department of Agriculture;2015.**

Using data from "What We Eat in America" from 2005-2010, which is part of the National Health and Nutrition Examination Survey (NHANES), the authors aimed to identify differences between National School Lunch Program (NSLP) participants and nonparticipants. The data

were assessed by age category (5-8 years, 9-13 years, and 14-18 years) for outcome measures such as usual nutrient intake, body mass index, and healthy eating index scores. The authors also analyzed differences between participants and nonparticipants in two income groups: "(1) children from families who were income-eligible to receive free or reduced-price meals (hereafter referred to as income-eligible children) and (2) children from higher-income families who were not eligible to receive free or reduced-price meals (but could participate in the NSLP by paying the full price for their meal)." The evidence indicates that NSLP participants in both income groups were more likely than nonparticipants to consume vegetables, fluid milk, flavored milk, and fruit or fruit juice, and less likely to consume salty snacks, and sweets and desserts at lunch. Further, income-eligible NSLP participants had a higher Healthy Eating Index-2005 (HEI-2005) score than nonparticipants. HEI-2005 is a measure of diet quality that reflects a person's conformance to the Dietary Guidelines recommendations. Other measures of nutrient intake, food consumption patterns, and overweight and obesity were similar among all school children. The authors conclude that children who participate in NSLP tend to make healthier choices at lunch than those who do not participate, particularly among income-eligible children, and that the NSLP is an important source of nutrition for school children.

24. **Farris A. R., Misyak S., Duffey K. J., et al. Nutritional comparison of packed and school lunches in pre-kindergarten and kindergarten children following the implementation of the 2012-2013 National School Lunch Program standards.** ***Journal of nutrition education and behavior.*** **Nov-Dec 2014;46(6):621-626.**

Farris et al. examined the nutritional quality of packed lunches versus school lunches for pre-kindergarten and kindergarten children in 3 schools in rural Virginia. In total, the authors analyzed the macro and micronutrient quality of 1,314 lunches of which 42.8% were packed lunches. The results indicate that school lunches were lower in calories, fat, saturated fat, sugar, vitamin C, and iron but were higher in protein, sodium, fiber, vitamin A, and calcium. Further, school lunches were more likely to contain fruit, vegetables, milk, and juice with no added sugars. The authors conclude that school lunches were more likely to meet nutrition standards than packed lunches and they suggest that schools consider policy changes to encourage healthier options for packed lunches.

25. **Hanson K. L., Olson C. M. School meals participation and weekday dietary quality were associated after controlling for weekend eating among U.S. school children aged 6 to 17 years.** ***Journal of Nutrition.*** **May 2013;143(5):714-721.**

Using data from the National Health and Nutrition Examination Study (NHANES), Hanson et al. examined the relationships between school meals participation and weekday energy intake and dietary quality. NHANES data from 2003-2008 were analyzed for children aged 6-17 with dietary recall data for one weekday and one weekend day (n = 2376). The outcomes of interest were estimated energy requirement (%EER) and differences in Healthy Eating Index-2005 (HEI) scores for breakfast, lunch, and for the entire day. The authors found that, "[o]verall, school meals participants and nonparticipants had equivalent %EERs and total HEI scores, but participants scored higher for milk and lower for saturated fat and sodium after adjustment for weekend eating. Family income moderated the relationship between school meals participation and HEI. Low-income children who ate school breakfast and lunch had significantly higher total HEI, and total grain, and meat and beans component scores." The authors conclude that further research is needed to better understand ways to improve the diets of American children and that

the new nutrition standards put forth by the Healthy Hunger-Free Kids Act of 2010 may be differentially affecting the dietary intakes of low-income participants.

26. **Mathias K. C., Jacquier E., Eldridge A. L. Missing lunch is associated with lower intakes of micronutrients from foods and beverages among children and adolescents in the United States. *Journal of the Academy of Nutrition and Dietetics.* Apr 2016;116(4):667-676 e666.**

Mathias et al. utilize data from the National Health and Nutrition Examination Survey to determine whether missing lunch is associated with lower daily intakes of micronutrients among US children and adolescents. Data from the 2009-2010 and 2011-2012 NHANES were combined for a total sample of 4,755 individuals aged 4 to 18 years. The authors note the importance of this research stems from the estimate that in the United States, lunch contributes more than 20% of the daily intakes of most micronutrients for children and adolescents consuming lunch. The data indicate that, "...missing lunch was associated with lower micronutrient intakes, with the lunch meal primarily responsible for the higher micronutrient intakes of lunch consumers compared with nonconsumers. Missing lunch was also associated with lower energy, fiber, and sodium intakes." While the focus of much research has historically been on the importance of breakfast, these findings identify potential concerns for children missing lunch and the opportunities that the National School Lunch Program has to fill in these nutritional gaps.

27. **Alaimo Katherine, Olson Christine M., Frongillo Edward A. Food insufficiency and American school-aged children's cognitive,**

academic, and psychosocial development. *Pediatrics.* 2001;108(1):44-53.

Alaimo et al. analyzed data from the Third National Health and Nutrition Examination Survey (NHANES III) to investigate the association between food insufficiency and cognitive, academic, and psychosocial outcomes. The study included US children and teens in the 6 to 11 year and 12 to 16 year age groups (n=5,344). Outcomes of interest included sociodemographic data, academic scores, psychosocial outcomes such as emotional, mental, and behavioral problems, health status, previous health, nutrition, social and environmental risk, and food insufficiency defined as "...an inadequate amount of food intake due to a lack of money or resources." The authors found that after controlling for factors such as race/ethnicity, poverty index, age, gender, and metropolitan region food-insufficient children had, "...significantly lower arithmetic scores and were more likely to have repeated a grade, have seen a psychologist, and have had difficulty getting along with other children. Food-insufficient teenagers were more likely to have seen a psychologist, have been suspended from school, and have had difficulty getting along with other children." Food insufficiency among children is often reflective of the underlying food insufficiency of an entire family and therefore the authors conclude that achieving the goal of increasing food security of American households will likely benefit children.

28. **Florence Michelle D., Asbridge Mark, Veugelers Paul J. Diet Quality and Academic Performance. *Journal of School Health.* 2008;78(4):209-215.**

Florence et al. used data from the 2003 Children's Lifestyle and School-performance Study (CLASS) to examine the association between overall diet quality and academic performance. CLASS is a large study of health, nutrition, physical activity, school performance, and

socioeconomic determinants among students in grade 5 in Nova Scotia, Canada (n=4,589). Diet quality was assessed using a validated food frequency questionnaire and academic performance was measured using the Elementary Literacy Assessment, which is a standardized test commonly used in Nova Scotia. The authors found an independent association between overall diet quality and academic performance in that students with poorer diet quality were significantly more likely to perform worse on the assessment. They also found that students who had an increased consumption of fruits and vegetables, and lower caloric intake of fat were significantly less likely to fail the assessment. Finally, the authors noted that children attending better schools and living in wealthy neighborhoods also performed better, thus demonstrating a socioeconomic component to academic performance.

29. **MacLellan Debbie, Taylor Jennifer, Wood Kyla. Food intake and academic performance among adolescents.** ***Canadian Journal of Dietetic Practice and Research.*** **2008;69(3):141-144.**

MacLellan et al. analyzed data from the 2003 Youth Risk Behavior Survey in Prince Edward Island to examine the association between food use and grade, sex, and academic performance. 325 junior high school students (grades 7 through 9) were surveyed to collect demographic data, self-reported academic performance, and dietary data. The authors found that students who reported higher academic performance, measured as average grades above 90%, were more likely to consume milk, vegetables, and fruit daily compared to those with lower grades. They conclude that these findings support an association between dietary behaviors and academic performance but further research with a larger and more representative sample is needed in the future.

30. **Ross Amy.** ***Nutrition and its Effects on Academic Performance: How Can Our Schools Improve?*** **: Northern Michigan University;2010.**

Ross presents a literature review about studies concerning nutrition and its relationship to brain function, cognition, learning, and social behaviors. The author discusses that the relationship between nutrition and cognition has been well researched and a consensus exists among the scientific community that normal brain function is impacted by dietary building blocks such as amino acids, iron, zinc, protein, carbohydrates, and various vitamins and minerals that we derive from our food. A number of studies have examined the association between academic performance, cognitive functioning, and different aspects of health and nutrition. For example, one study that Ross noted examined body mass index (BMI) among children ages 8 to 16 and found that as BMI increased, test scores decreased and the odds of poor performance in visuospatial organization and general mental ability were higher among overweight and at-risk children compared to normal weight children. A large number of studies demonstrate similar associations including the relationship between food insecurity, inadequate intakes of nutrients and energy, and outcomes such as lower mean grade point average, lower scores on academic achievement tests, behavior problems, worse school attendance, and more disciplinary action. Ross concludes that when children are not receiving proper nutrition they are unable to reach their full potential and it is therefore extremely important for schools to continue to strive to serve nutritious meals to their students and to teach children the importance of nutrition.

31. **Taras Howard. Nutrition and Student Performance at School.** ***Journal of School Health.*** **2005;75(6).**

Taras presents a literature review of studies published after 1980 that examine the association between nutrition, academic performance, and cognitive function among school-aged children. Articles that met the inclusion criteria were separated into four categories: food insufficiency, iron deficiency and supplementation, deficiency and supplementation of micronutrients, and the importance of breakfast (n>50 articles). Data indicate that iron deficiency is associated with academic disadvantage if the deficiency is great enough to cause anemia, although these effects are diminished with the use of supplementation. There is a lack of consensus in the literature to conclude that additional vitamin or mineral supplementation would be beneficial for academic performance in the United States, although this has shown positive impacts in developing countries. In the United States, food insufficiency has been associated with significantly poorer cognitive functioning, decreased school attendance, and diminished academic achievement. Finally, the literature indicates that there is a positive impact of breakfast on short term cognitive skills.

32. ***Child Weight and Physical Activity.*** **Washington State Department of Health;2013.**

The authors present Washington state data on child weight and physical activity. The data show that in 2012, around 10% of Washington students in grades 8, 10, and 12 were obese and another 13-14% were overweight. Among 10th grade students, American Indian/Alaska Natives, Blacks, Hispanics, and Pacific Islanders were more likely than their white counterparts to be overweight or obese. Nationally, the authors indicate that the percentage of children and adolescents who were defined as overweight has doubled since the early 1970's and in 2012, around 42% of Washington students in grades 8, 10, and 12 reported that they were trying to lose weight.

33. **Ebbeling Cara B., Pawlak Dorota B., Ludwig David S. Childhood obesity: public-health crisis, common sense cure.** ***The Lancet.*** **2002;360(9331):473-482.**

Ebbeling et al. present a global literature review on the scope of the childhood obesity problem and developments in the establishment of a cause, prevention, and treatment for obesity. Rates of childhood obesity have grown across the globe, with a nearly 2 to 3 fold increase in the rates in the United States over the last 25 years. Most relevant to this review, the authors examined extensive literature that demonstrates the association between childhood obesity and hypertension, high blood lipids, chronic inflammation, increased blood clotting tendency, endothelial dysfunction, hyperinsulinaemia, sleep apnea, asthma, and type 2 diabetes. Further, type 2 diabetes presents additional risks such as heart disease, stroke, kidney failure, and blindness. In addition to the physical health risks from childhood obesity, many studies have indicated substantial psychosocial consequences such as negative self-image and stereotyping. The authors note that Black and Hispanic youth in the United States are at a greater risk for type 2 diabetes and cardiovascular disease than their white counterparts.

34. **Jay Shubrook Jr.** ***Childhood Obesity and the Risk of Diabetes in Minority Populations*** **American Osteopathic Association Health Watch;2011.**

Shubrook presents data on childhood obesity and diabetes among children in the United States. Data shows that childhood obesity increases the risk of adult obesity with estimates indicating that obese children as young as age 6 have a 50% chance of being obese as an adult. Further data indicates that childhood obesity increases the risk of coronary heart disease and mortality as an adult. Data from the National Health and Nutrition Examination Survey (NHANES) show that

Hispanic and non-Hispanic black children have the highest rates for childhood obesity in the United States. There also appears to be a disproportionately higher incidence of type 2 diabetes among minority children with the highest incidence found among Navajo Indian females (38.42 cases per 100,000 people compared to 3.7 cases per 100,000 white females). Shubrook concludes that the burden of obesity is of great concern, particularly among minority populations in the U.S. and this increased risk needs to be acknowledged in order to address the problem effectively.

35. **Lucio R, Hunt E, M Bornovalova. Identifying the necessary and sufficient number of risk factors for predicting academic failure. *Developmental psychology.* 2012;48(2):422-428.**

Lucio et al. analyzed data from the Educational Longitudinal Study: 2002 which includes a national sample of 14,796 students. The authors used a 5-step process to identify which factors contribute to academic 'failure'—a grade point average (GPA) of less than 2.0 which is the minimum GPA needed to graduate from high school. They found that a number of academic outcomes impact a student's GPA and therefore their ability to attain a high school diploma. Many of these are academic outcomes that other research has found to be impacted by skipping breakfast such as academic engagement, grade retention, and behavior among students. The authors also found that the odds of passing decreased with each additional risk factor: "For each risk factor that is added, there is a 47% increased likelihood of failing."

36. **Melby J. N., Conger R. D., Fang S. A., et al. Adolescent family experiences and educational attainment during early adulthood. *Developmental psychology.* Nov 2008;44(6):1519-1536.**

Melby et al. analyzed data from a longitudinal study of two-biological-parent intact families in Iowa. They had a sample size of 451 families. The researchers conducted modeling to determine what factors impact educational attainment and found level of academic engagement was strongly correlated with later educational attainment.

37. **Ou Suh-Ruu, Reynolds Arthur J. Predictors of educational attainment in the Chicago Longitudinal Study. *School Psychology Quarterly.* 2008;23(2):199-229.**

Ou and Reynolds analyzed data from the Chicago Longitudinal Study, using a sample size of 1,286 youth in order to investigate predictors of high school completion and total educational attainment. They found that, among other factors, school absences, grade retention, and youth's educational expectations all influenced educational attainment.

38. **Winding T. N., Nohr E. A., Labriola M., et al. Personal predictors of educational attainment after compulsory school: influence of measures of vulnerability, health, and school performance. *Scandinavian journal of public health.* Feb 2013;41(1):92-101.**

Winding et al. analyzed data from a 2004 questionnaire completed by a cohort of adolescents born in 1989 (n=3053) in Denmark (83% response rate) and linked 2010 educational attainment data from Statistics Denmark. This allowed for a follow-up of 6.5 years. The authors found that low grades during primary school was predictive of not having completed a secondary education by age 20/21 (odds ratios between 1.7 and 2.5). For students with low math grades this

association was even stronger. The authors cite two additional studies which have also found an association between school performance and later educational attainment.

39. ***Health of Washington State: Mental Health.*** **Washington State Department of Health;2008.**

Washington Behavioral Risk Factor Surveillance System (BRFSS) data from 2004-2006 indicate that American Indians and Alaska Natives and non-Hispanic black individuals reported significantly higher rates of poor mental health compared to other groups. These relationships persisted after adjusting for additional factors such as age, income, and education. Washington BRFSS data also show an association between lower annual household income and poor mental health, a relationship that was also shown with education. It is well understood that mental health is also closely related to other areas such as employment opportunities, physical health, substance abuse. This report also highlights a Washington state study from 2002 that reveal that 16% of individuals in the state who were receiving publicly funded mental health services had at least one felony conviction, a rate over twice that of the general population.

40. **Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System Prevalence And Trends Data: Washington-2014. 2014; http://apps.nccd.cdc.gov/brfss/page.asp?cat=XX&yr=2014&state=WA#XX. Accessed August 16, 2016.**

Behavioral Risk Factor Surveillance System (BRFSS) 2014 data from Washington state show significant correlations between lower income and a number of health indicators including: worse overall self-reported health, depression, asthma, arthritis, stroke, oral health, tobacco use, women's health indicators, health screening rates, physical activity, and diabetes. Data also show that as educational attainment increases income level also increases.

41. **Christensen Trevor, Weisser Justin.** ***Health of Washington State Report: Tobacco Use.*** **Washington State Department of Health;2015.**

Christensen et al. report Washington state Behavioral Risk Factor Surveillance System (BRFSS) data from 2012 to 2014 indicate that prevalence of smoking decreases as income and levels of education increase. Further, American Indians and Alaska Natives (AI/AN) and Native Hawaiian/Other Pacific Islander populations have significantly higher smoking rates than white, black, Hispanic, and Asian populations.

42. **Kandel Denise B., Griesler Pamela C., Schaffran Christine. Educational attainment and smoking among women: Risk factors and consequences for offspring.** ***Drug and Alcohol Dependence.*** **2009;104:S24-S33.**

Researchers examined United States data from four national data sets and found that, among women, lower levels of education are associated with greater risk of being a current smoker, smoking daily, smoking heavily, being nicotine dependent, starting to smoke at an early age, having higher levels of circulating cotinine (a metabolite of nicotine) per cigarettes smoked, and continuing to smoke in pregnancy. In addition, lower levels of maternal education were linked to increased risk of antisocial behavior among offspring.

43. **Kemple Angela.** ***Health of Washington State Report: Diabetes.*** **Washington State Department of Health;2016.**

Kemple presents data from Washington regarding diabetes in the state. Washington data from the Behavioral Risk Factor Surveillance System (BRFSS) from 2012-2014 show that among adults, the percentage of persons with diabetes increased as household income decreased. This relationship was also true for education. Further, BRFSS data also show that age-adjusted diabetes prevalence is highest among those who are Hispanic, American Indian/Alaska Native, and black.

44. **McCarty C. A., Mason W. A., Kosterman R., et al. Adolescent school failure predicts later depression among girls.** ***Journal of Adolescent Health.*** **Aug 2008;43(2):180-187.**

McCarty et al. conducted a prospective longitudinal cohort study with a sample of 808 youth followed from ages 10 to 21. The researchers discovered that adolescent school 'failure' (meaning being suspended, expelled, or dropping out of high school early) predisposed girls to depression in early adulthood.

45. **McLaren L. Socioeconomic status and obesity.** ***Epidemiologic reviews.*** **2007;29:29-48.**

McLaren et al. conducted a meta-analysis exploring the relationship between obesity and SES among adults. A total of 333 studies published internationally met the inclusion criteria. In highly developed countries, the majority of the studies found higher body weights among women with lower education attainment. Nearly 50% of the studies in highly developed countries found the same relationship for men.

46. **Mersky JP, AJ Reynolds. Educational success and adult health: Findings from the Chicago longitudinal study.** ***Prevention Science.*** **2009;10(2):175-195.**

Mersky and Reynolds analyzed data from a Chicago prospective cohort study that followed 1,539 individuals. Results indicate that high school completion was significantly and inversely associated with tobacco smoking, frequent substance use, depression, and no health insurance coverage. In addition, middle school reading performance was inversely related to depression and student's expectation to attend college was negatively associated with frequent drug use.

47. **Mezuk B, Eaton WW, Golden SH, et al. The influence of educational attainment on depression and risk of type 2 diabetes.** ***American journal of public health.*** **2011;98(8):1480.**

Researchers analyzed adult survey data collected in the Baltimore Epidemiological Catchment Area and then conducted follow-up interviews with the survey cohort. Mezuk et al. found a statistically significant association between type 2 diabetes and lower educational attainment. In addition, the data indicate that depression was associated with type 2 diabetes, but each year of education attained decreased the risk of type 2 diabetes for those experiencing depression.

48. **Poel A.** ***Health of Washington State Report: Mortality and Life Expectancy. Data Update 2015.*** **Washington State Department of Health;2015.**

Poel presents Washington state data on mortality and life expectancy. The data show that age-adjusted death rates were higher in Washington census tracks with higher poverty rates. The state data also show that American Indian/Alaska Natives, Native Hawaiian/Other Pacific Islanders, and black residents had the highest age-adjusted death rate and shortest life expectancy at birth compared to other groups in the state.

49. **Serafin M. *Health of Washington State Report: Self-reported Health Status. Data Update 2016.* Washington State Department of Health;2016.**

Serafin presents data from Washington state on self-reported health status. The data show that after accounting for age, education, race and ethnicity, household income was a strong predictor of self-reported health status. Health status varied by race and ethnicity, with close to 35% of Hispanics, 30% of American Indian/Alaska Natives, and 20% of Native Hawaiian/Other Pacific Islanders reporting fair or poor health. Washington Behavioral Risk Factor Surveillance System (BRFSS) data from 2012-2014 also show that education was a strong predictor of self-reported fair or poor health after adjusting for age.

50. **Skodova Z., Nagyova I., van Dijk J. P., et al. Socioeconomic differences in psychosocial factors contributing to coronary heart disease: a review. *Journal of clinical psychology in medical settings.* Sep 2008;15(3):204-213.**

Skodova et al. conducted a meta-analysis of the literature addressing the relationships between SES, coronary heart disease (CHD), and psychosocial factors contributing to coronary heart disease. Researchers identified 12 studies that met their inclusion criteria. They found that higher levels of education are associated with lower rates of CHD, and that decreasing education is associated with factors that are linked to CHD such as depression, anxiety, hostility, and a lack of social supports.

51. **Steptoe A., Hamer M., Butcher L., et al. Educational attainment but not measures of current socioeconomic circumstances are associated with leukocyte telomere length in healthy older men and women. *Brain, behavior, and immunity.* Oct 2011;25(7):1292-1298.**

Steptoe et al. analyzed data collected from 543 male and female London-based civil servants of white European origin. All participants were between the ages of 53 and 76 and healthy. Researchers looked at blood samples to determine telomere length and telomerase activity. Telomere shortening is associated with aging. Short telomeres are also associated with increased risk of premature heart attack and mortality. Researchers found that lower educational attainment was associated with shorter telomere length after controlling for biological and behavioral covariates. This association remained significant even after adjusting for current SES. Researchers speculated that low educational attainment may be an indicator of long-term lower SES, and may be associated with accumulated stress resulting in telomere shortening. They also postulate that education may promote problem-solving skills leading to reduced responses to stress, thereby impacting aging.

52. **Bureau of Labor Statistics website. Employment projections: Earnings and unemployment rates by educational attainment. Last Updated March 15, 2016; http://www.bls.gov/emp/ep_chart_001.htm. Accessed November 1, 2016.**

National data from 2015 indicate that as educational attainment increases median weekly earnings also increase and unemployment rates decrease.

53. **Ellings Amy. *Health of Washington State Report: Obesity and Overweight.* Washington State Department of Health;2015.**

Ellings reports Washington state Behavioral Risk Factor Surveillance System (BRFSS) data from 2002-2014, which shows that obesity rates are the highest among low income families and that as income increases, rates of obesity decrease. Further, individuals that graduated college or attended some college had lower rates of obesity than those who had a high school education or less. Black, American Indian and Alaska Native, and Hispanic Washington residents had higher rates of obesity even after accounting for gender, income, education, and age.

54. **Paul Karsten I., Moser Klaus. Unemployment impairs mental health: Meta-analyses. *Journal of Vocational Behavior.* 2009;74(3):264-282.**

Paul et al. conducted a meta-analysis of 237 cross-sectional and 87 longitudinal studies that examined the relationship between mental health and unemployment. The meta-analysis of cross-sectional data revealed that unemployed persons showed significantly more symptoms of distress and impaired well-being than did employed persons. The meta-analyses of longitudinal studies and natural experiments supported the concept that unemployment is not only correlated to distress but also causes it.

55. **Ponnet K. Financial stress, parent functioning and adolescent problem behavior: an actor-partner interdependence approach to family stress processes in low-, middle-, and high-income families. *Journal of youth and adolescence.* Oct 2014;43(10):1752-1769.**

Ponnet cites extensive evidence on the relationship between financial hardship and emotional problems among youth and adults, family conflict, problem behavior among adolescents, and psychological distress. The author analyzed data from a subsample of two-parent families with children between 11 and 17 years of age from the Relationship between Mothers, Fathers and Children study drawn from the Dutch-speaking part of Belgium (n= 1,596 individuals from 798 families). Analysis showed that parents in low-income groups had significantly more financial stress than those in middle-income and high-income groups. The author found that the association between financial stress and problem behavior in adolescents is mediated by depressive symptoms, interparental conflict, and positive parenting. They also found that financial stress had more detrimental impacts on depressive feelings for mothers with low incomes than for those with higher incomes.

56. **Prause J., Dooley D., Huh J. Income volatility and psychological depression. *American journal of community psychology.* Mar 2009;43(1-2):57-70.**

Prause et al. analyzed a sample (n = 4,493) from the National Longitudinal Survey of Youth. Researchers found that income volatility was significantly associated with depression; and downward volatility (frequent losses in income) was significantly associated with depression even after controlling for baseline depression. High income appeared to act as a buffer, so those with lower incomes were more vulnerable to the adverse effects of downward volatility.

57. **Spencer N., Thanh T. M., Louise S. Low income/socio-economic status in early childhood and physical health in later childhood/adolescence: a systematic review.** ***Maternal and child health journal.*** **Apr 2013;17(3):424-431.**

Spencer et al. conducted a meta-analysis of studies examining the relationship between low socioeconomic status in the first five years of life and physical health outcomes in later childhood and adolescence. Nine studies met the researchers' strict inclusion criteria. The studies indicated significant associations between early childhood low-income status and a number of adverse health outcomes including: activity-limiting illness, parent-reported poor health status, acute and recurrent infections, increasing body mass index (BMI), dental caries, and higher rates of hospitalization.

58. **Subramanyam M., Kawachi I., Berkman L., et al. Relative deprivation in income and self-rated health in the United States.** ***Social science & medicine.*** **Aug 2009;69(3):327-334.**

Subramanyam et al. analyzed data from the 2002, 2004, and 2006 Current Population Surveys conducted by the United States Census Bureau. Researchers found that individuals from the lowest income category were over five times more likely to report being in poor health than participants from the highest income category. In addition, they found that relative deprivation (the differences in incomes between an individual and others who have higher incomes than that individual [one measure of income inequality]) appeared to explain a large part of this association.

59. **Food Research & Action Center. Relationship Between Poverty and Obesity. 2015; http://frac.org/initiatives/hunger-and-obesity/are-low-income-people-at-greater-risk-for-overweight-or-obesity/. Accessed November 14, 2016.**

Overview of studies from the United States that present research on the relationship between obesity and poverty. Provides relevant study conclusions for both adult and child populations.